3800-FM-BPNP SM0485 Rev. 10/2013
Instructions

PA39-03724

WHOLE EFFLUENT TOXICITY (WET) TEST SUMMARY REPORT - COVER SHEET

NPDES Permit Number: **PA0039004** Facility Name: **Towamencin Municipal Authority**
Species Tested: *Ceriodaphnia dubia* _X ***Pimephales promelas*** Test Type: **X Chronic** __ Acute
Re-Test? ☐ Yes X No (If Yes, indicate the date of original test completion:)

SAMPLE INFORMATION

Date/Time	Sample Source	Temperature	Holding Time	Chlorine	Dechlorinated?
10/01/18, 0750	**Final effluent**	**4.0 °C**	**24 hours**	**0.01 mg/L**	__Yes _x_No
10/03/18, 0750	**Final effluent**	**4.0 °C**	**24 hours**	**0.00 mg/L**	__Yes _x_No
10/05/18, 0830	**Final effluent**	**4.0 °C**	**24 hours**	**0.02 mg/L**	__Yes _x_No

TEST CONDITIONS

Date/Time of Test Initiation **10/02/18, 1530** Date/Time of Test Termination **10/09/18, 1430**
X Renewal Test Non-Renewal Test Frequency of Renewals: **Daily**
Dilution Series: **24, 48, 72, 96, 100%** Target Instream Waste Concentration (TIWC): **96%**
Age of Organisms at Start of Test: **<30 hours**
Number of Replicates: **4** Number of Organisms per Replicate: **10**
Source of Organisms: **ABS, Inc.** Feeding Regimen: **Twice/day** *Artemia spp. nauplii*
Light Intensity: **50-100 foot-candles** Photoperiod: **16L-8D**
Temperature measurements made at least once per 24-hour period? **X Yes** Temperature Range: **24.7-25.9° C**
DO measured daily in at least one replicate of each concentration? **X Yes** (attach log sheet)
Were the chambers aerated? Yes **X** No Rate:
pH measured daily in at least one replicate of each concentration? **X Yes** (attach log sheet)
Were test acceptability criteria in the EPA method met? **X Yes** No
Were there any modifications to or deviations from EPA methods (if Yes, explain on separate sheet)? Yes **X No**

DILUTION / REAGENT WATER

USEPA moderately hard reconstituted water as per EPA-821-R-02-013 2002

Date of Last Test for Chemistry: **10/06/18** Conductivity: **263** µmhos/cm
pH: **8.0** TRC: **0** mg/L

CONTROL RESULTS

Pimephales promelas

Survival: **100 %**
Mean Dry Weight of Survivors (if applicable): **0.4340 mg**

REFERENCE TOXICITY TESTS

Date of most recent test: **10/02/18** Same conditions as test: **X Yes** No
Were test acceptability criteria in the EPA method met? **X Yes** No

TEST RESULTS

6. The permittee must report the results of each test endpoint that has a WET limit in Part A of this permit on the Discharge Monitoring Report (DMR). Test results shall be reported on the DMR in terms of acute or chronic Toxicity Units (TUa or TUc), where TUa is used for acute tests and TUc is used for chronic tests. If DEP's WET Analysis Spreadsheet indicates a passing result for an endpoint, report the value obtained from the expression "1/TIWC", which is equivalent to the permit limit. If the Spreadsheet indicates a failure, report the value obtained from the expression "> 1/TIWC". If a dilution higher than the TIWC dilution is used for the comparison with the control, report the value obtained from the expression "1/dilution". For example, an acute test endpoint failure at a TIWC dilution of 50% would be reported as "> 2.0 TUa" (1/0.5). Taken from PADEP SOP No. BPNPSM-PMT-031, page 11
Permit language varies, questions should be directed to the DEP's Bureau of Point and Non-Point Source Management at 717-787-2137 or your regional office.

Control compared to: **TIWC X**	Other:	Toxic Unit chronic (TUc): 100%/96%	**1.04 Survival**
Survival: **X Pass**	Reproduction: **X Pass**		**1.04 Growth**

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of the individuals personally responsible for obtaining the information, I believe the attached information is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine or imprisonment as provided by 18 Pa. C.S. §4904.

Christopher J. Nally		10/16/18	**39-03724**
Name of Laboratory Manager	Signature of Laboratory Manager	Date	DEP Lab ID No.

American Aquatic Testing, Incorporated – 890 North Graham Street – Allentown, PA 18109
www.AmericanAquatic.net

WHOLE EFFLUENT TOXICITY (WET) TEST SUMMARY REPORT

NPDES Permit Number: **PA0039004** Facility Name: **Towamencin Municipal Authority**
Species Tested: *Ceriodaphnia dubia* **X** ***Pimephales promelas*** Test Type: **X Chronic** __ Acute

TEST ENDPOINT SUMMARY

Test survival NOEC: **100 %**	Test growth NOEC: **100%**
Test survival IC_{25}: **>100%**	Test growth IC_{25}: **>100%**
PMSD Su: 3.2% (No limits established; EPA833-R-02-013)	PMSD: **18.3%** Growth
TUa: **1.0** (Toxic Unit acute; 100%/LC_{50})	PMSD acceptable (Acceptable range 12%-30%; EPA833-R-02-013)
48 hour LC_{50}: **>100%**	
NOEC – No Observed Effect Concentration	PMSD – Percent Minimum Significant Difference

SURVIVAL / GROWTH DATA SUMMARY

Concentration	Ave. % Survival	Ave. Weight - mg	C.V. % Weight
Control	100	0.4340	8.611
24%	100	0.4533	5.061
48%	92.5	0.4670	6.490
72%	100	0.5345	11.071
96%	100	0.4953	8.542
100%	97.5	0.5143	13.661

Statistics	Normality	Is data normal?	Homogeneity	Is data homogeneous?	Analysis
Survival	Shapiro-Wilk's	No	Bartlett's	No	Dunnett's
Growth	Shapiro-Wilk's	Yes	Bartlett's	Yes	Dunnett's

PHYSICAL CHEMISTRY SUMMARY

	Temp.	° C	pH	Std. Units	D. O.	ppm	Cond.	µmhos
CONC.	Min	Max	Min	Max	Min	Max	Min	Max
Control	See	See	7.9	8.1	6.6	8.4	263	276
24%			7.5	8.0	6.7	8.4		
48%	Raw	Raw	7.5	7.9	6.8	8.7		
72%			7.5	7.8	6.1	9.3		
96%	Data	Data	7.5	7.8	6.5	9.5		
100%			7.4	7.8	6.5	10.7	2114	2678

REFERENCE TEST

Reference toxicant: Potassium chloride

Test Start: **10/02/18, 1530** Test terminated: **10/09/18, 1430**

Control survival: **100%**

Test NOEC: **250** ppm (Growth) Test #816 on attached chart

Random mortality: **0%**

Results within + /- 2standard deviations? **Yes**

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Survival
TIWC (decimal)	0.96
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name

Towamencin

Permit No.

PA0039004

Test Completion Date 10/8/2018

Replicate No.	Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	1.000	1.000
Std Dev.	0.000	0.000
# Replicates	10	10

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail **PASS**

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Growth
TIWC (decimal)	0.96
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Towamencin

Permit No.: PA0039004

Test Completion Date: 10/9/2018

Replicate No.	Control	TIWC
1	0.39	0.509
2	0.481	0.549
3	0.428	0.464
4	0.437	0.459
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.434	0.495
Std Dev.	0.037	0.042
# Replicates	4	4

T-Test Result	6.6901
Deg. of Freedom	5
Critical T Value	0.7267
Pass or Fail	PASS

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Client/Toxicant: 414
Project Number: 01-02
Species: P. promelas

Beginning Date & Time: 10-2-18 1530
Ending Date & Time: 10-9-18 1430
Hatch Date: 10-1-18

Chronic Test
American Aquatic Testing, Inc.
Live Count

Conc.	Rep	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Control	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
24%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
48%	A	10	9'	9	9	9	9	9	9
	B	10	10	9'	9	9	9	9	9
	C	10	9'	9	9	9	9	9	9
	D	10	10	10	10	10	10	10	10
72%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
96%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
100%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	9'	9	9	9	9
	D	10	10	10	10	10	10	10	10
	A								
	B								
	C								
	D								
Initials		JO	EKH	EKH	EKH	JO	MJF	EKH	EKH
Date		10/2	10-3	10-4	10-5	10/6	10-7	10-8	10-9

Observations:

CHFHLC.wk3

Client/Toxicant: 414
Project Number: 01-02
Species: P. promelas

Beginning Date & Time: 10-2-18 1530
Ending Date & Time: 10-9-18 1430
Hatch Date: 10-1-18

Chronic Test

American Aquatic Testing, Inc.

