

Chemical Analysis Report

SO-DIST-2016-10-19-01

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

Event Description: **SMP: Pollywog & OK Branch**
Request ID: **RQ-2016-10-17-06**
Customer: **SO-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901
Attn: Ben Paswater

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Certified by: Colin Wright, Environmental Administrator

Date Certified: 14-NOV-2016 12:31

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

Case Narrative

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

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

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

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

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

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

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

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

Precision is reported as relative percent difference unless otherwise noted.

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

QC Codes used in this report may include:

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

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

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

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

Sample Location: POLLYWOG CREEK @ SR80

Collection Date/Time: 10/18/2016 13:05

Field ID: G3SD101816-1

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1841891	EPA 180.1 Rev. 2.0	Turbidity	7.2		NTU	P313522	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P313972	
		Sulfate	4.1		mg SO4/L	P313971	
	SM 2120 B	Color (true)	310		PCU	P313495	
	SM 2320 B-97	Total Alkalinity	28		mg CaCO3/L	P313617	
	SM 2540 C-97	TDS	119		mg/L	P314157	
	SM 2540 D-97	TSS	12		mg/L	P314151	
	SM 4500 F-C-97	Fluoride	0.14		mg F/L	P313619	
1841895	EPA 350.1 Rev. 2.0	Ammonia-N	0.073		mg N/L	P314403	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P314208	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.074		mg N/L	P313563	
	EPA 365.1 Rev. 2.0	Total-P	0.48		mg P/L	P314129	
	SM 5310 B-00	Organic Carbon	24		mg C/L	P313573	
1841899	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.39		mg P/L	P313493	
1841907	EPA 200.7 Rev. 4.4	Calcium	12.3		mg/L	P313545	
		Iron	2.04E+03		ug/L	P313545	
		Magnesium	3.30		mg/L	P313545	
		Potassium	0.84	I	mg/L	P313545	
		Sodium	10.6		mg/L	P313545	
	EPA 200.8 Rev. 5.4	Zinc	6.1	I	ug/L	P313545	
		Arsenic	1.64		ug/L	P313545	
		Cadmium	0.020	U	ug/L	P313545	
		Chromium	1.48		ug/L	P313545	
		Copper	0.78		ug/L	P313545	
		Lead	0.69		ug/L	P313545	
		Nickel	0.99		ug/L	P313545	
		Silver	0.0050	U	ug/L	P313545	

Ref. Method and Comment:

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

SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

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

Sample Location: POLLYWOG CREEK @ POLLYWOG PT.

Collection Date/Time: 10/18/2016 12:50

Field ID: G3SD101816-2

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1841892	EPA 180.1 Rev. 2.0	Turbidity	5.8		NTU	P313522	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P313972	
		Sulfate	5.9		mg SO4/L	P313971	
	SM 2120 B	Color (true)	300		PCU	P313495	
	SM 2320 B-97	Total Alkalinity	34		mg CaCO3/L	P313617	
	SM 2540 C-97	TDS	117		mg/L	P314157	
	SM 2540 D-97	TSS	6	I	mg/L	P314151	
	SM 4500 F-C-97	Fluoride	0.18		mg F/L	P313619	
1841896	EPA 350.1 Rev. 2.0	Ammonia-N	0.080		mg N/L	P314403	

Field ID: G3SD101816-2

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1841896	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P314208	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.076		mg N/L	P313563	
	EPA 365.1 Rev. 2.0	Total-P	0.51		mg P/L	P314129	
	SM 5310 B-00	Organic Carbon	23		mg C/L	P313573	
1841900	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.42		mg P/L	P313493	
1841908	EPA 200.7 Rev. 4.4	Calcium	14.6		mg/L	P313545	
		Iron	2.02E+03		ug/L	P313545	
		Magnesium	3.56		mg/L	P313545	
		Potassium	0.87	I	mg/L	P313545	
		Sodium	11.6		mg/L	P313545	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P313545	
		Arsenic	1.66		ug/L	P313545	
		Cadmium	0.020	U	ug/L	P313545	
		Chromium	1.55		ug/L	P313545	
		Copper	0.63		ug/L	P313545	
		Lead	0.68		ug/L	P313545	
		Nickel	0.98		ug/L	P313545	
		Silver	0.0050	U	ug/L	P313545	

Ref. Method and Comment:

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

SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

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

Sample Location: OK BRANCH @ EUCALYPTUS BLD.

