Chemical Analysis Report

CEN-DIST-2022-05-04-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Run 10**
Request ID: **RQ-2022-05-02-28**
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

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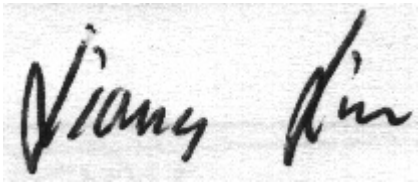
Certified by: Liang Lin, Environmental Administrator

Date Certified: 11-MAY-2022 13:40



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: Cow Creek at Osteen-Maytown Road **Collection Date/Time: 05/03/2022 14:15**

Field ID: G2CE0086 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2324062	EPA 200.7 Rev. 4.4	Calcium	3.80		mg/L	P413386	
		Iron	1.0E+03		ug/L	P413386	
		Magnesium	1.07		mg/L	P413386	
		Potassium	0.30	U	mg/L	P413386	
		Sodium	7.5		mg/L	P413386	
		Strontium	23.6		ug/L	P413386	
		Tin	3.0	U	ug/L	P413386	
		Titanium	1.7	I	ug/L	P413386	
		Vanadium	2.0	U	ug/L	P413386	
		Zinc	6.9	I	ug/L	P413386	
	EPA 200.8 Rev. 5.4	Aluminum	301		ug/L	P413386	
		Antimony	0.050	U	ug/L	P413386	
		Arsenic	0.32		ug/L	P413386	
		Barium	7.06		ug/L	P413386	
		Beryllium	0.010	U	ug/L	P413386	
		Boron**	21.3		ug/L	P413386	
		Cadmium	0.020	U	ug/L	P413386	
		Chromium	0.40	U	ug/L	P413386	
		Cobalt	0.106		ug/L	P413386	
		Copper	0.40	U	ug/L	P413386	
		Lead	0.38	I	ug/L	P413386	
		Manganese	7.01		ug/L	P413386	
		Molybdenum	0.15	U	ug/L	P413386	
		Nickel	0.50	U	ug/L	P413386	
		Selenium	0.20	U	ug/L	P413386	
		Silver	0.010	U	ug/L	P413386	
		Thallium	0.10	U	ug/L	P413386	
	SM 2340 B-2011	Hardness	13.9		mg/L	P413386	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P413386

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: P413386

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: P413386

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	104		P	85 - 115
Magnesium	100		P	85 - 115
Potassium	104		P	85 - 115
Sodium	99.9		P	85 - 115
Strontium	103		P	85 - 115
Tin	103		P	85 - 115
Titanium	103		P	85 - 115
Vanadium	96.7		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413386

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.9		P	85 - 115
Antimony	98.6		P	85 - 115
Arsenic	99.4		P	85 - 115
Barium	103		P	85 - 115
Beryllium	94.4		P	85 - 115
Boron	98.7		P	85 - 115
Cadmium	96.7		P	85 - 115
Chromium	97.5		P	85 - 115
Cobalt	99.1		P	85 - 115
Copper	97.7		P	85 - 115
Lead	98.4		P	85 - 115
Manganese	98.3		P	85 - 115
Molybdenum	98.9		P	85 - 115
Nickel	98.9		P	85 - 115
Selenium	99.5		P	85 - 115
Silver	96.6		P	85 - 115
Thallium	101		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P413386

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2323733	Calcium	97.7		P	80 - 120
2323733	Iron	103		P	80 - 120
2323733	Magnesium	99.2		P	80 - 120
2323733	Potassium	100		P	80 - 120
2323733	Sodium	97.0		P	80 - 120
2323733	Strontium	100		P	80 - 120
2323733	Tin	99.4		P	80 - 120
2323733	Titanium	102		P	80 - 120
2323733	Vanadium	98.0		P	80 - 120
2323733	Zinc	103		P	80 - 120
2324070	Calcium	95.5		P	80 - 120
2324070	Iron	105	103	P/P	80 - 120
2324070	Magnesium	96.5		P	80 - 120
2324070	Potassium	105	102	P/P	80 - 120
2324070	Sodium	96.1		P	80 - 120
2324070	Strontium	106	104	P/P	80 - 120
2324070	Tin	106	102	P/P	80 - 120
2324070	Titanium	105	103	P/P	80 - 120
2324070	Vanadium	101	98.9	P/P	80 - 120
2324070	Zinc	105	103	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413386

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2323733	Aluminum	95.3		P	80 - 120
2323733	Antimony	101		P	80 - 120
2323733	Arsenic	97.8		P	80 - 120
2323733	Barium	102		P	80 - 120
2323733	Beryllium	90.1		P	80 - 120
2323733	Boron	97.9		P	80 - 120
2323733	Cadmium	98.7		P	80 - 120
2323733	Chromium	99.4		P	80 - 120
2323733	Cobalt	95.4		P	80 - 120
2323733	Copper	93.8		P	80 - 120
2323733	Lead	98.6		P	80 - 120
2323733	Manganese	99.4		P	80 - 120
2323733	Molybdenum	102		P	80 - 120
2323733	Nickel	96.0		P	80 - 120
2323733	Selenium	95.6		P	80 - 120
2323733	Silver	94.8		P	80 - 120
2323733	Thallium	104		P	80 - 120
2324070	Aluminum	95.2	95.9	P/P	80 - 120
2324070	Antimony	101	102	P/P	80 - 120
2324070	Arsenic	98.9	99.1	P/P	80 - 120
2324070	Barium	103	104	P/P	80 - 120
2324070	Beryllium	94.6	93.4	P/P	80 - 120
2324070	Boron	98.8	99.5	P/P	80 - 120
2324070	Cadmium	101	101	P/P	80 - 120
2324070	Chromium	99.0	99.5	P/P	80 - 120
2324070	Cobalt	97.1	96.7	P/P	80 - 120
2324070	Copper	93.4	93.7	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413386

