

Chemical Analysis Report

WAS-SECT-2018-04-19-02

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

Event Description: **Wakulla BMAP**
Request ID: **RQ-2018-04-16-17**
Customer: **WAS-SECT**
Project ID: **BMAP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Curtis Musson

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 10-MAY-2018 15:13

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored background.

Case Narrative

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

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

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 ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes	
1986212	EPA 180.1 Rev. 2.0	Turbidity	0.85		NTU	P343767	MS	
	EPA 300.0 Rev. 2.1	Chloride	8.4		mg Cl/L	P344011		
		Sulfate	10		mg SO4/L	P344013		
	SM 2120 B	Color (true)	70		PCU	P343788		
	SM 2320 B-97	Total Alkalinity	143	A	mg CaCO3/L	P344451		
	SM 2540 C-97	TDS	175	A	mg/L	P344144		
	SM 2540 D-97	TSS	2	UA	mg/L	P343916		
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P344455		
1986213	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P344180		
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.16	I	mg N/L	P343887		
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.39		mg N/L	P343943		
	EPA 365.1 Rev. 2.0	Total-P	0.028		mg P/L	P343920		
	SM 5310 B-00	Organic Carbon	1.4		mg C/L	P344204		
1986214	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.040		mg P/L	P343761		
1986218	EPA 8321B	2,4-D	0.0020	U	ug/L	P343718		
		Bentazon	8.0E-04	U	ug/L	P343718		
		MCP	0.0020	U	ug/L	P343718		
		Triclopyr**	0.0040	U	ug/L	P343718		
		Imidacloprid	0.0020	U	ug/L	P343718		
		Diuron	0.0020	U	ug/L	P343718		
		Pyraclostrobin**	0.0020	U	ug/L	P343718		
		Primidone**	0.0040	U	ug/L	P343718		
		Linuron	0.0040	U	ug/L	P343718		
		Acetaminophen**	0.0080	U	ug/L	P343718		
		Fenuron	0.0080	U	ug/L	P343718		
		Imazapyr**	0.0089	I	ug/L	P343718		
		Carbamazepine**	4.0E-04	U	ug/L	P343718		
		Fluridone**	4.9E-04	I	ug/L	P343718		
		Hydrocodone**	8.0E-04	U	ug/L	P343718		
		Sucralose**	0.10	U	ug/L	P343719		
		1986219	EPA 200.7 Rev. 4.4	Calcium	45.8		mg/L	P343891
				Iron	30	U	ug/L	P343891
				Magnesium	9.78		mg/L	P343891
				Potassium	0.55	I	mg/L	P343891
Sodium	5.2				mg/L	P343891		
Zinc	5.0			U	ug/L	P343891		
EPA 200.8 Rev. 5.4	Arsenic			0.63		ug/L	P343891	
	Cadmium		0.020	U	ug/L	P343891		
	Chromium		0.85	I	ug/L	P343891		
	Copper		0.20	U	ug/L	P343891		
	Lead		0.050	U	ug/L	P343891		
	Nickel		0.20	U	ug/L	P343891		
	Silver		0.010	U	ug/L	P343891		

Field ID: 34879

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
-----------	-------------	-----------	--------	------	-------	----------	----------

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Chloride: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

EPA 365.1 Rev. 2.0: Total-P: The result was confirmed on 05/03/2018.

EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: The sample was reanalyzed on 05/01/2018. The result was 0.025 Q mg P/L.

EPA 8321B: MS accuracy for imazapyr could not be assessed due to high concentration of parameter in the spiked sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P343767

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P343891

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: P343891

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
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P344011

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P344013

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344180

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343887

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343943

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343920

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343761

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

Reference Method: EPA 8321B
Batch ID: P343718

Component	Result	Code	Units
2,4-D	0.0020	U	ug/L
Acetaminophen	0.0080	U	ug/L
Bentazon	8.0E-04	U	ug/L
Carbamazepine	4.0E-04	U	ug/L
Diuron	0.0020	U	ug/L
Fenuron	0.0080	U	ug/L
Fluridone	4.0E-04	U	ug/L
Hydrocodone	8.0E-04	U	ug/L
Imazapyr	0.0040	U	ug/L
Imidacloprid	0.0020	U	ug/L
Linuron	0.0040	U	ug/L
MCP	0.0020	U	ug/L
Primidone	0.0040	U	ug/L
Pyraclostrobin	0.0020	U	ug/L
Triclopyr	0.0040	U	ug/L

