

Arkansas Analytical, Inc.

Toxicity Test Results
City of DeQueen
NPDES PERMIT NUMBER: AR0021733
Third Quarter 2017
AFIN # 67-00023

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

Ceriodaphnia dubia, Survival and Reproduction Test
Test 1002.0

Prepared for: **Mr. Mike Sims**
City of DeQueen
P.O. Box 730
DeQueen, Arkansas 71832

Prepared by: Arkansas Analytical, Inc.
8100 National Drive
Little Rock, Arkansas 72209
Lab Number K1708002

Wednesday, August 23, 2017

Plant location

City of DeQueen. 1/8 mile south from intersection of Coulter Ave. and south of 9th Street on Philip Cox Blvd, in Section 36, Township 8 South, Range 32 West in Sevier 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: Moderately hard 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: Moderately hard synthetic
- No deviation from method

Reference Toxicant Data

REFERENCE TOXICANT (Potassium Chloride)

<i>Ceriodaphnia dubia</i> 7/19/17-7/26/17		<i>Pimephales promelas</i> 7/19/17-7/26/17	
NOEC Survival:	500 ppm KCl	NOEC Survival:	500 ppm KCl
LOEC Survival:	1000 ppm KCl	LOEC Survival:	1000 ppm KCl
NOEC Reproduction:	250 ppm KCl	NOEC Growth:	500 ppm KCl
LOEC Reproduction:	500 ppm KCl	LOEC Growth:	1000 ppm KCl

Summary of Results

City of DeQueen

<i>Ceriodaphnia dubia</i>		<i>Pimephales promelas</i>	
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	21.0%	%CV Growth Parameter: TQP6C	17.4%
PMSD Reproduction	28.2%	PMSD Growth	20.9%

Conclusion

Pimephales promelas, (Method 1000.0): The permit issued to the City of DeQueen, 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 City of DeQueen, 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, Shelby Chappell, Hallie Freyaldenhoven

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		BILLING		Project Description		Turnaround Time		Preservation Codes:	
City of DeQueen Wastewater Plant		City of DeQueen Wastewater Plant		Chronic Toxicity		1 Day (100%) 2 Day (50%) 3 Day (25%)		1. Cool 4 Degrees Centigrade 2. Sulfuric Acid (H ₂ SO ₄), pH < 2 3. Nitric Acid (HNO ₃), pH < 2 4. Thiosulfate for Dechlorination 5. Hydrochloric Acid(HCl) 6. Sodium Hydroxide (NaOH), pH > 12	
514 South 9th		P.O. Box 730		Reporting Information		Routine		TEST PARAMETERS	
DeQueen, AR 71832		DeQueen, AR 71832		Telephone: 870-642-5231		Preservative Code: 1		Bottle Type Code	
Attn: Mike Sims		Email: msims@cityofdequeen.com		Fax: 870-642-3117		Bottle Type: P		G = Glass; P = Plastic V = Septum; A = Amber	
Sampler(s) Signature: <i>MS</i>		Sampler(s) Printed: <i>Michael Sims</i>		SAMPLE IDENTIFICATION/ DESCRIPTION		Chronic Biomonitoring		Arkansas Analytical Work Order Number: K1708002	
Field Number	SAMPLE COLLECTION Dates	Times	Grab	Comp	Number of Bottles	Sample Matrix	Water	Final Discharge	Outfall
	8-6-7-17	9:30		X	4				X
1. Relinquished by: (Signature) <i>MS</i>		Date/Time 8-7-17		2. Received by: (Signature) <i>Shon Randle</i>		Date/Time 8/7/2017 09:34		SAMPLE CONDITION UPON RECEIPT IN LAB	
3. Relinquished by: (Signature) <i>MS</i>		Date/Time 8/7/2017 12:20		4. Received by lab: (Signature) <i>Shonmy Riddle</i>		1. CUSTODY SEALS: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		REMARKS / SAMPLE COMMENTS: <i>PO# 74446</i>	
						2. CONTAINERS CORRECT: Yes <input type="checkbox"/> No <input type="checkbox"/>			
						3. COC/LABELS AGREE: Yes <input type="checkbox"/> No <input type="checkbox"/>			
						4. RECEIVED ON ICE: Yes <input type="checkbox"/> No <input type="checkbox"/>			
						5. TEMPERATURE ON RECEIPT: 1 °C			
						6. TEMPERATURE GUN ID: HHT# 2			
						FOR COMPLETION BY LAB ONLY			



