

Chemical Analysis Report

CEN-DIST-2017-05-12-02

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

Event Description: **Puzzle Lake + D&B**
Request ID: **RQ-2017-05-08-39**
Customer: **CEN-DIST**
Project ID: **SMP**

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

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Certified by: Colin Wright, Program Administrator

Date Certified: 16-JUN-2017 14:25

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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: LAKE CHARLES @ 400M SOUTH OF CENTER **Collection Date/Time: 05/11/2017 12:45**

Field ID: G1CE0030

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1898960	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P325311	
	EPA 300.0 Rev. 2.1	Chloride	17	A	mg Cl/L	P325898	
		Sulfate	6.2	A	mg SO4/L	P325901	
	SM 2120 B	Color (true)	280		PCU	P325221	
	SM 2320 B-97	Total Alkalinity	32		mg CaCO3/L	P325700	
	SM 2540 C-97	TDS	155		mg/L	P325688	
	SM 2540 D-97	TSS	3	I	mg/L	P325677	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P325703	RPD
1898963	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P325278	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P325453	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P325357	
	EPA 365.1 Rev. 2.0	Total-P	0.038		mg P/L	P325336	
	SM 5310 B-00	Organic Carbon	34		mg C/L	P325582	
1898966	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.007	I	mg P/L	P325226	

Ref. Method and Comment:

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: 05/11/2017 11:40**

Field ID: G2CE0070

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1898961	EPA 180.1 Rev. 2.0	Turbidity	1.1		NTU	P325311	
	EPA 300.0 Rev. 2.1	Chloride	10	A	mg Cl/L	P326707	
		Sulfate	5.4	A	mg SO4/L	P326708	
	SM 2120 B	Color (true)	5.5	I	PCU	P325221	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P325698	
	SM 2540 C-97	TDS	35		mg/L	P325688	
	SM 2540 D-97	TSS	2	I	mg/L	P325677	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P325702	RPD
1898964	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P325278	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.39		mg N/L	P325453	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P325357	
	EPA 365.1 Rev. 2.0	Total-P	0.008		mg P/L	P325337	
	SM 5310 B-00	Organic Carbon	4.7		mg C/L	P325582	
1898967	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P325226	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Chloride: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

Sample Location: FIELD BLANK

Collection Date/Time: 05/11/2017 12:30

Field ID: Field Blank

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1898962	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P325311	

Field ID: Field Blank

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1898962	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P326707	
		Sulfate	0.20	UQ	mg SO4/L	P326861	
	SM 2120 B	Color (true)	2.5	U	PCU	P325222	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P325700	
	SM 2540 C-97	TDS	15	U	mg/L	P325686	
	SM 2540 D-97	TSS	2	U	mg/L	P325675	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P325703	RPD
1898965	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P325279	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P325453	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P325357	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P325337	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P325582	
1898968	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P325225	
1898972	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P325446	
		Iron	30	U	ug/L	P325446	
		Magnesium	0.040	U	mg/L	P325446	
		Potassium	0.30	U	mg/L	P325446	
		Sodium	0.50	U	mg/L	P325446	
		Zinc	5.0	U	ug/L	P325446	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P325446	
		Cadmium	0.020	U	ug/L	P325446	
		Chromium	0.40	U	ug/L	P325446	
		Copper	0.60	I	ug/L	P325446	
		Lead	0.050	U	ug/L	P325446	
		Nickel	0.20	U	ug/L	P325446	
		Silver	0.010	U	ug/L	P325446	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Chloride: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

EPA 300.0 Rev. 2.1: Sulfate: Sample expired prior to analysis due to analytical difficulties.

