

Chemical Analysis Report

NW-DIST-2023-04-13-03

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **NW Run**
Request ID: **RQ-2023-04-10-37**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 W Government Street
Suite 208
Pensacola, FL 32502-5794
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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant

Date Certified: 01-MAY-2023 14:43



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 groups are included in this report: Metals and Nutrients.

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: WIGGINS BRANCH BELOW HIGHWAY 29

Collection Date/Time: 04/11/2023 10:50

Field ID: G4NW0163

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2400240	EPA 350.1 Rev. 2.0	Ammonia-N	0.063		mg N/L	P428753	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.29		mg N/L	P428920	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.054		mg N/L	P428884	
	EPA 365.1 Rev. 2.0	Total-P	0.008		mg P/L	P428522	
	SM 5310 B-2011	Organic Carbon	3.8		mg C/L	P428700	
2400258	EPA 200.7 Rev. 4.4	Calcium	2.19		mg/L	P428501	
		Iron	1.56E+03		ug/L	P428501	
		Magnesium	0.87		mg/L	P428501	
		Potassium	0.30	I	mg/L	P428501	
		Sodium	2.1		mg/L	P428501	
		Strontium	7.4	I	ug/L	P428501	
		Tin	3.0	U	ug/L	P428501	
		Titanium	0.75	U	ug/L	P428501	
		Vanadium	2.0	U	ug/L	P428501	
		Zinc	5.0	U	ug/L	P428501	
	EPA 200.8 Rev. 5.4	Aluminum	63		ug/L	P428501	
		Antimony	0.050	U	ug/L	P428501	
		Arsenic	0.40		ug/L	P428501	
		Barium	15.3		ug/L	P428501	
		Beryllium	0.051		ug/L	P428501	
		Boron	9.0		ug/L	P428501	
		Cadmium	0.020	U	ug/L	P428501	
		Chromium	0.40	U	ug/L	P428501	
		Cobalt	0.459		ug/L	P428501	
		Copper	0.40	U	ug/L	P428501	
		Lead	0.20	U	ug/L	P428501	
		Manganese	36.7		ug/L	P428501	
		Molybdenum	0.15	U	ug/L	P428501	
		Nickel	0.64	I	ug/L	P428501	
		Selenium	0.20	U	ug/L	P428501	
		Silver	0.010	U	ug/L	P428501	
		Thallium	0.10	U	ug/L	P428501	
	SM 2340 B-2011	Hardness	9.0		mg/L	P428501	

Sample Location: BIG ESCAMBIA CREEK DOWNSTREAM OF FANNIE RD

Collection Date/Time: 04/11/2023 10:15

Field ID: G4NW0421					Matrix: W-SURF-FRH		
Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2400239	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P428753	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.20		mg N/L	P428920	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.53		mg N/L	P428884	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P428522	
	SM 5310 B-2011	Organic Carbon	2.8		mg C/L	P428700	

Sample Location: LITTLE PINE BARREN CREEK ABOVE CR99

Collection Date/Time: 04/11/2023 11:25

Field ID: G4NW0420

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2400241	EPA 350.1 Rev. 2.0	Ammonia-N	0.010		mg N/L	P428753	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.17	I	mg N/L	P428920	
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.2		mg N/L	P428884	
	EPA 365.1 Rev. 2.0	Total-P	0.007		mg P/L	P428522	
	SM 5310 B-2011	Organic Carbon	1.4		mg C/L	P428700	
2400259	EPA 200.7 Rev. 4.4	Calcium	2.02		mg/L	P428501	
		Iron	1.11E+03		ug/L	P428501	
		Magnesium	1.99		mg/L	P428501	
		Potassium	0.95	I	mg/L	P428501	
		Sodium	2.7		mg/L	P428501	
		Strontium	20.4		ug/L	P428501	
		Tin	3.0	U	ug/L	P428501	
		Titanium	0.75	U	ug/L	P428501	
		Vanadium	2.0	U	ug/L	P428501	
		Zinc	5.0	U	ug/L	P428501	
	EPA 200.8 Rev. 5.4	Aluminum	41		ug/L	P428501	
		Antimony	0.050	U	ug/L	P428501	
		Arsenic	0.28		ug/L	P428501	
		Barium	72.0		ug/L	P428501	
		Beryllium	0.041		ug/L	P428501	
		Boron	9.4		ug/L	P428501	
		Cadmium	0.020	U	ug/L	P428501	
		Chromium	0.40	U	ug/L	P428501	
		Cobalt	0.373		ug/L	P428501	
		Copper	0.40	U	ug/L	P428501	
		Lead	0.20	U	ug/L	P428501	
		Manganese	41.4		ug/L	P428501	
		Molybdenum	0.15	U	ug/L	P428501	
		Nickel	0.50	U	ug/L	P428501	
		Selenium	0.20	U	ug/L	P428501	
		Silver	0.014	I	ug/L	P428501	
		Thallium	0.10	U	ug/L	P428501	
		Hardness	13.3		mg/L	P428501	
	SM 2340 B-2011						

