Toxicity Tests
For
Western Virginia Water Authority

Report # 2998

Submitted To:
S. Scott Shirley
Chief Operating Officer- Water Quality
Western Virginia Water Authority

Submitted By:
Biological Monitoring, Inc.
1800 Kraft Drive, Suite 104
Blacksburg, VA 24060

Phone: 540-953-2821
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Report Date: Nov 22, 2022

Biological Monitoring, Inc. is accredited by The NELAC Institute (TNI 2016, ID:460015). The test results reported herein meet all requirements of TNI. The procedures are deemed compliant with the methods and acceptable for reporting.

Quality Manager

BIOLOGICAL MONITORING, INC
1800 KRAFT DRIVE SUITE 104 BLACKSBURG VIRGINIA 24060
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TNI ACCREDITED LAB# 460015

Toxicity Testing Data Summary

Client Western Virginia Water Authority **Permit #** 4AROA202.20 **Sample** 13th Street Bridge

Test ID	WVA111122-3	**Result**	NOEC = 25, IC25 > 100	**Pass/Fail**	NA	**Next Step**	NA
Test ID	WVA111122-4	**Result**	NOEC = 100, IC25 > 100	**Pass/Fail**	NA	**Next Step**	NA

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Certificate of Analysis

Client	**Western Virginia Water Authority**	**Report #**	**2998**
BMI Project #	**4268**	**Report Date**	**Nov 22, 2022**
Permit #	**4AROA202.20**	**Sample ID #s**	**WVA111122-2, WVA111222-2, WVA111322-2, WVA111422-2, WVA111522-2**
Sample	**13th Street Bridge**	**Test ID #**	**WVA111122-3**

Test Type	**Short Term Chronic**			**Organism**	**Pimephales promelas**
Test Start Date	**Nov 11, 2022**	**Test Start Time**	**1300**	**EPA Method #**	**1000**
Test End Date	**Nov 18, 2022**	**Test End Time**	**1230**	**Photoperiod**	**16h L/8h D**

Endpoint	Survival	**Method**	Dunnett's Test	**Result**	NOEC = 25
Endpoint	Survival	**Method**	Graphical	**Result**	48h LC50 > 100
Endpoint	Growth	**Method**	Dunnett's Test	**Result**	NOEC = 100
Endpoint	Growth	**Method**	Linear Interpolation	**Result**	IC25 > 100
Endpoint	Growth	**Method**	PMSD	**Result**	21.13%

Final Result NOEC = 25, IC25 > 100, TUc = 4 **Pass/Fail** NA

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Client	**Western Virginia Water Authority**	**Report #**	**2998**
BMI Project #	**4268**	**Report Date**	**Nov 22, 2022**
Permit #	**4AROA202.20**	**Sample ID #s**	**WVA111122-2, WVA111222-2, WVA111322-2, WVA111422-2, WVA111522-2**
Sample	**13th Street Bridge**	**Test ID #**	**WVA111122-4**

Test Type	**Short Term Chronic**			**Organism**	**Ceriodaphnia dubia**
Test Start Date	**Nov 11, 2022**	**Test Start Time**	**1300**	**EPA Method #**	**1002**
Test End Date	**Nov 17, 2022**	**Test End Time**	**1230**	**Photoperiod**	**16h L/8h D**

Endpoint	Survival	**Method**	Fisher's Exact Test	**Result**	NOEC = 100
Endpoint	Survival	**Method**	Graphical	**Result**	48h LC50 > 100
Endpoint	Reproduction	**Method**	Dunnett's Test	**Result**	NOEC = 100
Endpoint	Reproduction	**Method**	Linear Interpolation	**Result**	IC25 > 100
Endpoint	Reproduction	**Method**	PMSD	**Result**	14.37%

Final Result NOEC = 100, IC25 > 100, TUc = 1 **Pass/Fail** NA

Chronic Toxicity Test
(*Pimephales promelas*)

Experiment I.D.# WVA111122-3
Biologist(s): JR PR VF RG MH WB
Permit # 4AR0A202.20
Client: WVWA
Effluent toxicant: 13th street bridge
Sample Type: (Grab) Composite
Sample Chlorine: <0.02
Dilution Water Used MHRW
Feeding Schedule: 0.15 ml Artemia 2x Daily
Aeration: None
Template #: 4x6 odd

Start of Test Date: 11-11-22 Time: 1300
End of Test Date: 11-18-22 Time: 1230
Test Duration: 7 days
Test Temperature: 25 +/- 1 deg C
Test Volume: 350 ml
Test Containers Used: 500 ml PE
Renewal Frequency: Daily
Test Organism Age: ~~<24hr~~ ① 24 to 48hr
Organism Batch #: ABS111122-1
Organisms per concentration: 40
Waterbath/Shelf #: 5

SAMPLE COLLECTION				TEST RENEWAL			
Date(s)		Time(s)					
From:	To:	From:	To:	Date(s)	Time(s)	Test Day	Diluent Batch #:
11-11-22	—	0900	—	11-11-22	1300	0	8314
11-12-22	—	0725	—	11-12-22	1130	1	8314
11-13-22	—	0840	—	11-13-22	1130	2	8318
11-14-22	—	0930	—	11-14-22	1200	3	8318
11-15-22	—	1025	—	11-15-22	1200	4	8318
	—		—	11-16-22	1130	5	8320
				11-17-22	1130	6	8320

