Arkansas Analytical, Inc.

Toxicity Test Results

JACKSONVILLE WASTEWATER UTILITY
NPDES PERMIT NUMBER: AR0041335
August 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 K2008008

Tuesday, September 01, 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)

Ceriodaphnia dubia 7/21/20-7/28/20		*Pimephales promelas* 7/21/20-7/28/20	
NOEC Survival:	500 ppm KCl	NOEC Survival:	500 ppm KCl
LOEC Survival:	1000 ppm KCl	LOEC Survival:	1000 ppm KCl
NOEC Reproduction:	125 ppm KCl	NOEC Growth:	500 ppm KCl
LOEC Reproduction:	250 ppm KCl	LOEC Growth:	1000 ppm KCl

Summary of Results

Jacksonville Wastewater Utility

Ceriodaphnia dubia		*Pimephales promelas*	
NOEC Survival Parameter: **TOP3B**	100%	NOEC Survival Parameter: **TOP6C**	100%
Pass/Fail Survival Parameter: **TLP3B**	Pass	Pass/Fail Survival Parameter: **TLP6C**	Pass
NOEC Reproduction Parameter: **TPP3B**	100%	NOEC Growth Parameter: **TPP6C**	100%
Pass/Fail Reproduction Parameter: **TGP3B**	Pass	Pass/Fail Growth Parameter: **TGP6C**	Pass
%CV Reproduction Parameter: **TQP3B**	27.8%	%CV Growth Parameter: **TQP6C**	20.8%
PMSD Reproduction	46.7%	PMSD Growth	22.7%

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

Reviewed by:

Melissa Bird

Melissa Bird

Appendices

Appendix A.....Chains of custody

Appendix B.....Fathead minnow data & statistics

Appendix C.....*Ceriodaphnia dubia* data & statistics

Appendix D.....Water chemistry data

Appendix E.....Reference toxicant control charts

Arkansas Analytical Inc.
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
Jacksonville Wastewater Utility	Chronic Toxicity	1 Day (100%)
248 Cloverdale Rd.		2 Day (50%)
Jacksonville, AR 72076	**Reporting Information**	3 Day (25%)
	Telephone: 501-982-0581	Routine
Attn: Forrest Lindsey	Fax: 501-982-5791	Preservative Code: 1
	Email: forrest@jwwu.com; patrick@jwwu.com	Bottle Type: P

Preservation Codes:
1. Cool, 6 Degrees Centigrade
2. Sulfuric Acid (H_2SO_4), pH < 2
3. Nitric Acid (HNO_3), pH < 2
4. Thiosulfate for Dechlorination
5. Hydrochloric Acid(HCl)
6. Sodium Hydroxide (NaOH), pH > 12

Sampler(s) Signature: Forrest Lindsey

Sampler(s) Printed: Forrest Lindsey

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity	TEST PARAMETERS	Bottle Type Code
Comp Start Date/Time	8/16/2020	7:00A		X	4	Water	Effluent Composite (24hr)	X		A
Comp End Date/Time	8/17/2020	7:00A								

Bottle Type Code: G = Glass; P = Plastic; V = Septum; A = Amber

Arkansas Analytical Work Order Number: K2008008

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
	8/17/2020 8:20A	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Amanda Forbes

SAMPLE CONDITION UPON RECEIPT IN LAB

1. CUSTODY SEALS: ✓ Yes ___ No
2. CONTAINERS CORRECT: ___ Yes ___ No
3. COC/LABELS AGREE: ___ Yes ___ No
4. RECEIVED ON ICE: ___ Yes ___ No
5. TEMPERATURE ON RECEIPT: 2 °C
6. TEMPERATURE GUN ID: HHT# 2

FOR COMPLETION BY LAB ONLY

REMARKS / SAMPLE COMMENTS

Arkansas Analytical Inc.
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	Chronic Toxicity	1 Day (100%)	1. Cool, 6 Degrees Centigrade / 4. Thiosulfate for Dechlorination
248 Cloverdale Rd.		2 Day (50%)	2. Sulfuric Acid (H_2SO_4), pH < 2 / 5. Hydrochloric Acid(HCl)
Jacksonville, AR 72076	Reporting Information	3 Day (25%)	3. Nitric Acid (HNO_3), pH < 2 / 6. Sodium Hydroxide (NaOH), pH > 12
	Telephone: 501-982-0581	(Routine)	TEST PARAMETERS
Attn: Forrest Lindsey	Fax: 501-982-5791	Preservative Code:	1
	Email: forrest@jwwu.com; patrick@jwwu.com	Bottle Type:	P

