

Chemical Analysis Report

SE-DIST-2023-12-19-01

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

Event Description: **Port St. Lucie Run**
Request ID: **RQ-2023-11-06-54**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

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Certified by: Marek Topolski, Environmental Specialist III

Date Certified: 10-JAN-2024 09:10

A handwritten signature in black ink, appearing to read "Marek Topolski", with a stylized, flowing script.

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: North fork St Lucie River North Of Port St Lucie Blvd **Collection Date/Time: 12/18/2023 11:20**

Field ID: G2SE0070

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2457863	EPA 200.7 Rev. 4.4	Calcium	105		mg/L	P439262	
		Iron	260		ug/L	P439262	
		Magnesium	83.1		mg/L	P439262	
		Potassium	22.7		mg/L	P439262	
		Sodium	600		mg/L	P439262	
		Strontium	3.33E+03		ug/L	P439262	
		Tin	3.0	U	ug/L	P439262	
		Titanium	2.6	I	ug/L	P439262	
		Vanadium	2.0	U	ug/L	P439262	
		Zinc	5.0	U	ug/L	P439262	
	EPA 200.8 Rev. 5.4	Aluminum	75		ug/L	P439262	
		Antimony	0.091	I	ug/L	P439262	
		Arsenic	1.28		ug/L	P439262	
		Barium	34.4		ug/L	P439262	
		Beryllium	0.010	U	ug/L	P439262	
		Boron	257		ug/L	P439262	
		Cadmium	0.020	U	ug/L	P439262	
		Chromium	0.85	I	ug/L	P439262	
		Cobalt	0.062	I	ug/L	P439262	
		Copper	1.50		ug/L	P439262	
	SM 2340 B-2011	Lead	0.20	U	ug/L	P439262	
		Manganese	12.9		ug/L	P439262	
		Molybdenum	2.11		ug/L	P439262	
		Nickel	0.50	U	ug/L	P439262	
		Selenium	0.20	U	ug/L	P439262	
		Silver	0.010	U	ug/L	P439262	
		Thallium	0.10	U	ug/L	P439262	
		Hardness	605		mg/L	P439262	

Sample Location: North fork St Lucie River Prima Vista Blvd

Collection Date/Time: 12/18/2023 11:45

Field ID: G2SE0071

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2457864	EPA 200.7 Rev. 4.4	Calcium	81.1		mg/L	P439262	
		Iron	650		ug/L	P439262	
		Magnesium	26.2		mg/L	P439262	
		Potassium	7.1		mg/L	P439262	
		Sodium	161		mg/L	P439262	
		Strontium	2.76E+03		ug/L	P439262	
		Tin	3.0	U	ug/L	P439262	
		Titanium	3.4		ug/L	P439262	
		Vanadium	2.0	U	ug/L	P439262	
		Zinc	5.0	U	ug/L	P439262	
	EPA 200.8 Rev. 5.4	Aluminum	148		ug/L	P439262	
		Antimony	0.13	I	ug/L	P439262	
		Arsenic	1.17		ug/L	P439262	
		Barium	31.6		ug/L	P439262	
		Beryllium	0.013	I	ug/L	P439262	
		Boron	90.9		ug/L	P439262	
		Cadmium	0.020	U	ug/L	P439262	
		Chromium	1.1	I	ug/L	P439262	
		Cobalt	0.079	I	ug/L	P439262	
		Copper	1.93		ug/L	P439262	
		Lead	0.28	I	ug/L	P439262	
		Manganese	15.8		ug/L	P439262	
		Molybdenum	1.92		ug/L	P439262	
		Nickel	0.50	U	ug/L	P439262	
		Selenium	0.20	U	ug/L	P439262	
		Silver	0.010	U	ug/L	P439262	
		Thallium	0.10	U	ug/L	P439262	
	SM 2340 B-2011	Hardness	310		mg/L	P439262	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P439262

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: P439262

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: P439262

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	111		P	85 - 115
Iron	106		P	85 - 115
Magnesium	109		P	85 - 115
Potassium	99.5		P	85 - 115
Sodium	103		P	85 - 115
Strontium	99.8		P	85 - 115
Tin	102		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	101		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P439262

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.9		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	99.8		P	85 - 115
Barium	100		P	85 - 115
Beryllium	95.1		P	85 - 115
Boron	99.7		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	101		P	85 - 115
Cobalt	98.5		P	85 - 115
Copper	97.7		P	85 - 115
Lead	94.9		P	85 - 115
Manganese	99.9		P	85 - 115
Molybdenum	98.4		P	85 - 115
Nickel	99.2		P	85 - 115
Selenium	99.3		P	85 - 115
Silver	96.1		P	85 - 115
Thallium	98.5		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P439262

