

# Arkansas Analytical, Inc.

## Toxicity Test Results

**JACKSONVILLE WASTEWATER UTILITY**  
**NPDES PERMIT NUMBER: AR0041335**  
**March 2020**  
**AFIN# 60-00543**

Fathead Minnow, *Pimephales promelas*, Larval Survival and Growth Test  
Test 1000.0

*Ceriodaphnia dubia*, Survival and Reproduction Test  
Test 1002.0

Prepared for: **Patrick Ellis**  
**Jacksonville Wastewater Utility**  
**P.O. Box 69**  
**Jacksonville, Arkansas 72078**

Prepared by: Arkansas Analytical, Inc.  
8100 National Drive  
Little Rock, Arkansas 72209  
**Lab Number K2003005**

Friday, March 20, 2020

## Plant location

---

Jacksonville Wastewater Utility. The plant is located ¼ mile West of Hwy. 161 North of Cloverdale Road in the City of Jacksonville, between Missouri-Pacific Railroad and Bayou Meto in Section 31, Township 3 North, Range 10 West in Pulaski County, Arkansas

## Test Methods

---

EPA Method 1000.0 *Pimephales promelas*, Larval survival and growth test

- Test chambers: 500 mL plastic cups
- Test solution volume: 250 mL
- Number of test organisms per chamber: 10
- Number of replicates per concentration: 5
- Test temperature 25°C ± 1°C
- Test concentrations: 0%, 32%, 42%, 56%, 75%, 100%
- Dilution water: Soft synthetic
- No deviation from method

EPA Method 1002.0 *Ceriodaphnia dubia*, Survival and reproduction test

- Test chambers: 30 mL plastic cups
- Test solution volume: 15 mL
- Number of test organisms per chamber: 1
- Number of replicates per concentration: 10
- Test temperature 25°C ± 1°C
- Test concentrations: 0%, 32%, 42%, 56%, 75%, 100%
- Dilution water: Soft synthetic
- No deviation from method

## Reference Toxicant Data

---

### REFERENCE TOXICANT (Potassium Chloride)

<i>Ceriodaphnia dubia</i> 2/12/20-2/18/20		<i>Pimephales promelas</i> 2/12/20-2/19/20	
NOEC Survival:	250 ppm KCl	NOEC Survival:	500 ppm KCl
LOEC Survival:	500 ppm KCl	LOEC Survival:	1000ppm KCl
NOEC Reproduction:	125 ppm KCl	NOEC Growth:	500ppm KCl
LOEC Reproduction:	250 ppm KCl	LOEC Growth:	1000 ppm KCl

## Summary of Results

---

### Jacksonville Wastewater Utility

<i>Ceriodaphnia dubia</i>		<i>Pimephales promelas</i>	
NOEC Survival Parameter: <b>TOP3B</b>	100%	NOEC Survival Parameter: <b>TOP6C</b>	100%
Pass/Fail Survival Parameter: <b>TLP3B</b>	Pass	Pass/Fail Survival Parameter: <b>TLP6C</b>	Pass
NOEC Reproduction Parameter: <b>TPP3B</b>	100%	NOEC Growth Parameter: <b>TPP6C</b>	100%
Pass/Fail Reproduction Parameter: <b>TGP3B</b>	Pass	Pass/Fail Growth Parameter: <b>TGP6C</b>	Pass
%CV Reproduction Parameter: <b>TQP3B</b>	30.3%	%CV Growth Parameter: <b>TQP6C</b>	11.6%
PMSD Reproduction	43.4%	PMSD Growth	16.5%

### Conclusion

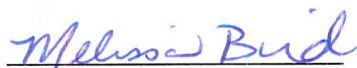
---

*Pimephales promelas*, (Method 1000.0): The permit issued to the Jacksonville Wastewater Utility, specifies that the **critical dilution is 100% effluent**. The effluent samples **did not** exhibit lethal or sublethal effects at the critical dilution and, as such, **passed** both portions of the test.

*Ceriodaphnia dubia*, (Method 1002.0): The permit issued to the Jacksonville Wastewater Utility, specifies that the **critical dilution is 100% effluent**. The effluent samples **did not** exhibit lethal or sublethal effects at the critical dilution, and, as such, **passed** both portions of the test.

