Chemical Analysis Report

TLH-ROC-2022-07-19-04

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

Event Description: **Run 16**
Request ID: **RQ-2022-06-06-68**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 05-AUG-2022 09:39

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: Quincy Creek upstream Ralph Strang Rd **Collection Date/Time: 07/19/2022 11:05**

Field ID: G1TLHR0163 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2342456	EPA 200.7 Rev. 4.4	Calcium	6.51		mg/L	P416943	
		Iron	2.34E+03		ug/L	P416943	
		Lithium**	1.5	U	ug/L	P416943	
		Magnesium	1.98		mg/L	P416943	
		Potassium	0.51	I	mg/L	P416943	
		Sodium	3.0		mg/L	P416943	
		Strontium	20.0		ug/L	P416943	
		Tin	3.0	U	ug/L	P416943	
		Titanium	2.4	I	ug/L	P416943	
		Vanadium	2.0	U	ug/L	P416943	
		Zinc	5.0	U	ug/L	P416943	
	EPA 200.8 Rev. 5.4	Aluminum	270		ug/L	P416943	
		Antimony	0.050	U	ug/L	P416943	
		Arsenic	1.0		ug/L	P416943	
		Barium	15.2		ug/L	P416943	
		Beryllium	0.024	I	ug/L	P416943	
		Boron	11.8		ug/L	P416943	
		Cadmium	0.020	U	ug/L	P416943	
		Chromium	0.61	I	ug/L	P416943	
		Cobalt	0.248		ug/L	P416943	
		Copper	0.40	U	ug/L	P416943	
		Lead	0.36	I	ug/L	P416943	
		Manganese	67.3		ug/L	P416943	
		Molybdenum	0.15	U	ug/L	P416943	
		Nickel	0.50	U	ug/L	P416943	
		Selenium	0.20	U	ug/L	P416943	
		Silver	0.010	U	ug/L	P416943	
		Thallium	0.10	U	ug/L	P416943	
		Uranium**	0.166		ug/L	P416943	
	SM 2340 B-2011	Hardness	24.4		mg/L	P416943	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P416943

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Lithium	1.5	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: P416943

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
Uranium	0.0050	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P416943

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	104		P	85 - 115
Lithium	98.8		P	85 - 115
Magnesium	99.5		P	85 - 115
Potassium	101		P	85 - 115
Sodium	105		P	85 - 115
Strontium	105		P	85 - 115
Tin	99.6		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	101		P	85 - 115
Zinc	99.6		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P416943

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.7		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	98.0		P	85 - 115
Barium	101		P	85 - 115
Beryllium	89.2		P	85 - 115
Boron	98.1		P	85 - 115
Cadmium	97.3		P	85 - 115
Chromium	99.2		P	85 - 115
Cobalt	97.2		P	85 - 115
Copper	95.7		P	85 - 115
Lead	93.7		P	85 - 115
Manganese	101		P	85 - 115
Molybdenum	95.4		P	85 - 115
Nickel	98.5		P	85 - 115
Selenium	94.5		P	85 - 115
Silver	96.6		P	85 - 115
Thallium	95.0		P	85 - 115
Uranium	91.2		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P416943

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342516	Calcium	103		P	80 - 120
2342516	Iron	103	104	P/P	80 - 120
2342516	Lithium	111	112	P/P	80 - 120
2342516	Magnesium	99.4		P	80 - 120
2342516	Potassium	103	105	P/P	80 - 120
2342516	Sodium	107	111	P/P	80 - 120
2342516	Strontium	104	106	P/P	80 - 120
2342516	Tin	94.4	100	P/P	80 - 120
2342516	Titanium	99.8	103	P/P	80 - 120
2342516	Vanadium	99.3	103	P/P	80 - 120
2342516	Zinc	95.5	98.9	P/P	80 - 120
2342680	Calcium	96.7		P	80 - 120
2342680	Iron	105		P	80 - 120
2342680	Lithium	111		P	80 - 120
2342680	Magnesium	94.9		P	80 - 120
2342680	Potassium	105		P	80 - 120
2342680	Sodium	98.6		P	80 - 120
2342680	Strontium	108		P	80 - 120
2342680	Tin	98.9		P	80 - 120
2342680	Titanium	104		P	80 - 120
2342680	Vanadium	105		P	80 - 120
2342680	Zinc	102		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P416943