Weight Data

QC 0.00764

% Conc.	Rep	Pan #	A weight of boat (g)	B weight of boat & fish (g)	(B−A)*1000=C dry weight of fish (mg)	D # of surviving fish	C/D mean dry weight (mg)	C/E IC_{25} & NOEC calc. weight (mg)
Control	A	1	0.00841	0.01231	3.90	10	0.390	0.390
	B	2	0.00748	0.01229	4.81	10	0.481	0.481
	C	3	0.00804	0.01232	4.28	10	0.428	0.428
	D	4	0.00722	0.01159	4.37	10	0.437	0.437
24	A	5	0.00720	0.01153	4.33	10		0.433
	B	6	0.00705	0.01175	4.70	10		0.470
	C	7	0.00636	0.01112	4.76	10		0.476
	D	8	0.00669	0.01103	4.34	10		0.434
48	A	9	0.00796	0.01262	4.66	9		0.466
	B	10	0.00730	0.01236	5.06	9		0.506
	C	11	0.00819	0.01251	4.32	9		0.432
	D	12	0.00739	0.01203	4.64	10		0.464
72	A	13	0.00737	0.01328	5.91	10		0.591
	B	14	0.00752	0.01240	4.88	10		0.488
	C	15	0.00648	0.01127	4.79	10		0.479
	D	16	0.00698	0.01278	5.80	10		0.580
96	A	17	0.00810	0.01319	5.09	10		0.509
	B	18	0.00699	0.01248	5.49	10		0.549
	C	19	0.00744	0.01208	4.64	10		0.464
	D	20	0.00686	0.01145	4.59	10		0.459
100	A	21	0.00675	0.01170	4.95	10		0.495
	B	22	0.00730	0.01235	5.05	10		0.505
	C	23	0.00676	0.01288	6.12	9		0.612
	D	24	0.00695	0.01140	4.45	10		0.445
	A							
	B							
	C							
	D							
	Initials		thd	thd	thd	EGH	thd	thd
	Date		10/5/18	10/10/18	10/10/18	10-9	10/10/18	10/10/18

QC 0.00764

QC 0.00764

E = Original number of organisms at test initiation, adjusted for losses.

Observations:

Date/Time In: 10-9-18 1430
Temp: 105

Date/Time Out: 10/10/18 5:00
Temp: 105

CHPHWT.wk3

Job Number: 414-01-02
Species: P. promelas

Start Date & Time: 10-2-18 1530
End Date & Time: 10-9-18 1430

Freshwater Chronic Test
American Aquatic Testing, Inc.
Phisical / Chemical Parameters

Initial Readings

Parameter	Concentration	Day 1	2	3	4	5	6	7	8
Dissolved Oxygen (mg/L)	Control	7.9	7.6	7.5	8.2	8.4	8.2	8.2	
	24%	8.1	7.8	7.7	8.4	8.4	8.3	8.2	
	48%	8.3	8.3	7.9	8.6	8.7	8.6	8.5	
	72%	8.8	8.8	8.7	9.0	9.1	9.3	9.0	
	96%	9.1	9.1	8.6	9.3	9.4	9.5	9.4	
	100%	9.8	8.3	9.1	9.8	10.0	10.7	10.6	
	—								
pH	Control	8.0	8.0	8.1	8.0	7.9 (1)	8.0	8.1	
	24%	7.8	7.5	7.7	8.0	7.9	7.9	8.0	
	48%	7.7	7.5	7.7	7.9	7.8	7.9	7.9	
	72%	7.6	7.5	7.6	7.7	7.7	7.7	7.8	
	96%	7.5	7.5	7.6	7.7	7.7	7.6	7.7	
	100%	7.4	7.4	7.6	7.6	7.6	7.5	7.6	
	—								
	Initials	MP	JK	JO	JO	JO	MJF	EKH	
	Date	10/2	10/3	10/4	10/5	10/6	10-7	10-8	

Conductivity (umhos/cm)		
Date	Control	100%
10/2	2776	2114
10/4	2728	2624
10/6	2763	2678

Alkalinity (mg/L as CaCO3)		
Date	Control	100%
10/2	50	70
10/4	60	80
10-6	60	100

Hardness (mg/L as CaCO3)		
Date	Control	100%
10/2	90	150
10/4	90	170
10-6	100	210
Initials	BR	BR

Final Readings

Parameter	Concentration	Day 1	2	3	4	5	6	7	8
Dissolved Oxygen (mg/L)	Control	7.3	6.6	7.1	7.2	7.2	6.8	6.7	
	24%	7.2	6.7	7.2	7.2	7.1	6.8	6.8	
	48%	7.3	6.8	7.3	7.3	7.1	6.8	6.9	
	72%	7.5	6.5	7.2	7.3	7.2	6.8	6.1	
	96%	7.5	6.5	7.1	7.2	7.1	6.9	6.6	
	100%	7.6	6.5	7.1	7.1	7.1	6.7	6.5	
	—								
pH	Control	7.9	8.0	7.9	7.9	7.9	7.9	7.9	
	24%	7.7	7.9	7.8	7.8	7.9	7.9	7.8	
	48%	7.7	7.8	7.8	7.8	7.8	7.8	7.8	
	72%	7.7	7.8	7.8	7.7	7.8	7.8	7.7	
	96%	7.7	7.8	7.8	7.7	7.8	7.8	7.7	
	100%	7.7	7.7	7.8	7.7	7.7	7.7	7.7	
	—								
	Initials	MP	EKH	JO	MJF	MJF	EKH	BR	
	Date	10/3	10-4	10/5	10-6	10-7	10-8	10/9	

Chlorine (mg/L)		
Date	Control	100%
10/2	0.00	0.01
10/4	0.00	0.00
10-6	0.00	0.02

NaSO4 added (mg/L)		
Date	Control	100%
Initials	BR	BR

Observations: (1) 8.0 - JO 10/6

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	10/2/2018	Test ID:	4140102ppc	Sample ID:	Towamencin
End Date:	10/9/2018	Lab ID:	AAT, INC	Sample Type:	COMPOSITE
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:					

Conc-%	1	2	3	4
Control	1.0000	1.0000	1.0000	1.0000
24	1.0000	1.0000	1.0000	1.0000
48	0.9000	0.9000	0.9000	1.0000
72	1.0000	1.0000	1.0000	1.0000
96	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	0.9000	1.0000

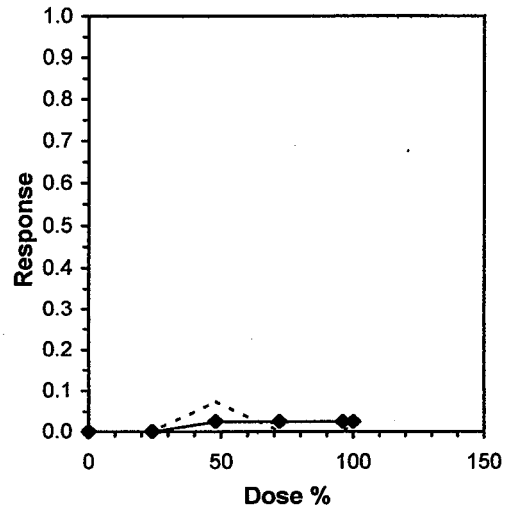
			Transform: Arcsin Square Root						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4				1.0000	1.0000
24	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	0.000	2.410	0.0802	1.0000	1.0000
*48	0.9250	0.9250	1.2898	1.2490	1.4120	6.318	4	3.674	2.410	0.0802	0.9750	0.9750
72	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	0.000	2.410	0.0802	0.9750	0.9750
96	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	0.000	2.410	0.0802	0.9750	0.9750
100	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	1.225	2.410	0.0802	0.9750	0.9750

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.75445	0.916	5.2E-15	5.27706
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.03102	0.03181	0.00974	0.00221	0.00858	5, 18
Treatments vs Control										

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



ToxCalc v5.0.23

Reviewed by: ER

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	10/2/2018	Test ID:	4140102ppc	Sample ID:	Towamencin
End Date:	10/9/2018	Lab ID:	AAT, INC	Sample Type:	COMPOSITE
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:					

Conc-%	1	2	3	4
Control	0.3900	0.4810	0.4280	0.4370
24	0.4330	0.4700	0.4760	0.4340
48	0.4660	0.5060	0.4320	0.4640
72	0.5910	0.4880	0.4790	0.5800
96	0.5090	0.5490	0.4640	0.4590
100	0.4950	0.5050	0.6120	0.4450

