Chemical Analysis Report

TLH-ROC-2022-05-19-01

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

Event Description: **Run 2**
Request ID: **RQ-2022-03-21-14**
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: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 26-MAY-2022 09:50

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: New River @ SR22 **Collection Date/Time: 05/19/2022 10:50**

Field ID: G2TLHR0091 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2328461	EPA 200.7 Rev. 4.4	Calcium	2.31		mg/L	P414132	
		Iron	930		ug/L	P414132	
		Magnesium	0.36		mg/L	P414132	
		Potassium	0.30	U	mg/L	P414132	
		Sodium	2.1		mg/L	P414132	
		Strontium	11.4		ug/L	P414132	
		Tin	3.0	U	ug/L	P414132	
		Titanium	2.6	I	ug/L	P414132	
		Vanadium	2.0	U	ug/L	P414132	
		Zinc	5.0	U	ug/L	P414132	
	EPA 200.8 Rev. 5.4	Aluminum	545		ug/L	P414132	
		Antimony	0.050	U	ug/L	P414132	
		Arsenic	0.28		ug/L	P414132	
		Barium	5.09		ug/L	P414132	
		Beryllium	0.010	U	ug/L	P414132	
		Boron**	11.7		ug/L	P414132	
		Cadmium	0.020	U	ug/L	P414132	
		Chromium	0.40	U	ug/L	P414132	
		Cobalt	0.112		ug/L	P414132	
		Copper	0.40	U	ug/L	P414132	
		Lead	0.72		ug/L	P414132	
		Manganese	5.80		ug/L	P414132	
		Molybdenum	0.15	U	ug/L	P414132	
		Nickel	0.50	U	ug/L	P414132	
		Selenium	0.20	U	ug/L	P414132	
		Silver	0.010	U	ug/L	P414132	
		Thallium	0.10	U	ug/L	P414132	
	SM 2340 B-2011	Hardness	7.3		mg/L	P414132	

Ref. Method and Comment:
EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 05/23/2022.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P414132

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: P414132

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: P414132

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	102		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	103		P	85 - 115
Sodium	101		P	85 - 115
Strontium	101		P	85 - 115
Tin	104		P	85 - 115
Titanium	101		P	85 - 115
Vanadium	93.1		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P414132

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	100		P	85 - 115
Antimony	97.6		P	85 - 115
Arsenic	96.1		P	85 - 115
Barium	101		P	85 - 115
Beryllium	93.0		P	85 - 115
Boron	104		P	85 - 115
Cadmium	97.0		P	85 - 115
Chromium	95.2		P	85 - 115
Cobalt	96.3		P	85 - 115
Copper	94.0		P	85 - 115
Lead	93.4		P	85 - 115
Manganese	97.3		P	85 - 115
Molybdenum	97.0		P	85 - 115
Nickel	96.4		P	85 - 115
Selenium	96.1		P	85 - 115
Silver	97.8		P	85 - 115
Thallium	97.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P414132

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2327776	Calcium	103		P	80 - 120
2327776	Iron	106	106	P/P	80 - 120
2327776	Magnesium	107	107	P/P	80 - 120
2327776	Potassium	101	105	P/P	80 - 120
2327776	Sodium	101		P	80 - 120
2327776	Strontium	103	103	P/P	80 - 120
2327776	Tin	102	107	P/P	80 - 120
2327776	Titanium	98.8	103	P/P	80 - 120
2327776	Vanadium	93.8	98.5	P/P	80 - 120
2327776	Zinc	95.5	105	P/P	80 - 120
2327777	Calcium	98.5		P	80 - 120
2327777	Iron	102		P	80 - 120
2327777	Magnesium	98.2		P	80 - 120
2327777	Potassium	94.8		P	80 - 120
2327777	Sodium	97.8		P	80 - 120
2327777	Strontium	98.1		P	80 - 120
2327777	Tin	101		P	80 - 120
2327777	Titanium	98.5		P	80 - 120
2327777	Vanadium	94.5		P	80 - 120
2327777	Zinc	100		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P414132

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2327776	Aluminum	101	102	P/P	80 - 120
2327776	Antimony	102	103	P/P	80 - 120
2327776	Arsenic	101	101	P/P	80 - 120
2327776	Barium	104	105	P/P	80 - 120
2327776	Beryllium	97.0	94.2	P/P	80 - 120
2327776	Boron	103	102	P/P	80 - 120
2327776	Cadmium	99.5	102	P/P	80 - 120
2327776	Chromium	99.7	99.7	P/P	80 - 120
2327776	Cobalt	99.1	100	P/P	80 - 120
2327776	Copper	99.1	98.2	P/P	80 - 120
2327776	Lead	96.6	97.0	P/P	80 - 120
2327776	Manganese	100	101	P/P	80 - 120
2327776	Molybdenum	103	103	P/P	80 - 120
2327776	Nickel	98.8	99.3	P/P	80 - 120
2327776	Selenium	98.5	98.0	P/P	80 - 120
2327776	Silver	97.8	98.5	P/P	80 - 120
2327776	Thallium	98.6	102	P/P	80 - 120
2327777	Aluminum	98.4		P	80 - 120
2327777	Antimony	101		P	80 - 120
2327777	Arsenic	100		P	80 - 120
2327777	Barium	103		P	80 - 120
2327777	Beryllium	96.4		P	80 - 120
2327777	Boron	105		P	80 - 120
2327777	Cadmium	101		P	80 - 120
2327777	Chromium	99.4		P	80 - 120
2327777	Cobalt	97.3		P	80 - 120
2327777	Copper	95.6		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P414132