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457797	Calcium	107	107	P/P	80 - 120
2457797	Iron	103	104	P/P	80 - 120
2457797	Magnesium	107	107	P/P	80 - 120
2457797	Potassium	103	103	P/P	80 - 120
2457797	Sodium	100	98.0	P/P	80 - 120
2457797	Strontium	99.4	98.4	P/P	80 - 120
2457797	Tin	98.4	98.9	P/P	80 - 120
2457797	Titanium	100	100	P/P	80 - 120
2457797	Vanadium	100	99.8	P/P	80 - 120
2457797	Zinc	99.7	99.9	P/P	80 - 120
2458059	Calcium	105		P	80 - 120
2458059	Iron	104		P	80 - 120
2458059	Magnesium	105		P	80 - 120
2458059	Potassium	100		P	80 - 120
2458059	Sodium	101		P	80 - 120
2458059	Strontium	98.8		P	80 - 120
2458059	Tin	97.2		P	80 - 120
2458059	Titanium	101		P	80 - 120
2458059	Vanadium	101		P	80 - 120
2458059	Zinc	99.0		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P439262

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457797	Aluminum	99.0	100	P/P	80 - 120
2457797	Antimony	101	102	P/P	80 - 120
2457797	Arsenic	101	102	P/P	80 - 120
2457797	Barium	102	103	P/P	80 - 120
2457797	Beryllium	94.7	94.8	P/P	80 - 120
2457797	Boron	100	101	P/P	80 - 120
2457797	Cadmium	101	101	P/P	80 - 120
2457797	Chromium	103	103	P/P	80 - 120
2457797	Cobalt	100	101	P/P	80 - 120
2457797	Copper	102	102	P/P	80 - 120
2457797	Lead	96.3	96.6	P/P	80 - 120
2457797	Manganese	99.4	102	P/P	80 - 120
2457797	Molybdenum	99.1	99.5	P/P	80 - 120
2457797	Nickel	101	102	P/P	80 - 120
2457797	Selenium	100	103	P/P	80 - 120
2457797	Silver	95.9	96.4	P/P	80 - 120
2457797	Thallium	102	103	P/P	80 - 120
2458059	Aluminum	99.7		P	80 - 120
2458059	Antimony	104		P	80 - 120
2458059	Arsenic	99.7		P	80 - 120
2458059	Barium	101		P	80 - 120
2458059	Beryllium	94.3		P	80 - 120
2458059	Boron	106		P	80 - 120
2458059	Cadmium	103		P	80 - 120
2458059	Chromium	99.9		P	80 - 120
2458059	Cobalt	99.5		P	80 - 120
2458059	Copper	97.0		P	80 - 120

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P439262

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2458059	Lead	96.2		P	80 - 120
2458059	Manganese	102		P	80 - 120
2458059	Molybdenum	101		P	80 - 120
2458059	Nickel	100		P	80 - 120
2458059	Selenium	99.5		P	80 - 120
2458059	Silver	96.7		P	80 - 120
2458059	Thallium	103		P	80 - 120

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P439262

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457797	Calcium	0.676	Spike	P	0 - 20
2457797	Iron	0.705	Spike	P	0 - 20
2457797	Magnesium	0.407	Spike	P	0 - 20
2457797	Potassium	0.590	Spike	P	0 - 20
2457797	Sodium	1.39	Spike	P	0 - 20
2457797	Strontium	1.05	Spike	P	0 - 20
2457797	Tin	0.506	Spike	P	0 - 20
2457797	Titanium	0.00329	Spike	P	0 - 20
2457797	Vanadium	0.316	Spike	P	0 - 20
2457797	Zinc	0.220	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P439262

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457797	Aluminum	1.21	Spike	P	0 - 20
2457797	Antimony	0.946	Spike	P	0 - 20
2457797	Arsenic	0.476	Spike	P	0 - 20
2457797	Barium	1.27	Spike	P	0 - 20
2457797	Beryllium	0.105	Spike	P	0 - 20
2457797	Boron	0.710	Spike	P	0 - 20
2457797	Cadmium	0.0812	Spike	P	0 - 20
2457797	Chromium	0.130	Spike	P	0 - 20
2457797	Cobalt	1.21	Spike	P	0 - 20
2457797	Copper	0.588	Spike	P	0 - 20
2457797	Lead	0.329	Spike	P	0 - 20
2457797	Manganese	1.57	Spike	P	0 - 20
2457797	Molybdenum	0.428	Spike	P	0 - 20
2457797	Nickel	0.635	Spike	P	0 - 20
2457797	Selenium	2.98	Spike	P	0 - 20
2457797	Silver	0.546	Spike	P	0 - 20
2457797	Thallium	0.506	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: A123391