Sampler(s) Signature: [signature]

Sampler(s) Printed: Forrest Lindsey

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity	Bottle Type Code
Comp Start Date/Time	8/18/20	7:15A		X	4	Water	Effluent Composite (24hr)	X	B
Comp End Date/Time	8/19/20	7:15A							

Bottle Type Code: G = Glass; P = Plastic; V = Septum; A = Amber

Arkansas Analytical Work Order Number: K2008008

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
[signature]	8:15am 8/19/2020	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Amanda Robuck

SAMPLE CONDITION UPON RECEIPT IN LAB		
1. CUSTODY SEALS:	√ Yes	___ No
2. CONTAINERS CORRECT:	___ Yes	___ No
3. COC/LABELS AGREE:	___ Yes	___ No
4. RECEIVED ON ICE:	___ Yes	___ No
5. TEMPERATURE ON RECEIPT:	1 °C	
6. TEMPERATURE GUN ID:	HHT# 2	
FOR COMPLETION BY LAB ONLY		

REMARKS / SAMPLE COMMENTS

Arkansas Analytical Inc.

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	Chronic Toxicity	1 Day (100%)	1. Cool, 6 Degrees Centigrade / 4. Thiosulfate for Dechlorination
248 Cloverdale Rd.		2 Day (50%)	2. Sulfuric Acid (H_2SO_4), pH < 2 / 5. Hydrochloric Acid(HCl)
Jacksonville, AR 72076	Reporting Information	3 Day (25%)	3. Nitric Acid (HNO_3), pH < 2 / 6. Sodium Hydroxide (NaOH), pH > 12
	Telephone: 501-982-0581	Routine	TEST PARAMETERS
Attn: Forrest Lindsey	Fax: 501-982-5791	Preservative Code:	1
	Email: forrest@jwwu.com; patrick@jwwu.com	Bottle Type:	P

Bottle Type Code: G = Glass; P = Plastic; V = Septum; A = Amber

Sampler(s) Signature: Forrest Lindsey

Sampler(s) Printed: Forrest Lindsey

Arkansas Analytical Work Order Number: K2008008

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity	
Comp Start Date/Time	8/20/20	8:15A		X	4	Water	Effluent Composite (24hr)	X	C
Comp End Date/Time	8/21/20	8:15A							

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
	8/21/2020 12:40p	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Amanda Polk

SAMPLE CONDITION UPON RECEIPT IN LAB		
1. CUSTODY SEALS:	✓ Yes	No
2. CONTAINERS CORRECT:	Yes	No
3. COC/LABELS AGREE:	Yes	No
4. RECEIVED ON ICE:	Yes	No
5. TEMPERATURE ON RECEIPT:	1 °C	
6. TEMPERATURE GUN ID:	HHT# 2	
FOR COMPLETION BY LAB ONLY		

