

Chemical Analysis Report

SE-DIST-2016-02-24-01

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

Event Description: **SMP_2016_Bay_weekof2/22**

Request ID: **RQ-2016-02-22-23**

Customer: **SE-DIST**

Project ID: **SMP**

Send Reports to:

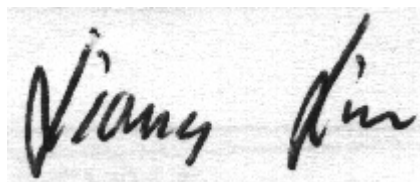
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

For additional information please contact

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Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 16-MAR-2016 17:21

A handwritten signature in black ink, appearing to read "Liang Lin", is shown 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: BISCANE BAY (BB32)

Collection Date/Time: 02/23/2016 12:15

Field ID: G4SEBB32_02232016

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1774294	EPA 180.1 Rev. 2.0	Turbidity	1.5		NTU	P299189	
	SM 2320 B-97	Total Alkalinity	134		mg CaCO3/L	P299823	
	SM 2540 D-97	TSS	3	U	mg/L	P299685	
	SM 4500 F-C-97	Fluoride	1.2		mg F/L	P299390	
1774296	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P299986	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.18	I	mg N/L	P299645	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.007	I	mg N/L	P299852	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P299565	
	SM 5310 B-00	Organic Carbon	2.4		mg C/L	P299437	
1774298	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P299180	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: ENRG7_8090

Collection Date/Time: 02/23/2016 12:45

Field ID: G5SE0033_02232016

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1774295	EPA 180.1 Rev. 2.0	Turbidity	2.3		NTU	P299189	
	SM 2320 B-97	Total Alkalinity	132		mg CaCO3/L	P299823	
	SM 2540 D-97	TSS	8	I	mg/L	P299685	
	SM 4500 F-C-97	Fluoride	1.2		mg F/L	P299390	
1774297	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P299986	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.23	I	mg N/L	P299645	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P299852	
	EPA 365.1 Rev. 2.0	Total-P	0.009	I	mg P/L	P299565	
	SM 5310 B-00	Organic Carbon	2.0		mg C/L	P299437	
1774299	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P299180	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: FLORIDA CITY CANAL (FC-15)

Collection Date/Time: 02/23/2016 14:15

Field ID: G4SEFC15_02232016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1774288	EPA 180.1 Rev. 2.0	Turbidity	1.7	A	NTU	P299189	
	EPA 300.0 Rev. 2.1	Chloride	38		mg Cl/L	P299554	
		Sulfate	18		mg SO4/L	P299559	
	SM 2120 B	Color (true)	4.0	I	PCU	P299211	
	SM 2320 B-97	Total Alkalinity	197		mg CaCO3/L	P299823	
	SM 2540 C-97	TDS	278		mg/L	P299759	
	SM 2540 D-97	TSS	3	I	mg/L	P299682	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P299391	
1774290	EPA 350.1 Rev. 2.0	Ammonia-N	0.038		mg N/L	P299980	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.40		mg N/L	P299575	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.40		mg N/L	P299502	

Field ID: G4SEFC15_02232016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1774290	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P299569	
	SM 5310 B-00	Organic Carbon	3.1		mg C/L	P299436	
1774292	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P299178	
1774308	EPA 200.7 Rev. 4.4	Calcium	77.3		mg/L	P299426	
		Iron	30	U	ug/L	P299426	
		Magnesium	5.17		mg/L	P299426	
		Potassium	6.8		mg/L	P299426	
		Sodium	24.6		mg/L	P299426	
		Zinc	5.0	U	ug/L	P299426	
	EPA 200.8 Rev. 5.4	Arsenic	0.83		ug/L	P299426	
		Cadmium	0.020	U	ug/L	P299426	
		Chromium	0.050	I	ug/L	P299426	
		Copper	0.46		ug/L	P299426	
		Lead	0.11	I	ug/L	P299426	
		Nickel	0.76		ug/L	P299426	
		Silver	0.0050	U	ug/L	P299426	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

SM 5310 B-00: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: C102 @ 248TH ST.