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

EPA 200.8 Rev. 5.4: The copper result was confirmed in the undigested sample on 05/19/2017.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P325311

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P325446

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325446

Component	Result	Code	Units
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P325446

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: P325898

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P325901

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326707

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326708

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326861

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325278

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325279

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325453

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325357

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325336

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325337

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325225

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325226

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

Reference Method: SM 2120 B
Batch ID: P325221

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P325222

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report

Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P325698

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

Reference Method: SM 2320 B-97
Batch ID: P325700

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

Reference Method: SM 2540 C-97
Batch ID: P325686

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P325688

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P325675

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P325677

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P325702

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P325703

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P325582

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: P325446

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	105		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	101		P	85 - 115
Sodium	108		P	85 - 115
Zinc	97.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P325446

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	107		P	85 - 115
Cadmium	105		P	85 - 115
Chromium	102		P	85 - 115
Copper	103		P	85 - 115
Lead	102		P	85 - 115
Nickel	106		P	85 - 115
Silver	98.5		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P325898

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P325901

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	94.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P326707

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P326708

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	106		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P326861

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325278

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325279

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325453

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325357

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325336

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325337

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325225

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325226

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

Reference Method: SM 2320 B-97
Batch ID: P325698

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P325700

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P325702

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	93.7		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P325703

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.1		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P325582

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325446

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1899030	Calcium	101		P	80 - 120
1899030	Iron	109		P	80 - 120
1899030	Magnesium	109		P	80 - 120
1899030	Potassium	98.4		P	80 - 120
1899030	Sodium	102		P	80 - 120
1899030	Zinc	107		P	80 - 120
1899346	Calcium	100		P	80 - 120
1899346	Iron	105	106	P/P	80 - 120
1899346	Magnesium	102		P	80 - 120
1899346	Potassium	99.7	97.9	P/P	80 - 120
1899346	Sodium	103		P	80 - 120
1899346	Zinc	98.8	97.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P325446

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1899030	Arsenic	110		P	80 - 120
1899030	Cadmium	106		P	80 - 120
1899030	Chromium	101		P	80 - 120
1899030	Copper	103		P	80 - 120
1899030	Lead	101		P	80 - 120
1899030	Nickel	105		P	80 - 120
1899030	Silver	97.5		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P325446

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1899346	Arsenic	107	108	P/P	80 - 120
1899346	Cadmium	107	106	P/P	80 - 120
1899346	Chromium	99.6	98.9	P/P	80 - 120
1899346	Copper	99.1	99.7	P/P	80 - 120
1899346	Lead	99.4	99.6	P/P	80 - 120
1899346	Nickel	101	101	P/P	80 - 120
1899346	Silver	98.4	97.8	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P325898

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898960	Chloride	95.3		P	90 - 110
1898993	Chloride	98.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P325901

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898960	Sulfate	93.2		P	90 - 110
1898993	Sulfate	94.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326707

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898961	Chloride	109		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326708

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898961	Sulfate	107		P	90 - 110
1899010	Sulfate	105		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326861

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1903208	Sulfate	104		P	90 - 110
1903209	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325278

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898920	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325279

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325279

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1899013	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325453

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898920	Kjeldahl Nitrogen	95.7	95.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325357

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898922	NO2NO3-N	100	99.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325336

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898859	Total-P	93.7	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325337

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898964	Total-P	101	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325225

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898807	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325226

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898860	O-Phosphate-P	99.2	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P325702

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1899364	Fluoride	93.4	101	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P325703

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1899011	Fluoride	96.5	102	P/P	91 - 105

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P325582

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1898858	Organic Carbon	106		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P325311

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898928	Turbidity	1.11	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325446

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1899346	Calcium	0.356	Spike	P	0 - 20
1899346	Iron	0.708	Spike	P	0 - 20
1899346	Magnesium	1.30	Spike	P	0 - 20
1899346	Potassium	1.17	Spike	P	0 - 20
1899346	Sodium	0.201	Spike	P	0 - 20
1899346	Zinc	0.973	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P325446

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1899346	Arsenic	0.812	Spike	P	0 - 20
1899346	Cadmium	1.19	Spike	P	0 - 20
1899346	Chromium	0.653	Spike	P	0 - 20
1899346	Copper	0.660	Spike	P	0 - 20
1899346	Lead	0.216	Spike	P	0 - 20
1899346	Nickel	0.326	Spike	P	0 - 20
1899346	Silver	0.616	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P325898

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898960	Chloride	0.0573	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P325901

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898960	Sulfate	0.221	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326707

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898961	Chloride	2.75	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326708

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898961	Sulfate	2.76	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326861

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1903208	Sulfate	0.343	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325278

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898920	Ammonia-N	0.428	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325279

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1899013	Ammonia-N	0.957	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325453

