RESULTS OF CHRONIC TOXICITY TESTS

3-brood- *Ceriodaphnia dubia* static definitive renewal

Test date: December 8-14, 2020
Sampling period: December 6-11, 2020
Report date: December 21, 2020

Conducted For:

TOWAMENCIN MA
2225 Kriebel Rd
Lansdale, PA 19446

NPDES: PA0039004

Conducted and Prepared By:

ENVIROSCIENCE, INCORPORATED
5070 Stow Rd.
Stow, OH 44224

EnviroScience
Excellence In Any Environment

For ENVIROSCIENCE, INC.:

Katherine L. Hansler, Aquatic Biologist

For TOWAMENCIN MA:

_____, _____
(signature) (title)

December 21, 2020

Mr. Ralph Jacoby
Towamencin MA
2225 Kriebel Rd
Lansdale, PA 19446

Dear Mr. Jacoby:

Enclosed is a copy of EnviroScience's report for the following Whole Effluent Toxicity (WET) test that was initiated on December 8, 2020:

(1) 3-brood static, renewal chronic bioassay using *Ceriodaphnia dubia* (water flea)

The tested concentrations were 24, 48, 72, 96, and 100 percent effluent diluted with moderately hard water. The TIWC is 96%. Endpoints are listed below.

WET endpoints for Towamencin MA; 12/2020
sampling period: 12/06-11/20

C. dubia acute endpoint:	48-hour LC_{50} = 90.25% effluent, TU_a = 1.11	
C. dubia chronic endpoints:	NOEC=	96% effluent
	LOEC=	100% effluent
	Ch V=	97.98% effluent
	TU_c=	1.04 as 100÷NOEC
	IC_{25} =	77.53% effluent (TU_c as 100÷IC_{25} = 1.29)
	TIWC =	Fail (survival and reproduction)

Please call me if you have any questions.

Sincerely,

Katherine L. Hansler

Katherine L. Hansler, Aquatic Biologist

enclosures

EnviroScience
5070 Stow Road
Stow, OH 44224
Toll Free: 800-940-4025 | Office: 330-688-0111 | Fax: 330-688-3858

TABLE 1.
Toxicity Test Report - General Information

1. Facility/Discharger: Towamencin MA Report Date: 12/21/20

2. Facility Address: 2225 Kriebel Rd, Lansdale, PA 19446

3. NPDES Permit #: PA0039004 4. Receiving Stream: _____

5. Facility Contact: Ralph Jacoby 6. Phone #: 215-855-8165

7. Testing Lab Name: EnviroScience, Inc., 5070 Stow Rd., Stow, OH 44224
PA Certification: 68-01628

8. Lab contact: Kate Hansler 9. Phone #: 330-688-0111

10. Outfall(s) Tested: 001

11. Test Species: *Ceriodaphnia dubia* Method: EPA 1002.0

12. Test Conditions: chronic, static-renewal, 3-brood *C. dubia*

13. Dechlorination? no Original Chlorine Level: <0.02 mg/l

14. Report Contents:
. Report Contents:

General information .....Table 1
Sampling information .....Table 2
Test dates and times.....Table 2
Test conditions.....Table 3
Initial chemistry .....Table 4
Test results *C. dubia* .....Table 5
Additional information .....Table 6
SRT information, dechlorination procedure, deviations/relevant information, summary of results, list of endpoints

Chain-of-Custody/bench sheets/analysis Attachment A
SRT Control Charts

Katherine L. Hansler
Signature of preparer

12/21/20
Date

Katherine L. Hansler
Name (typed or printed)

Aquatic Biologist
Title

TABLE 2

Sampling Summary					
Outfall	Sample Type grab/composite	Volume Received	Sample Collection		Flow - MGD
			Begin MM/DD/YY-Time	End MM/DD/YY-Time	
001	composite	3 gal	12/06/20-0800	12/07/20-0800	4.8
001	composite	3 gal	12/08/20-0800	12/09/20-0800	4.133
001	composite	4 gal	12/10/20-0800	12/11/20-0800	3.816

Dates/Times of Test Performance:	
Ceriodaphnia dubia	
Start Date: MM/DD/YY	12/08/20
Start Time:	1400 hrs
End Date: MM/DD/YY	11/14/20
End Time:	1300 hrs

Comments: Sample receipt in the testing laboratory and sample temperature upon receipt:

1. 12/08/20 at 1320 hrs; 1.6 °C
2. 12/10/20 at 1415 hrs; 1.9 °C
3. 12/12/20 at 1115 hrs; 2.6 °C

TABLE 3 Summary of toxicity test conditions for chronic testing with *Ceriodaphnia dubia*.

		Ceriodaphnia dubia
1.	Age and origin of test organisms:	14-22 hours, EnviroScience 12/07/20, 1600-2400
2.	Test type and duration:	static, daily renewal, until 60% of control specimens produce 3rd brood
3.	Light quality and intensity:	wide spectrum fluorescent/50-100 fc
4.	Photoperiod:	16/8 hours light/dark
5.	Test solution temperatures °C:	25.0±1.0
6.	Feeding regime:	daily: alga *Selenastrum capricornutum* to provide approx. 2.3×10^5 cells/ml; and 0.1ml YAT concentrate
7.	Size of test vessel:	30 ml plastic cup
8.	Volume and depth of test solutions:	15 ml and 24 mm
9.	No. of test organisms per vessel:	1
10.	No. of vessels per solution:	10
11.	Total no. of organisms per solution:	10
12.	Test concentrations as percent effluent:	24, 48, 72, 96, and 100
13.	Renewal MM/DD-test days:	12/07-0,1; 12/09-2,3; 12/11-4,5,6
14.	Dilution and primary control water:	moderately hard reconstituted water (MHRW)
15.	Secondary control:	NA
16.	Aeration:	not necessary
17.	Endpoints:	mortality - no movement with gentle prodding (LC_{50}, TU_a); survival and reproduction NOEC (TU_c)

Notes: [1] Adverse effects are also recorded but are not used to calculate toxicity endpoints (e.g. NOEC, TU_c). Adverse effects include cumulative mortality plus behavioral effects such as immobility, atypical swimming, loss of equilibrium, or some other specified condition.

TABLE 4

Initial Water Quality. Values of pH, dissolved oxygen (DO) concentration, conductivity, total alkalinity, total hardness, and total residual chlorine for each new sample of effluent or control water. Values recorded for effluent and renewal solutions on intermediate days and values recorded for final solutions are tabulated on bench sheets in the Attachment.

Sample	DO mg/l	pH s.u.	Conductivity µmho/cm	Alkalinity mg/l $CaCO_3$	Hardness mg/l $CaCO_3$	Residual Chlorine mg/l	Ammonia mg/l
100% effluent:							
07 December 20	8.6	7.3	1048	84	132	<0.02	1.59
09 December 20	8.6	7.3	2390	70	172	<0.02	0.61
11 December 20	8.6	7.6	3110	74	172	<0.02	0.72

Comments:
These results are only supporting data. Results cannot be reported to PA DEP for NPDES compliance.

