Chemical Analysis Report

NE-DIST-2022-06-14-01

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

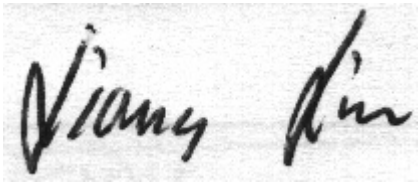
Event Description: **Vilano Boat**
Request ID: **RQ-2022-05-23-09**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
8800 Baymeadows Way West
Suite 100
Jacksonville, FL 32256
Attn: Jeremy Parrish

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: Liang Lin, Environmental Administrator

Date Certified: 06-JUL-2022 10:39



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: Ximanies CR ~1 mi upstrm of Mouth **Collection Date/Time: 06/13/2022 10:05**

Field ID: 27010968 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2334287	EPA 180.1 Rev. 2.0	Turbidity	20		NTU	P415202	
	SM 2320 B-2011	Total Alkalinity	122		mg CaCO3/L	P415758	
	SM 2540 D-2011	TSS	43		mg/L	P415654	
	SM 4500-F- C-2011	Fluoride	1.3		mg F/L	P415761	
2334290	EPA 350.1 Rev. 2.0	Ammonia-N	0.031		mg N/L	P415678	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.60		mg N/L	P415404	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.007	I	mg N/L	P415832	
	EPA 365.1 Rev. 2.0	Total-P	0.086		mg P/L	P415467	
	SM 5310 B-2011	Organic Carbon	3.5	I	mg C/L	P415408	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Sombrero Creek @ 1st North Bend Above the ICW **Collection Date/Time: 06/13/2022 10:35**

Field ID: 27010010 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2334288	EPA 180.1 Rev. 2.0	Turbidity	19		NTU	P415202	
	SM 2320 B-2011	Total Alkalinity	124		mg CaCO3/L	P415758	
	SM 2540 D-2011	TSS	28		mg/L	P415654	
	SM 4500-F- C-2011	Fluoride	1.3		mg F/L	P415761	
2334291	EPA 350.1 Rev. 2.0	Ammonia-N	0.059		mg N/L	P415678	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.64		mg N/L	P415404	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P415832	
	EPA 365.1 Rev. 2.0	Total-P	0.087		mg P/L	P415467	
	SM 5310 B-2011	Organic Carbon	4.3		mg C/L	P415408	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: St. Augustine Inlet SE of Vilano Bt Rmp **Collection Date/Time: 06/13/2022 11:05**

Field ID: G5NE0587 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2334285	EPA 180.1 Rev. 2.0	Turbidity	8.6	A	NTU	P415202	
	SM 2320 B-2011	Total Alkalinity	119		mg CaCO3/L	P415758	
	SM 2540 D-2011	TSS	18		mg/L	P415654	
	SM 4500-F- C-2011	Fluoride	1.3		mg F/L	P415761	
2334286	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P415673	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.30	I	mg N/L	P415404	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P415832	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P415570	
	SM 5310 B-2011	Organic Carbon	2.1	I	mg C/L	P415408	
2334304	EPA 200.7 Rev. 4.4	Aluminum	240	U	ug/L	P415463	
		Calcium	446		mg/L	P415463	
		Iron	530		ug/L	P415463	
		Magnesium	1.48E+03		mg/L	P415463	
		Strontium	7.90E+03		ug/L	P415463	
		Tin	84	I	ug/L	P415463	
		Titanium	17	I	ug/L	P415463	
		Vanadium	20	U	ug/L	P415463	
		Zinc	50	U	ug/L	P415463	
	EPA 200.8 Rev. 5.4	Antimony	0.20	U	ug/L	P415463	
		Arsenic	2.59		ug/L	P415463	
		Beryllium	0.040	U	ug/L	P415463	
		Cadmium	0.080	U	ug/L	P415463	
		Chromium	1.6	U	ug/L	P415463	
		Cobalt	0.19	I	ug/L	P415463	
		Copper	1.6	U	ug/L	P415463	
		Lead	2.0	U	ug/L	P415463	
		Manganese	15.4		ug/L	P415463	
		Molybdenum	13.6		ug/L	P415463	
		Nickel	2.0	U	ug/L	P415463	
		Selenium	0.80	U	ug/L	P415463	
		Silver	0.040	U	ug/L	P415463	
		Thallium	1.0	U	ug/L	P415463	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium, magnesium and strontium are unavailable because of high analyte concentration in the QC sample.

