Chemical Analysis Report

CEN-DIST-2021-11-16-02

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

Event Description: **Spruce Creek Bio + Other Spruce**
Request ID: **RQ-2021-11-15-17**
Customer: **CEN-DIST**
Project ID: **SMP**

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

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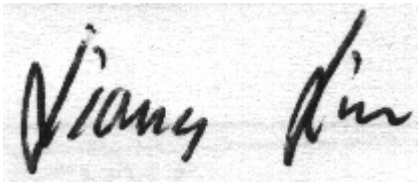
Date Certified: 02-DEC-2021 14:16



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: 11/15/2021 10:40**

Field ID: G5CE0083 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2289750	EPA 200.7 Rev. 4.4	Barium	14.0		ug/L	P406549	
		Calcium	19.4		mg/L	P406549	
		Iron	1.22E+03		ug/L	P406549	
		Magnesium	2.67		mg/L	P406549	
		Manganese	12.4		ug/L	P406549	
		Potassium	1.3		mg/L	P406549	
		Sodium	14.1		mg/L	P406549	
		Zinc	5.2	I	ug/L	P406549	
	EPA 200.8 Rev. 5.4	Aluminum	507		ug/L	P406549	
		Antimony	0.066	I	ug/L	P406549	
		Arsenic	0.72		ug/L	P406549	
		Boron**	30.3		ug/L	P406549	
		Cadmium	0.020	U	ug/L	P406549	
		Chromium	0.83	I	ug/L	P406549	
		Copper	0.79	I	ug/L	P406549	
		Lead	0.68		ug/L	P406549	
		Nickel	0.61	I	ug/L	P406549	
		Selenium	0.20	U	ug/L	P406549	
		Silver	0.010	U	ug/L	P406549	
		Thallium	0.10	U	ug/L	P406549	
	SM 2340B	Hardness	59.4		mg/L	P406549	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406549

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: P406549

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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: P406549

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	106		P	85 - 115
Calcium	106		P	85 - 115
Iron	108		P	85 - 115
Magnesium	111		P	85 - 115
Manganese	104		P	85 - 115
Potassium	97.9		P	85 - 115
Sodium	102		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406549

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	104		P	85 - 115
Antimony	106		P	85 - 115
Arsenic	100		P	85 - 115
Boron	101		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	101		P	85 - 115
Copper	96.9		P	85 - 115
Lead	97.3		P	85 - 115
Nickel	97.9		P	85 - 115
Selenium	98.8		P	85 - 115
Silver	98.5		P	85 - 115
Thallium	102		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290028	Barium	113		P	80 - 120
2290028	Calcium	108		P	80 - 120
2290028	Iron	110		P	80 - 120
2290028	Magnesium	113		P	80 - 120
2290028	Manganese	109		P	80 - 120
2290028	Potassium	103		P	80 - 120
2290028	Sodium	103		P	80 - 120
2290028	Zinc	107		P	80 - 120
2290216	Barium	112	117	P/P	80 - 120
2290216	Calcium	105		P	80 - 120
2290216	Iron	109	111	P/P	80 - 120
2290216	Magnesium	110	113	P/P	80 - 120
2290216	Manganese	107	112	P/P	80 - 120
2290216	Potassium	102	105	P/P	80 - 120
2290216	Sodium	102	104	P/P	80 - 120
2290216	Zinc	103	109	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290028	Aluminum	105		P	80 - 120
2290028	Antimony	110		P	80 - 120
2290028	Arsenic	101		P	80 - 120
2290028	Boron	102		P	80 - 120
2290028	Cadmium	104		P	80 - 120
2290028	Chromium	104		P	80 - 120
2290028	Copper	97.8		P	80 - 120
2290028	Lead	100		P	80 - 120
2290028	Nickel	96.8		P	80 - 120
2290028	Selenium	98.8		P	80 - 120
2290028	Silver	99.6		P	80 - 120
2290028	Thallium	104		P	80 - 120
2290216	Aluminum	104	104	P/P	80 - 120
2290216	Antimony	108	111	P/P	80 - 120
2290216	Arsenic	98.1	100	P/P	80 - 120
2290216	Boron	105	104	P/P	80 - 120
2290216	Cadmium	104	103	P/P	80 - 120
2290216	Chromium	105	105	P/P	80 - 120
2290216	Copper	96.1	96.3	P/P	80 - 120
2290216	Lead	98.5	98.8	P/P	80 - 120
2290216	Nickel	96.9	96.5	P/P	80 - 120
2290216	Selenium	98.4	99.2	P/P	80 - 120
2290216	Silver	98.7	100	P/P	80 - 120
2290216	Thallium	106	104	P/P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406549

