Chemical Analysis Report

CEN-DIST-2021-08-11-04

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

Event Description: **Spruce and Phelps - WBIDs 2674 and 2982**
Request ID: **RQ-2021-08-09-52**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
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FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
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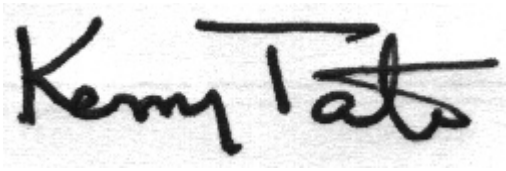
Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 31-AUG-2021 11:45



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: Spruce Creek at Spruce Creek Blvd. **Collection Date/Time: 08/10/2021 12:10**

Field ID: G5CE0083 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2268622	EPA 200.7 Rev. 4.4	Barium	13.7		ug/L	P402557	
		Calcium	18.8		mg/L	P402557	
		Iron	1.51E+03		ug/L	P402557	
		Magnesium	2.55		mg/L	P402557	
		Manganese	21.2		ug/L	P402557	
		Potassium	1.7		mg/L	P402557	
		Sodium	12.6		mg/L	P402557	
		Zinc	8.5	I	ug/L	P402557	
	EPA 200.8 Rev. 5.4	Aluminum	553		ug/L	P402557	
		Antimony	0.10	I	ug/L	P402557	
		Arsenic	1.92		ug/L	P402557	
		Beryllium	0.037	I	ug/L	P402557	
		Boron**	30.8		ug/L	P402557	
		Cadmium	0.020	U	ug/L	P402557	
		Chromium	0.91	I	ug/L	P402557	
		Copper	1.38		ug/L	P402557	
		Lead	0.88		ug/L	P402557	
		Nickel	0.64	I	ug/L	P402557	
		Selenium	0.23	I	ug/L	P402557	
		Silver	0.010	U	ug/L	P402557	
		Thallium	0.10	U	ug/L	P402557	
	SM 2340B	Hardness	57.4		mg/L	P402557	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402557

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: P402557

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: P402557

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	108		P	85 - 115
Calcium	103		P	85 - 115
Iron	108		P	85 - 115
Magnesium	108		P	85 - 115
Manganese	103		P	85 - 115
Potassium	104		P	85 - 115
Sodium	102		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402557

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	100		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	98.3		P	85 - 115
Beryllium	94.3		P	85 - 115
Boron	102		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	96.1		P	85 - 115
Copper	95.2		P	85 - 115
Lead	102		P	85 - 115
Nickel	98.4		P	85 - 115
Selenium	96.8		P	85 - 115
Silver	104		P	85 - 115
Thallium	103		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402557

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2268535	Barium	105	107	P/P	80 - 120
2268535	Calcium	101		P	80 - 120
2268535	Iron	107	107	P/P	80 - 120
2268535	Magnesium	106	107	P/P	80 - 120
2268535	Manganese	102	103	P/P	80 - 120
2268535	Potassium	103	104	P/P	80 - 120
2268535	Sodium	99.9		P	80 - 120
2268535	Zinc	105	106	P/P	80 - 120
2269248	Barium	105		P	80 - 120
2269248	Calcium	101		P	80 - 120
2269248	Iron	108		P	80 - 120
2269248	Magnesium	101		P	80 - 120
2269248	Manganese	101		P	80 - 120
2269248	Potassium	101		P	80 - 120
2269248	Sodium	103		P	80 - 120
2269248	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402557

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2268535	Aluminum	101	101	P/P	80 - 120
2268535	Antimony	104	105	P/P	80 - 120
2268535	Arsenic	98.5	98.3	P/P	80 - 120
2268535	Beryllium	95.9	98.5	P/P	80 - 120
2268535	Boron	102	103	P/P	80 - 120
2268535	Cadmium	100	103	P/P	80 - 120
2268535	Chromium	103	102	P/P	80 - 120
2268535	Copper	95.5	96.0	P/P	80 - 120
2268535	Lead	102	103	P/P	80 - 120
2268535	Nickel	96.2	95.9	P/P	80 - 120
2268535	Selenium	97.9	99.2	P/P	80 - 120
2268535	Silver	101	102	P/P	80 - 120
2268535	Thallium	105	106	P/P	80 - 120
2269248	Aluminum	98.1		P	80 - 120
2269248	Antimony	103		P	80 - 120
2269248	Arsenic	99.3		P	80 - 120
2269248	Beryllium	96.5		P	80 - 120
2269248	Boron	104		P	80 - 120
2269248	Cadmium	102		P	80 - 120
2269248	Chromium	97.5		P	80 - 120
2269248	Copper	94.9		P	80 - 120
2269248	Lead	104		P	80 - 120
2269248	Nickel	97.3		P	80 - 120
2269248	Selenium	97.3		P	80 - 120
2269248	Silver	102		P	80 - 120
2269248	Thallium	107		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402557