Methods or Instrumentation used in chemical analysis:

Dissolved Oxygen: APHA (1998, 20th ed.) 4500-O G., YSI 5100
pH: APHA (1998, 20th ed.) 4500-H^+ B., Orion 920A/Orion 2Star
Conductivity: APHA (1998, 20th ed.) 2510 B., Orion 160
Total Alkalinity: APHA (1998, 20th ed.) 2320 B.
Total Hardness: APHA (1998, 20th ed.) 2340 C.
Total Residual Chlorine: APHA (1998, 20th ed.) 4500-Cl D., HACH Auto CAT 9000
Ammonia nitrogen: APHA (1992, 18th ed.) 4500-NH_3 C., HI 95715

TABLE 5

Results of a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test Conducted 12/08/20 – 12/14/20 using Effluent from Outfall 001.

Test Solutions	Cumulative Percent Survival[a] Test Day							No. Young Produced per Specimen	
	1	2	3	4	5	6	7	Mean[a]	%CV
MHRW control/ dilution water	100	100	100	100	100	100	NA	30.2	10.56
24% Effluent	100	100	100	100	100	100	NA	31.4	31.36
48% Effluent	100	100	100	100	100	100	NA	34.2	16.59
72% Effluent	100	100	100	100	100	100	NA	26.0	60.57
96% Effluent	60	50	50	50	50	50	NA	17.1	105.96
100% Effluent	0	0	0	0	0	0*	NA	0*	0

Acute 48-Hour LC_{50} = 90.25% 95% C.I. Lower Limit: 85.69 95% C.I. Upper Limit: 95.07	Survival NOEC = 96% Survival LOEC = 100%	Reproduction NOEC = 96% Reproduction LOEC = 100%	**Chronic Toxicity Unit (TUc):** **1.04 (100÷NOEC)**
Acute Toxicity Unit (TUa): 1.11 (100÷LC_{50})	Chronic Value Survival = 97.98%	Chronic Value Reprod. = 97.98%	
		IC_{25} = 77.53% IC_{50} = 96.27%	**TUc as 100÷IC_{25}: 1.29**

Methods used to determine LC_{50}: Spearman-Karber.

Methods used to determine NOEC: Shapiro-Wilk's, Bartlett's (fail), Steel's, ICp model; Cetis 1.9.6.

[a] - * indicates significant reduction from the primary control group (α= 0.05).

control group % survival	control group mean # young/survivor	control group %CV for mean young	control group % producing 3 broods
100	30.2	10.56	100

TABLE 6 - Additional Toxicity Test Information

6.1 Standard Reference Toxicant (SRT) Test results (control charts are attached).

Reference Toxicant Test Results							
Species	Date	Duration	Toxicant/ Diluent	control specimens surviving %	controls: mean # young or mean dry weight (mg)	Results	Within control limits?
*C. dubia**	11/17/20-11/23/20	6 days	NaCl/ MHRW	100	31.9 young	IC_{25}: 0.4373 g/l	yes
P. promelas *	11/17/20-11/24/20	7 days	KCl/ DMW	88	0.416 mg	IC_{25}: 1.055 g/l	yes

* chronic test.

Acute SRT charts maintained for acute test protocols only. For test dates 11/17-19/20, *C. dubia* 48-hr LC_{50} = 2.17 g NaCl/L MHRW at 25°C; 11/17-21/20, *P. promelas* 96-hr LC_{50} = 7.27 g NaCl/L MHRW at 25°C.

6.2 Indicate below any other relevant information that may aid in the evaluation of this report. Include any deviations from EPA methodology that were necessary for these tests as well as any sample manipulations which were performed, such as aeration, dechlorination with sodium thiosulfate, etc. and the justification for such manipulations or deviations. Attach additional pages as needed.

6.2.1 Minnow growth values were calculated according the most recent edition of U.S. EPA's manual (4th edition), which calculates growth as mean dry weight per fish using the number of specimens exposed rather than the number of survivors.

6.3 Summary of test results:

WET endpoints for Towamencin MA; 12/2020

sampling period: 12/06-11/20

C. dubia acute endpoint: 48-hour LC_{50} = 90.25% effluent, TU_a = 1.11

C. dubia chronic endpoints:

NOEC=	96% effluent
LOEC=	100% effluent
Ch V=	97.98% effluent
TU_c=	1.04 as 100÷NOEC
IC_{25} =	77.53% effluent (TU_c as 100÷IC_{25} = 1.29)
TIWC =	Fail (survival and reproduction)

ATTACHMENTS

Chain-of-Custody/Sample Submission form(s).
Bench sheets and data analysis.
Standard Reference Toxicant (SRT) Control Charts

TERMS

LC_{50} =	median lethal effluent concentration = concentration that would kill half of the exposed specimens for a specified exposure period
TU_a =	Acute Toxicity Unit = 100÷48-hour or 96-hour LC_{50}
NOEC =	No Observed Effect Concentration
LOEC =	Lowest Observed Effect Concentration
Ch V =	Chronic Value = square root of NOEC*LOEC
TU_c =	Chronic Toxicity Unit = 100÷NOEC
IC_{25} =	Inhibition Concentration = concentration that would cause a 25% reduction in water flea reproduction or fathead minnow growth

3800-FM-BPNPSM0485 Rev. 10/2013
Cover Sheet

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF POINT AND NON-POINT SOURCE MANAGEMENT

WHOLE EFFLUENT TOXICITY (WET) TEST SUMMARY REPORT
COVER SHEET

NPDES Permit Number: **PA0039004** Facility Name: **Towamencin MA**

Species Tested: ☒ *Ceriodaphnia dubia* ☐ *Pimephales promelas* Test Type: ☒ Chronic ☐ Acute

Re-Test? ☒ Yes ☐ No (If Yes, indicate the date of original test completion: **11/10/20**)

SAMPLE INFORMATION

	Date/Time	Sample Source	Temperature	Holding Time	Chlorine	Dechlorinated?
1.	12/07/20-0800	001	1.6°C	<36 hrs	<0.02 mg/L	☐ Yes ☒ No
2.	12/09/20-0800	001	1.9°C	<36hrs	<0.02 mg/L	☐ Yes ☒ No
3.	12/11/20-0800	001	2.6°C	<36hrs	<0.02 mg/L	☐ Yes ☒ No

TEST CONDITIONS

Date/Time of Test Initiation: **12/08/20-1400** Date/Time of Test Termination: **12/14/20-1300**

☒ 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 Tests: **14-22 hrs**

Number of Replicates: **10** Number of Organisms per Replicate: **1**

Source of Organisms: **ESCulture** Feeding Regimen: **daily**

Light Intensity: **50-100fc** Photoperiod: **16/8 light/dark**

Temperature measurements made at least once per 24-hour period? ☒ Yes ☐ No (attach log sheet)

DO measured daily in at least one replicate of each concentration? ☒ Yes ☐ No (attach log sheet)

Were the test chambers aerated? ☐ Yes ☒ No Rate:

pH measured daily in at least one replicate of each concentration? ☒ Yes ☐ No (attach log sheet)

Were test acceptability criteria in the EPA method met? ☒ Yes ☐ No

Were there any modifications to or deviations from EPA methods (if Yes, explain on separate sheet)? ☐ Yes ☒ No

DILUTION / REAGENT WATER

Date of Last Test for Chemistry: **12/10/20** Conductivity: **301** µmhos/cm

pH: **7.4** TRC: **<0.02** mg/L

CONTROL RESULTS

Ceriodaphnia dubia

Survival: **100%**

Percent that produced 3 broods (if applicable): **100 %**

Young per Surviving Female (if applicable): **30.2**

Pimephales promelas

Survival:

Mean Dry Weight of Survivors (if applicable):

REFERENCE TOXICITY TESTS

Date of most recent test: **11/17/20** Same conditions as test? ☒ Yes ☐ No

Were test acceptability criteria in the EPA method met? ☒ Yes ☐ No

TEST RESULTS

Control compared to: ☒ TIWC Dilution ☐ Other:

Survival: ☐ Pass ☒ Fail Growth: ☐ Pass ☐ Fail Reproduction: ☐ Pass ☒ Fail

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.

