

Chemical Analysis Report

CEN-DIST-2016-11-23-02

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-2016-11-21-46**

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
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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 19-DEC-2016 11:29



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: SPRUCE CREEK @ AIRPORT RD.

Collection Date/Time: 11/22/2016 11:00

Field ID: G5CE0072

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852410	EPA 180.1 Rev. 2.0	Turbidity	2.3		NTU	P315716	
	EPA 300.0 Rev. 2.1	Chloride	2.0E+03		mg Cl/L	P316119	
		Sulfate	260		mg SO4/L	P316115	
	SM 2120 B	Color (true)	68		PCU	P315706	
	SM 2320 B-97	Total Alkalinity	200		mg CaCO3/L	P315886	
	SM 2540 C-97	TDS	3.90E+03		mg/L	P316228	
	SM 2540 D-97	TSS	3	I	mg/L	P316223	
	SM 4500 F-C-97	Fluoride	0.21		mg F/L	P315988	
1852411	EPA 350.1 Rev. 2.0	Ammonia-N	0.031		mg N/L	P316196	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.82		mg N/L	P316363	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.048		mg N/L	P316217	
	EPA 365.1 Rev. 2.0	Total-P	0.081		mg P/L	P316260	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P315821	
1852412	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.045		mg P/L	P315704	
1852418	EPA 200.8 Rev. 5.4	Arsenic	0.73	I	ug/L	P315844	
		Cadmium	0.020	U	ug/L	P315844	
		Copper	0.39	I	ug/L	P315844	
		Lead	0.063	I	ug/L	P315844	
		Silver	0.0050	U	ug/L	P315844	

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: TURNBULL BAY @ 2 MILES NW of TURNBULL BAY RD

Collection Date/Time: 11/22/2016 12:10

Field ID: G5CE0075

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852398	EPA 180.1 Rev. 2.0	Turbidity	3.3		NTU	P315716	
	SM 2320 B-97	Total Alkalinity	135		mg CaCO3/L	P315886	
	SM 2540 D-97	TSS	6	I	mg/L	P316224	
	SM 4500 F-C-97	Fluoride	0.93		mg F/L	P315888	
1852402	EPA 350.1 Rev. 2.0	Ammonia-N	0.033		mg N/L	P316196	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.59		mg N/L	P316363	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.030		mg N/L	P316217	
	EPA 365.1 Rev. 2.0	Total-P	0.062		mg P/L	P316149	
	SM 5310 B-00	Organic Carbon	6.9		mg C/L	P315822	
1852406	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.038		mg P/L	P315703	

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: STRICKLAND BAY @ 875M EAST (DOWNSTREAM) OF RR CROSSING

Collection Date/Time: 11/22/2016 12:20

Field ID: G5CE0074

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
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Field ID: G5CE0074

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852399	EPA 180.1 Rev. 2.0	Turbidity	3.6		NTU	P315716	
	SM 2320 B-97	Total Alkalinity	140		mg CaCO3/L	P315886	
	SM 2540 D-97	TSS	10	I	mg/L	P316225	
	SM 4500 F-C-97	Fluoride	0.86		mg F/L	P315888	
1852403	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P316196	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P316363	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.037		mg N/L	P316217	
	EPA 365.1 Rev. 2.0	Total-P	0.065		mg P/L	P316149	
	SM 5310 B-00	Organic Carbon	7.6		mg C/L	P315822	
1852407	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.041		mg P/L	P315703	

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: ROSE BAY @ 125M NE OF BOAT RAMP

Collection Date/Time: 11/22/2016 13:22

Field ID: G5CE0073

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852400	EPA 180.1 Rev. 2.0	Turbidity	4.8		NTU	P315716	
	SM 2320 B-97	Total Alkalinity	133		mg CaCO3/L	P315886	
	SM 2540 D-97	TSS	9	I	mg/L	P316225	
	SM 4500 F-C-97	Fluoride	1.0		mg F/L	P315888	
1852404	EPA 350.1 Rev. 2.0	Ammonia-N	0.049		mg N/L	P316196	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.65		mg N/L	P316363	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.026		mg N/L	P316217	
	EPA 365.1 Rev. 2.0	Total-P	0.071		mg P/L	P316149	
	SM 5310 B-00	Organic Carbon	6.5		mg C/L	P315822	
1852408	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.039		mg P/L	P315704	

