

Chemical Analysis Report

CEN-DIST-2022-03-24-04

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

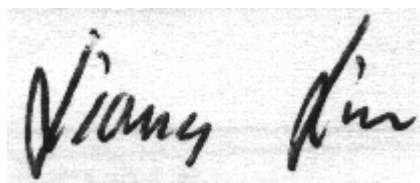
Event Description: **Nutrient Kit + Metals + Phytoplankton**
Request ID: **RQ-2022-03-21-36**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Matt Bearden

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

Certified by: Liang Lin, Environmental Administrator

Date Certified: 08-APR-2022 15:55

A handwritten signature in black ink, appearing to read "Liang Lin", is shown on a light-colored background.

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: Lake Terrace SW of Center

Collection Date/Time: 03/23/2022 12:16

Field ID: G4CE0215

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2314495	EPA 200.7 Rev. 4.4	Calcium	19.6		mg/L	P411642	
		Iron	30	U	ug/L	P411642	
		Magnesium	2.76		mg/L	P411642	
		Potassium	3.6		mg/L	P411642	
		Sodium	12.8		mg/L	P411642	
		Strontium	46.6		ug/L	P411642	
		Tin	3.0	U	ug/L	P411642	
		Titanium	0.86	I	ug/L	P411642	
		Vanadium	3.7	I	ug/L	P411642	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P411642	
		Aluminum	99		ug/L	P411642	
		Antimony	0.29		ug/L	P411642	
		Arsenic	0.49		ug/L	P411642	
		Barium	16.3		ug/L	P411642	
		Beryllium	0.010	U	ug/L	P411642	
		Boron**	32.0		ug/L	P411642	
		Cadmium	0.020	U	ug/L	P411642	
		Chromium	0.40	U	ug/L	P411934	
		Cobalt	0.041	I	ug/L	P411642	
		Copper	4.44		ug/L	P411642	
		Lead	0.38	I	ug/L	P411642	
		Manganese	8.37		ug/L	P411642	
		Molybdenum	0.51	I	ug/L	P411642	
		Nickel	0.50	U	ug/L	P411642	
		Selenium	0.20	U	ug/L	P411642	
		Silver	0.010	U	ug/L	P411642	
		Thallium	0.10	U	ug/L	P411642	
	SM 2340B	Hardness	60.2		mg/L	P411642	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P411642

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: P411642

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
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

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P411934

Component	Result	Code	Units
Chromium	0.40	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P411642

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	103		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	102		P	85 - 115
Sodium	99.2		P	85 - 115
Strontium	100		P	85 - 115
Tin	102		P	85 - 115
Titanium	99.3		P	85 - 115
Vanadium	94.1		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P411642

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	98.4		P	85 - 115
Arsenic	101		P	85 - 115
Barium	101		P	85 - 115
Beryllium	93.7		P	85 - 115
Boron	103		P	85 - 115
Cadmium	97.2		P	85 - 115
Cobalt	99.9		P	85 - 115
Copper	98.4		P	85 - 115
Lead	98.3		P	85 - 115
Manganese	94.7		P	85 - 115
Molybdenum	99.4		P	85 - 115
Nickel	101		P	85 - 115
Selenium	98.6		P	85 - 115
Silver	102		P	85 - 115
Thallium	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P411934

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chromium	95.7		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P411642

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314301	Calcium	98.7		P	80 - 120
2314301	Iron	104		P	80 - 120
2314301	Magnesium	98.5		P	80 - 120
2314301	Potassium	101		P	80 - 120
2314301	Sodium	98.9		P	80 - 120
2314301	Strontium	101		P	80 - 120
2314301	Tin	102		P	80 - 120
2314301	Titanium	101		P	80 - 120
2314301	Vanadium	95.4		P	80 - 120
2314301	Zinc	100		P	80 - 120
2314495	Calcium	99.4		P	80 - 120
2314495	Iron	105	104	P/P	80 - 120
2314495	Magnesium	104	102	P/P	80 - 120
2314495	Potassium	97.6	101	P/P	80 - 120
2314495	Sodium	98.7		P	80 - 120
2314495	Strontium	99.6	99.7	P/P	80 - 120
2314495	Tin	102	102	P/P	80 - 120
2314495	Titanium	99.5	100	P/P	80 - 120
2314495	Vanadium	95.3	96.1	P/P	80 - 120
2314495	Zinc	103	104	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P411642

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314301	Aluminum	102		P	80 - 120
2314301	Antimony	104		P	80 - 120
2314301	Arsenic	99.8		P	80 - 120
2314301	Barium	103		P	80 - 120
2314301	Beryllium	93.0		P	80 - 120
2314301	Boron	106		P	80 - 120
2314301	Cadmium	101		P	80 - 120
2314301	Cobalt	98.2		P	80 - 120
2314301	Copper	96.3		P	80 - 120
2314301	Lead	98.4		P	80 - 120
2314301	Manganese	98.5		P	80 - 120
2314301	Molybdenum	98.1		P	80 - 120
2314301	Nickel	93.2		P	80 - 120
2314301	Selenium	98.2		P	80 - 120
2314301	Silver	102		P	80 - 120
2314301	Thallium	103		P	80 - 120
2314495	Aluminum	100	101	P/P	80 - 120
2314495	Antimony	101	102	P/P	80 - 120
2314495	Arsenic	101	103	P/P	80 - 120
2314495	Barium	102	103	P/P	80 - 120
2314495	Beryllium	96.3	95.1	P/P	80 - 120
2314495	Boron	105	106	P/P	80 - 120
2314495	Cadmium	99.2	101	P/P	80 - 120
2314495	Cobalt	101	102	P/P	80 - 120
2314495	Copper	98.8	99.7	P/P	80 - 120
2314495	Lead	99.6	100	P/P	80 - 120
2314495	Manganese	97.9	98.6	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411642

