Chemical Analysis Report

NW-DIST-2022-02-23-02

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

Event Description: **Yellow River Run**
Request ID: **RQ-2022-02-21-63**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
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160 Government Center
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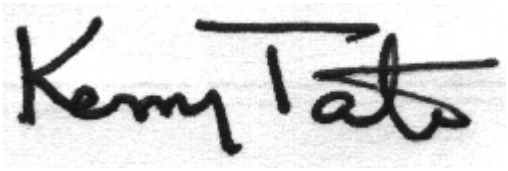
Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 09-MAR-2022 12:56



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 River Above Metts Creek **Collection Date/Time: 02/22/2022 13:15**

Field ID: G4NW0370 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2307620	EPA 200.7 Rev. 4.4	Calcium	4.88		mg/L	P410465	
		Iron	440		ug/L	P410465	
		Magnesium	1.21		mg/L	P410465	
		Potassium	0.50	I	mg/L	P410465	
		Sodium	2.2		mg/L	P410465	
		Strontium	12.1		ug/L	P410465	
		Tin	3.0	U	ug/L	P410465	
		Titanium	0.75	U	ug/L	P410465	
		Vanadium	2.0	U	ug/L	P410465	
		Zinc	5.0	U	ug/L	P410465	
	EPA 200.8 Rev. 5.4	Aluminum	92		ug/L	P410465	
		Antimony	0.050	U	ug/L	P410465	
		Arsenic	0.23		ug/L	P410465	
		Barium	13.3		ug/L	P410465	
		Beryllium	0.020	I	ug/L	P410465	
		Boron**	8.8		ug/L	P410465	
		Cadmium	0.020	U	ug/L	P410465	
		Chromium	0.40	U	ug/L	P410465	
		Cobalt	0.128		ug/L	P410465	
		Copper	0.40	U	ug/L	P410465	
		Lead	0.20	U	ug/L	P410465	
		Manganese	19.8		ug/L	P410465	
		Molybdenum	0.15	U	ug/L	P410465	
		Nickel	0.50	U	ug/L	P410465	
		Selenium	0.20	U	ug/L	P410465	
		Silver	0.010	U	ug/L	P410465	
		Thallium	0.10	U	ug/L	P410465	
	SM 2340B	Hardness	17.2		mg/L	P410465	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410465

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: P410465

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: P410465

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	103		P	85 - 115
Magnesium	99.7		P	85 - 115
Potassium	101		P	85 - 115
Sodium	102		P	85 - 115
Strontium	98.1		P	85 - 115
Tin	97.5		P	85 - 115
Titanium	98.6		P	85 - 115
Vanadium	91.2		P	85 - 115
Zinc	93.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410465

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.9		P	85 - 115
Antimony	99.9		P	85 - 115
Arsenic	97.4		P	85 - 115
Barium	100		P	85 - 115
Beryllium	94.3		P	85 - 115
Boron	99.6		P	85 - 115
Cadmium	96.8		P	85 - 115
Chromium	96.2		P	85 - 115
Cobalt	95.6		P	85 - 115
Copper	93.7		P	85 - 115
Lead	92.7		P	85 - 115
Manganese	96.2		P	85 - 115
Molybdenum	95.7		P	85 - 115
Nickel	95.4		P	85 - 115
Selenium	96.4		P	85 - 115
Silver	94.0		P	85 - 115
Thallium	93.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410465

