

Chemical Analysis Report

SW-DIST-2023-06-02-02

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

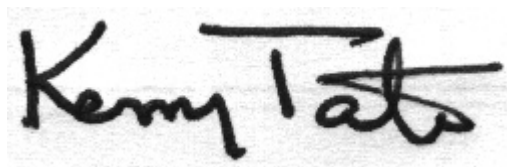
Event Description: **Horsehole**
Request ID: **RQ-2023-06-05-66**
Customer: **SW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
Attn: Ben Paswater

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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 15-JUN-2023 10:38

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line extending from the end of the name.

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: HORSEHOLE CREEK AT19

Collection Date/Time: 06/01/2023 12:15

Field ID: G1SW0103

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2414266	EPA 200.7 Rev. 4.4	Calcium	54.9		mg/L	P430809	
		Iron	380		ug/L	P430809	
		Magnesium	4.51		mg/L	P430809	
		Potassium	0.44	I	mg/L	P430809	
		Sodium	7.5		mg/L	P430809	
		Strontium	67.1		ug/L	P430809	
		Tin	3.0	U	ug/L	P430809	
		Titanium	0.75	U	ug/L	P430809	
		Vanadium	2.0	U	ug/L	P430809	
		Zinc	5.0	U	ug/L	P430809	
	EPA 200.8 Rev. 5.4	Aluminum	41		ug/L	P430809	
		Antimony	0.097	I	ug/L	P430809	
		Arsenic	0.73		ug/L	P430809	
		Barium	8.85		ug/L	P430809	
		Beryllium	0.010	U	ug/L	P430809	
		Boron	20.0		ug/L	P430809	
		Cadmium	0.020	U	ug/L	P430809	
		Chromium	0.40	U	ug/L	P430809	
		Cobalt	0.102		ug/L	P430809	
		Copper	0.40	U	ug/L	P430809	
		Lead	0.20	U	ug/L	P430809	
		Manganese	81.0		ug/L	P430809	
		Molybdenum	0.26	I	ug/L	P430809	
		Nickel	0.50	U	ug/L	P430809	
		Selenium	0.20	U	ug/L	P430809	
		Silver	0.010	U	ug/L	P430809	
		Thallium	0.10	U	ug/L	P430809	
	SM 2340 B-2011	Hardness	156		mg/L	P430809	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P430809

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: P430809

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: P430809

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	102		P	85 - 115
Magnesium	101		P	85 - 115
Potassium	101		P	85 - 115
Sodium	96.3		P	85 - 115
Strontium	99.5		P	85 - 115
Tin	101		P	85 - 115
Titanium	101		P	85 - 115
Vanadium	101		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P430809

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.8		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	98.8		P	85 - 115
Barium	103		P	85 - 115
Beryllium	97.0		P	85 - 115
Boron	101		P	85 - 115
Cadmium	99.6		P	85 - 115
Chromium	95.7		P	85 - 115
Cobalt	99.4		P	85 - 115
Copper	96.8		P	85 - 115
Lead	100		P	85 - 115
Manganese	96.1		P	85 - 115
Molybdenum	97.1		P	85 - 115
Nickel	96.8		P	85 - 115
Selenium	99.1		P	85 - 115
Silver	103		P	85 - 115
Thallium	95.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P430809

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2414260	Calcium	99.3		P	80 - 120
2414260	Iron	94.6	102	P/P	80 - 120
2414260	Magnesium	92.8	105	P/P	80 - 120
2414260	Potassium	96.0	104	P/P	80 - 120
2414260	Sodium	97.4		P	80 - 120
2414260	Strontium	93.4	101	P/P	80 - 120
2414260	Tin	93.1	102	P/P	80 - 120
2414260	Titanium	92.9	100	P/P	80 - 120
2414260	Vanadium	91.7	99.5	P/P	80 - 120
2414260	Zinc	92.0	100	P/P	80 - 120
2414410	Calcium	101		P	80 - 120
2414410	Iron	103		P	80 - 120
2414410	Magnesium	102		P	80 - 120
2414410	Potassium	105		P	80 - 120
2414410	Sodium	104		P	80 - 120
2414410	Strontium	101		P	80 - 120
2414410	Tin	101		P	80 - 120
2414410	Titanium	101		P	80 - 120
2414410	Vanadium	102		P	80 - 120
2414410	Zinc	104		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P430809

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2414260	Aluminum	97.5	97.8	P/P	80 - 120
2414260	Antimony	105	105	P/P	80 - 120
2414260	Arsenic	99.3	99.5	P/P	80 - 120
2414260	Barium	102	102	P/P	80 - 120
2414260	Beryllium	96.1	94.5	P/P	80 - 120
2414260	Boron	98.4	99.8	P/P	80 - 120
2414260	Cadmium	100	102	P/P	80 - 120
2414260	Chromium	94.3	95.0	P/P	80 - 120
2414260	Cobalt	97.8	98.0	P/P	80 - 120
2414260	Copper	95.7	95.0	P/P	80 - 120
2414260	Lead	102	102	P/P	80 - 120
2414260	Manganese	94.8	95.2	P/P	80 - 120
2414260	Molybdenum	98.5	98.6	P/P	80 - 120
2414260	Nickel	95.4	95.8	P/P	80 - 120
2414260	Selenium	99.3	100	P/P	80 - 120
2414260	Silver	103	103	P/P	80 - 120
2414260	Thallium	97.3	99.5	P/P	80 - 120
2414410	Aluminum	97.5		P	80 - 120
2414410	Antimony	103		P	80 - 120
2414410	Arsenic	97.4		P	80 - 120
2414410	Barium	102		P	80 - 120
2414410	Beryllium	94.5		P	80 - 120
2414410	Boron	101		P	80 - 120
2414410	Cadmium	100		P	80 - 120
2414410	Chromium	97.8		P	80 - 120
2414410	Cobalt	97.6		P	80 - 120
2414410	Copper	95.9		P	80 - 120

