Chemical Analysis Report

SE-DIST-2023-05-10-01

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

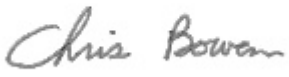
Event Description: **SMP - Port St. Lucie Boat**
Request ID: **RQ-2023-05-01-50**
Customer: **SE-DIST**
Project ID: **SMP**

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

For additional information please contact
Colin Wright, Ph.D.
Chris Bowen, B.S.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Chris Bowen, Environmental Administrator

Date Certified: 19-MAY-2023 09:47



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: 05/09/2023 12:15**

Field ID: G2SE0071 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2408637	EPA 200.7 Rev. 4.4	Calcium	89.6		mg/L	P429734	
		Iron	640		ug/L	P429734	
		Magnesium	23.4		mg/L	P429734	
		Potassium	7.0		mg/L	P429734	
		Sodium	139		mg/L	P429734	
		Strontium	3.52E+03		ug/L	P429734	
		Tin	3.0	U	ug/L	P429734	
		Titanium	1.0	I	ug/L	P429734	
		Vanadium	2.0	U	ug/L	P429734	
		Zinc	5.0	U	ug/L	P429734	
	EPA 200.8 Rev. 5.4	Aluminum	154		ug/L	P429734	
		Antimony	0.13	I	ug/L	P429734	
		Arsenic	1.65		ug/L	P429734	
		Barium	37.1		ug/L	P429734	
		Beryllium	0.015	I	ug/L	P429734	
		Boron	83.2		ug/L	P429734	
		Cadmium	0.020	U	ug/L	P429734	
		Chromium	0.57	I	ug/L	P429734	
		Cobalt	0.098		ug/L	P429734	
		Copper	2.82		ug/L	P429734	
		Lead	0.29	I	ug/L	P429734	
		Manganese	25.8		ug/L	P429734	
		Molybdenum	2.65		ug/L	P429734	
		Nickel	0.53	I	ug/L	P429734	
		Selenium	0.20	U	ug/L	P429734	
		Silver	0.010	U	ug/L	P429734	
		Thallium	0.10	U	ug/L	P429734	
	SM 2340 B-2011	Hardness	320		mg/L	P429734	

Sample Location: NORTH FORK ST LUCIE RIVER NORTH OF PORT ST LUCIE BLVD **Collection Date/Time: 05/09/2023 11:30**

Field ID: G2SE0070 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2408638	EPA 200.7 Rev. 4.4	Calcium	81.5		mg/L	P429734	
		Iron	350		ug/L	P429734	
		Magnesium	25.3		mg/L	P429734	
		Potassium	7.9		mg/L	P429734	
		Sodium	154		mg/L	P429734	
		Strontium	3.29E+03		ug/L	P429734	
		Tin	3.0	U	ug/L	P429734	
		Titanium	0.75	U	ug/L	P429734	
		Vanadium	2.0	U	ug/L	P429734	
		Zinc	5.0	U	ug/L	P429734	
	EPA 200.8 Rev. 5.4	Aluminum	101		ug/L	P429734	
		Antimony	0.13	I	ug/L	P429734	
		Arsenic	1.65		ug/L	P429734	
		Barium	32.5		ug/L	P429734	
		Beryllium	0.013	I	ug/L	P429734	
		Boron	92.4		ug/L	P429734	
		Cadmium	0.020	U	ug/L	P429734	
		Chromium	0.48	I	ug/L	P429734	
		Cobalt	0.072	I	ug/L	P429734	
		Copper	3.04		ug/L	P429734	
		Lead	0.20	I	ug/L	P429734	
		Manganese	15.0		ug/L	P429734	
		Molybdenum	2.62		ug/L	P429734	
		Nickel	0.56	I	ug/L	P429734	
		Selenium	0.20	U	ug/L	P429734	
		Silver	0.010	U	ug/L	P429734	
		Thallium	0.10	U	ug/L	P429734	
	SM 2340 B-2011	Hardness	308		mg/L	P429734	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P429734

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: P429734

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: P429734

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	100		P	85 - 115
Sodium	105		P	85 - 115
Strontium	104		P	85 - 115
Tin	104		P	85 - 115
Titanium	101		P	85 - 115
Vanadium	103		P	85 - 115
Zinc	108		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429734

