

Chemical Analysis Report

CEN-DIST-2017-03-29-02

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

Event Description: **South Grasshopper Lk**
Request ID: **RQ-2017-03-13-46**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
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3319 Maguire Blvd., Suite 232
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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 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: Grasshopper Lake South @ 325m SE of Boat Ramp **Collection Date/Time: 03/28/2017 11:50**

Field ID: G2CE0070

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1884041	EPA 180.1 Rev. 2.0	Turbidity	1.1		NTU	P322463	
	EPA 300.0 Rev. 2.1	Chloride	9.4	A	mg Cl/L	P323117	
		Sulfate	4.7	A	mg SO4/L	P323120	
	SM 2120 B	Color (true)	5.0	I	PCU	P322436	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P322915	
	SM 2540 C-97	TDS	31		mg/L	P322829	
	SM 2540 D-97	TSS	4	I	mg/L	P323018	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P323076	
1884043	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P322425	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.43		mg N/L	P322460	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P322568	
	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P322640	
	SM 5310 B-00	Organic Carbon	5.4		mg C/L	P322511	
1884045	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P322445	

Ref. Method and Comment:

SM 2120 B: The result was confirmed on 03/29/2017.

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Grasshopper Lake South @ 325m SE of Boat Ramp **Collection Date/Time: 03/28/2017 11:50**

Field ID: G2CE0070_D

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1884042	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P322463	
	EPA 300.0 Rev. 2.1	Chloride	9.3		mg Cl/L	P323117	
		Sulfate	4.6		mg SO4/L	P323120	
	SM 2120 B	Color (true)	7.2		PCU	P322436	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P322916	
	SM 2540 C-97	TDS	30		mg/L	P322829	
	SM 2540 D-97	TSS	3	I	mg/L	P323018	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P322919	
1884044	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P322425	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.44		mg N/L	P322460	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P322568	
	EPA 365.1 Rev. 2.0	Total-P	0.008		mg P/L	P322640	
	SM 5310 B-00	Organic Carbon	5.2		mg C/L	P322511	
1884046	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P322445	

Ref. Method and Comment:

SM 2120 B: The result was confirmed on 03/29/2017.

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: FIELD BLANK **Collection Date/Time: 03/28/2017 12:05**

Field ID: FIELD BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1884038	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P322463	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P323117	
		Sulfate	0.20	U	mg SO4/L	P323120	
		Color (true)	2.5	U	PCU	P322436	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P322915	
	SM 2540 C-97	TDS	15	U	mg/L	P322829	
	SM 2540 D-97	TSS	2	U	mg/L	P323018	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P323076	
1884039	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P322425	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P322457	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P322568	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P322640	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P322511	
1884040	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P322445	
1884060	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P322663	
		Iron	30	U	ug/L	P322663	
		Magnesium	0.040	U	mg/L	P322663	
		Potassium	0.30	U	mg/L	P322663	
		Sodium	0.50	U	mg/L	P322663	
		Zinc	5.0	U	ug/L	P322663	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P322663	
		Cadmium	0.020	U	ug/L	P322663	
		Chromium	0.40	U	ug/L	P322663	
		Copper	0.20	U	ug/L	P322663	
		Lead	0.050	U	ug/L	P322663	
		Nickel	0.20	U	ug/L	P322663	
		Silver	0.010	U	ug/L	P322663	

Ref. Method and Comment:
 SM 2540 D-97: 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: P322463

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P322663

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
Zinc	5.0	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P322663

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P323117

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P323120

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P322425

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P322457

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P322460

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P322568

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P322640

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P322445

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: SM 2120 B
Batch ID: P322436

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P322915

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2320 B-97
Batch ID: P322916

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-97
Batch ID: P322829

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P323018

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P322919

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P323076

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P322511

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: P322663

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	104		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	102		P	85 - 115
Sodium	102		P	85 - 115
Zinc	99.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P322663

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.9		P	85 - 115
Cadmium	93.7		P	85 - 115
Chromium	96.6		P	85 - 115
Copper	95.4		P	85 - 115
Lead	99.2		P	85 - 115
Nickel	97.6		P	85 - 115
Silver	98.1		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P323117

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P323120

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	94.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P322425

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

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P322457

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

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P322460

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: P322568

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P322640

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P322445

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

Reference Method: SM 2320 B-97
Batch ID: P322915

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 108

Reference Method: SM 2320 B-97
Batch ID: P322916

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P322919

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.5		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P323076

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.9		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P322511