Collection Date/Time: 10/18/2016 13:40

Field ID: G3SD101816-3

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1841893	EPA 180.1 Rev. 2.0	Turbidity	3.4		NTU	P313522	
	EPA 300.0 Rev. 2.1	Chloride	59		mg Cl/L	P313972	
		Sulfate	22		mg SO4/L	P313971	
		Color (true)	100		PCU	P313495	
	SM 2320 B-97	Total Alkalinity	225		mg CaCO3/L	P313617	
	SM 2540 C-97	TDS	387	A	mg/L	P314157	
	SM 2540 D-97	TSS	3	I	mg/L	P314151	
	SM 4500 F-C-97	Fluoride	0.21		mg F/L	P313619	
1841897	EPA 350.1 Rev. 2.0	Ammonia-N	0.064		mg N/L	P314394	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P314208	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.25		mg N/L	P313563	
	EPA 365.1 Rev. 2.0	Total-P	0.095		mg P/L	P314131	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P313573	
1841901	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.057		mg P/L	P313493	
1841909	EPA 200.7 Rev. 4.4	Calcium	88.6		mg/L	P313545	
		Iron	730		ug/L	P313545	
		Magnesium	6.25		mg/L	P313545	
		Potassium	4.6		mg/L	P313545	
		Sodium	40.9		mg/L	P313545	

Field ID: G3SD101816-3

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1841909	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P313545	
	EPA 200.8 Rev. 5.4	Arsenic	1.41		ug/L	P313545	
		Cadmium	0.020	U	ug/L	P313545	
		Chromium	0.56		ug/L	P313545	
		Copper	0.32	I	ug/L	P313545	
		Lead	0.065	I	ug/L	P313545	
		Nickel	0.46		ug/L	P313545	
		Silver	0.0050	U	ug/L	P313545	

Ref. Method and Comment:

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

SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

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

Sample Location: FIELD BLANK

Collection Date/Time: 10/18/2016 13:55

Field ID: G3SD101816-4

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1841894	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P313522	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P313972	
		Sulfate	0.20	U	mg SO4/L	P313971	
	SM 2120 B	Color (true)	2.5	U	PCU	P313495	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P313617	
	SM 2540 C-97	TDS	15	U	mg/L	P314156	
	SM 2540 D-97	TSS	2	U	mg/L	P314150	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P313619	
1841898	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P314394	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P314208	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P313563	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P314131	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P313573	
1841902	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P313493	
1841910	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P313545	
		Iron	30	U	ug/L	P313545	
		Magnesium	0.040	U	mg/L	P313545	
		Potassium	0.30	U	mg/L	P313545	
		Sodium	0.50	U	mg/L	P313545	
		Zinc	5.0	U	ug/L	P313545	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P313545	
		Cadmium	0.020	U	ug/L	P313545	
		Chromium	0.050	U	ug/L	P313545	
		Copper	0.10	U	ug/L	P313545	
		Lead	0.050	U	ug/L	P313545	
		Nickel	0.050	U	ug/L	P313545	
		Silver	0.0050	U	ug/L	P313545	

Field ID: G3SD101816-4

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
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Ref. Method and Comment:

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

SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium 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: P313522

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P313545

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: P313545

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: P313971

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P313972

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P314394

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

Quality Assurance Report

Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314403

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P314208

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313563

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314129

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314131

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313493

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

Reference Method: SM 2120 B
Batch ID: P313495

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P313617

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

Reference Method: SM 2540 C-97
Batch ID: P314156

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P314157

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P314150

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P314151

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P313619

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P313573

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: P313545

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	102		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	97.8		P	85 - 115
Sodium	100		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313545

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.3		P	85 - 115
Cadmium	97.5		P	85 - 115
Chromium	95.7		P	85 - 115
Copper	98.7		P	85 - 115
Lead	95.7		P	85 - 115
Nickel	99.4		P	85 - 115
Silver	95.6		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313971