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P430809

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2414410	Lead	103		P	80 - 120
2414410	Manganese	98.9		P	80 - 120
2414410	Molybdenum	96.5		P	80 - 120
2414410	Nickel	97.4		P	80 - 120
2414410	Selenium	97.7		P	80 - 120
2414410	Silver	102		P	80 - 120
2414410	Thallium	98.2		P	80 - 120

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P430809

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2414260	Calcium	7.03	Spike	P	0 - 20
2414260	Iron	7.59	Spike	P	0 - 20
2414260	Magnesium	7.74	Spike	P	0 - 20
2414260	Potassium	6.39	Spike	P	0 - 20
2414260	Sodium	7.71	Spike	P	0 - 20
2414260	Strontium	7.21	Spike	P	0 - 20
2414260	Tin	9.03	Spike	P	0 - 20
2414260	Titanium	7.48	Spike	P	0 - 20
2414260	Vanadium	8.12	Spike	P	0 - 20
2414260	Zinc	8.47	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P430809

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2414260	Aluminum	0.304	Spike	P	0 - 20
2414260	Antimony	0.461	Spike	P	0 - 20
2414260	Arsenic	0.228	Spike	P	0 - 20
2414260	Barium	0.115	Spike	P	0 - 20
2414260	Beryllium	1.61	Spike	P	0 - 20
2414260	Boron	0.999	Spike	P	0 - 20
2414260	Cadmium	1.64	Spike	P	0 - 20
2414260	Chromium	0.740	Spike	P	0 - 20
2414260	Cobalt	0.169	Spike	P	0 - 20
2414260	Copper	0.761	Spike	P	0 - 20
2414260	Lead	0.542	Spike	P	0 - 20
2414260	Manganese	0.404	Spike	P	0 - 20
2414260	Molybdenum	0.157	Spike	P	0 - 20
2414260	Nickel	0.344	Spike	P	0 - 20
2414260	Selenium	0.937	Spike	P	0 - 20
2414260	Silver	0.299	Spike	P	0 - 20
2414260	Thallium	2.19	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: A119619

Included Lab Sample IDs: 2414266

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.5	98.5	P/P	90 - 110
Antimony	103	103	P/P	90 - 110
Arsenic	98.5	97.8	P/P	90 - 110
Barium	99.9	98.9	P/P	90 - 110
Beryllium	96.8	96.6	P/P	90 - 110
Boron	96.0	97.5	P/P	90 - 110
Cadmium	98.7	98.4	P/P	90 - 110
Chromium	97.1	97.3	P/P	90 - 110
Cobalt	99.3	98.1	P/P	90 - 110
Copper	95.4	94.0	P/P	90 - 110
Lead	100	100	P/P	90 - 110
Manganese	97.0	99.4	P/P	90 - 110
Molybdenum	97.5	96.9	P/P	90 - 110
Nickel	96.1	95.4	P/P	90 - 110
Selenium	98.4	100	P/P	90 - 110
Silver	102	102	P/P	90 - 110
Thallium	99.5	98.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A119677

Included Lab Sample IDs: 2414266

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	97.3	97.5	P/P	90 - 110
Iron	100	99.2	P/P	90 - 110
Magnesium	99.7	98.5	P/P	90 - 110
Potassium	100	99.1	P/P	90 - 110
Sodium	97.6	98.6	P/P	90 - 110
Strontium	99.4	99.7	P/P	90 - 110
Tin	101	100	P/P	90 - 110
Titanium	100	100	P/P	90 - 110
Vanadium	99.9	100	P/P	90 - 110
Zinc	100	99.7	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	101	99.3	101			7.03
	Iron	102	94.6	102	103		7.59
	Magnesium	101	92.8	105	102		7.74
	Potassium	101	96.0	104	105		6.39
	Sodium	96.3	97.4	104			7.71
	Strontium	99.5	93.4	101	101		7.21
	Tin	101	93.1	102	101		9.03
	Titanium	101	92.9	100	101		7.48
	Vanadium	101	91.7	99.5	102		8.12
	Zinc	102	92.0	100	104		8.47
EPA 200.8 Rev. 5.4	Aluminum	98.8	97.5	97.8	97.5		0.304
	Antimony	104	105	105	103		0.461
	Arsenic	98.8	99.3	99.5	97.4		0.228
	Barium	103	102	102	102		0.115
	Beryllium	97.0	96.1	94.5	94.5		1.61
	Boron	101	98.4	99.8	101		0.999
	Cadmium	99.6	100	102	100		1.64
	Chromium	95.7	94.3	95.0	97.8		0.740
	Cobalt	99.4	97.8	98.0	97.6		0.169
	Copper	96.8	95.7	95.0	95.9		0.761
	Lead	100	102	102	103		0.542
	Manganese	96.1	94.8	95.2	98.9		0.404
	Molybdenum	97.1	98.5	98.6	96.5		0.157
	Nickel	96.8	95.4	95.8	97.4		0.344
	Selenium	99.1	99.3	100	97.7		0.937
	Silver	103	103	103	102		0.299
	Thallium	95.2	97.3	99.5	98.2		2.19

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	2414266
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2414266
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2414266

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	06/02/2023	06/05/2023 12:00	George D Taylor	06/09/2023 02:23	McKinley C Carter	2414266
EPA 200.8 Rev. 5.4	06/02/2023	06/05/2023 12:00	George D Taylor	06/06/2023 17:10	Conrad Hartmann	2414266
SM 2340 B-2011	06/02/2023			06/09/2023 02:23	McKinley C Carter	2414266