Meters: Instrument Id#: Temp.: 077 pH: 061

DO: 061 Conductivity/Salinity: 061

Condition of Organisms at End of Test: Normal

Average weight per control fish: 0.600 Control Survival (%): 100

Comments: ① VF 11-14-22

Experiment ID: WVAH1122-3

Conc: Units	Day	Number of Live Organisms A	B	C	D	DO (mg/L) Before	After	pH Before	After	Alkalinity mg/L as $CaCO_3$	Hardness mg/L as $CaCO_3$	Cond./ Salinity umho/ 0/00	Temp. (C) Before	After	Feeding 1	Feeding 2	Comments	Initials
%	0	10	10	10	10		7.79		8.14	66	102	295		25	✓	✓		MH
	1	10	10	10	10	6.60	6.98	8.03	8.13			286	25	25	✓	✓		MH
	2	10	10	10	10	6.68	7.24	8.00	8.27	58	104	301	25	25	✓	✓		VF
0	3	10	10	10	10	7.33	9.29	8.09	8.15			312	25	25	✓	✓		VF
	4	10	10	10	10	7.48	9.32	8.12	8.19			313	25	25	✓	✓		VF
	5	10	10	10	10	8.04	8.27	8.11	8.26	60	106	298	25	25	✓	✓		VF
	6	10	10	10	10	8.05	9.53	8.06	8.30			305	25	25	✓	✓		BG
	7	10	10	10	10	7.88		8.08					25		No Food			LMD
	0	10	10	10	10		7.79		8.08			291		25	✓	✓		MH
	1	10	10	10	10	6.54	6.84	8.02	8.10			303	25	25	✓	✓		MH
	2	10	10	10	10	6.74	7.21	8.01	8.13			295	25	25	✓	✓		VF
6.25	3	8	10	10	10	7.42	9.20	8.03	8.16			308	25	25	✓	✓		VF
	4	7	10	10	10	7.71	9.26	8.03	8.20			309	25	25	✓	✓		VF
	5	6	10	9	9	7.99	8.67	8.09	8.20			303	25	25	✓	✓		VF
	6	6	10	9	8	7.86	9.26	8.04	8.26			304	25	25	✓	✓		BG
	7	6	10	9	8	7.65		7.99					25		No Food			LMD
	0	10	10	10	10		7.78		8.09			286		25	✓	✓		MH
	1	10	10	10	10	6.53	6.80	8.03	8.12			276	25	25	✓	✓		MH
	2	10	10	10	10	6.72	7.01	7.95	8.14			295	25	25	✓	✓		VF
12.5	3	~~9~~ 10	~~9~~ 10	9	10	7.26	8.87	7.95	8.12			301	25	25	✓	✓		VF
	4	9	9	9	10	7.34	9.17	7.91	8.22			309	25	25	✓	✓		VF
	5	9	9	9	10	7.92	8.61	8.07	8.21			301	25	25	✓	✓		VF
	6	9	9	9	10	7.90	8.78	8.06	8.23			302	25	25	✓	✓		BG
	7	9	9	9	10	7.46		7.99					25		No Food			LMD

© VF 11-14-22

Experiment ID: WVA111122-3

Conc: Units	Day	Number of Live Organisms A	B	C	D	DO (mg/L) Before	After	pH Before	After	Alkalinity mg/L as $CaCO_3$	Hardness mg/L as $CaCO_3$	Cond./ Salinity umho/ 0/00	Temp. (C) Before	After	Feeding 1	Feeding 2	Comments	Initials
%	0	10	10	10	10		7.82		8.08			278		25	✓	✓		MH
	1	10	10	10	9	6.55	6.66	8.03	8.13			326	25	25	✓	✓		MH
	2	10	10	10	9	6.80	6.29	7.96	8.16			283	25	25	✓	✓		VF
25	3	10	9 10	9 10	9	7.19	8.39	8.01	8.16			300	25	25	✓	✓		VF
	4	10	10	10	8	6.88	8.98	7.87	8.25			306	25	25	✓	✓		VF
	5	10	10	10	8	7.85	8.38	8.06	8.24			297	25	25	✓	✓		VF
	6	10	10	10	8	7.91	9.18	8.12	8.23			299	25	25	✓	✓		BR
	7	10	10	10	8	7.34		8.03					25		No Food			CWO
	0	10	10	10	10		7.92		8.08			262		25	✓	✓		MH
	1	10	10	10	10	6.62	6.69	8.11	8.12			371	25	25	✓	✓		MH
	2	10	10	10	10	6.77	6.34	7.95	8.16			271	25	25	✓	✓		VF
	3	9	9	8	9	7.23	8.35	8.09	8.21			287	25	25	✓	✓		VF
50	4	8	8	8	9	6.92	8.94	7.89	8.25			303	25	25	✓	✓		VF
	5	8	8	8	9	7.87	8.35	8.09	8.26			293	25	25	✓	✓		VF
	6	8	8	8	9	7.81	9.34	8.18	8.24			297	25	25	✓	✓		BR
	7	7	8	8	9	8.10		8.19					25		No Food			CWO
	0	10	10	10	10		8.08		8.04	96	130	233		25	✓	✓		MH
	1	10	10	10	10	6.61	6.70	8.14	8.07	92	106	450	25	25	✓	✓		MH
	2	10	10	9	10	6.70	6.85	8.00	8.15	98	144	240	25	25	✓	✓		VF
100	3	9	10	8	10	7.23	8.39	8.14	8.24	120	166	265	25	25	✓	✓		VF
	4	9	10	8	10	6.71	8.96	7.99	8.29	114	162	296	25	25	✓	✓		VF
	5	8	10	8	10	8.11	8.45	8.18	8.27			288	25	25	✓	✓		VF
	6	8	10	8	10	8.00	9.24	8.34	8.28			288	25	25	✓	✓		BR
	7	7	10	8	10	7.90		8.29					25		No Food			CWO

④ VF 11-14-22

Weight Data Sheet

Experiment ID: WVAH1122-3

Treatment ID	Initial Weight (mg)	Final Weight (mg)	# Larvae	Comments	Initials
0 A	17.92	23.53	10		LWD
0 B	17.94	23.62	10		LWD
0 C	18.62	24.75	10		LWD
0 D	17.46	24.05	10		LWD
6.25 A	17.75	22.88	10		LWD
6.25 B	17.50	24.53	10		LWD
6.25 C	19.51	25.75	10		LWD
6.25 D	18.39	23.36	10		LWD
12.5 A	18.72	24.98	10		LWD
12.5 B	18.14	25.34	10		LWD
12.5 C	18.23	23.75	10		LWD
12.5 D	19.31	26.45	10		LWD
25 A	18.66	25.28	10		LWD
25 B	18.33	25.14	10		LWD
25 C	18.99	24.38	10		LWD
25 D	17.57	23.97	10		LWD
50 A	18.88	23.78	10		LWD
50 B	18.05	23.60	10		LWD
50 C	17.70	23.49	10		LWD
50 D	19.44	25.48	10		LWD
100 A	17.85	23.30	10		LWD
100 B	19.42	25.83	10		LWD
100 C	18.06	22.51	10		LWD
100 D	18.25	24.71	10		LWD

CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Biological Monitoring, Inc.**