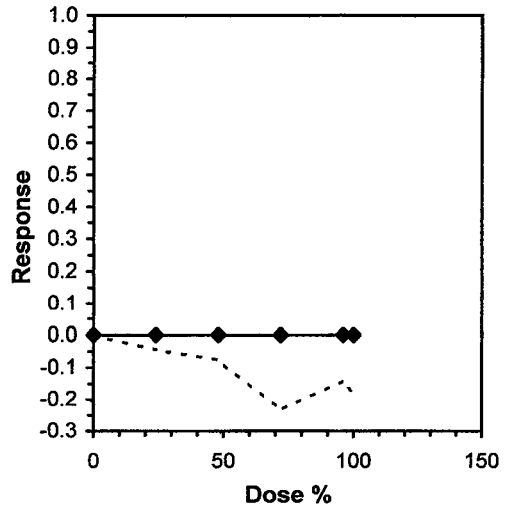
			Transform: Untransformed						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	0.4340	1.0000	0.4340	0.3900	0.4810	8.611	4				0.4830	1.0000
24	0.4533	1.0444	0.4533	0.4330	0.4760	5.061	4	-0.583	2.410	0.0795	0.4830	1.0000
48	0.4670	1.0760	0.4670	0.4320	0.5060	6.490	4	-1.000	2.410	0.0795	0.4830	1.0000
72	0.5345	1.2316	0.5345	0.4790	0.5910	11.071	4	-3.045	2.410	0.0795	0.4830	1.0000
96	0.4953	1.1411	0.4953	0.4590	0.5490	8.542	4	-1.856	2.410	0.0795	0.4830	1.0000
100	0.5143	1.1849	0.5143	0.4450	0.6120	13.661	4	-2.432	2.410	0.0795	0.4830	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97233	0.916	0.48032	-0.185
Bartlett's Test indicates equal variances (p = 0.50)	4.33327	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.07953	0.18325	0.00586	0.00218	0.05518	5, 18
Treatments vs Control										