Biomonitoring Analysts: Melissa Bird, Emily Nichols, Jettie Parnell, Tracy Bounds

Reviewed by:

  
Melissa Bird

## Appendices

---

Appendix A.....	Chains of custody
Appendix B.....	Fathead minnow data & statistics
Appendix C.....	<i>Ceriodaphnia dubia</i> data & statistics
Appendix D.....	Water chemistry data
Appendix E.....	Reference toxicant control charts



8100 National Dr.  
 Little Rock, AR 72209  
 PHONE: 501-455-3233  
 FAX: 501-455-6118

# CHAIN OF CUSTODY RECORD

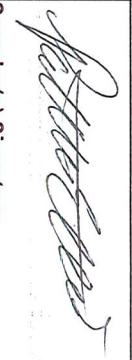
CLIENT INFORMATION		Project Description		Turnaround Time		Preservation Codes:					
Jacksonville Wastewater Utility 248 Cloverdale Rd. Jacksonville, AR 72076		Chronic Toxicity		1 Day (100%) 2 Day (50%) 3 Day (25%)		1. Cool, 6 Degrees Centigrade 2. Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> ), pH < 2 3. Nitric Acid (HNO <sub>3</sub> ), pH < 2 4. Thiou sulfate for Dechlorination 5. Hydrochloric Acid(HCl) 6. Sodium Hydroxide (NaOH), pH > 12					
Attn: Patrick Ellis		Reporting Information Telephone: 501-982-0581 Fax: 501-982-5791 Email: patrick@jvwu.com		Routine		TEST PARAMETERS					
				Preservative Code: 1							
				Bottle Type: P							
Sampler(s) Signature		Sampler(s) Printed		SAMPLE		Arkansas Analytical Work Order Number: K2003-065A					
Field Number	SAMPLE COLLECTION Dates/Times	Grab	Comp	Number of Bottles	Sample Matrix	IDENTIFICATION/ DESCRIPTION					
Set-Up	3/8/00 7:00 A		X		Water	Chronic Toxicity					
Take Off	3/9/00 7:30 A		X		Water	X					
1. Relinquished by: (Signature)		Date/Time		2. Received by: (Signature)		SAMPLE CONDITION UPON RECEIPT IN LAB					
<i>[Signature]</i>		3/9/00 9:15 A		<i>[Signature]</i>		1. CUSTODY SEALS: <input checked="" type="checkbox"/> Yes ___ No 2. CONTAINERS CORRECT: <input checked="" type="checkbox"/> Yes ___ No 3. COCLABELS AGREE: <input checked="" type="checkbox"/> Yes ___ No 4. RECEIVED ON ICE: <input checked="" type="checkbox"/> Yes ___ No 5. TEMPERATURE ON RECEIPT: 1 °C 6. TEMPERATURE GUN ID: HHT# 2 FOR COMPLETION BY LAB ONLY					
3. Relinquished by: (Signature)		Date/Time		4. Received by lab: (Signature)		REMARKS / SAMPLE COMMENTS					
<i>[Signature]</i>				<i>[Signature]</i>							

