

**Toxicity Tests
For
Western Virginia Water Authority
Report # 2997**

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
Fax: 540-951-1481

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

A handwritten signature in black ink, appearing to read "Wendy R. Boyer", written over a horizontal line.



BIOLOGICAL MONITORING, INC

1800 KRAFT DRIVE SUITE 104 BLACKSBURG VIRGINIA 24060

PH:540-953-2821 EMAIL: BMI@BIOMON.COM WWW.BIOMON.COM



TNI ACCREDITED LAB# 460015

Toxicity Testing Data Summary

Client	Western Virginia Water Authority Permit # 4AROA198.08		Sample	Explore Park
Test ID	WVA111122-1	Result	NOEC = 12.5, IC25 > 100	Pass/Fail NA
				Next Step NA
Test ID	WVA111122-2	Result	NOEC = 100, IC25 > 100	Pass/Fail NA
				Next Step NA



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TNI ACCREDITED LAB# 460015

Certificate of Analysis

Client Western Virginia Water Authority

Report # 2997

BMI Project # 4268

Report Date Nov 22, 2022

Permit # 4AROA198.08

Sample ID #s WVA111122-1, WVA111222-1,
WVA111322-1, WVA111422-1,
WVA111522-1

Sample Explore Park

Test ID # WVA111122-1

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 1200

Photoperiod 16h L/8h D

Endpoint Survival

Method Dunnett's Test

Result NOEC = 50

Endpoint Survival

Method Graphical

Result 48h LC50 > 100

Endpoint Growth

Method Dunnett's Test

Result NOEC = 12.5

Endpoint Growth

Method Linear Interpolation

Result IC25 > 100

Endpoint Growth

Method PMSD

Result 13.29%

Final Result NOEC = 12.5, IC25 > 100, TUC = 8

Pass/Fail NA



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TNI ACCREDITED LAB# 460015

Certificate of Analysis

Client	Western Virginia Water Authority	Report #	2997
BMI Project #	4268	Report Date	Nov 22, 2022
Permit #	4AROA198.08	Sample ID #s	WVA111122-1, WVA111222-1, WVA111322-1, WVA111422-1, WVA111522-1
Sample	Explore Park	Test ID #	WVA111122-2

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	1200
		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	Steel's Many-One Rank Tes	Result	NOEC = 100
Endpoint	Reproduction	Method	Linear Interpolation	Result	IC25 > 100
Endpoint	Reproduction	Method	PMSD	Result	13.82%

Final Result	NOEC = 100, IC25 > 100, TUC = 1	Pass/Fail	NA
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Chronic Toxicity Test
(*Pimephales promelas*)

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Experiment I.D.# WYA111122-1
Biologist(s): JR PR VF RG MH WB
Permit # 4AR0A198.08
Client: WYWA
Effluent toxicant: Explore Park
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: 1200
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: <24 hr 24-48 hr
Organism Batch #: ABS111122-1
Organisms per concentration: 40
Waterbath/Shelf #: 5

SAMPLE COLLECTION							
Date(s)		Time(s)		TEST RENEWAL			
From:	To:	From:	To:	Date(s)	Time(s)	Test Day	Diluent Batch #:
11-11-22	—	0940	—	11-11-22	1300	0	8314
11-12-22	—	0800	—	11-12-22	1130	1	8314
11-13-22	—	0910 ⁰⁹⁰⁵	—	11-13-22	1130	2	8318
11-14-22	—	0930 ⁰⁹⁰⁵	—	11-14-22	1200	3	8318
11-15-22	—	1000	—	11-15-22	1130	4	8318
11-16-22	—	1000	—	11-16-22	1200	5	8320
				11-17-22	1200	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: 0.694 Control Survival (%): 97.5

Comments: ① VF 11-14-22 ② VF 11-16-22

Experiment ID: WVAW122-1

Conc: Units	Day	Number of Live Organisms				DO (mg/L)		pH		Alkalinity mg/L as CaCO ₃	Hardness mg/L as CaCO ₃	Cond./ Salinity umho/ 0/00	Temp. (C)		Feeding 1	Feeding 2	Comments	Initials
		A	B	C	D	Before	After	Before	After				Before	After				
0	0	10	10	10	10		7.91		8.12	66	102	298		25	✓	✓		MH
	1	10	10	10	10	6.56	6.71	7.98	8.14			284	25	25	✓	✓		MH
	2	10	10	10	10	6.82	7.61	8.06	8.17	58	104	298	25	25	✓	✓		VF
	3	10	10	10	10	7.44	7.52	8.08	8.20			321	25	25	✓	✓		VF
	4	10	10	10	10	9.02	8.69	8.13	8.21			314	25	25	✓	✓		VF
	5	10	9	10	10	8.31	7.94	8.10	8.25	60	106	302	25	25	✓	✓		VF
	6	10	9	10	10	8.04	8.41	8.02	8.20			309	25	25	✓	✓		BZ
	7	10	9	10	10	8.28		8.12					25		No Food			(un)
6.25	0	10	10	10	10		7.98		8.10			297		25	✓	✓		MH
	1	10	10	10	10	6.65	6.94	8.03	8.14			319	25	25	✓	✓		MH
	2	10	10	10	10	6.94	7.70	8.04	8.16			297	25	25	✓	✓		VF
	3	10	10	10	10	7.29	7.91	8.02	8.15			309	25	25	✓	✓		VF
	4	10	9	9	10	8.48	8.78	7.93	8.23			315	25	25	✓	✓		VF
	5	10	10	9	10	7.99	7.87	8.18	8.22			306	25	25	✓	✓		VF
	6	10	10	9	10	8.00	8.63	8.05	8.23			308	25	25	✓	✓		BZ
	7	10	10	9	10	8.02		8.11					25		No Food			(un)
12.5	0	10	10	10	10		7.98		8.10			298		25	✓	✓		MH
	1	10	10	10	10	6.71	7.15	8.09	8.15			315	25	25	✓	✓		MH
	2	10	10	10	10	7.08	7.62	8.01	8.15			296	25	25	✓	✓		VF
	3	8	9	10	10	7.28	8.22	8.02	8.15			307	25	25	✓	✓		VF
	4	8	8	9	10	8.14	8.85	7.86	8.19			299	25	25	✓	✓		VF
	5	8	8	9	10	7.84	7.80	8.14	8.21			308	25	25	✓	✓		VF
	6	8	8	9	10	7.89	8.60	8.06	8.24			310	25	25	✓	✓		BZ
	7	8	8	9	10	7.94		8.11					25		No Food			(un)