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898920	Kjeldahl Nitrogen	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325357

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898922	NO2NO3-N	0.922	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325336

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898859	Total-P	4.69	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325337

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898964	Total-P	3.44	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325225

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898807	O-Phosphate-P	0.498	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325226

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898860	O-Phosphate-P	0.533	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P325221

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898918	Color (true)	2.00	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P325222

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1899011	Color (true)	4.32	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P325698

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1899364	Total Alkalinity	0.593	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P325700

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1899011	Total Alkalinity	0.127	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P325686

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898803	TDS	5.49	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P325688

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898919	TDS	1.36	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P325702

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1899364	Fluoride	4.36	Spike	F	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P325703

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1899011	Fluoride	3.92	Spike	F	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P325582

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1898858	Organic Carbon	0.384	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: SM 2120 B
Run ID: A76385
Included Lab Sample IDs: 1898960, 1898961, 1898962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	98.2	P/P	85 - 115
Color (true)	98.2	98.9	P/P	85 - 115
Color (true)	98.9	98.6	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A76386
Included Lab Sample IDs: 1898966, 1898967, 1898968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	98.9	P/P	90 - 110
O-Phosphate-P	98.6	98.7	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A76421

Included Lab Sample IDs: 1898963, 1898964, 1898965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	104	105	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A76437

Included Lab Sample IDs: 1898960, 1898961, 1898962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	100	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A76449

Included Lab Sample IDs: 1898963, 1898964, 1898965

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A76491

Included Lab Sample IDs: 1898963, 1898964, 1898965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	99.5	P/P	90 - 110
Total-P	99.8	99.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A76547

Included Lab Sample IDs: 1898972

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.4	98.1	P/P	90 - 110
Iron	100	99.8	P/P	90 - 110
Magnesium	100	99.2	P/P	90 - 110
Potassium	99.4	98.4	P/P	90 - 110
Sodium	103	103	P/P	90 - 110
Zinc	101	99.4	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A76560

Included Lab Sample IDs: 1898963, 1898964, 1898965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.4	95.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A76563

Included Lab Sample IDs: 1898972

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	104	103	P/P	90 - 110
Cadmium	102	101	P/P	90 - 110
Chromium	101	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A76563

Included Lab Sample IDs: 1898972

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	103	102	P/P	90 - 110
Lead	99.3	98.7	P/P	90 - 110
Nickel	104	102	P/P	90 - 110
Silver	101	99.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A76593

Included Lab Sample IDs: 1898963, 1898964, 1898965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	91.5	95.3	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A76617

Included Lab Sample IDs: 1898960, 1898961, 1898962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	104	P/P	90 - 110
Total Alkalinity	104	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A76617

Included Lab Sample IDs: 1898960, 1898961, 1898962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	99.0	P/P	90 - 110
Fluoride	96.2	100	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A76672

Included Lab Sample IDs: 1898960

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	101	P/P	90 - 110
Sulfate	94.2	96.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A77051

Included Lab Sample IDs: 1898961, 1898962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	103	P/P	90 - 110
Chloride	103	95.0	P/P	90 - 110
Sulfate	103	109	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A77076