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



ToxCalc v5.0.23

Reviewed by: ER

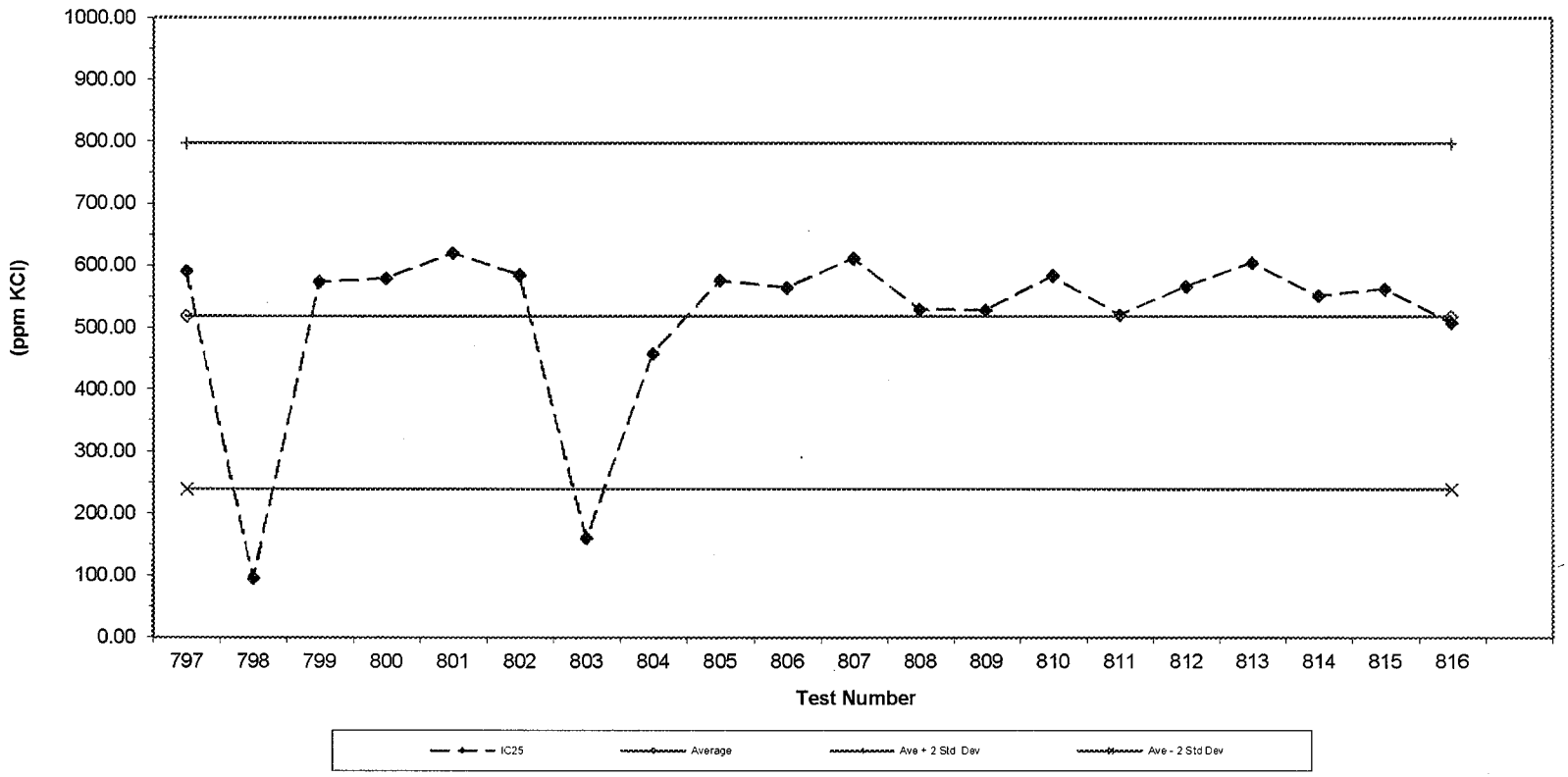
CHRONIC 1 10/02 to 09/18

Date Time	Temp (C)	Date Time	Temp (C)	Date Time	Temp (C)	Date Time	Temp (C)	Date Time	Temp (C)
10/2/18 10:22	25.22	10/4/18 2:22	25.11	10/5/18 18:22	25.33	10/7/18 10:22	25.11	10/9/18 2:22	25.17
10/2/18 10:52	25.28	10/4/18 2:52	25.11	10/5/18 18:52	25.28	10/7/18 10:52	25.17	10/9/18 2:52	25.11
10/2/18 11:22	25.28	10/4/18 3:22	25.06	10/5/18 19:22	25.22	10/7/18 11:22	25.22	10/9/18 3:22	25.06
10/2/18 11:52	25.33	10/4/18 3:52	25.06	10/5/18 19:52	25.22	10/7/18 11:52	25.33	10/9/18 3:52	25.06
10/2/18 12:22	25.44	10/4/18 4:22	25	10/5/18 20:22	25.17	10/7/18 12:22	25.39	10/9/18 4:22	25
10/2/18 12:52	25.56	10/4/18 4:52	24.94	10/5/18 20:52	25.11	10/7/18 12:52	25.44	10/9/18 4:52	25
10/2/18 13:22	25.56	10/4/18 5:22	24.94	10/5/18 21:22	25.11	10/7/18 13:22	25.5	10/9/18 5:22	24.94
10/2/18 13:52	25.56	10/4/18 5:52	24.89	10/5/18 21:52	25.06	10/7/18 13:52	25.56	10/9/18 5:52	24.94
10/2/18 14:22	25.56	10/4/18 6:22	24.89	10/5/18 22:22	25.06	10/7/18 14:22	25.61	10/9/18 6:22	24.89
10/2/18 14:52	25.61	10/4/18 6:52	24.83	10/5/18 22:52	25.06	10/7/18 14:52	25.72	10/9/18 6:52	24.94
10/2/18 15:22	25.61	10/4/18 7:22	24.78	10/5/18 23:22	25	10/7/18 15:22	25.78	10/9/18 7:22	24.94
10/2/18 15:52	25.67	10/4/18 7:52	24.78	10/5/18 23:52	24.94	10/7/18 15:52	25.89	10/9/18 7:52	24.94
10/2/18 16:22	25.67	10/4/18 8:22	24.78	10/6/18 0:22	24.94	10/7/18 16:22	25.94	10/9/18 8:22	24.94
10/2/18 16:52	25.67	10/4/18 8:52	24.78	10/6/18 0:52	24.89	10/7/18 16:52	26	10/9/18 8:52	24.94
10/2/18 17:22	25.67	10/4/18 9:22	24.72	10/6/18 1:22	24.89	10/7/18 17:22	25.94	10/9/18 9:22	24.94
10/2/18 17:52	25.72	10/4/18 9:52	24.78	10/6/18 1:52	24.89	10/7/18 17:52	25.94	10/9/18 9:52	24.94
10/2/18 18:22	25.78	10/4/18 10:22	24.83	10/6/18 2:22	24.83	10/7/18 18:22	25.89	10/9/18 10:22	25
10/2/18 18:52	25.78	10/4/18 10:52	24.89	10/6/18 2:52	24.83	10/7/18 18:52	25.83	10/9/18 10:52	25.06
10/2/18 19:22	25.72	10/4/18 11:22	24.94	10/6/18 3:22	24.78	10/7/18 19:22	25.78	10/9/18 11:22	25.11
10/2/18 19:52	25.67	10/4/18 11:52	25.06	10/6/18 3:52	24.78	10/7/18 19:52	25.72	10/9/18 11:52	25.17
10/2/18 20:22	25.67	10/4/18 12:22	25.17	10/6/18 4:22	24.78	10/7/18 20:22	25.67	10/9/18 12:22	25.22
10/2/18 20:52	25.61	10/4/18 12:52	25.33	10/6/18 4:52	24.78	10/7/18 20:52	25.61	10/9/18 12:52	25.28
10/2/18 21:22	25.61	10/4/18 13:22	25.39	10/6/18 5:22	24.78	10/7/18 21:22	25.61	10/9/18 13:22	25.33
10/2/18 21:52	25.56	10/4/18 13:52	25.44	10/6/18 5:52	24.72	10/7/18 21:52	25.56	10/9/18 13:52	25.33
10/2/18 22:22	25.5	10/4/18 14:22	25.5	10/6/18 6:22	24.72	10/7/18 22:22	25.56	10/9/18 14:22	25.33
10/2/18 22:52	25.5	10/4/18 14:52	25.44	10/6/18 6:52	24.72	10/7/18 22:52	25.5	10/9/18 14:52	25.44
10/2/18 23:22	25.5	10/4/18 15:22	25.44	10/6/18 7:22	24.72	10/7/18 23:22	25.5	10/9/18 15:22	25.5
10/2/18 23:52	25.44	10/4/18 15:52	25.44	10/6/18 7:52	24.72	10/7/18 23:52	25.5	10/9/18 15:52	25.56
10/3/18 0:22	25.44	10/4/18 16:22	25.44	10/6/18 8:22	24.72	10/8/18 0:22	25.5	10/9/18 16:22	25.67
10/3/18 0:52	25.39	10/4/18 16:52	25.39	10/6/18 8:52	24.78	10/8/18 0:52	25.44	10/9/18 16:52	25.72
10/3/18 1:22	25.39	10/4/18 17:22	25.39	10/6/18 9:22	24.83	10/8/18 1:22	25.44		
10/3/18 1:52	25.33	10/4/18 17:52	25.33	10/6/18 9:52	24.94	10/8/18 1:52	25.44		
10/3/18 2:22	25.33	10/4/18 18:22	25.33	10/6/18 10:22	25.06	10/8/18 2:22	25.39		
10/3/18 2:52	25.33	10/4/18 18:52	25.28	10/6/18 10:52	25.11	10/8/18 2:52	25.39		
10/3/18 3:22	25.28	10/4/18 19:22	25.28	10/6/18 11:22	25.22	10/8/18 3:22	25.39		
10/3/18 3:52	25.28	10/4/18 19:52	25.28	10/6/18 11:52	25.28	10/8/18 3:52	25.33		
10/3/18 4:22	25.22	10/4/18 20:22	25.28	10/6/18 12:22	25.33	10/8/18 4:22	25.33		
10/3/18 4:52	25.22	10/4/18 20:52	25.28	10/6/18 12:52	25.39	10/8/18 4:52	25.33		
10/3/18 5:22	25.22	10/4/18 21:22	25.28	10/6/18 13:22	25.5	10/8/18 5:22	25.33		
10/3/18 5:52	25.17	10/4/18 21:52	25.28	10/6/18 13:52	25.56	10/8/18 5:52	25.33		
10/3/18 6:22	25.17	10/4/18 22:22	25.22	10/6/18 14:22	25.56	10/8/18 6:22	25.28		
10/3/18 6:52	25.17	10/4/18 22:52	25.22	10/6/18 14:52	25.56	10/8/18 6:52	25.28		
10/3/18 7:22	25.11	10/4/18 23:22	25.22	10/6/18 15:22	25.5	10/8/18 7:22	25.28		
10/3/18 7:52	25.11	10/4/18 23:52	25.22	10/6/18 15:52	25.44	10/8/18 7:52	25.28		
10/3/18 8:22	25.11	10/5/18 0:22	25.22	10/6/18 16:22	25.39	10/8/18 8:22	25.22		
10/3/18 8:52	25.11	10/5/18 0:52	25.22	10/6/18 16:52	25.28	10/8/18 8:52	25.22		
10/3/18 9:22	25.11	10/5/18 1:22	25.17	10/6/18 17:22	25.22	10/8/18 9:22	25.22		
10/3/18 9:52	24.89	10/5/18 1:52	25.17	10/6/18 17:52	25.17	10/8/18 9:52	25.22		
10/3/18 10:22	25.17	10/5/18 2:22	25.17	10/6/18 18:22	25.17	10/8/18 10:22	25.22		
10/3/18 10:52	25.22	10/5/18 2:52	25.11	10/6/18 18:52	25.11	10/8/18 10:52	25.28		
10/3/18 11:22	25.28	10/5/18 3:22	25.11	10/6/18 19:22	25.06	10/8/18 11:22	25.39		
10/3/18 11:52	25.39	10/5/18 3:52	25.11	10/6/18 19:52	25.06	10/8/18 11:52	25.5		
10/3/18 12:22	25.44	10/5/18 4:22	25.06	10/6/18 20:22	25	10/8/18 12:22	25.56		
10/3/18 12:52	25.56	10/5/18 4:52	25.06	10/6/18 20:52	24.94	10/8/18 12:52	25.61		
10/3/18 13:22	25.61	10/5/18 5:22	25.06	10/6/18 21:22	24.94	10/8/18 13:22	25.61		
10/3/18 13:52	25.61	10/5/18 5:52	25	10/6/18 21:52	24.94	10/8/18 13:52	25.61		
10/3/18 14:22	25.61	10/5/18 6:22	24.94	10/6/18 22:22	24.89	10/8/18 14:22	25.61		
10/3/18 14:52	25.56	10/5/18 6:52	24.94	10/6/18 22:52	24.89	10/8/18 14:52	25.72		
10/3/18 15:22	25.5	10/5/18 7:22	24.89	10/6/18 23:22	24.83	10/8/18 15:22	25.78		
10/3/18 15:52	25.44	10/5/18 7:52	24.89	10/6/18 23:52	24.83	10/8/18 15:52	25.89		
10/3/18 16:22	25.44	10/5/18 8:22	24.89	10/7/18 0:22	24.83	10/8/18 16:22	25.83		
10/3/18 16:52	25.33	10/5/18 8:52	24.83	10/7/18 0:52	24.83	10/8/18 16:52	25.89		
10/3/18 17:22	25.33	10/5/18 9:22	24.83	10/7/18 1:22	24.78	10/8/18 17:22	25.89		
10/3/18 17:52	25.33	10/5/18 9:52	24.89	10/7/18 1:52	24.78	10/8/18 17:52	25.89		
10/3/18 18:22	25.33	10/5/18 10:22	24.94	10/7/18 2:22	24.78	10/8/18 18:22	25.89		
10/3/18 18:52	25.28	10/5/18 10:52	25.06	10/7/18 2:52	24.78	10/8/18 18:52	25.78		
10/3/18 19:22	25.28	10/5/18 11:22	25.11	10/7/18 3:22	24.78	10/8/18 19:22	25.72		
10/3/18 19:52	25.28	10/5/18 11:52	25.22	10/7/18 3:52	24.72	10/8/18 19:52	25.67		
10/3/18 20:22	25.28	10/5/18 12:22	25.33	10/7/18 4:22	24.72	10/8/18 20:22	25.61		
10/3/18 20:52	25.28	10/5/18 12:52	25.44	10/7/18 4:52	24.72	10/8/18 20:52	25.56		
10/3/18 21:22	25.22	10/5/18 13:22	25.5	10/7/18 5:22	24.72	10/8/18 21:22	25.5		
10/3/18 21:52	25.22	10/5/18 13:52	25.44	10/7/18 5:52	24.72	10/8/18 21:52	25.44		
10/3/18 22:22	25.22	10/5/18 14:22	25.5	10/7/18 6:22	24.72	10/8/18 22:22	25.39		
10/3/18 22:52	25.22	10/5/18 14:52	25.56	10/7/18 6:52	24.72	10/8/18 22:52	25.39		
10/3/18 23:22	25.22	10/5/18 15:22	25.61	10/7/18 7:22	24.72	10/8/18 23:22	25.33		
10/3/18 23:52	25.22	10/5/18 15:52	25.61	10/7/18 7:52	24.78	10/8/18 23:52	25.33		
10/4/18 0:22	25.17	10/5/18 16:22	25.56	10/7/18 8:22	24.78	10/9/18 0:22	25.28		
10/4/18 0:52	25.17	10/5/18 16:52	25.5	10/7/18 8:52	24.89	10/9/18 0:52	25.22		
10/4/18 1:22	25.17	10/5/18 17:22	25.44	10/7/18 9:22	24.94	10/9/18 1:22	25.22		
10/4/18 1:52	25.17	10/5/18 17:52	25.39	10/7/18 9:52	25	10/9/18 1:52	25.17		