① 11-15-22 VF

Experiment ID: WVA111122-1

Conc. Units	Day	Number of Live Organisms				DO (mg/L)		pH		Alkalinity mg/L as CaCO ₃	Hardness mg/L as CaCO ₃	Cond./ Salinity umho/ 0/00	Temp. (C)		Feeding 1	Feeding 2	Comments	Initials
		A	B	C	D	Before	After	Before	After				Before	After				
25	0	10	10	10	10	7.98		8.12				301		25	✓			MH
	1	10	10	10	10	6.73	7.16	8.09	8.16			295	25	25	✓			MH
	2	10	10	10	10	7.20	6.62	8.02	8.17			292	26	25	✓			VF
	3	10	9	9	9	7.34	8.39	8.07	8.19			305	28	25	✓			VF
	4	10	9	9	9	7.81	8.80	7.88	8.22			286	25	25	✓			VF
	5	10	9	9	9	8.29	8.28	8.14	8.22			314	25	25	✓			VF
	6	10	9	9	9	7.93	8.68	8.06	8.25			316	25	25	✓			BA
	7	10	9	9	9	7.71		8.12					25		No Food			WMD
50	0	10	10	10	10	7.96		8.16				309	25	25	✓			MH
	1	10	10	10	10	6.67	7.18	8.14	8.16			319	25	25	✓			MH
	2	8	10	10	10	7.06	6.55	8.15	8.17			290	25	25	✓			VF
	3	7	10	10	10	7.42	8.12	8.13	8.22			300	25	25	✓		cond. 289	VF
	4	7	10	10	10	7.69	8.71	7.97	8.21			339	25	25	✓			VF
	5	7	10	10	10	8.36	8.33	8.20	8.24			326	25	25	✓			VF
	6	7	10	10	10	7.80	8.74	8.22	8.27			318	25	25	✓			BA
	7	7	10	10	10	7.63		8.20					25		No Food			WMD
100	0	10	10	10	10	8.19		8.12		110	160	328		25	✓			MH
	1	10	10	10	10	6.68	7.31	8.25	8.18	110	128	468	25	25	✓			MH
	2	9	9	10	10	6.73	6.29	8.10	8.17	104	148	282	25	25	✓			VF
	3	8	6	10	10	7.45	8.15	8.22	8.25	126	162	327	25	25	✓			VF
	4	7	6	9	9	7.33	8.80	8.07	8.19	126	168	371	25	25	✓			VF
	5	7	6	9	9	8.25	8.41	8.22	8.22			352	25	25	✓			VF
	6	7	6	9	9	7.72	8.73	8.39	8.27			355	25	25	✓			BA
	7	7	6	9	9	7.75		8.35					25		No Food			WMD

① VF 11-14-22

Weight Data Sheet

Experiment ID: WVA111122-1

Treatment ID	Initial Weight (mg)	Final Weight (mg)	# Larvae	Comments	Initials
0 A	18.24	25.78	10		WVO
0 B	18.19	24.41	10		WVO
0 C	18.23	24.72	10		WVO
0 D	18.61	24.00	10		WVO
6.25 A	17.93	24.68	10		WVO
6.25 B	18.26	24.39	10		WVO
6.25 C	18.12	24.68	10		WVO
6.25 D	17.98	23.71	10		WVO
12.5 A	17.98	23.81	10		WVO
12.5 B	17.32	23.75	10		WVO
12.5 C	18.43	24.20	10		WVO
12.5 D	17.76	23.91	10		WVO
25 A	17.43	24.08	10		WVO
25 B	17.40	22.87	10		WVO
25 C	17.45	23.39	10		WVO
25 D	18.89	24.48	10		WVO
50 A	18.96	24.64	10		WVO
50 B	18.38	26.01	10		WVO
50 C	18.40	24.79	10		WVO
50 D	17.60	23.98	10		WVO
100 A	19.52	25.67	10		WVO
100 B	18.10	23.39	10		WVO
100 C	18.18	23.34	10		WVO
100 D	18.78	24.93	10		WVO

CETIS Analytical Report

Report Date: 21 Nov-22 17:07 (p 1 of 4)
Test Code/ID: WVA111122-1 / 15-2956-5132

Fathead Minnow 7-d Larval Survival and Growth Test

Biological Monitoring, Inc.

Analysis ID: 16-5519-4691	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.4
Analyzed: 21 Nov-22 17:04	Analysis: Parametric-Control vs Treatments	Status Level: 1
Batch ID: 04-6657-1116	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 12:00	Species: Pimephales promelas	Brine:
Test Length: 6d 23h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age: 48
Sample ID: 06-5768-2298	Code: WVA111122-1	Project: Special Studies
Sample Date: 11 Nov-22 09:40	Material: Riverine Monitoring Sample	Source: 4AROA198.08 (4AROA198.0)
Receipt Date: 11 Nov-22 12:05	CAS (PC):	Station: Explore Park
Sample Age: 3h	Client: Western Va Water Authority	

