

Chemical Analysis Report

CEN-DIST-2016-12-21-03

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

Event Description: **Strickland D/Turnbull B/Spruce C/Rose Bx2**

Request ID: **RQ-2016-12-12-24**

Customer: **CEN-DIST**

Project ID: **SMP**

Send Reports to:

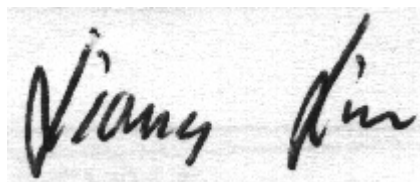
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Mike Linger

For additional information please contact

Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 17-JAN-2017 13:51

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored 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: ROSE BAY @ US 1

Collection Date/Time: 12/20/2016 11:39

Field ID: G5CE0038

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859430	EPA 180.1 Rev. 2.0	Turbidity	3.6		NTU	P317191	
	SM 2320 B-97	Total Alkalinity	134		mg CaCO3/L	P317403	
	SM 2540 D-97	TSS	10		mg/L	P317638	
	SM 4500 F-C-97	Fluoride	1.1		mg F/L	P317412	
1859433	EPA 350.1 Rev. 2.0	Ammonia-N	0.053		mg N/L	P317455	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.51		mg N/L	P317200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.017		mg N/L	P317535	
	EPA 365.1 Rev. 2.0	Total-P	0.066		mg P/L	P317465	MS
	SM 5310 B-00	Organic Carbon	5.0		mg C/L	P317238	
1859436	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.038		mg P/L	P317189	

Ref. Method and Comment:

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: ROSE BAY @ 125M NE OF BOAT RAMP

Collection Date/Time: 12/20/2016 11:29

Field ID: G5CE0073

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859431	EPA 180.1 Rev. 2.0	Turbidity	5.4		NTU	P317191	
	SM 2320 B-97	Total Alkalinity	135		mg CaCO3/L	P317403	
	SM 2540 D-97	TSS	9	I	mg/L	P317638	
	SM 4500 F-C-97	Fluoride	1.1		mg F/L	P317412	
1859434	EPA 350.1 Rev. 2.0	Ammonia-N	0.058		mg N/L	P317455	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.52		mg N/L	P317200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.017		mg N/L	P317535	
	EPA 365.1 Rev. 2.0	Total-P	0.065		mg P/L	P317465	MS
	SM 5310 B-00	Organic Carbon	4.9		mg C/L	P317238	
1859437	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.041		mg P/L	P317189	

Ref. Method and Comment:

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: TURNBULL BAY @ 2 MILES NW OF
TURNBULL BAY**

Collection Date/Time: 12/20/2016 12:12

Field ID: G5CE0075

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859432	EPA 180.1 Rev. 2.0	Turbidity	8.8		NTU	P317191	
	SM 2320 B-97	Total Alkalinity	133		mg CaCO3/L	P317403	
	SM 2540 D-97	TSS	27		mg/L	P317638	
	SM 4500 F-C-97	Fluoride	1.1		mg F/L	P317412	
1859435	EPA 350.1 Rev. 2.0	Ammonia-N	0.043		mg N/L	P317455	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.57		mg N/L	P317200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.015		mg N/L	P317535	
	EPA 365.1 Rev. 2.0	Total-P	0.065	J	mg P/L	P317465	MS
	SM 5310 B-00	Organic Carbon	4.6		mg C/L	P317238	

Field ID: G5CE0075

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859438	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.037		mg P/L	P317189	

Ref. Method and Comment:

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.

EPA 365.1 Rev. 2.0: Total-P: Refer to the narrative for an explanation of QC Codes.

Sample Location: SPRUCE CREEK @ AIRPORT RD.