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342516	Aluminum	97.8	99.2	P/P	80 - 120
2342516	Antimony	102	105	P/P	80 - 120
2342516	Arsenic	99.0	102	P/P	80 - 120
2342516	Barium	101	104	P/P	80 - 120
2342516	Beryllium	90.4	95.1	P/P	80 - 120
2342516	Boron	99.0	101	P/P	80 - 120
2342516	Cadmium	96.6	101	P/P	80 - 120
2342516	Chromium	101	103	P/P	80 - 120
2342516	Cobalt	97.3	99.4	P/P	80 - 120
2342516	Copper	95.3	98.3	P/P	80 - 120
2342516	Lead	92.8	95.0	P/P	80 - 120
2342516	Manganese	103	105	P/P	80 - 120
2342516	Molybdenum	97.1	100	P/P	80 - 120
2342516	Nickel	98.9	100	P/P	80 - 120
2342516	Selenium	93.5	97.9	P/P	80 - 120
2342516	Silver	94.8	98.2	P/P	80 - 120
2342516	Thallium	96.7	99.2	P/P	80 - 120
2342516	Uranium	92.8	95.2	P/P	80 - 120
2342680	Aluminum	102		P	80 - 120
2342680	Antimony	105		P	80 - 120
2342680	Arsenic	103		P	80 - 120
2342680	Barium	106		P	80 - 120
2342680	Beryllium	94.0		P	80 - 120
2342680	Boron	106		P	80 - 120
2342680	Cadmium	103		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P416943

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342680	Chromium	104		P	80 - 120
2342680	Cobalt	101		P	80 - 120
2342680	Copper	101		P	80 - 120
2342680	Lead	97.4		P	80 - 120
2342680	Manganese	106		P	80 - 120
2342680	Molybdenum	101		P	80 - 120
2342680	Nickel	102		P	80 - 120
2342680	Selenium	97.0		P	80 - 120
2342680	Silver	98.4		P	80 - 120
2342680	Thallium	102		P	80 - 120
2342680	Uranium	97.5		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P416943

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342516	Calcium	1.19	Spike	P	0 - 20
2342516	Iron	1.07	Spike	P	0 - 20
2342516	Lithium	1.07	Spike	P	0 - 20
2342516	Magnesium	1.35	Spike	P	0 - 20
2342516	Potassium	1.41	Spike	P	0 - 20
2342516	Sodium	2.10	Spike	P	0 - 20
2342516	Strontium	1.72	Spike	P	0 - 20
2342516	Tin	5.73	Spike	P	0 - 20
2342516	Titanium	2.99	Spike	P	0 - 20
2342516	Vanadium	3.70	Spike	P	0 - 20
2342516	Zinc	3.55	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P416943

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342516	Aluminum	1.35	Spike	P	0 - 20
2342516	Antimony	2.55	Spike	P	0 - 20
2342516	Arsenic	2.61	Spike	P	0 - 20
2342516	Barium	2.82	Spike	P	0 - 20
2342516	Beryllium	5.12	Spike	P	0 - 20
2342516	Boron	1.38	Spike	P	0 - 20
2342516	Cadmium	4.80	Spike	P	0 - 20
2342516	Chromium	1.95	Spike	P	0 - 20
2342516	Cobalt	2.13	Spike	P	0 - 20
2342516	Copper	3.09	Spike	P	0 - 20
2342516	Lead	2.39	Spike	P	0 - 20
2342516	Manganese	1.49	Spike	P	0 - 20
2342516	Molybdenum	2.88	Spike	P	0 - 20
2342516	Nickel	1.39	Spike	P	0 - 20
2342516	Selenium	4.56	Spike	P	0 - 20
2342516	Silver	3.54	Spike	P	0 - 20
2342516	Thallium	2.61	Spike	P	0 - 20
2342516	Uranium	2.49	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: A113698
Included Lab Sample IDs: 2342456