Data Transform	Alt Hyp	NOEL ¹	LOEL	TOEL	TU	PMSD
Angular-(Corrected)	C > T	50	100	70.71	2	16.00%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	0	2.407	0.24	6	CDF	0.8333	Non-Significant Effect
		12.5	1.529	2.407	0.24	6	CDF	0.2187	Non-Significant Effect
		25	0.8175	2.407	0.24	6	CDF	0.5042	Non-Significant Effect
		50	0.6468	2.407	0.24	6	CDF	0.5822	Non-Significant Effect
		100*	2.783	2.407	0.24	6	CDF	0.0239	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	0.975	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.222971	0.0445942	5	2.244	0.0942	Non-Significant Effect
Error	0.357667	0.0198704	18			
Total	0.580638		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	5.027	15.09	0.4126	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.945	0.884	0.2108	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
6.25		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
12.5		4	0.8750	0.7227	1.0000	0.8500	0.8000	1.0000	0.0479	10.94%	10.26%
25		4	0.9250	0.8454	1.0000	0.9000	0.9000	1.0000	0.0250	5.41%	5.13%
50		4	0.9250	0.6863	1.0000	1.0000	0.7000	1.0000	0.0750	16.22%	5.13%
100		4	0.7750	0.5363	1.0000	0.8000	0.6000	0.9000	0.0750	19.35%	20.51%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.00%
6.25		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.00%
12.5		4	1.219	0.9879	1.45	1.178	1.107	1.412	0.07256	11.91%	11.12%
25		4	1.29	1.16	1.419	1.249	1.249	1.412	0.04074	6.32%	5.94%
50		4	1.307	0.972	1.642	1.412	0.9912	1.412	0.1052	16.10%	4.70%
100		4	1.094	0.8006	1.387	1.12	0.8861	1.249	0.09214	16.85%	20.23%

CETIS Analytical Report

Report Date: 21 Nov-22 17:07 (p 2 of 4)
Test Code/ID: WVA111122-1 / 15-2956-5132

Fathead Minnow 7-d Larval Survival and Growth Test

Biological Monitoring, Inc.

Analysis ID: 16-5519-4691 Endpoint: 7d Survival Rate
Analyzed: 21 Nov-22 17:04 Analysis: Parametric-Control vs Treatments
CETIS Version: CETISv1.9.4
Status Level: 1

7d Survival Rate Detail

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

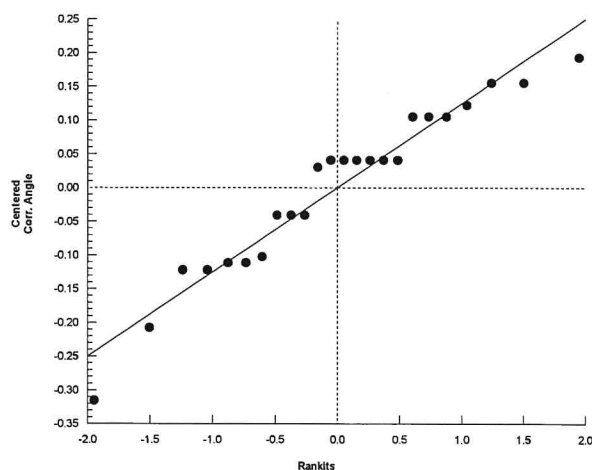
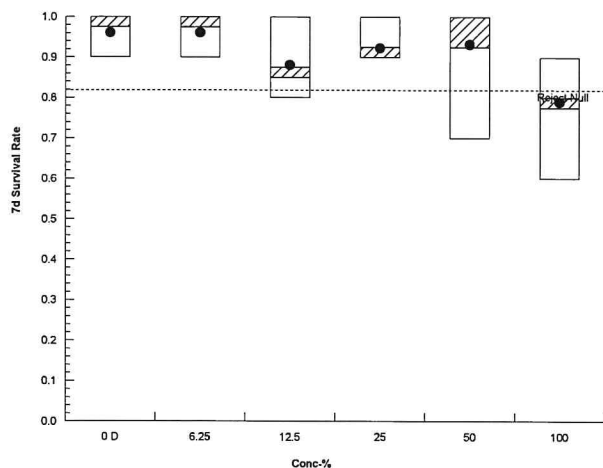
Angular (Corrected) Transformed Detail

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

7d Survival Rate Binomials

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

Graphics



CETIS Analytical Report

Report Date: 21 Nov-22 17:14 (p 1 of 2)
Test Code/ID: WVA111122-1 / 15-2956-5132

Fathead Minnow 7-d Larval Survival and Growth Test

Biological Monitoring, Inc.

Analysis ID: 16-0029-8735	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.4
Analyzed: 21 Nov-22 17:14	Analysis: Parametric-Control vs Treatments	Status Level: 1
Batch ID: 04-6657-1116	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 12:00	Species: Pimephales promelas	Brine:
Test Length: 6d 23h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age: 48
Sample ID: 06-5768-2298	Code: WVA111122-1	Project: Special Studies
Sample Date: 11 Nov-22 09:40	Material: Riverine Monitoring Sample	Source: 4AROA198.08 (4AROA198.0)
Receipt Date: 11 Nov-22 12:05	CAS (PC):	Station: Explore Park
Sample Age: 3h	Client: Western Va Water Authority	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	12.5	25	17.68	8	13.29%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	1.684	2.407	0.092	6	CDF	0.1739	Non-Significant Effect
		12.5	2.331	2.407	0.092	6	CDF	0.0577	Non-Significant Effect
		25*	2.677	2.407	0.092	6	CDF	0.0296	Significant Effect
		50	1.743	2.407	0.092	6	CDF	0.1588	Non-Significant Effect
		100	1.959	2.407	0.092	6	CDF	0.1118	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	0.6938	0.25	>>	Yes	Passes Criteria
PMSD	0.1329	0.12	0.3	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0252478	0.0050496	5	1.722	0.1806	Non-Significant Effect
Error	0.05279	0.0029328	18			
Total	0.0780378		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.721	15.09	0.7428	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9884	0.884	0.9911	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	0.6937	0.5902	0.7973	0.697	0.627	0.754	0.03255	9.38%	0.00%
6.25		4	0.6292	0.5567	0.7018	0.6345	0.573	0.675	0.0228	7.25%	9.30%
12.5		4	0.6045	0.5558	0.6532	0.599	0.577	0.643	0.01531	5.06%	12.86%
25		4	0.5912	0.5068	0.6757	0.5765	0.547	0.665	0.02653	8.97%	14.77%
50		4	0.627	0.5618	0.6922	0.6385	0.568	0.663	0.0205	6.54%	9.62%
100		4	0.6187	0.4971	0.7404	0.615	0.529	0.716	0.03823	12.36%	10.81%