Analysis ID:	13-3089-3159	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 17:51	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	04-8102-8422	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	11 Nov-22 13:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	18 Nov-22 12:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	7d	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CO **Age:** 48
Sample ID:	00-7504-8612	**Code:**	WVA111122-2	**Project:**	Special Studies
Sample Date:	11 Nov-22 09:00	**Material:**	Riverine Monitoring Sample	**Source:**	4AROA202.20 (4AROA202.2)
Receipt Date:	11 Nov-22 12:05	**CAS (PC):**		**Station:**	13th Street Bridge
Sample Age:	4h	**Client:**	Western Va Water Authority		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	25	50	35.36	4	16.32%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water	6.25	2.326	2.407	0.257	6	CDF	0.0582	Non-Significant Effect
	12.5	1.144	2.407	0.257	6	CDF	0.3599	Non-Significant Effect
	25	0.7136	2.407	0.257	6	CDF	0.5518	Non-Significant Effect
	50*	2.794	2.407	0.257	6	CDF	0.0234	Significant Effect
	100	1.699	2.407	0.257	6	CDF	0.1701	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.245182	0.0490364	5	2.149	0.1059	Non-Significant Effect
Error	0.410663	0.0228146	18			
Total	0.655845		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	4.194	4.248	0.0106	Equal Variances
Variances	Mod Levene Equality of Variance Test	2.378	4.248	0.0801	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9619	0.884	0.4781	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	0.8250	0.5532	1.0000	0.8500	0.6000	1.0000	0.0854	20.70%	17.50%
12.5		4	0.9250	0.8454	1.0000	0.9000	0.9000	1.0000	0.0250	5.41%	7.50%
25		4	0.9500	0.7909	1.0000	1.0000	0.8000	1.0000	0.0500	10.53%	5.00%
50		4	0.8000	0.6701	0.9299	0.8000	0.7000	0.9000	0.0408	10.21%	20.00%
100		4	0.8750	0.6363	1.0000	0.9000	0.7000	1.0000	0.0750	17.14%	12.50%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
6.25		4	1.164	0.8087	1.518	1.178	0.8861	1.412	0.1115	19.17%	17.59%
12.5		4	1.29	1.16	1.419	1.249	1.249	1.412	0.04074	6.32%	8.66%
25		4	1.336	1.093	1.578	1.412	1.107	1.412	0.07622	11.41%	5.40%
50		4	1.114	0.9457	1.282	1.107	0.9912	1.249	0.05277	9.48%	21.13%
100		4	1.231	0.8888	1.572	1.26	0.9912	1.412	0.1074	17.45%	12.85%

Fathead Minnow 7-d Larval Survival and Growth Test — **Biological Monitoring, Inc.**

Analysis ID: 13-3089-3159 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 21 Nov-22 17:51 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		0.6000	1.0000	0.9000	0.8000
12.5		0.9000	0.9000	0.9000	1.0000
25		1.0000	1.0000	1.0000	0.8000
50		0.7000	0.8000	0.8000	0.9000
100		0.7000	1.0000	0.8000	1.0000

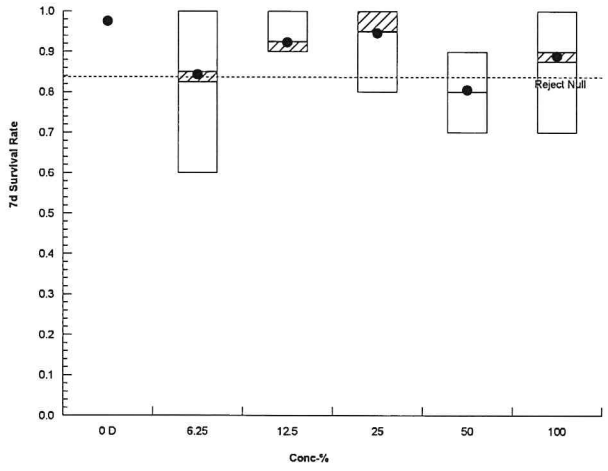
Angular (Corrected) Transformed Detail

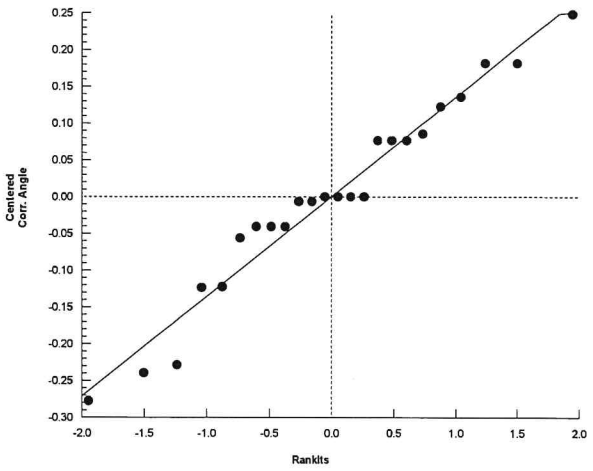
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.412	1.412	1.412	1.412
6.25		0.8861	1.412	1.249	1.107
12.5		1.249	1.249	1.249	1.412
25		1.412	1.412	1.412	1.107
50		0.9912	1.107	1.107	1.249
100		0.9912	1.412	1.107	1.412

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		6/10	10/10	9/10	8/10
12.5		9/10	9/10	9/10	10/10
25		10/10	10/10	10/10	8/10
50		7/10	8/10	8/10	9/10
100		7/10	10/10	8/10	10/10

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Biological Monitoring, Inc.**

Analysis ID:	11-6438-0977	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 17:51	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	04-8102-8422	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	11 Nov-22 13:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	18 Nov-22 12:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	7d	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CO **Age:** 48
Sample ID:	00-7504-8612	**Code:**	WVA111122-2	**Project:**	Special Studies
Sample Date:	11 Nov-22 09:00	**Material:**	Riverine Monitoring Sample	**Source:**	4AROA202.20 (4AROA202.2)
Receipt Date:	11 Nov-22 12:05	**CAS (PC):**		**Station:**	13th Street Bridge
Sample Age:	4h	**Client:**	Western Va Water Authority		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	>100	n/a	1	21.13%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water	6.25	0.3036	2.407	0.127	6	CDF	0.7288	Non-Significant Effect
	12.5	-1.001	2.407	0.127	6	CDF	0.9828	Non-Significant Effect
	25	-0.5741	2.407	0.127	6	CDF	0.9491	Non-Significant Effect
	50	0.8208	2.407	0.127	6	CDF	0.5027	Non-Significant Effect
	100	0.5883	2.407	0.127	6	CDF	0.6086	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.6002	0.25	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0271057	0.0054212	5	0.9762	0.4587	Non-Significant Effect
Error	0.0999612	0.0055534	18			
Total	0.127067		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.66	15.09	0.7522	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9611	0.884	0.4600	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.6003	0.5279	0.6726	0.5905	0.561	0.659	0.02272	7.57%	0.00%
6.25		4	0.5843	0.4295	0.739	0.5685	0.497	0.703	0.04862	16.64%	2.67%
12.5		4	0.653	0.5259	0.7801	0.67	0.552	0.72	0.03994	12.23%	-8.79%
25		4	0.6305	0.5298	0.7312	0.651	0.539	0.681	0.03163	10.03%	-5.04%
50		4	0.557	0.4791	0.6349	0.567	0.49	0.604	0.02447	8.79%	7.21%
100		4	0.5692	0.4181	0.7204	0.593	0.445	0.646	0.04749	16.69%	5.16%