Collection Date/Time: 12/20/2016 10:38

Field ID: G5CE0072

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859439	EPA 180.1 Rev. 2.0	Turbidity	2.5		NTU	P317191	
	EPA 300.0 Rev. 2.1	Chloride	2.0E+03		mg Cl/L	P317777	
		Sulfate	250		mg SO4/L	P317774	
	SM 2120 B	Color (true)	41		PCU	P317196	
	SM 2320 B-97	Total Alkalinity	218		mg CaCO3/L	P317327	
	SM 2540 C-97	TDS	4.18E+03		mg/L	P317658	
	SM 2540 D-97	TSS	4	I	mg/L	P317636	
	SM 4500 F-C-97	Fluoride	0.22		mg F/L	P317328	
1859440	EPA 350.1 Rev. 2.0	Ammonia-N	0.040		mg N/L	P317455	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.64		mg N/L	P317200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.051		mg N/L	P317535	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P317465	MS
	SM 5310 B-00	Organic Carbon	10		mg C/L	P317237	
1859441	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.067		mg P/L	P317189	
1859451	EPA 200.7 Rev. 4.4	Calcium	121		mg/L	P317512	
		Iron	390		ug/L	P317512	
		Magnesium	137		mg/L	P317512	
		Potassium	48		mg/L	P317512	
		Sodium	1.20E+03		mg/L	P317512	
	EPA 200.8 Rev. 5.4	Arsenic	0.73		ug/L	P317512	
		Cadmium	0.020	U	ug/L	P317512	
		Chromium	0.22		ug/L	P317512	
		Copper	0.45		ug/L	P317512	
		Lead	0.061	I	ug/L	P317512	
		Nickel	0.26		ug/L	P317512	
		Silver	0.0050	U	ug/L	P317512	
		Zinc	1.6	I	ug/L	P317512	

Ref. Method and Comment:

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.

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium, magnesium, potassium, and sodium are unavailable because of high analyte concentration in the QC sample.

Sample Location: STRICKLAND BAY @ 875 M EAST (DS) OF RR CROSSING

Collection Date/Time: 12/20/2016 12:22

Field ID: G5CE0074

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
-----------	-------------	-----------	--------	------	-------	----------	----------

Field ID: G5CE0074

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859442	EPA 180.1 Rev. 2.0	Turbidity	3.8		NTU	P317191	
	SM 2320 B-97	Total Alkalinity	132	A	mg CaCO3/L	P317403	
	SM 2540 D-97	TSS	8	I	mg/L	P317638	
	SM 4500 F-C-97	Fluoride	1.1		mg F/L	P317412	
1859443	EPA 350.1 Rev. 2.0	Ammonia-N	0.044		mg N/L	P317455	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.49		mg N/L	P317200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.014		mg N/L	P317535	
	EPA 365.1 Rev. 2.0	Total-P	0.054		mg P/L	P317465	MS
	SM 5310 B-00	Organic Carbon	4.6		mg C/L	P317238	
1859444	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.034		mg P/L	P317189	
1859452	EPA 200.7 Rev. 4.4	Iron	270	I	ug/L	P317512	
	EPA 200.8 Rev. 5.4	Arsenic	2.16		ug/L	P317512	
		Cadmium	0.060	U	ug/L	P317512	
		Chromium	0.63		ug/L	P317512	
		Copper	0.90	I	ug/L	P317512	
		Lead	0.41	I	ug/L	P317512	
		Nickel	0.51	I	ug/L	P317512	
		Silver	0.015	U	ug/L	P317512	
		Zinc	3.0	U	ug/L	P317512	

Ref. Method and Comment:
 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.
 EPA 200.8 Rev. 5.4: The sample required dilution due to matrix interference.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P317191

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P317512

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

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P317512

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317512

Component	Result	Code	Units
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L
Zinc	1.0	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317774

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317777

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317455

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317200

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317535

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317465

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P317189

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

Reference Method: SM 2120 B
Batch ID: P317196

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report

Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P317327

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

Reference Method: SM 2320 B-97
Batch ID: P317403

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

Reference Method: SM 2540 C-97
Batch ID: P317658

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P317636

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P317638

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P317328

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P317412

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P317237

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

Reference Method: SM 5310 B-00
Batch ID: P317238

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: P317512

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	99.4		P	85 - 115
Iron	103		P	85 - 115
Magnesium	99.4		P	85 - 115
Potassium	91.8		P	85 - 115
Sodium	95.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317512

