

Chemical Analysis Report

SE-DIST-2016-09-08-01

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

Event Description: **SMP-Last Season Glades Run**

Request ID: **RQ-2016-09-05-70**

Customer: **SE-DIST**

Project ID: **SMP**

Send Reports to:

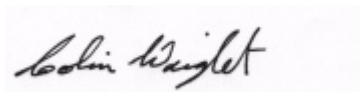
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Matthew Sewell

For additional information please contact

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Certified by: Colin Wright, Environmental Administrator

Date Certified: 30-SEP-2016 14:54

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

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: WCA1 NORTH @ G-3C1

Collection Date/Time: 09/07/2016 12:25

Field ID: G5SE0046

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1829431	EPA 180.1 Rev. 2.0	Turbidity	5.4		NTU	P310870	
	EPA 300.0 Rev. 2.1	Chloride	140		mg Cl/L	P311400	
		Sulfate	68		mg SO4/L	P311406	
	SM 2120 B	Color (true)	84	A	PCU	P310843	
	SM 2320 B-97	Total Alkalinity	193		mg CaCO3/L	P311189	
	SM 2540 C-97	TDS	577		mg/L	P311634	
	SM 2540 D-97	TSS	6	I	mg/L	P311570	
	SM 4500 F-C-97	Fluoride	0.31		mg F/L	P311194	
1829433	EPA 350.1 Rev. 2.0	Ammonia-N	0.044		mg N/L	P311078	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P310958	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.13		mg N/L	P311278	
	EPA 365.1 Rev. 2.0	Total-P	0.055		mg P/L	P311223	
	SM 5310 B-00	Organic Carbon	24		mg C/L	P311105	
1829435	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.020		mg P/L	P310834	
1829451	EPA 200.7 Rev. 4.4	Calcium	73.5		mg/L	P311044	
		Iron	100	I	ug/L	P311044	
		Magnesium	18.5		mg/L	P311044	
		Potassium	7.2		mg/L	P311044	
		Sodium	94.9		mg/L	P311044	
		Zinc	5.0	U	ug/L	P311044	
	EPA 200.8 Rev. 5.4	Arsenic	1.84		ug/L	P311044	
		Beryllium	0.010	U	ug/L	P311044	
		Cadmium	0.020	U	ug/L	P311044	
		Chromium	0.28		ug/L	P311044	
		Copper	0.43		ug/L	P311044	
		Lead	0.10	I	ug/L	P311044	
		Nickel	0.33		ug/L	P311044	
		Silver	0.0050	U	ug/L	P311044	

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: WEST PALM BEACH CANAL @ ENR SUPPLY CANAL

Collection Date/Time: 09/07/2016 12:45

Field ID: G5SE0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1829425	EPA 180.1 Rev. 2.0	Turbidity	24		NTU	P310870	
	EPA 300.0 Rev. 2.1	Chloride	61		mg Cl/L	P311400	
		Sulfate	31		mg SO4/L	P311406	
	SM 2120 B	Color (true)	60	A	PCU	P310848	
	SM 2320 B-97	Total Alkalinity	123		mg CaCO3/L	P311189	
	SM 2540 C-97	TDS	304		mg/L	P311634	
	SM 2540 D-97	TSS	22		mg/L	P311570	
	SM 4500 F-C-97	Fluoride	0.19		mg F/L	P311194	

Field ID: G5SE0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1829427	EPA 350.1 Rev. 2.0	Ammonia-N	0.085		mg N/L	P311078	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P310958	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P311278	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P311223	
	SM 5310 B-00	Organic Carbon	17		mg C/L	P311105	
1829429	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.031		mg P/L	P310834	

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: HILLSCAN 0.25M S. OF L-16 CANAL