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290216	Barium	4.51	Spike	P	0 - 20
2290216	Calcium	2.56	Spike	P	0 - 20
2290216	Iron	2.43	Spike	P	0 - 20
2290216	Magnesium	2.26	Spike	P	0 - 20
2290216	Manganese	4.71	Spike	P	0 - 20
2290216	Potassium	3.27	Spike	P	0 - 20
2290216	Sodium	1.20	Spike	P	0 - 20
2290216	Zinc	5.79	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406549

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290216	Aluminum	0.00430	Spike	P	0 - 20
2290216	Antimony	2.46	Spike	P	0 - 20
2290216	Arsenic	2.10	Spike	P	0 - 20
2290216	Boron	0.306	Spike	P	0 - 20
2290216	Cadmium	0.238	Spike	P	0 - 20
2290216	Chromium	0.161	Spike	P	0 - 20
2290216	Copper	0.160	Spike	P	0 - 20
2290216	Lead	0.316	Spike	P	0 - 20
2290216	Nickel	0.385	Spike	P	0 - 20
2290216	Selenium	0.813	Spike	P	0 - 20
2290216	Silver	1.28	Spike	P	0 - 20
2290216	Thallium	1.32	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: A109036
Included Lab Sample IDs: 2289750

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	102	P/P	90 - 110
Antimony	103	104	P/P	90 - 110
Arsenic	99.1	95.7	P/P	90 - 110
Boron	104	105	P/P	90 - 110
Cadmium	103	103	P/P	90 - 110
Chromium	103	101	P/P	90 - 110
Copper	94.3	91.9	P/P	90 - 110
Lead	94.7	94.9	P/P	90 - 110
Nickel	93.6	92.1	P/P	90 - 110
Selenium	103	101	P/P	90 - 110
Silver	96.7	96.7	P/P	90 - 110
Thallium	98.1	96.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A109076
Included Lab Sample IDs: 2289750

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	110	110	P/P	90 - 110
Calcium	102	103	P/P	90 - 110
Iron	103	104	P/P	90 - 110
Magnesium	104	104	P/P	90 - 110
Manganese	105	105	P/P	90 - 110
Potassium	94.5	96.0	P/P	90 - 110
Sodium	98.1	99.7	P/P	90 - 110
Zinc	104	102	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	113	112	117			4.51
	Calcium	106	108	105				2.56
	Iron	108	110	109	111			2.43
	Magnesium	111	113	110	113			2.26
	Manganese	104	109	107	112			4.71
	Potassium	97.9	103	102	105			3.27
	Sodium	102	103	102	104			1.20
	Zinc	103	107	103	109			5.79
EPA 200.8 Rev. 5.4	Aluminum	104	104	104	105			0.0043
	Antimony	106	108	111	110			2.46
	Arsenic	100	98.1	100	101			2.10
	Boron	101	105	104	102			0.306
	Cadmium	101	104	103	104			0.238
	Chromium	101	105	105	104			0.161
	Copper	96.9	96.1	96.3	97.8			0.160
	Lead	97.3	98.5	98.8	100			0.316
	Nickel	97.9	96.9	96.5	96.8			0.385
	Selenium	98.8	98.4	99.2	98.8			0.813
	Silver	98.5	98.7	100	99.6			1.28
	Thallium	102	106	104	104			1.32

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	2289750
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2289750
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2289750

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	11/16/2021	11/19/2021 10:30	Emily M Philpot	11/23/2021 20:20	Josef B Mick	2289750
EPA 200.8 Rev. 5.4	11/16/2021	11/19/2021 10:30	Emily M Philpot	11/22/2021 18:11	Alexander Thompson	2289750
SM 2340B	11/16/2021			11/23/2021 20:20	Josef B Mick	2289750