Sample Location: Salt Run Offshore From Lighthouse **Collection Date/Time: 06/13/2022 11:35**

Field ID: 27010138 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2334289	EPA 180.1 Rev. 2.0	Turbidity	11		NTU	P415202	
	SM 2320 B-2011	Total Alkalinity	128		mg CaCO3/L	P415758	
	SM 2540 D-2011	TSS	20		mg/L	P415654	
	SM 4500-F- C-2011	Fluoride	1.3		mg F/L	P415761	
2334292	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P415678	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.54		mg N/L	P415404	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P415832	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P415467	
	SM 5310 B-2011	Organic Carbon	0.92	I	mg C/L	P415408	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P415202

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415463

Component	Result	Code	Units
Aluminum	60	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	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: P415463

Component	Result	Code	Units
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	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: P415673

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415678

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415404

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415832

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415467

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415570

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

Reference Method: SM 2320 B-2011
Batch ID: P415758

Component	Result	Code	Units
Total Alkalinity	1.0	U	mg CaCO3/L

Reference Method: SM 2540 D-2011
Batch ID: P415654

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P415761

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P415408

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P415202

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	96.6		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415463

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Calcium	108		P	85 - 115
Iron	110		P	85 - 115
Magnesium	107		P	85 - 115
Strontium	101		P	85 - 115
Tin	104		P	85 - 115
Titanium	104		P	85 - 115
Vanadium	96.3		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415463

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Antimony	99.3		P	85 - 115
Arsenic	98.1		P	85 - 115
Beryllium	89.9		P	85 - 115
Cadmium	98.0		P	85 - 115
Chromium	96.2		P	85 - 115
Cobalt	96.5		P	85 - 115
Copper	95.0		P	85 - 115
Lead	98.4		P	85 - 115
Manganese	96.8		P	85 - 115
Molybdenum	98.3		P	85 - 115
Nickel	97.0		P	85 - 115
Selenium	95.7		P	85 - 115
Silver	96.6		P	85 - 115
Thallium	99.4		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415673

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415678

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415404

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	102		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415832

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	96.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415467

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	107		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415570

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

Reference Method: SM 2320 B-2011
Batch ID: P415758

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.0		P	94 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P415761

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.5		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P415408

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.0		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415463

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334304	Aluminum	109	103	P/P	70 - 130
2334304	Iron	109	101	P/P	70 - 130
2334304	Tin	85.7	87.5	P/P	80 - 120
2334304	Titanium	104	102	P/P	80 - 120
2334304	Vanadium	105	103	P/P	80 - 120
2334304	Zinc	105	104	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415463

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334304	Antimony	93.4	92.2	P/P	70 - 130
2334304	Arsenic	105	104	P/P	70 - 130
2334304	Beryllium	96.7	102	P/P	70 - 130
2334304	Cadmium	83.5	86.2	P/P	70 - 130
2334304	Chromium	98.1	97.0	P/P	70 - 130
2334304	Cobalt	117	117	P/P	70 - 130
2334304	Copper	108	109	P/P	70 - 130
2334304	Lead	107	108	P/P	70 - 130
2334304	Manganese	95.0	94.2	P/P	70 - 130
2334304	Molybdenum	114	115	P/P	70 - 130
2334304	Nickel	122	122	P/P	70 - 130
2334304	Selenium	88.6	89.6	P/P	70 - 130
2334304	Silver	82.0	80.7	P/P	70 - 130
2334304	Thallium	110	110	P/P	70 - 130

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415673

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334346	Ammonia-N	98.2	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415678

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334144	Ammonia-N	106	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415404

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333621	Kjeldahl Nitrogen	102	109	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415832

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334290	NO2NO3-N	95.7	99.2	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415467

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334683	Total-P	102	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415570

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334685	Total-P	96.4	94.7	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P415761

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334143	Fluoride	96.0	97.5	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P415408

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333622	Organic Carbon	92.0	92.4	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P415202

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334285	Turbidity	5.46	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415463

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334304	Aluminum	5.91	Spike	P	0 - 20
2334304	Calcium	3.45	Spike	P	0 - 20
2334304	Iron	6.74	Spike	P	0 - 20
2334304	Magnesium	3.86	Spike	P	0 - 20
2334304	Strontium	2.60	Spike	P	0 - 20
2334304	Tin	1.10	Spike	P	0 - 20
2334304	Titanium	1.25	Spike	P	0 - 20
2334304	Vanadium	2.16	Spike	P	0 - 20
2334304	Zinc	0.803	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415463

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334304	Antimony	1.33	Spike	P	0 - 20
2334304	Arsenic	0.258	Spike	P	0 - 20
2334304	Beryllium	5.30	Spike	P	0 - 20
2334304	Cadmium	3.19	Spike	P	0 - 20
2334304	Chromium	1.12	Spike	P	0 - 20
2334304	Cobalt	0.203	Spike	P	0 - 20
2334304	Copper	0.428	Spike	P	0 - 20
2334304	Lead	0.200	Spike	P	0 - 20
2334304	Manganese	0.705	Spike	P	0 - 20
2334304	Molybdenum	0.562	Spike	P	0 - 20
2334304	Nickel	0.121	Spike	P	0 - 20
2334304	Selenium	1.12	Spike	P	0 - 20
2334304	Silver	1.63	Spike	P	0 - 20
2334304	Thallium	0.566	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415673