Reference Method: EPA 8321B
Batch ID: P343719

Component	Result	Code	Units
Sucralose	0.10	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: SM 2120 B
 Batch ID: P343788

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
 Batch ID: P344451

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

Reference Method: SM 2540 C-97
 Batch ID: P344144

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
 Batch ID: P343916

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
 Batch ID: P344455

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
 Batch ID: P344204

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: P343891

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	106		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	99.9		P	85 - 115
Sodium	96.9		P	85 - 115
Zinc	98.0		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P343891

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	102		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343891

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cadmium	98.2		P	85 - 115
Chromium	95.0		P	85 - 115
Copper	98.3		P	85 - 115
Lead	96.5		P	85 - 115
Nickel	101		P	85 - 115
Silver	99.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P344011

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P344013

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344180

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343887

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343943

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343920

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343761

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P343718

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2,4-D	95.8		P	40 - 150
Acetaminophen	94.1		P	30 - 150
Bentazon	105		P	30 - 150
Carbamazepine	104		P	40 - 150
Diuron	83.2		P	40 - 150
Fenuron	112		P	40 - 150
Fluridone	90.0		P	40 - 150
Hydrocodone	107		P	40 - 150
Imazapyr	120		P	40 - 150
Imidacloprid	114		P	40 - 160
Linuron	98.9		P	40 - 150
MCPP	98.6		P	40 - 150
Primidone	105		P	40 - 150
Pyraclostrobin	84.1		P	40 - 150
Triclopyr	105		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P343719

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sucralose	88.0		P	40 - 150

Reference Method: SM 2320 B-97
Batch ID: P344451

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P344455

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.2		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P344204

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343891

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985957	Calcium	97.1		P	80 - 120
1985957	Iron	103		P	80 - 120
1985957	Magnesium	100		P	80 - 120
1985957	Potassium	95.5		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343891

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985957	Sodium	94.7		P	80 - 120
1985957	Zinc	97.0		P	80 - 120
1986219	Calcium	98.1		P	80 - 120
1986219	Iron	103	102	P/P	80 - 120
1986219	Magnesium	99.4		P	80 - 120
1986219	Potassium	97.2	95.4	P/P	80 - 120
1986219	Sodium	95.9		P	80 - 120
1986219	Zinc	93.8	96.6	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343891

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985957	Arsenic	103		P	80 - 120
1985957	Cadmium	102		P	80 - 120
1985957	Chromium	97.0		P	80 - 120
1985957	Copper	96.5		P	80 - 120
1985957	Lead	99.6		P	80 - 120
1985957	Nickel	99.1		P	80 - 120
1985957	Silver	99.2		P	80 - 120
1986219	Arsenic	102	103	P/P	80 - 120
1986219	Cadmium	103	102	P/P	80 - 120
1986219	Chromium	95.6	96.9	P/P	80 - 120
1986219	Copper	94.5	95.5	P/P	80 - 120
1986219	Lead	97.3	99.2	P/P	80 - 120
1986219	Nickel	97.4	98.7	P/P	80 - 120
1986219	Silver	98.8	100	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P344011

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986195	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P344013

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986195	Sulfate	97.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344180

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986275	Ammonia-N	103	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343887

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986213	Kjeldahl Nitrogen	104	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343943

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986171	NO2NO3-N	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343920

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986213	Total-P	102	99.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343761

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985972	O-Phosphate-P	98.1	98.9	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P343718