Katherine L. Hansler		12/22/20	68-01628
Name of Laboratory Manager	Signature of Laboratory Manager	Date	DEP Lab ID No.

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 MA

Permit No.

PA0039004

Test Completion Date 11/12/2019

Replicate No.	Control	TIWC
1	20	7
2	24	26
3	27	35
4	31	38
5	27	34
6	33	36
7	31	33
8	30	23
9	36	32
10	31	0
11		
12		
13		
14		
15		

Mean	29.000	26.400
Std Dev.	4.619	12.989
# Replicates	10	10

T-Test Result	1.0939
Deg. of Freedom	12
Critical T Value	0.8726
Pass or Fail	**PASS**

Test Completion Date 11/10/2020

Replicate No.	Control	TIWC
1	18	15
2	24	23
3	24	28
4	36	13
5	23	20
6	12	21
7	24	19
8	27	13
9	30	0
10	20	2
11		
12		
13		
14		
15		

Mean	23.800	15.400
Std Dev.	6.546	8.884
# Replicates	10	10

T-Test Result	-0.7633
Deg. of Freedom	15
Critical T Value	0.8662
Pass or Fail	**FAIL**

Test Completion Date 12/14/2020

Replicate No.	Control	TIWC
1	27	36
2	32	0
3	30	0
4	30	0
5	33	33
6	28	33
7	24	31
8	31	38
9	32	0
10	35	0
11		
12		
13		
14		
15		

Mean	30.200	17.100
Std Dev.	3.190	18.120
# Replicates	10	10

T-Test Result	-0.9603
Deg. of Freedom	10
Critical T Value	0.8791
Pass or Fail	**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	Survival
TIWC (decimal)	0.96
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name: Towamencin MA

Permit No.: PA0039004

Test Completion Date: 11/12/2019

Replicate No.	Control	TIWC
1	1	0
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	0
11		
12		
13		
14		
15		

Mean	1.000	0.800
Std Dev.	0.000	0.422
# Replicates	10	10

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

Test Completion Date: 11/10/2020

Replicate No.	Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	0	1
7	1	1
8	1	1
9	1	0
10	1	1
11		
12		
13		
14		
15		

Mean	0.900	0.900
Std Dev.	0.316	0.316
# Replicates	10	10

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

Test Completion Date: 12/14/2020

Replicate No.	Control	TIWC
1	1	1
2	1	0
3	1	0
4	1	0
5	1	1
6	1	1
7	1	1
8	1	1
9	1	0
10	1	0
11		
12		
13		
14		
15		

Mean	1.000	0.500
Std Dev.	0.000	0.527
# Replicates	10	10

T-Test Result -1.5000
Deg. of Freedom 9
Critical T Value 0.8834
Pass or Fail **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

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5070 Stow Road
Stow, OH 44224
Phone (330) 688-0111
Fax (330) 688-3858
1-800-940-4025

Client: Towamencin Municipal Authority
Address: 2225 Kriebel Road
Lansdale, PA 19446
Contact: Ralph Jacoby
Phone: 215-855-8165
Permit #: PA0039004

SAMPLE SUBMISSION AND CHAIN OF CUSTODY FORM

Test(s) to be performed:
( ) Chronic Definitive
( ) Acute Definitive
( ) 48 hr. Screening
( ) 24 hr. Stormwater
( ) Pass/Fail _____

Test Species
( ) P. promelas and C. dubia
( ) P. promelas
( ) C. dubia
( ) D. magna
( ) _____

Wastewater Type (Circle One)
Industrial Other
Municipal
Other _____

When listing a composite sample in the table below, please provide the start and end time of the composite period.

Start		End		Station No.	Sample Site	Sample Type		Number of Cubitainers	Chemistry				
Date	Time	Date	Time			Comp	Grab		TRC	Cond	D.O.	pH	Temp. °C
12/6/20	8:00AM	12/7/20	8:00AM			✓		1					

Comp. = Composite, D.O. = Dissolved Oxygen measured in mg/l, pH measured in s.u., Conductivity measured in uohm/cm

Sampling Collector's Information: please ✓ all appropriate boxes

✓	Effluent	Collectors Name:	Erich Fromm
	Upstream	Collectors Signature:	[signature]
	Near Field	M.G.D. =	4.8
	Far Field	Weather Conditions:	Partly Sunny
Plume Determined By What Method?			

EnviroScience Personnel Only

	Effluent	Collected By:	
	Upstream	Collectors Signature:	
	Near Field		
	Far Field		

Comments:

Received from:	Received by:	Date	Time	Shipping Information		EnviroScience Use Only	
	[signature]	120820	1320	Date Shipped		Client	Towamencin
				Time Shipped		Sample ID's	TOWA 120820 EFF
				Method Shipped		Cond. Of Container	good
				ES Vehicle		Temp. °C	1.6

EnviroScience, Inc. Cooler Receipt Form

Client Towamencin

ES Sample ID TOWA 120820 EFF

Cooler Received by: MT

Date Cooler Received and Opened 120820

Received from: FedEX ✓ UPS___ Client Drop Off____ ES Courier____

1. Were custody seals on the outside of cooler? Yes____ No ✓
   Were custody seals signed, dated and intact? Yes____ No ✓
2. Did Chain of Custody (COC) accompany the samples? Yes ✓ No____
3. Were the COC's signed in the appropriate places? Yes ✓ No____
   If No explain_____
4. Was the sample time and date filled in correctly? Yes ✓ No____
5. Sample Temperature upon receipt 1.6 °C
6. Did all sample container labels match the samples written on the COC? Yes____ No ✓
   Were the sample containers in good condition? Yes ✓ No____
7. Was sufficient quantity received to perform indicated tests? Yes ✓ No____
8. Was this sample received within required holding time? Yes ✓ No____

Explain any discrepancies or client notifications that occurred regarding this sample: no labels on cubes

EnviroScience
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5070 Stow Road
Stow, OH 44224
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Fax (330) 688-3858
1-800-940-4025

Client: Towamencin Municipal Authority
Address: 2225 Kriebel Road
Lansdale, PA 19446
Contact: Ralph Jacoby
Phone: 215-855-8165
Permit #: **PA0039004**

SAMPLE SUBMISSION AND CHAIN OF CUSTODY FORM

Test(s) to be performed:
( ) Chronic Definitive
( ) Acute Definitive
( ) 48 hr. Screening
( ) 24 hr. Stormwater
( ) Pass/Fail _____

Test Species
( ) P. promelas and C. dubia
( ) P. promelas
( ) C. dubia
( ) D. magna
( ) _____

Wastewater Type (Circle One)
Industrial Other
Municipal
Other _____

When listing a composite sample in the table below, please provide the start and end time of the composite period.