Collection Date/Time: 02/23/2016 15:00

Field ID: G4SE0064_02232016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1774289	EPA 180.1 Rev. 2.0	Turbidity	3.9		NTU	P299189	
	EPA 300.0 Rev. 2.1	Chloride	56		mg Cl/L	P299554	
		Sulfate	7.4		mg SO4/L	P299559	
	SM 2120 B	Color (true)	36	A	PCU	P299211	
	SM 2320 B-97	Total Alkalinity	191		mg CaCO3/L	P299823	
	SM 2540 C-97	TDS	306		mg/L	P299759	
	SM 2540 D-97	TSS	7	I	mg/L	P299682	
	SM 4500 F-C-97	Fluoride	0.21		mg F/L	P299391	
1774291	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P299981	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P299575	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.50		mg N/L	P299502	
	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P299569	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P299436	
1774293	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P299178	
1774309	EPA 200.7 Rev. 4.4	Calcium	62.9		mg/L	P299426	
		Iron	170		ug/L	P299426	
		Magnesium	9.16		mg/L	P299426	
		Potassium	3.8		mg/L	P299426	
		Sodium	36.0		mg/L	P299426	
		Zinc	5.0	U	ug/L	P299426	

Field ID: G4SE0064_02232016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1774309	EPA 200.8 Rev. 5.4	Arsenic	0.68		ug/L	P299426	
		Cadmium	0.020	U	ug/L	P299426	
		Chromium	0.10	I	ug/L	P299426	
		Copper	0.25	I	ug/L	P299426	
		Lead	0.12	I	ug/L	P299426	
		Nickel	0.17	I	ug/L	P299426	
		Silver	0.0050	U	ug/L	P299426	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

SM 5310 B-00: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P299189

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P299426

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P299426

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
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P299554

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P299559

Component	Result	Code	Units
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Quality Assurance Report

Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P299559

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299980

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299981

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299986

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299575

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299645

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299502

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299852

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P299565

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: P299569

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299178

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299180

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

Reference Method: SM 2120 B
Batch ID: P299211

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P299823

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO3/L

Reference Method: SM 2540 C-97
Batch ID: P299759

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P299682

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P299685

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P299390

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P299391

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P299436

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

Reference Method: SM 5310 B-00
Batch ID: P299437

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: P299426

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	104		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	104		P	85 - 115
Sodium	105		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P299426

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.2		P	85 - 115
Cadmium	95.9		P	85 - 115
Chromium	99.7		P	85 - 115
Copper	95.9		P	85 - 115
Lead	92.8		P	85 - 115
Nickel	97.1		P	85 - 115
Silver	96.7		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P299554

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P299559

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.7		P	90 - 110

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299980

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299981

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299986

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.7		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299575

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299645

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299502

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299852

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P299565

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P299569

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299178

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: P299180

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

Reference Method: SM 2320 B-97
Batch ID: P299823

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P299390

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.3		P	94 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P299391

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.8		P	94 - 108

Reference Method: SM 5310 B-00
Batch ID: P299436

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	91.4		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P299437

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P299426

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774309	Calcium	101		P	80 - 120
1774309	Iron	101	104	P/P	80 - 120
1774309	Magnesium	103		P	80 - 120
1774309	Potassium	101	103	P/P	80 - 120
1774309	Sodium	104		P	80 - 120
1774309	Zinc	99.0	101	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P299426

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774761	Calcium	104		P	80 - 120
1774761	Iron	101		P	80 - 120
1774761	Magnesium	104		P	80 - 120
1774761	Potassium	103		P	80 - 120
1774761	Sodium	101		P	80 - 120
1774761	Zinc	98.2		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P299426

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774309	Arsenic	97.3	98.4	P/P	80 - 120
1774309	Cadmium	97.4	100	P/P	80 - 120
1774309	Chromium	96.3	97.0	P/P	80 - 120
1774309	Copper	92.0	93.3	P/P	80 - 120
1774309	Lead	92.3	94.7	P/P	80 - 120
1774309	Nickel	92.7	94.4	P/P	80 - 120
1774309	Silver	94.4	95.7	P/P	80 - 120
1774761	Arsenic	95.4		P	80 - 120
1774761	Cadmium	96.0		P	80 - 120
1774761	Chromium	95.2		P	80 - 120
1774761	Copper	87.9		P	80 - 120
1774761	Lead	91.1		P	80 - 120
1774761	Nickel	90.8		P	80 - 120
1774761	Silver	94.6		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P299554

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774314	Chloride	103		P	90 - 110
1774315	Chloride	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299980

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774219	Ammonia-N	97.8	99.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299981

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774321	Ammonia-N	98.0	98.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299986

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774297	Ammonia-N	106	105	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299645

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774127	Kjeldahl Nitrogen	97.7	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299502

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774228	NO2NO3-N	99.1	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299852

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774382	NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P299565

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1773797	Total-P	96.2	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P299569

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774228	Total-P	99.3	98.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299178

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774109	O-Phosphate-P	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299180

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774217	O-Phosphate-P	99.8	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P299390

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774467	Fluoride	94.7	94.7	P/P	94 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P299391

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774012	Fluoride	96.0	96.7	P/P	94 - 107

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P299437

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774216	Organic Carbon	89.7	88.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P299189

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774288	Turbidity	1.77	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P299426

