McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

7302 Kanis Road
P.O. Box 34087
Little Rock, AR 72204 / 72203
501-371-0272 • FAX 501-371-9932
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February 26, 2019

Mr. Gavin Gray
Enforcement Analyst
Office of Water Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock Arkansas 72118-5317

RE: Permit Compliance Schedule
Effluent Limits for *Ceriodaphnia. dubia* Toxicity
Progress Report 1- One Year From Effective Date
NPDES Permit Number: AR0033987, AFIN 21-00045
City of Dumas, Desha County, AR

Dear Mr. Gray:

Pursuant to the above referenced NPDES Permit, Part IB issued on February 9, 2019 and modified March 1, 2017, the city of Dumas has successfully passed all the quarterly whole effluent toxicity (WET) tests conducted for the year 2018. The tests were performed on *Pimephales promelas* and *Ceriodaphnia dubia* for larval survival and growth, and survival and reproduction tests, respectively.

Enclosed are the laboratory results including testing procedures in accordance with EPA-821-R-02-013 as stipulated in Part II, B. and C. of the NPDES Permit.

If you desire additional information or questions, please feel free to contact us at 501-371-0272 or at ckwelle@mce.us.com.

Sincerely,

Chid H. Kwelle, Ph.D., P.E.
McClelland Consulting Engineers

CC: Patrick Fitzgerald, WWTP Superintendent, 155 E. Waterman, Dumas, AR 71639
Adam Triche, Asst. Water and Wastewater Dept. Manager, atriche@mce.us.com

Arkansas Analytical, Inc.

Toxicity Test Results

CITY OF DUMAS
NPDES PERMIT NUMBER: AR0033987
First Quarter 2018
AFIN # 21-00045

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

Ceriodaphnia dubia, Survival and Reproduction Test
Test 1002.0

Prepared for: **Pat Fitzgerald**
City of Dumas
155 E. Waterman
Dumas, Arkansas, 71639

Prepared by: Arkansas Analytical,
8100 National Drive
Little Rock, Arkansas 72209
Lab Number K1802009

Friday, March 9, 2018

Plant Location

City of Dumas. The plant is located in Dumas, Arkansas, Highway 165 North in Section 25, Township 9 South, Range 4 West in Desha 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%, 16%, 22%, 29%, 39%, 52%
- 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%, 16%, 22%, 29%, 39%, 52%
- Dilution water: Moderately hard synthetic
- No deviation from method

Reference Toxicant Data

REFERENCE TOXICANT (Potassium Chloride)

Ceriodaphnia dubia 1/30/18-2/6/18		*Pimephales promelas* 1/17/18-1/24/18	
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 Dumas

Ceriodaphnia dubia		*Pimephales promelas*	
NOEC Survival Parameter: **TOP3B**	52%	NOEC Survival Parameter: **TOP6C**	52%
Pass/Fail Survival Parameter: **TLP3B**	Pass	Pass/Fail Survival Parameter: **TLP6C**	Pass
NOEC Reproduction Parameter: **TPP3B**	52%	NOEC Growth Parameter: **TPP6C**	52%
Pass/Fail Reproduction Parameter: **TGP3B**	Pass	Pass/Fail Growth Parameter: **TGP6C**	Pass
%CV Reproduction Parameter: **TQP3B**	30.8%	%CV Growth Parameter: **TQP6C**	11.5%
PMSD Reproduction	31.9%	PMSD Growth	13.9%

Conclusion

Pimephales promelas, (Method 1000.0): The permit issued to the City of Dumas, specifies that the **critical dilution is 39% 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 Dumas, specifies that the **critical dilution is 39% 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, Hallie Freyaldenhoven

Reviewed by:

Melissa Bird

Melissa Bird

Appendices

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

CHAIN OF CUSTODY RECORD

CLIENT INFORMATION	BILLING INFORMATION
McClelland Consulting Engineers	McClelland Consulting Engineers
1311 W 2nd St.	P.O. Box 34087
Little Rock, AR 72201	Little Rock, AR 72203-4087
Attn: Matt Bienvenu	

Project Description: Chronic Toxicity; City of Dumas

Reporting Information: Telephone: 501-378-7808; Fax: 501-376-4677; Email: mbienvenu@mcclelland-engrs.com

Turnaround Time: 1 Day (100%); 2 Day (50%); 3 Day (25%); Routine

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

Preservative Code: 1
Bottle Type: P

Sampler(s) Signature: Jesse James
Sampler(s) Printed: Jesse James

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	TEST PARAMETERS: Chronic Toxicity	Bottle Type Code
	2/19-2/20	6A-6A		X	4	Water	Final Discharge	X	A

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

Arkansas Analytical Work Order Number: K1802009

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
Jesse James	2/20/18 1511	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Danny Riddle

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

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Telephone: 501-378-7808
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Email: mbienvenu@mcclelland-engrs.com

Turnaround Time: 1 Day (100%); 2 Day (50%); 3 Day (25%); Routine

Preservative Code: 1
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: Jesse Jones
Sampler(s) Printed: Jesse Jones

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	TEST PARAMETERS: Chronic Toxicity	Bottle Type Code	Arkansas Analytical Work Order Number:
	2/20-2/21	8A-8A		X	4	Water	Final Discharge	X	B	K1802009

TEST PARAMETERS: G = Glass; P = Plastic; V = Septum; A = Amber

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
Jesse Jones	2/21/18 1529	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Danny Riddle

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

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Attn: Matt Bienvenu	

Project Description: Chronic Toxicity; City of Dumas

Reporting Information: Telephone: 501-378-7808; Fax: 501-376-4677; Email: mbienvenu@mcclelland-engrs.com

Turnaround Time: 1 Day (100%); 2 Day (50%); 3 Day (25%); Routine

Preservative Code: 1; 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: Jesse James

Sampler(s) Printed: Jesse James

TEST PARAMETERS: Chronic Toxicity

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

Arkansas Analytical Work Order Number: K1802009

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity	Bottle Type Code
	2/21-2/22	10A-10A		X	4	Water	Final Discharge	X	C

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
	2/22/16 1509	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Amanda Johnson

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

CETIS Summary Report

Test Code: K1802009FH | 04-3971-8483

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

Batch ID:	20-1223-0593	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Melissa Bird
Start Date:	21 Feb-18 15:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	21 Feb-18 13:49	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	n/a	**Source:**	Aquatox, AR	**Age:**	<24
Sample ID:	02-1929-0295	**Code:**	K1802009FH	**Client:**	City of Dumas
Sample Date:	20 Feb-18 06:00	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (1Q)
Receipt Date:	20 Feb-18 15:11	**Source:**	City of Dumas (AR0033987)		
Sample Age:	34h (2 °C)	**Station:**	Final Discharge		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1802009B	21 Feb-18 08:00	21 Feb-18 15:29	23 Feb-18 00:00	2
2	K1802009C	22 Feb-18 10:00	22 Feb-18 15:09	25 Feb-18 00:00	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
16-0681-1266	7d Survival Rate	Steel Many-One Rank Sum Test	52	> 52	n/a	1.923	5.77%
10-8579-7978	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	52	> 52	n/a	1.923	13.9%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
16-0681-1266	7d Survival Rate	Control Resp	0.98	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	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
16		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.04%
22		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.04%
29		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
39		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
52		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%