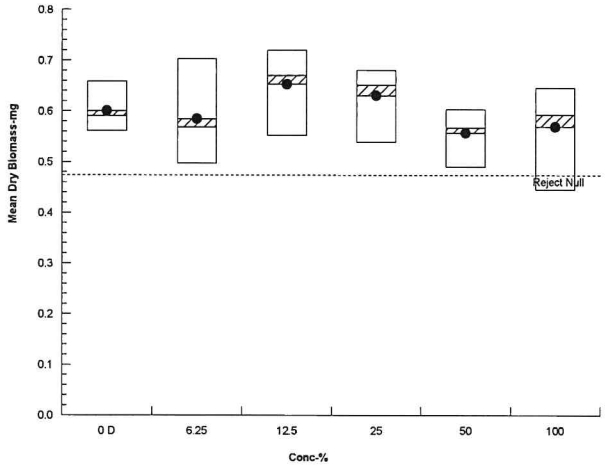
Mean Dry Biomass-mg Detail

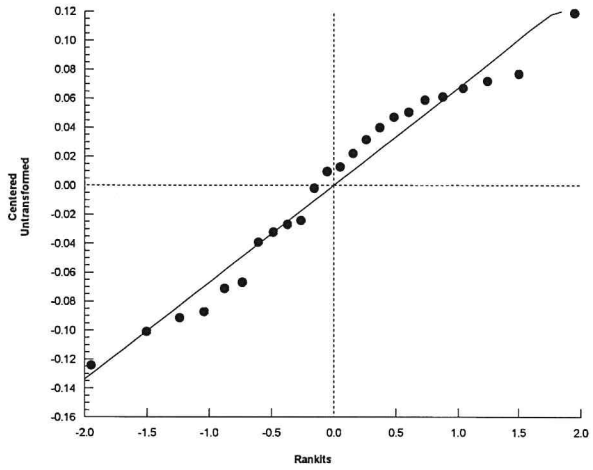
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.561	0.568	0.613	0.659
6.25		0.513	0.703	0.624	0.497
12.5		0.626	0.72	0.552	0.714
25		0.662	0.681	0.539	0.64
50		0.49	0.555	0.579	0.604
100		0.545	0.641	0.445	0.646

Fathead Minnow 7-d Larval Survival and Growth Test **Biological Monitoring, Inc.**

Analysis ID:	11-6438-0977	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 17:51	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Biological Monitoring, Inc.**

Analysis ID:	11-1869-4986	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 17:51	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	04-8102-8422	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	11 Nov-22 13:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	18 Nov-22 12:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	7d	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CO **Age:** 48
Sample ID:	00-7504-8612	**Code:**	WVA111122-2	**Project:**	Special Studies
Sample Date:	11 Nov-22 09:00	**Material:**	Riverine Monitoring Sample	**Source:**	4AROA202.20 (4AROA202.2)
Receipt Date:	11 Nov-22 12:05	**CAS (PC):**		**Station:**	13th Street Bridge
Sample Age:	4h	**Client:**	Western Va Water Authority		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	36928	1000	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.6002	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	39.32	n/a	n/a	2.544	n/a	n/a
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**Mean**	**%Effect**
0	D	4	0.6003	0.561	0.659	0.04544	7.57%	0.0%	0.617	0.0%
6.25		4	0.5843	0.497	0.703	0.09725	16.64%	2.67%	0.617	0.0%
12.5		4	0.653	0.552	0.72	0.07987	12.23%	-8.79%	0.617	0.0%
25		4	0.6305	0.539	0.681	0.06326	10.03%	-5.04%	0.617	0.0%
50		4	0.557	0.49	0.604	0.04894	8.79%	7.21%	0.5631	8.73%
100		4	0.5692	0.445	0.646	0.09498	16.69%	5.17%	0.5631	8.73%

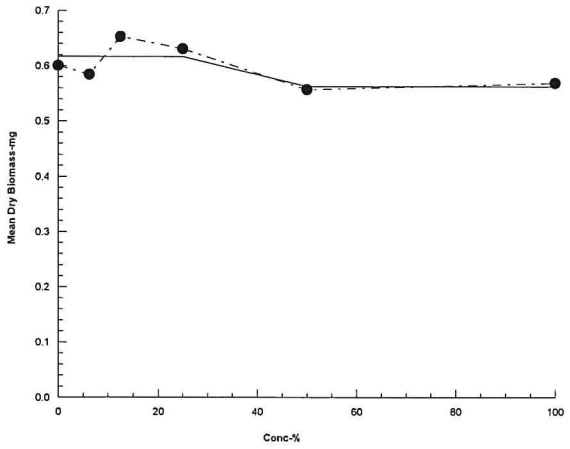
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.561	0.568	0.613	0.659
6.25		0.513	0.703	0.624	0.497
12.5		0.626	0.72	0.552	0.714
25		0.662	0.681	0.539	0.64
50		0.49	0.555	0.579	0.604
100		0.545	0.641	0.445	0.646

Fathead Minnow 7-d Larval Survival and Growth Test **Biological Monitoring, Inc.**

Analysis ID:	11-1869-4986	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 17:51	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Chronic Toxicity Test
(*Ceriodaphnia dubia*)

Experiment I.D.# WVA111122-4
Biologist(s): JR PR WB VF RG MH
Permit # 4AR0A202.20
Client: WVWA
Effluent toxicant: 13th Street Bridge
Sample Type: (Grab) Composite
Sample Chlorine: <0.02
Dilution Water Used MHRW
Feeding Schedule: 0.1 ml YCT and Rs Daily
Aeration: None
Template #: 4

