

Chemical Analysis Report

SE-DIST-2023-08-16-01

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

Event Description: **Port St. Lucie Run**
Request ID: **RQ-2023-08-14-41**
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
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Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 06-SEP-2023 13:58



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 PRIMA VISTA BLVD **Collection Date/Time: 08/15/2023 10:30**

Field ID: G2SE0071

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2431442	EPA 200.7 Rev. 4.4	Calcium	65.2		mg/L	P433987	
		Iron	780		ug/L	P433987	
		Magnesium	13.7		mg/L	P433987	
		Potassium	4.1		mg/L	P433987	
		Sodium	83.1		mg/L	P433987	
		Strontium	2.10E+03		ug/L	P433987	
		Tin	3.0	U	ug/L	P433987	
		Titanium	2.7	I	ug/L	P433987	
		Vanadium	2.0	U	ug/L	P433987	
		Zinc	5.0	I	ug/L	P433987	
	EPA 200.8 Rev. 5.4	Aluminum	145		ug/L	P433987	
		Antimony	0.12	I	ug/L	P433987	
		Arsenic	1.76		ug/L	P433987	
		Barium	27.6		ug/L	P433987	
		Beryllium	0.021	I	ug/L	P433987	
		Boron	63.6		ug/L	P433987	
		Cadmium	0.020	U	ug/L	P433987	
		Chromium	0.56	I	ug/L	P433987	
		Cobalt	0.082		ug/L	P433987	
		Copper	3.07		ug/L	P433987	
		Lead	0.29	I	ug/L	P433987	
		Manganese	26.1		ug/L	P433987	
		Molybdenum	1.39		ug/L	P433987	
		Nickel	0.50	U	ug/L	P433987	
		Selenium	0.20	U	ug/L	P433987	
		Silver	0.010	U	ug/L	P433987	
		Thallium	0.10	U	ug/L	P433987	
	SM 2340 B-2011	Hardness	219		mg/L	P433987	

**Sample Location: NORTH FORK ST LUCIE RIVER NORTH OF
 PORT ST LUCIE BLVD**

Collection Date/Time: 08/15/2023 11:00

Field ID: G2SE0070

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2431443	EPA 200.7 Rev. 4.4	Calcium	63.3		mg/L	P433987	
		Iron	390		ug/L	P433987	
		Magnesium	15.4		mg/L	P433987	
		Potassium	4.7		mg/L	P433987	
		Sodium	96.4		mg/L	P433987	
		Strontium	2.09E+03		ug/L	P433987	
		Tin	3.0	U	ug/L	P433987	
		Titanium	1.5	I	ug/L	P433987	
		Vanadium	2.0	U	ug/L	P433987	
		Zinc	5.0	U	ug/L	P433987	
	EPA 200.8 Rev. 5.4	Aluminum	100		ug/L	P433987	
		Antimony	0.11	I	ug/L	P433987	
		Arsenic	1.79		ug/L	P433987	
		Barium	26.9		ug/L	P433987	
		Beryllium	0.015	I	ug/L	P433987	
		Boron	72.0		ug/L	P433987	
		Cadmium	0.020	U	ug/L	P433987	
		Chromium	0.46	I	ug/L	P433987	
		Cobalt	0.068	I	ug/L	P433987	
		Copper	1.80		ug/L	P433987	
	SM 2340 B-2011	Lead	0.20	U	ug/L	P433987	
		Manganese	15.8		ug/L	P433987	
		Molybdenum	1.54		ug/L	P433987	
		Nickel	0.50	U	ug/L	P433987	
		Selenium	0.20	U	ug/L	P433987	
		Silver	0.010	U	ug/L	P433987	
		Thallium	0.10	U	ug/L	P433987	
		Hardness	221		mg/L	P433987	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P433987

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: P433987

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: P433987

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	98.2		P	80 - 120
Iron	100		P	80 - 120
Magnesium	97.9		P	80 - 120
Potassium	97.8		P	80 - 120
Sodium	99.2		P	80 - 120
Strontium	103		P	80 - 120
Tin	100		P	80 - 120
Titanium	99.3		P	80 - 120
Vanadium	100		P	80 - 120
Zinc	103		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P433987

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.1		P	85 - 115
Antimony	99.2		P	85 - 115
Arsenic	98.3		P	85 - 115
Barium	101		P	85 - 115
Beryllium	97.1		P	85 - 115
Boron	97.2		P	85 - 115
Cadmium	98.2		P	85 - 115
Chromium	95.8		P	85 - 115
Cobalt	96.2		P	85 - 115
Copper	96.8		P	85 - 115
Lead	91.4		P	85 - 115
Manganese	96.6		P	85 - 115
Molybdenum	96.8		P	85 - 115
Nickel	97.2		P	85 - 115
Selenium	98.9		P	85 - 115
Silver	110		P	85 - 115
Thallium	98.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P433987

