Chemical Analysis Report

TLH-ROC-2022-10-31-02

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

Event Description: **June-Aug. North Run**
Request ID: **RQ-2022-08-15-32**
Customer: **TLH-ROC**
Project ID: **SMP**

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

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Certified by: Colin Wright, Program Administrator

Date Certified: 17-NOV-2022 12:01

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: Steinhatchee River 40m N of Yearling Rd **Collection Date/Time: 10/31/2022 10:35**

Field ID: G1TLHR0065 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2366183	EPA 200.7 Rev. 4.4	Calcium	98.8		mg/L	P421757	
		Iron	120		ug/L	P421757	
		Magnesium	12.7		mg/L	P421757	
		Potassium	0.57	I	mg/L	P421757	
		Sodium	5.4		mg/L	P421757	
		Strontium	462		ug/L	P421757	
		Tin	5.4	I	ug/L	P421757	
		Titanium	1.2	I	ug/L	P421757	
		Vanadium	2.0	U	ug/L	P421757	
		Zinc	5.0	U	ug/L	P421757	
	EPA 200.8 Rev. 5.4	Aluminum	18	I	ug/L	P421757	
		Antimony	0.050	U	ug/L	P421757	
		Arsenic	0.15	I	ug/L	P421757	
		Barium	16.5		ug/L	P421757	
		Beryllium	0.010	U	ug/L	P421757	
		Boron	15.4		ug/L	P421757	
		Cadmium	0.020	U	ug/L	P421757	
		Chromium	0.40	U	ug/L	P421757	
		Cobalt	0.113		ug/L	P421757	
		Copper	0.40	U	ug/L	P421757	
		Lead	0.20	U	ug/L	P421757	
		Manganese	181		ug/L	P421757	
		Molybdenum	0.15	U	ug/L	P421757	
		Nickel	0.50	U	ug/L	P421757	
		Selenium	0.20	U	ug/L	P421757	
		Silver	0.010	U	ug/L	P421757	
		Thallium	0.10	U	ug/L	P421757	
	SM 2340 B-2011	Hardness	299		mg/L	P421757	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P421757

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: P421757

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: P421757

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	109		P	80 - 120
Iron	109		P	80 - 120
Magnesium	107		P	80 - 120
Potassium	106		P	80 - 120
Sodium	105		P	80 - 120
Strontium	104		P	80 - 120
Tin	107		P	80 - 120
Titanium	108		P	80 - 120
Vanadium	106		P	80 - 120
Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P421757

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.5		P	85 - 115
Antimony	103		P	85 - 115
Arsenic	101		P	85 - 115
Barium	105		P	85 - 115
Beryllium	97.0		P	85 - 115
Boron	103		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	100		P	85 - 115
Copper	98.0		P	85 - 115
Lead	98.6		P	85 - 115
Manganese	103		P	85 - 115
Molybdenum	97.6		P	85 - 115
Nickel	98.6		P	85 - 115
Selenium	98.9		P	85 - 115
Silver	103		P	85 - 115
Thallium	97.2		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P421757

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2365548	Calcium	102		P	80 - 120
2365548	Iron	102		P	80 - 120
2365548	Magnesium	100		P	80 - 120
2365548	Potassium	94.3		P	80 - 120
2365548	Sodium	102		P	80 - 120
2365548	Strontium	100		P	80 - 120
2365548	Tin	101		P	80 - 120
2365548	Titanium	103		P	80 - 120
2365548	Vanadium	100		P	80 - 120
2365548	Zinc	96.6		P	80 - 120
2366226	Calcium	101	94.3	P/P	80 - 120
2366226	Iron	103	97.9	P/P	80 - 120
2366226	Magnesium	100	95.4	P/P	80 - 120
2366226	Potassium	97.7	93.9	P/P	80 - 120
2366226	Sodium	98.1		P	80 - 120
2366226	Strontium	99.4	96.2	P/P	80 - 120
2366226	Tin	101	97.0	P/P	80 - 120
2366226	Titanium	103	99.2	P/P	80 - 120
2366226	Vanadium	99.2	95.6	P/P	80 - 120
2366226	Zinc	93.6	91.9	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P421757

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2365548	Aluminum	96.0		P	80 - 120
2365548	Antimony	107		P	80 - 120
2365548	Arsenic	101		P	80 - 120
2365548	Barium	104		P	80 - 120
2365548	Beryllium	95.3		P	80 - 120
2365548	Boron	102		P	80 - 120
2365548	Cadmium	103		P	80 - 120
2365548	Chromium	105		P	80 - 120
2365548	Cobalt	98.6		P	80 - 120
2365548	Copper	95.3		P	80 - 120
2365548	Lead	100		P	80 - 120
2365548	Manganese	104		P	80 - 120
2365548	Molybdenum	102		P	80 - 120
2365548	Nickel	94.7		P	80 - 120
2365548	Selenium	91.5		P	80 - 120
2365548	Silver	101		P	80 - 120
2365548	Thallium	100		P	80 - 120
2366226	Aluminum	94.0	95.2	P/P	80 - 120
2366226	Antimony	102	104	P/P	80 - 120
2366226	Arsenic	99.1	100	P/P	80 - 120
2366226	Barium	102	105	P/P	80 - 120
2366226	Beryllium	95.4	93.5	P/P	80 - 120
2366226	Boron	100	101	P/P	80 - 120
2366226	Cadmium	99.7	102	P/P	80 - 120
2366226	Chromium	101	103	P/P	80 - 120
2366226	Cobalt	96.8	99.3	P/P	80 - 120
2366226	Copper	97.8	98.8	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P421757

