

Chemical Analysis Report

TLH-ROC-2022-08-16-02

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

Event Description: **Run 17**
Request ID: **RQ-2022-07-25-18**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Michael Eckles

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 30-AUG-2022 18:29



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: Flat Creek @ CR269

Collection Date/Time: 08/16/2022 12:50

Field ID: G2TLHR0020

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2349708	EPA 200.7 Rev. 4.4	Calcium	4.68		mg/L	P418215	
		Iron	970		ug/L	P418215	
		Magnesium	1.93		mg/L	P418215	
		Potassium	0.48	I	mg/L	P418215	
		Sodium	2.3		mg/L	P418215	
		Strontium	13.0		ug/L	P418215	
		Tin	3.0	U	ug/L	P418215	
		Titanium	2.1	I	ug/L	P418215	
		Vanadium	2.0	U	ug/L	P418215	
		Zinc	5.0	U	ug/L	P418215	
	EPA 200.8 Rev. 5.4	Aluminum	235		ug/L	P418215	
		Antimony	0.050	U	ug/L	P418215	
		Arsenic	0.74		ug/L	P418215	
		Barium	14.5		ug/L	P418215	
		Beryllium	0.028	I	ug/L	P418215	
		Boron	10.0		ug/L	P418215	
		Cadmium	0.020	U	ug/L	P418215	
		Chromium	0.53	I	ug/L	P418215	
		Cobalt	0.174		ug/L	P418215	
		Copper	0.40	U	ug/L	P418215	
		Lead	0.20	U	ug/L	P418215	
		Manganese	32.6		ug/L	P418215	
		Molybdenum	0.18	I	ug/L	P418215	
		Nickel	0.50	U	ug/L	P418215	
		Selenium	0.20	U	ug/L	P418215	
		Silver	0.010	U	ug/L	P418215	
		Thallium	0.10	U	ug/L	P418215	
	SM 2340 B-2011	Hardness	19.6		mg/L	P418215	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P418215

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: P418215

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: P418215

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	93.0		P	80 - 120
Iron	96.7		P	80 - 120
Magnesium	95.9		P	80 - 120
Potassium	96.2		P	80 - 120
Sodium	93.3		P	80 - 120
Strontium	98.3		P	80 - 120
Tin	96.0		P	80 - 120
Titanium	97.5		P	80 - 120
Vanadium	96.8		P	80 - 120
Zinc	96.5		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P418215

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	106		P	85 - 115
Arsenic	103		P	85 - 115
Barium	108		P	85 - 115
Beryllium	97.0		P	85 - 115
Boron	98.7		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	101		P	85 - 115
Copper	99.4		P	85 - 115
Lead	97.1		P	85 - 115
Manganese	104		P	85 - 115
Molybdenum	101		P	85 - 115
Nickel	101		P	85 - 115
Selenium	103		P	85 - 115
Silver	102		P	85 - 115
Thallium	98.5		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P418215

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349420	Calcium	98.8		P	80 - 120
2349420	Iron	104	104	P/P	80 - 120
2349420	Magnesium	104	103	P/P	80 - 120
2349420	Potassium	101	104	P/P	80 - 120
2349420	Sodium	97.4		P	80 - 120
2349420	Strontium	103	106	P/P	80 - 120
2349420	Tin	100	103	P/P	80 - 120
2349420	Titanium	101	105	P/P	80 - 120
2349420	Vanadium	102	104	P/P	80 - 120
2349420	Zinc	101	102	P/P	80 - 120
2349422	Calcium	97.7		P	80 - 120
2349422	Iron	101		P	80 - 120
2349422	Magnesium	97.8		P	80 - 120
2349422	Potassium	98.9		P	80 - 120
2349422	Sodium	96.9		P	80 - 120
2349422	Strontium	102		P	80 - 120
2349422	Tin	98.9		P	80 - 120
2349422	Titanium	100		P	80 - 120
2349422	Vanadium	102		P	80 - 120
2349422	Zinc	98.5		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P418215

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349420	Aluminum	111	113	P/P	80 - 120
2349420	Antimony	107	105	P/P	80 - 120
2349420	Arsenic	103	102	P/P	80 - 120
2349420	Barium	110	106	P/P	80 - 120
2349420	Beryllium	98.6	96.8	P/P	80 - 120
2349420	Boron	107	105	P/P	80 - 120
2349420	Cadmium	102	99.7	P/P	80 - 120
2349420	Chromium	106	104	P/P	80 - 120
2349420	Cobalt	100	98.6	P/P	80 - 120
2349420	Copper	98.7	97.0	P/P	80 - 120
2349420	Lead	98.9	97.7	P/P	80 - 120
2349420	Manganese	117	109	P/P	80 - 120
2349420	Molybdenum	102	102	P/P	80 - 120
2349420	Nickel	101	98.9	P/P	80 - 120
2349420	Selenium	99.3	96.4	P/P	80 - 120
2349420	Silver	102	99.8	P/P	80 - 120
2349420	Thallium	102	102	P/P	80 - 120
2349422	Aluminum	104		P	80 - 120
2349422	Antimony	106		P	80 - 120
2349422	Arsenic	102		P	80 - 120
2349422	Barium	105		P	80 - 120
2349422	Beryllium	95.3		P	80 - 120
2349422	Boron	101		P	80 - 120
2349422	Cadmium	103		P	80 - 120
2349422	Chromium	104		P	80 - 120
2349422	Cobalt	99.5		P	80 - 120
2349422	Copper	94.6		P	80 - 120

