Chemical Analysis Report

SW-DIST-2021-08-18-01

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

Event Description: **Run 4: Otting and Citrus Blue**
Request ID: **RQ-2021-08-09-56**
Customer: **SW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
Attn: Ben Paswater

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: 25-AUG-2021 15:13

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 Otting @ Middle **Collection Date/Time: 08/12/2021 13:40**

Field ID: G4SW0113 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2270310	EPA 200.7 Rev. 4.4	Barium	4.6		ug/L	P402737	
		Calcium	14.5		mg/L	P402737	
		Iron	1.47E+03		ug/L	P402737	
		Magnesium	2.32		mg/L	P402737	
		Manganese	33.1		ug/L	P402737	
		Potassium	0.30	U	mg/L	P402737	
		Sodium	2.9		mg/L	P402737	
		Zinc	5.0	U	ug/L	P402737	
	EPA 200.8 Rev. 5.4	Aluminum	196		ug/L	P402737	
		Antimony	0.050	U	ug/L	P402737	
		Arsenic	0.62		ug/L	P402737	
		Beryllium	0.027	I	ug/L	P402737	
		Boron**	17.2		ug/L	P402737	
		Cadmium	0.020	U	ug/L	P402737	
		Chromium	0.49	I	ug/L	P402737	
		Copper	0.40	U	ug/L	P402737	
		Lead	0.37	I	ug/L	P402737	
		Nickel	0.50	U	ug/L	P402737	
		Selenium	0.20	U	ug/L	P402737	
		Silver	0.010	U	ug/L	P402737	
		Thallium	0.10	U	ug/L	P402737	
	SM 2340B	Hardness	45.9		mg/L	P402737	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402737

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Manganese	1.0	U	ug/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402737

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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
Copper	0.40	U	ug/L
Lead	0.20	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: P402737

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	106		P	85 - 115
Calcium	101		P	85 - 115
Iron	106		P	85 - 115
Magnesium	101		P	85 - 115
Manganese	101		P	85 - 115
Potassium	105		P	85 - 115
Sodium	102		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402737

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	100		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	103		P	85 - 115
Beryllium	99.2		P	85 - 115
Boron	100		P	85 - 115
Cadmium	99.5		P	85 - 115
Chromium	99.5		P	85 - 115
Copper	102		P	85 - 115
Lead	102		P	85 - 115
Nickel	102		P	85 - 115
Selenium	100		P	85 - 115
Silver	105		P	85 - 115
Thallium	103		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2270375	Barium	103		P	80 - 120
2270375	Calcium	99.9		P	80 - 120
2270375	Iron	103		P	80 - 120
2270375	Magnesium	101		P	80 - 120
2270375	Manganese	99.4		P	80 - 120
2270375	Potassium	108		P	80 - 120
2270375	Sodium	102		P	80 - 120
2270375	Zinc	100		P	80 - 120
2270488	Barium	102	104	P/P	80 - 120
2270488	Calcium	97.5		P	80 - 120
2270488	Iron	104	106	P/P	80 - 120
2270488	Magnesium	99.6		P	80 - 120
2270488	Manganese	98.8	101	P/P	80 - 120
2270488	Potassium	106	105	P/P	80 - 120
2270488	Sodium	102		P	80 - 120
2270488	Zinc	98.6	98.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2270375	Aluminum	97.2		P	80 - 120
2270375	Antimony	101		P	80 - 120
2270375	Arsenic	101		P	80 - 120
2270375	Beryllium	94.2		P	80 - 120
2270375	Boron	99.6		P	80 - 120
2270375	Cadmium	99.2		P	80 - 120
2270375	Chromium	98.4		P	80 - 120
2270375	Copper	97.8		P	80 - 120
2270375	Lead	102		P	80 - 120
2270375	Nickel	98.2		P	80 - 120
2270375	Selenium	97.1		P	80 - 120
2270375	Silver	102		P	80 - 120
2270375	Thallium	107		P	80 - 120
2270488	Aluminum	97.1	97.7	P/P	80 - 120
2270488	Antimony	102	103	P/P	80 - 120
2270488	Arsenic	103	103	P/P	80 - 120
2270488	Beryllium	96.1	96.9	P/P	80 - 120
2270488	Boron	100	100	P/P	80 - 120
2270488	Cadmium	101	102	P/P	80 - 120
2270488	Chromium	102	102	P/P	80 - 120
2270488	Copper	96.5	96.7	P/P	80 - 120
2270488	Lead	102	102	P/P	80 - 120
2270488	Nickel	97.5	98.0	P/P	80 - 120
2270488	Selenium	98.0	98.3	P/P	80 - 120
2270488	Silver	103	103	P/P	80 - 120
2270488	Thallium	107	107	P/P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402737