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334346	Ammonia-N	1.78	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415678

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334144	Ammonia-N	0.129	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415404

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333621	Kjeldahl Nitrogen	4.85	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415832

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334290	NO2NO3-N	3.47	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415467

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334683	Total-P	1.85	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415570

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334685	Total-P	1.70	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P415758

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334143	Total Alkalinity	0.430	Sample	P	0 - 3.8

Reference Method: SM 4500-F- C-2011
Batch ID: P415761

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334143	Fluoride	0.999	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P415408

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333622	Organic Carbon	0.416	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A112824
Included Lab Sample IDs: 2334285, 2334287, 2334288, 2334289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	100	P/P	95 - 105

Reference Method: SM 5310 B-2011
Run ID: A112926
Included Lab Sample IDs: 2334286, 2334290, 2334291, 2334292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.9	97.7	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A112966
Included Lab Sample IDs: 2334304

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.9	101	P/P	90 - 110
Calcium	105	105	P/P	90 - 110
Iron	104	104	P/P	90 - 110
Magnesium	105	105	P/P	90 - 110
Strontium	98.2	99.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A112986
Included Lab Sample IDs: 2334304

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Tin	99.3	99.6	P/P	95 - 105
Titanium	102	101	P/P	95 - 105
Vanadium	102	101	P/P	95 - 105
Zinc	99.3	98.3	P/P	95 - 105

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A112995
Included Lab Sample IDs: 2334304

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	102	105	P/P	90 - 110
Arsenic	104	104	P/P	90 - 110
Beryllium	101	105	P/P	90 - 110
Cadmium	102	103	P/P	90 - 110
Chromium	101	103	P/P	90 - 110
Cobalt	105	107	P/P	90 - 110
Copper	106	108	P/P	90 - 110
Lead	103	103	P/P	90 - 110
Manganese	101	104	P/P	90 - 110
Molybdenum	103	104	P/P	90 - 110
Nickel	107	108	P/P	90 - 110
Selenium	101	102	P/P	90 - 110
Silver	104	104	P/P	90 - 110
Thallium	101	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113005
Included Lab Sample IDs: 2334286, 2334290, 2334291, 2334292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	103	P/P	90 - 110
Kjeldahl Nitrogen	103	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113008
Included Lab Sample IDs: 2334292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113015
Included Lab Sample IDs: 2334290, 2334291

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	99.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A113018
Included Lab Sample IDs: 2334286, 2334290, 2334291, 2334292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.8	97.6	P/P	90 - 110
Ammonia-N	99.6	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113053
Included Lab Sample IDs: 2334286

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	97.8	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A113065
Included Lab Sample IDs: 2334285, 2334287, 2334288, 2334289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	97.5	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A113065
Included Lab Sample IDs: 2334285, 2334287, 2334288, 2334289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113114
Included Lab Sample IDs: 2334286, 2334290, 2334291, 2334292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113114
Included Lab Sample IDs: 2334286, 2334290, 2334291, 2334292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	98.0	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 180.1 Rev. 2.0	Turbidity	96.6				5.46	
EPA 200.7 Rev. 4.4	Aluminum	102	109	103			5.91
	Calcium	108					3.45
	Iron	110	109	101			6.74
	Magnesium	107					3.86
	Strontium	101					2.60
	Tin	104	85.7	87.5			1.10
	Titanium	104	104	102			1.25
	Vanadium	96.3	105	103			2.16
	Zinc	102	105	104			0.803
EPA 200.8 Rev. 5.4	Antimony	99.3	93.4	92.2			1.33
	Arsenic	98.1	105	104			0.258
	Beryllium	89.9	96.7	102			5.30
	Cadmium	98.0	83.5	86.2			3.19
	Chromium	96.2	98.1	97.0			1.12
	Cobalt	96.5	117	117			0.203
	Copper	95.0	108	109			0.428
	Lead	98.4	107	108			0.200
	Manganese	96.8	95.0	94.2			0.705
	Molybdenum	98.3	115	114			0.562
	Nickel	97.0	122	122			0.121
	Selenium	95.7	88.6	89.6			1.12
	Silver	96.6	82.0	80.7			1.63
	Thallium	99.4	110	110			0.566
EPA 350.1 Rev. 2.0	Ammonia-N	96.0	98.2	101			1.78
	Ammonia-N	94.4	105	106			0.129
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	102	109			4.85
EPA 353.2 Rev. 2.0	NO2NO3-N	96.5	95.7	99.2			3.47
EPA 365.1 Rev. 2.0	Total-P	107	102	100			1.85
	Total-P	103	96.4	94.7			1.70
SM 2320 B-2011	Total Alkalinity	99.0				0.430	
SM 4500-F- C-2011	Fluoride	99.5	96.0	97.5			0.999
SM 5310 B-2011	Organic Carbon	96.0	92.0	92.4			0.416

