Chemical Analysis Report

NE-DIST-2022-03-30-02

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

Event Description: **Palm Valley North**
Request ID: **RQ-2022-03-28-43**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
8800 Baymeadows Way West
Suite 100
Jacksonville, FL 32256
Attn: Jeremy Parrish

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: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 19-APR-2022 09:21

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: Yellow Water CR at SR 228 **Collection Date/Time: 03/29/2022 12:45**

Field ID: 20030549 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2315395	EPA 200.7 Rev. 4.4	Calcium	4.56		mg/L	P411895	
		Iron	1.60E+03		ug/L	P411895	
		Magnesium	0.98		mg/L	P411895	
		Potassium	0.30	U	mg/L	P411895	
		Sodium	4.9		mg/L	P411895	
		Strontium	19.2		ug/L	P411895	
		Tin	3.0	U	ug/L	P411895	
		Titanium	1.9	I	ug/L	P411895	
		Vanadium	2.0	U	ug/L	P411895	
		Zinc	12	I	ug/L	P411895	
	EPA 200.8 Rev. 5.4	Aluminum	648		ug/L	P411895	
		Antimony	0.097	I	ug/L	P411895	
		Arsenic	0.48		ug/L	P411895	
		Barium	11.8		ug/L	P411895	
		Beryllium	0.051		ug/L	P411895	
		Boron**	14.8		ug/L	P411895	
		Cadmium	0.023	I	ug/L	P411895	
		Chromium	1.1	I	ug/L	P411895	
		Cobalt	0.334		ug/L	P411895	
		Copper	5.03		ug/L	P411895	
		Lead	2.54		ug/L	P411895	
		Manganese	24.1		ug/L	P411895	
		Molybdenum	0.15	U	ug/L	P411895	
		Nickel	1.1	I	ug/L	P411895	
		Selenium	0.20	U	ug/L	P411895	
		Silver	0.010	U	ug/L	P411895	
		Thallium	0.10	U	ug/L	P411895	
	SM 2340 B-2011	Hardness	15.4		mg/L	P411895	

Ref. Method and Comment:
EPA 200.8 Rev. 5.4: The copper and lead result was confirmed in the undigested sample on 04/05/2022.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411895

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: P411895

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: P411895

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	104		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	95.7		P	85 - 115
Sodium	96.5		P	85 - 115
Strontium	95.5		P	85 - 115
Tin	101		P	85 - 115
Titanium	97.4		P	85 - 115
Vanadium	92.5		P	85 - 115
Zinc	98.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.1		P	80 - 120
Antimony	96.7		P	80 - 120
Arsenic	100		P	80 - 120
Barium	101		P	80 - 120
Beryllium	94.1		P	80 - 120
Boron	103		P	80 - 120
Cadmium	97.1		P	80 - 120
Chromium	95.3		P	80 - 120
Cobalt	100		P	80 - 120
Copper	97.7		P	80 - 120
Lead	98.4		P	80 - 120
Manganese	94.9		P	80 - 120
Molybdenum	98.4		P	80 - 120
Nickel	99.0		P	80 - 120
Selenium	98.8		P	80 - 120
Silver	101		P	80 - 120
Thallium	99.9		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411895

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315224	Calcium	101		P	80 - 120
2315224	Iron	102		P	80 - 120
2315224	Magnesium	104		P	80 - 120
2315224	Potassium	95.5		P	80 - 120
2315224	Sodium	99.8		P	80 - 120
2315224	Strontium	94.9		P	80 - 120
2315224	Tin	99.4		P	80 - 120
2315224	Titanium	103		P	80 - 120
2315224	Vanadium	98.7		P	80 - 120
2315224	Zinc	100		P	80 - 120
2315487	Calcium	100		P	80 - 120
2315487	Iron	101	103	P/P	80 - 120
2315487	Magnesium	102	105	P/P	80 - 120
2315487	Potassium	93.6	94.9	P/P	80 - 120
2315487	Sodium	94.8		P	80 - 120
2315487	Strontium	98.0	103	P/P	80 - 120
2315487	Tin	103	105	P/P	80 - 120
2315487	Titanium	102	105	P/P	80 - 120
2315487	Vanadium	99.1	102	P/P	80 - 120
2315487	Zinc	105	107	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315224	Aluminum	109		P	80 - 120
2315224	Antimony	97.9		P	80 - 120
2315224	Arsenic	99.5		P	80 - 120
2315224	Barium	99.5		P	80 - 120
2315224	Beryllium	94.9		P	80 - 120
2315224	Boron	102		P	80 - 120
2315224	Cadmium	97.9		P	80 - 120
2315224	Chromium	96.7		P	80 - 120
2315224	Cobalt	98.9		P	80 - 120
2315224	Copper	94.8		P	80 - 120
2315224	Lead	96.8		P	80 - 120
2315224	Manganese	95.7		P	80 - 120
2315224	Molybdenum	99.9		P	80 - 120
2315224	Nickel	97.5		P	80 - 120
2315224	Selenium	97.6		P	80 - 120
2315224	Silver	101		P	80 - 120
2315224	Thallium	100		P	80 - 120
2315487	Aluminum	98.7	96.4	P/P	80 - 120
2315487	Antimony	97.9	96.8	P/P	80 - 120
2315487	Arsenic	99.3	98.6	P/P	80 - 120
2315487	Barium	99.4	98.2	P/P	80 - 120
2315487	Beryllium	95.9	94.4	P/P	80 - 120
2315487	Boron	105	105	P/P	80 - 120
2315487	Cadmium	97.0	96.5	P/P	80 - 120
2315487	Chromium	98.4	97.3	P/P	80 - 120
2315487	Cobalt	98.4	96.6	P/P	80 - 120
2315487	Copper	96.4	95.1	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315487	Lead	98.7	97.4	P/P	80 - 120
2315487	Manganese	96.0	94.3	P/P	80 - 120
2315487	Molybdenum	101	99.3	P/P	80 - 120
2315487	Nickel	97.9	96.3	P/P	80 - 120
2315487	Selenium	98.1	96.1	P/P	80 - 120
2315487	Silver	100	98.9	P/P	80 - 120
2315487	Thallium	101	101	P/P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411895