Collection Date/Time: 09/07/2016 13:15

Field ID: G5SE0005

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1829426	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P310870	
	EPA 300.0 Rev. 2.1	Chloride	140		mg Cl/L	P311400	
		Sulfate	110		mg SO4/L	P311406	
	SM 2120 B	Color (true)	170		PCU	P310848	
	SM 2320 B-97	Total Alkalinity	338		mg CaCO3/L	P311189	
	SM 2540 C-97	TDS	805		mg/L	P311634	
	SM 2540 D-97	TSS	21		mg/L	P311570	
	SM 4500 F-C-97	Fluoride	0.73		mg F/L	P311194	
1829428	EPA 350.1 Rev. 2.0	Ammonia-N	0.53		mg N/L	P311078	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	3.4		mg N/L	P310958	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.77		mg N/L	P311278	
	EPA 365.1 Rev. 2.0	Total-P	0.18		mg P/L	P311223	
	SM 5310 B-00	Organic Carbon	40		mg C/L	P311105	
1829430	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.095		mg P/L	P310834	

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: WCA1 SOUTH

Collection Date/Time: 09/07/2016 16:00

Field ID: G5SE0047

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1829432	EPA 180.1 Rev. 2.0	Turbidity	0.95		NTU	P310870	
	EPA 300.0 Rev. 2.1	Chloride	100		mg Cl/L	P311400	
		Sulfate	40		mg SO4/L	P311406	
	SM 2120 B	Color (true)	74		PCU	P310843	
	SM 2320 B-97	Total Alkalinity	143		mg CaCO3/L	P311189	
	SM 2540 C-97	TDS	399		mg/L	P311634	
	SM 2540 D-97	TSS	3	I	mg/L	P311570	
	SM 4500 F-C-97	Fluoride	0.24		mg F/L	P311194	
1829434	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P311078	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P310958	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.017		mg N/L	P311278	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P311223	

Field ID: G5SE0047

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1829434	SM 5310 B-00	Organic Carbon	22		mg C/L	P311105	
1829436	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P310834	
1829452	EPA 200.7 Rev. 4.4	Calcium	52.7		mg/L	P311044	
		Iron	30	U	ug/L	P311044	
		Magnesium	13.4		mg/L	P311044	
		Potassium	5.3		mg/L	P311044	
		Sodium	64.7		mg/L	P311044	
		Zinc	5.0	U	ug/L	P311044	
	EPA 200.8 Rev. 5.4	Arsenic	1.17		ug/L	P311044	
		Beryllium	0.010	U	ug/L	P311044	
		Cadmium	0.020	U	ug/L	P311044	
		Chromium	0.14	I	ug/L	P311044	
		Copper	0.18	I	ug/L	P311044	
		Lead	0.050	U	ug/L	P311044	
		Nickel	0.18	I	ug/L	P311044	
		Silver	0.0050	U	ug/L	P311044	

Ref. Method and Comment:

SM 2540 C-97: The reported result is consistent with the laboratory conductivity, 685 umhos/cm.

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

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P310870

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P311044

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: P311044

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Beryllium	0.010	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

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311044

Component	Result	Code	Units
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311400

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311406

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311078

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P310958

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311278

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311223

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310834

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

Reference Method: SM 2120 B
Batch ID: P310843

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report Method Blank Results

Reference Method: SM 2120 B
Batch ID: P310848

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P311189

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

Reference Method: SM 2540 C-97
Batch ID: P311634

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P311570

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P311194

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P311105

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: P311044

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	104		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	97.1		P	85 - 115
Sodium	97.7		P	85 - 115
Zinc	98.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311044

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	99.9		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P311044

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Beryllium	98.4		P	85 - 115
Cadmium	98.9		P	85 - 115
Chromium	98.0		P	85 - 115
Copper	98.4		P	85 - 115
Lead	97.6		P	85 - 115
Nickel	99.2		P	85 - 115
Silver	98.1		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P311400

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P311406

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

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P311078

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: P310958

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

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P311278

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P311223

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	94.6		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P310834

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P311189

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

Reference Method: SM 4500 F-C-97
Batch ID: P311194

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.8		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P311105