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2270488	Barium	1.97	Spike	P	0 - 20
2270488	Calcium	0.268	Spike	P	0 - 20
2270488	Iron	1.21	Spike	P	0 - 20
2270488	Magnesium	1.05	Spike	P	0 - 20
2270488	Manganese	1.80	Spike	P	0 - 20
2270488	Potassium	1.07	Spike	P	0 - 20
2270488	Sodium	0.0696	Spike	P	0 - 20
2270488	Zinc	0.224	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402737

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2270488	Aluminum	0.626	Spike	P	0 - 20
2270488	Antimony	0.876	Spike	P	0 - 20
2270488	Arsenic	0.0239	Spike	P	0 - 20
2270488	Beryllium	0.758	Spike	P	0 - 20
2270488	Boron	0.261	Spike	P	0 - 20
2270488	Cadmium	0.818	Spike	P	0 - 20
2270488	Chromium	0.478	Spike	P	0 - 20
2270488	Copper	0.267	Spike	P	0 - 20
2270488	Lead	0.744	Spike	P	0 - 20
2270488	Nickel	0.541	Spike	P	0 - 20
2270488	Selenium	0.279	Spike	P	0 - 20
2270488	Silver	0.638	Spike	P	0 - 20
2270488	Thallium	0.701	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: A107401
Included Lab Sample IDs: 2270310

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.0	98.7	P/P	90 - 110
Antimony	98.3	97.9	P/P	90 - 110
Arsenic	98.5	98.9	P/P	90 - 110
Beryllium	93.8	93.0	P/P	90 - 110
Boron	99.7	101	P/P	90 - 110
Cadmium	98.8	98.8	P/P	90 - 110
Chromium	96.1	95.8	P/P	90 - 110
Copper	95.3	95.6	P/P	90 - 110
Lead	98.7	98.7	P/P	90 - 110
Nickel	95.3	95.3	P/P	90 - 110
Selenium	96.5	97.0	P/P	90 - 110
Silver	97.2	97.3	P/P	90 - 110
Thallium	103	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A107416
Included Lab Sample IDs: 2270310

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	102	P/P	90 - 110
Calcium	98.3	98.7	P/P	90 - 110
Iron	98.7	99.9	P/P	90 - 110
Magnesium	98.2	98.6	P/P	90 - 110
Manganese	99.7	100	P/P	90 - 110
Potassium	100	101	P/P	90 - 110
Sodium	99.0	100	P/P	90 - 110
Zinc	98.1	97.8	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	Barium	106	103	102	104			1.97
	Calcium	101	99.9	97.5				0.268
	Iron	106	103	104	106			1.21
	Magnesium	101	101	99.6				1.05
	Manganese	101	99.4	98.8	101			1.80
	Potassium	105	108	106	105			1.07
	Sodium	102	102	102				0.0696
	Zinc	104	100	98.6	98.8			0.224
EPA 200.8 Rev. 5.4	Aluminum	100	97.1	97.7	97.2			0.626
	Antimony	101	102	103	101			0.876
	Arsenic	103	103	103	101			0.0239
	Beryllium	99.2	96.1	96.9	94.2			0.758
	Boron	100	100	100	99.6			0.261
	Cadmium	99.5	101	102	99.2			0.818
	Chromium	99.5	102	102	98.4			0.478
	Copper	102	96.5	96.7	97.8			0.267
	Lead	102	102	102	102			0.744
	Nickel	102	97.5	98.0	98.2			0.541
	Selenium	100	98.0	98.3	97.1			0.279
	Silver	105	103	103	102			0.638
	Thallium	103	107	107	107			0.701

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	2270310
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2270310
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2270310

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	08/18/2021	08/20/2021 12:50	Elliott D. Healy	08/24/2021 06:21	Josef B Mick	2270310
EPA 200.8 Rev. 5.4	08/18/2021	08/20/2021 12:50	Elliott D. Healy	08/23/2021 22:37	Alexander Thompson	2270310
SM 2340B	08/18/2021			08/24/2021 06:21	Josef B Mick	2270310