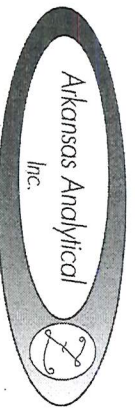




8100 National Dr.  
 Little Rock, AR 72209  
 PHONE: 501-455-3233  
 FAX: 501-455-6118

# CHAIN OF CUSTODY RECORD

CLIENT INFORMATION		Project Description		Turnaround Time		Preservation Codes:							
Jacksonville Wastewater Utility 248 Cloverdale Rd. Jacksonville, AR 72076		Chronic Toxicity		1 Day (100%)	2 Day (50%)	3 Day (25%)	1. Cool 6 Degrees Centigrade 2. Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> ), pH < 2 3. Nitric Acid (HNO <sub>3</sub> ), pH < 2 4. Thiosulfate for Dechlorination 5. Hydrochloric Acid(HCl) 6. Sodium Hydroxide (NaOH), pH > 12						
Attn: Patrick Ellis		Reporting Information		Routine		TEST PARAMETERS							
Telephone: 501-982-0581		Telephone: 501-982-5791		Fax: 501-982-5791		Preservative Code:		Bottle Type Code					
Email: patrick@jvwu.com		Bottle Type:		1		P		G = Glass, P = Plastic V = Septum, A = Amber					
Samplers(s) Signature 		Samplers(s) Printed Patrick Ellis		SAMPLE IDENTIFICATION/ DESCRIPTION BIO		Chronic Toxicity							
Field Number	SAMPLE COLLECTION Dats	Times	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE						
Set-Up	3/10/10	8:30 A		X		Water	X						
Take Off	3/11/10	7:34 A		X		Water	X						
1. Relinquished by: (Signature)		Date/Time		3/11/10		2. Received by: (Signature)		SAMPLE CONDITION UPON RECEIPT IN LAB 1. CUSTODY SEALS: <input checked="" type="checkbox"/> Yes ___ No 2. CONTAINERS CORRECT: <input checked="" type="checkbox"/> Yes ___ No 3. COCLABELS AGREE: <input checked="" type="checkbox"/> Yes ___ No 4. RECEIVED ON ICE: <input checked="" type="checkbox"/> Yes ___ No 5. TEMPERATURE ON RECEIPT: 1 °C 6. TEMPERATURE GUN ID: HHT# 2				REMARKS / SAMPLE COMMENTS	
3. Relinquished by: (Signature)		Date/Time		8:46 A		4. Received by lab: (Signature)		Sydney James					



8100 National Dr.  
 Little Rock, AR 72209  
 PHONE: 501-455-3233  
 FAX: 501-455-6118

# CHAIN OF CUSTODY RECORD

CLIENT INFORMATION		Project Description		Turnaround Time		Preservation Codes:	
Jacksonville Wastewater Utility 248 Cloverdale Rd. Jacksonville, AR 72076		Chronic Toxicity		1 Day (100%) 2 Day (50%) 3 Day (25%)		1. Cool, 6 Degrees Centigrade 2. Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> ), pH < 2 3. Nitric Acid (HNO <sub>3</sub> ), pH < 2 4. Thioulate for Dechlorination 5. Hydrochloric Acid (HCl) 6. Sodium Hydroxide (NaOH), pH > 12	
Attn: Patrick Ellis		Reporting Information Telephone: 501-982-0581 Fax: 501-982-5791 Email: patrick@jvwu.com		Routine		TEST PARAMETERS	
		Preservative Code: 1		Bottle Type Code: P		Arkansas Analytical Work Order Number: K2003-	
Sampler(s) Signature		Sampler(s) Printed		Chronic Toxicity		Chloride	
Field Number	SAMPLE COLLECTION Dates	Times	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION
Set-Up	3/12/20	2:00 pm		X		Water	X
Take Off	3/13/20	12:01 pm		X		Water	X
1. Relinquished by: (Signature)		Date/Time		2. Received by: (Signature)		Date/Time	
		12. 33 pm 3/13/20					
3. Relinquished by: (Signature)		Date/Time		4. Received by lab: (Signature)		Date/Time	
SAMPLE CONDITION UPON RECEIPT IN LAB				REMARKS / SAMPLE COMMENTS			
1. CUSTODY SEALS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				*Chloride added to sample			
2. CONTAINERS CORRECT: <input type="checkbox"/> Yes <input type="checkbox"/> No				per Finsea analysis -			
3. COC/LABELS AGREE: <input type="checkbox"/> Yes <input type="checkbox"/> No				3/13/20			
4. RECEIVED ON ICE: <input type="checkbox"/> Yes <input type="checkbox"/> No				⑧			
5. TEMPERATURE ON RECEIPT: 2 °C							
6. TEMPERATURE GUN ID: HHT# 2							
FOR COMPLETION BY LAB ONLY							

**CETIS Summary Report**

Report Date: 20 Mar-20 13:51 (p 1 of 2)  
 Test Code/ID: K2003005FH / 20-5867-0846

**Fathead Minnow 7-d Larval Survival and Growth Test**

Arkansas Analytical

Batch ID: 03-7799-9781	Test Type: Growth-Survival (7d)	Analyst: Emily Nichols
Start Date: 11 Mar-20 12:57	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 18 Mar-20 11:15	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 6d 22h	Taxon: Actinopterygii	Source: Aquatox, AR
		Age: <48
Sample ID: 01-2088-0583	Code: K2003005FH	Project: WET Quarterly Compliance Test (1Q)
Sample Date: 11 Mar-20 07:34	Material: POTW Effluent	Source: Jacksonville Wastewater Utility (AR00)
Receipt Date: 11 Mar-20 08:46	CAS (PC):	Station:
Sample Age: 5h (1 °C)	Client: Jacksonville Wastewater Utility	