Start		End		Station	Sample Site	Sample Type		Number of	Chemistry				
Date	Time	Date	Time	No.		Comp	Grab	Cubitainers	TRC	Cond	D.O.	pH	Temp. °C
12/8/20	8:00AM	12/9/20	8:00AM			✓							

Comp. = Composite, D.O. = Dissolved Oxygen measured in mg/l, pH measured in s.u., Conductivity measured in uohm/cm

Sampling Collector's Information: please ✓ all appropriate boxes

	Effluent	Collectors Name:	Erich Fromm
	Upstream	Collectors Signature:	[signature]
	Near Field	M.G.D. =	4.133
	Far Field	Weather Conditions:	Cloudy
Plume Determined By What Method?			

EnviroScience Personnel Only

	Effluent	Collected By:	
	Upstream	Collectors Signature:	
	Near Field		
	Far Field		

Comments:

Received from:	Received by:	Date	Time	Shipping Information		EnviroScience Use Only	
	[signature]	121020	1415	Date Shipped		Client	Towamencin
				Time Shipped		Sample ID's	TOWA 121020EFF
				Method Shipped		Cond. Of Container	good
				ES Vehicle		Temp. °C	1.9°C

EnviroScience, Inc. Cooler Receipt Form

Client Towamencin M.A.

ES Sample ID TOWA 121020 EFF

Cooler Received by: AT

Date Cooler Received and Opened 121020

Received from: FedEX X UPS___ Client Drop Off____ ES Courier____

1. Were custody seals on the outside of cooler? Yes_____ No X
   Were custody seals signed, dated and intact? Yes_____ No X
2. Did Chain of Custody (COC) accompany the samples? Yes X No_____
3. Were the COC's signed in the appropriate places? Yes X No_____
   If No explain_____
4. Was the sample time and date filled in correctly? Yes_____ No_____
5. Sample Temperature upon receipt 1.9 °C
6. Did all sample container labels match the samples written on the COC? Yes_____ No X
   Were the sample containers in good condition? Yes X No_____
7. Was sufficient quantity received to perform indicated tests? Yes X No_____
8. Was this sample received within required holding time? Yes X No_____

Explain any discrepancies or client notifications that occurred regarding this sample: Wipes not labeled

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Excellence In Any Environment

5070 Stow Road
Stow, Ohio 44224
Phone (330) 688-0111; 1-800-940-4025
Fax (330) 688-3858

EnviroScience
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EnviroScience, Inc.
5070 Stow Road
Stow, OH 44224
Phone (330) 688-0111
Fax (330) 688-3858
1-800-940-4025

Client: Towamencin Municipal Authority
Address: 2225 Kriebel Road
Lansdale, PA 19446
Contact: Ralph Jacoby
Phone: 215-855-8165
Permit #: **PA0039004**

SAMPLE SUBMISSION AND CHAIN OF CUSTODY FORM

Test(s) to be performed:
( ) Chronic Definitive
( ) Acute Definitive
( ) 48 hr. Screening
( ) 24 hr. Stormwater
( ) Pass/Fail _____

Test Species
( ) P. promelas and C. dubia
( ) P. promelas
( ) C. dubia
( ) D. magna
( ) _____

Wastewater Type (Circle One)
Industrial Other
Municipal
Other _____

When listing a composite sample in the table below, please provide the start and end time of the composite period.

Start		End		Station	Sample Site	Sample Type		Number of	Chemistry				
Date	Time	Date	Time	No.		Comp	Grab	Cubitainers	TRC	Cond	D.O.	pH	Temp. °C
12/10/20	8:00AM	12/11/20	8:00AM			✓		1					

Comp. = Composite, D.O. = Dissolved Oxygen measured in mg/l, pH measured in s.u., Conductivity measured in uohm/cm

Sampling Collector's Information: please ✓ all appropriate boxes

✓	Effluent	Collectors Name:	Erich Fromm
	Upstream	Collectors Signature:	[signature]
	Near Field	M.G.D. =	3.816
	Far Field	Weather Conditions:	Sunny
Plume Determined By What Method?			

EnviroScience Personnel Only

	Effluent	Collected By:	
	Upstream	Collectors Signature:	
	Near Field		
	Far Field		

Comments:

Received from:	Received by:	Date	Time	Shipping Information		EnviroScience Use Only	
	[signature]	121220	1115	Date Shipped		Client	Towamencin
				Time Shipped		Sample ID's	TOWA 121220 EFF
				Method Shipped		Cond. Of Container	good
				ES Vehicle		Temp. °C	2.6

EnviroScience, Inc. Cooler Receipt Form

Client Towamencin

ES Sample ID TOWA 121220 EFF

Cooler Received by: MT

Date Cooler Received and Opened 121220

Received from: FedEX ✓ UPS___ Client Drop Off___ ES Courier___

1. Were custody seals on the outside of cooler? Yes___ No ✓
   Were custody seals signed, dated and intact? Yes___ No ✓
2. Did Chain of Custody (COC) accompany the samples? Yes ✓ No___
3. Were the COC's signed in the appropriate places? Yes ✓ No___
   If No explain___
4. Was the sample time and date filled in correctly? Yes ✓ No___
5. Sample Temperature upon receipt 2.6 °C
6. Did all sample container labels match the samples written on the COC? Yes___ No ✓
   Were the sample containers in good condition? Yes ✓ No___
7. Was sufficient quantity received to perform indicated tests? Yes ✓ No___
8. Was this sample received within required holding time? Yes ✓ No___

Explain any discrepancies or client notifications that occurred regarding this sample: no labels

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EnviroScience Inc. ***Ceriodaphnia dubia*** **Survival and Reproduction; EPA 1002.0:**

Project ID:	TOWA 120820	**Start Date:**	120820	**Time:**	1400
Permit No.:	PA0039004	**End Date:**	121420	**Time:**	1300
Diluent:	MHR				

MHR	Day	1	2	3	4	5	6	7	8	9	10	Number Adults	# Dead/ # Adversely Affected
	1	/	/	/	/	/	/	/	/	/	/	10	0 / 0
	2	/	/	/	/	/	/	/	/	/	/	10	0 / 0
	3	04	69	59	49	04	04	49	49	49	04	10	0 / 0
	4	49	04	04	04	59	39	04	04	04	69	10	0 / 0
	5	99	109	89	109	99	109	99	109	119	109	10	0 / 0
	6	149	169	179	169	199	159	119	179	179	199	10	0 / 0
	7												/
Totals		27	32	30	30	33	28	24	31	32	35	$\bar{X}$ = 30.2	
Number of Broods		3	3	3	3	3	3	3	3	3	3	CV = 10.56	

24%	Day	1	2	3	4	5	6	7	8	9	10	Number Adults	# Dead/ # Adversely Affected
	1	/	/	/	/	/	/	/	/	/	/	10	0 / 0
	2	/	/	/	/	/	/	/	/	/	/	10	0 / 0
	3	0	0	6	5	0	0	0	7	5	0	10	0 / 0
	4	4	2	0	0	3	4	3	0	0	4	10	0 / 0
	5	10	0	10	10	11	10	12	12	10	10	10	0 / 0
	6	19	2	20	18	22	19	19	20	17	20	10	0 / 0
	7												/
Totals		33	4	36	33	36	33	34	39	32	34	$\bar{X}$ = 31.4	
Number of Broods		3	2	3	3	3	3	3	3	3	3	CV = 31.36	