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: ROSE BAY @ US 1

Collection Date/Time: 11/22/2016 13:33

Field ID: G5CE0038

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852401	EPA 180.1 Rev. 2.0	Turbidity	3.8		NTU	P315716	
	SM 2320 B-97	Total Alkalinity	133		mg CaCO3/L	P315886	
	SM 2540 D-97	TSS	7	I	mg/L	P316225	
	SM 4500 F-C-97	Fluoride	1.0		mg F/L	P315888	
1852405	EPA 350.1 Rev. 2.0	Ammonia-N	0.056		mg N/L	P316196	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.69		mg N/L	P316363	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.033		mg N/L	P316217	
	EPA 365.1 Rev. 2.0	Total-P	0.066		mg P/L	P316260	
	SM 5310 B-00	Organic Carbon	6.6		mg C/L	P315822	
1852409	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.043		mg P/L	P315704	

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: STRICKLAND BAY @ 875M EAST
 (DOWNSTREAM) OF RR CROSSING**

Collection Date/Time: 11/22/2016 12:20

Field ID: G5CE0074

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852424	EPA 200.7 Rev. 4.4	Calcium	318		mg/L	P315850	
		Iron	180	I	ug/L	P315850	
		Magnesium	951		mg/L	P315850	
		Potassium	268		mg/L	P315850	
		Sodium	7.94E+03		mg/L	P315850	
	EPA 200.8 Rev. 5.4	Arsenic	1.72		ug/L	P315850	
		Cadmium	0.060	U	ug/L	P315850	
		Chromium	0.34	I	ug/L	P315850	
		Copper	0.85	I	ug/L	P315850	
		Lead	0.25	U	ug/L	P315850	
		Nickel	0.75	U	ug/L	P316456	
		Silver	0.015	U	ug/L	P315850	
		Zinc	3.0	U	ug/L	P315850	

Ref. Method and Comment:

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.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P315716

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315850

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: P315844

Component	Result	Code	Units
Arsenic	0.25	U	ug/L
Cadmium	0.020	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Component	Result	Code	Units
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Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

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
Lead	0.050	U	ug/L
Silver	0.0050	U	ug/L
Zinc	1.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Component	Result	Code	Units
Nickel	0.25	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316115

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316119

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P316196

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316363

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316217

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316149

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
Batch ID: P316260

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315703

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315704

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

Reference Method: SM 2120 B
Batch ID: P315706

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P315886

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

Reference Method: SM 2540 C-97
Batch ID: P316228

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P316223

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P316224

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P316225

Component	Result	Code	Units
TSS	3	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P315888

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P315988

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P315821

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

Reference Method: SM 5310 B-00
Batch ID: P315822

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: P315850

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	107		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	97.4		P	85 - 115
Sodium	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315844

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	93.7		P	85 - 115
Cadmium	101		P	85 - 115
Copper	99.9		P	85 - 115
Lead	97.4		P	85 - 115
Silver	98.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	99.9		P	85 - 115
Chromium	101		P	85 - 115
Copper	98.7		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Lead	96.8		P	85 - 115
Silver	98.2		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	97.8		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316115

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316119

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P316196

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: P316363

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316217

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316149

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316260

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315703

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315704

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

Reference Method: SM 2320 B-97
Batch ID: P315886

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.4		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P315888

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

Reference Method: SM 4500 F-C-97
Batch ID: P315988

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

Reference Method: SM 5310 B-00
Batch ID: P315821

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.6		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P315822

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315850

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852424	Iron	103	102	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315844