Mean Dry Weight-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.4064	0.3856	0.4272	0.384	0.429	0.007488	0.01674	4.12%	0.00%
16		5	0.4118	0.3841	0.4395	0.393	0.446	0.009967	0.02229	5.41%	-1.33%
22		5	0.366	0.318	0.414	0.305	0.404	0.01727	0.03862	10.55%	9.94%
29		5	0.461	0.3896	0.5324	0.392	0.519	0.02571	0.0575	12.47%	-13.43%
39		5	0.4316	0.37	0.4932	0.358	0.483	0.02219	0.04961	11.49%	-6.20%
52		5	0.3838	0.3547	0.413	0.353	0.405	0.0105	0.02348	6.12%	5.56%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.0000	0.9000	1.0000	1.0000	1.0000
16		1.0000	1.0000	1.0000	1.0000	1.0000
22		1.0000	1.0000	1.0000	1.0000	1.0000
29		0.9000	1.0000	1.0000	1.0000	1.0000
39		1.0000	1.0000	1.0000	1.0000	0.9000
52		1.0000	0.9000	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	0.412	0.429	0.409	0.398	0.384
16		0.446	0.422	0.393	0.403	0.395
22		0.362	0.404	0.305	0.365	0.394
29		0.41	0.509	0.519	0.475	0.392
39		0.358	0.414	0.433	0.483	0.47
52		0.393	0.353	0.365	0.405	0.403

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	10/10	9/10	10/10	10/10	10/10
16		10/10	10/10	10/10	10/10	10/10
22		10/10	10/10	10/10	10/10	10/10
29		9/10	10/10	10/10	10/10	10/10
39		10/10	10/10	10/10	10/10	9/10
52		10/10	9/10	10/10	10/10	10/10

CETIS Summary Report

Test Code: K1802009CD | 03-6009-9164

Cladoceran 7-d Survival and Reproduction Test — Arkansas Analytical, Inc.

Batch ID:	09-1749-0214	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Melissa Bird
Start Date:	21 Feb-18 11:18	**Protocol:**	EPA/600/4-91/002 (1994)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	28 Feb-18 10:35	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	04-4608-9867	**Code:**	K1802009CD	**Client:**	City of Dumas
Sample Date:	20 Feb-18 06:00	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (1Q)
Receipt Date:	20 Feb-18 15:11	**Source:**	City of Dumas (AR0033987)		
Sample Age:	29h (2 °C)	**Station:**	Final Discharge		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1802009B	21 Feb-18 08:00	21 Feb-18 15:29	23 Feb-18 00:00	2
2	K1802009C	22 Feb-18 10:00	22 Feb-18 15:09	25 Feb-18 00:00	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
16-9053-5249	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	52	> 52	n/a	1.923	n/a
21-0689-4407	Reproduction	Steel Many-One Rank Sum Test	52	> 52	n/a	1.923	31.9%

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
16-9053-5249	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
21-0689-4407	Reproduction	Control Resp	21.5	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%
16		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
22		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
29		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
39		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
52		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	21.5	16.86	26.14	13	29	2.051	6.485	30.16%	0.00%
16		10	23.2	18.63	27.77	13	30	2.021	6.391	27.55%	-7.91%
22		10	23.2	17.67	28.73	14	36	2.444	7.729	33.31%	-7.91%
29		10	24.6	19.84	29.36	15	33	2.104	6.653	27.05%	-14.42%
39		10	20.6	16.06	25.14	14	29	2.007	6.346	30.80%	4.19%
52		10	23.6	19	28.2	13	31	2.034	6.433	27.26%	-9.77%

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
16		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
22		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
29		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
39		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
52		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	14	26	19	28	29	28	15	17	26	13
16		14	28	25	28	28	20	13	30	28	18
22		14	31	26	21	22	16	36	32	19	15
29		15	28	27	28	32	29	18	33	17	19
39		16	29	15	27	26	14	16	29	19	15
52		20	28	15	29	20	31	13	25	31	24

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
16		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
22		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
29		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
39		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
52		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: K1802009					Test Start (Date/Time): 2-21-18 / 1530				
Client: Dumas					Test End (Date/Time): 2-28-18 / 1349				
		Day of Test							
900		1	2	3	4	5	6	7	notes
Control	MHS	2/21/18	2/22/18	2/23/18	2-24-18	2-25-18	2-26-18	2-27-18	
D.O. (mg/L)	INITIAL	8.7	9.0	8.2	8.2	8.4	8.9	8.8	
	FINAL	6.9	6.8	8.0	8.2	8.8	7.7	8.0	
pH (s.u.)	INITIAL	7.9	7.4	7.4	7.6	7.7	7.5	7.5	
	FINAL	7.4	7.4	7.6	7.8	7.9	7.4	7.1	
temp (C)	INITIAL	21	20	22	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
ALKALINITY (mg/L)		72	→	→	→	→	→	→	
HARDNESS (mg/L)		110	→	→	→	→	→	→	
CONDUCTIVITY (umho		337	→	→	→	→	→	→	
CHLORINE (mg/L)		<0.05	→	→	→	→	→	→	
CONC:	100%								
D.O. (mg/L)	INITIAL	8.9	8.9	8.3	8.5	8.4	9.1	9.1	
	FINAL	7.0	7.1	8.0	8.0	8.8	7.5	7.4	
pH (s.u)	INITIAL	7.7	7.6	7.9	7.6	7.3	7.6	7.5	
	FINAL	7.4	7.4	7.6	7.8	7.2	7.5	7.3	
temp (C)	INITIAL	21	20	22	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:	22%								
D.O. (mg/L)	INITIAL	9.0	9.0	8.6	8.5	8.9	9.2	9.1	
	FINAL	7.2	7.3	8.0	8.0	8.8	7.2	7.8	
pH (mg/L)	INITIAL	7.7	7.6	7.2	7.7	7.5	7.5	7.5	
	FINAL	7.5	7.5	7.6	7.9	7.6	7.5	7.3	
temp (C)	INITIAL	21	20	22	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:	79%								
D.O. (mg/L)	INITIAL	9.1	9.1	8.9	8.6	9.0	9.2	9.2	
	FINAL	7.2	7.3	7.7	7.9	8.8	7.4	7.8	
pH (s.u.)	INITIAL	7.6	7.7	7.5	7.7	7.6	7.5	7.5	
	FINAL	7.5	7.5	7.6	7.9	7.7	7.5	7.4	
temp (C)	INITIAL	20	20	21	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:	39%								
D.O. (mg/L)	INITIAL	9.1	9.3	9.0	8.7	9.0	9.3	9.3	
	FINAL	7.2	7.3	7.6	7.9	8.8	7.3	7.6	
pH (s.u.)	INITIAL	7.6	7.7	7.3	7.6	7.7	7.5	7.5	
	FINAL	7.5	7.5	7.6	7.9	7.9	7.5	7.5	
temp (C)	INITIAL	20	19	21	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:	5%								
D.O. (mg/L)	INITIAL	9.2	9.4	9.2	8.7	9.0	9.4	9.6	
	FINAL	7.2	7.3	7.6	7.3	8.8	7.0	7.7	
pH (s.u.)	INITIAL	7.6	7.8	7.4	7.6	7.7	7.5	7.6	
	FINAL	7.5	7.6	7.6	7.8	7.9	7.5	7.5	
temp (C)	INITIAL	20	19	21	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:		A	A	B	B	C	C	C	
ALKALINITY (mg/L)		100	→	98	→	80	→	→	
HARDNESS (mg/L)		30	→	36	→	26	→	→	
CONDUCTIVITY (umho		326	→	322	→	292	→	→	
CHLORINE (mg/L)		<0.05	→	0.05	→	0.07	→	→	