Start of Test Date: 11-11-22 Time: 1300
End of Test Date: 11-17-22 Time: 1230
Test Duration: 3 Broods
Test Temperature: 25 +/- 1 deg C
Test Volume: 15 ml
Test Containers Used: 30 ml PS
Renewal Frequency: Daily
Test Organism Age: 15-21h
Organism Batch #: 110322 (1600-2200)
Organisms per concentration: 10
Waterbath/Shelf #: 9

SAMPLE COLLECTION				TEST RENEWAL			
Date(s)		Time(s)					
From:	To:	From:	To:	Date(s)	Time(s)	Test Day	Diluent Batch #:
11-11-22	—	0900	—	11-11-22	1300	0	8314
11-12-22	—	0725	—	11-12-22	1130	1	8314
11-13-22	—	0840	—	11-13-22	1130	2	8318
11-14-22	—	0930	—	11-14-22	1200	3	8318
11-15-22	—	1025	—	11-15-22	1200	4	8318
				11-16-22	1130	5	8320
						6	

Food Batch/Days Used: YCT 101822/0-5 Algae 110222/0-4
YCT — Algae 111522/5

Meters: Instrument Id#: Temp.: 077 pH: 061
DO: 061 Conductivity/Salinity: 061

Condition of Organisms at End of Test: Normal
Control Survival (%): 100 Average # Young/Female: 31.5
Percent control female with 3 broods (%): 100
Comments:

Experiment ID: WVA111122-2① 4

Conc: Units	Day	A	B	C	D	E	F	G	H	I	J	# Young	# Adults	# Males	Init.
%	1	0	0	0	0	0	0	0	0	0	0	0	10		AR
	2	0	0	0	0	0	0	0	0	0	0	0	10		AR
	3	5	0	0	0	0	4	0	6	4	0	19	10	0	AR
	4	0	4	5	5	4	0	6	0	0	6	30	10	0	AR
0	5	10	11	10	12	9	11	10	13	10	12	108	10	0	AR
	6	15	14	12	20	11	17	18	15	19	17	158	10	0	AR
	7														
	Total	30	29	27	37	24	32	34	34	33	35	315	10	0	AR
	1	0	0	0	0	0	0	0	0	0	0	0	10		AR
	2	0	0	0	0	0	0	0	0	0	0	0	10		AR
	3	5	4	0	0	0	0	0	0	0	0	9	10	0	AR
	4	0	0	5	4	5	6	5	6	4	5	40	10	0	AR
6.25	5	12	12	8	11	13	11	9	7	13	13	109	10	0	AR
	6	11	18	13	20	15	15	16	11	21	13	153	10	0	AR
	7														
	Total	28	34	26	35	33	32	30	24	38	31	311	10	0	AR
	1	0	0	0	0	0	0	0	0	0	0	0	10		AR
	2	0	0	0	0	0	0	0	0	0	0	0	10		AR
	3	6	5	0	0	0	0	0	0	0	0	11	10	0	AR
	4	0	11	6	5	6	3	5	6	4	5	51	10	0	AR
12.5	5	10	0	11	10	12	11	12	11	12	11	100	10	0	AR
	6	18	19	8	14	20	12	17	17	18	17	160	10	0	AR
	7														
	Total	34	35	25	29	38	26	34	34	34	33	322	10	0	AR

① AR 11-11-22

①

Experiment ID: WVA111122-Z4

Conc: Units	Day	A	B	C	D	E	F	G	H	I	J	# Young	# Adults	# Males	Init.
%	1	0	0	0	0	0	0	0	0	0	0	0	10		PAL
	2	0	0	0	0	0	0	0	0	0	0	0	10		PAL
	3	0	7	5	0	0	0	6	6	0	0	24	10	0	PAL
	4	7	0	0	4	5	5	0	0	4	5	30	10	0	PAL
25	5	11	13	13	8	10	11	14	10	10	11	111	10	0	PAL
	6	16	16	7	19	18	22	16	20	15	16	165	10	0	PAL
	7														
	Total	34	36	25	31	33	38	36	36	29	32	330	10	0	PAL
	1	0	0	0	0	0	0	0	0	0	0	0	10		PAL
	2	0	0	0	0	0	0	0	0	0	0	0	10		PAL
	3	6	5	6	0	0	7	0	0	4	0	28	10	0	PAL
	4	0	0	0	5	6	0	6	4	0	5	26	10	0	PAL
50	5	13	14	12	11	10	13	11	10	12	11	117	10	0	PAL
	6	18	20	14	12	19	19	19	15	6	16	158	10	0	PAL
	7														
	Total	37	39	32	28	35	39	36	29	22	32	329	10	0	PAL
	1	0	0	0	0	0	0	0	0	0	0	0	10		PAL
	2	0	0	0	0	0	0	0	0	0	0	0	10		PAL
	3	6	0	6	5	0	0	5	0	0	0	22	10	0	PAL
	4	0	7	0	0	6	4	0	5	6	5	33	10	0	PAL
100	5	12	14	14	12	11	12	6	9	12	11	113	10	0	PAL
	6	21	12	17	13	10	16	15	23	19	21	167	10	0	PAL
	7														
	Total	39	33	37	30	27	32	26	37	37	37	335	10	0	PAL

① PAL 11-11-22

Experiment ID: WVA111122-4

Conc: Units	Day	Temperature (C)		Dissolved Oxygen (mg/L)		pH		Cond. (umhos)	Alkalinity (mg/L $CaCO_3$)	Hardness (mg/L $CaCO_3$)	Food	Init.
		Before	After	Before	After	Before	After					
%	0		25		7.79		8.14	295	66	102	✓	MH
	1	25	25	7.45	6.98	8.08	8.13	286			✓	BR
	2	25	25	7.26	7.24	8.14	8.27	301	58	104	✓	VF
	3	25	25	7.22	9.29	8.23	8.15	312			✓	VF
0	4	25	25	7.19	9.32	8.21	8.19	313			✓	BR
	5	25	25	8.06	8.27	8.18	8.26	298	60	106	✓	VF
	6	25	25	8.08	9.53	8.48	8.30	305			✓	BR
	7											
	0		25		7.79		8.08	291			✓	MH
	1	25	25	7.49	6.84	8.19	8.10	303			✓	BR
	2	25	25	7.22	7.21	8.22	8.13	290			✓	VF
	3	25	25	7.16	9.20	8.28	8.16	308			✓	VF
6.25	4	25	25	7.12	9.26	8.26	8.20	309			✓	BR
	5	25	25	8.08	8.67	8.20	8.20	303			✓	VF
	6	25	25	8.19	9.26	8.43	8.26	304			✓	BR
	7					~~8.~~ ①						
	0		25		7.78		8.09	286			✓	MH
	1	25	25	7.51	6.80	8.26	8.12	276			✓	BR
	2	25	25	7.32	7.01	8.28	8.14	295			✓	VF
	3	25	25	7.09	8.87	8.33	8.12	301			✓	VF
12.5	4	25	25	7.00	9.17	8.31	8.22	309			✓	BR
	5	25	25	8.16	8.61	8.25	8.21	301			✓	VF
	6	25	25	7.97	8.78	8.40	8.23	362			✓	BR
	7											