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	102		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P322663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P322663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884303	Calcium	100		P	80 - 120
1884303	Iron	104		P	80 - 120
1884303	Magnesium	101		P	80 - 120
1884303	Potassium	101		P	80 - 120
1884303	Sodium	102		P	80 - 120
1884303	Zinc	98.8		P	80 - 120
1884721	Calcium	99.5		P	80 - 120
1884721	Iron	103	104	P/P	80 - 120
1884721	Magnesium	98.4		P	80 - 120
1884721	Potassium	103	103	P/P	80 - 120
1884721	Sodium	101		P	80 - 120
1884721	Zinc	96.8	98.0	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P322663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884303	Arsenic	96.6		P	80 - 120
1884303	Cadmium	92.5		P	80 - 120
1884303	Chromium	95.1		P	80 - 120
1884303	Copper	92.2		P	80 - 120
1884303	Lead	97.9		P	80 - 120
1884303	Nickel	93.6		P	80 - 120
1884303	Silver	98.1		P	80 - 120
1884721	Arsenic	98.8	97.2	P/P	80 - 120
1884721	Cadmium	96.3	95.2	P/P	80 - 120
1884721	Chromium	98.1	96.7	P/P	80 - 120
1884721	Copper	92.9	92.5	P/P	80 - 120
1884721	Lead	98.3	98.3	P/P	80 - 120
1884721	Nickel	95.4	94.0	P/P	80 - 120
1884721	Silver	99.2	98.8	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P323117

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1883912	Chloride	98.7		P	90 - 110
1884041	Chloride	98.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P323120

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1883912	Sulfate	94.3		P	90 - 110
1884041	Sulfate	94.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P322425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884008	Ammonia-N	103	103	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P322457

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884013	Kjeldahl Nitrogen	96.4	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P322460

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884166	Kjeldahl Nitrogen	101	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P322568

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884013	NO2NO3-N	99.8	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P322640

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884166	Total-P	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P322445

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884010	O-Phosphate-P	96.9	98.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P323076

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1883324	Fluoride	97.3	98.5	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P322511

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884008	Organic Carbon	103		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P322463

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884088	Turbidity	4.10	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P322663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884721	Calcium	0.503	Spike	P	0 - 20
1884721	Iron	1.04	Spike	P	0 - 20
1884721	Magnesium	0.507	Spike	P	0 - 20
1884721	Potassium	0.382	Spike	P	0 - 20
1884721	Sodium	1.06	Spike	P	0 - 20
1884721	Zinc	1.24	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P322663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884721	Arsenic	1.61	Spike	P	0 - 20
1884721	Cadmium	1.16	Spike	P	0 - 20
1884721	Chromium	1.34	Spike	P	0 - 20
1884721	Copper	0.431	Spike	P	0 - 20
1884721	Lead	0.0289	Spike	P	0 - 20
1884721	Nickel	1.40	Spike	P	0 - 20
1884721	Silver	0.429	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P323117

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884041	Chloride	0.279	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P323120

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884041	Sulfate	0.174	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P322425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884008	Ammonia-N	0.636	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P322457

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884013	Kjeldahl Nitrogen	0.366	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P322460

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884166	Kjeldahl Nitrogen	2.61	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P322568

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884013	NO2NO3-N	1.96	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P322640

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884166	Total-P	1.39	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P322445

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884010	O-Phosphate-P	1.18	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P322436

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884007	Color (true)	1.66	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P322915

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884162	Total Alkalinity	0.905	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P322916

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884321	Total Alkalinity	0.157	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P322829

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884007	TDS	8.42	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P322919

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884321	Fluoride	0.520	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P323076

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1883324	Fluoride	1.00	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P322511

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1884008	Organic Carbon	0.0989	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A75437
Included Lab Sample IDs: 1884039, 1884043, 1884044

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	104	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A75443
Included Lab Sample IDs: 1884038, 1884041, 1884042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	102	P/P	85 - 115
Color (true)	102	102	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A75452
Included Lab Sample IDs: 1884040, 1884045, 1884046

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A75456
Included Lab Sample IDs: 1884038, 1884041, 1884042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	100	P/P	95 - 105

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A75475

Included Lab Sample IDs: 1884039, 1884043, 1884044

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.1	95.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A75490

Included Lab Sample IDs: 1884039, 1884043, 1884044

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	98.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A75499

Included Lab Sample IDs: 1884039, 1884043, 1884044

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	98.4	P/P	90 - 110
Kjeldahl Nitrogen	104	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A75554

Included Lab Sample IDs: 1884039, 1884043, 1884044

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A75569

Included Lab Sample IDs: 1884060

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.0	98.7	P/P	90 - 110
Cadmium	95.6	95.2	P/P	90 - 110
Chromium	97.5	97.8	P/P	90 - 110
Copper	99.6	99.3	P/P	90 - 110
Lead	99.1	98.7	P/P	90 - 110
Nickel	99.2	99.3	P/P	90 - 110
Silver	98.2	96.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A75593

Included Lab Sample IDs: 1884060

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	100	P/P	90 - 110
Iron	100	98.9	P/P	90 - 110
Magnesium	101	99.3	P/P	90 - 110
Potassium	101	99.2	P/P	90 - 110
Sodium	101	99.0	P/P	90 - 110
Zinc	103	99.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A75625

Included Lab Sample IDs: 1884038, 1884041, 1884042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	105	P/P	90 - 110
Total Alkalinity	105	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A75625

Included Lab Sample IDs: 1884042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	95.0	96.6	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A75710

Included Lab Sample IDs: 1884038, 1884041

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.1	96.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A75723