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	103		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	101		P	85 - 115
Copper	101		P	85 - 115
Lead	104		P	85 - 115
Nickel	102		P	85 - 115
Silver	104		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317774

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317777

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317455

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317200

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317535

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P317465

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P317189

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

Reference Method: SM 2320 B-97

Batch ID: P317327

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.0		P	95 - 108

Reference Method: SM 2320 B-97

Batch ID: P317403

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.3		P	95 - 108

Reference Method: SM 4500 F-C-97

Batch ID: P317328

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	92 - 103

Reference Method: SM 4500 F-C-97

Batch ID: P317412

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.5		P	92 - 103

Reference Method: SM 5310 B-00

Batch ID: P317237

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.8		P	85 - 115

Reference Method: SM 5310 B-00

Batch ID: P317238

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P317512

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
---------------	-----------	---------	---------	-----------	----------------

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317512

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859451	Iron	98.1	95.3	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317512

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859451	Arsenic	109	108	P/P	70 - 130
1859451	Cadmium	97.4	97.9	P/P	70 - 130
1859451	Chromium	86.5	84.9	P/P	70 - 130
1859451	Copper	95.7	93.0	P/P	70 - 130
1859451	Lead	112	111	P/P	70 - 130
1859451	Nickel	99.4	96.6	P/P	70 - 130
1859451	Silver	96.1	96.0	P/P	70 - 130
1859451	Zinc	92.3	90.2	P/P	70 - 130

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317774

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858994	Sulfate	97.1		P	90 - 110
1859371	Sulfate	95.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317777

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858994	Chloride	99.7		P	90 - 110
1859371	Chloride	99.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317455

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858207	Ammonia-N	104	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317200

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859434	Kjeldahl Nitrogen	105	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317535

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858361	NO2NO3-N	105	99.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317465

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859435	Total-P	85.6	89.6	F/F	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P317189

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859436	O-Phosphate-P	98.0	99.0	P/P	90 - 110

Reference Method: SM 5310 B-00
Batch ID: P317237

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859358	Organic Carbon	96.8	95.2	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P317238

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859363	Organic Carbon	94.7	95.4	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P317191

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859372	Turbidity	0.664	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317512

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859451	Calcium	0.224	Spike	P	0 - 20
1859451	Iron	2.65	Spike	P	0 - 20
1859451	Magnesium	1.98	Spike	P	0 - 20
1859451	Potassium	0.0852	Spike	P	0 - 20
1859451	Sodium	0.151	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317512

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859451	Arsenic	1.51	Spike	P	0 - 20
1859451	Cadmium	0.433	Spike	P	0 - 20
1859451	Chromium	1.89	Spike	P	0 - 20
1859451	Copper	2.86	Spike	P	0 - 20
1859451	Lead	1.00	Spike	P	0 - 20
1859451	Nickel	2.85	Spike	P	0 - 20
1859451	Silver	0.152	Spike	P	0 - 20
1859451	Zinc	2.34	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317774

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859371	Sulfate	0.187	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317777

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859371	Chloride	0.103	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317455

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858207	Ammonia-N	1.28	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317200

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859434	Kjeldahl Nitrogen	4.98	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317535

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858361	NO2NO3-N	4.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317465

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859435	Total-P	4.30	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P317189

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859436	O-Phosphate-P	0.735	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P317196

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859415	Color (true)	1.63	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
 Batch ID: P317327

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859342	Total Alkalinity	0.299	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
 Batch ID: P317403

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859442	Total Alkalinity	0.641	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
 Batch ID: P317658

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859415	TDS	6.74	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P317328

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859342	Fluoride	0.959	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
 Batch ID: P317412

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858388	Fluoride	1.42	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
 Batch ID: P317237

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859358	Organic Carbon	1.61	Spike	P	0 - 20

Reference Method: SM 5310 B-00
 Batch ID: P317238

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859363	Organic Carbon	0.577	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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A73527

Included Lab Sample IDs: 1859436, 1859437, 1859438, 1859441, 1859444

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	97.4	P/P	90 - 110
O-Phosphate-P	98.7	99.3	P/P	90 - 110
O-Phosphate-P	99.3	100	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A73528