① 11/17/22 BG

Experiment ID:

Conc: Units	Day	Temperature (C)		Dissolved Oxygen (mg/L)		pH		Cond. (umhos)	Alkalinity (mg/L $CaCO_3$)	Hardness (mg/L $CaCO_3$)	Food	Init.
		Before	After	Before	After	Before	After					
%	0		25		7.82		8.08	278			✓	MH
	1	25	25	7.51	6.66	8.32	8.13	326			✓	PGL
	2	25	25	7.40	6.29	8.35	8.16	283			✓	VF
	3	25	25	6.98	8.39	8.38	8.16	300			✓	VF
25	4	25	25	6.89	8.98	8.33	8.25	306			✓	PGL
	5	25	25	8.19	8.38	8.28	8.24	297			✓	VF
	6	25	25	7.89		8.44					✓	BH
	7											
	0		25		7.92		8.08	262			✓	MH
	1	25	25	7.53	6.69	8.40	8.12	371			✓	PGL
	2	25	25	7.47	6.34	8.44	8.16	271			✓	VF
	3	25	25	6.91	8.35	8.44	8.21	287			✓	VF
50	4	25	25	6.82	8.94	8.34	8.25	303			✓	PGL
	5	25	25	8.25	8.35	8.30	8.26	293			✓	VF
	6	25	25	7.87		8.51					✓	BH
	7											
	0		25		8.08		8.04	233	96	130	✓	MH
	1	25	25	7.57	6.70	8.44	8.07	450	92	106	✓	PGL
	2	25	25	7.46	6.85	8.48	8.15	240	98	144	✓	VF
	3	25	25	6.90	8.39	8.45	8.24	265	120	166	✓	VF
100	4	25	25	6.78	8.96	8.34	8.29	296	114	162	✓	PGL
	5	25	25	8.28	8.45	8.33	8.27	288			✓	VF
	6	25	25	7.94		8.62					✓	BH
	7											

Ceriodaphnia 7-d Survival and Reproduction Test

Biological Monitoring, Inc.

Analysis ID:	18-6181-8996	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 18:20	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	17-8928-3291	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	11 Nov-22 13:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	17 Nov-22 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	5d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** 24
Sample ID:	03-5402-2261	**Code:**	WVA111122-2	**Project:**	Special Studies
Sample Date:	11 Nov-22 09:00	**Material:**	Riverine Monitoring Sample	**Source:**	4AROA202.20 (4AROA202.2)
Receipt Date:	11 Nov-22 12:05	**CAS (PC):**		**Station:**	13th Street Bridge
Sample Age:	4h	**Client:**	Western Va Water Authority		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	>100	n/a	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	D	10	0	10	1	0	0.0%
6.25		10	0	10	1	0	0.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%

6d 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
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		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

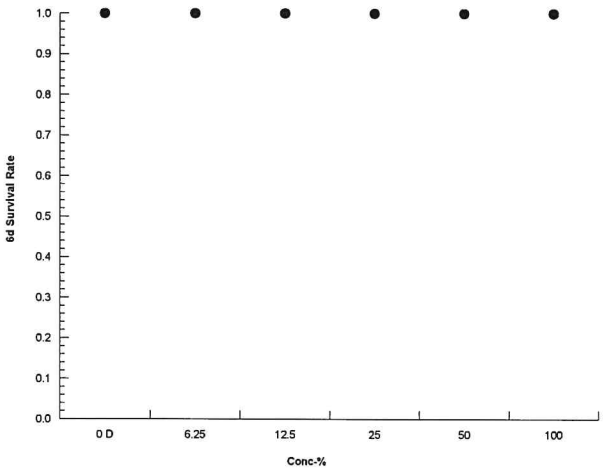
6d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Biological Monitoring, Inc.**

Analysis ID:	18-6181-8996	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 18:20	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Biological Monitoring, Inc.**

Analysis ID:	08-9145-3740	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 18:20	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8928-3291	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	11 Nov-22 13:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	17 Nov-22 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	5d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** 24
Sample ID:	03-5402-2261	**Code:**	WVA111122-2	**Project:**	Special Studies
Sample Date:	11 Nov-22 09:00	**Material:**	Riverine Monitoring Sample	**Source:**	4AROA202.20 (4AROA202.2)
Receipt Date:	11 Nov-22 12:05	**CAS (PC):**		**Station:**	13th Street Bridge
Sample Age:	4h	**Client:**	Western Va Water Authority		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	>100	n/a	1	14.37%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water	6.25	0.2022	2.289	4.528	18	CDF	0.7664	Non-Significant Effect
	12.5	-0.3539	2.289	4.528	18	CDF	0.9175	Non-Significant Effect
	25	-0.7583	2.289	4.528	18	CDF	0.9691	Non-Significant Effect
	50	-0.7078	2.289	4.528	18	CDF	0.9647	Non-Significant Effect
	100	-1.011	2.289	4.528	18	CDF	0.9851	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	31.5	15	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	43.5333	8.70667	5	0.4451	0.8150	Non-Significant Effect
Error	1056.4	19.563	54			
Total	1099.93		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.369	15.09	0.9277	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9523	0.9459	0.0201	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	31.5	28.65	34.35	32.5	24	37	1.258	12.63%	0.00%
6.25		10	31.1	28.06	34.14	31.5	24	38	1.345	13.68%	1.27%
12.5		10	32.2	29.23	35.17	34	25	38	1.315	12.91%	-2.22%
25		10	33	30.2	35.8	33.5	25	38	1.238	11.87%	-4.76%
50		10	32.9	29.02	36.78	33.5	22	39	1.716	16.49%	-4.44%
100		10	33.5	30.19	36.81	35	26	39	1.462	13.81%	-6.35%