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P428501

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: P428501

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428753

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428920

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428884

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428522

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: SM 5310 B-2011
Batch ID: P428700

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P428501

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	105		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	104		P	85 - 115
Sodium	104		P	85 - 115
Strontium	99.6		P	85 - 115
Tin	103		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	102		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P428501

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	105		P	85 - 115
Arsenic	101		P	85 - 115
Barium	103		P	85 - 115
Beryllium	99.1		P	85 - 115
Boron	103		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	105		P	85 - 115
Cobalt	107		P	85 - 115
Copper	103		P	85 - 115
Lead	108		P	85 - 115
Manganese	106		P	85 - 115
Molybdenum	102		P	85 - 115
Nickel	105		P	85 - 115
Selenium	97.4		P	85 - 115
Silver	109		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P428753

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P428920

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.3		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P428884

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	103		P	90 - 110

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428522

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	105		P	90 - 110

Reference Method: SM 5310 B-2011
Batch ID: P428700

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P428501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400047	Calcium	101		P	80 - 120
2400047	Iron	105	105	P/P	80 - 120
2400047	Magnesium	103		P	80 - 120
2400047	Potassium	101	103	P/P	80 - 120
2400047	Sodium	104	107	P/P	80 - 120
2400047	Strontium	98.6	100	P/P	80 - 120
2400047	Tin	98.8	101	P/P	80 - 120
2400047	Titanium	101	101	P/P	80 - 120
2400047	Vanadium	101	102	P/P	80 - 120
2400047	Zinc	100	99.9	P/P	80 - 120
2400258	Calcium	103		P	80 - 120
2400258	Iron	103		P	80 - 120
2400258	Magnesium	106		P	80 - 120
2400258	Potassium	102		P	80 - 120
2400258	Sodium	105		P	80 - 120
2400258	Strontium	100		P	80 - 120
2400258	Tin	99.4		P	80 - 120
2400258	Titanium	103		P	80 - 120
2400258	Vanadium	103		P	80 - 120
2400258	Zinc	105		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P428501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400047	Aluminum	103	105	P/P	80 - 120
2400047	Antimony	108	109	P/P	80 - 120
2400047	Arsenic	102	103	P/P	80 - 120
2400047	Barium	102	104	P/P	80 - 120
2400047	Beryllium	96.1	93.7	P/P	80 - 120
2400047	Boron	106	104	P/P	80 - 120
2400047	Cadmium	105	104	P/P	80 - 120
2400047	Chromium	106	105	P/P	80 - 120
2400047	Cobalt	104	103	P/P	80 - 120
2400047	Copper	99.9	101	P/P	80 - 120
2400047	Lead	106	107	P/P	80 - 120
2400047	Manganese	104	106	P/P	80 - 120
2400047	Molybdenum	104	105	P/P	80 - 120
2400047	Nickel	101	103	P/P	80 - 120
2400047	Selenium	96.3	97.4	P/P	80 - 120
2400047	Silver	110	109	P/P	80 - 120
2400047	Thallium	99.1	106	P/P	80 - 120
2400258	Aluminum	101		P	80 - 120
2400258	Antimony	105		P	80 - 120
2400258	Arsenic	101		P	80 - 120
2400258	Barium	99.6		P	80 - 120
2400258	Beryllium	95.8		P	80 - 120
2400258	Boron	106		P	80 - 120
2400258	Cadmium	104		P	80 - 120
2400258	Chromium	108		P	80 - 120
2400258	Cobalt	107		P	80 - 120
2400258	Copper	105		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P428501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400258	Lead	108		P	80 - 120
2400258	Manganese	103		P	80 - 120
2400258	Molybdenum	102		P	80 - 120
2400258	Nickel	104		P	80 - 120
2400258	Selenium	96.5		P	80 - 120
2400258	Silver	108		P	80 - 120
2400258	Thallium	99.6		P	80 - 120

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428753

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400241	Ammonia-N	97.0	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428920

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400216	Kjeldahl Nitrogen	95.8	94.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428884