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774309	Calcium	2.48	Spike	P	0 - 20
1774309	Iron	2.43	Spike	P	0 - 20
1774309	Magnesium	4.19	Spike	P	0 - 20
1774309	Potassium	0.945	Spike	P	0 - 20
1774309	Sodium	0.509	Spike	P	0 - 20
1774309	Zinc	2.10	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P299426

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774309	Arsenic	1.12	Spike	P	0 - 20
1774309	Cadmium	2.80	Spike	P	0 - 20
1774309	Chromium	0.652	Spike	P	0 - 20
1774309	Copper	1.33	Spike	P	0 - 20
1774309	Lead	2.46	Spike	P	0 - 20
1774309	Nickel	1.82	Spike	P	0 - 20
1774309	Silver	1.35	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P299554

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774315	Chloride	0.141	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P299559

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774315	Sulfate	1.74	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299980

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774219	Ammonia-N	1.38	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299981

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774321	Ammonia-N	0.468	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299986

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774297	Ammonia-N	0.774	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299575

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774244	Kjeldahl Nitrogen	0.574	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299645

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774127	Kjeldahl Nitrogen	2.31	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299502

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774228	NO2NO3-N	0.870	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299852

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774382	NO2NO3-N	0.506	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P299565

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1773797	Total-P	1.36	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P299569

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774228	Total-P	0.489	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299178

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774109	O-Phosphate-P	0.588	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299180

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774217	O-Phosphate-P	0.823	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P299211

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774289	Color (true)	2.87	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P299823

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774467	Total Alkalinity	0.401	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P299759

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774226	TDS	4.48	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P299390

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774467	Fluoride	0.0	Spike	P	0 - 3.7

Reference Method: SM 4500 F-C-97
Batch ID: P299391

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774012	Fluoride	0.473	Spike	P	0 - 3.7

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
Batch ID: P299436

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774244	Organic Carbon	0.519	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P299437

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774216	Organic Carbon	0.782	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A67800
Included Lab Sample IDs: 1774292, 1774293, 1774298, 1774299

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.5	99.4	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A67802
Included Lab Sample IDs: 1774288, 1774289, 1774294, 1774295

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

Reference Method: SM 2120 B
Run ID: A67818
Included Lab Sample IDs: 1774288, 1774289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.0	96.3	P/P	85 - 115

Reference Method: SM 4500 F-C-97
Run ID: A67872
Included Lab Sample IDs: 1774288, 1774289, 1774294, 1774295

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.6	99.5	P/P	90 - 110
Fluoride	99.0	99.0	P/P	90 - 110
Fluoride	99.5	99.0	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A67885
Included Lab Sample IDs: 1774290, 1774291, 1774296, 1774297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A67885

Included Lab Sample IDs: 1774290, 1774291, 1774296, 1774297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.8	94.8	P/P	90 - 110
Organic Carbon	94.4	95.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A67914

Included Lab Sample IDs: 1774290, 1774291

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A67933

Included Lab Sample IDs: 1774288, 1774289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	98.8	P/P	90 - 110
Sulfate	97.8	95.7	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A67966

Included Lab Sample IDs: 1774308, 1774309

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	100	P/P	90 - 110
Iron	99.7	101	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	101	102	P/P	90 - 110
Sodium	104	102	P/P	90 - 110
Zinc	100	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A67998

Included Lab Sample IDs: 1774308, 1774309

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	101	P/P	90 - 110
Cadmium	101	101	P/P	90 - 110
Chromium	103	104	P/P	90 - 110
Copper	102	101	P/P	90 - 110
Lead	99.3	101	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Silver	98.2	98.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A68003

Included Lab Sample IDs: 1774290, 1774291, 1774296, 1774297

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A68013

Included Lab Sample IDs: 1774290, 1774291

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

Reference Method: SM 2320 B-97

Run ID: A68022

Included Lab Sample IDs: 1774288, 1774289, 1774294, 1774295

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.5	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A68043

Included Lab Sample IDs: 1774296, 1774297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A68091

Included Lab Sample IDs: 1774290, 1774291, 1774296, 1774297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	98.6	P/P	90 - 110
Ammonia-N	102	99.4	P/P	90 - 110
Ammonia-N	99.4	98.9	P/P	90 - 110
Ammonia-N	99.5	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A68140

Included Lab Sample IDs: 1774296, 1774297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	102	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				1.77	
EPA 200.7 Rev. 4.4	Calcium	102	101 104			2.48
	Iron	104	101 104 101			2.43
	Magnesium	103	103 104			4.19
	Potassium	104	101 103 103			0.945
	Sodium	105	104 101			0.509
	Zinc	101	99.0 101 98.2			2.10
EPA 200.8 Rev. 5.4	Arsenic	96.2	97.3 98.4 95.4			1.12