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315844

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852058	Arsenic	96.3	99.4	P/P	80 - 120
1852058	Cadmium	105	105	P/P	80 - 120
1852058	Copper	97.6	99.3	P/P	80 - 120
1852058	Lead	96.3	98.1	P/P	80 - 120
1852058	Silver	96.7	97.9	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852424	Arsenic	97.6	102	P/P	70 - 130
1852424	Cadmium	88.2	91.0	P/P	70 - 130
1852424	Chromium	79.4	81.2	P/P	70 - 130
1852424	Copper	91.1	91.4	P/P	70 - 130
1852424	Lead	102	101	P/P	70 - 130
1852424	Silver	86.3	85.8	P/P	70 - 130
1852424	Zinc	83.3	90.1	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849922	Nickel	78.6		P	70 - 130
1850586	Nickel	91.2	91.7	P/P	70 - 130

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316115

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852258	Sulfate	97.7		P	90 - 110
1852259	Sulfate	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316119

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852258	Chloride	101		P	90 - 110
1852259	Chloride	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P316196

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852333	Ammonia-N	99.1	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316363

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1853069	Kjeldahl Nitrogen	97.7	99.3	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316217

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852290	NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316149

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852333	Total-P	92.8	94.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316260

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852238	Total-P	103	97.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315703

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852243	O-Phosphate-P	96.8	98.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315704

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852408	O-Phosphate-P	97.1	99.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P315888

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852235	Fluoride	96.4	97.8	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P315988

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852673	Fluoride	94.8	95.3	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P315821

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852056	Organic Carbon	97.3	96.6	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P315822

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850377	Organic Carbon	95.5	96.3	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P315716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852319	Turbidity	7.05	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315850

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852424	Calcium	6.21	Spike	P	0 - 20
1852424	Iron	0.133	Spike	P	0 - 20
1852424	Magnesium	4.57	Spike	P	0 - 20
1852424	Potassium	4.63	Spike	P	0 - 20
1852424	Sodium	4.32	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315844

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852058	Arsenic	3.19	Spike	P	0 - 20
1852058	Cadmium	0.462	Spike	P	0 - 20
1852058	Copper	1.68	Spike	P	0 - 20
1852058	Lead	1.89	Spike	P	0 - 20
1852058	Silver	1.21	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852424	Arsenic	4.53	Spike	P	0 - 20
1852424	Cadmium	3.15	Spike	P	0 - 20
1852424	Chromium	2.24	Spike	P	0 - 20
1852424	Copper	0.339	Spike	P	0 - 20
1852424	Lead	0.616	Spike	P	0 - 20
1852424	Silver	0.611	Spike	P	0 - 20
1852424	Zinc	7.83	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850586	Nickel	0.575	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316115

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852258	Sulfate	0.444	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316119

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852258	Chloride	0.841	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P316196

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852333	Ammonia-N	0.925	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316363

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1853069	Kjeldahl Nitrogen	1.45	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316217

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852290	NO2NO3-N	0.473	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316149

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852333	Total-P	1.24	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316260

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852238	Total-P	4.69	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315703

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852243	O-Phosphate-P	1.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315704

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852408	O-Phosphate-P	1.75	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
Batch ID: P315706

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852258	Color (true)	2.81	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P315886

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852235	Total Alkalinity	0.690	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P316228

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852050	TDS	2.84	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P315888

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852235	Fluoride	0.986	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P315988

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852673	Fluoride	0.498	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P315821

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852056	Organic Carbon	0.722	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P315822

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850377	Organic Carbon	0.741	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: A72994

Included Lab Sample IDs: 1852406, 1852407, 1852408, 1852409, 1852412

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.4	98.8	P/P	90 - 110
O-Phosphate-P	97.8	97.4	P/P	90 - 110
O-Phosphate-P	98.8	96.1	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A72995

Included Lab Sample IDs: 1852410

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A72997

Included Lab Sample IDs: 1852398, 1852399, 1852400, 1852401, 1852410

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

Reference Method: SM 5310 B-00

Run ID: A73041

Included Lab Sample IDs: 1852402, 1852403, 1852404, 1852405, 1852411

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	96.8	P/P	90 - 110
Organic Carbon	96.8	97.0	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A73065