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431032	Calcium	95.8		P	80 - 120
2431032	Iron	101	101	P/P	80 - 120
2431032	Magnesium	95.7		P	80 - 120
2431032	Potassium	96.0	98.1	P/P	80 - 120
2431032	Sodium	99.3		P	80 - 120
2431032	Strontium	103	104	P/P	80 - 120
2431032	Tin	100	101	P/P	80 - 120
2431032	Titanium	99.4	99.4	P/P	80 - 120
2431032	Vanadium	101	101	P/P	80 - 120
2431032	Zinc	101	99.7	P/P	80 - 120
2431167	Calcium	101		P	80 - 120
2431167	Iron	103		P	80 - 120
2431167	Magnesium	103		P	80 - 120
2431167	Potassium	103		P	80 - 120
2431167	Sodium	109		P	80 - 120
2431167	Strontium	108		P	80 - 120
2431167	Tin	99.9		P	80 - 120
2431167	Titanium	101		P	80 - 120
2431167	Vanadium	104		P	80 - 120
2431167	Zinc	105		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P433987

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431032	Aluminum	95.6	96.2	P/P	80 - 120
2431032	Antimony	100	102	P/P	80 - 120
2431032	Arsenic	97.1	98.0	P/P	80 - 120
2431032	Barium	99.9	101	P/P	80 - 120
2431032	Beryllium	95.5	93.6	P/P	80 - 120
2431032	Boron	100	104	P/P	80 - 120
2431032	Cadmium	98.0	98.0	P/P	80 - 120
2431032	Chromium	95.1	96.3	P/P	80 - 120
2431032	Cobalt	92.3	93.7	P/P	80 - 120
2431032	Copper	92.9	93.2	P/P	80 - 120
2431032	Lead	92.0	92.8	P/P	80 - 120
2431032	Manganese	94.4	98.8	P/P	80 - 120
2431032	Molybdenum	96.9	99.1	P/P	80 - 120
2431032	Nickel	92.6	93.0	P/P	80 - 120
2431032	Selenium	96.2	97.2	P/P	80 - 120
2431032	Silver	108	110	P/P	80 - 120
2431032	Thallium	102	103	P/P	80 - 120
2431167	Aluminum	97.1		P	80 - 120
2431167	Antimony	97.2		P	80 - 120
2431167	Arsenic	94.8		P	80 - 120
2431167	Barium	100		P	80 - 120
2431167	Beryllium	91.5		P	80 - 120
2431167	Boron	101		P	80 - 120
2431167	Cadmium	99.3		P	80 - 120
2431167	Chromium	98.0		P	80 - 120
2431167	Cobalt	93.6		P	80 - 120
2431167	Copper	96.3		P	80 - 120

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P433987

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431167	Lead	90.1		P	80 - 120
2431167	Manganese	97.0		P	80 - 120
2431167	Molybdenum	95.4		P	80 - 120
2431167	Nickel	97.5		P	80 - 120
2431167	Selenium	95.7		P	80 - 120
2431167	Silver	108		P	80 - 120
2431167	Thallium	99.1		P	80 - 120

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P433987

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431032	Calcium	2.95	Spike	P	0 - 20
2431032	Iron	0.437	Spike	P	0 - 20
2431032	Magnesium	0.347	Spike	P	0 - 20
2431032	Potassium	1.74	Spike	P	0 - 20
2431032	Sodium	1.78	Spike	P	0 - 20
2431032	Strontium	1.36	Spike	P	0 - 20
2431032	Tin	0.467	Spike	P	0 - 20
2431032	Titanium	0.0789	Spike	P	0 - 20
2431032	Vanadium	0.464	Spike	P	0 - 20
2431032	Zinc	0.892	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P433987

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431032	Aluminum	0.488	Spike	P	0 - 20
2431032	Antimony	2.07	Spike	P	0 - 20
2431032	Arsenic	0.905	Spike	P	0 - 20
2431032	Barium	1.54	Spike	P	0 - 20
2431032	Beryllium	1.84	Spike	P	0 - 20
2431032	Boron	2.66	Spike	P	0 - 20
2431032	Cadmium	0.0324	Spike	P	0 - 20
2431032	Chromium	1.19	Spike	P	0 - 20
2431032	Cobalt	1.50	Spike	P	0 - 20
2431032	Copper	0.319	Spike	P	0 - 20
2431032	Lead	0.854	Spike	P	0 - 20
2431032	Manganese	2.26	Spike	P	0 - 20
2431032	Molybdenum	1.86	Spike	P	0 - 20
2431032	Nickel	0.471	Spike	P	0 - 20
2431032	Selenium	1.06	Spike	P	0 - 20
2431032	Silver	2.18	Spike	P	0 - 20
2431032	Thallium	1.80	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: A121137

