Chemical Analysis Report

NE-DIST-2018-07-18-01

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

Event Description: **Rice cr. rps/lvs**
Request ID: **RQ-2018-07-16-20**
Customer: **NE-DIST**
Project ID: **SMP**

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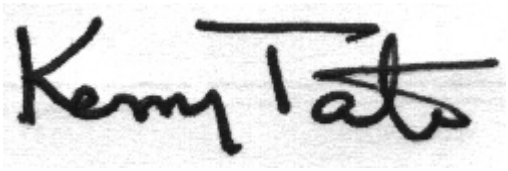
Date Certified: 09-AUG-2018 08:19



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: Rice CR ~150m AB Wooden Brdg BL GA Pac Eff **Collection Date/Time: 07/17/2018 09:45**

Field ID: 20030050 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2008363	EPA 180.1 Rev. 2.0	Turbidity	4.4		NTU	P348692	
	EPA 300.0 Rev. 2.1	Chloride	21		mg Cl/L	P349062	
		Sulfate	2.6		mg SO4/L	P349065	
	SM 2120 B	Color (true)	590		PCU	P348713	
	SM 2320 B-97	Total Alkalinity	26		mg CaCO3/L	P348843	
	SM 2540 C-97	TDS	169		mg/L	P349270	
	SM 2540 D-97	TSS	4	I	mg/L	P349276	
	SM 4500 F-C-97	Fluoride	0.076	I	mg F/L	P348849	
2008367	EPA 350.1 Rev. 2.0	Ammonia-N	0.023		mg N/L	P349068	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P348847	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.036		mg N/L	P348761	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P348981	
	SM 5310 B-00	Organic Carbon	40		mg C/L	P348930	
2008371	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.078		mg P/L	P348686	
2008379	EPA 200.7 Rev. 4.4	Calcium	14.0		mg/L	P348660	
		Iron	1.68E+03		ug/L	P348660	
		Magnesium	3.46		mg/L	P348660	
		Potassium	0.62	I	mg/L	P348660	
		Sodium	12.1		mg/L	P348660	
		Zinc	5.0	U	ug/L	P348660	
	EPA 200.8 Rev. 5.4	Arsenic	0.75		ug/L	P348660	
		Cadmium	0.020	U	ug/L	P348660	
		Chromium	0.81	I	ug/L	P348660	
		Copper	0.26	I	ug/L	P348660	
		Lead	0.50		ug/L	P348660	
		Nickel	1.13		ug/L	P348660	
		Silver	0.010	U	ug/L	P349023	

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: Rice CR @ Wooden BR Below GA. Pacific **Collection Date/Time: 07/17/2018 09:55**

Field ID: 20030252 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2008364	EPA 180.1 Rev. 2.0	Turbidity	4.5		NTU	P348692	
	EPA 300.0 Rev. 2.1	Chloride	19		mg Cl/L	P349062	
		Sulfate	2.6		mg SO4/L	P349065	
	SM 2120 B	Color (true)	580		PCU	P348713	
	SM 2320 B-97	Total Alkalinity	25		mg CaCO3/L	P348843	
	SM 2540 C-97	TDS	175		mg/L	P349270	
	SM 2540 D-97	TSS	4	I	mg/L	P349276	
	SM 4500 F-C-97	Fluoride	0.076	I	mg F/L	P348849	
2008368	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P349068	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P348847	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.040		mg N/L	P348761	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P348981	
	SM 5310 B-00	Organic Carbon	40		mg C/L	P348930	
2008372	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.075		mg P/L	P348686	
2008380	EPA 200.7 Rev. 4.4	Calcium	13.8		mg/L	P348660	
		Iron	1.80E+03		ug/L	P348660	
		Magnesium	3.49		mg/L	P348660	
		Potassium	0.66	I	mg/L	P348660	
		Sodium	11.9		mg/L	P348660	
		Zinc	5.0	U	ug/L	P348660	
	EPA 200.8 Rev. 5.4	Arsenic	0.75		ug/L	P348660	
		Cadmium	0.020	U	ug/L	P348660	
		Chromium	0.88	I	ug/L	P348660	
		Copper	0.33	I	ug/L	P348660	
		Lead	0.54		ug/L	P348660	
		Nickel	1.19		ug/L	P348660	
		Silver	0.010	U	ug/L	P349023	