**Sample Renewals**

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K2003005A	09 Mar-20 07:30	09 Mar-20 08:18	12 Mar-20 00:00	1
2	K2003005C	13 Mar-20 12:01	13 Mar-20 12:33	15 Mar-20 00:00	2

**Multiple Comparison Summary**

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	TU	PMSD	S
03-2585-6555	7d Survival Rate	Dunnett Multiple Comparison Test	100	>100	n/a	1	8.14%	1
16-9376-4900	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	>100	n/a	1	16.5%	1

**Test Acceptability**

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
03-2585-6555	7d Survival Rate	Control Resp	0.98	0.8	>>	Yes	Passes Criteria	
16-9376-4900	Mean Dry Biomass-mg	Control Resp	0.6546	0.25	>>	Yes	Passes Criteria	
16-9376-4900	Mean Dry Biomass-mg	PMSD	0.1647	0.12	0.3	Yes	Passes Criteria	

**7d Survival Rate Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
32		5	0.9400	0.8289	1.0000	0.8000	1.0000	0.0400	0.0894	9.52%	4.08%
42		5	0.9400	0.8720	1.0000	0.9000	1.0000	0.0245	0.0548	5.83%	4.08%
56		5	0.9600	0.8920	1.0000	0.9000	1.0000	0.0245	0.0548	5.71%	2.04%
75		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.04%

**Mean Dry Biomass-mg Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.6546	0.5888	0.7204	0.571	0.706	0.02371	0.05301	8.10%	0.00%
32		5	0.5912	0.4652	0.7172	0.449	0.695	0.04537	0.1014	17.16%	9.69%
42		5	0.587	0.5267	0.6473	0.549	0.66	0.02172	0.04856	8.27%	10.33%
56		5	0.6662	0.6101	0.7223	0.612	0.72	0.02019	0.04515	6.78%	-1.77%
75		5	0.6362	0.536	0.7364	0.546	0.714	0.03608	0.08067	12.68%	2.81%
100		5	0.736	0.6302	0.8418	0.653	0.854	0.0381	0.0852	11.58%	-12.44%



**CETIS Summary Report**Report Date: 20 Mar-20 13:51 (p 2 of 2)  
Test Code/ID: K2003005FH / 20-5867-0846**Fathead Minnow 7-d Larval Survival and Growth Test**

Arkansas Analytical

**7d Survival Rate Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	1.0000	0.9000	1.0000	1.0000	1.0000
32		0.9000	0.8000	1.0000	1.0000	1.0000
42		0.9000	0.9000	0.9000	1.0000	1.0000
56		0.9000	1.0000	0.9000	1.0000	1.0000
75		0.9000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

**Mean Dry Biomass-mg Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.647	0.694	0.571	0.706	0.655
32		0.449	0.552	0.695	0.683	0.577
42		0.614	0.558	0.66	0.549	0.554
56		0.612	0.699	0.669	0.631	0.72
75		0.546	0.678	0.714	0.691	0.552
100		0.796	0.696	0.854	0.681	0.653

**7d Survival Rate Binomials**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	10/10	9/10	10/10	10/10	10/10
32		9/10	8/10	10/10	10/10	10/10
42		9/10	9/10	9/10	10/10	10/10
56		9/10	10/10	9/10	10/10	10/10
75		9/10	10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10	10/10

**CETIS Summary Report**

Report Date: 26 Mar-20 11:44 (p 1 of 2)  
 Test Code/ID: K2003005CD / 17-3970-8784

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

Arkansas Analytical

Batch ID: 18-7659-7342	Test Type: Reproduction-Survival (7d)	Analyst: Emily Nichols
Start Date: 11 Mar-20 11:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 17 Mar-20 11:00	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 6d	Taxon: Branchiopoda	Source: In-House Culture Age: <24
Sample ID: 00-2330-8586	Code: K2003005CD	Project: WET Quarterly Compliance Test (1Q)
Sample Date: 11 Mar-20 07:34	Material: POTW Effluent	Source: Jacksonville Wastewater Utility (AR00)
Receipt Date: 11 Mar-20 08:46	CAS (PC):	Station:
Sample Age: 4h (1 °C)	Client: Jacksonville Wastewater Utility	