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985800	2,4-D	73.2	69.0	P/P	40 - 150
1985800	Acetaminophen	105	110	P/P	30 - 150
1985800	Bentazon	43.0	42.4	P/P	30 - 150
1985800	Carbamazepine	77.0	80.9	P/P	40 - 150
1985800	Diuron	69.8	69.4	P/P	40 - 150
1985800	Fenuron	75.8	78.8	P/P	40 - 150
1985800	Fluridone	74.5	76.3	P/P	40 - 150
1985800	Hydrocodone	108	114	P/P	40 - 150
1985800	Imidacloprid	193	201	F/F	40 - 160
1985800	Linuron	88.0	101	P/P	40 - 150
1985800	MCP	70.2	65.1	P/P	40 - 150
1985800	Primidone	91.2	101	P/P	40 - 150
1985800	Pyraclostrobin	80.2	81.6	P/P	40 - 150
1985800	Triclopyr	78.2	78.0	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P343719

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986060	Sucralose	46.4	49.1	P/P	40 - 150

Reference Method: SM 4500 F-C-97
Batch ID: P344455

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986212	Fluoride	96.2	95.6	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P344204

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986171	Organic Carbon	95.9	98.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P343767

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986169	Turbidity	2.85	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343891

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986219	Calcium	0.595	Spike	P	0 - 20
1986219	Iron	1.23	Spike	P	0 - 20
1986219	Magnesium	1.68	Spike	P	0 - 20
1986219	Potassium	1.56	Spike	P	0 - 20
1986219	Sodium	0.309	Spike	P	0 - 20
1986219	Zinc	2.93	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343891

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986219	Arsenic	1.04	Spike	P	0 - 20
1986219	Cadmium	0.628	Spike	P	0 - 20
1986219	Chromium	1.25	Spike	P	0 - 20
1986219	Copper	1.10	Spike	P	0 - 20
1986219	Lead	1.87	Spike	P	0 - 20
1986219	Nickel	1.25	Spike	P	0 - 20
1986219	Silver	1.68	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P344011

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986195	Chloride	1.21	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P344013

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986195	Sulfate	2.51	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344180

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986275	Ammonia-N	1.01	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986213	Kjeldahl Nitrogen	2.73	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343943

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986171	NO2NO3-N	0.343	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343920

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986213	Total-P	2.65	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343761

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985972	O-Phosphate-P	0.812	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P343718

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985800	2,4-D	4.35	Spike	P	0 - 30
1985800	Acetaminophen	4.74	Spike	P	0 - 30
1985800	Bentazon	0.982	Spike	P	0 - 30
1985800	Carbamazepine	4.92	Spike	P	0 - 30
1985800	Diuron	0.635	Spike	P	0 - 30
1985800	Fenuron	3.77	Spike	P	0 - 30
1985800	Fluridone	2.34	Spike	P	0 - 30
1985800	Hydrocodone	5.46	Spike	P	0 - 30
1985800	Imazapyr	1.13	Spike	P	0 - 30
1985800	Imidacloprid	3.76	Spike	P	0 - 30
1985800	Linuron	13.8	Spike	P	0 - 30
1985800	MCPP	7.45	Spike	P	0 - 30
1985800	Primidone	9.71	Spike	P	0 - 30
1985800	Pyraclostrobin	1.74	Spike	P	0 - 30
1985800	Triclopyr	0.270	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P343719

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986060	Sucralose	4.17	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: SM 2120 B
 Batch ID: P343788

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986166	Color (true)	1.18	Sample	P	0 - 20

Reference Method: SM 2320 B-97
 Batch ID: P344451

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986212	Total Alkalinity	0.229	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
 Batch ID: P344144

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986212	TDS	2.29	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P344455

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986212	Fluoride	0.476	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
 Batch ID: P344204

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986171	Organic Carbon	2.07	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 Surrogates

Lab Sample ID: 1986218
 Field Sample ID: 34879

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	2,4-D-d3	82.8	P	30 - 160
EPA 8321B	2,4-D-d3	82.8	P	30 - 160
EPA 8321B	Acetaminophen-d4	91.1	P	30 - 160
EPA 8321B	Acetaminophen-d4	91.1	P	30 - 160
EPA 8321B	Carbamazepine-d10	114	P	30 - 160
EPA 8321B	Carbamazepine-d10	114	P	30 - 160
EPA 8321B	Diuron-d6	75.5	P	30 - 160
EPA 8321B	Diuron-d6	75.5	P	30 - 160
EPA 8321B	Primidone-d5	107	P	30 - 160
EPA 8321B	Primidone-d5	107	P	30 - 160