Quality Control Chart *Pimephales promelas*

IC_{25}

American Aquatic Testing, Inc. - Chronic Toxicity
Chart date: 10/11/18 Chart: #793



AMERICAN AQUATIC TESTING, INC.
890 North Graham St
Allentown, Pa 18109
610-434-9015

CHAIN OF CUSTODY

Job# 414-01-02
Client Towamencin
Address Landsdale, PA
Phone #

Contact Henry Stepnowski
Sample Disposal: Return to Client ( ) Lab disposal (X)

Sample #	Initial Chemistry Upon Arrival @ AAT: Temp °C	Dis O2 ppm	pH Std Unit	Alk. mg/L	Hard mg/L	Cl- mg/L	SAMPLE INFORMATION: Sample ID	Sample Type	Sample Volume	Sample Date	Sample Time	Tox Testing Req'd: Acute	Chronic	Sediment
01	4.0						Final	24 hr. comp	4 gals	9/30-10/1/18	0750-0750		✓	
02	4.0						Final	24 hr. comp	4 gals	10/2-3/18	0750-0750		✓	
03	4.0						Final	24 hr. comp	5 gals	10/4-5/18	0830-0830		✓	

Sample collected by: AAT personnel ( ) Client personnel (X)
Sample Rec'd on ice: (YES) NO N/A
Sample rec'd w/in hold. Time?: (YES) NO N/A
Sample container intact?: (YES) NO N/A
Correct vol. for testing received?: (YES) NO N/A

Sample #	Relinquished by:	Received by	Date	Time	Relinquished by:	Received by	Date	Time	Lab ISTN
01	[signature]	[signature]	10/1/18	10:35AM	[signature]	[signature]	10/1/18	1230	182212
02	[signature]	[signature]	10/3/18	1000	[signature]	[signature]	10/3/18	1145	182233
03	[signature]	[signature]	10/5/18	0955	[signature]	[signature]	10/5/18	1150	182250

Special Instructions:

Dilution Water Collection Date(s): N/A

Will ammonia be analyzed on these samples? YES (NO)

Will additional parameters be analyzed on these samples? YES (NO)

3800-FM-BPNP SM0485 Rev. 10/2013
Instructions

PA39-03724

WHOLE EFFLUENT TOXICITY (WET) TEST SUMMARY REPORT - COVER SHEET

NPDES Permit Number: **PA0039004** Facility Name: **Towamencin Municipal Authority**
Species Tested: **X** ***Ceriodaphnia dubia*** _ *Pimephales promelas* Test Type: **X Chronic** __ Acute
Re-Test? ☐ Yes X No (If Yes, indicate the date of original test completion:)

SAMPLE INFORMATION

Date/Time	Sample Source	Temperature	Holding Time	Chlorine	Dechlorinated?
10/01/18, 0750	**Final effluent**	**4.0 °C**	**24 hours**	**0.01 mg/L**	**Yes x No**
10/03/18, 0750	**Final effluent**	**4.0 °C**	**24 hours**	**0.00 mg/L**	**Yes x No**
10/15/18, 0830	**Final effluent**	**4.0 °C**	**24 hours**	**0.02 mg/L**	**Yes x No**

TEST CONDITIONS

Date/Time of Test Initiation **10/02/18, 1430** Date/Time of Test Termination **10/08/18, 1530**
X Renewal Test Non-Renewal Test Frequency of Renewals: **Daily**
Dilution Series: **24, 48, 72, 96, 100%** Target Instream Waste Concentration (TIWC): **96%**
Age of Organisms at Start of Test: **<24 hours**
Number of Replicates: **10** Number of Organisms per Replicate: **1**
Source of Organisms: **In-house cultures** Feeding Regimen: **Once/day** *Selenastrum capricornutum* & YWT, at test exchange
Light Intensity: **50-100 foot-candles** Photoperiod: **16L-8D**
Temperature measurements made at least once per 24-hour period? **X Yes** Temperature Range: **24.7-25.9° C**
DO measured daily in at least one replicate of each concentration? **X Yes** (attach log sheet)
Were the chambers aerated? Yes **X** No Rate:
pH measured daily in at least one replicate of each concentration? **X Yes** (attach log sheet)
Were test acceptability criteria in the EPA method met? **X Yes** No
Were there any modifications to or deviations from EPA methods (if Yes, explain on separate sheet)? Yes **X No**

DILUTION / REAGENT WATER

USEPA moderately hard reconstituted water as per EPA-821-R-02-013 2002

Date of Last Test for Chemistry: **10/06/18** Conductivity: **263** µmhos/cm
pH: **8.0** TRC: **0** mg/L

CONTROL RESULTS

Ceriodaphnia dubia

Survival: **100 %**
Percent that produced 3 broods (if applicable): **90 %** Young per Surviving Female (if applicable): **26.9**

REFERENCE TOXICITY TESTS

Date of most recent test: **10/03/18** Same conditions as test: **X Yes** No
Were test acceptability criteria in the EPA method met? **X Yes** No

TEST RESULTS

6. The permittee must report the results of each test endpoint that has a WET limit in Part A of this permit on the Discharge Monitoring Report (DMR). Test results shall be reported on the DMR in terms of acute or chronic Toxicity Units (TUa or TUc), where TUa is used for acute tests and TUc is used for chronic tests. If DEP's WET Analysis Spreadsheet indicates a passing result for an endpoint, report the value obtained from the expression "1/TIWC", which is equivalent to the permit limit. If the Spreadsheet indicates a failure, report the value obtained from the expression "> 1/TIWC". If a dilution higher than the TIWC dilution is used for the comparison with the control, report the value obtained from the expression "1/dilution". For example, an acute test endpoint failure at a TIWC dilution of 50% would be reported as "> 2.0 TUa" (1/0.5). Taken from PADEP SOP No. BPNPSM-PMT-031, page 11
Permit language varies, questions should be directed to the DEP's Bureau of Point and Non-Point Source Management at 717-787-2137 or your regional office.

Control compared to: **TIWC X**	Other:	Toxic Unit chronic (TUc): 100%/96%	**1.04 Survival**
Survival: **X Pass**	Reproduction: **X Pass**		**1.04 Reproduction**

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of the individuals personally responsible for obtaining the information, I believe the attached information is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine or imprisonment as provided by 18 Pa. C.S. §4904.

Christopher J. Nally		10/16/18	**39-03724**
Name of Laboratory Manager	Signature of Laboratory Manager	Date	DEP Lab ID No.

WHOLE EFFLUENT TOXICITY (WET) TEST SUMMARY REPORT

NPDES Permit Number: **PA0039004** Facility Name: **Towamencin Municipal Authority**

Species Tested: **X** ***Ceriodaphnia dubia*** _ *Pimephales promelas* Test Type: **X Chronic** __ Acute

TEST ENDPOINT SUMMARY

Test survival NOEC: **100 %**	Test reproduction NOEC: **100%**
Test survival IC_{25}: **>100%**	Test reproduction IC_{25}: **>100%**
PMSD Su: N/A (No limits established; EPA833-R-02-013)	PMSD: **16.9%** Reproduction
TUa: **1.0** (Toxic Unit acute; 100%/LC_{50})	PMSD acceptable (Acceptable range 13%-47%; EPA833-R-02-013)
48 hour LC_{50}: **>100%**	
NOEC – No Observed Effect Concentration	PMSD – Percent Minimum Significant Difference

REPRODUCTION DATA SUMMARY

Concentration	Minimum	Average/Female	C.V. %
Control	21	26.9	13.959
24%	26	30.0	9.686
48%	27	31.6	8.976
72%	15	29.7	19.572
96%	14	25.9	19.215
100%	13	26.0	20.672

Statistics	**Normality**	**Is data normal?**	**Homogeneity**	**Is data homogeneous?**	**Analysis**
Survival	Kolmogorov D	N/A	Bartlett's	N/A	Fisher's Exact
Reproduction	Kolmogorov D	No	Bartlett's	Yes	Dunnett's

PHYSICAL CHEMISTRY SUMMARY

	Temp.	**° C**	**pH**	**Std. Units**	**D. O.**	**ppm**	**Cond.**	**µmhos**
CONC.	Min	Max	Min	Max	Min	Max	Min	Max
Control	See	See	7.9	8.3	6.5	8.4	263	276
24%	Raw	Raw	7.5	8.3	6.5	8.4		
48%			7.5	8.3	6.5	8.7		
72%	Data	Data	7.5	8.3	6.6	9.3		
96%			7.5	8.4	6.6	9.5		
100%			7.4	8.4	6.6	10.7	2114	2678