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P418215

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349422	Lead	96.9		P	80 - 120
2349422	Manganese	102		P	80 - 120
2349422	Molybdenum	102		P	80 - 120
2349422	Nickel	99.2		P	80 - 120
2349422	Selenium	99.6		P	80 - 120
2349422	Silver	102		P	80 - 120
2349422	Thallium	99.9		P	80 - 120

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P418215

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2349420	Calcium	0.204	Spike	P	0 - 20
2349420	Iron	0.176	Spike	P	0 - 20
2349420	Magnesium	0.811	Spike	P	0 - 20
2349420	Potassium	2.21	Spike	P	0 - 20
2349420	Sodium	0.401	Spike	P	0 - 20
2349420	Strontium	2.13	Spike	P	0 - 20
2349420	Tin	2.26	Spike	P	0 - 20
2349420	Titanium	3.42	Spike	P	0 - 20
2349420	Vanadium	1.95	Spike	P	0 - 20
2349420	Zinc	1.36	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P418215

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2349420	Aluminum	1.57	Spike	P	0 - 20
2349420	Antimony	2.43	Spike	P	0 - 20
2349420	Arsenic	1.29	Spike	P	0 - 20
2349420	Barium	2.83	Spike	P	0 - 20
2349420	Beryllium	1.80	Spike	P	0 - 20
2349420	Boron	1.21	Spike	P	0 - 20
2349420	Cadmium	2.14	Spike	P	0 - 20
2349420	Chromium	2.48	Spike	P	0 - 20
2349420	Cobalt	1.82	Spike	P	0 - 20
2349420	Copper	1.67	Spike	P	0 - 20
2349420	Lead	1.26	Spike	P	0 - 20
2349420	Manganese	2.43	Spike	P	0 - 20
2349420	Molybdenum	0.552	Spike	P	0 - 20
2349420	Nickel	2.20	Spike	P	0 - 20
2349420	Selenium	2.98	Spike	P	0 - 20
2349420	Silver	1.84	Spike	P	0 - 20
2349420	Thallium	0.0532	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: A114229

Included Lab Sample IDs: 2349708

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	100	P/P	90 - 110
Antimony	101	99.8	P/P	90 - 110
Arsenic	102	102	P/P	90 - 110
Barium	99.8	101	P/P	90 - 110
Boron	98.5	101	P/P	90 - 110
Cadmium	103	103	P/P	90 - 110
Chromium	102	101	P/P	90 - 110
Cobalt	99.0	99.8	P/P	90 - 110
Copper	98.4	99.7	P/P	90 - 110
Lead	93.7	94.0	P/P	90 - 110
Manganese	103	102	P/P	90 - 110
Molybdenum	98.3	97.9	P/P	90 - 110
Nickel	98.0	99.1	P/P	90 - 110
Selenium	102	102	P/P	90 - 110
Silver	98.8	98.9	P/P	90 - 110
Thallium	102	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A114254

Included Lab Sample IDs: 2349708

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Beryllium	99.0	91.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A114269

Included Lab Sample IDs: 2349708

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	95.6	96.2	P/P	90 - 110
Iron	96.0	97.3	P/P	90 - 110
Magnesium	95.5	96.4	P/P	90 - 110
Potassium	98.0	99.2	P/P	90 - 110
Sodium	95.3	97.1	P/P	90 - 110
Strontium	98.9	100	P/P	90 - 110
Tin	96.0	98.6	P/P	90 - 110
Titanium	95.3	99.8	P/P	90 - 110
Vanadium	97.1	98.3	P/P	90 - 110
Zinc	95.1	99.3	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	MS
			LCS	SMP			
EPA 200.7 Rev. 4.4	Calcium	93.0	98.8	97.7			0.204
	Iron	96.7	104	104	101		0.176
	Magnesium	95.9	104	103	97.8		0.811
	Potassium	96.2	101	104	98.9		2.21
	Sodium	93.3	97.4	96.9			0.401
	Strontium	98.3	103	106	102		2.13
	Tin	96.0	100	103	98.9		2.26
	Titanium	97.5	101	105	100		3.42
	Vanadium	96.8	102	104	102		1.95
	Zinc	96.5	101	102	98.5		1.36
EPA 200.8 Rev. 5.4	Aluminum	102	104	111	113		1.57
	Antimony	106	106	107	105		2.43
	Arsenic	103	102	103	102		1.29
	Barium	108	105	110	106		2.83
	Beryllium	97.0	95.3	98.6	96.8		1.80
	Boron	98.7	101	107	105		1.21
	Cadmium	103	103	102	99.7		2.14
	Chromium	103	104	106	104		2.48
	Cobalt	101	99.5	100	98.6		1.82
	Copper	99.4	94.6	98.7	97.0		1.67
	Lead	97.1	96.9	98.9	97.7		1.26
	Manganese	104	102	117	109		2.43
	Molybdenum	101	102	102	102		0.552
	Nickel	101	99.2	101	98.9		2.20
	Selenium	103	99.6	99.3	96.4		2.98
	Silver	102	102	102	99.8		1.84
	Thallium	98.5	99.9	102	102		0.0532

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	2349708
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2349708
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2349708

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	08/16/2022	08/17/2022 11:10	Megan Whitefoot	08/22/2022 23:30	Alexander Thompson	2349708
EPA 200.8 Rev. 5.4	08/16/2022	08/17/2022 11:10	Megan Whitefoot	08/19/2022 17:34	Emily M Philpot	2349708
	08/16/2022	08/17/2022 11:10	Megan Whitefoot	08/22/2022 14:58	Alexander Thompson	2349708
SM 2340 B-2011	08/16/2022			08/22/2022 23:30	Alexander Thompson	2349708