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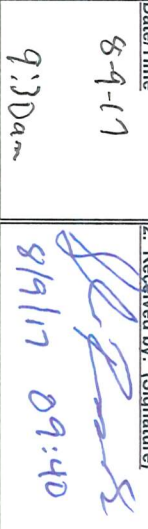
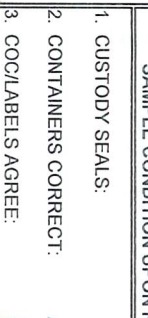

CHAIN OF CUSTODY RECORD

CLIENT INFORMATION		BILLING		Project Description		Turnaround Time		Preservation Codes:	
City of DeQueen Wastewater Plant		City of DeQueen Wastewater Plant		Chronic Toxicity		1 Day (100%) 2 Day (50%) 3 Day (25%)		1. Cool 4 Degrees Centigrade 2. Sulfuric Acid (H ₂ SO ₄), pH < 2 3. Nitric Acid (HNO ₃), pH < 2 4. Thiosulfate for Dechlorination 5. Hydrochloric Acid(HCl) 6. Sodium Hydroxide (NaOH), pH > 12	
514 South 9th		P. O. Box 730		Reporting Information		Routine		TEST PARAMETERS	
DeQueen, AR 71832		DeQueen, AR 71832		Telephone: 870-642-5231		Preservative Code: 1		Bottle Type Code	
Attn: Mike Sims		Email: msims@cityofdequeen.com		Fax: 870-642-3117		Bottle Type: P		G = Glass; P = Plastic V = Syring; A = Amber	
Sampler(s) Signature		Sampler(s) Printed		SAMPLE IDENTIFICATION/ DESCRIPTION		Chronic Biomonitoring		Arkansas Analytical Work Order Number: K1708002	
Field Number	SAMPLE COLLECTION Dates	Times	Grab	Number of Bottles	Sample Matrix	Water	Final Discharge	Outfall	
	8-7-8-17	9:30-7:30		X	4				X
1. Relinquished by: (Signature)		Date/Time		2. Received by: (Signature)		Date/Time		3. Relinquished by: (Signature)	
MHL SS		9:30 8/8/17		Shon Rowder		8/8/2017 0936		MHL SS	
Date/Time		Date/Time		Date/Time		Date/Time		Date/Time	
08/08/2017		1307		Sammy Riddle					
4. Received by lab: (Signature)		4. RECEIVED ON ICE:		5. TEMPERATURE ON RECEIPT:		6. TEMPERATURE GUN ID:		FOR COMPLETION BY LAB ONLY	
		Yes ___ No ___		1 °C		HHT# 2			
SAMPLE CONDITION UPON RECEIPT IN LAB		REMARKS / SAMPLE COMMENTS							
1. CUSTODY SEALS: <input checked="" type="checkbox"/> 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	
74446									



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CHAIN OF CUSTODY RECORD

CLIENT INFORMATION		BILLING		Project Description		Turnaround Time		Preservation Codes:	
City of DeQueen Wastewater Plant		City of DeQueen Wastewater Plant		Chronic Toxicity		1 Day (100%) 2 Day (50%) 3 Day (25%)		1. Cool 4 Degrees Centigrade 2. Sulfuric Acid (H ₂ SO ₄), pH < 2 3. Nitric Acid (HNO ₃), pH < 2	
514 South 9th		P. O. Box 730		Reporting Information		Routine Telephone: 870-642-5231 Fax: 870-642-3117 Email: msims@cityofdequeen.com		4. Thioulate for Dechlorination 5. Hydrochloric Acid(HCl) 6. Sodium Hydroxide (NaOH), pH > 12	
DeQueen, AR 71832		DeQueen, AR 71832		Attn: Mike Sims		Preservative Code: 1 Bottle Type: P		TEST PARAMETERS Bottle Type Code	
Sampler(s) Signature 		Sampler(s) Printed MS		SAMPLE IDENTIFICATION/ DESCRIPTION Chronic Biomonitoring		Arkansas Analytical Work Order Number: K1708002		G = Glass, P = Plastic V = Septum, A = Amber	
Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	Water	Final Discharge	Outfall
	8-8-17	8:30am-1:30pm		X	4				X
1. Relinquished by: (Signature)		Date/Time		2. Received by: (Signature)		Date/Time		3. Relinquished by: (Signature)	
		8-9-17				9:30am			
4. Received by lab: (Signature)		Date/Time		5. TEMPERATURE ON RECEIPT: 1 °C		HHT# 2		REMARKS / SAMPLE COMMENTS	
		8/9/17 13:40		Johnny Riddle				P# 74446	
SAMPLE CONDITION UPON RECEIPT IN LAB 1. CUSTODY SEALS: <input checked="" type="checkbox"/> 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									