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.1		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313972

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314394

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314403

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: P314208

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313563

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314129

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: P314131

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313493

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P313617

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

Reference Method: SM 4500 F-C-97
Batch ID: P313619

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P313573

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P313545

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1841413	Iron	104		P	80 - 120
1841413	Magnesium	97.9		P	80 - 120
1841413	Sodium	99.2		P	80 - 120
1841413	Zinc	97.2		P	80 - 120
1842020	Iron	102	102	P/P	80 - 120
1842020	Magnesium	103	103	P/P	80 - 120
1842020	Potassium	99.1	99.8	P/P	80 - 120
1842020	Sodium	101		P	80 - 120
1842020	Zinc	97.6	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313545

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1841413	Arsenic	100		P	80 - 120
1841413	Cadmium	101		P	80 - 120
1841413	Chromium	93.2		P	80 - 120
1841413	Copper	94.9		P	80 - 120
1841413	Lead	99.0		P	80 - 120
1841413	Nickel	96.4		P	80 - 120
1841413	Silver	97.8		P	80 - 120
1842020	Arsenic	99.7	101	P/P	80 - 120
1842020	Cadmium	100	99.4	P/P	80 - 120
1842020	Chromium	96.3	96.3	P/P	80 - 120
1842020	Copper	95.9	95.6	P/P	80 - 120
1842020	Lead	99.4	99.1	P/P	80 - 120
1842020	Nickel	95.7	96.2	P/P	80 - 120
1842020	Silver	98.2	97.5	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313971

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1841400	Sulfate	96.0		P	90 - 110
1841512	Sulfate	97.1		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313972

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1841400	Chloride	99.1		P	90 - 110
1841512	Chloride	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314394

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840221	Ammonia-N	97.9	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314403

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1841513	Ammonia-N	101	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P314208

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1842117	Kjeldahl Nitrogen	104	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313563

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1841551	NO2NO3-N	98.5	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314129

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1841501	Total-P	98.6	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314131

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1841965	Total-P	107	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313493

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1842122	O-Phosphate-P	94.7	96.8	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
 Batch ID: P313619

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1842085	Fluoride	99.8	101	P/P	91 - 105

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P313522

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841729	Turbidity	4.19	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P313545

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1842020	Calcium	1.71	Spike	P	0 - 20
1842020	Iron	0.201	Spike	P	0 - 20
1842020	Magnesium	0.389	Spike	P	0 - 20
1842020	Potassium	0.640	Spike	P	0 - 20
1842020	Sodium	0.0770	Spike	P	0 - 20
1842020	Zinc	2.55	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P313545

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1842020	Arsenic	1.12	Spike	P	0 - 20
1842020	Cadmium	0.905	Spike	P	0 - 20
1842020	Chromium	0.0371	Spike	P	0 - 20
1842020	Copper	0.377	Spike	P	0 - 20
1842020	Lead	0.235	Spike	P	0 - 20
1842020	Nickel	0.557	Spike	P	0 - 20
1842020	Silver	0.664	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P313971

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841400	Sulfate	0.392	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P313972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841400	Chloride	0.141	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314394

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840221	Ammonia-N	2.09	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314403

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841513	Ammonia-N	1.71	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P314208

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1842117	Kjeldahl Nitrogen	0.228	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313563

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841551	NO2NO3-N	1.53	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314129

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841501	Total-P	1.80	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314131

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841965	Total-P	3.67	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313493

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1842122	O-Phosphate-P	2.19	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P313495

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841957	Color (true)	0.563	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
Batch ID: P313617

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1842085	Total Alkalinity	0.120	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P314156

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841499	TDS	2.53	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P314157

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841893	TDS	7.24	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P313619

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1842085	Fluoride	0.959	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P313573

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1841551	Organic Carbon	1.11	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: A72317
Included Lab Sample IDs: 1841899, 1841900, 1841901, 1841902

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.6	P/P	90 - 110
O-Phosphate-P	100	100	P/P	90 - 110
O-Phosphate-P	102	100	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A72318
Included Lab Sample IDs: 1841891, 1841892, 1841893, 1841894