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: Rice CR @ SR 309 **Collection Date/Time: 07/17/2018 11:00**

Field ID: 20030254 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2008365	EPA 180.1 Rev. 2.0	Turbidity	6.5		NTU	P348692	
	EPA 300.0 Rev. 2.1	Chloride	16		mg Cl/L	P349062	
		Sulfate	2.4		mg SO4/L	P349065	
	SM 2120 B	Color (true)	630		PCU	P348713	
	SM 2320 B-97	Total Alkalinity	15		mg CaCO3/L	P348843	
	SM 2540 C-97	TDS	144		mg/L	P349270	
	SM 2540 D-97	TSS	5	I	mg/L	P349276	
	SM 4500 F-C-97	Fluoride	0.073	I	mg F/L	P348849	
2008369	EPA 350.1 Rev. 2.0	Ammonia-N	0.030		mg N/L	P349068	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P348847	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.050		mg N/L	P348761	
	EPA 365.1 Rev. 2.0	Total-P	0.085		mg P/L	P348981	
	SM 5310 B-00	Organic Carbon	40		mg C/L	P348930	
2008373	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.056		mg P/L	P348686	
2008381	EPA 200.7 Rev. 4.4	Calcium	11.6		mg/L	P348660	
		Iron	1.74E+03		ug/L	P348660	
		Magnesium	3.09		mg/L	P348660	
		Potassium	0.38	I	mg/L	P348660	
		Sodium	9.0		mg/L	P348660	
		Zinc	5.0	U	ug/L	P348660	
	EPA 200.8 Rev. 5.4	Arsenic	0.67		ug/L	P348660	
		Cadmium	0.020	U	ug/L	P348660	
		Chromium	0.87	I	ug/L	P348660	
		Copper	0.34	I	ug/L	P348660	
		Lead	0.55		ug/L	P348660	
		Nickel	0.71	I	ug/L	P348660	
		Silver	0.010	U	ug/L	P349023	

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: Field Blank **Collection Date/Time: 07/17/2018 11:10**

Field ID: BLANK071718 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2008366	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P348692	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P349062	
		Sulfate	0.20	U	mg SO4/L	P349065	
	SM 2120 B	Color (true)	2.5	U	PCU	P348713	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P348843	
	SM 2540 C-97	TDS	15	U	mg/L	P349268	
	SM 2540 D-97	TSS	2	U	mg/L	P349274	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P348849	
2008370	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P349068	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P348847	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P348761	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P348981	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P348930	
2008374	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P348686	
2008382	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P348660	
		Iron	30	U	ug/L	P348660	
		Magnesium	0.040	U	mg/L	P348660	
		Potassium	0.30	U	mg/L	P348660	
		Sodium	0.50	U	mg/L	P348660	
		Zinc	5.0	U	ug/L	P348660	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P348660	
		Cadmium	0.020	U	ug/L	P348660	
		Chromium	0.40	U	ug/L	P348660	
		Copper	0.20	U	ug/L	P348660	
		Lead	0.050	U	ug/L	P348660	
		Nickel	0.20	U	ug/L	P348660	
		Silver	0.010	U	ug/L	P349023	

Ref. Method and Comment:
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: P348692

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348660

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: P348660

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P349023

Component	Result	Code	Units
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349062

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349065

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349068

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348847

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348847

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348761

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348981

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348686

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

Reference Method: SM 2120 B
Batch ID: P348713

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P348843

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

Reference Method: SM 2540 C-97
Batch ID: P349268

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P349270

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P349274

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P349276

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P348849

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P348930

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: P348660

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	108		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	105		P	85 - 115
Sodium	101		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348660