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 200.8 Rev. 5.4	Cadmium	95.9	97.4	100	96.0		2.80
	Chromium	99.7	96.3	97.0	95.2		0.652
	Copper	95.9	92.0	93.3	87.9		1.33
	Lead	92.8	92.3	94.7	91.1		2.46
	Nickel	97.1	92.7	94.4	90.8		1.82
	Silver	96.7	94.4	95.7	94.6		1.35
EPA 300.0 Rev. 2.1	Chloride	103	103	103		0.141	
	Sulfate	99.7				1.74	
EPA 350.1 Rev. 2.0	Ammonia-N	101	97.8	99.6			1.38
	Ammonia-N	99.4	98.0	98.5			0.468
	Ammonia-N	99.7	106	105			0.774
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.5					0.574
	Kjeldahl Nitrogen	95.8	97.7	100			2.31
EPA 353.2 Rev. 2.0	NO2NO3-N	102	99.1	100			0.870
	NO2NO3-N	98.5	98.5	99.0			0.506
EPA 365.1 Rev. 2.0	Total-P	99.6	96.2	97.5			1.36
	Total-P	105	99.3	98.7			0.489
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	102	102			0.588
	O-Phosphate-P	102	99.8	101			0.823
SM 2120 B	Color (true)					2.87	
SM 2320 B-97	Total Alkalinity	103				0.401	
SM 2540 C-97	TDS					4.48	
SM 4500 F-C-97	Fluoride	97.3	94.7	94.7			0.0
	Fluoride	96.8	96.0	96.7			0.473
SM 5310 B-00	Organic Carbon	91.4					0.519
	Organic Carbon	101	89.7	88.7			0.782

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1774288, 1774289, 1774294, 1774295
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1774308, 1774309
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1774308, 1774309
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1774288, 1774289
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1774288, 1774289
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1774290, 1774291, 1774296, 1774297
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1774290, 1774291, 1774296, 1774297
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1774290, 1774291, 1774296, 1774297
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1774290, 1774291, 1774296, 1774297
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1774292, 1774293, 1774298, 1774299
SM 2120 B / E31780	True Color measured at 450 nm	1774288, 1774289
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1774288, 1774289, 1774294, 1774295
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1774288, 1774289
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1774288, 1774289, 1774294, 1774295
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1774288, 1774289, 1774294, 1774295

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1774290, 1774291, 1774296, 1774297

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	02/24/2016			02/24/2016 15:24	Sima Feizi	1774288, 1774289, 1774294, 1774295
EPA 200.7 Rev. 4.4	02/24/2016	02/29/2016	Elliott D. Healy	03/02/2016	Joshua Ayres	1774308, 1774309
EPA 200.8 Rev. 5.4	02/24/2016	02/29/2016	Elliott D. Healy	03/03/2016	Charles J. Peterson	1774308, 1774309
EPA 300.0 Rev. 2.1	02/24/2016			03/01/2016	Ping Hua	1774288, 1774289
EPA 350.1 Rev. 2.0	02/24/2016			03/08/2016	Diana M. Turner	1774290, 1774291, 1774296, 1774297
EPA 351.2 Rev. 2.0	02/24/2016	03/02/2016	Christopher Armour	03/04/2016	Rochelle Y Jackson	1774290, 1774291
	02/24/2016	03/03/2016	Sofia Elnemr	03/07/2016	Rochelle Y Jackson	1774296, 1774297
EPA 353.2 Rev. 2.0	02/24/2016			03/01/2016	Peter D. Kaus	1774290, 1774291
	02/24/2016			03/07/2016	Diana M. Turner	1774296, 1774297
EPA 365.1 Rev. 2.0	02/24/2016	03/02/2016	Christopher Armour	03/03/2016	Lipi Saha	1774290, 1774291, 1774296, 1774297
EPA 365.1 Rev. 2.0 dissolved	02/24/2016			02/24/2016 15:17	Bryan A. Werth	1774292
	02/24/2016			02/24/2016 15:18	Bryan A. Werth	1774293
	02/24/2016			02/24/2016 15:22	Bryan A. Werth	1774298
	02/24/2016			02/24/2016 15:23	Bryan A. Werth	1774299
SM 2120 B	02/24/2016			02/24/2016 17:25	Blanca Fach	1774289
	02/24/2016			02/24/2016 17:27	Blanca Fach	1774288
SM 2320 B-97	02/24/2016			03/04/2016	Dale L. Simmons	1774288, 1774289, 1774294, 1774295
SM 2540 C-97	02/24/2016			02/26/2016	Yijie Li	1774288, 1774289
SM 2540 D-97	02/24/2016			02/26/2016	Yijie Li	1774288, 1774289, 1774294, 1774295
SM 4500 F-C-97	02/24/2016			02/26/2016	Dale L. Simmons	1774288, 1774289, 1774294, 1774295
SM 5310 B-00	02/24/2016			02/27/2016	Sofia Elnemr	1774290, 1774291, 1774296, 1774297