CETIS Summary Report

Report Date: 23 Aug-17 07:57 (p 1 of 2)
 Test Code: K1708002FH | 03-6470-4482

Fathead Minnow 7-d Larval Survival and Growth Test

Arkansas Analytical, Inc.

Batch ID: 12-4243-6532	Test Type: Growth-Survival (7d)	Analyst: Shelby Chappell
Start Date: 08 Aug-17 15:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 15 Aug-17 14:10	Species: Pimephales promelas	Brine: Not Applicable
Duration: 6d 23h	Source: Aquatox, AR	Age: <24
Sample ID: 07-7841-7205	Code: 2E65B435	Client: City of DeQueen
Sample Date: 07 Aug-17 07:30	Material: POTW Effluent	Project: WET Quarterly Compliance Test (3Q)
Receipt Date: 07 Aug-17 12:20	Source: City of DeQueen (AR0021733)	
Sample Age: 32h (1 °C)	Station:	

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1708002B	08 Aug-17 07:30	08 Aug-17 13:07	10 Aug-17 00:00	1
2	K1708002C	09 Aug-17 06:30	09 Aug-17 13:40	11 Aug-17 00:00	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
07-9138-4397	7d Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	7.78%
02-8905-6691	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	100	> 100	n/a	1	20.9%

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
07-9138-4397	7d Survival Rate	Control Resp	0.96	0.8	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	0.00%
32		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	-2.08%
42		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	-2.08%
56		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	-2.08%
75		5	0.9400	0.8720	1.0000	0.9000	1.0000	0.0245	0.0548	5.83%	2.08%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%

Mean Dry Weight-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.3738	0.3293	0.4183	0.333	0.416	0.01604	0.03587	9.60%	0.00%
32		5	0.3238	0.2728	0.3748	0.258	0.37	0.01835	0.04104	12.67%	13.38%
42		5	0.3704	0.2841	0.4567	0.26	0.433	0.03107	0.06948	18.76%	0.91%
56		5	0.3134	0.2697	0.3572	0.274	0.367	0.01576	0.03523	11.24%	16.16%
75		5	0.3562	0.2864	0.426	0.318	0.451	0.02513	0.05619	15.78%	4.71%
100		5	0.3702	0.2902	0.4502	0.288	0.447	0.02882	0.06443	17.40%	0.96%

CETIS Summary ReportReport Date: 23 Aug-17 07:57 (p 2 of 2)
Test Code: K1708002FH | 03-6470-4482

Fathead Minnow 7-d Larval Survival and Growth Test

Arkansas Analytical, Inc.

7d Survival Rate Detail

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

Mean Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.416	0.333	0.356	0.357	0.407
32		0.37	0.34	0.258	0.324	0.327
42		0.425	0.377	0.26	0.433	0.357
56		0.367	0.291	0.319	0.316	0.274
75		0.318	0.451	0.364	0.329	0.319
100		0.447	0.351	0.423	0.288	0.342

7d Survival Rate Binomials

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

CETIS Summary Report

Report Date: 23 Aug-17 07:58 (p 1 of 2)
 Test Code: K1708002CD | 21-2913-3080

Cladoceran 7-d Survival and Reproduction Test

Arkansas Analytical, Inc.