REFERENCE TEST

Reference toxicant: Potassium chloride

Test Start: **10/03/18, 1430** Test terminated: **10/09/18, 1745**

Control survival: **100%**

Test NOEC: **250** ppm (Reproduction) Test #259 on attached chart

Random mortality: **0%**

Results within + /- 2standard deviations? **Yes**

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Survival
TIWC (decimal)	0.96
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Towamencin

Permit No.: PA0039004

Test Completion Date: 10/8/2018

Replicate No.	Control	TIWC
1	10	10
2	10	10
3	10	10
4	10	10
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	10.000	10.000
Std Dev.	0.000	0.000
# Replicates	4	4

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail: PASS

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Reproduction
TIWC (decimal)	0.96
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name: Towamencin

Permit No.: PA0039004

Test Completion Date: 10/8/2018

Replicate No.	Control	TIWC
1	28	24
2	21	27
3	24	14
4	30	28
5	30	28
6	30	30
7	31	22
8	24	29
9	29	26
10	22	31
11		
12		
13		
14		
15		
Mean	26.900	25.900
Std Dev.	3.755	4.977
# Replicates	10	10

T-Test Result	3.1660
Deg. of Freedom	15
Critical T Value	0.8662
Pass or Fail	PASS

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Project # 414-01-02

Beginning Date/Time: 10-2-18 1430
Ending Date/Time: 10-8-18 1530

Ceriodaphnia dubia Survival and Reproduction Test
American Aquatic Testing, Inc.
Survival/Reproduction Date

Day	Conc. Control		Replicate 1		2		3		4		5		6		7		8		9		10		Init
1	N	B	0		0		0		0		0		0		0		0		0		0		JK
2	N	B	0		0		0		0		0		0		0		0		0		0		JO
3	N	B	4	1	0		3	1	0		6	1	4	1	4	1	3	1	5	1	0		JO
4	N	B	0		7	1	0		5	1	0		0		0		0		0		4	1	JO
5	N	B	7	2	0		6	2	7	2	9	2	10	2	9	2	7	2	8	2	7	2	MF
6	N	B	17	3	14	2	15	3	18	3	15	3	16	3	18	3	14	3	16	3	11	3	TP
7	N	B																					
8	N	B																					
	Tot N	Tot B	28	3	21	2	24	3	30	3	30	3	30	3	31	3	24	3	29	3	22	3	Tot A

Average Neonates / Female = 26.9 % Females with 3rd Brood = 90 10

Day	Conc. 24%		Replicate 1		2		3		4		5		6		7		8		9		10		Init
1	N	B	0		0		0		0		0		0		0		0		0		0		JK
2	N	B	0		0		0		0		0		0		0		0		0		0		JO
3	N	B	5	1	0		4	1	0		5	1	6	1	5	1	4	1	5	1	0		JO
4	N	B	0		6	1	0		4	1	0		0		0		0		0		6	1	JO
5	N	B	7	2	12	2	9	2	8	2	9	2	10	2	12	2	10	2	12	2	11	2	MF
6	N	B	16	3	18	3	15	3	14	3	17	3	16	3	14	3	16	3	14	3	10	3	TP
7	N	B																					
8	N	B																					
	Tot N	Tot B	28	3	36	3	28	3	26	3	31	3	32	3	31	3	30	3	31	3	27	3	Tot A

Average Neonates / Female = 30.0 % Females with 3rd Brood = 100 10

Day	Conc. 48%		Replicate 1		2		3		4		5		6		7		8		9		10		Init
1	N	B	0		0		0		0		0		0		0		0		0		0		JK
2	N	B	0		0		0		0		0		0		0		0		0		0		JO
3	N	B	5	1	0		6	1	0		4	1	6	1	5	1	4	1	5	1	0		JO
4	N	B	0		4	1	0		4	1	0		0		0		0		0		5	1	JO
5	N	B	8	2	11	2	11	2	8	2	11	2	10	2	8	2	12	2	12	2	8	2	MF
6	N	B	16	3	19	3	20	3	18	3	15	3	14	3	14	3	17	3	15	3	18	3	TP
7	N	B																					
8	N	B																					
	Tot N	Tot B	29	3	34	3	37	3	33	3	30	3	30	3	27	3	33	3	32	3	31	3	Tot A

Average Neonates / Female = 31.6 % Females with 3rd Brood = 100 10

(N= neonates, B=brood, A= Alive)

Observations

Project # 414-01-02

Beginning Date/Time: 10-2-18 1430
Ending Date/Time: 10-8-18 1530

Ceriodaphnia dubia Survival and Reproduction Test

American Aquatic Testing, Inc.

Survival/Reproduction Date

Day	Conc. 72%		Replicate 1		2		3		4		5		6		7		8		9		10		Init
1	N	B	0		0		0		0		0		0		0		0		0		0		JK
2	N	B	0		0		0		0		0		0		0		0		0		0		JO
3	N	B	0		5	1	4	1	0		4	1	3	1	5	1	6	1	4	1	0		JO
4	N	B	2	1	0		0		4	1	0		0		0		0		0		6	1	JO
5	N	B	0		6	2	8	2	15	2	11	2	12	2	10	2	10	2	9	2	5	2	MF
6	N	B	13	2	17	3	18	3	18	3	17	3	18	3	16	3	17	3	15	3	19	3	TP
7	N	B																					
8	N	B																					
	Tot N	Tot B	15	2	28	3	30	3	37	3	32	3	33	3	31	3	33	3	28	3	30	3	Tot A

Average Neonates / Female = 29.7 % Females with 3rd Brood = 90 | 10

Day	Conc. 96%		Replicate 1		2		3		4		5		6		7		8		9		10		Init
1	N	B	0		0		0		0		0		0		0		0		0		0		JK
2	N	B	0		0		0		0		0		0		0		0		0		0		JO
3	N	B	4	1	0		0		0		3	1	4	1	4	1	5	1	4	1	0		JO
4	N	B	0		5	1	6	1	6	1	0		0		0		0		0		5	1	JO
5	N	B	6	2	6	2	0		6	2	10	2	10	2	6	2	9	2	8	2	8	2	MF
6	N	B	14	3	16	3	8	2	16	3	15	3	16	3	12	3	15	3	14	3	18	3	TP
7	N	B																					
8	N	B																					
	Tot N	Tot B	24	3	27	3	14	2	28	3	28	3	30	3	22	3	29	3	26	3	31	3	Tot A

Average Neonates / Female = 25.9 % Females with 3rd Brood = 90 | 10

Day	Conc. 100%		Replicate 1		2		3		4		5		6		7		8		9		10		Init
1	N	B	0		0		0		0		0		0		0		0		0		0		JK
2	N	B	0		0		0		0		0		0		0		0		0		0		JO
3	N	B	5	1	0		4	1	0		4	1	3	1	4	1	5	1	4	1	0		JO
4	N	B	0		7	1	0		6	1	0		0		0		0		0		5	1	JO
5	N	B	6	2	8	2	6	2	9	2	8	2	0		5	2	10	2	6	2	6	2	MF
6	N	B	13	3	14	3	16	3	15	3	14	3	10	2	15	3	18	3	16	3	18	3	TP
7	N	B																					
8	N	B																					
	Tot N	Tot B	24	3	29	3	26	3	30	3	26	3	13	2	24	3	33	3	26	3	29	3	Tot A

Ceria Survival Reproduction 2018 BlankPage

Average Neonates / Female = 26.0 % Females with 3rd Brood = 90 | 10

(N= neonates, B=brood, A= Alive)

Observations

Job Number: 414-01-02
Species: C. dubia

Start Date & Time: 10-2-18 1430
End Date & Time: 10-8-18 1538

Freshwater Chronic Test
American Aquatic Testing, Inc.
Phisical / Chemical Parameters

Initial Readings

Parameter	Concentration	Day 1	2	3	4	5	6	7	8
Dissolved Oxygen (mg/L)	Control	7.9	7.6	7.5	8.0	8.4	8.2		
	24%	8.1	7.8	7.7	8.4	8.4	8.3		
	48%	8.3	8.3	7.9	8.6	8.7	8.6		
	72%	8.8	8.8	8.2	9.0	9.1	9.3		
	96%	9.1	9.1	8.6	9.3	9.4	9.5		
	100%	9.8	10.3	9.1	9.8	10.0	10.7		
	—								
pH	Control	8.0	8.0	8.1	8.0	7.9	8.0		
	24%	7.8	7.5	7.7	8.0	7.9	7.9		
	48%	7.7	7.5	7.7	7.9	7.8	7.9		
	72%	7.6	7.5	7.6	7.7	7.7	7.7		
	96%	7.5	7.5	7.6	7.7	7.6	7.6		
	100%	7.4	7.4	7.6	7.6	7.6	7.5		
	—								
	Initials	MP	JK	JO	JO	JO	MF		
	Date	10/2	10/3	10/4	10/5	10/6	10-7		

