Chemical Analysis Report

TLH-ROC-2021-09-30-02

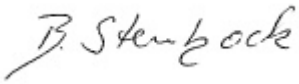
Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Run 9**
Request ID: **RQ-2021-09-06-55**
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: 14-OCT-2021 14:59



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: Alapaha River CR751 **Collection Date/Time: 09/30/2021 13:20**

Field ID: G1TLHR0146 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2279774	EPA 200.7 Rev. 4.4	Barium	26.2		ug/L	P404485	
		Calcium	5.77		mg/L	P404485	
		Iron	1.73E+03		ug/L	P404485	
		Magnesium	2.12		mg/L	P404485	
		Manganese	38.3		ug/L	P404485	
		Potassium	2.3		mg/L	P404485	
		Sodium	3.1		mg/L	P404485	
		Zinc	5.0	U	ug/L	P404485	
	EPA 200.8 Rev. 5.4	Aluminum	444		ug/L	P404485	
		Antimony	0.051	I	ug/L	P404485	
		Arsenic	1.11		ug/L	P404485	
		Beryllium	0.045		ug/L	P404485	
		Boron**	21.0		ug/L	P404485	
		Cadmium	0.035	I	ug/L	P404485	
		Chromium	0.73	I	ug/L	P404485	
		Copper	0.40	U	ug/L	P404485	
		Lead	0.74		ug/L	P404485	
		Nickel	0.69	I	ug/L	P404485	
		Selenium	0.20	U	ug/L	P404485	
		Silver	0.010	U	ug/L	P404485	
		Thallium	0.10	U	ug/L	P404485	
	SM 2340B	Hardness	23.1		mg/L	P404485	

Ref. Method and Comment:
EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 10/06/2021.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P404485

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Manganese	1.0	U	ug/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P404485

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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
Copper	0.40	U	ug/L
Lead	0.20	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: P404485

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	100		P	85 - 115
Iron	106		P	85 - 115
Magnesium	105		P	85 - 115
Manganese	100		P	85 - 115
Potassium	100		P	85 - 115
Sodium	95.5		P	85 - 115
Zinc	96.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P404485

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	105		P	85 - 115
Arsenic	102		P	85 - 115
Beryllium	105		P	85 - 115
Boron	106		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	96.2		P	85 - 115
Copper	99.8		P	85 - 115
Lead	98.6		P	85 - 115
Nickel	103		P	85 - 115
Selenium	98.5		P	85 - 115
Silver	103		P	85 - 115
Thallium	104		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P404485

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2279381	Barium	102	103	P/P	80 - 120
2279381	Calcium	96.8		P	80 - 120
2279381	Iron	105	107	P/P	80 - 120
2279381	Magnesium	103	105	P/P	80 - 120
2279381	Manganese	99.8	99.8	P/P	80 - 120
2279381	Potassium	101	103	P/P	80 - 120
2279381	Sodium	105	104	P/P	80 - 120
2279381	Zinc	96.5	95.8	P/P	80 - 120
2279759	Barium	104		P	80 - 120
2279759	Calcium	99.2		P	80 - 120
2279759	Iron	108		P	80 - 120
2279759	Magnesium	107		P	80 - 120
2279759	Manganese	101		P	80 - 120
2279759	Potassium	103		P	80 - 120
2279759	Sodium	103		P	80 - 120
2279759	Zinc	99.0		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P404485

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2279381	Aluminum	100	97.5	P/P	80 - 120
2279381	Antimony	112	112	P/P	80 - 120
2279381	Arsenic	99.8	96.7	P/P	80 - 120
2279381	Beryllium	99.5	93.1	P/P	80 - 120
2279381	Boron	106	102	P/P	80 - 120
2279381	Cadmium	107	103	P/P	80 - 120
2279381	Chromium	103	99.2	P/P	80 - 120
2279381	Copper	93.3	90.6	P/P	80 - 120
2279381	Lead	98.6	96.6	P/P	80 - 120
2279381	Nickel	96.8	93.5	P/P	80 - 120
2279381	Selenium	98.4	95.6	P/P	80 - 120
2279381	Silver	103	99.3	P/P	80 - 120
2279381	Thallium	106	103	P/P	80 - 120
2279759	Aluminum	102		P	80 - 120
2279759	Antimony	110		P	80 - 120
2279759	Arsenic	99.8		P	80 - 120
2279759	Beryllium	102		P	80 - 120
2279759	Boron	108		P	80 - 120
2279759	Cadmium	102		P	80 - 120
2279759	Chromium	96.5		P	80 - 120
2279759	Copper	97.5		P	80 - 120
2279759	Lead	99.1		P	80 - 120
2279759	Nickel	99.7		P	80 - 120
2279759	Selenium	96.6		P	80 - 120
2279759	Silver	101		P	80 - 120
2279759	Thallium	107		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P404485