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	104		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829521	Calcium	90.7	96.2	P/P	80 - 120
1829521	Iron	99.6	100	P/P	80 - 120
1829521	Magnesium	99.6	102	P/P	80 - 120
1829521	Potassium	98.3	101	P/P	80 - 120
1829521	Sodium	98.0		P	80 - 120
1829521	Zinc	99.7	99.6	P/P	80 - 120
1829575	Calcium	100		P	80 - 120
1829575	Iron	101		P	80 - 120
1829575	Magnesium	102		P	80 - 120
1829575	Potassium	98.6		P	80 - 120
1829575	Sodium	97.2		P	80 - 120
1829575	Zinc	97.6		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829521	Arsenic	100	97.6	P/P	80 - 120
1829521	Beryllium	101	99.3	P/P	80 - 120
1829521	Cadmium	98.6	99.7	P/P	80 - 120
1829521	Chromium	98.9	98.4	P/P	80 - 120
1829521	Copper	96.9	95.0	P/P	80 - 120
1829521	Lead	98.1	97.6	P/P	80 - 120
1829521	Nickel	97.3	96.1	P/P	80 - 120
1829521	Silver	97.3	97.2	P/P	80 - 120
1829575	Arsenic	101		P	80 - 120
1829575	Beryllium	101		P	80 - 120
1829575	Cadmium	101		P	80 - 120
1829575	Chromium	99.4		P	80 - 120
1829575	Copper	93.9		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829575	Lead	98.7		P	80 - 120
1829575	Nickel	94.3		P	80 - 120
1829575	Silver	97.5		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311400

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829457	Chloride	97.9		P	90 - 110
1829585	Chloride	99.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311406

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829457	Sulfate	98.7		P	90 - 110
1829585	Sulfate	99.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311078

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829404	Ammonia-N	103	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P310958

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829419	Kjeldahl Nitrogen	88.9	90.8	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311278

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829427	NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311223

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829419	Total-P	102	97.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310834

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829429	O-Phosphate-P	96.8	98.6	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P311194

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

Reference Method: SM 4500 F-C-97
Batch ID: P311194

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829410	Fluoride	96.4	97.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P311105

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829427	Organic Carbon	105	104	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P310870

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829411	Turbidity	10.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829521	Calcium	3.31	Spike	P	0 - 20
1829521	Iron	0.657	Spike	P	0 - 20
1829521	Magnesium	2.34	Spike	P	0 - 20
1829521	Potassium	3.00	Spike	P	0 - 20
1829521	Sodium	0.495	Spike	P	0 - 20
1829521	Zinc	0.103	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829521	Arsenic	2.71	Spike	P	0 - 20
1829521	Beryllium	1.38	Spike	P	0 - 20
1829521	Cadmium	1.10	Spike	P	0 - 20
1829521	Chromium	0.502	Spike	P	0 - 20
1829521	Copper	1.93	Spike	P	0 - 20
1829521	Lead	0.479	Spike	P	0 - 20
1829521	Nickel	1.26	Spike	P	0 - 20
1829521	Silver	0.0973	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311400

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829457	Chloride	0.357	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311406

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829457	Sulfate	0.285	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311078

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829404	Ammonia-N	0.181	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P310958

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829419	Kjeldahl Nitrogen	1.53	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311278

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829427	NO2NO3-N	0.265	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311223

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829419	Total-P	2.98	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310834

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829429	O-Phosphate-P	1.40	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P310843

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829431	Color (true)	3.76	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P310848

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829425	Color (true)	0.703	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
Batch ID: P311189

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829410	Total Alkalinity	1.96	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P311634

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829412	TDS	0.563	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P311194

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829410	Fluoride	0.470	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P311105

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829427	Organic Carbon	0.661	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: A71491
Included Lab Sample IDs: 1829429, 1829430, 1829435, 1829436