Conductivity (umhos/cm)		
Date	Control	100%
10/2	2760	2114
10/4	272	2624
10/6	263	2678

Alkalinity (mg/L as CaCO3)		
Date	Control	100%
10/2	50	70
10/4	60	80
10-6	60	100

Hardness (mg/L as CaCO3)		
Date	Control	100%
10/2	90	150
10/4	90	170
10-6	100	210
Initials	BR	BR

Final Readings

Parameter	Concentration	Day 1	2	3	4	5	6	7	8
Dissolved Oxygen (mg/L)	Control	6.8	7.5	7.4	7.5	8.2	6.5		
	24%	6.9	7.6	7.5	7.4	8.2	6.5		
	48%	7.0	7.7	7.5	7.4	8.3	6.5		
	72%	6.9	7.7	7.5	7.5	8.2	6.6		
	96%	6.9	7.8	7.6	7.5	8.3	6.6		
	100%	6.9	7.7	7.5	7.5	8.3	6.6		
	—								
pH	Control	7.9	8.0	7.9	8.0	8.3	8.0		
	24%	7.8	7.9	7.9	8.0	8.3	8.0		
	48%	7.7	7.8	7.9	7.9	8.3	8.0		
	72%	7.8	7.8	7.9	7.9	8.3	8.0		
	96%	7.8	7.8	7.9	7.9	8.4	8.1		
	100%	7.8	7.7	8.0	7.8	8.4	8.1		
	—								
	Initials	JK	EKH	EKH	MF	MF	MF		
	Date	10/3	10-4	10-5	10/6	10-7	10-8		

Chlorine (mg/L)		
Date	Control	100%
10/2	0.00	0.01
10/4	0.00	0.00
10-6	0.00	0.02

NaSO4 added (mg/L)		
Date	Control	100%
Initials	BR	BR

Observations: 10/6 8.0 - 10/6

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	10/2/2018	Test ID:	2951201cdc	Sample ID:	Towamencin
End Date:	10/8/2018	Lab ID:	AAT, INC	Sample Type:	COMPOSITE
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia
Comments:					

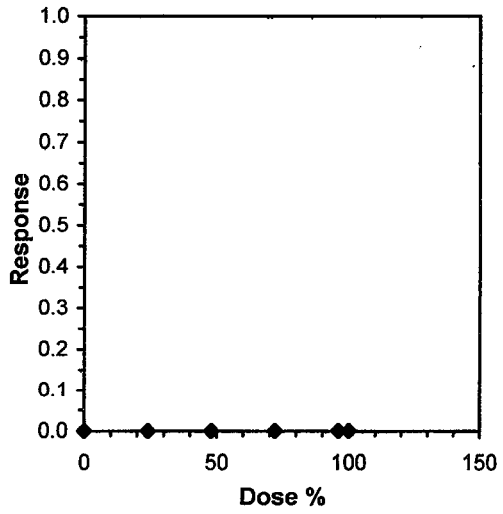
Conc-%	1	2	3	4	5	6	7	8	9	10
Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
24	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
48	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
72	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
96	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Isotonic Mean	Isotonic N-Mean
Control	1.0000	1.0000	0	10	10	10			1.0000	1.0000
24	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
48	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
72	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
96	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
100	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	100	>100		1
Treatments vs Control				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



ToxCalc v5.0.23

Reviewed by: SK

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	10/2/2018	Test ID:	2951201cdc	Sample ID:	Towamencin
End Date:	10/8/2018	Lab ID:	AAT, INC	Sample Type:	COMPOSITE
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
Control	28.000	21.000	24.000	30.000	30.000	30.000	31.000	24.000	29.000	22.000
24	28.000	36.000	28.000	26.000	31.000	32.000	31.000	30.000	31.000	27.000
48	29.000	34.000	37.000	33.000	30.000	30.000	27.000	33.000	32.000	31.000
72	15.000	28.000	30.000	37.000	32.000	33.000	31.000	33.000	28.000	30.000
96	24.000	27.000	14.000	28.000	28.000	30.000	22.000	29.000	26.000	31.000
100	24.000	29.000	26.000	30.000	26.000	13.000	24.000	33.000	26.000	29.000

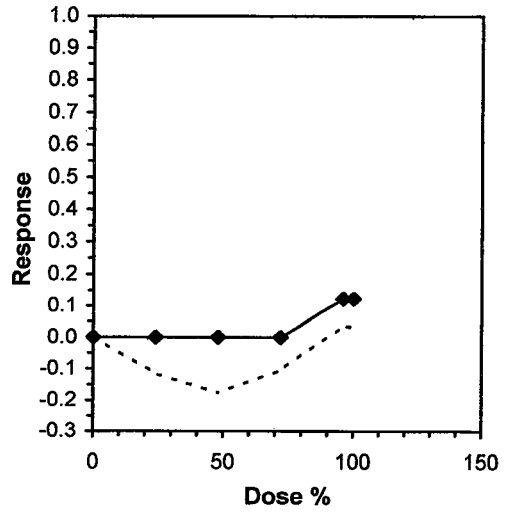
			Transform: Untransformed						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	26.900	1.0000	26.900	21.000	31.000	13.959	10				29.550	1.0000
24	30.000	1.1152	30.000	26.000	36.000	9.686	10	-1.563	2.287	4.536	29.550	1.0000
48	31.600	1.1747	31.600	27.000	37.000	8.976	10	-2.369	2.287	4.536	29.550	1.0000
72	29.700	1.1041	29.700	15.000	37.000	19.572	10	-1.412	2.287	4.536	29.550	1.0000
96	25.900	0.9628	25.900	14.000	31.000	19.215	10	0.504	2.287	4.536	25.950	0.8782
100	26.000	0.9665	26.000	13.000	33.000	20.672	10	0.454	2.287	4.536	25.950	0.8782

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.04609	0.895	-1.3753	3.10468
Bartlett's Test indicates equal variances (p = 0.16)	7.91541	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	4.5357	0.16861	57.47	19.6722	0.02092	5, 54
Treatments vs Control										

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL	Skew
IC05	81.850			
IC10	91.700			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