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.754	0.627	0.649	0.745
6.25		0.675	0.613	0.656	0.573
12.5		0.583	0.643	0.577	0.615
25		0.665	0.547	0.594	0.559
50		0.568	0.663	0.639	0.638
100		0.615	0.529	0.716	0.615

CETIS Analytical Report

Report Date: 21 Nov-22 17:14 (p 2 of 2)
Test Code/ID: WVA111122-1 / 15-2956-5132

Fathead Minnow 7-d Larval Survival and Growth Test

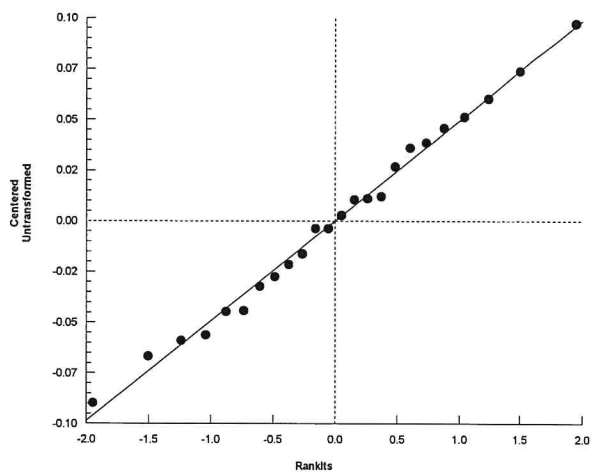
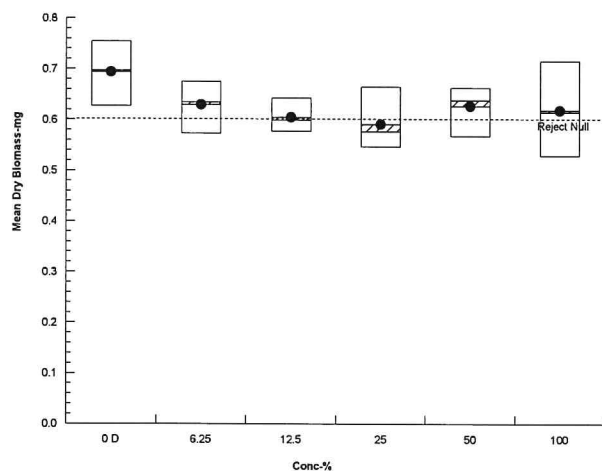
Biological Monitoring, Inc.

Analysis ID: 16-0029-8735
Analyzed: 21 Nov-22 17:14

Endpoint: Mean Dry Biomass-mg
Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.9.4
Status Level: 1

Graphics



CETIS Analytical Report

Report Date: 21 Nov-22 17:07 (p 1 of 2)
Test Code/ID: WVA111122-1 / 15-2956-5132

Fathead Minnow 7-d Larval Survival and Growth Test

Biological Monitoring, Inc.

Analysis ID: 15-4653-3929	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.4
Analyzed: 21 Nov-22 17:06	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Batch ID: 04-6657-1116	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 12:00	Species: Pimephales promelas	Brine:
Test Length: 6d 23h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age: 48
Sample ID: 06-5768-2298	Code: WVA111122-1	Project: Special Studies
Sample Date: 11 Nov-22 09:40	Material: Riverine Monitoring Sample	Source: 4AROA198.08 (4AROA198.0)
Receipt Date: 11 Nov-22 12:05	CAS (PC):	Station: Explore Park
Sample Age: 3h	Client: Western Va Water Authority	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1620022	1000	Yes	Two-Point Interpolation

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	0.6938	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	3.361	0.9787	n/a	29.75	n/a	102.2
IC10	7.864	1.272	n/a	12.72	n/a	78.59
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	0.6937	0.627	0.754	0.0651	9.38%	0.0%	0.6937	0.0%
6.25		4	0.6292	0.573	0.675	0.0456	7.25%	9.3%	0.6292	9.3%
12.5		4	0.6045	0.577	0.643	0.03061	5.06%	12.86%	0.6104	12.02%
25		4	0.5912	0.547	0.665	0.05306	8.97%	14.77%	0.6104	12.02%
50		4	0.627	0.568	0.663	0.041	6.54%	9.62%	0.6104	12.02%
100		4	0.6187	0.529	0.716	0.07647	12.36%	10.81%	0.6104	12.02%

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.754	0.627	0.649	0.745
6.25		0.675	0.613	0.656	0.573
12.5		0.583	0.643	0.577	0.615
25		0.665	0.547	0.594	0.559
50		0.568	0.663	0.639	0.638
100		0.615	0.529	0.716	0.615

CETIS Analytical Report

Report Date: 21 Nov-22 17:07 (p 2 of 2)
Test Code/ID: WVA111122-1 / 15-2956-5132

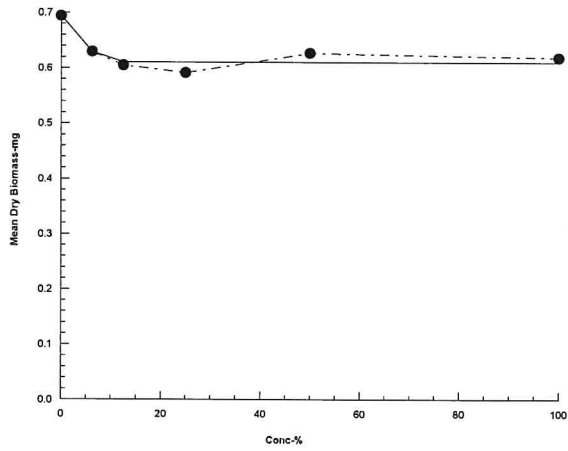
Fathead Minnow 7-d Larval Survival and Growth Test

Biological Monitoring, Inc.