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2366226	Lead	97.6	97.5	P/P	80 - 120
2366226	Manganese	101	103	P/P	80 - 120
2366226	Molybdenum	97.5	98.6	P/P	80 - 120
2366226	Nickel	95.0	97.9	P/P	80 - 120
2366226	Selenium	90.4	92.8	P/P	80 - 120
2366226	Silver	100	101	P/P	80 - 120
2366226	Thallium	95.3	97.1	P/P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P421757

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2366226	Calcium	3.78	Spike	P	0 - 20
2366226	Iron	4.24	Spike	P	0 - 20
2366226	Magnesium	4.17	Spike	P	0 - 20
2366226	Potassium	3.15	Spike	P	0 - 20
2366226	Sodium	3.30	Spike	P	0 - 20
2366226	Strontium	3.29	Spike	P	0 - 20
2366226	Tin	4.28	Spike	P	0 - 20
2366226	Titanium	3.74	Spike	P	0 - 20
2366226	Vanadium	3.70	Spike	P	0 - 20
2366226	Zinc	1.89	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P421757

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2366226	Aluminum	1.26	Spike	P	0 - 20
2366226	Antimony	1.57	Spike	P	0 - 20
2366226	Arsenic	1.17	Spike	P	0 - 20
2366226	Barium	1.96	Spike	P	0 - 20
2366226	Beryllium	1.66	Spike	P	0 - 20
2366226	Boron	0.749	Spike	P	0 - 20
2366226	Cadmium	2.09	Spike	P	0 - 20
2366226	Chromium	2.10	Spike	P	0 - 20
2366226	Cobalt	2.53	Spike	P	0 - 20
2366226	Copper	1.03	Spike	P	0 - 20
2366226	Lead	0.0653	Spike	P	0 - 20
2366226	Manganese	1.11	Spike	P	0 - 20
2366226	Molybdenum	1.20	Spike	P	0 - 20
2366226	Nickel	3.00	Spike	P	0 - 20
2366226	Selenium	2.59	Spike	P	0 - 20
2366226	Silver	1.15	Spike	P	0 - 20
2366226	Thallium	1.83	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: A115737
Included Lab Sample IDs: 2366183

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.3	98.7	P/P	90 - 110
Antimony	98.8	101	P/P	90 - 110
Arsenic	97.9	97.4	P/P	90 - 110
Barium	100	100	P/P	90 - 110
Beryllium	97.3	97.2	P/P	90 - 110
Boron	95.7	97.9	P/P	90 - 110
Cadmium	100	103	P/P	90 - 110
Chromium	98.5	100	P/P	90 - 110
Cobalt	96.0	95.8	P/P	90 - 110
Copper	94.0	93.2	P/P	90 - 110
Lead	95.5	96.0	P/P	90 - 110
Manganese	99.3	100	P/P	90 - 110
Molybdenum	97.3	98.9	P/P	90 - 110
Nickel	94.7	93.7	P/P	90 - 110
Selenium	98.9	101	P/P	90 - 110
Silver	101	101	P/P	90 - 110
Thallium	95.8	95.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A115780
Included Lab Sample IDs: 2366183

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	105	94.9	P/P	90 - 110
Iron	107	95.5	P/P	90 - 110
Magnesium	104	92.5	P/P	90 - 110
Potassium	104	92.8	P/P	90 - 110
Sodium	106	95.2	P/P	90 - 110
Strontium	105	94.8	P/P	90 - 110
Tin	105	93.0	P/P	90 - 110
Titanium	110	98.3	P/P	90 - 110
Vanadium	107	97.0	P/P	90 - 110
Zinc	103	92.4	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	109	102	101	94.3			3.78
	Iron	109	102	103	97.9			4.24
	Magnesium	107	100	100	95.4			4.17
	Potassium	106	94.3	97.7	93.9			3.15
	Sodium	105	102	98.1				3.30
	Strontium	104	100	99.4	96.2			3.29
	Tin	107	101	101	97.0			4.28
	Titanium	108	103	103	99.2			3.74
	Vanadium	106	100	99.2	95.6			3.70
	Zinc	101	96.6	93.6	91.9			1.89
EPA 200.8 Rev. 5.4	Aluminum	98.5	94.0	95.2	96.0			1.26
	Antimony	103	102	104	107			1.57
	Arsenic	101	99.1	100	101			1.17
	Barium	105	102	105	104			1.96
	Beryllium	97.0	95.4	93.5	95.3			1.66
	Boron	103	100	101	102			0.749
	Cadmium	101	99.7	102	103			2.09
	Chromium	103	101	103	105			2.10
	Cobalt	100	96.8	99.3	98.6			2.53
	Copper	98.0	97.8	98.8	95.3			1.03
	Lead	98.6	97.6	97.5	100			0.0653
	Manganese	103	101	103	104			1.11
	Molybdenum	97.6	97.5	98.6	102			1.20
	Nickel	98.6	95.0	97.9	94.7			3.00
	Selenium	98.9	90.4	92.8	91.5			2.59
	Silver	103	100	101	101			1.15
	Thallium	97.2	95.3	97.1	100			1.83

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	2366183
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2366183
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2366183

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	10/31/2022	11/02/2022 11:30	George D Taylor	11/06/2022 23:19	McKinley C Carter	2366183
EPA 200.8 Rev. 5.4	10/31/2022	11/02/2022 11:30	George D Taylor	11/03/2022 19:50	Emily M Philpot	2366183
SM 2340 B-2011	10/31/2022			11/06/2022 23:19	McKinley C Carter	2366183