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	102		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	99.9		P	85 - 115
Copper	99.2		P	85 - 115
Lead	99.9		P	85 - 115
Nickel	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P349023

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349062

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349065

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349068

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348847

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: P348761

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348761

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348981

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348686

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

Reference Method: SM 2120 B
Batch ID: P348713

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	109		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P348843

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P348849

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

Reference Method: SM 5310 B-00
Batch ID: P348930

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348660

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2007909	Calcium	104		P	80 - 120
2007909	Iron	106		P	80 - 120
2007909	Magnesium	108		P	80 - 120
2007909	Potassium	100		P	80 - 120
2007909	Sodium	99.3		P	80 - 120
2007909	Zinc	107		P	80 - 120
2008233	Calcium	106		P	80 - 120
2008233	Iron	107	107	P/P	80 - 120
2008233	Magnesium	107		P	80 - 120
2008233	Potassium	103	102	P/P	80 - 120
2008233	Sodium	101		P	80 - 120
2008233	Zinc	101	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348660

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2007909	Arsenic	105		P	80 - 120
2007909	Cadmium	107		P	80 - 120
2007909	Chromium	101		P	80 - 120
2007909	Copper	103		P	80 - 120
2007909	Lead	104		P	80 - 120
2007909	Nickel	103		P	80 - 120
2008233	Arsenic	102	103	P/P	80 - 120
2008233	Cadmium	104	106	P/P	80 - 120
2008233	Chromium	96.4	98.1	P/P	80 - 120
2008233	Copper	94.8	96.1	P/P	80 - 120
2008233	Lead	101	102	P/P	80 - 120
2008233	Nickel	97.5	99.5	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P349023

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008001	Silver	99.2		P	80 - 120
2008141	Silver	103	103	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349062

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2006061	Chloride	108		P	90 - 110
2007924	Chloride	98.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349065

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2006061	Sulfate	106		P	90 - 110
2007924	Sulfate	97.7		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349068

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008406	Ammonia-N	97.3	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348847

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008405	Kjeldahl Nitrogen	99.8	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348761

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008302	NO2NO3-N	99.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348981

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008408	Total-P	95.9	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348686

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008228	O-Phosphate-P	94.9	96.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P348849

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008487	Fluoride	97.6	97.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P348930

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008367	Organic Carbon	101		P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P348692

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008296	Turbidity	7.34	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348660

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008233	Calcium	0.369	Spike	P	0 - 20
2008233	Iron	0.0186	Spike	P	0 - 20
2008233	Magnesium	0.143	Spike	P	0 - 20
2008233	Potassium	0.710	Spike	P	0 - 20
2008233	Sodium	0.220	Spike	P	0 - 20
2008233	Zinc	0.966	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348660

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008233	Arsenic	1.35	Spike	P	0 - 20
2008233	Cadmium	1.86	Spike	P	0 - 20
2008233	Chromium	1.66	Spike	P	0 - 20
2008233	Copper	1.31	Spike	P	0 - 20
2008233	Lead	1.16	Spike	P	0 - 20
2008233	Nickel	2.08	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P349023

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008141	Silver	0.366	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349062

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2007924	Chloride	2.45	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349065

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2007924	Sulfate	2.30	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349068

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008406	Ammonia-N	1.50	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348847

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008405	Kjeldahl Nitrogen	1.40	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348761

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008302	NO2NO3-N	0.429	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348981

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008408	Total-P	2.10	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348686

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008228	O-Phosphate-P	1.25	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P348713

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008297	Color (true)	0.238	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P348843

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008487	Total Alkalinity	0.776	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P349268

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2007831	TDS	5.30	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P349270

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008242	TDS	0.590	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P348849

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008487	Fluoride	0.474	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P348930