Analysis ID: 15-4653-3929 Endpoint: Mean Dry Biomass-mg
Analyzed: 21 Nov-22 17:06 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.9.4
Status Level: 1

Graphics



Chronic Toxicity Test
(Ceriodaphnia dubia)

Page 1 of 5

Experiment I.D.# WVA 111122-2
 Biologist(s): JR VR PR WB VF RG MH
 Permit # 4AR0A198.08
 Client: WVWA
 Effluent toxicant: Explore Park
 Sample Type: Grab Composite
 Sample Chlorine: LO.02
 Dilution Water Used MHRW
 Feeding Schedule: 0.1 ml YCT and Rs Daily
 Aeration: None
 Template #: 3

Start of Test Date: 11/11/22 Time: 1300
 End of Test Date: 11/17/22 Time: 1200
 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							
Date(s)		Time(s)		TEST RENEWAL			
From:	To:	From:	To:	Date(s)	Time(s)	Test Day	Diluent Batch #:
11-11-22	—	0940	—	11-11-22	1300	0	8314
11-12-22	—	0800	—	11-12-22	1130	1	8314
11-13-22	—	0910	—	11-13-22	1130	2	8318
11-14-22	—	0905	—	11-14-22	1230	3	8318
11-15-22	—	1000	—	11-15-22	1230	4	8318
				11-16-22	1200	5	8320
						6	

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

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

Condition of Organisms at End of Test: Normal
 Control Survival (%): 100 Average # Young/Female: 30.1
 Percent control female with 3 broods (%): 100
 Comments: —

①
Experiment ID: WYA111122-X/2

Conc: Units	Day	A	B	C	D	E	F	G	H	I	J	# Young	# Adults	# Males	Init.
0	1	0	0	0	0	0	0	0	0	0	0	0	10		PL
	2	0	0	0	0	0	0	0	0	0	0	0	10		PL
	3	0	0	0	0	0	0	5	0	0	0	5	10	0	PL
	4	5	6	4	4	5	3	0	6	5	4	42	10	0	PL
	5	9	12	9	13	8	12	10	10	9	12	104	10	0	PL
	6	14	18	19	16	9	11	18	18	10	17	150	10	0	PL
	7														
6.25	Total	28	36	32	33	22	26	33	34	24	33	301	10	0	PL
	1	0	0	0	0	0	0	0	0	0	0	0	10		PL
	2	0	0	0	0	0	0	0	0	0	0	0	10		PL
	3	4	0	5	0	0	4	5	0	4	0	22	10	0	PL
	4	0	5	12	6	4	10	0	3	10	6	56	10	0	PL
	5	14	9	0	10	11	21	13	9	11	12	81	10	0	PL
	6	16	17	20	15	8	14	17	9	17	20	155	10	0	PL
12.5	7														
	Total	34	31	37	31	23	32	35	21	32	38	314	10	0	PL
	1	0	0	0	0	0	0	0	0	0	0	0	10		PL
	2	0	0	0	0	0	0	0	0	0	0	0	10		PL
	3	0	0	0	5	5	0	5	4	0	0	19	10	0	PL
	4	4	5	4	11	0	6	13	0	3	5	51	10	0	PL
	5	11	12	10	0	11	12	0	12	12	10	90	10	0	PL
	6	14	19	20	16	18	11	18	16	18	12	162	10	0	PL
	7														
	Total	29	36	34	32	34	29	36	32	33	27	322	10	0	PL

① PL 11-11-72

Experiment ID: WVA111122-X2

Conc: Units	Day	A	B	C	D	E	F	G	H	I	J	# Young	# Adults	# Males	Init.
25	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	0	0	5	0	0	5	5	4	0	5	26	10	0	AR
	4	4	4	17	4	4	10	0	0	5	0	26	10	0	AR
	5	12	11	11	12	10	13	12	10	9	11	111	10	0	AR
	6	17	14	21	20	9	14	15	18	18	17	167	10	0	AR
	7														
50	Total	35	31	38	36	25	34	32	34	32	33	330	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	0	0	0	0	5	6	0	0	4	5	22	10	0	AR
	4	5	4	5	4	0	0	4	5	0	17	30	10	0	AR
	5	12	13	12	10	11	10	10	12	8	13	111	10	0	AR
	6	13	15	17	14	20	18	19	10	12	18	156	10	0	AR
100	7														
	Total	30	34	34	28	36	34	33	27	26	37	319	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	5	0	0	0	0	0	7	5	4	28	10	0	AR
	4	9	0	4	5	4	4	4	0	0	17	35	10	0	AR
	5	27	13	11	10	12	12	9	13	12	13	107	10	0	AR
	6	18	17	14	14	17	11	22	14	18	15	162	10	0	AR
	7														
	Total	34	35	31	29	35	27	35	36	35	35	332	10	0	AR