Included Lab Sample IDs: 2457863, 2457864

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.7	96.6	P/P	90 - 110
Antimony	98.9	97.9	P/P	90 - 110
Arsenic	98.5	94.8	P/P	90 - 110
Barium	98.2	95.7	P/P	90 - 110
Beryllium	97.1	94.1	P/P	90 - 110
Boron	94.6	99.5	P/P	90 - 110
Cadmium	95.8	95.3	P/P	90 - 110
Chromium	94.8	93.7	P/P	90 - 110
Cobalt	96.1	92.0	P/P	90 - 110
Copper	97.3	92.0	P/P	90 - 110
Lead	93.8	92.5	P/P	90 - 110
Manganese	95.1	93.9	P/P	90 - 110
Molybdenum	98.3	95.9	P/P	90 - 110
Nickel	96.9	91.8	P/P	90 - 110
Selenium	97.3	95.4	P/P	90 - 110
Silver	97.1	95.7	P/P	90 - 110
Thallium	98.5	97.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A123399

Included Lab Sample IDs: 2457863, 2457864

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	104	102	P/P	90 - 110
Calcium	105	104	P/P	90 - 110
Iron	101	99.5	P/P	90 - 110
Iron	103	101	P/P	90 - 110
Magnesium	101	99.1	P/P	90 - 110
Magnesium	102	101	P/P	90 - 110
Potassium	97.9	96.2	P/P	90 - 110
Potassium	98.5	97.9	P/P	90 - 110
Sodium	100	99.3	P/P	90 - 110
Sodium	99.3	97.8	P/P	90 - 110
Strontium	99.3	99.8	P/P	90 - 110
Strontium	99.8	102	P/P	90 - 110
Tin	100	101	P/P	90 - 110
Tin	98.7	100	P/P	90 - 110
Titanium	101	102	P/P	90 - 110
Titanium	99.6	101	P/P	90 - 110
Vanadium	101	101	P/P	90 - 110
Vanadium	99.0	101	P/P	90 - 110
Zinc	101	102	P/P	90 - 110
Zinc	102	103	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	111	107	107	105		0.676
	Iron	106	103	104	104		0.705
	Magnesium	109	107	107	105		0.407
	Potassium	99.5	103	103	100		0.590
	Sodium	103	100	98.0	101		1.39
	Strontium	99.8	99.4	98.4	98.8		1.05
	Tin	102	98.4	98.9	97.2		0.506
	Titanium	102	100	100	101		0.0032
	Vanadium	101	100	99.8	101		0.316
	Zinc	102	99.7	99.9	99.0		0.220
EPA 200.8 Rev. 5.4	Aluminum	97.9	99.0	100	99.7		1.21
	Antimony	101	101	102	104		0.946
	Arsenic	99.8	101	102	99.7		0.476
	Barium	100	102	103	101		1.27
	Beryllium	95.1	94.7	94.8	94.3		0.105
	Boron	99.7	100	101	106		0.710
	Cadmium	100	103	101	101		0.0812
	Chromium	101	103	103	99.9		0.130
	Cobalt	98.5	100	101	99.5		1.21
	Copper	97.7	102	102	97.0		0.588
	Lead	94.9	96.3	96.6	96.2		0.329
	Manganese	99.9	99.4	102	102		1.57
	Molybdenum	98.4	99.1	99.5	101		0.428
	Nickel	99.2	101	102	100		0.635
	Selenium	99.3	100	103	99.5		2.98
	Silver	96.1	95.9	96.4	96.7		0.546
	Thallium	98.5	102	103	103		0.506

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	2457863, 2457864
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2457863, 2457864
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2457863, 2457864

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	12/19/2023	12/20/2023 13:15	George D Taylor	12/21/2023 16:33	Samatha Luckman	2457863
	12/19/2023	12/20/2023 13:15	George D Taylor	12/21/2023 16:43	Samatha Luckman	2457863
	12/19/2023	12/20/2023 13:15	George D Taylor	12/21/2023 17:25	Samatha Luckman	2457864
EPA 200.8 Rev. 5.4	12/19/2023	12/20/2023 13:15	George D Taylor	12/21/2023 17:47	Emily M Philpot	2457863
	12/19/2023	12/20/2023 13:15	George D Taylor	12/21/2023 17:57	Emily M Philpot	2457864
SM 2340 B-2011	12/19/2023			12/21/2023 16:33	Samatha Luckman	2457863
	12/19/2023			12/21/2023 17:25	Samatha Luckman	2457864