REMARKS / SAMPLE COMMENTS

Revision 3
1/4/16

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Arkansas Analytical**

Batch ID:	11-5426-1256	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Emily Nichols
Start Date:	18 Aug-20 11:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Soft Synthetic Water
Ending Date:	25 Aug-20 10:42	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Test Length:	7d	**Taxon:**	Actinopterygii	**Source:**	Aquatox, AR **Age:** <48
Sample ID:	17-4347-6531	**Code:**	K2008008FH	**Project:**	WET Quarterly Compliance Test (3Q)
Sample Date:	17 Aug-20 07:00	**Material:**	POTW Effluent	**Source:**	Jacksonville Wastewater Utility (AR00
Receipt Date:	17 Aug-20 08:20	**CAS (PC):**		**Station:**	
Sample Age:	28h (2 °C)	**Client:**	Jacksonville Wastewater Utility		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K2008008B	19 Aug-20 07:15	19 Aug-20 08:15	20 Aug-20 00:00	1
2	K2008008C	21 Aug-20 08:15	21 Aug-20 12:48	22 Aug-20 00:00	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
06-9645-6072	7d Survival Rate	Steel Many-One Rank Sum Test		100	>100	n/a	1	8.17%	1
02-2956-0862	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test		100	>100	n/a	1	22.7%	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
06-9645-6072	7d Survival Rate	Control Resp	0.98	0.8	>>	Yes	Passes Criteria
02-2956-0862	Mean Dry Biomass-mg	Control Resp	0.4492	0.25	>>	Yes	Passes Criteria
02-2956-0862	Mean Dry Biomass-mg	PMSD	0.227	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	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
42		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
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	0.9200	0.8161	1.0000	0.8000	1.0000	0.0374	0.0837	9.09%	6.12%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.4492	0.389	0.5094	0.389	0.524	0.02167	0.04845	10.79%	0.00%
32		5	0.4284	0.3483	0.5085	0.37	0.536	0.02885	0.06452	15.06%	4.63%
42		5	0.4394	0.3803	0.4985	0.401	0.521	0.02129	0.04761	10.84%	2.18%
56		5	0.5176	0.4378	0.5974	0.457	0.614	0.02874	0.06426	12.42%	-15.23%
75		5	0.541	0.4971	0.5849	0.486	0.581	0.0158	0.03533	6.53%	-20.44%
100		5	0.5654	0.4195	0.7113	0.454	0.76	0.05256	0.1175	20.79%	-25.87%

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	1.0000	1.0000	0.9000	1.0000
32		1.0000	1.0000	1.0000	0.9000	1.0000
42		0.9000	1.0000	1.0000	1.0000	1.0000
56		1.0000	1.0000	0.9000	1.0000	0.9000
75		0.9000	1.0000	1.0000	1.0000	1.0000
100		1.0000	0.8000	1.0000	0.9000	0.9000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.451	0.437	0.389	0.445	0.524
32		0.431	0.536	0.39	0.415	0.37
42		0.415	0.521	0.401	0.439	0.421
56		0.467	0.504	0.457	0.614	0.546
75		0.581	0.559	0.486	0.535	0.544
100		0.573	0.454	0.54	0.76	0.5

7d Survival Rate Binomials

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

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Arkansas Analytical**

Batch ID:	11-7530-4335	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emily Nichols
Start Date:	18 Aug-20 09:45	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Soft Synthetic Water
Ending Date:	26 Aug-20 10:26	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	13-6923-3232	**Code:**	K2008008CD	**Project:**	WET Quarterly Compliance Test (3Q)
Sample Date:	17 Aug-20 07:00	**Material:**	POTW Effluent	**Source:**	Jacksonville Wastewater Utility (AR00
Receipt Date:	17 Aug-20 08:20	**CAS (PC):**		**Station:**	
Sample Age:	27h (2 °C)	**Client:**	Jacksonville Wastewater Utility		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K2008008B	19 Aug-20 07:15	19 Aug-20 08:15	20 Aug-20 00:00	1
2	K2008008C	21 Aug-20 08:15	21 Aug-20 12:48	22 Aug-20 00:00	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
17-5475-3628	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1
13-8863-7323	Reproduction	Steel Many-One Rank Sum Test		100	>100	n/a	1	46.7%	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
17-5475-3628	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
13-8863-7323	Reproduction	Control Resp	22.2	15	>>	Yes	Passes Criteria
13-8863-7323	Reproduction	PMSD	0.467	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	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
32		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
42		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
56		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
75		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
100		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	22.2	17.79	26.61	13	30	1.948	6.161	27.75%	0.00%
32		10	38.3	33.23	43.37	27	48	2.241	7.088	18.51%	-72.52%
42		10	39.9	34.3	45.5	26	49	2.474	7.824	19.61%	-79.73%
56		10	44.8	39.7	49.9	37	58	2.255	7.131	15.92%	-101.80%
75		10	32.8	23.16	42.44	0	47	4.263	13.48	41.10%	-47.75%
100		10	37.3	26.37	48.23	7	57	4.831	15.28	40.95%	-68.02%

avg. neonates per surviving female in the 100%

$\bar{X}$ = 43.8 CV = 17.2%

en
9-1-2020

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	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
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	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
100		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	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	28	30	22	26	14	15	26	13	26	22
32		40	32	34	48	39	27	44	31	47	41
42		48	35	33	48	46	36	49	36	42	26
56		51	40	51	58	37	42	39	42	50	38
75		40	35	27	37	46	28	29	0	47	39
100		16	48	43	57	40	31	47	40	7	44