48%	Day	1	2	3	4	5	6	7	8	9	10	Number Adults	# Dead/ # Adversely Affected
	1	/	/	/	/	/	/	/	/	/	/	10	0 / 0
	2	/	/	/	/	/	/	/	/	/	/	10	0 / 0
	3	0	5	5	5	1	0	0	6	5	0	10	0 / 0
	4	4	0	0	0	6	5	4	0	0	5	10	0 / 0
	5	13	9	11	8	16	13	10	13	13	11	10	0 / 0
	6	17	18	20	11	21	19	16	22	14	16	10	0 / 0
	7												/
Totals		34	32	36	24	44	37	30	41	32	32	$\bar{X}$ = 34.2	
Number of Broods		3	3	3	3	3	3	3	3	3	3	CV = 16.59	

EnviroScience Inc. ***Ceriodaphnia dubia*** **Survival and Reproduction; EPA 1002.0:**

Project ID:	TIWA
Permit No.:	

Start Date:	120820

72%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Number Adults	# Dead/ # Adversely Affected
1	/	/	/	/	/	/	/	/	/	/	10	0 / 0
2	/	/	/	/	/	/	/	/	/	/	10	0 / 0
3	0	0	6	3	0	0	2	5	5	4	10	0 / 0
4	0	3	0	0	4	3	0	0	3	0	10	0 / 0
5	12	0	12	13	0	12	13	13	14	0	10	0 / 0
6	18	0	21	17	0	17	16	18	20	0	10	0 / 0
7												/
Totals	36	3	39	33	4	32	31	36	42	4	$\bar{X}$ = 26.0	
Number of Broods	3	1	3	3	1	3	3	3	3	1	CV = 60.57	

96%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Number Adults	# Dead/ # Adversely Affected
1	/	D	D	D	/	/	/	/	D	/	10	4 / 4
2	/	↓	↓	↓	/	/	/	/	↓	D	10	5 / 5
3	0	↓	↓	↓	0	0	0	0	↓	↓	10	5 / 5
4	6	↓	↓	↓	4	3	5	6	↓	↓	10	5 / 5
5	13	↓	↓	↓	12	12	10	12	↓	↓	10	5 / 5
6	17	↓	↓	↓	17	18	16	20	↓	↓	10	5 / 5
7		↓	↓	↓					↓	↓		/
Totals	36	0	0	0	33	33	31	38	0	0	$\bar{X}$ = 17.1	
Number of Broods	3	0	0	0	3	3	3	3	0	0	CV = 105.96	

100%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Number Adults	# Dead/ # Adversely Affected
1	D	D	D	D	D	D	D	D	D	D	10	10 / 10
2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		/
3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		/
4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		/
5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		/
6	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		/
7		↓	↓	↓	↓	↓	↓	↓	↓	↓		/
Totals											$\bar{X}$ =	
Number of Broods											CV =	

EnviroScience Inc. ***Ceriodaphnia dubia*** **Survival and Reproduction; EPA 1002.0:** pg. 3 of 3

Project ID:	TDWA
Permit No.:	

KHV

Start Date:	120820

Brood Board Information:

Replicate	1	2	3	4	5	6	7	8	9	10	BB #: 112920 A
	35	37	38	39	43	44	45	47	48	50	Date: 120720
											Time: 1600-2400

Test Information:

Day	Initiation	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7
YAT Batch #	YATE 102120	YATF 102120		YATA 120920		YATA 120820		YATB 120920		YATB 120920				
Algae Batch #	ES B 112020	ES B 112020		ESB 112020		ES B 112020		ES C 112020		ESC 112020				
Test Level:	Solution Temperature °C for Initial (I) and Final (F) solutions													
	I	I	F	I	F	I	F	I	F	I	F	I	F	F
MHR	24.0	24.0	24.0	24.0	25.6	24.5	24.8	24.5	24.9	24.0	24.6		25.6	
24%	24.0	24.0	24.3	24.0	25.5	24.2	24.6	24.3	24.7	24.0	24.6		25.6	
48%	24.0	24.0	24.0	24.0	25.1	24.3	24.6	24.3	25.0	24.0	24.4		25.2	
72%	24.0	24.0	24.0	24.0	25.2	24.5	24.7	24.6	24.8	24.0	24.4		25.4	
96%	24.0	24.0	24.0	24.0	25.0	24.3	24.7	24.3	24.7	24.4	24.7		25.4	
100%	24.0	24.0	24.0	24.0	25.0	—		—		—		—		
Change time		13	50	14	45	13	10	13	10	13	00			
✓transfer	✓Loading	✓		✓		✓		✓		✓				
Initials	TM	MT		TM		TM		CB		TM		TM		

Initial is the initiation temperature, or the temperature of the new board C. dubia are being transferred into.

Comments Section:

Day	Date	Comments	Initials

Key M=Missing, D=Dead, KIT=Killed in transfer, m=empty, g=gravid, y=eyed, r=releasing, N=Sample number, A=Adversely affected

CETIS Analytical Report

Report Date: 15 Dec-20 13:29 (p 1 of 1)
Test Code/ID: 43BDA1AA / 11-3650-1162

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroScience**

Analysis ID:	20-1502-1339	**Endpoint:**	2d Survival Rate	**CETIS Version:**	CETISv1.9.6
Analyzed:	15 Dec-20 13:28	**Analysis:**	Untrimmed Spearman-Kärber	**Status Level:**	1

Sample ID:	01-1623-1798	**Code:**	6ED8E76	**Project:**	
Sample Date:	07 Dec-20 08:00	**Material:**	POTW Effluent	**Source:**	Discharge Monitoring Report
Receipt Date:	08 Dec-20 13:20	**CAS (PC):**		**Station:**	001
Sample Age:	30h	**Client:**	Towamencin		

$TU_a = \frac{100}{LC_{50}} = 1.11$

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	0.00%	1.955469	0.0112789	90.25	85.69	95.07

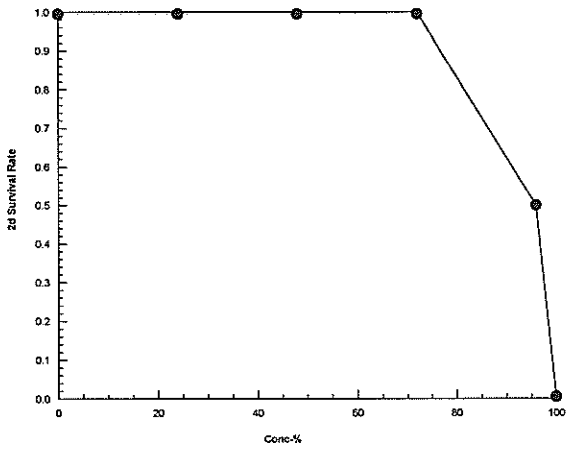
2d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
24		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
48		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
72		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
96		10	0.5000	0.0000	1.0000	0.5270	105.40%	50.0%	5/10	0.5	50.0%
100		10	0.0000	0.0000	0.0000	0.0000		100.0%	0/10	0	100.0%

2d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	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	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Graphics



KHV

CETIS Analytical Report

Report Date:	15 Dec-20 13:29 (p 1 of 1)
Test Code/ID:	43BDA1AA / 11-3650-1162

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroScience**

Analysis ID:	09-0863-9435	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.6
Analyzed:	15 Dec-20 13:28	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Sample ID:	01-1623-1798	**Code:**	6ED8E76	**Project:**	
Sample Date:	07 Dec-20 08:00	**Material:**	POTW Effluent	**Source:**	Discharge Monitoring Report
Receipt Date:	08 Dec-20 13:20	**CAS (PC):**		**Station:**	001
Sample Age:	30h	**Client:**	Towamencin		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	96	100	97.98	1.042