Included Lab Sample IDs: 1898962

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

Quality Assurance Report Calibration Verification

* 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			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						1.11	
EPA 200.7 Rev. 4.4	Calcium	101	101	100				0.356
	Iron	105	109	105	106			0.708
	Magnesium	103	109	102				1.30
	Potassium	101	98.4	99.7	97.9			1.17
	Sodium	108	102	103				0.201
	Zinc	97.7	107	98.8	97.8			0.973
EPA 200.8 Rev. 5.4	Arsenic	107	110	107	108			0.812
	Cadmium	105	106	107	106			1.19
	Chromium	102	101	99.6	98.9			0.653
	Copper	103	103	99.1	99.7			0.660
	Lead	102	101	99.4	99.6			0.216
	Nickel	106	105	101	101			0.326
	Silver	98.5	97.5	98.4	97.8			0.616
EPA 300.0 Rev. 2.1	Chloride	98.4	95.3	98.4			0.0573	
	Chloride	107	109				2.75	
	Sulfate	94.3	93.2	94.7			0.221	
	Sulfate	106	107	105			2.76	
	Sulfate	103	104	101			0.343	
EPA 350.1 Rev. 2.0	Ammonia-N	103	101	102				0.428
	Ammonia-N	105	101	102				0.957
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	95.7	95.7				0.0
EPA 353.2 Rev. 2.0	NO2NO3-N	101	100	99.4				0.922
EPA 365.1 Rev. 2.0	Total-P	99.0	93.7	99.5				4.69
	Total-P	102	101	97.8				3.44
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	100	101				0.498
	O-Phosphate-P	103	99.2	100				0.533
SM 2120 B	Color (true)						2.00	
	Color (true)						4.32	
SM 2320 B-97	Total Alkalinity	103					0.593	
	Total Alkalinity	103					0.127	
SM 2540 C-97	TDS						5.49	
	TDS						1.36	
SM 4500 F-C-97	Fluoride	93.7	93.4	101				4.36
	Fluoride	97.1	96.5	102				3.92
SM 5310 B-00	Organic Carbon	94.4	106					0.384

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1898960, 1898961, 1898962
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1898972
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1898972

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1898960, 1898961, 1898962
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1898960, 1898961, 1898962
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1898963, 1898964, 1898965
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1898963, 1898964, 1898965
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1898963, 1898964, 1898965
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1898963, 1898964, 1898965
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1898966, 1898967, 1898968
SM 2120 B / E31780	True Color measured at 450 nm	1898960, 1898961, 1898962
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1898960, 1898961, 1898962
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1898960, 1898961, 1898962
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1898960, 1898961, 1898962
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1898960, 1898961, 1898962
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1898963, 1898964, 1898965

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	05/12/2017			05/12/2017 15:15	Blanca Fach	1898960, 1898961, 1898962
EPA 200.7 Rev. 4.4	05/12/2017	05/17/2017	Elliott D. Healy	05/18/2017	Martin Acosta	1898972
EPA 200.8 Rev. 5.4	05/12/2017	05/17/2017	Elliott D. Healy	05/19/2017	Betina Topolski	1898972
EPA 300.0 Rev. 2.1	05/12/2017			05/25/2017	Ping Hua	1898960
	05/12/2017			06/08/2017	Julia Storbeck	1898961, 1898962
	05/12/2017			06/14/2017	Julia Storbeck	1898962
EPA 350.1 Rev. 2.0	05/12/2017			05/15/2017	Julia Storbeck	1898963, 1898964, 1898965
EPA 351.2 Rev. 2.0	05/12/2017	05/18/2017	Adrian Shelby	05/22/2017	Joseph Suarez	1898963, 1898964, 1898965
EPA 353.2 Rev. 2.0	05/12/2017			05/16/2017	Beverly Y. Sanders	1898963, 1898964, 1898965
EPA 365.1 Rev. 2.0	05/12/2017	05/16/2017	Adrian Shelby	05/17/2017	Lipi Saha	1898963, 1898964, 1898965
EPA 365.1 Rev. 2.0 dissolved	05/12/2017			05/12/2017 13:13	Anthony C. Onicha	1898966
	05/12/2017			05/12/2017 13:14	Anthony C. Onicha	1898967
	05/12/2017			05/12/2017 13:35	Anthony C. Onicha	1898968
SM 2120 B	05/12/2017			05/12/2017 14:37	Julia Storbeck	1898961
	05/12/2017			05/12/2017 14:40	Julia Storbeck	1898962
	05/12/2017			05/12/2017 14:52	Julia Storbeck	1898960
SM 2320 B-97	05/12/2017			05/22/2017	Dale L. Simmons	1898961
	05/12/2017			05/23/2017	Dale L. Simmons	1898960, 1898962
SM 2540 C-97	05/12/2017			05/17/2017	Yijie Li	1898960, 1898961, 1898962
SM 2540 D-97	05/12/2017			05/17/2017	Yijie Li	1898960, 1898961, 1898962
SM 4500 F-C-97	05/12/2017			05/22/2017	Dale L. Simmons	1898961
	05/12/2017			05/23/2017	Dale L. Simmons	1898960, 1898962
SM 5310 B-00	05/12/2017			05/19/2017	Christopher Armour	1898963, 1898964, 1898965