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2306557	Calcium	98.1		P	80 - 120
2306557	Iron	106	98.2	P/P	80 - 120
2306557	Magnesium	97.6		P	80 - 120
2306557	Potassium	103	95.7	P/P	80 - 120
2306557	Sodium	99.7		P	80 - 120
2306557	Strontium	98.5	92.2	P/P	80 - 120
2306557	Tin	96.3	91.1	P/P	80 - 120
2306557	Titanium	98.8	92.0	P/P	80 - 120
2306557	Vanadium	92.5	86.1	P/P	80 - 120
2306557	Zinc	91.4	85.7	P/P	80 - 120
2306559	Calcium	100		P	80 - 120
2306559	Iron	104		P	80 - 120
2306559	Magnesium	102		P	80 - 120
2306559	Potassium	101		P	80 - 120
2306559	Sodium	104		P	80 - 120
2306559	Strontium	98.1		P	80 - 120
2306559	Tin	97.1		P	80 - 120
2306559	Titanium	98.6		P	80 - 120
2306559	Vanadium	92.2		P	80 - 120
2306559	Zinc	91.1		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410465

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2306557	Aluminum	95.3	94.6	P/P	80 - 120
2306557	Antimony	102	101	P/P	80 - 120
2306557	Arsenic	99.2	98.4	P/P	80 - 120
2306557	Barium	100	100	P/P	80 - 120
2306557	Beryllium	96.1	92.4	P/P	80 - 120
2306557	Boron	97.9	97.5	P/P	80 - 120
2306557	Cadmium	99.8	99.0	P/P	80 - 120
2306557	Chromium	96.7	94.8	P/P	80 - 120
2306557	Cobalt	95.8	94.8	P/P	80 - 120
2306557	Copper	93.3	92.8	P/P	80 - 120
2306557	Lead	93.5	92.0	P/P	80 - 120
2306557	Manganese	96.2	95.4	P/P	80 - 120
2306557	Molybdenum	98.4	96.9	P/P	80 - 120
2306557	Nickel	96.1	95.2	P/P	80 - 120
2306557	Selenium	98.0	97.6	P/P	80 - 120
2306557	Silver	93.9	93.0	P/P	80 - 120
2306557	Thallium	97.8	96.4	P/P	80 - 120
2306559	Aluminum	98.5		P	80 - 120
2306559	Antimony	103		P	80 - 120
2306559	Arsenic	101		P	80 - 120
2306559	Barium	101		P	80 - 120
2306559	Beryllium	95.9		P	80 - 120
2306559	Boron	103		P	80 - 120
2306559	Cadmium	100		P	80 - 120
2306559	Chromium	97.9		P	80 - 120
2306559	Cobalt	97.8		P	80 - 120
2306559	Copper	94.7		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410465

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2306559	Lead	94.1		P	80 - 120
2306559	Manganese	97.8		P	80 - 120
2306559	Molybdenum	100		P	80 - 120
2306559	Nickel	98.5		P	80 - 120
2306559	Selenium	98.9		P	80 - 120
2306559	Silver	95.4		P	80 - 120
2306559	Thallium	96.6		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410465

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2306557	Calcium	0.677	Spike	P	0 - 20
2306557	Iron	7.20	Spike	P	0 - 20
2306557	Magnesium	2.11	Spike	P	0 - 20
2306557	Potassium	6.48	Spike	P	0 - 20
2306557	Sodium	2.90	Spike	P	0 - 20
2306557	Strontium	6.19	Spike	P	0 - 20
2306557	Tin	5.55	Spike	P	0 - 20
2306557	Titanium	6.96	Spike	P	0 - 20
2306557	Vanadium	7.02	Spike	P	0 - 20
2306557	Zinc	6.39	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410465

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2306557	Aluminum	0.783	Spike	P	0 - 20
2306557	Antimony	1.15	Spike	P	0 - 20
2306557	Arsenic	0.854	Spike	P	0 - 20
2306557	Barium	0.0526	Spike	P	0 - 20
2306557	Beryllium	3.91	Spike	P	0 - 20
2306557	Boron	0.313	Spike	P	0 - 20
2306557	Cadmium	0.849	Spike	P	0 - 20
2306557	Chromium	1.86	Spike	P	0 - 20
2306557	Cobalt	1.10	Spike	P	0 - 20
2306557	Copper	0.582	Spike	P	0 - 20
2306557	Lead	1.64	Spike	P	0 - 20
2306557	Manganese	0.741	Spike	P	0 - 20
2306557	Molybdenum	1.32	Spike	P	0 - 20
2306557	Nickel	0.929	Spike	P	0 - 20
2306557	Selenium	0.398	Spike	P	0 - 20
2306557	Silver	1.04	Spike	P	0 - 20
2306557	Thallium	1.47	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: A110695
Included Lab Sample IDs: 2307620