Batch ID: 04-3469-8947	Test Type: Reproduction-Survival (7d)	Analyst: Melissa Bird
Start Date: 08 Aug-17 15:20	Protocol: EPA/600/4-91/002 (1994)	Diluent: Mod-Hard Synthetic Water
Ending Date: 15 Aug-17 15:00	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 7d	Source: In-House Culture	Age: <24
Sample ID: 08-4279-4223	Code: 323C04EF	Client: City of DeQueen
Sample Date: 07 Aug-17 07:30	Material: POTW Effluent	Project: WET Quarterly Compliance Test (3Q)
Receipt Date: 07 Aug-17 12:20	Source: City of DeQueen (AR0021733)	
Sample Age: 32h (1 °C)	Station:	

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1708002B	08 Aug-17 07:30	08 Aug-17 13:07	10 Aug-17 00:00	1
2	K1708002C	09 Aug-17 06:30	09 Aug-17 13:40	11 Aug-17 00:00	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
20-3973-5781	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	> 100	n/a	1	n/a
06-8337-5099	Reproduction	Steel Many-One Rank Sum Test	100	> 100	n/a	1	28.2%

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
20-3973-5781	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
06-8337-5099	Reproduction	Control Resp	20.5	15	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	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	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	20.5	17.61	23.39	15	28	1.276	4.035	19.68%	0.00%
32		10	29.5	25.26	33.74	14	35	1.875	5.93	20.10%	-43.90%
42		10	30.1	26.29	33.91	16	35	1.683	5.322	17.68%	-46.83%
56		10	33.6	29.05	38.15	20	42	2.012	6.363	18.94%	-63.90%
75		10	31.9	28.05	35.75	19	37	1.703	5.384	16.88%	-55.61%
100		10	30.8	26.17	35.43	14	35	2.048	6.477	21.03%	-50.24%

CETIS Summary Report

Report Date: 23 Aug-17 07:58 (p 2 of 2)
 Test Code: K1708002CD | 21-2913-3080

Cladoceran 7-d Survival and Reproduction Test

Arkansas Analytical, Inc.

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
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	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	D	28	17	24	15	22	20	22	17	23	17
32		32	35	28	28	34	32	31	32	29	14
42		32	28	31	34	35	32	31	30	32	16
56		31	42	37	34	36	33	37	39	27	20
75		36	37	36	32	32	33	27	32	35	19
100		34	34	35	34	32	34	27	35	29	14

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	D	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	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 K17080012

Test Start (Date/Time) 8-8-17 1530

Client: Dr. Quisenberry

Test End (Date/Time) 8-15-17 1410

		Day of Test							notes
		1	2	3	4	5	6	7	
Control	871	8/8	8/9	8/10	8/11	8/12	8/13	8/14	8/12 872
D.O. (mg/L)	INITIAL	8.6	8.1	8.4	8.3	* 8.2 8.2	8.5	8.6	
	FINAL	7.1	8.1	7.4	7.6	8.3	9.0	6.7	
pH (s.u.)	INITIAL	7.6	7.8	7.7	7.7	* 7.25 7.25	7.8	7.6	
	FINAL	7.5	6.2	7.5	7.2	7.1	7.8	7.3	
temp (C)	INITIAL	22	23	22	22	23	22	22	
	FINAL	25	25	25	* 23 25	25	25	25	
ALKALINITY (mg/L)		94	—————	—————	—————	98.2	—————	—————	
HARDNESS (mg/L)		114	—————	—————	—————	98	—————	—————	
CONDUCTIVITY (umhc)		286	—————	—————	—————	274	—————	—————	
CHLORINE (mg/L)		<0.05	—————	—————	—————	<0.05	—————	—————	
CONC:									
D.O. (mg/L)	INITIAL	8.4	8.5	8.4	8.3	8.6	8.6	8.5	
	FINAL	7.3	8.1	7.2	7.4	8.1	8.9	6.7	
pH (s.u.)	INITIAL	7.4	7.7	7.7	7.7	7.5	7.6	7.6	
	FINAL	7.5	6.4	7.5	7.2	7.2	7.7	7.3	
temp (C)	INITIAL	22	23	24	23	24	24	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
D.O. (mg/L)	INITIAL	8.7	8.6	8.6	8.4	8.3	8.7	8.4	
	FINAL	7.5	8.0	7.2	7.5	8.1	8.9	6.8	
pH (mg/L)	INITIAL	7.4	7.7	7.8	7.7	7.4	7.6	7.4	
	FINAL	7.5	6.6	7.5	7.3	7.3	7.7	7.3	
temp (C)	INITIAL	23	24	24	24	25	24	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
D.O. (mg/L)	INITIAL	8.7	8.7	8.6	8.5	8.3	8.8	9.3	
	FINAL	7.3	8.0	7.3	7.5	8.0	8.9	7.0	
pH (s.u.)	INITIAL	7.5	7.7	7.8	7.8	7.4	7.5	7.3	
	FINAL	7.5	6.9	7.5	7.3	7.3	7.6	7.4	
temp (C)	INITIAL	23	25	25	24	26	25	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
D.O. (mg/L)	INITIAL	8.8	8.7	8.7	8.5	8.9	8.9	9.5	
	FINAL	7.3	7.7	7.3	7.5	7.9	8.9	7.1	
pH (s.u.)	INITIAL	7.5	7.6	7.8	7.8	7.3	7.4	7.3	
	FINAL	7.5	7.0	7.5	7.4	7.4	7.6	7.4	
temp (C)	INITIAL	23	25	25	25	26	26	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
D.O. (mg/L)	INITIAL	8.9	9.1	8.9	8.6	9.2	9.4	9.5	
	FINAL	7.0	7.7	7.2	7.6	7.9	8.9	7.2	
pH (s.u.)	INITIAL	7.5	7.6	7.7	7.8	7.2	7.2	7.2	
	FINAL	7.5	7.2	7.4	7.4	7.4	7.6	7.4	
temp (C)	INITIAL	23	26	26	25	27	26	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
ALKALINITY (mg/L)		A	A	B	* 80 C	C	C	B	
HARDNESS (mg/L)		52	—————	50	60	—————	—————	50	
HARDNESS (mg/L)		54	—————	58	52	—————	—————	58	
CONDUCTIVITY (umhc)		396	—————	344	490	—————	—————	344	
CHLORINE (mg/L)		<0.05	—————	<0.05	—————	<0.05	—————	<0.05	