cm 2/23/18

CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING — Ceriodaphnia Dubia

Lab # / Sample ID: K18D2009 — Test Start (Date/Time): 2/21/18, 1118

Client: Dumas — Test End (Date/Time): 2/28/18, 1035

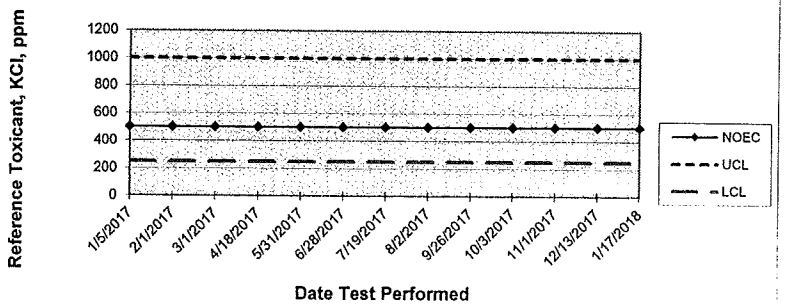
		Day of Test							
		2/21	2	3	4	5	6	7	notes/remarks
Control	MHS GDO	Set up	2/22	2/23	2/24	2/25	2/26	2/27	
D.O. (mg/L)	INITIAL	8.7	9.0	8.8	8.7	8.9	8.9	8.8	
	FINAL	8.4	8.1	8.0	8.8	8.5	8.2	8.1	
pH (s.u.)	INITIAL	7.9	7.4	6.9 7.4	7.6	7.7	7.5	7.5	
	FINAL	7.6	7.7	7.6	7.8	8.5	7.5	7.6	
temp (C)	INITIAL	21	20	22	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
ALKALINITY (mg/L)		72						→	
HARDNESS (mg/L)		110						→	
CONDUCTIVITY (umhos/cm)		337						→	
CHLORINE (mg/L)		<0.05						→	
CONC:	11%.								
D.O. (mg/L)	INITIAL	8.9	8.9	8.3	8.5	8.9	9.1	9.1	
	FINAL	8.4	8.2	8.0	9.0	8.4	8.1	8.0	
pH (s.u)	INITIAL	7.7	7.6	6.9	7.6	7.3	7.6	7.5	
	FINAL	7.7	7.7	7.6	7.8	7.7	7.6	7.6	
temp (C)	INITIAL	21	20	22	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:	22%.								
D.O. (mg/L)	INITIAL	9.0	9.0	8.6	8.5	8.9	9.2	9.1	
	FINAL	8.3	8.2	8.0	9.0	8.4	8.1	8.0	
pH (mg/L)	INITIAL	7.7	7.6	7.2	7.7	7.5	7.6	7.5	
	FINAL	7.7	7.7	7.6	7.8	7.9	7.7	7.6	
temp (C)	INITIAL	21	20	22	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:	29%.								
D.O. (mg/L)	INITIAL	9.1	9.1	8.9	9.0	9.0	9.2	9.2	
	FINAL	8.3	8.3	7.7	9.2	8.4	8.1	8.1	
pH (s.u.)	INITIAL	7.6	7.7	7.3	7.3	7.6	7.5	7.5	
	FINAL	7.8	7.8	7.6	7.8	7.8	7.7	7.6	
temp (C)	INITIAL	20	20	21	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:	39%.								
D.O. (mg/L)	INITIAL	9.1	9.3	9.0	8.7	9.0	9.3	9.3	
	FINAL	8.3	8.2	7.6	9.3	7.8	8.1	8.1	
pH (s.u.)	INITIAL	7.6	7.7	7.3	7.6	7.7	7.5	7.5	
	FINAL	7.8	7.8	7.6	7.8	8.3	7.7	7.7	
temp (C)	INITIAL	20	19	21	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:	52%.								
D.O. (mg/L)	INITIAL	9.2	9.4	9.2	8.7	9.0	9.4	9.6	
	FINAL	8.3	8.2	7.6	9.3	7.9	8.1	8.1	
pH (s.u.)	INITIAL	7.6	7.8	7.4	7.6	7.7	7.5	7.6	
	FINAL	7.9	7.9	7.6	7.8	8.3	7.8	7.7	
temp (C)	INITIAL	20	19	21	21	20	20	21	
	FINAL	25	25	25	25	25	25	25	
CONC:		A	A	B	B	C	C	C	
ALKALINITY (mg/L)		100	→	98	→	80	→	→	
HARDNESS (mg/L)		30	→	36	→	26	→	→	
CONDUCTIVITY (umhos/cm)		326	→	322	→	292	→	→	
CHLORINE (mg/L)		<0.05	→	0.05	→	0.07	→	→	

on 2/23/18 on 2/26/18

Revision 1
11/30/10

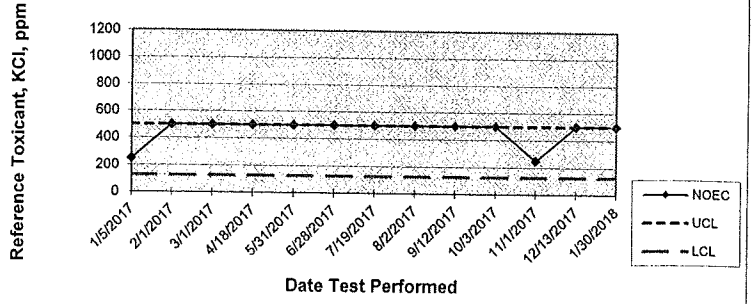
ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW SURVIVAL 7 Day
QUALITY ASSURANCE



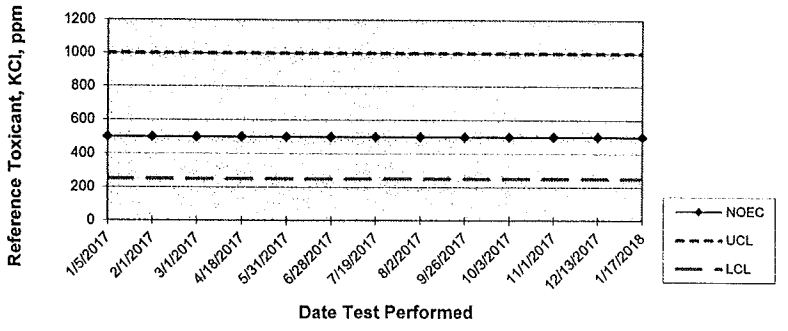
ARKANSAS ANALYTICAL, INC.