① 11-11-22

Experiment ID: WVA111122-2

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		7.91		8.12	298	66	102	✓	MH
	1	25	25	7.39	6.71	8.01	8.14	284			✓	PL
	2	25	25	7.21	7.61	8.13	8.17	298	58	104	✓	VF
	3	25	25	7.44	7.52	8.18	8.20	321			✓	VF
	4	25	25	7.60	8.69	8.14	8.21	314			✓	PL
	5	25	25	8.00	7.94	8.20	8.25	302	60	100	✓	VF
	6	25	25	8.06	8.41	8.47	8.20	309			✓	BL
6.25	7											
	0		25		7.98		8.10	297			✓	MH
	1	25	25	7.40	6.94	8.14	8.14	319			✓	PL
	2	25	25	7.16	7.10	8.18	8.16	297			✓	VF
	3	25	25	7.46	7.91	8.22	8.15	309			✓	VF
	4	25	25	7.49	8.78	8.18	8.23	315			✓	PL
	5	25	25	8.04	7.87	8.23	8.22	306			✓	VF
12.5	6	25	25	8.14	8.63	8.40	8.23	308			✓	BL
	7											
	0		25		7.98		8.10	298			✓	MH
	1	25	25	7.46	7.15	8.20	8.15	315			✓	PL
	2	25	25	7.09	7.62	8.21	8.15	296			✓	VF
	3	25	25	7.32	8.22	8.27	8.15	307			✓	VF
	4	25	25	7.36	8.85	8.21	8.19	299			✓	PL
	5	25	25	8.16	7.80	8.23	8.21	308			✓	VF
	6	25	25	8.28	8.60	8.42	8.24	310			✓	BL
	7											

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		7.98		8.12		8.12	301			✓	MH
	1	25	25	7.48	7.16	8.25	8.16	295			✓	PH
	2	25	25	7.26	6.62	8.26	8.17	292			✓	VF
	3	25	25	7.21	8.39	8.29	8.19	305			✓	VF
	4	25	25	7.09	8.80	8.27	8.22	280			✓	PH
	5	25	25	8.19	8.28	8.24	8.22	314			✓	VF
	6	25	25	8.30	8.08	8.47	8.25	316			✓	BH
	7											
50	0		7.96		8.16		8.16	309			✓	MH
	1	25	25	7.51	7.18	8.32	8.16	319			✓	PH
	2	25	25	7.33	6.55	8.36	8.17	290			✓	VF
	3	25	25	7.04	8.12	8.34	8.22	289			✓	VF
	4	25	25	7.00	8.71	8.29	8.21	339			✓	PH
	5	25	25	8.23	8.33	8.26	8.24	326			✓	VF
	6	25	25	8.36	8.74	8.55	8.27	328			✓	BH
	7											
100	0		8.19		8.12		8.12	328	110	160	✓	MH
	1	25	25	7.50	7.31	8.38	8.18	468	110	128	✓	PH
	2	25	25	7.41	6.29	8.39	8.17	282	104	148	✓	VF
	3	25	25	6.92	8.15	8.41	8.25	327	126	162	✓	VF
	4	25	25	6.88	8.80	8.32	8.19	371	126	168	✓	PH
	5	25	25	8.28	8.41	8.30	8.22	352			✓	VF
	6	25	25	8.36	8.73	8.63	8.27	355			✓	BH
	7											

CETIS Analytical Report

Report Date: 21 Nov-22 17:27 (p 1 of 2)

Test Code/ID: WVA111122-2 / 02-8087-0778

Ceriodaphnia 7-d Survival and Reproduction Test

Biological Monitoring, Inc.

Analysis ID: 03-6514-8649	Endpoint: 6d Survival Rate	CETIS Version: CETISv1.9.4
Analyzed: 21 Nov-22 17:26	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: 05-8775-6757	Code: WVA111122-1	Project: Special Studies
Sample Date: 11 Nov-22 09:40	Material: Riverine Monitoring Sample	Source: 4AROA198.08 (4AROA198.0)
Receipt Date: 11 Nov-22 12:05	CAS (PC):	Station: Explore Park
Sample Age: 3h	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

CETIS Analytical Report

Report Date: 21 Nov-22 17:27 (p 2 of 2)

Test Code/ID: WVA111122-2 / 02-8087-0778

Ceriodaphnia 7-d Survival and Reproduction Test

Biological Monitoring, Inc.

Analysis ID: 03-6514-8649

Endpoint: 6d Survival Rate

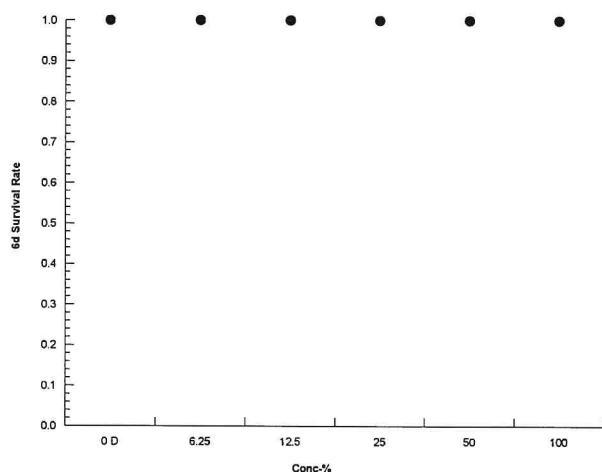
CETIS Version: CETISv1.9.4

Analyzed: 21 Nov-22 17:26

Analysis: STP 2xK Contingency Tables

Status Level: 1

Graphics



CETIS Analytical Report

Report Date: 21 Nov-22 17:27 (p 1 of 2)
Test Code/ID: WVA111122-2 / 02-8087-0778

Ceriodaphnia 7-d Survival and Reproduction Test					Biological Monitoring, Inc.	
Analysis ID:	11-6153-6751	Endpoint:	Reproduction	CETIS Version:	CETISv1.9.4	
Analyzed:	21 Nov-22 17:26	Analysis:	Nonparametric-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:	05-8775-6757	Code:	WVA111122-1	Project:	Special Studies	
Sample Date:	11 Nov-22 09:40	Material:	Riverine Monitoring Sample	Source:	4AROA198.08 (4AROA198.0)	
Receipt Date:	11 Nov-22 12:05	CAS (PC):		Station:	Explore Park	
Sample Age:	3h	Client:	Western Va Water Authority			

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	>100	n/a	1	13.82%

Steel Many-One Rank Sum Test									
Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	110.5	75	2	18	CDF	0.9287	Non-Significant Effect
		12.5	117.5	75	4	18	CDF	0.9824	Non-Significant Effect
		25	122	75	4	18	CDF	0.9941	Non-Significant Effect
		50	119.5	75	5	18	CDF	0.9889	Non-Significant Effect
		100	129	75	2	18	CDF	0.9992	Non-Significant Effect