Included Lab Sample IDs: 1884038, 1884041, 1884042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.3	98.9	P/P	90 - 110
Chloride	98.9	97.9	P/P	90 - 110
Sulfate	94.6	97.2	P/P	90 - 110
Sulfate	97.2	93.7	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 SMP	MS
					LCS		
EPA 180.1 Rev. 2.0	Turbidity					4.10	
EPA 200.7 Rev. 4.4	Calcium	102	100	99.5			0.503
	Iron	104	104	103	104		1.04
	Magnesium	103	101	98.4			0.507
	Potassium	102	101	103	103		0.382
	Sodium	102	102	101			1.06
	Zinc	99.7	98.8	96.8	98.0		1.24
EPA 200.8 Rev. 5.4	Arsenic	96.9	96.6	98.8	97.2		1.61
	Cadmium	93.7	92.5	96.3	95.2		1.16
	Chromium	96.6	95.1	98.1	96.7		1.34
	Copper	95.4	92.2	92.9	92.5		0.431
	Lead	99.2	97.9	98.3	98.3		0.0289
	Nickel	97.6	93.6	95.4	94.0		1.40
	Silver	98.1	98.1	99.2	98.8		0.429

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision	
					LCS	MS
EPA 300.0 Rev. 2.1	Chloride	96.6	98.2	98.7	0.279	
	Sulfate	94.9	94.4	94.3	0.174	
EPA 350.1 Rev. 2.0	Ammonia-N	104	103	103		0.636
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	96.4	96.8		0.366
	Kjeldahl Nitrogen	102	101	104		2.61
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	99.8	97.8		1.96
EPA 365.1 Rev. 2.0	Total-P	107	104	103		1.39
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	96.9	98.4		1.18
SM 2120 B	Color (true)				1.66	
SM 2320 B-97	Total Alkalinity	104			0.905	
	Total Alkalinity	104			0.157	
SM 2540 C-97	TDS				8.42	
SM 4500 F-C-97	Fluoride	94.5				0.520
	Fluoride	94.9	97.3	98.5		1.00
SM 5310 B-00	Organic Carbon	102	103			0.0989

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1884038, 1884041, 1884042
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1884060
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1884060
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1884038, 1884041, 1884042
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1884038, 1884041, 1884042
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1884039, 1884043, 1884044
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1884039, 1884043, 1884044
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1884039, 1884043, 1884044
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1884039, 1884043, 1884044
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1884040, 1884045, 1884046
SM 2120 B / E31780	True Color measured at 450 nm	1884038, 1884041, 1884042
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1884038, 1884041, 1884042
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1884038, 1884041, 1884042
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1884038, 1884041, 1884042
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1884038, 1884041, 1884042
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1884039, 1884043, 1884044

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	03/29/2017			03/29/2017 17:01	Blanca Fach	1884038, 1884041, 1884042
EPA 200.7 Rev. 4.4	03/29/2017	04/03/2017	Elliott D. Healy	04/05/2017	Martin Acosta	1884060
EPA 200.8 Rev. 5.4	03/29/2017	04/03/2017	Elliott D. Healy	04/04/2017	Betina Topolski	1884060
EPA 300.0 Rev. 2.1	03/29/2017			04/10/2017	Ping Hua	1884038, 1884041, 1884042
EPA 350.1 Rev. 2.0	03/29/2017			03/29/2017	Julie Michelle Frank	1884039, 1884043, 1884044
EPA 351.2 Rev. 2.0	03/29/2017	03/30/2017	Adrian Shelby	03/31/2017	Joseph Suarez	1884039, 1884043, 1884044
EPA 353.2 Rev. 2.0	03/29/2017			03/31/2017	Beverly Y. Sanders	1884039, 1884043, 1884044
EPA 365.1 Rev. 2.0	03/29/2017	04/03/2017	Vijayalakshmi Reddy	04/04/2017	Lipi Saha	1884039, 1884043, 1884044
EPA 365.1 Rev. 2.0 dissolved	03/29/2017			03/29/2017 14:36	Anthony C. Onicha	1884040
	03/29/2017			03/29/2017 14:37	Anthony C. Onicha	1884045
	03/29/2017			03/29/2017 14:38	Anthony C. Onicha	1884046
SM 2120 B	03/29/2017			03/29/2017 18:23	Julie Michelle Frank	1884038
	03/29/2017			03/29/2017 18:33	Julie Michelle Frank	1884041
	03/29/2017			03/29/2017 18:34	Julie Michelle Frank	1884042
SM 2320 B-97	03/29/2017			04/06/2017	Dale L. Simmons	1884038, 1884041, 1884042
SM 2540 C-97	03/29/2017			03/31/2017	Yijie Li	1884038, 1884041, 1884042
SM 2540 D-97	03/29/2017			03/31/2017	Yijie Li	1884038, 1884041, 1884042
SM 4500 F-C-97	03/29/2017			04/06/2017	Dale L. Simmons	1884042
	03/29/2017			04/10/2017	Dale L. Simmons	1884038, 1884041
SM 5310 B-00	03/29/2017			03/29/2017	Julie Michelle Frank	1884039, 1884043, 1884044