CERIODAPHNIA DUBIA SURVIVAL
QUALITY ASSURANCE



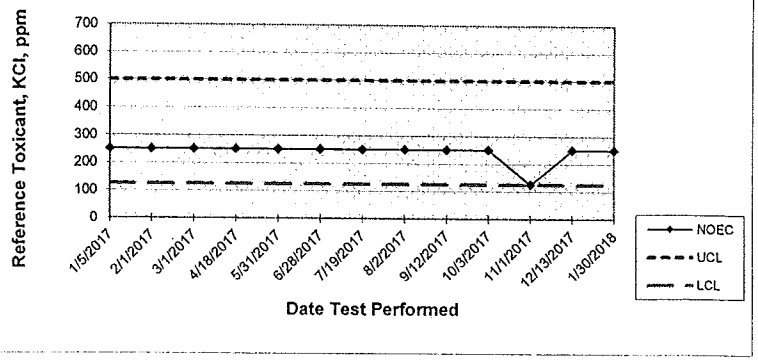
ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW GROWTH 7 Day
QUALITY ASSURANCE



ARKANSAS ANALYTICAL, INC.

CERIODAPHNIA DUBIA REPRODUCTION
QUALITY ASSURANCE



Arkansas Analytical, Inc.

Toxicity Test Results

CITY OF DUMAS
NPDES PERMIT NUMBER: AR0033987
Second Quarter 2018
AFIN # 21-00045

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

Ceriodaphnia dubia, Survival and Reproduction Test
Test 1002.0

Prepared for: **Pat Fitzgerald**
City of Dumas
155 E. Waterman
Dumas, Arkansas, 71639

Prepared by: Arkansas Analytical,
8100 National Drive
Little Rock, Arkansas 72209
Lab Number K1806008

Wednesday, July 11, 2018

Plant Location

City of Dumas. The plant is located in Dumas, Arkansas, Highway 165 North in Section 25, Township 9 South, Range 4 West in Desha 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%, 16%, 22%, 29%, 39%, 52%
- 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%, 16%, 22%, 29%, 39%, 52%
- Dilution water: Moderately hard synthetic
- No deviation from method

Reference Toxicant Data

REFERENCE TOXICANT (Potassium Chloride)

Ceriodaphnia dubia 5/30/18-6/5/18		*Pimephales promelas* 5/30/18-6/6/18	
NOEC Survival:	500 ppm KCl	NOEC Survival:	500 ppm KCl
LOEC Survival:	1000 ppm KCl	LOEC Survival:	1000ppm KCl
NOEC Reproduction:	250 ppm KCl	NOEC Growth:	500ppm KCl
LOEC Reproduction:	500 ppm KCl	LOEC Growth:	1000 ppm KCl

Summary of Results

City of Dumas

Ceriodaphnia dubia		*Pimephales promelas*	
NOEC Survival Parameter: **TOP3B**	52%	NOEC Survival Parameter: **TOP6C**	52%
Pass/Fail Survival Parameter: **TLP3B**	Pass	Pass/Fail Survival Parameter: **TLP6C**	Pass
NOEC Reproduction Parameter: **TPP3B**	52%	NOEC Growth Parameter: **TPP6C**	52%
Pass/Fail Reproduction Parameter: **TGP3B**	Pass	Pass/Fail Growth Parameter: **TGP6C**	Pass
%CV Reproduction Parameter: **TQP3B**	26.8%	%CV Growth Parameter: **TQP6C**	7.03%
PMSD Reproduction	44.5%	PMSD Growth	18.4%

Conclusion

Pimephales promelas, (Method 1000.0): The permit issued to the City of Dumas, specifies that the **critical dilution is 39% 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 Dumas, specifies that the **critical dilution is 39% 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, Emma Powell, Sam Petty

Reviewed by:

Melissa Bird

Melissa Bird

Appendices

Arkansas Analytical Inc.

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

CHAIN OF CUSTODY RECORD

CLIENT INFORMATION	BILLING INFORMATION	Project Description	Turnaround Time	Preservation Codes:
McClelland Consulting Engineers	McClelland Consulting Engineers	Chronic Toxicity	1 Day (100%)	1. Cool, 6 Degrees Centigrade / 4. Thiosulfate for Dechlorination
1311 W 2nd St.	P.O. Box 34087	City of Dumas	2 Day (50%)	2. Sulfuric Acid (H_2SO_4), pH < 2 / 5. Hydrochloric Acid(HCl)
Little Rock, AR 72201	Little Rock, AR 72203-4087	**Reporting Information**	3 Day (25%)	3. Nitric Acid (HNO_3), pH < 2 / 6. Sodium Hydroxide (NaOH), pH > 12
		Telephone: 501-378-7808	Routine	
Attn: Matt Bienvenu		Fax: 501-376-4677	Preservative Code:	1
		Email: mbienvenu@mcclelland-engrs.com	Bottle Type:	P

Sampler(s) Signature: Jesse James

Sampler(s) Printed: Jesse James

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 (G = Glass; P = Plastic; V = Septum; A = Amber)	Arkansas Analytical Work Order Number:
	6/18-6/19	7A-7A		X	4	Water	Final Discharge	X			K1806-008A

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)	SAMPLE CONDITION UPON RECEIPT IN LAB	REMARKS / SAMPLE COMMENTS
Jesse James	6/19/18 1527		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	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)	FOR COMPLETION BY LAB ONLY	
		Sydney James		

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

CHAIN OF CUSTODY RECORD

CLIENT INFORMATION	BILLING INFORMATION	Project Description	Turnaround Time
McClelland Consulting Engineers	McClelland Consulting Engineers	Chronic Toxicity	1 Day (100%)
1311 W 2nd St.	P.O. Box 34087	City of Dumas	2 Day (50%)
Little Rock, AR 72201	Little Rock, AR 72203-4087	Reporting Information	3 Day (25%)
		Telephone: 501-378-7808	Routine
Attn: Matt Bienvenu		Fax: 501-376-4677	Preservative Code: 1
		Email: mbienvenu@mcclelland-engrs.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: Jesse James
Sampler(s) Printed: Jesse James

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	TEST PARAMETERS: Chronic Toxicity	Bottle Type Code (G = Glass; P = Plastic; V = Septum; A = Amber)	Arkansas Analytical Work Order Number: K1806-
	6/19/20	8A-8A		X	4	Water	Final Discharge	X		0818

1. Relinquished by: (Signature) — Date/Time: 6/20/18 1502
2. Received by: (Signature)
3. Relinquished by: (Signature) — Date/Time:
4. Received by lab: (Signature) Amanda Pabst