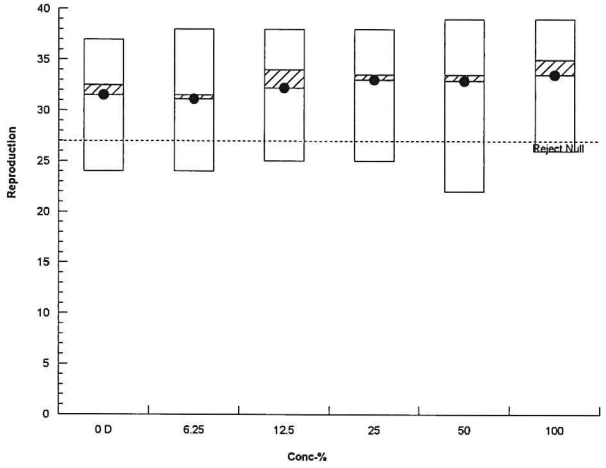
Reproduction Detail

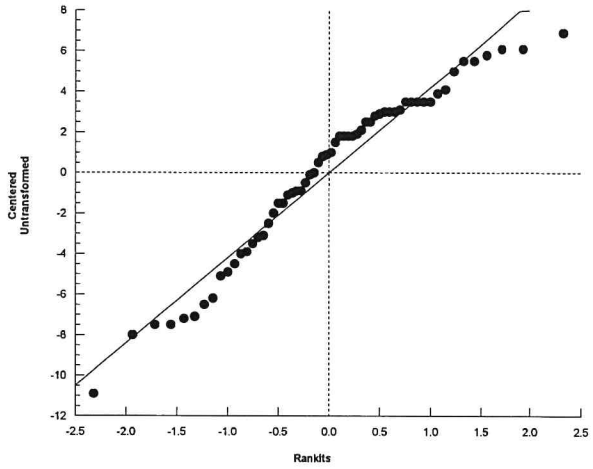
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	30	29	27	37	24	32	34	34	33	35
6.25		28	34	26	35	33	32	30	24	38	31
12.5		34	35	25	29	38	26	34	34	34	33
25		34	36	25	31	33	38	36	36	29	32
50		37	39	32	28	35	39	36	29	22	32
100		39	33	37	30	27	32	26	37	37	37

Ceriodaphnia 7-d Survival and Reproduction Test — **Biological Monitoring, Inc.**

Analysis ID:	08-9145-3740	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 18:20	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Biological Monitoring, Inc.**

Analysis ID:	06-6224-9122	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 18:21	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	17-8928-3291	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	11 Nov-22 13:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	17 Nov-22 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	5d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** 24
Sample ID:	03-5402-2261	**Code:**	WVA111122-2	**Project:**	Special Studies
Sample Date:	11 Nov-22 09:00	**Material:**	Riverine Monitoring Sample	**Source:**	4AROA202.20 (4AROA202.2)
Receipt Date:	11 Nov-22 12:05	**CAS (PC):**		**Station:**	13th Street Bridge
Sample Age:	4h	**Client:**	Western Va Water Authority		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	825728	1000	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	31.5	15	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	n/a	n/a	<1	n/a	n/a
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**Mean**	**%Effect**
0	D	10	31.5	24	37	3.979	12.63%	0.0%	32.37	0.0%
6.25		10	31.1	24	38	4.254	13.68%	1.27%	32.37	0.0%
12.5		10	32.2	25	38	4.158	12.91%	-2.22%	32.37	0.0%
25		10	33	25	38	3.916	11.87%	-4.76%	32.37	0.0%
50		10	32.9	22	39	5.425	16.49%	-4.44%	32.37	0.0%
100		10	33.5	26	39	4.625	13.81%	-6.35%	32.37	0.0%

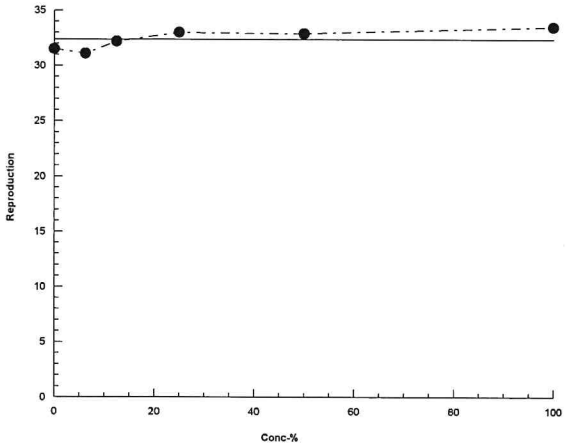
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	30	29	27	37	24	32	34	34	33	35
6.25		28	34	26	35	33	32	30	24	38	31
12.5		34	35	25	29	38	26	34	34	34	33
25		34	36	25	31	33	38	36	36	29	32
50		37	39	32	28	35	39	36	29	22	32
100		39	33	37	30	27	32	26	37	37	37

Ceriodaphnia 7-d Survival and Reproduction Test — **Biological Monitoring, Inc.**

Analysis ID:	06-6224-9122	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-22 18:21	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



BIOLOGICAL MONITORING, INC.
1800 KRAFT DRIVE SUITE 104 BLACKSBURG VIRGINIA 24060
PH: 540-953-2821 FAX: 540-951-1481 WWW.BIOMON.COM

NELAC ACCREDITED LAB # 460015

Sample Collection – Chain of Custody Form

Lab Sample ID (Lab Use Only): WVAW(1)111222-2

(1) WRB 11-11-22

General Information

Client WVWA Contact Name/Phone # 540-266-2835

NPDES Permit # VAR04J202.20 Outfall Name/# 13th Street Bridge

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information

[X] Grab Sample 11/11/2022 Date 9:00 Time _____ Volume 2 gal.