Included Lab Sample IDs: 1859430, 1859431, 1859432, 1859439, 1859442

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	99.0	P/P	95 - 105

Reference Method: SM 2120 B

Run ID: A73530

Included Lab Sample IDs: 1859439

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.8	99.9	P/P	85 - 115

Reference Method: SM 5310 B-00

Run ID: A73539

Included Lab Sample IDs: 1859433, 1859434, 1859435, 1859440, 1859443

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.0	97.8	P/P	90 - 110
Organic Carbon	97.8	97.0	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A73565

Included Lab Sample IDs: 1859439

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.6	97.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A73565

Included Lab Sample IDs: 1859439

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73577

Included Lab Sample IDs: 1859433, 1859434, 1859435, 1859440, 1859443

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	105	P/P	90 - 110
Kjeldahl Nitrogen	109	104	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A73587

Included Lab Sample IDs: 1859430, 1859431, 1859432, 1859442

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.4	98.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A73587

Included Lab Sample IDs: 1859430, 1859431, 1859432, 1859442

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.5	97.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A73601

Included Lab Sample IDs: 1859433, 1859434, 1859435, 1859440, 1859443

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.4	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A73633

Included Lab Sample IDs: 1859433, 1859434, 1859435, 1859440, 1859443

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73639

Included Lab Sample IDs: 1859440

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73685

Included Lab Sample IDs: 1859451, 1859452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	102	102	P/P	90 - 110
Arsenic	102	101	P/P	90 - 110
Cadmium	100	101	P/P	90 - 110
Cadmium	99.5	100	P/P	90 - 110
Chromium	98.0	98.4	P/P	90 - 110
Chromium	99.3	98.0	P/P	90 - 110
Copper	99.8	100	P/P	90 - 110
Copper	100	98.2	P/P	90 - 110
Lead	101	101	P/P	90 - 110
Lead	101	101	P/P	90 - 110
Nickel	101	102	P/P	90 - 110
Nickel	102	99.6	P/P	90 - 110
Silver	105	106	P/P	90 - 110
Silver	106	105	P/P	90 - 110
Zinc	101	101	P/P	90 - 110
Zinc	101	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A73712

Included Lab Sample IDs: 1859451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.0	95.0	P/P	90 - 110
Iron	98.7	90.8	P/P	90 - 110
Magnesium	98.6	95.0	P/P	90 - 110
Potassium	93.9	102	P/P	90 - 110
Sodium	96.8	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73730

Included Lab Sample IDs: 1859433, 1859434, 1859435

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	96.8	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73736

Included Lab Sample IDs: 1859443

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	96.8	97.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A73743

Included Lab Sample IDs: 1859452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	101	98.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A73754

Included Lab Sample IDs: 1859439

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	103	102	P/P	90 - 110
Sulfate	95.9	99.5	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery	LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity				0.664	
EPA 200.7 Rev. 4.4	Calcium	99.4				0.224
	Iron	103	98.1	95.3		2.65
	Magnesium	99.4				1.98
	Potassium	91.8				0.0852
	Sodium	95.8				0.151

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision	
					LCS	MS
EPA 200.8 Rev. 5.4	Arsenic	103	109	108		1.51
	Cadmium	102	97.4	97.9		0.433
	Chromium	101	86.5	84.9		1.89
	Copper	101	95.7	93.0		2.86
	Lead	104	112	111		1.00
	Nickel	102	99.4	96.6		2.85
	Silver	104	96.1	96.0		0.152
	Zinc	104	92.3	90.2		2.34
EPA 300.0 Rev. 2.1	Chloride	100	99.7	99.7	0.103	
	Sulfate	97.5	95.3	97.1	0.187	
EPA 350.1 Rev. 2.0	Ammonia-N	102	104	105		1.28
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	105	99.0		4.98
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	105	99.2		4.54
EPA 365.1 Rev. 2.0	Total-P	99.8	85.6	89.6		4.30
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	98.0	99.0		0.735
SM 2120 B	Color (true)				1.63	
SM 2320 B-97	Total Alkalinity	99.0			0.299	
	Total Alkalinity	99.3			0.641	
SM 2540 C-97	TDS				6.74	
SM 4500 F-C-97	Fluoride	97.5				0.959
	Fluoride	96.5				1.42
SM 5310 B-00	Organic Carbon	96.8	96.8	95.2		1.61
	Organic Carbon	94.8	94.7	95.4		0.577