ToxCalc v5.0.23

Reviewed by: ER

CHRONIC 1 10/02 to 09/18

Date Time	Temp (C)	Date Time	Temp (C)	Date Time	Temp (C)	Date Time	Temp (C)	Date Time	Temp (C)
10/2/18 10:22	25.22	10/4/18 2:22	25.11	10/5/18 18:22	25.33	10/7/18 10:22	25.11	10/9/18 2:22	25.17
10/2/18 10:52	25.28	10/4/18 2:52	25.11	10/5/18 18:52	25.28	10/7/18 10:52	25.17	10/9/18 2:52	25.11
10/2/18 11:22	25.28	10/4/18 3:22	25.06	10/5/18 19:22	25.22	10/7/18 11:22	25.22	10/9/18 3:22	25.06
10/2/18 11:52	25.33	10/4/18 3:52	25.06	10/5/18 19:52	25.22	10/7/18 11:52	25.33	10/9/18 3:52	25.06
10/2/18 12:22	25.44	10/4/18 4:22	25	10/5/18 20:22	25.17	10/7/18 12:22	25.39	10/9/18 4:22	25
10/2/18 12:52	25.56	10/4/18 4:52	24.94	10/5/18 20:52	25.11	10/7/18 12:52	25.44	10/9/18 4:52	25
10/2/18 13:22	25.56	10/4/18 5:22	24.94	10/5/18 21:22	25.11	10/7/18 13:22	25.5	10/9/18 5:22	24.94
10/2/18 13:52	25.56	10/4/18 5:52	24.89	10/5/18 21:52	25.06	10/7/18 13:52	25.56	10/9/18 5:52	24.94
10/2/18 14:22	25.56	10/4/18 6:22	24.89	10/5/18 22:22	25.06	10/7/18 14:22	25.61	10/9/18 6:22	24.89
10/2/18 14:52	25.61	10/4/18 6:52	24.83	10/5/18 22:52	25.06	10/7/18 14:52	25.72	10/9/18 6:52	24.94
10/2/18 15:22	25.61	10/4/18 7:22	24.78	10/5/18 23:22	25	10/7/18 15:22	25.78	10/9/18 7:22	24.94
10/2/18 15:52	25.67	10/4/18 7:52	24.78	10/5/18 23:52	24.94	10/7/18 15:52	25.89	10/9/18 7:52	24.94
10/2/18 16:22	25.67	10/4/18 8:22	24.78	10/6/18 0:22	24.94	10/7/18 16:22	25.94	10/9/18 8:22	24.94
10/2/18 16:52	25.67	10/4/18 8:52	24.78	10/6/18 0:52	24.89	10/7/18 16:52	26	10/9/18 8:52	24.94
10/2/18 17:22	25.67	10/4/18 9:22	24.72	10/6/18 1:22	24.89	10/7/18 17:22	25.94	10/9/18 9:22	24.94
10/2/18 17:52	25.72	10/4/18 9:52	24.78	10/6/18 1:52	24.89	10/7/18 17:52	25.94	10/9/18 9:52	24.94
10/2/18 18:22	25.78	10/4/18 10:22	24.83	10/6/18 2:22	24.83	10/7/18 18:22	25.89	10/9/18 10:22	25
10/2/18 18:52	25.78	10/4/18 10:52	24.89	10/6/18 2:52	24.83	10/7/18 18:52	25.83	10/9/18 10:52	25.06
10/2/18 19:22	25.72	10/4/18 11:22	24.94	10/6/18 3:22	24.78	10/7/18 19:22	25.78	10/9/18 11:22	25.11
10/2/18 19:52	25.67	10/4/18 11:52	25.06	10/6/18 3:52	24.78	10/7/18 19:52	25.72	10/9/18 11:52	25.17
10/2/18 20:22	25.67	10/4/18 12:22	25.17	10/6/18 4:22	24.78	10/7/18 20:22	25.67	10/9/18 12:22	25.22
10/2/18 20:52	25.61	10/4/18 12:52	25.33	10/6/18 4:52	24.78	10/7/18 20:52	25.61	10/9/18 12:52	25.28
10/2/18 21:22	25.61	10/4/18 13:22	25.39	10/6/18 5:22	24.78	10/7/18 21:22	25.61	10/9/18 13:22	25.33
10/2/18 21:52	25.56	10/4/18 13:52	25.44	10/6/18 5:52	24.72	10/7/18 21:52	25.56	10/9/18 13:52	25.33
10/2/18 22:22	25.5	10/4/18 14:22	25.5	10/6/18 6:22	24.72	10/7/18 22:22	25.56	10/9/18 14:22	25.33
10/2/18 22:52	25.5	10/4/18 14:52	25.44	10/6/18 6:52	24.72	10/7/18 22:52	25.5	10/9/18 14:52	25.44
10/2/18 23:22	25.5	10/4/18 15:22	25.44	10/6/18 7:22	24.72	10/7/18 23:22	25.5	10/9/18 15:22	25.5
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10/3/18 0:22	25.44	10/4/18 16:22	25.44	10/6/18 8:22	24.72	10/8/18 0:22	25.5	10/9/18 16:22	25.67
10/3/18 0:52	25.39	10/4/18 16:52	25.39	10/6/18 8:52	24.78	10/8/18 0:52	25.44	10/9/18 16:52	25.72
10/3/18 1:22	25.39	10/4/18 17:22	25.39	10/6/18 9:22	24.83	10/8/18 1:22	25.44		
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10/3/18 15:22	25.5	10/5/18 7:22	24.89	10/6/18 23:22	24.83	10/8/18 15:22	25.78		
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10/3/18 16:22	25.44	10/5/18 8:22	24.89	10/7/18 0:22	24.83	10/8/18 16:22	25.83		
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10/3/18 18:22	25.33	10/5/18 10:22	24.94	10/7/18 2:22	24.78	10/8/18 18:22	25.89		
10/3/18 18:52	25.28	10/5/18 10:52	25.06	10/7/18 2:52	24.78	10/8/18 18:52	25.78		
10/3/18 19:22	25.28	10/5/18 11:22	25.11	10/7/18 3:22	24.78	10/8/18 19:22	25.72		
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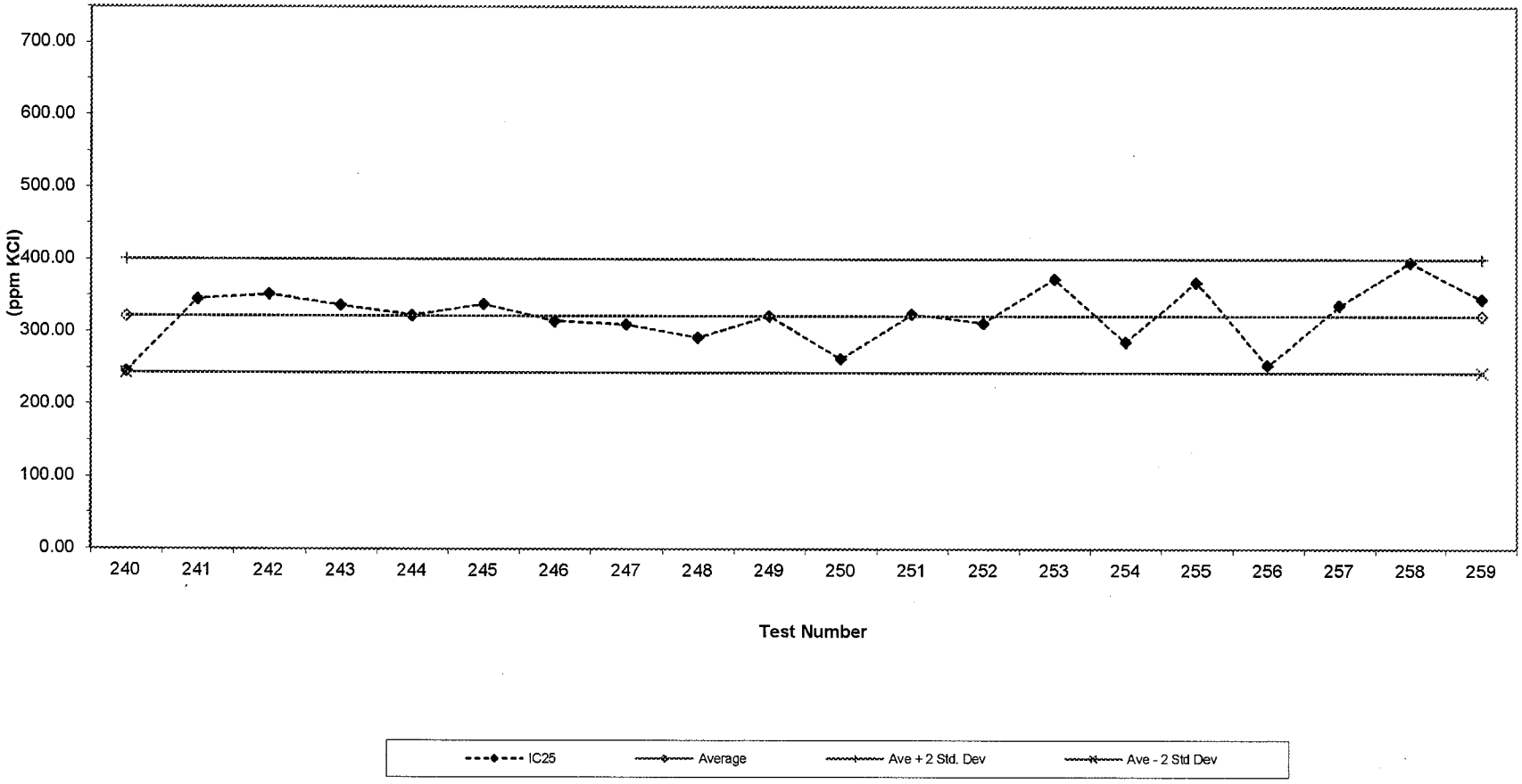
10/3/18 21:22	25.22	10/5/18 13:22	25.5	10/7/18 5:22	24.72	10/8/18 21:22	25.5		
10/3/18 21:52	25.22	10/5/18 13:52	25.44	10/7/18 5:52	24.72	10/8/18 21:52	25.44		
10/3/18 22:22	25.22	10/5/18 14:22	25.5	10/7/18 6:22	24.72	10/8/18 22:22	25.39		
10/3/18 22:52	25.22	10/5/18 14:52	25.56	10/7/18 6:52	24.72	10/8/18 22:52	25.39		
10/3/18 23:22	25.22	10/5/18 15:22	25.61	10/7/18 7:22	24.72	10/8/18 23:22	25.33		
10/3/18 23:52	25.22	10/5/18 15:52	25.61	10/7/18 7:52	24.78	10/8/18 23:52	25.33		
10/4/18 0:22	25.17	10/5/18 16:22	25.56	10/7/18 8:22	24.78	10/9/18 0:22	25.28		
10/4/18 0:52	25.17	10/5/18 16:52	25.5	10/7/18 8:52	24.89	10/9/18 0:52	25.22		
10/4/18 1:22	25.17	10/5/18 17:22	25.44	10/7/18 9:22	24.94	10/9/18 1:22	25.22		
10/4/18 1:52	25.17	10/5/18 17:52	25.39	10/7/18 9:52	25	10/9/18 1:52	25.17		

Quality Control Chart *Ceriodaphnia dubia*

IC_{25}

American Aquatic Testing, Inc. - Chronic Toxicity
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