Quality Assurance Report Surrogates

Lab Sample ID: 1986218
Field Sample ID: 34879

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Sucralose-d6	82.9	P	40 - 160
EPA 8321B	Sucralose-d6	82.9	P	40 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A83350
Included Lab Sample IDs: 1986214

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.5	98.1	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A83351
Included Lab Sample IDs: 1986212

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	99.0	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A83358
Included Lab Sample IDs: 1986212

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.6	100	P/P	90 - 115

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A83415
Included Lab Sample IDs: 1986212

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	106	102	P/P	90 - 110
Sulfate	104	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A83419
Included Lab Sample IDs: 1986213

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: A83423
Included Lab Sample IDs: 1986213

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.0	99.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A83432

Included Lab Sample IDs: 1986219

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	100	P/P	90 - 110
Cadmium	101	101	P/P	90 - 110
Chromium	98.6	98.5	P/P	90 - 110
Copper	98.8	98.3	P/P	90 - 110
Lead	98.6	98.8	P/P	90 - 110
Nickel	98.2	97.8	P/P	90 - 110
Silver	100	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A83433

Included Lab Sample IDs: 1986219

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	97.2	97.8	P/P	90 - 110
Iron	98.9	99.3	P/P	90 - 110
Magnesium	99.8	100	P/P	90 - 110
Potassium	94.6	94.4	P/P	90 - 110
Sodium	95.2	95.2	P/P	90 - 110
Zinc	97.0	99.4	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A83449

Included Lab Sample IDs: 1986218

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sucralose	71.2	84.3	P/P	60 - 150

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A83490

Included Lab Sample IDs: 1986213

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	98.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A83494

Included Lab Sample IDs: 1986213

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.3	99.2	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A83500

Included Lab Sample IDs: 1986213

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.6	98.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A83593
Included Lab Sample IDs: 1986212

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.4	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A83593
Included Lab Sample IDs: 1986212

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	98.1	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A83753
Included Lab Sample IDs: 1986218

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
2,4-D	102	105	P/P	50 - 150
Acetaminophen	107	102	P/P	60 - 150
Bentazon	136	140	P/P	50 - 150
Carbamazepine	117	116	P/P	60 - 150
Diuron	106	91.2	P/P	60 - 150
Fenuron	116	115	P/P	60 - 150
Fluridone	103	99.4	P/P	60 - 160
Hydrocodone	112	117	P/P	60 - 150
Imazapyr	116	117	P/P	50 - 150
Imidacloprid	108	108	P/P	60 - 150
Linuron	109	109	P/P	60 - 150
MCPP	106	105	P/P	50 - 150
Primidone	98.3	96.2	P/P	60 - 150
Pyraclostrobin	102	103	P/P	60 - 150
Triclopyr	115	108	P/P	50 - 160

* 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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					2.85	
EPA 200.7 Rev. 4.4	Calcium	101		97.1	98.1		0.595
	Iron	106		103	102		1.23
	Magnesium	102		100	99.4		1.68
	Potassium	99.9		95.5	97.2	95.4	1.56
	Sodium	96.9		94.7	95.9		0.309
	Zinc	98.0		97.0	93.8	96.6	2.93
EPA 200.8 Rev. 5.4	Arsenic	102		103	102	103	1.04
	Cadmium	98.2		102	103	102	0.628
	Chromium	95.0		97.0	95.6	96.9	1.25
	Copper	98.3		96.5	94.5	95.5	1.10