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314495	Molybdenum	103	103	P/P	80 - 120
2314495	Nickel	103	102	P/P	80 - 120
2314495	Selenium	101	101	P/P	80 - 120
2314495	Silver	102	102	P/P	80 - 120
2314495	Thallium	103	105	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411934

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314456	Chromium	94.5		P	80 - 120
2314614	Chromium	93.7	91.1	P/P	80 - 120

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P411642

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314495	Calcium	0.810	Spike	P	0 - 20
2314495	Iron	1.38	Spike	P	0 - 20
2314495	Magnesium	1.11	Spike	P	0 - 20
2314495	Potassium	1.95	Spike	P	0 - 20
2314495	Sodium	1.09	Spike	P	0 - 20
2314495	Strontium	0.0447	Spike	P	0 - 20
2314495	Tin	0.216	Spike	P	0 - 20
2314495	Titanium	0.607	Spike	P	0 - 20
2314495	Vanadium	0.836	Spike	P	0 - 20
2314495	Zinc	0.968	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P411642

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314495	Aluminum	1.11	Spike	P	0 - 20
2314495	Antimony	0.927	Spike	P	0 - 20
2314495	Arsenic	1.54	Spike	P	0 - 20
2314495	Barium	0.717	Spike	P	0 - 20
2314495	Beryllium	1.32	Spike	P	0 - 20
2314495	Boron	0.875	Spike	P	0 - 20
2314495	Cadmium	1.64	Spike	P	0 - 20
2314495	Cobalt	0.275	Spike	P	0 - 20
2314495	Copper	0.746	Spike	P	0 - 20
2314495	Lead	0.439	Spike	P	0 - 20
2314495	Manganese	0.592	Spike	P	0 - 20
2314495	Molybdenum	0.0746	Spike	P	0 - 20
2314495	Nickel	0.894	Spike	P	0 - 20
2314495	Selenium	0.363	Spike	P	0 - 20
2314495	Silver	0.0672	Spike	P	0 - 20
2314495	Thallium	1.51	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P411934

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314614	Chromium	2.76	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: A111216

Included Lab Sample IDs: 2314495

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.8	99.4	P/P	90 - 110
Iron	102	102	P/P	90 - 110
Magnesium	102	102	P/P	90 - 110
Potassium	103	103	P/P	90 - 110
Sodium	99.5	99.5	P/P	90 - 110
Strontium	96.1	96.9	P/P	90 - 110
Tin	97.9	99.4	P/P	90 - 110
Titanium	96.0	97.3	P/P	90 - 110
Vanadium	96.6	97.9	P/P	90 - 110
Zinc	102	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A111218

Included Lab Sample IDs: 2314495

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	104	105	P/P	90 - 110
Antimony	98.1	99.2	P/P	90 - 110
Arsenic	104	103	P/P	90 - 110
Barium	102	101	P/P	90 - 110
Beryllium	97.8	96.8	P/P	90 - 110
Boron	102	107	P/P	90 - 110
Cadmium	101	102	P/P	90 - 110
Cobalt	103	101	P/P	90 - 110
Copper	103	102	P/P	90 - 110
Lead	101	99.8	P/P	90 - 110
Manganese	98.2	99.6	P/P	90 - 110
Molybdenum	103	102	P/P	90 - 110
Nickel	103	102	P/P	90 - 110
Selenium	101	101	P/P	90 - 110
Silver	103	103	P/P	90 - 110
Thallium	105	105	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A111351

Included Lab Sample IDs: 2314495

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	96.6	95.3	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	101	98.7	99.4			0.810
	Iron	103	104	105	104		1.38
	Magnesium	104	98.5	104	102		1.11
	Potassium	102	101	97.6	101		1.95
	Sodium	99.2	98.9	98.7			1.09
	Strontium	100	101	99.6	99.7		0.0447
	Tin	102	102	102	102		0.216
	Titanium	99.3	101	99.5	100		0.607
	Vanadium	94.1	95.4	95.3	96.1		0.836
	Zinc	102	100	103	104		0.968
EPA 200.8 Rev. 5.4	Aluminum	102	100	101	102		1.11
	Antimony	98.4	101	102	104		0.927
	Arsenic	101	101	103	99.8		1.54
	Barium	101	102	103	103		0.717
	Beryllium	93.7	96.3	95.1	93.0		1.32
	Boron	103	105	106	106		0.875
	Cadmium	97.2	99.2	101	101		1.64
	Chromium	95.7	93.7	91.1	94.5		2.76
	Cobalt	99.9	101	102	98.2		0.275
	Copper	98.4	98.8	99.7	96.3		0.746
	Lead	98.3	99.6	100	98.4		0.439
	Manganese	94.7	97.9	98.6	98.5		0.592
	Molybdenum	99.4	103	103	98.1		0.0746
	Nickel	101	103	102	93.2		0.894
	Selenium	98.6	101	101	98.2		0.363
	Silver	102	102	102	102		0.0672
	Thallium	101	103	105	103		1.51

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	2314495
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2314495
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2314495

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	03/24/2022	03/28/2022 10:42	Megan Whitefoot	03/29/2022 19:25	Josef B Mick	2314495
EPA 200.8 Rev. 5.4	03/24/2022	03/28/2022 10:42	Megan Whitefoot	03/29/2022 13:34	Emily M Philpot	2314495
	03/24/2022	04/05/2022 10:26	Emily M Philpot	04/06/2022 14:05	Alexander Thompson	2314495
SM 2340B	03/24/2022			03/29/2022 19:25	Josef B Mick	2314495