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008367	Organic Carbon	0.274	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: A85316
Included Lab Sample IDs: 2008371, 2008372, 2008373, 2008374

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	98.0	P/P	90 - 110
O-Phosphate-P	98.6	98.3	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A85317
Included Lab Sample IDs: 2008363, 2008364, 2008365, 2008366

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	98.0	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A85321
Included Lab Sample IDs: 2008363, 2008364, 2008365, 2008366

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	105	108	P/P	90 - 115
Color (true)	105	106	P/P	90 - 115
Color (true)	109	105	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A85343
Included Lab Sample IDs: 2008367, 2008368, 2008369, 2008370

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A85355
Included Lab Sample IDs: 2008379, 2008380, 2008381, 2008382

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	102	P/P	95 - 105
Calcium	102	104	P/P	90 - 110
Iron	103	104	P/P	95 - 105
Iron	104	104	P/P	90 - 110
Magnesium	104	105	P/P	95 - 105
Magnesium	105	105	P/P	90 - 110
Potassium	100	99.5	P/P	90 - 110
Potassium	101	100	P/P	95 - 105
Sodium	100	99.1	P/P	95 - 105
Sodium	101	99.5	P/P	90 - 110
Zinc	103	102	P/P	95 - 105
Zinc	105	104	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A85366
Included Lab Sample IDs: 2008363, 2008364, 2008365, 2008366

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-97
Run ID: A85366
Included Lab Sample IDs: 2008363, 2008364, 2008365, 2008366

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

Reference Method: SM 5310 B-00
Run ID: A85392
Included Lab Sample IDs: 2008367, 2008368, 2008369, 2008370

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	97.2	P/P	90 - 110
Organic Carbon	97.2	97.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A85394
Included Lab Sample IDs: 2008379, 2008380, 2008381, 2008382

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	102	100	P/P	90 - 110
Arsenic	102	100	P/P	90 - 110
Cadmium	102	101	P/P	90 - 110
Cadmium	103	101	P/P	90 - 110
Chromium	98.8	98.6	P/P	90 - 110
Chromium	99.6	97.3	P/P	90 - 110
Copper	100	97.8	P/P	90 - 110
Copper	101	98.7	P/P	90 - 110
Lead	100	98.0	P/P	90 - 110
Lead	98.9	99.8	P/P	90 - 110
Nickel	101	98.3	P/P	90 - 110
Nickel	101	99.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A85407
Included Lab Sample IDs: 2008367, 2008368, 2008369, 2008370

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.2	96.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A85417
Included Lab Sample IDs: 2008363, 2008364, 2008365, 2008366

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Chloride	101	99.2	P/P	90 - 110
Sulfate	102	102	P/P	90 - 110
Sulfate	102	99.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A85419
Included Lab Sample IDs: 2008367, 2008368, 2008369

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.4	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A85425
Included Lab Sample IDs: 2008370

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A85427
Included Lab Sample IDs: 2008367, 2008368, 2008369, 2008370

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	101	P/P	90 - 110
Ammonia-N	98.6	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A85557
Included Lab Sample IDs: 2008379, 2008380, 2008381, 2008382