Test Acceptability Criteria						TAC Limits
Attribute	Test Stat	Lower	Upper	Overlap	Decision	
Control Resp	30.1	15	>>	Yes	Passes Criteria	

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	64.5333	12.9067	5	0.7819	0.5672	Non-Significant Effect
Error	891.4	16.5074	54			
Total	955.933		59			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Bartlett Equality of Variance Test	5.16	15.09	0.3966	Equal Variances	
Distribution	Shapiro-Wilk W Normality Test	0.9423	0.9459	0.0069	Non-Normal Distribution	

Reproduction Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	30.1	26.7	33.5	32.5	22	36	1.501	15.77%	0.00%
6.25		10	31.4	27.45	35.35	32	21	38	1.746	17.58%	-4.32%
12.5		10	32.2	30.02	34.38	32.5	27	36	0.9638	9.47%	-6.98%
25		10	33	30.5	35.5	33.5	25	38	1.106	10.59%	-9.63%
50		10	31.9	29.13	34.67	33.5	26	37	1.224	12.14%	-5.98%
100		10	33.2	30.99	35.41	35	27	36	0.9752	9.29%	-10.30%

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	28	36	32	33	22	26	33	34	24	33
6.25		34	31	37	31	23	32	35	21	32	38
12.5		29	36	34	32	34	29	36	32	33	27
25		35	31	38	36	25	34	32	34	32	33
50		30	34	34	28	36	34	33	27	26	37
100		34	35	31	29	35	27	35	36	35	35

CETIS Analytical Report

Report Date: 21 Nov-22 17:27 (p 2 of 2)
Test Code/ID: WVA111122-2 / 02-8087-0778

Ceriodaphnia 7-d Survival and Reproduction Test

Biological Monitoring, Inc.

Analysis ID: 11-6153-6751

Endpoint: Reproduction

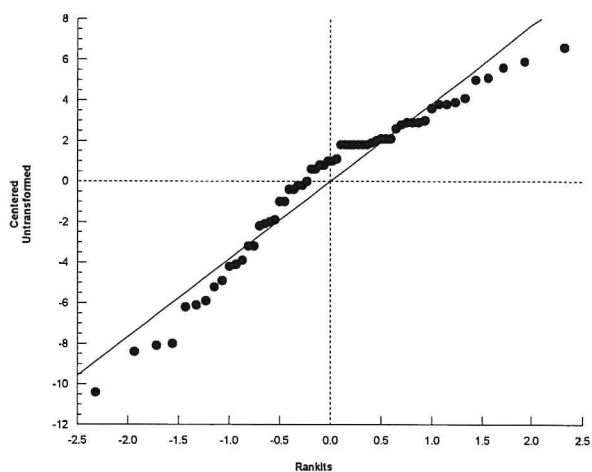
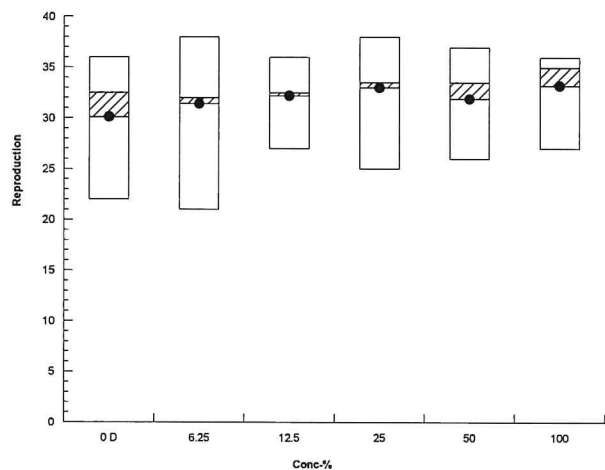
CETIS Version: CETISv1.9.4

Analyzed: 21 Nov-22 17:26

Analysis: Nonparametric-Control vs Treatments

Status Level: 1

Graphics



CETIS Analytical Report

Report Date: 21 Nov-22 17:27 (p 1 of 2)
 Test Code/ID: WVA111122-2 / 02-8087-0778

Ceriodaphnia 7-d Survival and Reproduction Test				Biological Monitoring, Inc.	
Analysis ID:	07-4795-9283	Endpoint:	Reproduction	CETIS Version:	CETISv1.9.4
Analyzed:	21 Nov-22 17:26	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:	05-8775-6757	Code:	WVA111122-1	Project:	Special Studies
Sample Date:	11 Nov-22 09:40	Material:	Riverine Monitoring Sample	Source:	4AROA198.08 (4AROA198.0)
Receipt Date:	11 Nov-22 12:05	CAS (PC):		Station:	Explore Park
Sample Age:	3h	Client:	Western Va Water Authority		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1683406	1000	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	30.1	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	30.1	22	36	4.748	15.77%	0.0%	31.97	0.0%
6.25		10	31.4	21	38	5.522	17.58%	-4.32%	31.97	0.0%
12.5		10	32.2	27	36	3.048	9.47%	-6.98%	31.97	0.0%
25		10	33	25	38	3.496	10.59%	-9.64%	31.97	0.0%
50		10	31.9	26	37	3.872	12.14%	-5.98%	31.97	0.0%
100		10	33.2	27	36	3.084	9.29%	-10.3%	31.97	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	28	36	32	33	22	26	33	34	24	33
6.25		34	31	37	31	23	32	35	21	32	38
12.5		29	36	34	32	34	29	36	32	33	27
25		35	31	38	36	25	34	32	34	32	33
50		30	34	34	28	36	34	33	27	26	37
100		34	35	31	29	35	27	35	36	35	35