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	98.3	P/P	90 - 110
O-Phosphate-P	99.7	100	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A71492
Included Lab Sample IDs: 1829431, 1829432

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	95.4	96.1	P/P	85 - 115

Reference Method: SM 2120 B
Run ID: A71493
Included Lab Sample IDs: 1829425, 1829426

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.4	98.2	P/P	85 - 115

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A71499

Included Lab Sample IDs: 1829425, 1829426, 1829431, 1829432

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	100	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A71576

Included Lab Sample IDs: 1829425, 1829426, 1829431, 1829432

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Sulfate	101	99.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A71590

Included Lab Sample IDs: 1829427, 1829428, 1829433, 1829434

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	97.8	P/P	90 - 110
Kjeldahl Nitrogen	99.8	98.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A71596

Included Lab Sample IDs: 1829427, 1829428, 1829433, 1829434

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	104	104	P/P	90 - 110
Ammonia-N	104	104	P/P	90 - 110
Ammonia-N	104	106	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A71605

Included Lab Sample IDs: 1829427, 1829428, 1829433, 1829434

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	106	105	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A71639

Included Lab Sample IDs: 1829425, 1829426, 1829431, 1829432

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

Reference Method: SM 4500 F-C-97

Run ID: A71639

Included Lab Sample IDs: 1829425, 1829426, 1829431, 1829432

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	99.5	P/P	90 - 110
Fluoride	99.5	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A71651

Included Lab Sample IDs: 1829427, 1829428, 1829433, 1829434

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: A71678

Included Lab Sample IDs: 1829427, 1829428, 1829433

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A71694

Included Lab Sample IDs: 1829451, 1829452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.6	101	P/P	90 - 110
Iron	99.1	98.9	P/P	90 - 110
Magnesium	100	100	P/P	90 - 110
Potassium	97.4	101	P/P	90 - 110
Sodium	95.7	98.9	P/P	90 - 110
Zinc	99.9	99.1	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71703

Included Lab Sample IDs: 1829451, 1829452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	99.5	P/P	90 - 110
Beryllium	99.7	99.3	P/P	90 - 110
Cadmium	97.6	97.9	P/P	90 - 110
Chromium	97.8	99.5	P/P	90 - 110
Copper	101	100	P/P	90 - 110
Lead	95.8	95.3	P/P	90 - 110
Silver	97.1	97.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A71709

Included Lab Sample IDs: 1829434

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71721

Included Lab Sample IDs: 1829451, 1829452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	101	97.6	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						10.0	
EPA 200.7 Rev. 4.4	Calcium	103	90.7	96.2	100			3.31
	Iron	104	99.6	100	101			0.657
	Magnesium	106	99.6	102	102			2.34
	Potassium	97.1	98.3	101	98.6			3.00
	Sodium	97.7	98.0	97.2				0.495
	Zinc	98.5	99.7	99.6	97.6			0.103
EPA 200.8 Rev. 5.4	Arsenic	99.9	100	97.6	101			2.71
	Beryllium	98.4	101	99.3	101			1.38
	Cadmium	98.9	98.6	99.7	101			1.10
	Chromium	98.0	98.9	98.4	99.4			0.502
	Copper	98.4	96.9	95.0	93.9			1.93
	Lead	97.6	98.1	97.6	98.7			0.479
	Nickel	99.2	97.3	96.1	94.3			1.26
	Silver	98.1	97.3	97.2	97.5			0.0973
EPA 300.0 Rev. 2.1	Chloride	101	97.9	99.2			0.357	
	Sulfate	99.6	98.7	99.2			0.285	
EPA 350.1 Rev. 2.0	Ammonia-N	104	103	103				0.181
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	88.9	90.8				1.53
EPA 353.2 Rev. 2.0	NO2NO3-N	104	106	106				0.265
EPA 365.1 Rev. 2.0	Total-P	94.6	102	97.1				2.98
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	96.8	98.6				1.40
SM 2120 B	Color (true)						3.76	
	Color (true)						0.703	
SM 2320 B-97	Total Alkalinity	104					1.96	
SM 2540 C-97	TDS						0.563	
SM 4500 F-C-97	Fluoride	99.8	96.4	97.0				0.470
SM 5310 B-00	Organic Carbon	104	105	104				0.661