Included Lab Sample IDs: 1852398, 1852399, 1852400, 1852401, 1852410

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	98.6	P/P	90 - 110
Total Alkalinity	98.6	96.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A73065

Included Lab Sample IDs: 1852398, 1852399, 1852400, 1852401

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.1	98.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A73103

Included Lab Sample IDs: 1852410

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A73127

Included Lab Sample IDs: 1852424

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	103	P/P	90 - 110
Iron	108	109	P/P	90 - 110
Magnesium	104	106	P/P	90 - 110
Potassium	99.9	101	P/P	90 - 110
Sodium	105	108	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A73131

Included Lab Sample IDs: 1852410

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	102	P/P	90 - 110
Sulfate	99.1	97.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A73172

Included Lab Sample IDs: 1852402, 1852403, 1852404, 1852405, 1852411

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A73189

Included Lab Sample IDs: 1852402, 1852403, 1852404, 1852405, 1852411

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73202

Included Lab Sample IDs: 1852402, 1852403, 1852404

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.5	98.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73211

Included Lab Sample IDs: 1852418

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.7	98.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73222

Included Lab Sample IDs: 1852418, 1852424

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.8	97.9	P/P	90 - 110
Cadmium	96.7	96.4	P/P	90 - 110
Cadmium	96.7	96.7	P/P	90 - 110
Chromium	96.5	92.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73222

Included Lab Sample IDs: 1852418, 1852424

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	96.6	94.6	P/P	90 - 110
Lead	92.4	91.2	P/P	90 - 110
Zinc	98.6	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73226

Included Lab Sample IDs: 1852405, 1852411

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73248

Included Lab Sample IDs: 1852424

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	97.9	97.2	P/P	90 - 110
Lead	92.0	92.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73267

Included Lab Sample IDs: 1852402, 1852403, 1852404, 1852405, 1852411

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	104	P/P	90 - 110
Kjeldahl Nitrogen	104	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73271

Included Lab Sample IDs: 1852418, 1852424

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	96.4	96.3	P/P	90 - 110
Silver	97.4	97.7	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73273

Included Lab Sample IDs: 1852424

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	101	97.7	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		LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity					7.05	
EPA 200.7 Rev. 4.4	Calcium	101					6.21
	Iron	107	103	102			0.133
	Magnesium	103					4.57
	Potassium	97.4					4.63
	Sodium	105					4.32
EPA 200.8 Rev. 5.4	Arsenic	93.7	96.3	99.4			3.19
	Arsenic	101	97.6	102			4.53
	Cadmium	101	105	105			0.462
	Cadmium	99.9	88.2	91.0			3.15
	Chromium	101	79.4	81.2			2.24
	Copper	99.9	97.6	99.3			1.68
	Copper	98.7	91.1	91.4			0.339
	Lead	97.4	96.3	98.1			1.89
	Lead	96.8	102	101			0.616
	Nickel	97.8	91.2	91.7	78.6		0.575
	Silver	98.9	96.7	97.9			1.21
	Silver	98.2	86.3	85.8			0.611
	Zinc	102	83.3	90.1			7.83
EPA 300.0 Rev. 2.1	Chloride	101	101	102		0.841	
	Sulfate	97.7	97.7	102		0.444	
EPA 350.1 Rev. 2.0	Ammonia-N	104	99.1	100			0.925
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	97.7	99.3			1.45
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	105	106	106			0.473
EPA 365.1 Rev. 2.0	Total-P	101	92.8	94.0			1.24
	Total-P	102	103	97.9			4.69
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	96.8	98.3			1.54
	O-Phosphate-P	99.3	97.1	99.5			1.75
SM 2120 B	Color (true)					2.81	
SM 2320 B-97	Total Alkalinity	98.4				0.690	
SM 2540 C-97	TDS					2.84	
SM 4500 F-C-97	Fluoride	96.5	96.4	97.8			0.986
	Fluoride	97.1	94.8	95.3			0.498
SM 5310 B-00	Organic Carbon	97.6	97.3	96.6			0.722
	Organic Carbon	98.8	95.5	96.3			0.741