[ ] Composite Sample Type _____ Time _____ Flow

Composite Start Date _____ Composite Start Time _____

Composite End Date _____ Composite End Time _____

Sub-samples _____ Frequency _____ Volume _____

Field Measurements

Temp at Collection Point	Temp In Collection Device	pH	Chlorine	Date/Time	Initials

Custody Information

Relinquished By	Date	Time	Received By	Date	Time
Jason Hill	11/11/2022	12:05	Joel Hasnahe	11/11/22	1205

Jason Hill / UDEQ — Printed Name/Affiliation

Signature

11/11/2022 — Date

Sample Check In (Lab Use Only)

Temperature 3.3°C pH 7.94 Chlorine <0.02 DO 8.64 Conductivity/Salinity 230

On Ice? ✓ Custody Seal? N/A Alkalinity 96 Hardness 130

Visual Description cloudy Odor none

Ammonia (NH3-N) 0.00 Initials MH Date/Time 11-11-22/1400

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NELAC ACCREDITED LAB # 460015

Sample Collection – Chain of Custody Form

Lab Sample ID (Lab Use Only): W V A i 1 1 2 2 2 - 2

General Information

Client: WWA Contact Name/Phone #: 540-266-2835

NPDES Permit #: 4AR0A202.20 Outfall Name/#: 13th Street

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information

[X] Grab Sample _____ Date 11/12/22 Time 7:25 Volume 2 gallons

[ ] Composite Sample Type _____ Time _____ Flow

Composite Start Date _____ Composite Start Time _____

Composite End Date _____ Composite End Time _____

Sub-samples _____ Frequency _____ Volume _____

Field Measurements

Temp at Collection Point	Temp In Collection Device	pH	Chlorine	Date/Time	Initials

Custody Information

Relinquished By	Date	Time	Received By	Date	Time
	11/12/22	9:35		11/12/22	0835

JASON HILL/VDEQ — Printed Name/Affiliation

Signature

11/12/2022 — Date

Sample Check In (Lab Use Only)

Temperature 1.2°C pH 7.57 98 Chlorine <0.02 DO 8.04 Conductivity/Salinity 205

On Ice? ✓ Custody Seal? N/A Alkalinity 92 Hardness 106

Visual Description cloudy Odor none

Ammonia (NH3-N) 0.00 Initials MH Date/Time 11-12-22 / 0940

① MH 11-12-22

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NELAC ACCREDITED LAB # 460015

Sample Collection – Chain of Custody Form

Lab Sample ID (Lab Use Only): W V A 1 1 1 3 2 2 - 2

General Information

Client WWA Contact Name/Phone # 540-266-2835

NPDES Permit # 4AR0A202.20 Outfall Name/# 13th Street

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information

[X] Grab Sample _____ Date 11/13/22 Time 8:40 Volume 2 gallons

[ ] Composite Sample Type _____ Time _____ Flow

Composite Start Date _____ Composite Start Time _____

Composite End Date _____ Composite End Time _____

Sub-samples _____ Frequency _____ Volume _____

Field Measurements

Temp at Collection Point	Temp In Collection Device	pH	Chlorine	Date/Time	Initials

Custody Information

Relinquished By	Date	Time	Received By	Date	Time
Lucy Smith	11/13/22	1045	Joe Hasnabe	11/13/22	1045

Lucy Baker Smith / VDEQ (Printed Name/Affiliation) Lucy Smith (Signature) 11/13/2022 (Date)

Sample Check In (Lab Use Only)

Temperature 2.9 pH 8.02 Chlorine <0.02 DO 8.19 Conductivity/Salinity 235

On Ice? ✓ Custody Seal? N/A Alkalinity 98 Hardness 144

Visual Description cloudy/yellow Odor None

Ammonia (NH3-N) 0.00 Initials MH Date/Time 11-13-22 / 1100

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NELAC ACCREDITED LAB # 460015

Sample Collection – Chain of Custody Form

Lab Sample ID (Lab Use Only): W V A 1 1 1 4 2 2 - 2

General Information

Client: WVWA Contact Name/Phone #: Lacy Burnette / 540-266-2835

NPDES Permit #: 4AROA202.20 Outfall Name/#: 13th Street Bridge

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information

[X] Grab Sample _____ Date 11/14/22 Time 0930 Volume 2 gallons LBJM

[ ] Composite Sample Type _____ Time _____ Flow _____

Composite Start Date _____ Composite Start Time _____

Composite End Date _____ Composite End Time _____

Sub-samples _____ Frequency _____ Volume _____

Field Measurements

Temp at Collection Point	Temp In Collection Device	pH	Chlorine	Date/Time	Initials

Custody Information

Relinquished By	Date	Time	Received By	Date	Time
Jay Burnette	11/14/22	10:06Am	Daniel Buchanan	11/14/22	10:06Am
			Wendell Boyles	11/14/22	10:06

Daniel Buchanan / WVWA — Printed Name/Affiliation

Daniel Buchanan — Signature

11/14/22 — Date

Sample Check In (Lab Use Only)

Temperature 4.4 pH 8.30 Chlorine <0.02 DO 8.67 Conductivity/Salinity 262

On Ice? ✓ Custody Seal? N/A Alkalinity 120 Hardness 166

Visual Description clear Odor none

Ammonia (NH3-N) 0.00 Initials VF Date/Time 11-14-22 / 1230

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PH: 540-953-2821 FAX: 540-951-1481 WWW.BIOMON.COM

NELAC ACCREDITED LAB # 460015

Sample Collection – Chain of Custody Form

Lab Sample ID (Lab Use Only): WVA1115522-2

General Information

Client WVWA Contact Name/Phone # (540)266-2835

NPDES Permit # 4AROA202.20 Outfall Name/# 13th Street Bridge

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information

[X] Grab Sample _____ Date 11/15/22 Time 1025 Volume 4 gal

[ ] Composite Sample Type _____ Time _____ Flow

Composite Start Date _____ Composite Start Time _____

Composite End Date _____ Composite End Time _____

Sub-samples _____ Frequency _____ Volume _____

Field Measurements

Temp at Collection Point	Temp In Collection Device	pH	Chlorine	Date/Time	Initials

Custody Information

Relinquished By	Date	Time	Received By	Date	Time
Eric Bowman	11/15/22	1050	Daniel Richardson	11/15/22	1050
Daniel Richardson	11/15/22	1200	Patricia Rasnake	11/15/22	1200

Daniel Richardson / WVWA — Printed Name/Affiliation

Daniel Richardson — Signature

11/15/22 — Date

Sample Check In (Lab Use Only)

Temperature 3.6 pH 8.28 Chlorine <0.02 DO 8.69 Conductivity/Salinity 291

On Ice? ✓ Custody Seal? N/A Alkalinity 114 Hardness 162

Visual Description clear Odor None

Ammonia (NH3-N) 0.00 Initials VF Date/Time 1230/11152022