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400245	NO2NO3-N	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428522

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400240	Total-P	106	106	P/P	90 - 110

Reference Method: SM 5310 B-2011
Batch ID: P428700

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400239	Organic Carbon	94.7	96.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P428501

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400047	Calcium	1.77	Spike	P	0 - 20
2400047	Iron	0.694	Spike	P	0 - 20
2400047	Magnesium	1.51	Spike	P	0 - 20
2400047	Potassium	1.40	Spike	P	0 - 20
2400047	Sodium	1.89	Spike	P	0 - 20
2400047	Strontium	1.50	Spike	P	0 - 20
2400047	Tin	2.49	Spike	P	0 - 20
2400047	Titanium	0.770	Spike	P	0 - 20
2400047	Vanadium	1.02	Spike	P	0 - 20
2400047	Zinc	0.194	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P428501

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400047	Aluminum	1.73	Spike	P	0 - 20
2400047	Antimony	1.44	Spike	P	0 - 20
2400047	Arsenic	1.55	Spike	P	0 - 20
2400047	Barium	2.22	Spike	P	0 - 20
2400047	Beryllium	2.51	Spike	P	0 - 20
2400047	Boron	2.24	Spike	P	0 - 20
2400047	Cadmium	1.15	Spike	P	0 - 20
2400047	Chromium	1.43	Spike	P	0 - 20
2400047	Cobalt	0.899	Spike	P	0 - 20
2400047	Copper	1.32	Spike	P	0 - 20
2400047	Lead	1.50	Spike	P	0 - 20
2400047	Manganese	2.04	Spike	P	0 - 20
2400047	Molybdenum	0.841	Spike	P	0 - 20
2400047	Nickel	1.97	Spike	P	0 - 20
2400047	Selenium	1.16	Spike	P	0 - 20
2400047	Silver	0.892	Spike	P	0 - 20
2400047	Thallium	6.56	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P428753

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400241	Ammonia-N	1.52	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P428920

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400216	Kjeldahl Nitrogen	1.32	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428884

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400245	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428522

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400240	Total-P	0.589	Spike	P	0 - 20

Reference Method: SM 5310 B-2011
Batch ID: P428700

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400239	Organic Carbon	1.33	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A118615

Included Lab Sample IDs: 2400239, 2400240, 2400241

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	97.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A118647

Included Lab Sample IDs: 2400258, 2400259

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	101	P/P	90 - 110
Antimony	105	105	P/P	90 - 110
Arsenic	99.1	99.9	P/P	90 - 110
Barium	98.9	98.1	P/P	90 - 110
Cadmium	101	101	P/P	90 - 110
Copper	101	102	P/P	90 - 110
Lead	104	104	P/P	90 - 110
Manganese	103	106	P/P	90 - 110
Molybdenum	99.7	99.4	P/P	90 - 110
Nickel	102	103	P/P	90 - 110
Selenium	98.0	96.9	P/P	90 - 110
Silver	106	107	P/P	90 - 110
Thallium	103	103	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A118661

Included Lab Sample IDs: 2400239, 2400240, 2400241

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.5	99.6	P/P	90 - 110
Organic Carbon	99.4	98.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A118672

Included Lab Sample IDs: 2400258, 2400259

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Beryllium	97.3	97.0	P/P	90 - 110
Boron	93.5	99.4	P/P	90 - 110
Chromium	103	104	P/P	90 - 110
Cobalt	102	103	P/P	90 - 110
Nickel	101	97.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A118680

Included Lab Sample IDs: 2400239, 2400240, 2400241

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.7	98.4	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A118729

Included Lab Sample IDs: 2400258, 2400259

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	101	P/P	90 - 110
Iron	102	103	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	101	102	P/P	90 - 110
Sodium	102	103	P/P	90 - 110
Strontium	100	100	P/P	90 - 110
Tin	99.2	99.1	P/P	90 - 110
Titanium	99.4	101	P/P	90 - 110
Vanadium	101	101	P/P	90 - 110
Zinc	102	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A118730