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: 4 °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	BILLING INFORMATION	Project Description	Turnaround Time
McClelland Consulting Engineers	McClelland Consulting Engineers	Chronic Toxicity	1 Day (100%)
1311 W 2nd St.	P.O. Box 34087	City of Dumas	2 Day (50%)
Little Rock, AR 72201	Little Rock, AR 72203-4087	Reporting Information	3 Day (25%)
		Telephone: 501-378-7808	Routine
Attn: Matt Bienvenu		Fax: 501-376-4677	Preservative Code: 1
		Email: mbienvenu@mcclelland-engrs.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

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

Sampler(s) Signature: Jesse James

Sampler(s) Printed: Jesse James

Arkansas Analytical Work Order Number: K1806-

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	TEST PARAMETERS: Chronic Toxicity	Bottle Type Code
	6/20-6/21	9A-9A		X	4	Water	Final Discharge	X	008C

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
Jesse James	6/21/18 1435	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Sydny James

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: 4 °C
6. TEMPERATURE GUN ID: HHT# 2

FOR COMPLETION BY LAB ONLY

REMARKS / SAMPLE COMMENTS

CETIS Summary Report

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

Batch ID:	00-9865-3670	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Melissa Bird
Start Date:	20 Jun-18 14:01	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	27 Jun-18 13:52	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	7d	**Source:**	Aquatox, AR	**Age:**	<24
Sample ID:	09-6406-9334	**Code:**	K1806008FH	**Client:**	City of Dumas
Sample Date:	19 Jun-18 07:00	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (2Q)
Receipt Date:	19 Jun-18 15:27	**Source:**	City of Dumas (AR0033987)		
Sample Age:	31h (2 °C)	**Station:**	Final Discharge		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1806008B	20 Jun-18 08:00	20 Jun-18 15:02	22 Jun-18 00:00	4
2	K1806008C	21 Jun-18 09:00	21 Jun-18 14:35	24 Jun-18 00:00	4

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
14-5983-6705	7d Survival Rate	Steel Many-One Rank Sum Test	52	> 52	n/a	1.923	5.16%
05-0064-0432	Mean Dry Weight-mg	Steel Many-One Rank Sum Test	52	> 52	n/a	1.923	18.4%

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
14-5983-6705	7d Survival Rate	Control Resp	1	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	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
16		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	2.00%
22		5	0.9600	0.8920	1.0000	0.9000	1.0000	0.0245	0.0548	5.71%	4.00%
29		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
39		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
52		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Mean Dry Weight-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.4614	0.4211	0.5017	0.424	0.509	0.0145	0.03242	7.03%	0.00%
16		5	0.3982	0.3672	0.4292	0.366	0.43	0.01118	0.025	6.28%	13.70%
22		5	0.4488	0.3873	0.5103	0.405	0.532	0.02217	0.04957	11.04%	2.73%
29		5	0.418	0.2769	0.5591	0.227	0.526	0.05081	0.1136	27.18%	9.41%
39		5	0.4418	0.4116	0.472	0.417	0.482	0.01086	0.02429	5.50%	4.25%
52		5	0.497	0.4464	0.5476	0.452	0.533	0.01823	0.04077	8.20%	-7.71%

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	1.0000	1.0000	1.0000	1.0000	1.0000
16		1.0000	1.0000	1.0000	0.9000	1.0000
22		1.0000	0.9000	1.0000	0.9000	1.0000
29		1.0000	1.0000	1.0000	1.0000	1.0000
39		1.0000	1.0000	1.0000	1.0000	1.0000
52		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	0.509	0.476	0.446	0.452	0.424
16		0.413	0.383	0.43	0.366	0.399
22		0.449	0.405	0.532	0.419	0.439
29		0.451	0.467	0.227	0.419	0.526
39		0.417	0.44	0.439	0.431	0.482
52		0.452	0.454	0.531	0.515	0.533

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	10/10	10/10	10/10	10/10	10/10
16		10/10	10/10	10/10	9/10	10/10
22		10/10	9/10	10/10	9/10	10/10
29		10/10	10/10	10/10	10/10	10/10
39		10/10	10/10	10/10	10/10	10/10
52		10/10	10/10	10/10	10/10	10/10

CETIS Summary Report

Cladoceran 7-d Survival and Reproduction Test — **Arkansas Analytical, Inc.**

Batch ID:	06-6757-6967	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Melissa Bird
Start Date:	20 Jun-18 11:15	**Protocol:**	EPA/600/4-91/002 (1994)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	28 Jun-18 11:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	8d 0h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	17-9526-5055	**Code:**	K1806008CD	**Client:**	City of Dumas
Sample Date:	19 Jun-18 07:00	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (2Q)
Receipt Date:	19 Jun-18 15:27	**Source:**	City of Dumas (AR0033987)		
Sample Age:	28h (2 °C)	**Station:**	Final Discharge		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1806008B	20 Jun-18 08:00	20 Jun-18 15:02	22 Jun-18 00:00	4
2	K1806008C	21 Jun-18 09:00	21 Jun-18 14:35	24 Jun-18 00:00	4

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
09-9506-3908	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	52	> 52	n/a	1.923	n/a
09-0082-8145	Reproduction	Dunnett Multiple Comparison Test	52	> 52	n/a	1.923	44.5%

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
09-9506-3908	7d Survival Rate	Control Resp	0.9	0.8	>>	Yes	Passes Criteria
09-0082-8145	Reproduction	Control Resp	25.5	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	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	0.00%
16		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	0.00%
22		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
29		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
39		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
52		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	25.5	18.3	32.7	5	44	3.181	10.06	39.44%	0.00%
16		10	28.8	17.26	40.34	0	56	5.103	16.14	56.03%	-12.94%
22		10	29.2	22.42	35.98	15	47	2.999	9.484	32.48%	-14.51%
29		10	29.6	22.26	36.94	14	50	3.243	10.25	34.64%	-16.08%
39		10	31.6	24.78	38.42	15	47	3.016	9.536	30.18%	-23.92%
52		10	37.5	30.73	44.27	22	50	2.994	9.466	25.24%	-47.06%

Neonates per surviving female in the control: $\bar{X} = 27.8$ CV=26.8%.

7-11-18 mb

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	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
16		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
22		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
29		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
39		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
52		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	5	30	33	44	23	21	21	28	22	28
16		34	36	30	56	17	20	49	0	22	24
22		32	36	24	47	20	27	37	15	22	32
29		37	23	36	50	28	22	29	14	22	35
39		30	24	15	29	37	42	38	30	47	24
52		41	37	49	45	36	27	40	50	22	28