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2268535	Barium	1.72	Spike	P	0 - 20
2268535	Calcium	1.62	Spike	P	0 - 20
2268535	Iron	0.256	Spike	P	0 - 20
2268535	Magnesium	0.129	Spike	P	0 - 20
2268535	Manganese	1.58	Spike	P	0 - 20
2268535	Potassium	0.621	Spike	P	0 - 20
2268535	Sodium	1.48	Spike	P	0 - 20
2268535	Zinc	0.377	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402557

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2268535	Aluminum	0.231	Spike	P	0 - 20
2268535	Antimony	0.821	Spike	P	0 - 20
2268535	Arsenic	0.192	Spike	P	0 - 20
2268535	Beryllium	2.69	Spike	P	0 - 20
2268535	Boron	0.467	Spike	P	0 - 20
2268535	Cadmium	2.14	Spike	P	0 - 20
2268535	Chromium	0.259	Spike	P	0 - 20
2268535	Copper	0.432	Spike	P	0 - 20
2268535	Lead	0.443	Spike	P	0 - 20
2268535	Nickel	0.300	Spike	P	0 - 20
2268535	Selenium	1.34	Spike	P	0 - 20
2268535	Silver	1.16	Spike	P	0 - 20
2268535	Thallium	1.34	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: A107347
Included Lab Sample IDs: 2268622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.6	99.7	P/P	90 - 110
Antimony	97.4	99.2	P/P	90 - 110
Arsenic	94.4	95.2	P/P	90 - 110
Beryllium	90.9	92.0	P/P	90 - 110
Boron	100	102	P/P	90 - 110
Cadmium	98.2	98.8	P/P	90 - 110
Chromium	91.6	97.1	P/P	90 - 110
Copper	90.2	93.1	P/P	90 - 110
Lead	97.1	96.8	P/P	90 - 110
Nickel	94.1	93.4	P/P	90 - 110
Selenium	95.2	96.9	P/P	90 - 110
Silver	95.6	95.7	P/P	90 - 110
Thallium	99.4	99.3	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A107416
Included Lab Sample IDs: 2268622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	104	101	P/P	90 - 110
Calcium	101	98.8	P/P	90 - 110
Iron	101	99.9	P/P	90 - 110
Magnesium	101	99.1	P/P	90 - 110
Manganese	102	99.9	P/P	90 - 110
Potassium	101	100	P/P	90 - 110
Sodium	98.8	98.8	P/P	90 - 110
Zinc	103	98.7	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	108	105	107	105			1.72
	Calcium	103	101	101				1.62
	Iron	108	107	107	108			0.256
	Magnesium	108	106	107	101			0.129
	Manganese	103	102	103	101			1.58
	Potassium	104	103	104	101			0.621
	Sodium	102	99.9	103				1.48
	Zinc	105	105	106	101			0.377
EPA 200.8 Rev. 5.4	Aluminum	100	98.1	101	101			0.231
	Antimony	102	103	104	105			0.821
	Arsenic	98.3	99.3	98.5	98.3			0.192
	Beryllium	94.3	96.5	95.9	98.5			2.69
	Boron	102	104	102	103			0.467
	Cadmium	102	102	100	103			2.14
	Chromium	96.1	97.5	103	102			0.259
	Copper	95.2	94.9	95.5	96.0			0.432
	Lead	102	104	102	103			0.443
	Nickel	98.4	97.3	96.2	95.9			0.300
	Selenium	96.8	97.3	97.9	99.2			1.34
	Silver	104	102	101	102			1.16
	Thallium	103	107	105	106			1.34

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	2268622
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2268622
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2268622

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	08/11/2021	08/17/2021 15:35	Elliott D. Healy	08/23/2021 18:46	Josef B Mick	2268622
EPA 200.8 Rev. 5.4	08/11/2021	08/17/2021 15:35	Elliott D. Healy	08/19/2021 16:11	Alexander Thompson	2268622
SM 2340B	08/11/2021			08/23/2021 18:46	Josef B Mick	2268622