**Sample Renewals**

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K2003005A	09 Mar-20 07:30	09 Mar-20 08:18	12 Mar-20 00:00	1
2	K2003005C	13 Mar-20 12:01	13 Mar-20 12:33	15 Mar-20 00:00	2

**Multiple Comparison Summary**

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	TU	PMSD	S
16-3425-8044	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	>100	n/a	1	n/a	1
10-7084-2793	Reproduction	Dunnett Multiple Comparison Test	100	>100	n/a	1	43.4%	1

**Test Acceptability**

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
16-3425-8044	7d Survival Rate	Control Resp	0.8	0.8	>>	Yes	Passes Criteria
10-7084-2793	Reproduction	Control Resp	17.1	15	>>	Yes	Passes Criteria
10-7084-2793	Reproduction	PMSD	0.4344	0.13	0.47	Yes	Passes Criteria

**7d Survival Rate Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	0.00%
32		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-25.00%
42		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-25.00%
56		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-25.00%
75		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	-12.50%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-25.00%

**Reproduction Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	17.1	10.29	23.91	1	30	3.009	9.515	55.65%	0.00%
32		10	22.7	17.79	27.61	6	29	2.171	6.865	30.24%	-32.75%
42		10	21.3	16.1	26.5	10	34	2.3	7.273	34.15%	-24.56%
56		10	25.8	22.36	29.24	17	30	1.519	4.803	18.62%	-50.88%
75		10	21.6	15.74	27.46	3	30	2.591	8.195	37.94%	-26.32%
100		10	20.4	16.16	24.64	12	28	1.875	5.929	29.06%	-19.30%

Arg. neonates per surviving female in the 0%  
 $\bar{X} = 20.8$  CV = 30.3%

em  
 3-20-2020

**CETIS Summary Report**

Report Date: 26 Mar-20 11:44 (p 2 of 2)  
 Test Code/ID: K2003005CD / 17-3970-8784

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

Arkansas Analytical

**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	L	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
32		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
42		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
56		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
75		1.0000	0.0000	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

**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	L	27	23	4	30	9	19	20	19	19	1
32		29	29	23	22	6	26	18	26	21	27
42		19	30	19	22	27	16	10	15	21	34
56		26	30	17	28	17	29	26	28	29	28
75		29	3	25	22	13	30	28	23	20	23
100		28	28	20	13	23	23	12	13	23	21

**7d 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	L	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
32		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
42		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
75		1/1	0/1	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

CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING

Fathead Minnow

Lab # / Sample ID K2003005

Test Start (Date/Time) 3-11-2020/1251

Client: JUNON

Test End (Date/Time) 3-18-2020/1115

		Day of Test							
		1	2	3	4	5	6	7	notes
Control	<u>SS038</u>	<u>3/11</u>	<u>3/12</u>	<u>3/13</u>	<u>3/14</u>	<u>3/15</u>	<u>3/16</u>	<u>3/17</u>	<u>SS039</u>
D.O. (mg/L)	INITIAL	<u>8.2</u>	<u>8.2</u>	<u>8.2</u>	<u>8.2</u>	<u>8.4</u>	<u>8.4</u>	<u>7.6</u>	<u>used 3/17</u>
	FINAL	<u>7.0</u>	<u>7.2</u>	<u>7.4</u>	<u>8.8</u>	<u>7.2</u>	<u>7.6</u>	<u>7.7</u>	
pH (s.u.)	INITIAL	<u>8.3</u>	<u>8.4</u>	<u>8.2</u>	<u>8.2</u>	<u>8.4</u>	<u>8.4</u>	<u>7.7</u>	
	FINAL	<u>7.9</u>	<u>8.1</u>	<u>7.8</u>	<u>7.0</u>	<u>7.9</u>	<u>7.7</u>	<u>7.3</u>	
temp (C)	INITIAL	<u>24</u>	<u>23</u>	<u>23</u>	<u>23</u>	<u>24</u> <u>23</u>	<u>22</u>	<u>21</u>	
	FINAL	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	
ALKALINITY (mg/L)		<u>38</u>						<u>34</u>	
HARDNESS (mg/L)		<u>48</u>						<u>38</u>	
CONDUCTIVITY (umhc)		<u>338</u> <u>338</u>						<u>147</u>	
CHLORINE (mg/L)		<u>40.05</u>						<u>40.05</u>	
CONC:	<u>32%</u>								
D.O. (mg/L)	INITIAL	<u>8.3</u>	<u>8.3</u>	<u>8.3</u>	<u>8.5</u>	<u>8.4</u>	<u>8.5</u>	<u>8.2</u>	
	FINAL	<u>6.9</u>	<u>7.3</u>	<u>7.2</u>	<u>8.2</u>	<u>7.4</u>	<u>7.6</u>	<u>7.5</u>	
pH (s.u.)	INITIAL	<u>8.0</u>	<u>8.2</u>	<u>8.0</u>	<u>8.0</u>	<u>8.4</u>	<u>8.2</u>	<u>7.9</u>	
	FINAL	<u>7.7</u>	<u>7.9</u>	<u>7.8</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.5</u>	
temp (C)	INITIAL	<u>24</u>	<u>23</u>	<u>23</u>	<u>24</u>	<u>24</u> <u>23</u>	<u>22</u>	<u>21</u>	
	FINAL	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	
CONC:	<u>42%</u>								
D.O. (mg/L)	INITIAL	<u>8.4</u>	<u>8.4</u>	<u>8.3</u>	<u>8.7</u>	<u>8.5</u>	<u>8.6</u>	<u>8.4</u>	
	FINAL	<u>6.9</u>	<u>7.3</u>	<u>7.5</u>	<u>8.1</u>	<u>7.5</u>	<u>7.5</u>	<u>7.3</u>	
pH (mg/L)	INITIAL	<u>7.9</u>	<u>8.1</u>	<u>8.0</u>	<u>7.9</u>	<u>8.0</u>	<u>8.0</u>	<u>7.7</u>	
	FINAL	<u>7.8</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.8</u>	<u>7.6</u>	
temp (C)	INITIAL	<u>24</u>	<u>23</u>	<u>23</u>	<u>24</u>	<u>23</u>	<u>22</u>	<u>24</u>	