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	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
16		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
22		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
29		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
39		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
52		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 K1806008						Test Start (Date/Time) 6-20-18/1401			
Client: Dumas						Test End (Date/Time) 6-27-18/1352			
		Day of Test							
		1	2	3	4	5	6	7	notes
Control	MHS916	6-20	6-21	6-22	6-23	6-24	6-25	6-26	MHS917
D.O. (mg/L)	INITIAL	8.5	8.0	8.2	8.1	8.3	8.6	8.2	used 6/22
	FINAL	6.9	7.4	7.8	8.1	7.8	7.8	7.4	
pH (s.u.)	INITIAL	8.6	8.4	8.4	8.2	8.6	8.4	8.1	
	FINAL	7.4	7.8	7.6	7.9	7.6	7.6	7.6	
temp (C)	INITIAL	21	22	22	22	22	21	23	
	FINAL	25	25	25	25	25	25	25	
ALKALINITY (mg/L)		61	——→	54	——→	——→	——→	——→	
HARDNESS (mg/L)		104	——→	92	——→	——→	——→	——→	
CONDUCTIVITY (umho		357	——→	308	——→	——→	——→	——→	
CHLORINE (mg/L)		<0.05	——→	<0.05	——→	——→	——→	——→	
CONC:	16%								
D.O. (mg/L)	INITIAL	8.4	7.9	8.3	8.4 ~~8.3~~	8.4	8.9	8.2	
	FINAL	6.7	6.8	7.6	8.0	7.7	7.8	7.6	
pH (s.u)	INITIAL	8.0	8.3	8.0	8.0	8.2	8.3	8.2	
	FINAL	7.5	7.8	7.8	7.9	7.7	7.7	7.6	
temp (C)	INITIAL	21	22	22	23 ~~22~~	21	20	23	
	FINAL	25	25	25	25	25	25	25	
CONC:	22%								
D.O. (mg/L)	INITIAL	8.7	8.0	8.3	8.5 ~~8.4~~	8.4	8.8	8.1	
	FINAL	6.9	6.7	7.7	7.9	7.7	7.7	7.6	
pH (mg/L)	INITIAL	8.1	8.3	8.0	8.0	8.2	8.3	8.1	
	FINAL	7.6	7.9	7.9	7.9	7.7	7.7	7.8	
temp (C)	INITIAL	21	22	21	22	21	21	23	
	FINAL	25	25	25	25	25	25	25	
CONC:	29%								
D.O. (mg/L)	INITIAL	8.8	8.2	8.5	8.5 ~~8.6~~	8.4	8.8	8.2	
	FINAL	6.9	6.7	7.6	7.8	7.6	7.6	7.5	
pH (s.u.)	INITIAL	8.2	8.3	8.1	8.0	8.2	8.2	8.1	
	FINAL	7.7	7.9	8.0	7.9	7.8	7.8	7.8	
temp (C)	INITIAL	20	21	21	22	21	21	23	
	FINAL	25	25	25	25	25	25	25	
CONC:	39%								
D.O. (mg/L)	INITIAL	8.8	8.2	8.5	8.5	8.5	8.9	8.2	
	FINAL	6.9	6.7	7.4	7.7	7.6	8.1	7.5	
pH (s.u.)	INITIAL	8.2	8.3	8.1	8.3	8.2	8.2	8.1	
	FINAL	7.8	7.9	8.0	7.9	7.8	7.8	7.9	
temp (C)	INITIAL	21	22	21	23	21	20	23	
	FINAL	25	25	25	25	25	25	25	
CONC:	52%								
D.O. (mg/L)	INITIAL	8.8	8.0	8.6	8.6	8.5	9.0	8.2	
	FINAL	6.9	6.7	7.0	7.6	7.4	8.0	7.5	
pH (s.u.)	INITIAL	8.2	8.3	8.2	8.0	8.2	8.2	8.1	
	FINAL	7.8	8.0	8.0	7.9	7.9	7.8	8.0	
temp (C)	INITIAL	21	23	21	22	21	20	24	
	FINAL	25	25	25	25	25	25	25	
CONC:	100%	A	A	B	B	C	C	C	
ALKALINITY (mg/L)		104	——→	112	——→	118	——→	——→	
HARDNESS (mg/L)		32	——→	32	——→	36	——→	——→	
CONDUCTIVITY (umho		301	——→	303	——→	305	——→	——→	
CHLORINE (mg/L)		<0.05	——→	<0.05	——→	<0.05	——→	——→	

eu 6-28-18

CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING — Ceriodaphnia Dubia

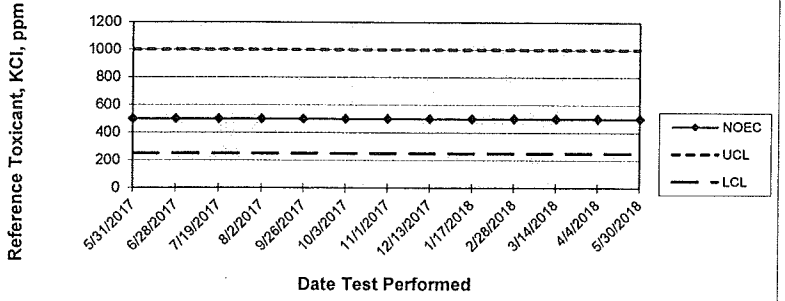
Lab # / Sample ID K1806008 — Test Start (Date/Time) 6-20-18/1115

Client: Dumas — Test End (Date/Time) 6-28-18/1115

		Day of Test							
		1	2	3	4	5	6	7	notes/remarks
Control	MHS 911.0	6-20	6-21	6-22	6-23	6-24	6-25	6-26	6-27 used MHS917 6-22
D.O. (mg/L)	INITIAL	8.5	8.0	8.2	8.1	8.3 8.4	8.6	8.2	8.5
	FINAL	7.8	7.5	8.5	8.5	8.5	7.8	7.1	7.5
pH (s.u.)	INITIAL	8.6	8.4	8.4	8.2	8.6	8.4	8.1	8.3
	FINAL	8.1	7.7	8.3	7.8	8.3	8.1	7.4	8.0
temp (C)	INITIAL	21	22	22	22	22	21	23	22
	FINAL	25	25	25	25	25	25	25	25
ALKALINITY (mg/L)		61	→	54	—	—	—	→	
HARDNESS (mg/L)		104	→	92	—	—	—	→	
CONDUCTIVITY (umhos/cm)		357	→	308	—	—	—	→	
CHLORINE (mg/L)		<0.05	→	<0.05	—	—	—	→	
CONC:	16%								
D.O. (mg/L)	INITIAL	8.4	7.9	8.3	8.4	8.4	8.9	8.2	8.5
	FINAL	7.9	8.0	8.6	8.5	8.4	8.0	7.6	7.8
pH (s.u)	INITIAL	8.0	8.3	8.8	8.6	8.2	8.3	8.2	8.0
	FINAL	8.1	7.8	8.3	7.9	8.3	8.1	7.6	8.0
temp (C)	INITIAL	21	22	22	23	21	20	23	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	22%								
D.O. (mg/L)	INITIAL	8.7	8.0	8.3	8.5	8.4	8.8	8.1	8.6
	FINAL	8.0	8.1	8.4	8.4	8.4	8.1	7.8	8.0
pH (mg/L)	INITIAL	8.1	8.3	8.8	8.0	8.2	8.3	8.1	8.0
	FINAL	8.2	7.9	8.3	8.1	8.3	8.1	7.7	8.1
temp (C)	INITIAL	21	22	21	22	21	21	23	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	29%								
D.O. (mg/L)	INITIAL	8.8	8.2	8.5	8.5	8.4	8.8	8.2	8.6
	FINAL	8.0	8.2	8.5	8.5	8.3	8.1	7.8	8.0
pH (s.u.)	INITIAL	8.2	8.3	8.1	8.0	8.1	8.2	8.1	8.0
	FINAL	8.2	8.0	8.3	8.2	8.3	8.0	7.8	8.1
temp (C)	INITIAL	20	21	21	22	21	21	23	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	39%								
D.O. (mg/L)	INITIAL	8.8	8.2	8.5	8.5	8.5	8.9	8.2	8.5
	FINAL	8.0	8.4	8.5	8.5	8.2	8.1	7.8	8.0
pH (s.u.)	INITIAL	8.2	8.3	8.1	8.0	8.2	8.2	8.1	8.1
	FINAL	8.2	8.1	8.3	8.2	8.3	8.1	7.9	8.1
temp (C)	INITIAL	21	22	21	23	21	20	23	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	52%								
D.O. (mg/L)	INITIAL	8.8	8.0	8.6	8.6	8.5	9.0	8.2	8.6
	FINAL	8.0	8.4	8.5	8.5	8.2	8.1	7.9	8.0
pH (s.u.)	INITIAL	8.2	8.3	8.2	8.0	8.2	8.2	8.1	8.1
	FINAL	8.3	8.2	8.4	8.3	8.3	8.1	8.0	8.2
temp (C)	INITIAL	21	23	21	22	21	20	24	22
	FINAL	25	25	25	25	25	25	25	25
CONC:	100%	A	A	B	B	C	C	C	C
ALKALINITY (mg/L)		104	→	112	→	118	—	—	—
HARDNESS (mg/L)		32	→	32	→	30	—	—	—
CONDUCTIVITY (umhos/cm)		301	→	303	→	305	—	—	—
CHLORINE (mg/L)		<0.05	→	<0.05	→	<0.05	—	—	—