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1859430, 1859431, 1859432, 1859439, 1859442
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1859451, 1859452
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1859451, 1859452
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1859439
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1859439
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1859433, 1859434, 1859435, 1859440, 1859443
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1859433, 1859434, 1859435, 1859440, 1859443
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1859433, 1859434, 1859435, 1859440, 1859443
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1859433, 1859434, 1859435, 1859440, 1859443
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1859436, 1859437, 1859438, 1859441, 1859444
SM 2120 B / E31780	True Color measured at 450 nm	1859439
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1859430, 1859431, 1859432, 1859439, 1859442
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1859439
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1859430, 1859431, 1859432, 1859439, 1859442
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1859430, 1859431, 1859432, 1859439, 1859442

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1859433, 1859434, 1859435, 1859440, 1859443

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	12/21/2016			12/21/2016 14:24	Julie Michelle Frank	1859430, 1859431, 1859432, 1859439, 1859442
EPA 200.7 Rev. 4.4	12/21/2016	12/28/2016	Elliott D. Healy	01/03/2017	Joshua Ayres	1859451
	12/21/2016	12/28/2016	Elliott D. Healy	01/04/2017	Joshua Ayres	1859452
EPA 200.8 Rev. 5.4	12/21/2016	12/28/2016	Elliott D. Healy	01/02/2017	Charles J. Peterson	1859451, 1859452
EPA 300.0 Rev. 2.1	12/21/2016			01/05/2017	Ping Hua	1859439
EPA 350.1 Rev. 2.0	12/21/2016			12/27/2016	Julie Michelle Frank	1859433, 1859434, 1859435, 1859440, 1859443
EPA 351.2 Rev. 2.0	12/21/2016	12/22/2016	Adrian Shelby	12/23/2016	Joseph Suarez	1859433, 1859434, 1859435, 1859440, 1859443
EPA 353.2 Rev. 2.0	12/21/2016			12/28/2016	Beverly Y. Sanders	1859433, 1859434, 1859435, 1859440, 1859443
EPA 365.1 Rev. 2.0	12/21/2016	12/28/2016	Adrian Shelby	01/04/2017	Lipi Saha	1859433, 1859434, 1859435, 1859443
	12/21/2016	12/28/2016	Adrian Shelby	12/29/2016	Beverly Y. Sanders	1859440
EPA 365.1 Rev. 2.0 dissolved	12/21/2016			12/21/2016 15:10	Julia Storbeck	1859436
	12/21/2016			12/21/2016 15:23	Julia Storbeck	1859437
	12/21/2016			12/21/2016 15:24	Julia Storbeck	1859438
	12/21/2016			12/21/2016 15:29	Julia Storbeck	1859441
	12/21/2016			12/21/2016 15:30	Julia Storbeck	1859444
SM 2120 B	12/21/2016			12/21/2016 16:44	Jared I. Manley	1859439
SM 2320 B-97	12/21/2016			12/22/2016	Dale L. Simmons	1859439
	12/21/2016			12/24/2016	Dale L. Simmons	1859430, 1859431, 1859432, 1859442
SM 2540 C-97	12/21/2016			12/23/2016	Yijie Li	1859439
SM 2540 D-97	12/21/2016			12/23/2016	Yijie Li	1859430, 1859431, 1859432, 1859439, 1859442
SM 4500 F-C-97	12/21/2016			12/22/2016	Dale L. Simmons	1859439
	12/21/2016			12/24/2016	Dale L. Simmons	1859430, 1859431, 1859432, 1859442
SM 5310 B-00	12/21/2016			12/22/2016	Julie Michelle Frank	1859433, 1859434, 1859435, 1859440, 1859443