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

Reference Method: SM 2120 B

Run ID: A72318

Included Lab Sample IDs: 1841891, 1841892, 1841893, 1841894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	85 - 115
Color (true)	102	104	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A72324

Included Lab Sample IDs: 1841891, 1841892, 1841893, 1841894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	100	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A72340

Included Lab Sample IDs: 1841895, 1841896, 1841897, 1841898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	104	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A72343

Included Lab Sample IDs: 1841895, 1841896, 1841897, 1841898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	94.2	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A72356

Included Lab Sample IDs: 1841891, 1841892, 1841893, 1841894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A72356

Included Lab Sample IDs: 1841891, 1841892, 1841893, 1841894

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A72421

Included Lab Sample IDs: 1841907, 1841908, 1841909, 1841910

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.4	99.5	P/P	90 - 110
Calcium	99.5	98.8	P/P	90 - 110
Iron	96.9	97.7	P/P	90 - 110
Iron	97.7	98.8	P/P	90 - 110
Magnesium	97.4	98.2	P/P	90 - 110
Magnesium	98.2	98.5	P/P	90 - 110
Potassium	97.2	98.1	P/P	90 - 110
Potassium	98.1	98.7	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A72421

Included Lab Sample IDs: 1841907, 1841908, 1841909, 1841910

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	95.2	96.6	P/P	90 - 110
Sodium	96.6	96.6	P/P	90 - 110
Zinc	102	100	P/P	90 - 110
Zinc	102	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A72427

Included Lab Sample IDs: 1841907, 1841908, 1841909, 1841910

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.2	97.2	P/P	90 - 110
Arsenic	97.7	97.2	P/P	90 - 110
Cadmium	94.3	94.8	P/P	90 - 110
Cadmium	94.8	96.7	P/P	90 - 110
Chromium	92.5	93.7	P/P	90 - 110
Chromium	93.7	95.9	P/P	90 - 110
Copper	97.2	97.4	P/P	90 - 110
Copper	97.4	97.2	P/P	90 - 110
Lead	93.7	96.9	P/P	90 - 110
Lead	94.0	93.7	P/P	90 - 110
Nickel	97.7	97.3	P/P	90 - 110
Nickel	98.4	97.7	P/P	90 - 110
Silver	95.5	95.8	P/P	90 - 110
Silver	95.8	96.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A72453

Included Lab Sample IDs: 1841891, 1841892, 1841893, 1841894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	103	P/P	90 - 110
Chloride	103	103	P/P	90 - 110
Sulfate	98.8	99.9	P/P	90 - 110
Sulfate	99.9	99.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A72547

Included Lab Sample IDs: 1841895, 1841896, 1841897

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A72551

Included Lab Sample IDs: 1841895, 1841896, 1841897, 1841898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A72562

Included Lab Sample IDs: 1841898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A72578

Included Lab Sample IDs: 1841895, 1841896, 1841897, 1841898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	101	P/P	90 - 110
Ammonia-N	101	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						4.19	
EPA 200.7 Rev. 4.4	Calcium	104						1.71
	Iron	102	104	102	102			0.201
	Magnesium	104	97.9	103	103			0.389
	Potassium	97.8	99.1	99.8				0.640
	Sodium	100	99.2	101				0.0770
	Zinc	100	97.2	97.6	100			2.55
EPA 200.8 Rev. 5.4	Arsenic	98.3	100	99.7	101			1.12
	Cadmium	97.5	101	100	99.4			0.905
	Chromium	95.7	93.2	96.3	96.3			0.0371
	Copper	98.7	94.9	95.9	95.6			0.377
	Lead	95.7	99.0	99.4	99.1			0.235
	Nickel	99.4	96.4	95.7	96.2			0.557
	Silver	95.6	97.8	98.2	97.5			0.664
EPA 300.0 Rev. 2.1	Chloride	100	99.1	101			0.141	
	Sulfate	97.1	96.0	97.1			0.392	
EPA 350.1 Rev. 2.0	Ammonia-N	103	97.9	100				2.09
	Ammonia-N	104	101	103				1.71
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	104	104				0.228
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	106	98.5	97.0				1.53
EPA 365.1 Rev. 2.0	Total-P	101	98.6	101				1.80
	Total-P	99.2	107	102				3.67
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	94.7	96.8				2.19
SM 2120 B	Color (true)						0.563	
SM 2320 B-97	Total Alkalinity	103					0.120	
SM 2540 C-97	TDS						2.53	
	TDS						7.24	
SM 4500 F-C-97	Fluoride	98.5	99.8	101				0.959
SM 5310 B-00	Organic Carbon	94.6						1.11