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1852398, 1852399, 1852400, 1852401, 1852410
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1852424
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1852418, 1852424
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1852410
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1852410
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1852402, 1852403, 1852404, 1852405, 1852411
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1852402, 1852403, 1852404, 1852405, 1852411
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1852402, 1852403, 1852404, 1852405, 1852411

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1852402, 1852403, 1852404, 1852405, 1852411
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1852406, 1852407, 1852408, 1852409, 1852412
SM 2120 B / E31780	True Color measured at 450 nm	1852410
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1852398, 1852399, 1852400, 1852401, 1852410
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1852410
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1852398, 1852399, 1852400, 1852401, 1852410
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1852398, 1852399, 1852400, 1852401, 1852410
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1852402, 1852403, 1852404, 1852405, 1852411

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	11/23/2016			11/23/2016 14:00	Sima Feizi	1852398, 1852399, 1852400, 1852401, 1852410
EPA 200.7 Rev. 4.4	11/23/2016	11/29/2016	Elliott D. Healy	12/01/2016	Joshua Ayres	1852424
EPA 200.8 Rev. 5.4	11/23/2016	11/29/2016	Elliott D. Healy	12/06/2016	Charles J. Peterson	1852418, 1852424
	11/23/2016	11/29/2016	Elliott D. Healy	12/06/2016	Robert K Palmer	1852418
	11/23/2016	11/29/2016	Elliott D. Healy	12/08/2016	Charles J. Peterson	1852418, 1852424
	11/23/2016	12/08/2016	Elliott D. Healy	12/09/2016	Robert K Palmer	1852424
EPA 300.0 Rev. 2.1	11/23/2016			12/03/2016	Ping Hua	1852410
EPA 350.1 Rev. 2.0	11/23/2016			12/02/2016	Sofia Elnemr	1852402, 1852403, 1852404, 1852405, 1852411
EPA 351.2 Rev. 2.0	11/23/2016	12/08/2016	Adrian Shelby	12/09/2016	Joseph Suarez	1852402, 1852403, 1852404, 1852405, 1852411
EPA 353.2 Rev. 2.0	11/23/2016			12/06/2016	Beverly Y. Sanders	1852402, 1852403, 1852404, 1852405, 1852411
EPA 365.1 Rev. 2.0	11/23/2016	12/05/2016	Adrian Shelby	12/06/2016	Lipi Saha	1852402, 1852403, 1852404
	11/23/2016	12/06/2016	Vijayalakshmi Reddy	12/07/2016	Lipi Saha	1852405, 1852411
EPA 365.1 Rev. 2.0 dissolved	11/23/2016			11/23/2016 14:03	Julia Storbeck	1852408
	11/23/2016			11/23/2016 14:20	Julia Storbeck	1852406
	11/23/2016			11/23/2016 14:21	Julia Storbeck	1852407
	11/23/2016			11/23/2016 14:22	Julia Storbeck	1852409
	11/23/2016			11/23/2016 14:27	Julia Storbeck	1852412
SM 2120 B	11/23/2016			11/23/2016 14:13	Jared I. Manley	1852410
SM 2320 B-97	11/23/2016			11/29/2016	Dale L. Simmons	1852398, 1852399, 1852400, 1852401, 1852410
SM 2540 C-97	11/23/2016			11/26/2016	Yijie Li	1852410
SM 2540 D-97	11/23/2016			11/26/2016	Yijie Li	1852398, 1852399, 1852400, 1852401, 1852410
SM 4500 F-C-97	11/23/2016			11/29/2016	Dale L. Simmons	1852398, 1852399, 1852400, 1852401
	11/23/2016			11/30/2016	Dale L. Simmons	1852410
SM 5310 B-00	11/23/2016			11/29/2016	Julie Michelle Frank	1852402, 1852403, 1852404, 1852405, 1852411