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	99.7	101	P/P	90 - 110
Silver	99.8	101	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			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						7.34	
EPA 200.7 Rev. 4.4	Calcium	105	104	106				0.369
	Iron	108	106	107	107			0.0186
	Magnesium	107	108	107				0.143
	Potassium	105	100	103	102			0.710
	Sodium	101	99.3	101				0.220
	Zinc	102	107	101	102			0.966
EPA 200.8 Rev. 5.4	Arsenic	102	105	102	103			1.35
	Cadmium	103	107	104	106			1.86
	Chromium	99.9	101	96.4	98.1			1.66
	Copper	99.2	103	94.8	96.1			1.31
	Lead	99.9	104	101	102			1.16
	Nickel	101	103	97.5	99.5			2.08
	Silver	101	99.2	103	103			0.366
EPA 300.0 Rev. 2.1	Chloride	99.0	98.7	108			2.45	
	Sulfate	99.4	97.7	106			2.30	
EPA 350.1 Rev. 2.0	Ammonia-N	102	97.3	99.2				1.50
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	99.8	98.1				1.40
EPA 353.2 Rev. 2.0	NO2NO3-N	98.0	99.2					0.429
EPA 365.1 Rev. 2.0	Total-P	99.0	95.9	98.0				2.10
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.1	94.9	96.4				1.25
SM 2120 B	Color (true)	109					0.238	
SM 2320 B-97	Total Alkalinity	103					0.776	
SM 2540 C-97	TDS						5.30	
	TDS						0.590	
SM 4500 F-C-97	Fluoride	97.8	97.6	97.0				0.474
SM 5310 B-00	Organic Carbon	95.2	101					0.274

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2008363, 2008364, 2008365, 2008366
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2008379, 2008380, 2008381, 2008382
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2008379, 2008380, 2008381, 2008382
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2008363, 2008364, 2008365, 2008366
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2008363, 2008364, 2008365, 2008366
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2008367, 2008368, 2008369, 2008370
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2008367, 2008368, 2008369, 2008370
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2008367, 2008368, 2008369, 2008370
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2008367, 2008368, 2008369, 2008370
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2008371, 2008372, 2008373, 2008374
SM 2120 B / E31780	True Color measured at 450 nm	2008363, 2008364, 2008365, 2008366
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2008363, 2008364, 2008365, 2008366
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2008363, 2008364, 2008365, 2008366
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2008363, 2008364, 2008365, 2008366

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2008363, 2008364, 2008365, 2008366
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2008367, 2008368, 2008369, 2008370