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2334285, 2334287, 2334288, 2334289
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2334304
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2334304
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2334286, 2334290, 2334291, 2334292
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2334286, 2334290, 2334291, 2334292
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2334286, 2334290, 2334291, 2334292
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2334286, 2334290, 2334291, 2334292
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2334285, 2334287, 2334288, 2334289
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2334285, 2334287, 2334288, 2334289
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2334285, 2334287, 2334288, 2334289
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2334286, 2334290, 2334291, 2334292

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	06/14/2022			06/14/2022 16:07	Khloe J Berg	2334287
	06/14/2022			06/14/2022 16:09	Khloe J Berg	2334285
	06/14/2022			06/14/2022 16:18	Khloe J Berg	2334288
	06/14/2022			06/14/2022 16:19	Khloe J Berg	2334289
EPA 200.7 Rev. 4.4	06/14/2022	06/21/2022 09:45	Megan Whitefoot	06/21/2022 22:17	McKinley C Carter	2334304
	06/14/2022	06/21/2022 09:45	Megan Whitefoot	06/21/2022 23:25	McKinley C Carter	2334304
	06/14/2022	06/21/2022 09:45	Megan Whitefoot	06/22/2022 13:32	McKinley C Carter	2334304
EPA 200.8 Rev. 5.4	06/14/2022	06/21/2022 09:45	Megan Whitefoot	06/22/2022 14:52	Alexander Thompson	2334304
	06/14/2022	06/21/2022 09:45	Megan Whitefoot	06/22/2022 16:09	Alexander Thompson	2334304
EPA 350.1 Rev. 2.0	06/14/2022			06/23/2022 11:16	Judith K. Clark	2334286
	06/14/2022			06/23/2022 16:19	Judith K. Clark	2334290
	06/14/2022			06/23/2022 16:20	Judith K. Clark	2334291
	06/14/2022			06/23/2022 16:21	Judith K. Clark	2334292
EPA 351.2 Rev. 2.0	06/14/2022	06/22/2022 15:49	Samantha L Bates	06/23/2022 11:45	Alexandra J Mattheus	2334286
	06/14/2022	06/22/2022 15:49	Samantha L Bates	06/23/2022 11:50	Alexandra J Mattheus	2334290
	06/14/2022	06/22/2022 15:49	Samantha L Bates	06/23/2022 11:52	Alexandra J Mattheus	2334291
	06/14/2022	06/22/2022 15:49	Samantha L Bates	06/23/2022 11:53	Alexandra J Mattheus	2334292
EPA 353.2 Rev. 2.0	06/14/2022			06/27/2022 14:17	Touraj Touran	2334290
	06/14/2022			06/27/2022 14:30	Touraj Touran	2334286
	06/14/2022			06/27/2022 14:31	Touraj Touran	2334291
	06/14/2022			06/27/2022 14:32	Touraj Touran	2334292
EPA 365.1 Rev. 2.0	06/14/2022	06/22/2022 17:36	Adam P Silver	06/23/2022 11:43	James L Waggerby	2334292
	06/14/2022	06/22/2022 17:36	Adam P Silver	06/23/2022 14:05	James L Waggerby	2334290
	06/14/2022	06/22/2022 17:36	Adam P Silver	06/23/2022 14:06	James L Waggerby	2334291
	06/14/2022	06/23/2022 14:45	Simonne.V. Calhoun	06/24/2022 14:07	James L Waggerby	2334286
SM 2320 B-2011	06/14/2022			06/24/2022 10:21	Dale L. Simmons	2334285
	06/14/2022			06/24/2022 10:34	Dale L. Simmons	2334287
	06/14/2022			06/24/2022 10:47	Dale L. Simmons	2334288
	06/14/2022			06/24/2022 11:00	Dale L. Simmons	2334289
SM 2540 D-2011	06/14/2022			06/17/2022 14:36	Yijie Li	2334285, 2334287, 2334288, 2334289
SM 4500-F- C-2011	06/14/2022			06/24/2022 08:23	Dale L. Simmons	2334285
	06/14/2022			06/24/2022 08:28	Dale L. Simmons	2334287
	06/14/2022			06/24/2022 08:33	Dale L. Simmons	2334288
	06/14/2022			06/24/2022 08:38	Dale L. Simmons	2334289
SM 5310 B-2011	06/14/2022			06/18/2022 07:19	Khloe J Berg	2334286
	06/14/2022			06/18/2022 07:32	Khloe J Berg	2334290
	06/14/2022			06/18/2022 07:45	Khloe J Berg	2334291
	06/14/2022			06/18/2022 08:01	Khloe J Berg	2334292