CETIS Analytical Report

Report Date: 21 Nov-22 17:27 (p 2 of 2)
Test Code/ID: WVA111122-2 / 02-8087-0778

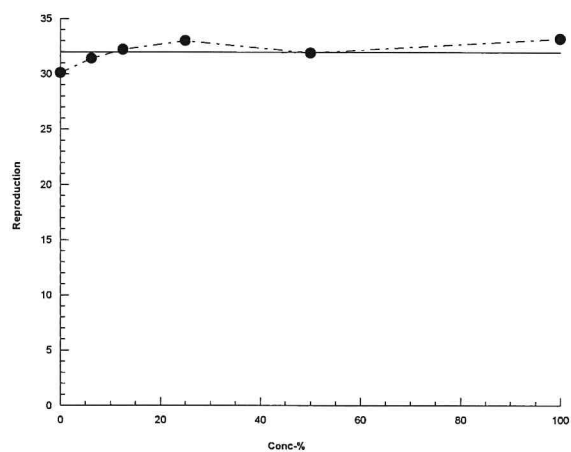
Ceriodaphnia 7-d Survival and Reproduction Test

Biological Monitoring, Inc.

Analysis ID: 07-4795-9283 Endpoint: Reproduction
Analyzed: 21 Nov-22 17:26 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.9.4
Status Level: 1

Graphics



BMI 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)

W V A L L I I 2 2 - 1

General Information

Client WVWA

Contact Name/Phone #

540-266-2835

NPDES Permit # 4420A198.08

Outfall Name/# Explore Park

Sample Chlorinated?

Dechlorinated?

Should BMI Dechlorinate Sample?

Sampling Information



Grab Sample

Date 11/11/22

Time

940

Volume

2gal.



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
<u>JASON HILL</u>	<u>11/11/2022</u>	<u>12:05</u>	<u>Joe Darnache</u>	<u>11/11/22</u>	<u>1205</u>

JASON HILL/UNDER

Printed Name/Affiliation

[Signature]

Signature

11/11/2022

Date

Sample Check In (Lab Use Only)

Temperature 3.3°C pH 8.14 Chlorine 50.02 DO 9.43 Conductivity/Salinity 397

On Ice? ✓ Custody Seal? N/A Alkalinity 110 Hardness 160

Visual Description cloudy Odor none

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

BMI 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)

W	V	A	L	I	I	2	2	2	-	1
---	---	---	---	---	---	---	---	---	---	---

General Information

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

NPDES Permit # 4AR0A198.08 Outfall Name/# Explore Park

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information



Grab Sample _____ Date 11/12/22 Time 8:00 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
	<u>11/12/22</u>	<u>9:35</u>	<u>Joe Korman</u>	<u>11/12/22</u>	<u>0935</u>

JASON HILL / VDEQ

Printed Name/Affiliation

Signature

11/12/2022

Date

Sample Check In (Lab Use Only)

Temperature 1.2°C pH 8.09 Chlorine 40.02 DO 7.95 Conductivity/Salinity 262

On Ice? ☒ Custody Seal? N/A Alkalinity 110 Hardness 128

Visual Description cloudy Odor none

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

BMI 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)

W	V	A	1	1	1	3	2	2	-	1
---	---	---	---	---	---	---	---	---	---	---

General Information

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

NPDES Permit # 4AR04198.08 Outfall Name/# Explore Park

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information



Grab Sample _____ Date 11/13/22 Time 9:10 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
<u>Lucy Smith</u>	<u>11/13/22</u>	<u>10:45</u>	<u>Joe Smith</u>	<u>11/13/22</u>	<u>10:45</u>

Lucy Baker Smith/VOEG

Printed Name/Affiliation

Joe Smith

Signature

11/13/2022

Date

Sample Check In (Lab Use Only)

Temperature 2.9 pH 8.06 Chlorine 0.02 DO 8.63 Conductivity/Salinity 284

On Ice? ☒ Custody Seal? N/A Alkalinity 104 Hardness 148

Visual Description cloudy/yellow Odor NONE

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

BMI 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)

W	V	A	1	1	1	4	2	2	-	1
---	---	---	---	---	---	---	---	---	---	---

General Information

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

NPDES Permit # 4AR04198.08 Outfall Name/# Explore Park

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information



Grab Sample _____ Date 11/14/22 Time 0905 Volume 2 gallons LB/JM



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
<u>[Signature]</u>	<u>11/14/22</u>	<u>10:00</u>	<u>[Signature]</u>	<u>11/14/22</u>	<u>10:00</u>

Daniel Buchanan / WVWA

Printed Name/Affiliation

[Signature]

Signature

11/14/22

Date

Sample Check In (Lab Use Only)

Temperature 4.4 pH 8.51 Chlorine 6.62 DO 8.64 Conductivity/Salinity 320

On Ice? ✓ Custody Seal? N/A Alkalinity 126 Hardness 162

Visual Description clear Odor none

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

BMI 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)

W	V	A	I	I	I	S	2	2	-	1
---	---	---	---	---	---	---	---	---	---	---

General Information

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

NPDES Permit # HA00A198.08 Outfall Name/# Explore Park

Sample Chlorinated? _____ Dechlorinated? _____

Should BMI Dechlorinate Sample? _____

Sampling Information



Grab Sample _____ Date 11/15/22 Time 1000 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
<u>E. Parnell</u>	<u>11/15/22</u>	<u>1050</u>	<u>Patrick Rasnake</u>	<u>11/15/22</u>	<u>1050 AM</u>
<u>Patrick Rasnake</u>	<u>11/15/22</u>	<u>1200</u>	<u>Patrick Rasnake</u>	<u>11/15/22</u>	<u>1200 AM</u>

Printed Name/Affiliation

Signature

Date

Sample Check In (Lab Use Only)

Temperature 3.6 pH 8.19 Chlorine <0.02 DO 8.60 Conductivity/Salinity 359

On Ice? ☒ Custody Seal? N/A Alkalinity 126 Hardness 168

Visual Description clear Odor None

Ammonia (NH₃-N) 0.00 Initials VF Date/Time 1230/11/15/2022