Fisher Exact/Bonferroni-Holm Test

Control vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Dilution Water	24	1.0000	Exact	1.0000	Non-Significant Effect
	48	1.0000	Exact	1.0000	Non-Significant Effect
	72	1.0000	Exact	1.0000	Non-Significant Effect
	96	0.0163	Exact	0.0650	Non-Significant Effect
	100*	0.0000	Exact	2.7E-05	Significant Effect

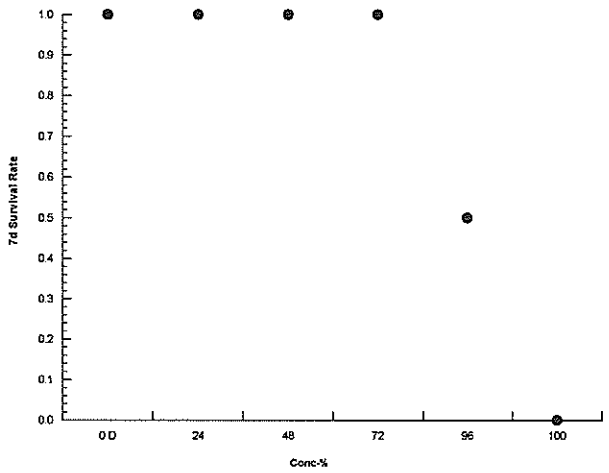
Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	D	10	0	10	1	0	0.0%
24		10	0	10	1	0	0.0%
48		10	0	10	1	0	0.0%
72		10	0	10	1	0	0.0%
96		5	5	10	0.5	0.5	50.0%
100		0	10	10	0	1	100.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	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	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Graphics



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CETIS Analytical Report

Report Date: 15 Dec-20 13:29 (p 1 of 2)
Test Code/ID: 43BDA1AA / 11-3650-1162

Ceriodaphnia 7-d Survival and Reproduction Test — EnviroScience

Analysis ID:	08-4406-7730	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.6
Analyzed:	15 Dec-20 13:28	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Sample ID:	01-1623-1798	**Code:**	6ED8E76	**Project:**	
Sample Date:	07 Dec-20 08:00	**Material:**	POTW Effluent	**Source:**	Discharge Monitoring Report
Receipt Date:	08 Dec-20 13:20	**CAS (PC):**		**Station:**	001
Sample Age:	30h	**Client:**	Towamencin		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	96	100	97.98	1.042	39.37%

Steel Many-One Rank Sum Test

Control vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water	24	135.5	76	2	18	CDF	0.9998	Non-Significant Effect
	48	129.5	76	3	18	CDF	0.9988	Non-Significant Effect
	72	116	76	3	18	CDF	0.9660	Non-Significant Effect
	96	97.5	76	2	18	CDF	0.5709	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1774.08	443.52	4	3.099	0.0246	Significant Effect
Error	6440.5	143.122	45			
Total	8214.58		49			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	27.11	13.28	1.9E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9376	0.9367	0.0108	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	30.2	27.92	32.48	30.5	24	35	1.009	10.56%	0.00%
24		10	31.4	24.36	38.44	33.5	4	39	3.113	31.36%	-3.97%
48		10	34.2	30.14	38.26	33	24	44	1.794	16.59%	-13.25%
72		10	26	14.73	37.27	32.5	3	42	4.98	60.57%	13.91%
96		10	17.1	4.138	30.06	15.5	0	38	5.73	105.96%	43.38%
100		10	0	0	0	0	0	0	0		100.00%

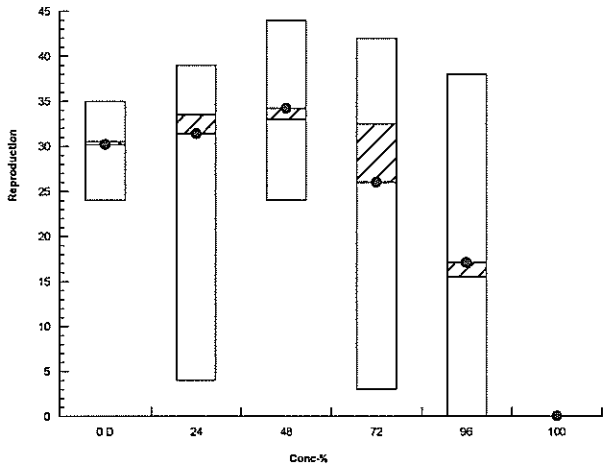
Reproduction Detail

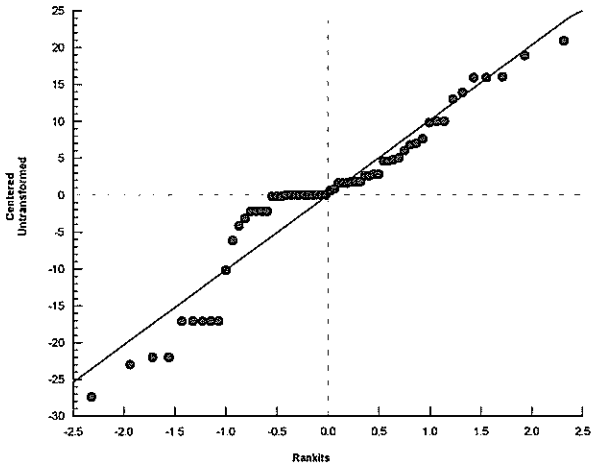
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	27	32	30	30	33	28	24	31	32	35
24		33	4	36	33	36	33	34	39	32	34
48		34	32	36	24	44	37	30	41	32	32
72		36	3	39	33	4	32	31	36	42	4
96		36	0	0	0	33	33	31	38	0	0
100		0	0	0	0	0	0	0	0	0	0

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroScience**

Analysis ID:	08-4406-7730	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.6
Analyzed:	15 Dec-20 13:28	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Graphics





CETIS Analytical Report

Report Date: 15 Dec-20 13:29 (p 1 of 1)
Test Code/ID: 43BDA1AA / 11-3650-1162

Ceriodaphnia 7-d Survival and Reproduction Test — EnviroScience

Analysis ID:	19-1138-1108	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.6
Analyzed:	15 Dec-20 13:29	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Sample ID:	01-1623-1798	**Code:**	6ED8E76	**Project:**	
Sample Date:	07 Dec-20 08:00	**Material:**	POTW Effluent	**Source:**	Discharge Monitoring Report
Receipt Date:	08 Dec-20 13:20	**CAS (PC):**		**Station:**	001
Sample Age:	30h	**Client:**	Towamencin		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	265305	1000	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	77.53	60.53	96.4	1.29	1.037	1.652
IC50	96.27	80.17	97.6	1.039	1.025	1.247

