

Chemical Analysis Report

SW-DIST-2022-07-06-02

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

Event Description: **Horsehole**
Request ID: **RQ-2022-07-04-62**
Customer: **SW-DIST**
Project ID: **SMP**

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

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Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 19-JUL-2022 16:00



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 @ 19

Collection Date/Time: 07/05/2022 12:45

Field ID: G1SW0103

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2339190	EPA 200.7 Rev. 4.4	Calcium	62.6		mg/L	P416378	
		Iron	570		ug/L	P416378	
		Magnesium	4.99		mg/L	P416378	
		Potassium	0.30	U	mg/L	P416378	
		Sodium	5.1		mg/L	P416378	
		Strontium	73.9		ug/L	P416378	
		Tin	3.0	U	ug/L	P416378	
		Titanium	1.4	I	ug/L	P416378	
		Vanadium	2.0	U	ug/L	P416378	
		Zinc	5.0	U	ug/L	P416378	
	EPA 200.8 Rev. 5.4	Aluminum	29		ug/L	P416378	
		Antimony	0.050	U	ug/L	P416378	
		Arsenic	0.61		ug/L	P416378	
		Barium	9.91		ug/L	P416378	
		Beryllium	0.012	I	ug/L	P416378	
		Boron	17.3		ug/L	P416378	
		Cadmium	0.020	U	ug/L	P416378	
		Chromium	0.40	U	ug/L	P416378	
		Cobalt	0.160		ug/L	P416378	
		Copper	0.40	U	ug/L	P416616	
		Lead	0.20	U	ug/L	P416378	
		Manganese	118		ug/L	P416378	
		Molybdenum	0.31	I	ug/L	P416378	
		Nickel	0.50	U	ug/L	P416616	
		Selenium	0.20	U	ug/L	P416378	
		Silver	0.010	U	ug/L	P416378	
		Thallium	0.10	U	ug/L	P416378	
	SM 2340 B-2011	Hardness	177		mg/L	P416378	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P416378

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: P416378

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
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P416616

Component	Result	Code	Units
Copper	0.40	U	ug/L
Nickel	0.50	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P416378

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	102		P	85 - 115
Magnesium	101		P	85 - 115
Potassium	103		P	85 - 115
Sodium	103		P	85 - 115
Strontium	101		P	85 - 115
Tin	101		P	85 - 115
Titanium	101		P	85 - 115
Vanadium	100		P	85 - 115
Zinc	97.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P416378

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	101		P	85 - 115
Barium	104		P	85 - 115
Beryllium	93.8		P	85 - 115
Boron	107		P	85 - 115
Cadmium	96.1		P	85 - 115
Chromium	98.4		P	85 - 115
Cobalt	101		P	85 - 115
Lead	102		P	85 - 115
Manganese	98.6		P	85 - 115
Molybdenum	99.3		P	85 - 115
Selenium	99.0		P	85 - 115
Silver	98.9		P	85 - 115
Thallium	98.6		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P416616

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	99.5		P	85 - 115
Nickel	102		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P416378

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2338848	Calcium	105	105	P/P	80 - 120
2338848	Iron	98.8	104	P/P	80 - 120
2338848	Magnesium	100	103	P/P	80 - 120
2338848	Potassium	106	105	P/P	80 - 120
2338848	Sodium	101	105	P/P	80 - 120
2338848	Strontium	101	102	P/P	80 - 120
2338848	Tin	102	101	P/P	80 - 120
2338848	Titanium	102	102	P/P	80 - 120
2338848	Vanadium	101	100	P/P	80 - 120
2338848	Zinc	97.0	96.7	P/P	80 - 120
2339748	Calcium	105		P	80 - 120
2339748	Iron	105		P	80 - 120
2339748	Magnesium	104		P	80 - 120
2339748	Potassium	105		P	80 - 120
2339748	Sodium	106		P	80 - 120
2339748	Strontium	104		P	80 - 120
2339748	Tin	100		P	80 - 120
2339748	Titanium	104		P	80 - 120
2339748	Vanadium	103		P	80 - 120
2339748	Zinc	97.0		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P416378

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2338848	Aluminum	100	99.8	P/P	80 - 120
2338848	Antimony	98.6	99.3	P/P	80 - 120
2338848	Arsenic	97.4	99.5	P/P	80 - 120
2338848	Barium	102	103	P/P	80 - 120
2338848	Beryllium	94.2	94.3	P/P	80 - 120
2338848	Boron	105	104	P/P	80 - 120
2338848	Cadmium	94.7	95.3	P/P	80 - 120
2338848	Chromium	96.9	97.9	P/P	80 - 120
2338848	Cobalt	98.3	99.4	P/P	80 - 120
2338848	Lead	101	101	P/P	80 - 120
2338848	Manganese	96.2	96.4	P/P	80 - 120
2338848	Molybdenum	98.8	98.9	P/P	80 - 120
2338848	Selenium	95.8	98.1	P/P	80 - 120
2338848	Silver	97.0	97.4	P/P	80 - 120
2338848	Thallium	97.3	99.0	P/P	80 - 120
2339748	Aluminum	99.6		P	80 - 120
2339748	Antimony	101		P	80 - 120
2339748	Arsenic	102		P	80 - 120
2339748	Barium	103		P	80 - 120
2339748	Beryllium	96.2		P	80 - 120
2339748	Boron	105		P	80 - 120
2339748	Cadmium	95.4		P	80 - 120
2339748	Chromium	93.7		P	80 - 120
2339748	Cobalt	99.6		P	80 - 120
2339748	Lead	102		P	80 - 120
2339748	Manganese	96.1		P	80 - 120
2339748	Molybdenum	101		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P416378