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315487	Calcium	0.836	Spike	P	0 - 20
2315487	Iron	1.21	Spike	P	0 - 20
2315487	Magnesium	1.55	Spike	P	0 - 20
2315487	Potassium	1.16	Spike	P	0 - 20
2315487	Sodium	0.893	Spike	P	0 - 20
2315487	Strontium	4.58	Spike	P	0 - 20
2315487	Tin	2.06	Spike	P	0 - 20
2315487	Titanium	2.37	Spike	P	0 - 20
2315487	Vanadium	2.48	Spike	P	0 - 20
2315487	Zinc	2.70	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315487	Aluminum	1.99	Spike	P	0 - 20
2315487	Antimony	1.13	Spike	P	0 - 20
2315487	Arsenic	0.695	Spike	P	0 - 20
2315487	Barium	1.09	Spike	P	0 - 20
2315487	Beryllium	1.63	Spike	P	0 - 20
2315487	Boron	0.432	Spike	P	0 - 20
2315487	Cadmium	0.488	Spike	P	0 - 20
2315487	Chromium	1.06	Spike	P	0 - 20
2315487	Cobalt	1.78	Spike	P	0 - 20
2315487	Copper	1.33	Spike	P	0 - 20
2315487	Lead	1.25	Spike	P	0 - 20
2315487	Manganese	1.51	Spike	P	0 - 20
2315487	Molybdenum	1.49	Spike	P	0 - 20
2315487	Nickel	1.61	Spike	P	0 - 20
2315487	Selenium	2.06	Spike	P	0 - 20
2315487	Silver	1.24	Spike	P	0 - 20
2315487	Thallium	0.0325	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: A111293
Included Lab Sample IDs: 2315395

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.8	99.3	P/P	90 - 110
Antimony	97.7	98.5	P/P	90 - 110
Arsenic	99.2	99.0	P/P	90 - 110
Barium	97.0	96.3	P/P	90 - 110
Beryllium	93.8	93.7	P/P	90 - 110
Boron	102	105	P/P	90 - 110
Cadmium	97.8	98.4	P/P	90 - 110
Chromium	96.9	97.0	P/P	90 - 110
Cobalt	97.9	98.0	P/P	90 - 110
Copper	98.0	97.9	P/P	90 - 110
Lead	96.9	97.0	P/P	90 - 110
Manganese	95.6	96.3	P/P	90 - 110
Molybdenum	97.1	97.8	P/P	90 - 110
Nickel	97.4	97.1	P/P	90 - 110
Selenium	97.6	97.5	P/P	90 - 110
Silver	103	103	P/P	90 - 110
Thallium	97.4	96.7	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A111402
Included Lab Sample IDs: 2315395

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Strontium	98.1	99.6	P/P	90 - 110
Tin	106	103	P/P	90 - 110
Titanium	105	103	P/P	90 - 110
Vanadium	105	103	P/P	90 - 110
Zinc	104	103	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A111501
Included Lab Sample IDs: 2315395

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	104	103	P/P	90 - 110
Iron	104	102	P/P	90 - 110
Magnesium	104	102	P/P	90 - 110
Potassium	103	99.4	P/P	90 - 110
Sodium	102	98.0	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	101	100				0.836
	Iron	104	102	101	103			1.21
	Magnesium	107	104	102	105			1.55
	Potassium	95.7	95.5	93.6	94.9			1.16
	Sodium	96.5	99.8	94.8				0.893
	Strontium	95.5	94.9	98.0	103			4.58
	Tin	101	99.4	103	105			2.06
	Titanium	97.4	103	102	105			2.37
	Vanadium	92.5	98.7	99.1	102			2.48
	Zinc	98.7	100	105	107			2.70
EPA 200.8 Rev. 5.4	Aluminum	99.1	109	98.7	96.4			1.99
	Antimony	96.7	97.9	97.9	96.8			1.13
	Arsenic	100	99.5	99.3	98.6			0.695
	Barium	101	99.5	99.4	98.2			1.09
	Beryllium	94.1	94.9	95.9	94.4			1.63
	Boron	103	102	105	105			0.432
	Cadmium	97.1	97.9	97.0	96.5			0.488
	Chromium	95.3	96.7	98.4	97.3			1.06
	Cobalt	100	98.9	98.4	96.6			1.78
	Copper	97.7	94.8	96.4	95.1			1.33
	Lead	98.4	96.8	98.7	97.4			1.25
	Manganese	94.9	95.7	96.0	94.3			1.51
	Molybdenum	98.4	99.9	101	99.3			1.49
	Nickel	99.0	97.5	97.9	96.3			1.61
	Selenium	98.8	97.6	98.1	96.1			2.06
	Silver	101	101	100	98.9			1.24
	Thallium	99.9	100	101	101			0.0325

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	2315395
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2315395
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2315395

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	03/30/2022	04/04/2022 10:40	Megan Whitefoot	04/08/2022 21:29	McKinley C Carter	2315395
	03/30/2022	04/04/2022 10:40	Megan Whitefoot	04/13/2022 14:05	McKinley C Carter	2315395
EPA 200.8 Rev. 5.4	03/30/2022	04/04/2022 10:40	Megan Whitefoot	04/05/2022 03:16	Alexander Thompson	2315395
SM 2340 B-2011	03/30/2022			04/13/2022 14:05	McKinley C Carter	2315395