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.4	98.7	P/P	90 - 110
Antimony	99.0	99.4	P/P	90 - 110
Arsenic	98.5	99.0	P/P	90 - 110
Barium	97.8	97.3	P/P	90 - 110
Beryllium	92.5	91.7	P/P	90 - 110
Boron	95.7	95.1	P/P	90 - 110
Cadmium	99.1	99.4	P/P	90 - 110
Chromium	99.7	99.2	P/P	90 - 110
Cobalt	97.3	97.4	P/P	90 - 110
Copper	97.7	97.7	P/P	90 - 110
Lead	92.2	91.8	P/P	90 - 110
Manganese	101	102	P/P	90 - 110
Molybdenum	95.4	95.8	P/P	90 - 110
Nickel	98.4	98.6	P/P	90 - 110
Selenium	96.1	98.3	P/P	90 - 110
Silver	97.2	97.2	P/P	90 - 110
Thallium	93.4	93.8	P/P	90 - 110
Uranium	97.1	97.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A113744
Included Lab Sample IDs: 2342456

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.8	99.7	P/P	90 - 110
Iron	98.7	98.7	P/P	90 - 110
Magnesium	98.5	98.3	P/P	90 - 110
Potassium	102	103	P/P	90 - 110
Sodium	101	101	P/P	90 - 110
Strontium	105	105	P/P	90 - 110
Tin	98.9	99.0	P/P	90 - 110
Titanium	99.4	101	P/P	90 - 110
Vanadium	102	101	P/P	90 - 110
Zinc	98.7	98.4	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A113877
Included Lab Sample IDs: 2342456

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lithium	104	105	P/P	95 - 105

* 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	103	96.7				1.19
	Iron	104	103	104	105			1.07
	Lithium	98.8	111	112	111			1.07
	Magnesium	99.5	99.4	94.9				1.35
	Potassium	101	103	105	105			1.41
	Sodium	105	107	111	98.6			2.10
	Strontium	105	104	106	108			1.72
	Tin	99.6	94.4	100	98.9			5.73
	Titanium	102	99.8	103	104			2.99
	Vanadium	101	99.3	103	105			3.70
	Zinc	99.6	95.5	98.9	102			3.55
EPA 200.8 Rev. 5.4	Aluminum	98.7	102	97.8	99.2			1.35
	Antimony	101	105	102	105			2.55
	Arsenic	98.0	103	99.0	102			2.61
	Barium	101	106	101	104			2.82
	Beryllium	89.2	94.0	90.4	95.1			5.12
	Boron	98.1	106	99.0	101			1.38
	Cadmium	97.3	103	96.6	101			4.80
	Chromium	99.2	104	101	103			1.95
	Cobalt	97.2	101	97.3	99.4			2.13
	Copper	95.7	101	95.3	98.3			3.09
	Lead	93.7	97.4	92.8	95.0			2.39
	Manganese	101	106	103	105			1.49
	Molybdenum	95.4	101	97.1	100			2.88
	Nickel	98.5	102	98.9	100			1.39
	Selenium	94.5	97.0	93.5	97.9			4.56
	Silver	96.6	98.4	94.8	98.2			3.54
	Thallium	95.0	102	96.7	99.2			2.61
	Uranium	91.2	97.5	92.8	95.2			2.49

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	2342456
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2342456
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2342456

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	07/19/2022	07/21/2022 09:48	Megan Whitefoot	07/27/2022 21:17	McKinley C Carter	2342456
	07/19/2022	07/21/2022 09:48	Megan Whitefoot	08/02/2022 15:10	McKinley C Carter	2342456
EPA 200.8 Rev. 5.4	07/19/2022	07/21/2022 09:48	Megan Whitefoot	07/25/2022 21:41	Emily M Philpot	2342456
SM 2340 B-2011	07/19/2022			07/27/2022 21:17	McKinley C Carter	2342456