*8-11-17 mb

CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING

Ceriodaphnia Dubia

Lab # / Sample ID R1708002

Test Start (Date/Time) 8-8-17 1520

Client: DeQueen

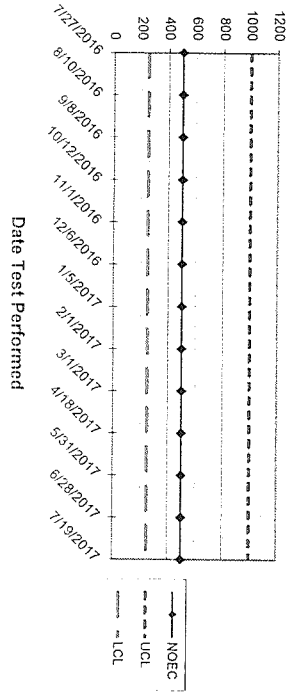
Test End (Date/Time) 8-15-17 1500

		Day of Test							
		1	2	3	4	5	6	7	notes/remarks
Control	MH 871	8/8	8/9	8/10	8/11	8/12	8/13	8/14	8/12 872
D.O. (mg/L)	INITIAL	8.6	8.1	8.4	8.3	8.2	8.5	8.6	
	FINAL	8.2	8.0	8.0	8.8	9.0	9.0	8.4	
pH (s.u.)	INITIAL	7.6	7.8	7.7	7.7	7.5	7.8	7.6	
	FINAL	7.7	7.7	7.6	7.7	7.8	7.8	7.8	
temp (C)	INITIAL	22	23	22	22	23	22	22	
	FINAL	25	25	25	25	25	25	25	
ALKALINITY (mg/L)		94	→	→	→	92	→	→	
HARDNESS (mg/L)		114	→	→	→	98	→	→	
CONDUCTIVITY (umhos/cm)		286	→	→	→	274	→	→	
CHLORINE (mg/L)		<0.05	→	→	→	<0.05	→	→	
CONC:									
D.O. (mg/L)	INITIAL	8.4	8.5	8.4	8.3	8.6	8.6	8.5	
	FINAL	8.3	7.9	8.0	8.6	9.0	8.9	8.4	
pH (s.u.)	INITIAL	7.4	7.7	7.7	7.7	7.5	7.6	7.6	
	FINAL	7.8	7.7	7.6	7.8	7.8	7.7	7.8	
temp (C)	INITIAL	22	23	24	23	24	24	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
D.O. (mg/L)	INITIAL	8.7	8.6	8.6	8.4	8.3	8.7	8.9	
	FINAL	8.3	8.0	7.9	8.6	9.0	8.9	8.4	
pH (mg/L)	INITIAL	7.4	7.7	7.8	7.7	7.4	7.6	7.4	
	FINAL	7.8	7.7	7.7	7.8	7.8	7.7	7.8	
temp (C)	INITIAL	23	24	24	24	24.5	24	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
D.O. (mg/L)	INITIAL	8.7	8.7	8.6	8.5	8.8	8.8	9.3	
	FINAL	8.3	8.1	8.0	8.6	9.0	8.9	8.4	