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	103		P	85 - 115
Arsenic	99.7		P	85 - 115
Barium	102		P	85 - 115
Beryllium	98.1		P	85 - 115
Boron	103		P	85 - 115
Cadmium	99.8		P	85 - 115
Chromium	98.2		P	85 - 115
Cobalt	102		P	85 - 115
Copper	98.1		P	85 - 115
Lead	102		P	85 - 115
Manganese	99.5		P	85 - 115
Molybdenum	99.1		P	85 - 115
Nickel	98.7		P	85 - 115
Selenium	99.2		P	85 - 115
Silver	107		P	85 - 115
Thallium	100		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P429734

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2408260	Calcium	100	103	P/P	80 - 120
2408260	Iron	102	104	P/P	80 - 120
2408260	Magnesium	101	103	P/P	80 - 120
2408260	Potassium	101	102	P/P	80 - 120
2408260	Sodium	106	106	P/P	80 - 120
2408260	Strontium	104	104	P/P	80 - 120
2408260	Tin	102	103	P/P	80 - 120
2408260	Titanium	103	102	P/P	80 - 120
2408260	Vanadium	103	103	P/P	80 - 120
2408260	Zinc	108	107	P/P	80 - 120
2408656	Calcium	102		P	80 - 120
2408656	Iron	105		P	80 - 120
2408656	Magnesium	101		P	80 - 120
2408656	Potassium	103		P	80 - 120
2408656	Sodium	106		P	80 - 120
2408656	Strontium	105		P	80 - 120
2408656	Tin	101		P	80 - 120
2408656	Titanium	102		P	80 - 120
2408656	Vanadium	104		P	80 - 120
2408656	Zinc	109		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429734

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2408260	Aluminum	101	101	P/P	80 - 120
2408260	Antimony	103	103	P/P	80 - 120
2408260	Arsenic	100	101	P/P	80 - 120
2408260	Barium	104	104	P/P	80 - 120
2408260	Beryllium	95.5	96.7	P/P	80 - 120
2408260	Boron	103	104	P/P	80 - 120
2408260	Cadmium	102	103	P/P	80 - 120
2408260	Chromium	100	100	P/P	80 - 120
2408260	Cobalt	103	104	P/P	80 - 120
2408260	Copper	100	100	P/P	80 - 120
2408260	Lead	104	105	P/P	80 - 120
2408260	Manganese	102	102	P/P	80 - 120
2408260	Molybdenum	99.5	101	P/P	80 - 120
2408260	Nickel	99.4	99.3	P/P	80 - 120
2408260	Selenium	101	101	P/P	80 - 120
2408260	Silver	104	104	P/P	80 - 120
2408260	Thallium	102	105	P/P	80 - 120
2408656	Aluminum	100		P	80 - 120
2408656	Antimony	104		P	80 - 120
2408656	Arsenic	103		P	80 - 120
2408656	Barium	104		P	80 - 120
2408656	Beryllium	98.2		P	80 - 120
2408656	Boron	102		P	80 - 120
2408656	Cadmium	101		P	80 - 120
2408656	Chromium	97.2		P	80 - 120
2408656	Cobalt	101		P	80 - 120
2408656	Copper	99.1		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429734

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2408656	Lead	104		P	80 - 120
2408656	Manganese	98.7		P	80 - 120
2408656	Molybdenum	102		P	80 - 120
2408656	Nickel	98.5		P	80 - 120
2408656	Selenium	102		P	80 - 120
2408656	Silver	102		P	80 - 120
2408656	Thallium	103		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P429734

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2408260	Calcium	1.53	Spike	P	0 - 20
2408260	Iron	1.69	Spike	P	0 - 20
2408260	Magnesium	1.53	Spike	P	0 - 20
2408260	Potassium	0.862	Spike	P	0 - 20
2408260	Sodium	0.0486	Spike	P	0 - 20
2408260	Strontium	0.373	Spike	P	0 - 20
2408260	Tin	0.887	Spike	P	0 - 20
2408260	Titanium	1.30	Spike	P	0 - 20
2408260	Vanadium	0.396	Spike	P	0 - 20
2408260	Zinc	0.980	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429734