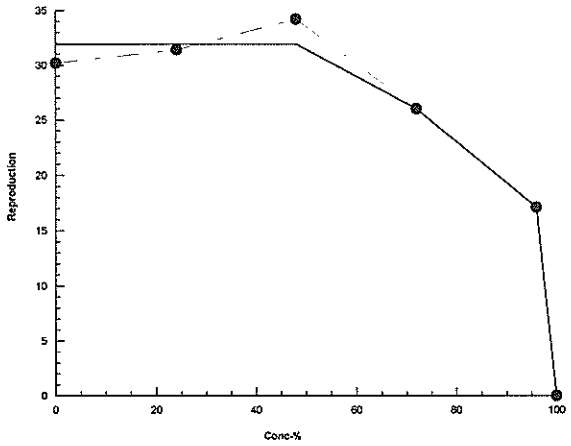
Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	D	10	30.2	24	35	3.19	10.56%	0.0%	31.93	0.0%
24		10	31.4	4	39	9.845	31.36%	-3.97%	31.93	0.0%
48		10	34.2	24	44	5.673	16.59%	-13.25%	31.93	0.0%
72		10	26	3	42	15.75	60.57%	13.91%	26	18.58%
96		10	17.1	0	38	18.12	106.00%	43.38%	17.1	46.45%
100		10	0	0	0	0		100.0%	0	100.0%

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	27	32	30	30	33	28	24	31	32	35
24		33	4	36	33	36	33	34	39	32	34
48		34	32	36	24	44	37	30	41	32	32
72		36	3	39	33	4	32	31	36	42	4
96		36	0	0	0	33	33	31	38	0	0
100		0	0	0	0	0	0	0	0	0	0

Graphics



EnviroScience Inc. Chronic Toxicity - Daily Chemistry Bench Sheet for ☑ *C. dubia* or ☐ FHM (check one)

Project ID:	T	O	W	A	120820	Permit No.:	PA0039004	Date:	12	08	20

Conductivity µmhos/cm - **INITIAL**

level	0	1	2	3	4	5	6
MHR	329	288	283	290	286	301	
24	496	489	891	880	985	995	
48	1608	1676	1350	1329	1667	1642	
72	850	857	1842	1892	2340	2360	
96	1035	1044	2250	2280	2990	2990	
100	1067	1080	2430	2430	3150	3170	

please initial and enter "I" and "F" in the appropriate instrument box.

	day→	0	1	2	3	4	5	6
TECH	Initial	CB	CB	CB	CB	AT	MT	
TECH	Final	CB	CB	CB	AT	MT	MT	
DO	830							
	820							
	YSI	I F	I F	I F	I F	I F	I F	
pH	920	I	I F	I	I F	I		
	2Star	F		F		F	I F	
cond.	160	I	I	I	I	I	I	

Dissolved Oxygen mg/l - **INITIAL**

level	0	1	2	3	4	5	6
MHR	8.6	8.6	8.6	8.6	8.6	8.6	
24	8.6	8.6	8.6	8.6	7.8	8.6	
48	8.6	8.6	8.6	8.6	8.6	8.6	
72	8.6	8.6	8.6	8.6	8.6	8.6	
96	8.6	8.6	8.6	8.6	8.6	8.6	
100	8.6	8.6	8.6	8.6	8.6	8.6	

Dissolved Oxygen mg/l - **FINAL**

level	0	1	2	3	4	5	6
MHR	8.6	8.6	8.6	8.6	8.6	8.6	
24	8.6	8.6	8.6	8.6	8.6	8.6	
48	8.6	8.6	8.6	8.6	8.6	8.6	
72	8.6	8.6	8.6	8.6	8.6	8.6	
96	8.6	8.6	8.6	8.6	8.6	8.6	
100	8.6	~~8.6~~	—	—	—	—	—

pH s.u. - **INITIAL**

level	0	1	2	3	4	5	6
MHR	7.5	7.9	7.7	7.4	7.6	7.4	
24	7.4	7.6	7.5	7.4	7.5	7.4	
48	7.4	7.5	7.4	7.3	7.4	7.4	
72	7.3	7.4	7.4	7.3	7.3	7.3	
96	7.2	7.3	7.3	7.2	7.3	7.3	
100	7.2	7.3	7.3	7.2	7.2	7.2	

pH s.u. - **FINAL**

level	0	1	2	3	4	5	6
MHR	7.5	7.5	7.6	7.7	7.7	7.7	
24	7.5	7.6	7.6	7.8	7.6	7.7	
48	7.6	7.7	7.6	7.7	7.7	7.7	
72	7.7	7.8	7.7	7.8	7.7	7.8	
96	7.9	7.9	7.8	7.8	7.6	7.8	
100	7.9	~~7.9~~	—	—	—	—	—

CB 12-10

CHRONIC BIOASSAY:
INITIAL WATER QUALITY CHECKS (DO, pH, conductivity); CHLORINE, ALKALINITY, HARDNESS DATA.

Project ID: TOWA 120820 Permit No.: PA0039004
Test Date: 120820

Sample Type: →	EFFLUENT					
EnviroScience No.:	TOWA 120820EFF	TOWA 121020EFF	TOWA121220EFF			
D. Oxygen (mg/l-%sat) **>4 & <100%?**	8.6	8.6	8.6			
pH (s.u) **6-9?**	7.3	7.3	7.6			
Conductivity (µmhos/cm)	1048	2390	3110			
Alkalinity (mg/l $CaCO_3$) **MDL = 20 mg/l**	(4.2) 84	(3.5) 70	(3.7) 74			
Hardness (mg/l $CaCO_3$) **MDL = 5 mg/l**	(3.3) 132	(4.3) 172	(4.3) 172			
TRC_I (mg/l) **<0.02?**	<0.02	<0.02	<0.02			
TRC_A (mg/l) <0.02?	—	—	—			
Ammonia as N (mg/L)	1.59	0.61	0.72			
Tech Initials :	CB	CB	AT			

Methods/Instrumentation :
DO: APHA (1998) 4500-O G, YSI 5100; pH: APHA (1998) 4500-H B, Orion 920A/2Star; Conductivity: APHA (1998) 2510-B, Orion 160; Hardness: APHA (1998) 2340-C; Alkalinity: APHA (1998) 2320-B; Chlorine: APHA (1998) 4500-Cl D, HACH Auto CAT9000

Sample Type: effluent (outfall # if more than one), upstream, downstream (NF, FF), lab water, etc.

EnviroScience No.: Tracking number from C-O-C (client code+date received+type/outfall/unique #)

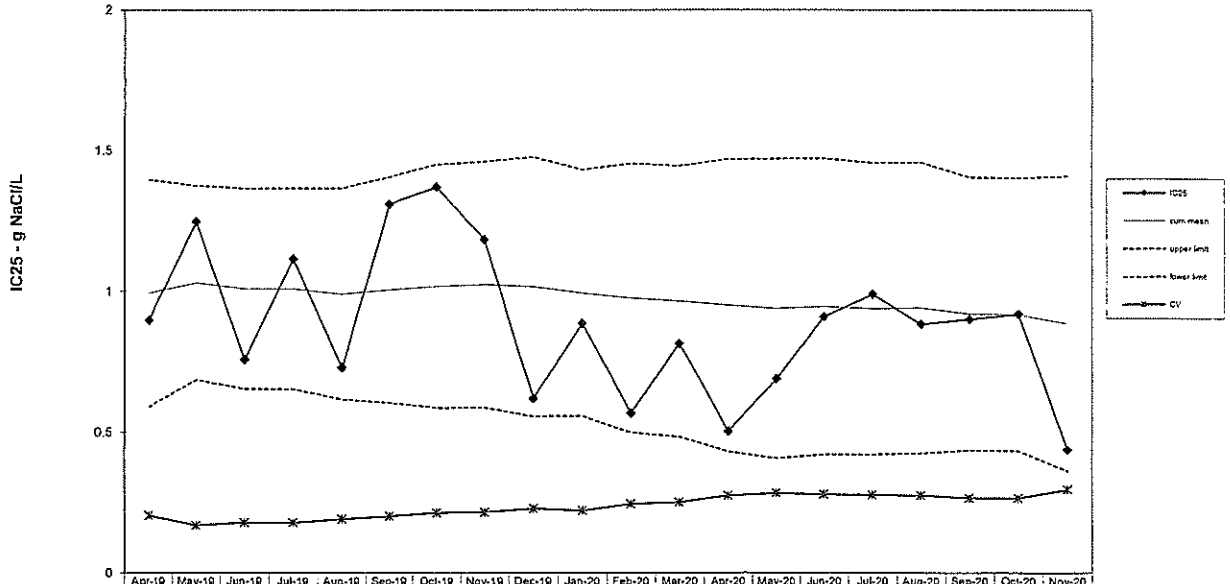
Dechlorination procedure:
TRC_I = total residual chlorine, initial value measured prior to dilution or use of sample.
TRC_A = TRC value measured after dechlorination.