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	102	P/P	90 - 110
Antimony	98.5	101	P/P	90 - 110
Arsenic	100	101	P/P	90 - 110
Barium	101	101	P/P	90 - 110
Beryllium	96.6	97.0	P/P	90 - 110
Boron	98.4	101	P/P	90 - 110
Cadmium	99.1	101	P/P	90 - 110
Chromium	98.4	99.2	P/P	90 - 110
Cobalt	97.0	99.3	P/P	90 - 110
Copper	97.7	100	P/P	90 - 110
Lead	94.3	95.4	P/P	90 - 110
Manganese	97.3	99.3	P/P	90 - 110
Molybdenum	98.6	100	P/P	90 - 110
Nickel	97.7	100	P/P	90 - 110
Selenium	101	101	P/P	90 - 110
Silver	91.8	93.7	P/P	90 - 110
Thallium	99.4	99.4	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A110770
Included Lab Sample IDs: 2307620

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.7	101	P/P	90 - 110
Iron	101	102	P/P	90 - 110
Magnesium	98.9	99.7	P/P	90 - 110
Potassium	98.9	98.0	P/P	90 - 110
Sodium	101	101	P/P	90 - 110
Strontium	92.7	93.3	P/P	90 - 110
Tin	94.2	95.8	P/P	90 - 110
Titanium	94.4	95.8	P/P	90 - 110
Vanadium	93.3	94.6	P/P	90 - 110
Zinc	92.0	94.5	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	98.1	100				0.677
	Iron	103	106	98.2	104			7.20
	Magnesium	99.7	97.6	102				2.11
	Potassium	101	103	95.7	101			6.48
	Sodium	102	99.7	104				2.90
	Strontium	98.1	98.5	92.2	98.1			6.19
	Tin	97.5	96.3	91.1	97.1			5.55
	Titanium	98.6	98.8	92.0	98.6			6.96
	Vanadium	91.2	92.5	86.1	92.2			7.02
	Zinc	93.7	91.4	85.7	91.1			6.39
EPA 200.8 Rev. 5.4	Aluminum	96.9	95.3	94.6	98.5			0.783
	Antimony	99.9	102	101	103			1.15
	Arsenic	97.4	99.2	98.4	101			0.854
	Barium	100	100	100	101			0.0526
	Beryllium	94.3	96.1	92.4	95.9			3.91
	Boron	99.6	97.9	97.5	103			0.313
	Cadmium	96.8	99.8	99.0	100			0.849
	Chromium	96.2	96.7	94.8	97.9			1.86
	Cobalt	95.6	95.8	94.8	97.8			1.10
	Copper	93.7	93.3	92.8	94.7			0.582
	Lead	92.7	93.5	92.0	94.1			1.64
	Manganese	96.2	96.2	95.4	97.8			0.741
	Molybdenum	95.7	98.4	96.9	100			1.32
	Nickel	95.4	96.1	95.2	98.5			0.929
	Selenium	96.4	98.0	97.6	98.9			0.398
	Silver	94.0	93.9	93.0	95.4			1.04
	Thallium	93.8	97.8	96.4	96.6			1.47

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	2307620
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2307620
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2307620

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	02/23/2022	03/01/2022 10:35	Megan Whitefoot	03/05/2022 03:05	Josef B Mick	2307620
EPA 200.8 Rev. 5.4	02/23/2022	03/01/2022 10:35	Megan Whitefoot	03/01/2022 18:47	Emily M Philpot	2307620
SM 2340B	02/23/2022			03/05/2022 03:05	Josef B Mick	2307620