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2279381	Barium	0.579	Spike	P	0 - 20
2279381	Calcium	0.392	Spike	P	0 - 20
2279381	Iron	1.62	Spike	P	0 - 20
2279381	Magnesium	1.72	Spike	P	0 - 20
2279381	Manganese	0.000847	Spike	P	0 - 20
2279381	Potassium	1.95	Spike	P	0 - 20
2279381	Sodium	0.196	Spike	P	0 - 20
2279381	Zinc	0.739	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P404485

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2279381	Aluminum	2.68	Spike	P	0 - 20
2279381	Antimony	0.107	Spike	P	0 - 20
2279381	Arsenic	3.11	Spike	P	0 - 20
2279381	Beryllium	6.29	Spike	P	0 - 20
2279381	Boron	4.12	Spike	P	0 - 20
2279381	Cadmium	3.20	Spike	P	0 - 20
2279381	Chromium	2.89	Spike	P	0 - 20
2279381	Copper	2.94	Spike	P	0 - 20
2279381	Lead	2.03	Spike	P	0 - 20
2279381	Nickel	3.46	Spike	P	0 - 20
2279381	Selenium	2.92	Spike	P	0 - 20
2279381	Silver	3.24	Spike	P	0 - 20
2279381	Thallium	2.31	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A108137
Included Lab Sample IDs: 2279774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	99.1	96.3	P/P	90 - 110
Calcium	97.4	97.5	P/P	90 - 110
Iron	98.8	98.8	P/P	90 - 110
Magnesium	98.3	98.5	P/P	90 - 110
Manganese	101	99.9	P/P	90 - 110
Potassium	99.0	99.3	P/P	90 - 110
Sodium	99.1	99.3	P/P	90 - 110
Zinc	96.5	94.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A108158
Included Lab Sample IDs: 2279774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.3	98.0	P/P	90 - 110
Arsenic	97.0	96.1	P/P	90 - 110
Beryllium	93.6	93.2	P/P	90 - 110
Boron	105	107	P/P	90 - 110
Cadmium	102	103	P/P	90 - 110
Chromium	96.7	96.7	P/P	90 - 110
Copper	91.1	90.3	P/P	90 - 110
Nickel	94.8	94.1	P/P	90 - 110
Selenium	101	99.5	P/P	90 - 110
Silver	99.0	98.7	P/P	90 - 110
Thallium	100	99.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A108187
Included Lab Sample IDs: 2279774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	109	110	P/P	90 - 110
Lead	97.2	96.4	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	Barium	102	102	103	104			0.579
	Calcium	100	96.8	99.2				0.392
	Iron	106	105	107	108			1.62
	Magnesium	105	103	105	107			1.72
	Manganese	100	99.8	99.8	101			0.0008
	Potassium	100	101	103	103			1.95
	Sodium	95.5	105	104	103			0.196
	Zinc	96.9	96.5	95.8	99.0			0.739
EPA 200.8 Rev. 5.4	Aluminum	101	102	100	97.5			2.68
	Antimony	105	110	112	112			0.107
	Arsenic	102	99.8	99.8	96.7			3.11
	Beryllium	105	102	99.5	93.1			6.29
	Boron	106	108	106	102			4.12
	Cadmium	102	102	107	103			3.20
	Chromium	96.2	96.5	103	99.2			2.89
	Copper	99.8	97.5	93.3	90.6			2.94
	Lead	98.6	99.1	98.6	96.6			2.03
	Nickel	103	99.7	96.8	93.5			3.46
	Selenium	98.5	96.6	98.4	95.6			2.92
	Silver	103	101	103	99.3			3.24
	Thallium	104	107	106	103			2.31

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	2279774
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2279774
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2279774

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	09/30/2021	10/04/2021 10:30	Emily M Philpot	10/04/2021 21:47	Josef B Mick	2279774
EPA 200.8 Rev. 5.4	09/30/2021	10/04/2021 10:30	Emily M Philpot	10/05/2021 18:38	Alexander Thompson	2279774
	09/30/2021	10/04/2021 10:30	Emily M Philpot	10/06/2021 16:19	Alexander Thompson	2279774
SM 2340B	09/30/2021			10/04/2021 21:47	Josef B Mick	2279774