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2327777	Lead	97.2		P	80 - 120
2327777	Manganese	99.4		P	80 - 120
2327777	Molybdenum	103		P	80 - 120
2327777	Nickel	96.4		P	80 - 120
2327777	Selenium	97.2		P	80 - 120
2327777	Silver	95.9		P	80 - 120
2327777	Thallium	99.8		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P414132

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2327776	Calcium	1.16	Spike	P	0 - 20
2327776	Iron	0.426	Spike	P	0 - 20
2327776	Magnesium	0.0584	Spike	P	0 - 20
2327776	Potassium	2.70	Spike	P	0 - 20
2327776	Sodium	2.11	Spike	P	0 - 20
2327776	Strontium	0.251	Spike	P	0 - 20
2327776	Tin	5.35	Spike	P	0 - 20
2327776	Titanium	4.54	Spike	P	0 - 20
2327776	Vanadium	4.91	Spike	P	0 - 20
2327776	Zinc	9.82	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P414132

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2327776	Aluminum	0.715	Spike	P	0 - 20
2327776	Antimony	0.516	Spike	P	0 - 20
2327776	Arsenic	0.407	Spike	P	0 - 20
2327776	Barium	0.423	Spike	P	0 - 20
2327776	Beryllium	2.96	Spike	P	0 - 20
2327776	Boron	0.656	Spike	P	0 - 20
2327776	Cadmium	2.13	Spike	P	0 - 20
2327776	Chromium	0.0772	Spike	P	0 - 20
2327776	Cobalt	1.08	Spike	P	0 - 20
2327776	Copper	0.850	Spike	P	0 - 20
2327776	Lead	0.429	Spike	P	0 - 20
2327776	Manganese	0.972	Spike	P	0 - 20
2327776	Molybdenum	0.243	Spike	P	0 - 20
2327776	Nickel	0.509	Spike	P	0 - 20
2327776	Selenium	0.517	Spike	P	0 - 20
2327776	Silver	0.751	Spike	P	0 - 20
2327776	Thallium	3.54	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: A112316
Included Lab Sample IDs: 2328461

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	98.5	P/P	90 - 110
Antimony	98.9	97.3	P/P	90 - 110
Arsenic	97.9	96.4	P/P	90 - 110
Barium	98.5	97.9	P/P	90 - 110
Beryllium	97.5	97.2	P/P	90 - 110
Boron	101	99.5	P/P	90 - 110
Cadmium	99.2	98.3	P/P	90 - 110
Chromium	98.2	97.6	P/P	90 - 110
Cobalt	97.0	95.6	P/P	90 - 110
Copper	94.9	94.1	P/P	90 - 110
Lead	93.4	91.8	P/P	90 - 110
Manganese	99.3	98.9	P/P	90 - 110
Molybdenum	98.7	96.7	P/P	90 - 110
Nickel	97.4	96.0	P/P	90 - 110
Selenium	97.1	97.5	P/P	90 - 110
Silver	99.5	98.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A112342
Included Lab Sample IDs: 2328461

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	103	P/P	90 - 110
Iron	100	102	P/P	90 - 110
Magnesium	99.8	102	P/P	90 - 110
Potassium	99.9	101	P/P	90 - 110
Sodium	101	102	P/P	90 - 110
Strontium	100	101	P/P	90 - 110
Tin	101	102	P/P	90 - 110
Titanium	97.0	96.7	P/P	90 - 110
Vanadium	97.3	97.9	P/P	90 - 110
Zinc	98.9	98.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A112347
Included Lab Sample IDs: 2328461

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Thallium	93.7	91.9	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	102	103	98.5				1.16
	Iron	102	106	106	102			0.426
	Magnesium	103	107	107	98.2			0.0584
	Potassium	103	101	105	94.8			2.70
	Sodium	101	101	97.8				2.11
	Strontium	101	103	103	98.1			0.251
	Tin	104	102	107	101			5.35
	Titanium	101	98.8	103	98.5			4.54
	Vanadium	93.1	93.8	98.5	94.5			4.91
	Zinc	100	95.5	105	100			9.82
EPA 200.8 Rev. 5.4	Aluminum	100	101	102	98.4			0.715
	Antimony	97.6	102	103	101			0.516
	Arsenic	96.1	101	101	100			0.407
	Barium	101	104	105	103			0.423
	Beryllium	93.0	97.0	94.2	96.4			2.96
	Boron	104	103	102	105			0.656
	Cadmium	97.0	99.5	102	101			2.13
	Chromium	95.2	99.7	99.7	99.4			0.0772
	Cobalt	96.3	99.1	100	97.3			1.08
	Copper	94.0	99.1	98.2	95.6			0.850
	Lead	93.4	96.6	97.0	97.2			0.429
	Manganese	97.3	100	101	99.4			0.972
	Molybdenum	97.0	103	103	103			0.243
	Nickel	96.4	98.8	99.3	96.4			0.509
	Selenium	96.1	98.5	98.0	97.2			0.517
	Silver	97.8	97.8	98.5	95.9			0.751
	Thallium	97.1	98.6	102	99.8			3.54

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	2328461
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2328461
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2328461

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	05/19/2022	05/20/2022 09:30	Megan Whitefoot	05/23/2022 22:55	Josef B Mick	2328461
EPA 200.8 Rev. 5.4	05/19/2022	05/20/2022 09:30	Megan Whitefoot	05/20/2022 21:15	Emily M Philpot	2328461
	05/19/2022	05/20/2022 09:30	Megan Whitefoot	05/23/2022 16:59	Alexander Thompson	2328461
SM 2340 B-2011	05/19/2022			05/23/2022 22:55	Josef B Mick	2328461