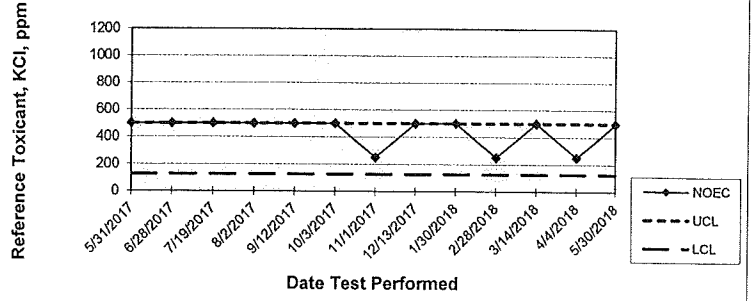
ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW SURVIVAL 7 Day
QUALITY ASSURANCE



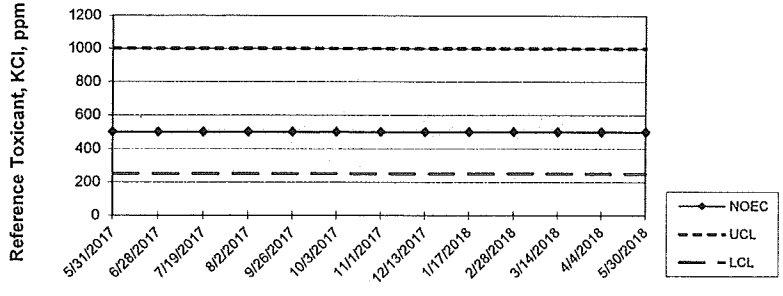
ARKANSAS ANALYTICAL, INC.

CERIODAPHNIA DUBIA SURVIVAL
QUALITY ASSURANCE



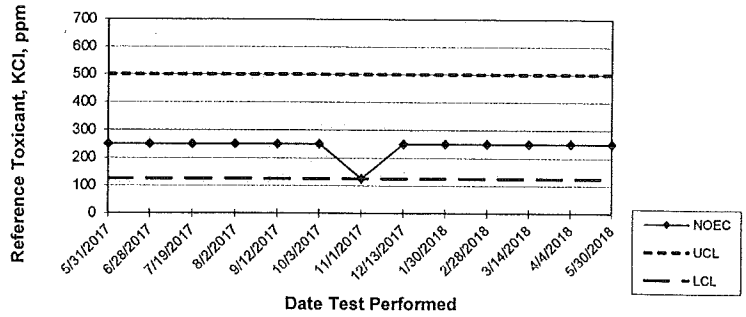
ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW GROWTH 7 Day
QUALITY ASSURANCE



ARKANSAS ANALYTICAL, INC.

CERIODAPHNIA DUBIA REPRODUCTION
QUALITY ASSURANCE



Arkansas Analytical, Inc.

Toxicity Test Results

CITY OF DUMAS
NPDES PERMIT NUMBER: AR0033987
Third Quarter 2018
AFIN # 21-00045

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

Ceriodaphnia dubia, Survival and Reproduction Test
Test 1002.0

Prepared for: **Pat Fitzgerald**
City of Dumas
155 E. Waterman
Dumas, Arkansas, 71639

Prepared by: Arkansas Analytical,
8100 National Drive
Little Rock, Arkansas 72209
Lab Number K1809011

Friday, October 19, 2018

Plant Location

City of Dumas. The plant is located in Dumas, Arkansas, Highway 165 North in Section 25, Township 9 South, Range 4 West in Desha 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%, 16%, 22%, 29%, 39%, 52%
- 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%, 16%, 22%, 29%, 39%, 52%
- Dilution water: Moderately hard synthetic
- No deviation from method

Reference Toxicant Data

REFERENCE TOXICANT (Potassium Chloride)

Ceriodaphnia dubia 8/22/18-8/29/18		*Pimephales promelas* 8/22/18-8/29/18	
NOEC Survival:	500 ppm KCl	NOEC Survival:	500 ppm KCl
LOEC Survival:	1000 ppm KCl	LOEC Survival:	1000ppm KCl
NOEC Reproduction:	250 ppm KCl	NOEC Growth:	500ppm KCl
LOEC Reproduction:	500 ppm KCl	LOEC Growth:	1000 ppm KCl

Summary of Results

City of Dumas

Ceriodaphnia dubia		*Pimephales promelas*	
NOEC Survival Parameter: **TOP3B**	52%	NOEC Survival Parameter: **TOP6C**	52%
Pass/Fail Survival Parameter: **TLP3B**	Pass	Pass/Fail Survival Parameter: **TLP6C**	Pass
NOEC Reproduction Parameter: **TPP3B**	52%	NOEC Growth Parameter: **TPP6C**	39%
Pass/Fail Reproduction Parameter: **TGP3B**	Pass	Pass/Fail Growth Parameter: **TGP6C**	Pass
%CV Reproduction Parameter: **TQP3B**	27.4%	%CV Growth Parameter: **TQP6C**	16.8%
PMSD Reproduction	28.9%	PMSD Growth	16.4%

Conclusion

Pimephales promelas, (Method 1000.0): The permit issued to the City of Dumas, specifies that the **critical dilution is 39% 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 Dumas, specifies that the **critical dilution is 39% 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, Hallie Freyaldenhoven, Tracy Bounds

Reviewed by:

Melissa Bird

Melissa Bird

Appendices

Arkansas Analytical Inc.