Included Lab Sample IDs: 2400239, 2400240, 2400241

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A118789

Included Lab Sample IDs: 2400239, 2400240, 2400241

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	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	MS
			LCS	SMP	MS		
EPA 200.7 Rev. 4.4	Calcium	103	101	103			1.77
	Iron	105	105	105	103		0.694
	Magnesium	103	103	106			1.51
	Potassium	104	101	103	102		1.40
	Sodium	104	104	107	105		1.89
	Strontium	99.6	98.6	100	100		1.50
	Tin	103	98.8	101	99.4		2.49
	Titanium	102	101	101	103		0.770
	Vanadium	102	101	102	103		1.02
	Zinc	102	100	99.9	105		0.194
EPA 200.8 Rev. 5.4	Aluminum	103	103	105	101		1.73
	Antimony	105	108	109	105		1.44
	Arsenic	101	102	103	101		1.55
	Barium	103	102	104	99.6		2.22
	Beryllium	99.1	96.1	93.7	95.8		2.51
	Boron	103	106	104	106		2.24
	Cadmium	102	105	104	104		1.15
	Chromium	105	106	105	108		1.43
	Cobalt	107	104	103	107		0.899
	Copper	103	99.9	101	105		1.32
	Lead	108	106	107	108		1.50
	Manganese	106	104	106	103		2.04
	Molybdenum	102	104	105	102		0.841
	Nickel	105	101	103	104		1.97
	Selenium	97.4	96.3	97.4	96.5		1.16
	Silver	109	110	109	108		0.892
	Thallium	100	99.1	106	99.6		6.56
EPA 350.1 Rev. 2.0	Ammonia-N	96.0	97.0	98.8			1.52
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.3	95.8	94.1			1.32
EPA 353.2 Rev. 2.0	NO2NO3-N	103	103	103			0.0
EPA 365.1 Rev. 2.0	Total-P	105	106	106			0.589
SM 5310 B-2011	Organic Carbon	98.6	94.7	96.2			1.33

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	2400258, 2400259
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2400258, 2400259
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2400239, 2400240, 2400241
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2400239, 2400240, 2400241
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2400239, 2400240, 2400241
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2400239, 2400240, 2400241
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2400258, 2400259
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2400239, 2400240, 2400241

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	04/13/2023	04/14/2023 13:20	George D Taylor	04/21/2023 18:21	McKinley C Carter	2400258
	04/13/2023	04/14/2023 13:20	George D Taylor	04/21/2023 18:42	McKinley C Carter	2400259
EPA 200.8 Rev. 5.4	04/13/2023	04/14/2023 13:20	George D Taylor	04/18/2023 21:08	Conrad Hartmann	2400259
	04/13/2023	04/14/2023 13:20	George D Taylor	04/18/2023 21:26	Conrad Hartmann	2400258
	04/13/2023	04/14/2023 13:20	George D Taylor	04/19/2023 15:23	Conrad Hartmann	2400259
	04/13/2023	04/14/2023 13:20	George D Taylor	04/19/2023 15:36	Conrad Hartmann	2400258
	04/13/2023			04/19/2023 13:11	Ping Hua	2400240
EPA 350.1 Rev. 2.0	04/13/2023			04/19/2023 13:15	Ping Hua	2400239
	04/13/2023			04/19/2023 13:17	Ping Hua	2400241
	04/13/2023	04/25/2023 12:18	Simonne.V. Calhoun	04/26/2023 12:19	Samantha L Bates	2400239
EPA 351.2 Rev. 2.0	04/13/2023	04/25/2023 12:18	Simonne.V. Calhoun	04/26/2023 12:21	Samantha L Bates	2400240
	04/13/2023	04/25/2023 12:18	Simonne.V. Calhoun	04/26/2023 12:23	Samantha L Bates	2400241
EPA 353.2 Rev. 2.0	04/13/2023			04/24/2023 10:30	Beverly Y. Sanders	2400239
	04/13/2023			04/24/2023 10:31	Beverly Y. Sanders	2400240
	04/13/2023			04/24/2023 11:22	Beverly Y. Sanders	2400241
EPA 365.1 Rev. 2.0	04/13/2023	04/14/2023 14:15	Alexis Price	04/17/2023 16:10	James L Waggeberby	2400240
	04/13/2023	04/14/2023 14:15	Alexis Price	04/17/2023 16:12	James L Waggeberby	2400239
	04/13/2023	04/14/2023 14:15	Alexis Price	04/17/2023 16:13	James L Waggeberby	2400241
SM 2340 B-2011	04/13/2023			04/21/2023 18:21	McKinley C Carter	2400258
	04/13/2023			04/21/2023 18:42	McKinley C Carter	2400259
SM 5310 B-2011	04/13/2023			04/18/2023 20:38	Elise M. Gillis	2400239
	04/13/2023			04/18/2023 23:17	Elise M. Gillis	2400240
	04/13/2023			04/18/2023 23:31	Elise M. Gillis	2400241