Sodium thiosulfate is used to reduce Total Residual Chlorine by dosing with 6.7 mg $Na_2S_2O_3$ per mg TRC.
A 6.7 mg/ml $Na_2S_2O_3$ solution is used; dose mls = X mg/l * liters in sample container being treated.

Comments: Describe dechlorination/pH-adjustments including lot numbers, concentration, volumes of sodium thiosulfate or acid/base solutions and volume of sample treated, preparation of blanks; problems associated with data collection, etc. Initial all entries along with date/time/sample #. Attach additional pages if necessary.

KHV

EnviroScience QC Chart - *Ceriodaphnia dubia*
Chronic Toxicity Endpoint - Reproduction IC_{25}



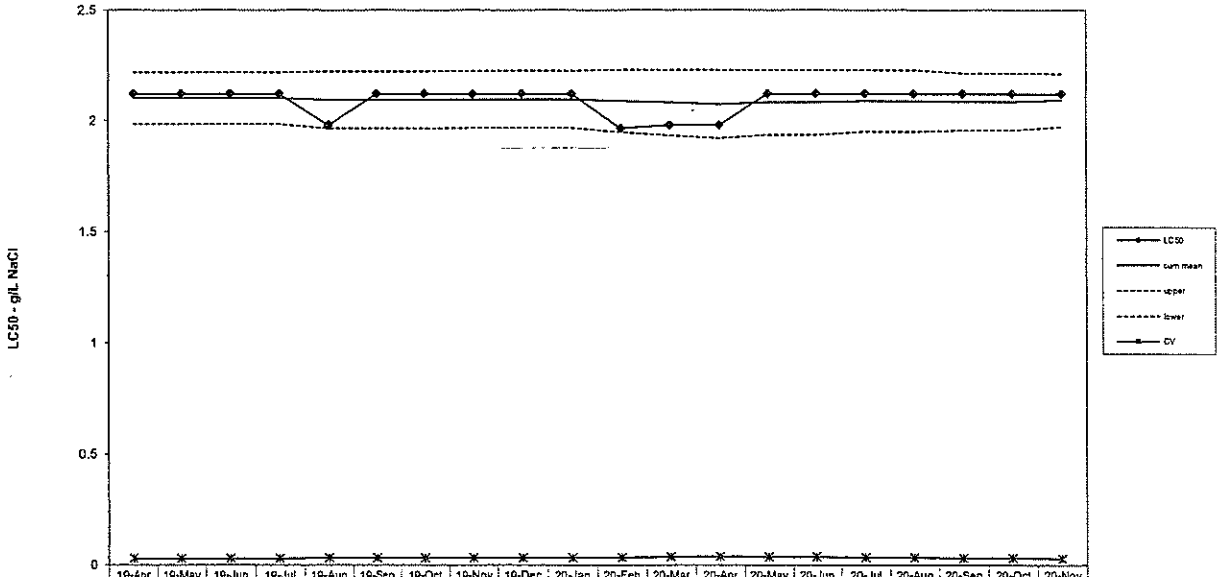
	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20
IC25	0.8551	1.246	0.7556	1.114	0.7289	1.308	1.37	1.182	0.6177	0.8853	0.5672	0.8133	0.5022	0.6875	0.9084	0.9889	0.8826	0.9003	0.918	0.4373
cum mean	0.99256	1.03002	1.00805	1.00875	0.99015	1.00446	1.01795	1.02365	1.01639	0.99385	0.9763	0.96437	0.94957	0.93857	0.94592	0.93807	0.94049	0.91971	0.91705	0.88552
upper limit	1.39624	1.3752	1.3645	1.36601	1.36548	1.40578	1.44962	1.46127	1.47646	1.43162	1.45323	1.44525	1.46888	1.4706	1.47166	1.45586	1.45668	1.40477	1.40151	1.40913
lower limit	0.58907	0.68484	0.6516	0.65149	0.61481	0.60311	0.58607	0.58602	0.55631	0.55608	0.49937	0.48348	0.43046	0.40653	0.42018	0.42027	0.4243	0.43464	0.43259	0.3619
CV	0.20329	0.16756	0.1768	0.17708	0.18953	0.19978	0.21213	0.21376	0.22533	0.22024	0.24426	0.24933	0.27334	0.28343	0.2779	0.27599	0.27443	0.26371	0.26414	0.28566

Test Date

EnviroScience QC/SRT Chart rev. 12/02/20

Tests conducted with MHRW

EnviroScience QC Chart- *Ceriodaphnia dubia*
Chronic Toxicity Endpoint - Survival LC50



	19-Apr	19-May	19-Jun	19-Jul	19-Aug	19-Sep	19-Oct	19-Nov	19-Dec	20-Jan	20-Feb	20-Mar	20-Apr	20-May	20-Jun	20-Jul	20-Aug	20-Sep	20-Oct	20-Nov
LC50	2.121	2.121	2.121	2.121	1.979	2.121	2.121	2.121	2.121	2.121	1.985	1.979	1.979	2.121	2.121	2.121	2.121	2.121	2.121	2.121
cum mean	2.1013	2.1013	2.1013	2.1013	2.0942	2.0942	2.0942	2.0961	2.0961	2.0961	2.0883	2.0812	2.0741	2.0819	2.0819	2.089	2.089	2.0845	2.0848	2.0919
upper	2.21864	2.21864	2.21864	2.21864	2.22313	2.22313	2.22313	2.22546	2.22546	2.22546	2.2295	2.22957	2.22603	2.22818	2.22818	2.22784	2.22784	2.21359	2.21359	2.21145
lower	1.98396	1.98396	1.98396	1.98396	1.96527	1.96527	1.96527	1.96674	1.96674	1.96674	1.947	1.93273	1.92017	1.93562	1.93562	1.95015	1.95015	1.95601	1.95601	1.97235
CV	0.02792	0.02792	0.02792	0.02792	0.03078	0.03078	0.03078	0.03085	0.03086	0.03085	0.03383	0.03567	0.03711	0.03513	0.03513	0.03323	0.03323	0.03089	0.03089	0.02858

Test Date

EnviroScience QC/SRT Chart rev. 12/02/20

Tests conducted with MHRW