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2324070	Lead	97.8	98.4	P/P	80 - 120
2324070	Manganese	98.8	100	P/P	80 - 120
2324070	Molybdenum	101	103	P/P	80 - 120
2324070	Nickel	97.3	97.0	P/P	80 - 120
2324070	Selenium	97.3	97.5	P/P	80 - 120
2324070	Silver	96.0	97.5	P/P	80 - 120
2324070	Thallium	103	103	P/P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P413386

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2324070	Calcium	0.626	Spike	P	0 - 20
2324070	Iron	1.69	Spike	P	0 - 20
2324070	Magnesium	0.0269	Spike	P	0 - 20
2324070	Potassium	1.89	Spike	P	0 - 20
2324070	Sodium	0.243	Spike	P	0 - 20
2324070	Strontium	1.49	Spike	P	0 - 20
2324070	Tin	4.19	Spike	P	0 - 20
2324070	Titanium	2.36	Spike	P	0 - 20
2324070	Vanadium	1.65	Spike	P	0 - 20
2324070	Zinc	2.16	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413386

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2324070	Aluminum	0.809	Spike	P	0 - 20
2324070	Antimony	1.06	Spike	P	0 - 20
2324070	Arsenic	0.233	Spike	P	0 - 20
2324070	Barium	0.711	Spike	P	0 - 20
2324070	Beryllium	1.27	Spike	P	0 - 20
2324070	Boron	0.598	Spike	P	0 - 20
2324070	Cadmium	0.105	Spike	P	0 - 20
2324070	Chromium	0.471	Spike	P	0 - 20
2324070	Cobalt	0.434	Spike	P	0 - 20
2324070	Copper	0.371	Spike	P	0 - 20
2324070	Lead	0.658	Spike	P	0 - 20
2324070	Manganese	1.66	Spike	P	0 - 20
2324070	Molybdenum	1.35	Spike	P	0 - 20
2324070	Nickel	0.322	Spike	P	0 - 20
2324070	Selenium	0.205	Spike	P	0 - 20
2324070	Silver	1.51	Spike	P	0 - 20
2324070	Thallium	0.293	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: A111947
Included Lab Sample IDs: 2324062

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.7	96.4	P/P	90 - 110
Antimony	101	100	P/P	90 - 110
Arsenic	96.8	97.2	P/P	90 - 110
Barium	99.5	98.3	P/P	90 - 110
Beryllium	94.2	94.8	P/P	90 - 110
Boron	97.1	93.8	P/P	90 - 110
Cadmium	99.8	98.7	P/P	90 - 110
Chromium	99.0	97.4	P/P	90 - 110
Cobalt	94.8	94.7	P/P	90 - 110
Copper	95.4	95.8	P/P	90 - 110
Lead	95.8	95.6	P/P	90 - 110
Manganese	99.4	98.0	P/P	90 - 110
Molybdenum	97.4	97.1	P/P	90 - 110
Nickel	95.5	95.4	P/P	90 - 110
Selenium	99.5	99.4	P/P	90 - 110
Silver	98.7	98.2	P/P	90 - 110
Thallium	96.6	95.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A111983
Included Lab Sample IDs: 2324062

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	100	P/P	90 - 110
Iron	101	100	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	98.9	100	P/P	90 - 110
Sodium	98.4	98.8	P/P	90 - 110
Strontium	101	103	P/P	90 - 110
Tin	99.9	102	P/P	90 - 110
Titanium	99.9	101	P/P	90 - 110
Vanadium	102	102	P/P	90 - 110
Zinc	101	105	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	103	97.7	95.5				0.626
	Iron	104	103	105	103			1.69
	Magnesium	100	99.2	96.5				0.0269
	Potassium	104	100	105	102			1.89
	Sodium	99.9	97.0	96.1				0.243
	Strontium	103	100	106	104			1.49
	Tin	103	99.4	106	102			4.19
	Titanium	103	102	105	103			2.36
	Vanadium	96.7	98.0	101	98.9			1.65
	Zinc	103	103	105	103			2.16
EPA 200.8 Rev. 5.4	Aluminum	98.9	95.2	95.9	95.3			0.809
	Antimony	98.6	101	102	101			1.06
	Arsenic	99.4	98.9	99.1	97.8			0.233
	Barium	103	103	104	102			0.711
	Beryllium	94.4	94.6	93.4	90.1			1.27
	Boron	98.7	98.8	99.5	97.9			0.598
	Cadmium	96.7	101	101	98.7			0.105
	Chromium	97.5	99.0	99.5	99.4			0.471
	Cobalt	99.1	97.1	96.7	95.4			0.434
	Copper	97.7	93.4	93.7	93.8			0.371
	Lead	98.4	97.8	98.4	98.6			0.658
	Manganese	98.3	98.8	100	99.4			1.66
	Molybdenum	98.9	101	103	102			1.35
	Nickel	98.9	97.3	97.0	96.0			0.322
	Selenium	99.5	97.3	97.5	95.6			0.205
	Silver	96.6	96.0	97.5	94.8			1.51
	Thallium	101	103	103	104			0.293

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	2324062
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2324062
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2324062

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	05/04/2022	05/05/2022 10:30	Megan Whitefoot	05/06/2022 17:29	McKinley C Carter	2324062
EPA 200.8 Rev. 5.4	05/04/2022	05/05/2022 10:30	Megan Whitefoot	05/05/2022 19:59	Alexander Thompson	2324062
SM 2340 B-2011	05/04/2022			05/06/2022 17:29	McKinley C Carter	2324062