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2339748	Selenium	97.8		P	80 - 120
2339748	Silver	96.3		P	80 - 120
2339748	Thallium	97.3		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P416616

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2339618	Copper	91.4	96.9	P/P	80 - 120
2339618	Nickel	91.6	97.4	P/P	80 - 120
2339698	Copper	98.2		P	80 - 120
2339698	Nickel	97.6		P	80 - 120

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P416378

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2338848	Calcium	0.135	Spike	P	0 - 20
2338848	Iron	5.50	Spike	P	0 - 20
2338848	Magnesium	2.46	Spike	P	0 - 20
2338848	Potassium	0.980	Spike	P	0 - 20
2338848	Sodium	2.79	Spike	P	0 - 20
2338848	Strontium	0.826	Spike	P	0 - 20
2338848	Tin	1.10	Spike	P	0 - 20
2338848	Titanium	0.371	Spike	P	0 - 20
2338848	Vanadium	0.343	Spike	P	0 - 20
2338848	Zinc	0.330	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P416378

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2338848	Aluminum	0.500	Spike	P	0 - 20
2338848	Antimony	0.754	Spike	P	0 - 20
2338848	Arsenic	2.07	Spike	P	0 - 20
2338848	Barium	0.873	Spike	P	0 - 20
2338848	Beryllium	0.146	Spike	P	0 - 20
2338848	Boron	0.344	Spike	P	0 - 20
2338848	Cadmium	0.588	Spike	P	0 - 20
2338848	Chromium	0.967	Spike	P	0 - 20
2338848	Cobalt	1.15	Spike	P	0 - 20
2338848	Lead	0.531	Spike	P	0 - 20
2338848	Manganese	0.202	Spike	P	0 - 20
2338848	Molybdenum	0.114	Spike	P	0 - 20
2338848	Selenium	2.31	Spike	P	0 - 20
2338848	Silver	0.413	Spike	P	0 - 20
2338848	Thallium	1.72	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P416616

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2339618	Copper	5.79	Spike	P	0 - 20
2339618	Nickel	6.08	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: A113424

Included Lab Sample IDs: 2339190

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.8	99.3	P/P	90 - 110
Antimony	96.9	98.1	P/P	90 - 110
Arsenic	100	101	P/P	90 - 110
Barium	99.1	99.0	P/P	90 - 110
Beryllium	93.0	96.2	P/P	90 - 110
Boron	99.8	100	P/P	90 - 110
Cadmium	97.1	97.1	P/P	90 - 110
Chromium	97.5	98.1	P/P	90 - 110
Cobalt	101	100	P/P	90 - 110
Lead	99.1	99.4	P/P	90 - 110
Manganese	96.6	98.3	P/P	90 - 110
Molybdenum	98.4	98.6	P/P	90 - 110
Selenium	98.1	97.6	P/P	90 - 110
Silver	99.6	98.4	P/P	90 - 110
Thallium	96.6	97.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A113427

Included Lab Sample IDs: 2339190

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	97.7	102	P/P	90 - 110
Iron	98.1	103	P/P	90 - 110
Magnesium	97.5	101	P/P	90 - 110
Potassium	99.7	101	P/P	90 - 110
Sodium	98.7	104	P/P	90 - 110
Strontium	96.4	102	P/P	90 - 110
Tin	94.7	98.2	P/P	90 - 110
Titanium	95.4	101	P/P	90 - 110
Vanadium	95.3	99.7	P/P	90 - 110
Zinc	92.2	94.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A113519

Included Lab Sample IDs: 2339190

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	94.1	92.4	P/P	90 - 110
Nickel	94.3	92.6	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 SMP	MS
			LCS				
EPA 200.7 Rev. 4.4	Calcium	104	105	105	105		0.135
	Iron	102	98.8	104	105		5.50
	Magnesium	101	100	103	104		2.46
	Potassium	103	106	105	105		0.980
	Sodium	103	101	105	106		2.79
	Strontium	101	101	102	104		0.826
	Tin	101	102	101	100		1.10
	Titanium	101	102	102	104		0.371
	Vanadium	100	103	101	100		0.343
	Zinc	97.5	97.0	96.7	97.0		0.330
EPA 200.8 Rev. 5.4	Aluminum	102	100	99.8	99.6		0.500
	Antimony	100	98.6	99.3	101		0.754
	Arsenic	101	97.4	99.5	102		2.07
	Barium	104	102	103	103		0.873
	Beryllium	93.8	94.2	94.3	96.2		0.146
	Boron	107	105	104	105		0.344
	Cadmium	96.1	94.7	95.3	95.4		0.588
	Chromium	98.4	96.9	97.9	93.7		0.967
	Cobalt	101	98.3	99.4	99.6		1.15
	Copper	99.5	91.4	96.9	98.2		5.79
	Lead	102	101	101	102		0.531
	Manganese	98.6	96.2	96.4	96.1		0.202
	Molybdenum	99.3	98.8	98.9	101		0.114
	Nickel	102	91.6	97.4	97.6		6.08
	Selenium	99.0	95.8	98.1	97.8		2.31
	Silver	98.9	97.0	97.4	96.3		0.413
	Thallium	98.6	97.3	99.0	97.3		1.72

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	2339190
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2339190
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2339190

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	07/06/2022	07/11/2022 09:57	Mackenzie Hunt	07/11/2022 19:07	McKinley C Carter	2339190
EPA 200.8 Rev. 5.4	07/06/2022	07/11/2022 09:57	Mackenzie Hunt	07/11/2022 16:33	Alexander Thompson	2339190
	07/06/2022	07/14/2022 09:21	Mackenzie Hunt	07/15/2022 00:37	Emily M Philpot	2339190
SM 2340 B-2011	07/06/2022			07/11/2022 19:07	McKinley C Carter	2339190