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1841891, 1841892, 1841893, 1841894
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1841907, 1841908, 1841909, 1841910
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1841907, 1841908, 1841909, 1841910
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1841891, 1841892, 1841893, 1841894
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1841891, 1841892, 1841893, 1841894
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1841895, 1841896, 1841897, 1841898
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1841895, 1841896, 1841897, 1841898
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1841895, 1841896, 1841897, 1841898
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1841895, 1841896, 1841897, 1841898
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1841899, 1841900, 1841901, 1841902
SM 2120 B / E31780	True Color measured at 450 nm	1841891, 1841892, 1841893, 1841894
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1841891, 1841892, 1841893, 1841894
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1841891, 1841892, 1841893, 1841894
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1841891, 1841892, 1841893, 1841894
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1841891, 1841892, 1841893, 1841894
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1841895, 1841896, 1841897, 1841898

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	10/19/2016			10/19/2016 15:13	Sima Feizi	1841891, 1841892, 1841893, 1841894
EPA 200.7 Rev. 4.4	10/19/2016	10/20/2016	Elliott D. Healy	10/25/2016	Betina Topolski	1841907, 1841908, 1841909, 1841910
EPA 200.8 Rev. 5.4	10/19/2016	10/20/2016	Elliott D. Healy	10/25/2016	Charles J. Peterson	1841907, 1841908, 1841909, 1841910
EPA 300.0 Rev. 2.1	10/19/2016			10/27/2016	Ping Hua	1841891, 1841892, 1841893, 1841894
EPA 350.1 Rev. 2.0	10/19/2016			11/01/2016	Sofia Elnemr	1841895, 1841896, 1841897, 1841898
EPA 351.2 Rev. 2.0	10/19/2016	10/31/2016	Adrian Shelby	11/01/2016	Joseph Suarez	1841895, 1841896, 1841897, 1841898
EPA 353.2 Rev. 2.0	10/19/2016			10/20/2016	Beverly Y. Sanders	1841895, 1841896, 1841897, 1841898
EPA 365.1 Rev. 2.0	10/19/2016	10/28/2016	Vijayalakshmi Reddy	10/31/2016	Lipi Saha	1841895, 1841896, 1841897, 1841898
EPA 365.1 Rev. 2.0 dissolved	10/19/2016			10/19/2016 15:34	Julia Storbeck	1841902
	10/19/2016			10/19/2016 15:55	Julia Storbeck	1841900
	10/19/2016			10/19/2016 16:04	Julia Storbeck	1841899
	10/19/2016			10/19/2016 16:05	Julia Storbeck	1841901
SM 2120 B	10/19/2016			10/19/2016 16:03	Julie Michelle Frank	1841893
	10/19/2016			10/19/2016 16:04	Julie Michelle Frank	1841894
	10/19/2016			10/19/2016 16:33	Julie Michelle Frank	1841891
	10/19/2016			10/19/2016 16:34	Julie Michelle Frank	1841892
SM 2320 B-97	10/19/2016			10/20/2016	Dale L. Simmons	1841891, 1841892, 1841893, 1841894
SM 2540 C-97	10/19/2016			10/22/2016	Yijie Li	1841891, 1841892, 1841893, 1841894
SM 2540 D-97	10/19/2016			10/22/2016	Yijie Li	1841891, 1841892, 1841893, 1841894
SM 4500 F-C-97	10/19/2016			10/20/2016	Dale L. Simmons	1841891, 1841892, 1841893, 1841894
SM 5310 B-00	10/19/2016			10/20/2016	Julie Michelle Frank	1841895, 1841896, 1841897, 1841898