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1829425, 1829426, 1829431, 1829432
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1829451, 1829452
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1829451, 1829452
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1829425, 1829426, 1829431, 1829432
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1829425, 1829426, 1829431, 1829432
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1829427, 1829428, 1829433, 1829434
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1829427, 1829428, 1829433, 1829434
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1829427, 1829428, 1829433, 1829434
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1829427, 1829428, 1829433, 1829434
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1829429, 1829430, 1829435, 1829436
SM 2120 B / E31780	True Color measured at 450 nm	1829425, 1829426, 1829431, 1829432
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1829425, 1829426, 1829431, 1829432
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1829425, 1829426, 1829431, 1829432

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1829425, 1829426, 1829431, 1829432
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1829425, 1829426, 1829431, 1829432
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1829427, 1829428, 1829433, 1829434

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	09/08/2016			09/08/2016 17:32	Sima Feizi	1829425, 1829426, 1829431, 1829432
EPA 200.7 Rev. 4.4	09/08/2016	09/13/2016	Elliott D. Healy	09/15/2016	Joshua Ayres	1829451, 1829452
EPA 200.8 Rev. 5.4	09/08/2016	09/13/2016	Elliott D. Healy	09/16/2016	Charles J. Peterson	1829451, 1829452
	09/08/2016	09/13/2016	Elliott D. Healy	09/19/2016	Charles J. Peterson	1829451, 1829452
EPA 300.0 Rev. 2.1	09/08/2016			09/16/2016	Ping Hua	1829425, 1829426, 1829431, 1829432
EPA 350.1 Rev. 2.0	09/08/2016			09/08/2016	Joseph Suarez	1829427, 1829428, 1829433, 1829434
EPA 351.2 Rev. 2.0	09/08/2016	09/12/2016	Adrian Shelby	09/13/2016	Christopher Armour	1829427, 1829428, 1829433, 1829434
EPA 353.2 Rev. 2.0	09/08/2016			09/15/2016	Peter D. Kaus	1829427, 1829428, 1829433, 1829434
EPA 365.1 Rev. 2.0	09/08/2016	09/15/2016	Vijayalakshmi Reddy	09/16/2016	Lipi Saha	1829427, 1829428, 1829433, 1829434
EPA 365.1 Rev. 2.0 dissolved	09/08/2016			09/08/2016 14:52	Julia Storbeck	1829429
	09/08/2016			09/08/2016 15:30	Julia Storbeck	1829430
	09/08/2016			09/08/2016 15:34	Julia Storbeck	1829435
	09/08/2016			09/08/2016 15:35	Julia Storbeck	1829436
SM 2120 B	09/08/2016			09/08/2016 18:42	Julie Michelle Frank	1829431
	09/08/2016			09/08/2016 18:43	Julie Michelle Frank	1829432
	09/08/2016			09/08/2016 20:08	Julie Michelle Frank	1829425
	09/08/2016			09/08/2016 20:10	Julie Michelle Frank	1829426
SM 2320 B-97	09/08/2016			09/14/2016	Dale L. Simmons	1829425, 1829426, 1829431, 1829432
SM 2540 C-97	09/08/2016			09/12/2016	Sima Feizi	1829425, 1829426, 1829431, 1829432
SM 2540 D-97	09/08/2016			09/12/2016	Sima Feizi	1829425, 1829426, 1829431, 1829432
SM 4500 F-C-97	09/08/2016			09/14/2016	Dale L. Simmons	1829425, 1829426, 1829431, 1829432
SM 5310 B-00	09/08/2016			09/14/2016	Sofia Elnemr	1829427, 1829428, 1829433, 1829434