	FINAL	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	
CONC:	<u>56%</u>								
D.O. (mg/L)	INITIAL	<u>8.4</u>	<u>8.6</u>	<u>8.4</u>	<u>8.9</u>	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>	
	FINAL	<u>6.3</u>	<u>7.3</u>	<u>7.6</u>	<u>8.0</u>	<u>7.4</u>	<u>7.4</u>	<u>7.1</u>	
pH (s.u.)	INITIAL	<u>7.8</u>	<u>8.0</u>	<u>7.9</u>	<u>7.7</u>	<u>7.8</u>	<u>7.8</u> <u>3.0</u>	<u>7.6</u>	
	FINAL	<u>7.7</u>	<u>7.8</u>	<u>7.8</u>	<u>7.9</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>	
temp (C)	INITIAL	<u>25</u>	<u>23</u>	<u>23</u>	<u>24</u>	<u>23</u>	<u>23</u>	<u>24</u>	
	FINAL	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	
CONC:	<u>75%</u>								
D.O. (mg/L)	INITIAL	<u>8.3</u>	<u>8.7</u>	<u>8.5</u>	<u>9.1</u>	<u>8.8</u>	<u>8.7</u>	<u>8.9</u>	
	FINAL	<u>6.7</u>	<u>7.3</u>	<u>7.4</u>	<u>8.0</u>	<u>7.3</u>	<u>7.4</u>	<u>7.0</u>	
pH (s.u.)	INITIAL	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>	<u>7.6</u>	<u>7.6</u>	<u>7.6</u>	<u>7.5</u>	
	FINAL	<u>7.5</u>	<u>7.8</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>	<u>7.6</u>	<u>7.4</u>	
temp (C)	INITIAL	<u>25</u>	<u>23</u>	<u>23</u>	<u>24</u>	<u>24</u>	<u>24</u>	<u>24</u>	
	FINAL	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	
CONC:	<u>100%</u>								
D.O. (mg/L)	INITIAL	<u>8.8</u>	<u>9.1</u>	<u>8.5</u>	<u>9.3</u>	<u>9.0</u>	<u>8.7</u>	<u>9.0</u>	
	FINAL	<u>6.6</u>	<u>7.2</u>	<u>7.3</u>	<u>8.0</u>	<u>7.2</u>	<u>7.0</u>	<u>6.9</u>	
pH (s.u.)	INITIAL	<u>7.5</u>	<u>7.6</u>	<u>7.6</u>	<u>7.4</u>	<u>7.4</u>	<u>7.6</u>	<u>7.2</u>	
	FINAL	<u>7.6</u>	<u>7.6</u>	<u>7.6</u>	<u>7.8</u>	<u>7.4</u>	<u>7.2</u>	<u>7.2</u>	
temp (C)	INITIAL	<u>25</u>	<u>23</u>	<u>23</u>	<u>25</u>	<u>24</u>	<u>23</u>	<u>21</u>	
	FINAL	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>26</u>	
CONC:	<u>100%</u>	<u>B</u>	<u>A</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>C</u>	<u>C</u>	
ALKALINITY (mg/L)		<u>36</u>	<u>28</u>		<u>36</u>	<u>30</u>			
HARDNESS (mg/L)		<u>52</u>	<u>70</u>		<u>52</u>	<u>54</u>			
CONDUCTIVITY (umhc)		<u>331</u>	<u>338</u>		<u>351</u>	<u>215</u>			
CHLORINE (mg/L)		<u>40.05</u>	<u>40.05</u>		<u>40.05</u>	<u>40.05</u>			