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	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
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	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
100		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1

CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING									Fathead Minnow
Lab # / Sample ID K20080008					Test Start (Date/Time) 8-18-2020/1110				
Client: Jacobs					Test End (Date/Time) 8-25-2020/1042				
		Day of Test							
		1	2	3	4	5	6	7	notes
Control	SS056	8/18	8/19	8/20	8/21	8/22	8/23	8/24	SS057
D.O. (mg/L)	INITIAL	7.3	8.4	8.4	8.2	8.1	8.6	8.4	8/22
	FINAL	6.5	7.9	8.2	8.7	7.8	8.1	7.0	
pH (s.u.)	INITIAL	7.8	8.1	8.2	8.1	8.3	8.6	8.2	
	FINAL	7.7	7.9	7.8	7.8	7.6	7.7	7.8	
temp (C)	INITIAL	22	22	21	22	23	20	21	
	FINAL	25	25	25	25	25	25	25	
ALKALINITY (mg/L)		34	—	—	—	36	—	—	
HARDNESS (mg/L)		44	—	—	—	36	—	—	
CONDUCTIVITY (umho		212	—	—	—	179	—	—	
CHLORINE (mg/L)		<0.05	—	—	—	<0.05	—	—	
CONC: 32%									
D.O. (mg/L)	INITIAL	7.4	8.3	8.6	8.4	8.2	8.7	8.6	
	FINAL	6.9	7.5	8.1	8.1 8.5	7.7	8.2	7.1	
pH (s.u)	INITIAL	7.9	7.7	7.7	7.7	8.0	8.2	7.9	
	FINAL	7.6	7.6	7.7	7.7 7.7	7.6	7.7	7.6	
temp (C)	INITIAL	22	22	21	22	22	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC: 42%									
D.O. (mg/L)	INITIAL	7.2	8.3	8.6	8.5	8.4	8.8	8.6	
	FINAL	6.9	7.4	8.0	8.3	7.6	8.2	7.1	
pH (mg/L)	INITIAL	7.7	7.6	7.6	7.6	7.4	8.0	7.7	
	FINAL	7.5	7.6	7.8	7.7	7.5	7.6	7.6	
temp (C)	INITIAL	22	22	21	23	22	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC: 56%									
D.O. (mg/L)	INITIAL	7.2	8.3	8.6	8.5	8.5	8.9	8.6	
	FINAL	6.9	7.5	8.0	8.1	7.6	8.3	7.2	
pH (s.u.)	INITIAL	7.6	7.6	7.5	7.4	7.7	7.8	7.5	
	FINAL	7.5	7.5	7.7	7.7	7.4	7.6	7.5	
temp (C)	INITIAL	22	23	21	22	21	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC: 75%									
D.O. (mg/L)	INITIAL	7.5	8.3	8.6	8.6	8.6	8.8	8.5	
	FINAL	6.9	7.5	8.0	7.9	7.4	8.2	7.1	
pH (s.u.)	INITIAL	7.5	7.5	7.3	7.3	7.6	7.6	7.4	
	FINAL	7.4	7.4	7.6	7.6	7.3	7.5	7.5	
temp (C)	INITIAL	22	23	21	22	22	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC: 100%									
D.O. (mg/L)	INITIAL	7.7	8.4	8.7	8.7	8.6	9.0	8.6	
	FINAL	7.0	7.5	7.9	7.8	7.3	8.2	7.1	
pH (s.u.)	INITIAL	7.2	7.2	7.1	7.0	7.5	7.3	7.2	
	FINAL	7.4	7.4	7.5	7.4	7.2	7.3	7.4	
temp (C)	INITIAL	23	23	21	23	23	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC: 100%		A	A	B	B	C	C	C	
ALKALINITY (mg/L)		14	—	14	—	20	—	—	
HARDNESS (mg/L)		62	—	68	—	66	—	—	
CONDUCTIVITY (umho		433	—	468	—	491	—	—	
CHLORINE (mg/L)		<0.05	—	<0.05	—	<0.05	—	—	

CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING — Ceriodaphnia Dubia

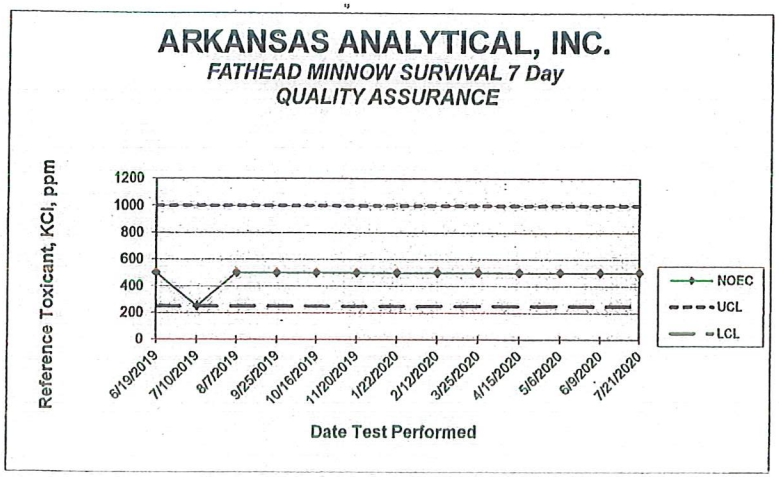
Lab # / Sample ID: K20080008 — Test Start (Date/Time): 8-18-2020/0945

Client: JWWA — Test End (Date/Time): 8-26-2020/1026

		Day of Test							
		1	2	3	4	5	6	7	notes/remarks
Control	~~MH~~ SS056	8/18	8/19	8/20	8/21	8/22	8/23	8/24	8/25 SS057
D.O. (mg/L)	INITIAL	7.3	8.4	8.4	8.2	8.1	8.6	8.4	8.3 8/22
	FINAL	8.6	8.5	8.1	8.5	8.5	8.3	7.9	7.9
pH (s.u.)	INITIAL	7.8	8.1	8.2	8.1	8.3	8.6	8.2	8.1
	FINAL	8.3	8.3	8.4	7.6	8.1	7.8	7.8	7.7
temp (C)	INITIAL	22	22	21	22	23	20	21	22
	FINAL	25	25	25	25	25	25	25	25
ALKALINITY (mg/L)		34	—	—	—	36	—	—	—
HARDNESS (mg/L)		44	—	—	—	36	—	—	—
CONDUCTIVITY (umhos/cm)		212	—	—	—	179	—	—	—
CHLORINE (mg/L)		<0.05	—	—	—	<0.05	—	—	—
CONC:	32%								
D.O. (mg/L)	INITIAL	7.4	8.3	8.6	8.4	8.2	8.7	8.6	8.4
	FINAL	8.6	8.7	8.0	8.5	8.5	8.3	8.0	8.0
pH (s.u)	INITIAL	7.9	7.7	7.7	7.7	8.0	8.2	7.9	7.7
	FINAL	8.1	8.2	8.1	7.7	7.9	7.8	7.7	7.7
temp (C)	INITIAL	22	22	21	22	22	20	21	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	42%								
D.O. (mg/L)	INITIAL	7.2	8.3	8.6	8.5	8.4	8.8	8.6	8.4
	FINAL	8.6	8.7	8.0	8.4	8.3	8.2	8.0	8.0
pH (mg/L)	INITIAL	7.7	7.6	7.6	7.6	7.9	8.0	7.7	7.6
	FINAL	8.1	8.2	8.0	7.7	7.9	7.8	7.7	7.6
temp (C)	INITIAL	22	22	21	23	22	20	21	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	56%								
D.O. (mg/L)	INITIAL	7.2	8.3	8.6	8.5	8.5	8.9	8.6	8.4
	FINAL	8.6	8.7	8.0	8.4	8.3	8.3	8.0	7.9
pH (s.u.)	INITIAL	7.6	7.6	7.5	7.4	7.7	7.8	7.5	7.7
	FINAL	8.0	8.1	8.0	7.9	7.9	7.7	7.7	7.6
temp (C)	INITIAL	22	23	21	22	21	20	21	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	75%								
D.O. (mg/L)	INITIAL	7.5	8.3	8.6	8.6	8.6	8.8	8.5	8.4
	FINAL	8.6	8.7	8.0	8.4	8.3	8.2	8.0	8.0
pH (s.u.)	INITIAL	7.5	7.5	7.3	7.3	7.6	7.6	7.4	7.6
	FINAL	7.9	8.0	7.9	7.7	7.7	7.6	7.6	7.5
temp (C)	INITIAL	22	23	21	22	22	20	21	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	100%								
D.O. (mg/L)	INITIAL	7.7	8.4	8.7	8.7	8.6	9.0	8.6	8.4
	FINAL	8.6	8.7	8.0	8.5	8.3	8.2	8.0	8.0
pH (s.u.)	INITIAL	7.2	7.2	7.1	7.0	7.5	7.3	7.2	7.4
	FINAL	7.8	7.9	7.7	7.5	7.6	7.5	7.5	7.4
temp (C)	INITIAL	23	23	21	23	23	20	21	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	100%	A	A	B	B	C	C	C	C
ALKALINITY (mg/L)		14	—	14	—	20	—	—	—
HARDNESS (mg/L)		62	—	68	—	66	—	—	—
CONDUCTIVITY (umhos/cm)		433	—	468	—	491	—	—	—
CHLORINE (mg/L)		<0.05	—	<0.05	—	<0.05	—	—	—

ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW SURVIVAL 7 Day
QUALITY ASSURANCE



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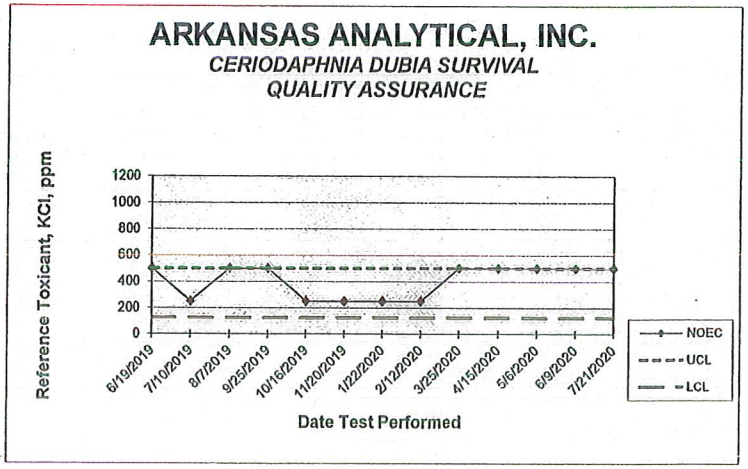
CERIODAPHNIA DUBIA SURVIVAL
QUALITY ASSURANCE



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FATHEAD MINNOW GROWTH 7 Day
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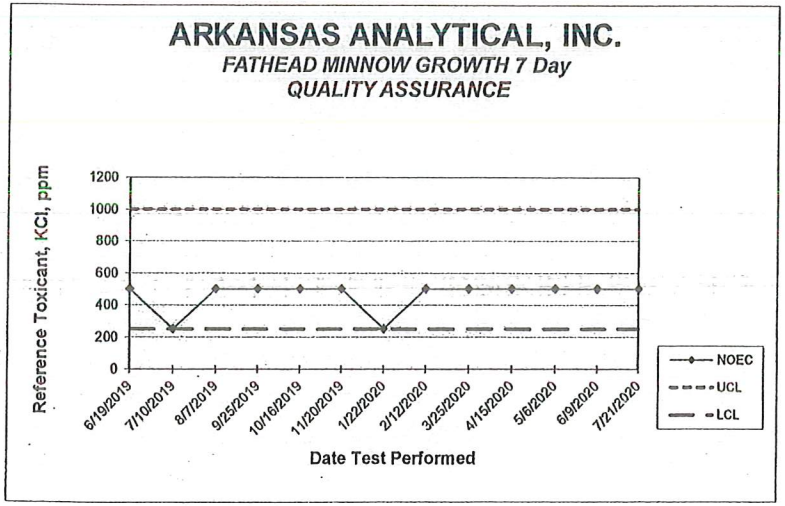

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CERIODAPHNIA DUBIA REPRODUCTION
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