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	07/18/2018			07/18/2018 16:18	William L. Brown IV	2008363, 2008364, 2008365, 2008366
EPA 200.7 Rev. 4.4	07/18/2018	07/18/2018 14:50	Elliott D. Healy	07/19/2018 12:50	Betina Topolski	2008382
	07/18/2018	07/18/2018 14:50	Elliott D. Healy	07/19/2018 16:37	Betina Topolski	2008379
	07/18/2018	07/18/2018 14:50	Elliott D. Healy	07/19/2018 16:43	Betina Topolski	2008380
	07/18/2018	07/18/2018 14:50	Elliott D. Healy	07/19/2018 16:49	Betina Topolski	2008381
EPA 200.8 Rev. 5.4	07/18/2018	07/18/2018 14:50	Elliott D. Healy	07/20/2018 15:13	Allison Taylor	2008382
	07/18/2018	07/18/2018 14:50	Elliott D. Healy	07/20/2018 19:24	Allison Taylor	2008379
	07/18/2018	07/18/2018 14:50	Elliott D. Healy	07/20/2018 19:33	Allison Taylor	2008380
	07/18/2018	07/18/2018 14:50	Elliott D. Healy	07/20/2018 19:43	Allison Taylor	2008381
	07/18/2018	07/24/2018 14:10	Elliott D. Healy	07/30/2018 11:27	Robert K Palmer	2008382
	07/18/2018	07/24/2018 14:10	Elliott D. Healy	07/30/2018 13:43	Robert K Palmer	2008379
	07/18/2018	07/24/2018 14:10	Elliott D. Healy	07/30/2018 13:49	Robert K Palmer	2008380
	07/18/2018	07/24/2018 14:10	Elliott D. Healy	07/30/2018 13:54	Robert K Palmer	2008381
EPA 300.0 Rev. 2.1	07/18/2018			07/23/2018 17:21	Lipi Saha	2008363
	07/18/2018			07/23/2018 17:57	Lipi Saha	2008364
	07/18/2018			07/23/2018 18:09	Lipi Saha	2008365
	07/18/2018			07/23/2018 18:21	Lipi Saha	2008366
EPA 350.1 Rev. 2.0	07/18/2018			07/24/2018 09:38	Ping Hua	2008368
	07/18/2018			07/24/2018 09:47	Ping Hua	2008369
	07/18/2018			07/24/2018 09:52	Ping Hua	2008367
	07/18/2018			07/24/2018 09:56	Ping Hua	2008370
EPA 351.2 Rev. 2.0	07/18/2018	07/20/2018 11:00	Adrian Shelby	07/23/2018 13:12	Joseph Suarez	2008367
	07/18/2018	07/20/2018 11:00	Adrian Shelby	07/23/2018 13:13	Joseph Suarez	2008368
	07/18/2018	07/20/2018 11:00	Adrian Shelby	07/23/2018 13:15	Joseph Suarez	2008369
	07/18/2018	07/20/2018 11:00	Adrian Shelby	07/23/2018 13:16	Joseph Suarez	2008370
EPA 353.2 Rev. 2.0	07/18/2018			07/19/2018 11:58	Lauren Bottorf	2008370
	07/18/2018			07/19/2018 12:01	Lauren Bottorf	2008367
	07/18/2018			07/19/2018 12:03	Lauren Bottorf	2008368
	07/18/2018			07/19/2018 12:04	Lauren Bottorf	2008369
EPA 365.1 Rev. 2.0	07/18/2018	07/23/2018 12:25	Sima Feizi	07/24/2018 08:07	Beverly Y. Sanders	2008367
	07/18/2018	07/23/2018 12:25	Sima Feizi	07/24/2018 08:08	Beverly Y. Sanders	2008368
	07/18/2018	07/23/2018 12:25	Sima Feizi	07/24/2018 08:09	Beverly Y. Sanders	2008369
	07/18/2018	07/23/2018 12:25	Sima Feizi	07/24/2018 10:57	Beverly Y. Sanders	2008370
EPA 365.1 Rev. 2.0 dissolved	07/18/2018			07/18/2018 15:34	Julia Storbeck	2008374
	07/18/2018			07/18/2018 15:48	Julia Storbeck	2008371
	07/18/2018			07/18/2018 15:49	Julia Storbeck	2008372
	07/18/2018			07/18/2018 15:50	Julia Storbeck	2008373
SM 2120 B	07/18/2018			07/18/2018 17:37	Tanya Welborn	2008366
	07/18/2018			07/18/2018 18:13	Tanya Welborn	2008363
	07/18/2018			07/18/2018 18:20	Tanya Welborn	2008364

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 2120 B	07/18/2018			07/18/2018 18:21	Tanya Welborn	2008365
SM 2320 B-97	07/18/2018			07/20/2018 03:47	Dale L. Simmons	2008363
	07/18/2018			07/20/2018 03:57	Dale L. Simmons	2008364
	07/18/2018			07/20/2018 04:07	Dale L. Simmons	2008365
	07/18/2018			07/20/2018 04:20	Dale L. Simmons	2008366
SM 2540 C-97	07/18/2018			07/20/2018 14:31	Yijie Li	2008363, 2008364, 2008365, 2008366
SM 2540 D-97	07/18/2018			07/20/2018 14:31	Yijie Li	2008363, 2008364, 2008365, 2008366
SM 4500 F-C-97	07/18/2018			07/20/2018 03:47	Dale L. Simmons	2008363
	07/18/2018			07/20/2018 03:57	Dale L. Simmons	2008364
	07/18/2018			07/20/2018 04:07	Dale L. Simmons	2008365
	07/18/2018			07/20/2018 04:20	Dale L. Simmons	2008366
SM 5310 B-00	07/18/2018			07/20/2018 04:32	Megan Treadwell	2008367
	07/18/2018			07/20/2018 05:56	Megan Treadwell	2008368
	07/18/2018			07/20/2018 06:10	Megan Treadwell	2008369
	07/18/2018			07/20/2018 06:24	Megan Treadwell	2008370