en  
3-19-2020



CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING

Ceriodaphnia Dubia

Lab # / Sample ID 42003005

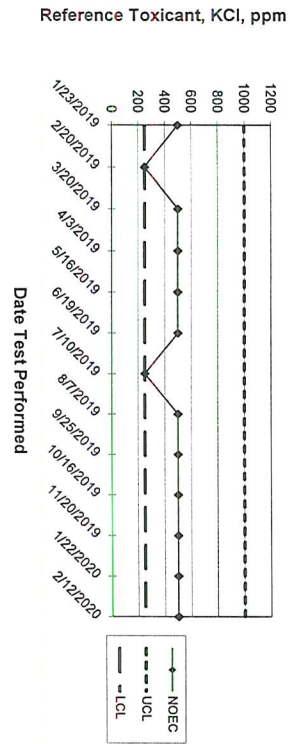
Test Start (Date/Time) 3-11-2020/1130

Client: JWUU

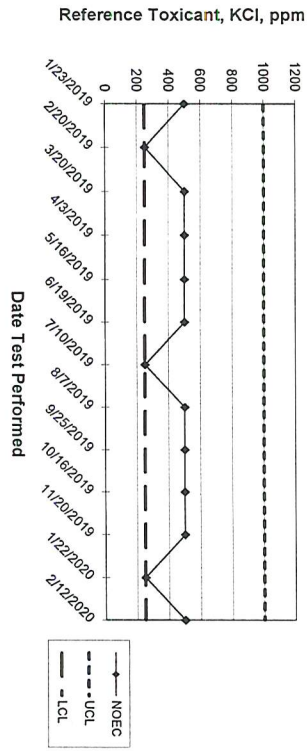
Test End (Date/Time) 3-17-2020/1100

		Day of Test							notes/remarks
		1	2	3	4	5	6	7	
Control	MH 55038	3/11	3/12	3/13	3/14	3/15	3/16	3/17	55039 wed 3/17
D.O. (mg/L)	INITIAL	8.2	8.2	8.2	8.2	8.1	8.4	7.7	
	FINAL	8.4	8.6	8.6	8.8	7.7	7.9		
pH (s.u.)	INITIAL	8.3	8.4	8.2	8.2	8.4	8.4	7.7	
	FINAL	8.3	8.5	8.5	8.4	8.3	8.2		
temp (C)	INITIAL	24	23	23	23	23	22	24	
	FINAL	25	25	25	25	25	25		
ALKALINITY (mg/L)		38						34	
HARDNESS (mg/L)		48						38	
CONDUCTIVITY (umhos/cm)		138						147	
CHLORINE (mg/L)		0.05						0.05	
CONC:	32%								
D.O. (mg/L)	INITIAL	8.3	8.3	8.3	8.5	8.4	8.5	8.2	
	FINAL	8.2	8.6	8.8	8.5	7.4	8.0		
pH (s.u)	INITIAL	8.0	8.2	8.0	8.0	8.1	8.2	7.8	
	FINAL	8.3	8.4	8.6	8.3	8.1	8.2		
temp (C)	INITIAL	24	23	23	24	23	22	24	
	FINAL	25	25	25	25	25	25		
CONC:	42%								
D.O. (mg/L)	INITIAL	8.4	8.4	8.3	8.7	8.5	8.6	8.4	
	FINAL	8.2	8.6	8.9	8.4	7.4	8.0		
pH (mg/L)	INITIAL	7.9	8.1	8.0	7.9	8.0	8.0	7.7	
	FINAL	8.2	8.4	8.6	8.2	7.9	8.1		
temp (C)	INITIAL	25	23	23	24	23	22	24	
	FINAL	25	25	25	25	25	25		
CONC:	56%								
D.O. (mg/L)	INITIAL	8.4	8.6	8.4	8.9	8.6	8.6	8.6	
	FINAL	8.2	8.6	8.9	8.3	7.8	8.1		
pH (s.u.)	INITIAL	7.8	8.0	7.9	7.7	7.8	7.8	7.6	
	FINAL	8.2	8.4	8.5	8.2	8.0	8.0		
temp (C)	INITIAL	25	23	23	24	23	23	24	
	FINAL	25	25	25	25	25	25		
CONC:	75%								
D.O. (mg/L)	INITIAL	8.3	8.7	8.5	9.1	8.8	8.7	8.9	
	FINAL	8.3	8.7	9.0	8.3	7.6	8.1		
pH (s.u.)	INITIAL	7.7	7.8	7.7	7.6	7.6	7.6	7.5	
	FINAL	8.3	8.6	8.5	8.2	7.8	8.0		
temp (C)	INITIAL	25	23	23	24	24	23	24	
	FINAL	25	25	25	25	25	25		
CONC:	100%								
D.O. (mg/L)	INITIAL	8.8	9.1	8.5	9.3	9.0	8.7	9.4	
	FINAL	8.3	8.8	9.0	8.3	7.9	8.0		
pH (s.u.)	INITIAL	7.5	7.6	7.6	7.4	7.4	7.3	7.2	
	FINAL	8.2	8.4	8.4	8.1	7.8	7.8		
temp (C)	INITIAL	25	23	23	25	24	23	24	
	FINAL	25	25	25	25	25	25		
CONC:	100%	B	A	A	B	C	C	C	
ALKALINITY (mg/L)		36	28		36	30			
HARDNESS (mg/L)		52	70		52	54			
CONDUCTIVITY (umhos/cm)		351	338		351	265			
CHLORINE (mg/L)		0.05	0.05		0.05	0.05			

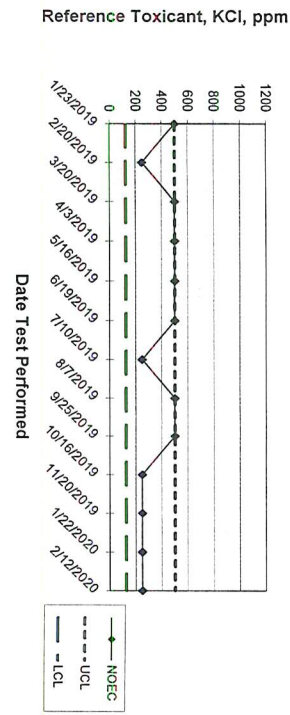
**ARKANSAS ANALYTICAL, INC.**  
**FATHEAD MINNOW SURVIVAL 7 Day**  
**QUALITY ASSURANCE**



**ARKANSAS ANALYTICAL, INC.**  
**FATHEAD MINNOW GROWTH 7 Day**  
**QUALITY ASSURANCE**



**ARKANSAS ANALYTICAL, INC.**  
**CERIODAPHNIA DUBIA SURVIVAL**  
**QUALITY ASSURANCE**



**ARKANSAS ANALYTICAL, INC.**  
**CERIODAPHNIA DUBIA REPRODUCTION**  
**QUALITY ASSURANCE**