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2408260	Aluminum	0.515	Spike	P	0 - 20
2408260	Antimony	0.416	Spike	P	0 - 20
2408260	Arsenic	0.531	Spike	P	0 - 20
2408260	Barium	0.346	Spike	P	0 - 20
2408260	Beryllium	1.06	Spike	P	0 - 20
2408260	Boron	1.40	Spike	P	0 - 20
2408260	Cadmium	1.62	Spike	P	0 - 20
2408260	Chromium	0.179	Spike	P	0 - 20
2408260	Cobalt	0.349	Spike	P	0 - 20
2408260	Copper	0.138	Spike	P	0 - 20
2408260	Lead	0.962	Spike	P	0 - 20
2408260	Manganese	0.309	Spike	P	0 - 20
2408260	Molybdenum	1.42	Spike	P	0 - 20
2408260	Nickel	0.0693	Spike	P	0 - 20
2408260	Selenium	0.488	Spike	P	0 - 20
2408260	Silver	0.0980	Spike	P	0 - 20
2408260	Thallium	3.07	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: A119153
Included Lab Sample IDs: 2408637, 2408638

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	99.1	P/P	90 - 110
Antimony	101	101	P/P	90 - 110
Arsenic	99.4	99.3	P/P	90 - 110
Barium	100	100	P/P	90 - 110
Beryllium	98.4	98.7	P/P	90 - 110
Boron	101	97.6	P/P	90 - 110
Cadmium	99.7	101	P/P	90 - 110
Chromium	98.8	99.4	P/P	90 - 110
Cobalt	102	102	P/P	90 - 110
Copper	96.4	97.3	P/P	90 - 110
Lead	102	102	P/P	90 - 110
Manganese	100	101	P/P	90 - 110
Molybdenum	98.4	99.3	P/P	90 - 110
Nickel	98.7	98.2	P/P	90 - 110
Selenium	101	100	P/P	90 - 110
Thallium	102	99.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A119177
Included Lab Sample IDs: 2408637, 2408638

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	101	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A119207
Included Lab Sample IDs: 2408637, 2408638

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	102	P/P	90 - 110
Iron	102	103	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	101	102	P/P	90 - 110
Sodium	106	106	P/P	90 - 110
Strontium	103	103	P/P	90 - 110
Tin	100	101	P/P	90 - 110
Titanium	100	99.7	P/P	90 - 110
Vanadium	100	99.9	P/P	90 - 110
Zinc	104	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		
						LCS	SMP	MS
EPA 200.7 Rev. 4.4	Calcium	101	100	103	102			1.53
	Iron	102	102	104	105			1.69
	Magnesium	101	101	103	101			1.53
	Potassium	100	101	102	103			0.862
	Sodium	105	106	106	106			0.0486
	Strontium	104	104	104	105			0.373
	Tin	104	102	103	101			0.887
	Titanium	101	103	102	102			1.30
	Vanadium	103	103	103	104			0.396
	Zinc	108	108	107	109			0.980
EPA 200.8 Rev. 5.4	Aluminum	101	101	101	100			0.515
	Antimony	103	103	103	104			0.416
	Arsenic	99.7	100	101	103			0.531
	Barium	102	104	104	104			0.346
	Beryllium	98.1	95.5	96.7	98.2			1.06
	Boron	103	103	104	102			1.40
	Cadmium	99.8	102	103	101			1.62
	Chromium	98.2	100	100	97.2			0.179
	Cobalt	102	103	104	101			0.349
	Copper	98.1	100	100	99.1			0.138
	Lead	102	104	105	104			0.962
	Manganese	99.5	102	102	98.7			0.309
	Molybdenum	99.1	99.5	101	102			1.42
	Nickel	98.7	99.4	99.3	98.5			0.0693
	Selenium	99.2	101	101	102			0.488
	Silver	107	104	104	102			0.0980
	Thallium	100	102	105	103			3.07

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	2408637, 2408638
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2408637, 2408638
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2408637, 2408638

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	05/10/2023	05/11/2023 13:35	George D Taylor	05/16/2023 23:18	McKinley C Carter	2408637
	05/10/2023	05/11/2023 13:35	George D Taylor	05/16/2023 23:34	McKinley C Carter	2408638
EPA 200.8 Rev. 5.4	05/10/2023	05/11/2023 13:35	George D Taylor	05/12/2023 20:42	Conrad Hartmann	2408637
	05/10/2023	05/11/2023 13:35	George D Taylor	05/12/2023 20:51	Conrad Hartmann	2408638
	05/10/2023	05/11/2023 13:35	George D Taylor	05/15/2023 17:03	Conrad Hartmann	2408637
	05/10/2023	05/11/2023 13:35	George D Taylor	05/15/2023 17:09	Conrad Hartmann	2408638
SM 2340 B-2011	05/10/2023			05/16/2023 23:18	McKinley C Carter	2408637
	05/10/2023			05/16/2023 23:34	McKinley C Carter	2408638