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 200.8 Rev. 5.4	Lead	96.5	99.6	97.3	99.2		1.87
	Nickel	101	99.1	97.4	98.7		1.25
	Silver	99.2	99.2	98.8	100		1.68
EPA 300.0 Rev. 2.1	Chloride	99.9	101			1.21	
	Sulfate	98.1	97.9			2.51	
EPA 350.1 Rev. 2.0	Ammonia-N	101	103	104			1.01
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	104	101			2.73
EPA 353.2 Rev. 2.0	NO2NO3-N	102	101				0.343
EPA 365.1 Rev. 2.0	Total-P	101	102	99.2			2.65
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	98.1	98.9			0.812
EPA 8321B	2,4-D	95.8	73.2	69.0			4.35
	Acetaminophen	94.1	105	110			4.74
	Bentazon	105	43.0	42.4			0.982
	Carbamazepine	104	77.0	80.9			4.92
	Diuron	83.2	69.8	69.4			0.635
	Fenuron	112	75.8	78.8			3.77
	Fluridone	90.0	74.5	76.3			2.34
	Hydrocodone	107	108	114			5.46
	Imazapyr	120					1.13
	Imidacloprid	114	193	201			3.76
	Linuron	98.9	88.0	101			13.8
	MCPP	98.6	70.2	65.1			7.45
	Primidone	105	91.2	101			9.71
	Pyraclostrobin	84.1	80.2	81.6			1.74
	Sucralose	88.0	46.4	49.1			4.17
	Triclopyr	105	78.2	78.0			0.270
SM 2120 B	Color (true)					1.18	
SM 2320 B-97	Total Alkalinity	102				0.229	
SM 2540 C-97	TDS					2.29	
SM 4500 F-C-97	Fluoride	95.2	96.2	95.6			0.476
SM 5310 B-00	Organic Carbon	95.8	95.9	98.0			2.07

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1986212
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1986219
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1986219
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1986212
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1986212
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1986213
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1986213
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1986213
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1986213
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1986214

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 8321B / E31780	Pesticides, herbicides, and other chemicals in water matrices by HPLC/MS/MS	1986218
SM 2120 B / E31780	True Color measured at 450 nm	1986212
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1986212
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1986212
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1986212
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1986212
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1986213

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	04/19/2018			04/19/2018 16:36	William L. Brown IV	1986212
EPA 200.7 Rev. 4.4	04/19/2018	04/23/2018 13:40	Elliott D. Healy	04/24/2018 15:13	Betina Topolski	1986219
EPA 200.8 Rev. 5.4	04/19/2018	04/23/2018 13:40	Elliott D. Healy	04/24/2018 17:57	Nadine Brooks	1986219
EPA 300.0 Rev. 2.1	04/19/2018			04/24/2018 16:25	Lipi Saha	1986212
EPA 350.1 Rev. 2.0	04/19/2018			04/25/2018 10:05	Ping Hua	1986213
EPA 351.2 Rev. 2.0	04/19/2018	04/23/2018 16:00	Adrian Shelby	04/25/2018 09:36	Joseph Suarez	1986213
EPA 353.2 Rev. 2.0	04/19/2018			04/24/2018 11:43	Lauren Bottorf	1986213
EPA 365.1 Rev. 2.0	04/19/2018	04/23/2018 13:56	Sima Feizi	04/24/2018 14:06	Beverly Y. Sanders	1986213
EPA 365.1 Rev. 2.0 dissolved	04/19/2018			04/19/2018 16:21	Megan Treadwell	1986214
EPA 8321B	04/19/2018	04/24/2018 10:00	Hoor Shaik	05/04/2018 08:33	Juyoung Kim	1986218
	04/19/2018	04/24/2018 10:00	Hoor Shaik	05/06/2018 15:19	Juyoung Kim	1986218
	04/19/2018	04/24/2018 15:30	Juyoung Kim	04/24/2018 21:08	Juyoung Kim	1986218
SM 2120 B	04/19/2018			04/20/2018 09:49	Tanya Welborn	1986212
SM 2320 B-97	04/19/2018			05/01/2018 19:53	Dale L. Simmons	1986212
SM 2540 C-97	04/19/2018			04/20/2018 18:00	William L. Brown IV	1986212
SM 2540 D-97	04/19/2018			04/20/2018 18:00	William L. Brown IV	1986212
SM 4500 F-C-97	04/19/2018			05/01/2018 19:45	Dale L. Simmons	1986212
SM 5310 B-00	04/19/2018			04/26/2018 00:48	Megan Treadwell	1986213