Included Lab Sample IDs: 2431442, 2431443

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	95.7	P/P	90 - 110
Calcium	101	101	P/P	90 - 110
Iron	99.4	99.7	P/P	90 - 110
Iron	99.7	96.5	P/P	90 - 110
Magnesium	98.9	99.5	P/P	90 - 110
Magnesium	99.5	96.7	P/P	90 - 110
Potassium	97.9	95.2	P/P	90 - 110
Potassium	98.2	97.9	P/P	90 - 110
Sodium	105	99.2	P/P	90 - 110
Sodium	105	105	P/P	90 - 110
Strontium	101	99.1	P/P	90 - 110
Strontium	102	101	P/P	90 - 110
Tin	95.6	95.6	P/P	90 - 110
Tin	95.6	97.3	P/P	90 - 110
Titanium	97.0	97.6	P/P	90 - 110
Titanium	97.4	97.0	P/P	90 - 110
Vanadium	96.3	97.2	P/P	90 - 110
Vanadium	96.6	96.3	P/P	90 - 110
Zinc	96.8	97.7	P/P	90 - 110
Zinc	97.7	98.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A121144

Included Lab Sample IDs: 2431442, 2431443

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.8	97.0	P/P	90 - 110
Antimony	99.0	98.6	P/P	90 - 110
Arsenic	96.8	97.1	P/P	90 - 110
Barium	99.7	98.3	P/P	90 - 110
Beryllium	96.7	95.4	P/P	90 - 110
Boron	99.3	102	P/P	90 - 110
Cadmium	101	99.8	P/P	90 - 110
Chromium	100	99.7	P/P	90 - 110
Cobalt	95.3	94.7	P/P	90 - 110
Copper	95.0	94.8	P/P	90 - 110
Lead	91.2	90.9	P/P	90 - 110
Manganese	100	100	P/P	90 - 110
Molybdenum	97.9	97.2	P/P	90 - 110
Nickel	95.9	95.3	P/P	90 - 110
Selenium	97.6	98.2	P/P	90 - 110
Silver	96.6	96.3	P/P	90 - 110
Thallium	97.3	96.9	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	98.2	95.8	101			2.95
	Iron	100	101	101	103		0.437
	Magnesium	97.9	95.7	103			0.347
	Potassium	97.8	96.0	98.1	103		1.74
	Sodium	99.2	99.3	109			1.78
	Strontium	103	103	104	108		1.36
	Tin	100	100	101	99.9		0.467
	Titanium	99.3	99.4	99.4	101		0.0789
	Vanadium	100	101	101	104		0.464
	Zinc	103	101	99.7	105		0.892
EPA 200.8 Rev. 5.4	Aluminum	97.1	95.6	96.2	97.1		0.488
	Antimony	99.2	100	102	97.2		2.07
	Arsenic	98.3	97.1	98.0	94.8		0.905
	Barium	101	99.9	101	100		1.54
	Beryllium	97.1	95.5	93.6	91.5		1.84
	Boron	97.2	100	104	101		2.66
	Cadmium	98.2	98.0	98.0	99.3		0.0324
	Chromium	95.8	95.1	96.3	98.0		1.19
	Cobalt	96.2	92.3	93.7	93.6		1.50
	Copper	96.8	92.9	93.2	96.3		0.319
	Lead	91.4	92.0	92.8	90.1		0.854
	Manganese	96.6	94.4	98.8	97.0		2.26
	Molybdenum	96.8	96.9	99.1	95.4		1.86
	Nickel	97.2	92.6	93.0	97.5		0.471
	Selenium	98.9	96.2	97.2	95.7		1.06
	Silver	110	108	110	108		2.18
	Thallium	98.6	102	103	99.1		1.80

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	2431442, 2431443
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2431442, 2431443
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2431442, 2431443

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	08/16/2023	08/17/2023 13:10	George D Taylor	08/18/2023 19:08	McKinley C Carter	2431442
	08/16/2023	08/17/2023 13:10	George D Taylor	08/18/2023 19:44	McKinley C Carter	2431443
EPA 200.8 Rev. 5.4	08/16/2023	08/17/2023 13:10	George D Taylor	08/18/2023 20:03	Conrad Hartmann	2431442
	08/16/2023	08/17/2023 13:10	George D Taylor	08/18/2023 20:13	Conrad Hartmann	2431443
SM 2340 B-2011	08/16/2023			08/18/2023 19:08	McKinley C Carter	2431442
	08/16/2023			08/18/2023 19:44	McKinley C Carter	2431443