pH (s.u.)	INITIAL	7.5	7.7	7.8	7.8	7.4	7.5	7.3	
	FINAL	7.8	7.7	7.7	7.8	7.8	7.6	7.7	
temp (C)	INITIAL	23	25	25	24	26	25	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
D.O. (mg/L)	INITIAL	8.8	8.7	8.7	8.5	8.9	8.9	9.5	
	FINAL	8.4	8.1	8.1	8.6	9.1	8.9	8.4	
pH (s.u.)	INITIAL	7.5	7.6	7.8	7.8	7.3	7.4	7.3	
	FINAL	7.8	7.7	7.7	7.8	7.8	7.6	7.6	
temp (C)	INITIAL	23	25	25	25	26	26	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
D.O. (mg/L)	INITIAL	8.9	9.1	8.9	8.6	9.2	9.4	9.5	
	FINAL	8.4	8.2	8.0	8.6	9.0	8.9	8.4	
pH (s.u.)	INITIAL	7.5	7.6	7.7	7.8	7.2	7.2	7.2	
	FINAL	7.9	7.7	7.7	7.8	7.8	7.6	7.6	
temp (C)	INITIAL	23	26	26	25	27	26	22	
	FINAL	25	25	25	25	25	25	25	
CONC:									
		A	A	B	*RC	C	C	B	
ALKALINITY (mg/L)		52	→	50	60	→	→	50	
HARDNESS (mg/L)		34	→	58	52	→	→	58	
CONDUCTIVITY (umhos/cm)		596	→	344	490	→	→	344	
CHLORINE (mg/L)		<0.05	→	<0.05	<0.05	→	→	<0.05	

*mb 8-11-17

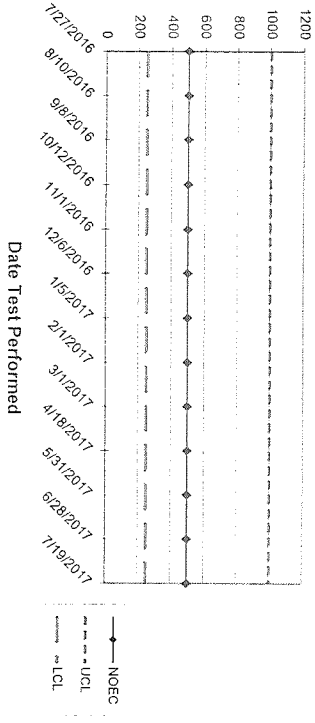
ARKANSAS ANALYTICAL, INC.
 FATHEAD MINNOW SURVIVAL 7 Day
 QUALITY ASSURANCE

Reference Toxicant, KCl, ppm



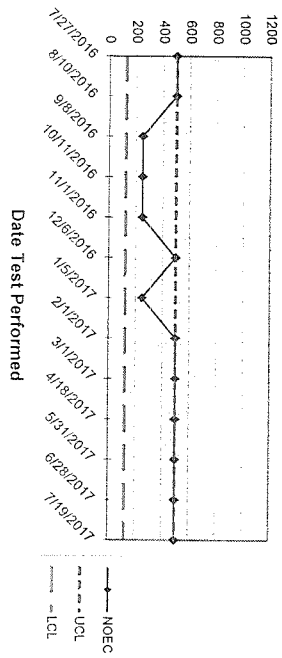
ARKANSAS ANALYTICAL, INC.
 FATHEAD MINNOW GROWTH 7 Day
 QUALITY ASSURANCE

Reference Toxicant, KCl, ppm



ARKANSAS ANALYTICAL, INC.
 CERIODAPHNIA DUBIA SURVIVAL
 QUALITY ASSURANCE

Reference Toxicant, KCl, ppm



ARKANSAS ANALYTICAL, INC.
 CERIODAPHNIA DUBIA REPRODUCTION
 QUALITY ASSURANCE

Reference Toxicant, KCl, ppm