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

CHAIN OF CUSTODY RECORD

CLIENT INFORMATION	BILLING INFORMATION	Project Description	Turnaround Time
McClelland Consulting Engineers	McClelland Consulting Engineers	Chronic Toxicity	1 Day (100%)
1311 W 2nd St.	P.O. Box 34087	City of Dumas	2 Day (50%)
Little Rock, AR 72201	Little Rock, AR 72203-4087	Reporting Information	3 Day (25%)
		Telephone: 501-378-7808	Routine
Attn: Matt Bienvenu		Fax: 501-376-4677	Preservative Code: 1
		Email: mbienvenu@mcclelland-engrs.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

Sampler(s) Printed: Jesse James

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity	Arkansas Analytical Work Order Number:
	9/24-9/25	7A-7A		X	4	Water	Final Discharge	X	K1809011 A

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

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
	9/25/18 1501	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Amanda Jobush

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	BILLING INFORMATION	Project Description	Turnaround Time
McClelland Consulting Engineers	McClelland Consulting Engineers	Chronic Toxicity	1 Day (100%)
1311 W 2nd St.	P.O. Box 34087	City of Dumas	2 Day (50%)
Little Rock, AR 72201	Little Rock, AR 72203-4087	**Reporting Information**	3 Day (25%)
		Telephone: 501-378-7808	Routine
Attn: Matt Bienvenu		Fax: 501-376-4677	Preservative Code: 1
		Email: mbienvenu@mcclelland-engrs.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

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

Sampler(s) Signature: Jesse James

Sampler(s) Printed: Jesse James

Arkansas Analytical Work Order Number: K1809-011B

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity
	9/25-9/26	6p-8a		X	4	Water	Final Discharge	X

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
Jesse James	9/26/18 1501	
3. Relinquished by: (Signature)	**Date/Time**	**4. Received by lab: (Signature)**
		Sydney James

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:	4 °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
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CHAIN OF CUSTODY RECORD

CLIENT INFORMATION	BILLING INFORMATION	Project Description	Turnaround Time
McClelland Consulting Engineers	McClelland Consulting Engineers	Chronic Toxicity	1 Day (100%)
1311 W 2nd St.	P.O. Box 34087	City of Dumas	2 Day (50%)
Little Rock, AR 72201	Little Rock, AR 72203-4087	Reporting Information	3 Day (25%)
		Telephone: 501-378-7808	Routine
Attn: Matt Bienvenu		Fax: 501-376-4677	Preservative Code: 1
		Email: mbienvenu@mcclelland-engrs.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: Jesse James

Sampler(s) Printed: Jesse James

TEST PARAMETERS

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

Arkansas Analytical Work Order Number: K1609011

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity	Bottle Type Code
	9/26-9/27	8A-9A		X	4	Water	Final Discharge	X	C

1. Relinquished by: (Signature) — Date/Time: 9/27/16 1515

2. Received by: (Signature)

3. Relinquished by: (Signature) — Date/Time

4. Received by lab: (Signature) Amanda Pobst

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

CETIS Summary Report

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

Batch ID:	08-6469-0753	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Melissa Bird
Start Date:	26 Sep-18 14:45	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Oct-18 13:45	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatox, AR	**Age:**	<24
Sample ID:	06-9626-2298	**Code:**	K1809011FH	**Client:**	City of Dumas
Sample Date:	25 Sep-18 07:00	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (3Q)
Receipt Date:	25 Sep-18 15:01	**Source:**	City of Dumas (AR0033987)		
Sample Age:	32h (2 °C)	**Station:**	Final Discharge		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1809011B	26 Sep-18 08:00	26 Sep-18 15:01	28 Sep-18 00:00	4
2	K1809011C	27 Sep-18 09:00	27 Sep-18 15:15	30 Sep-18 00:00	2

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
06-3708-4184	7d Survival Rate	Steel Many-One Rank Sum Test	52	> 52	n/a	1.923	7.88%
00-4403-9499	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	39	52	45.03	2.564	16.4%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
06-3708-4184	7d Survival Rate	Control Resp	0.98	0.8	>>	Yes	Passes Criteria
00-4403-9499	Mean Dry Biomass-mg	Control Resp	0.5916	0.25	>>	Yes	Passes Criteria
00-4403-9499	Mean Dry Biomass-mg	PMSD	0.1638	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	D	5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
16		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.04%
22		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
29		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
39		5	0.9600	0.8920	1.0000	0.9000	1.0000	0.0245	0.0548	5.71%	2.04%
52		5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	2.04%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.5916	0.4684	0.7148	0.483	0.698	0.04437	0.09922	16.77%	0.00%
16		5	0.5678	0.5231	0.6125	0.534	0.613	0.01609	0.03597	6.34%	4.02%
22		5	0.527	0.4534	0.6006	0.471	0.617	0.02652	0.0593	11.25%	10.92%
29		5	0.585	0.5208	0.6492	0.525	0.641	0.02311	0.05168	8.83%	1.12%
39		5	0.4974	0.4681	0.5267	0.467	0.52	0.01056	0.02362	4.75%	15.92%
52		5	0.49	0.3834	0.5966	0.395	0.571	0.0384	0.08586	17.52%	17.17%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.9000	1.0000	1.0000	1.0000	1.0000
16		1.0000	1.0000	1.0000	1.0000	1.0000
22		1.0000	1.0000	1.0000	1.0000	0.9000
29		1.0000	0.9000	1.0000	1.0000	1.0000
39		1.0000	0.9000	1.0000	1.0000	0.9000
52		1.0000	1.0000	1.0000	0.8000	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.698	0.522	0.561	0.483	0.694
16		0.545	0.534	0.613	0.547	0.6
22		0.617	0.525	0.477	0.545	0.471
29		0.539	0.525	0.627	0.593	0.641
39		0.478	0.516	0.467	0.52	0.506
52		0.395	0.571	0.55	0.399	0.535

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	9/10	10/10	10/10	10/10	10/10
16		10/10	10/10	10/10	10/10	10/10
22		10/10	10/10	10/10	10/10	9/10
29		10/10	9/10	10/10	10/10	10/10
39		10/10	9/10	10/10	10/10	9/10
52		10/10	10/10	10/10	8/10	10/10

CETIS Summary Report

Cladoceran 7-d Survival and Reproduction Test — **Arkansas Analytical, Inc.**

Batch ID:	10-1280-5862	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Melissa Bird
Start Date:	26 Sep-18 10:30	**Protocol:**	EPA/600/4-91/002 (1994)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Oct-18 13:10	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	16-3107-4215	**Code:**	K1809011CD	**Client:**	City of Dumas
Sample Date:	25 Sep-18 07:00	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (3Q)
Receipt Date:	25 Sep-18 15:01	**Source:**	City of Dumas (AR0033987)		
Sample Age:	28h (2 °C)	**Station:**	Final Discharge		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1809011B	26 Sep-18 08:00	26 Sep-18 15:01	28 Sep-18 00:00	4
2	K1809011C	27 Sep-18 09:00	27 Sep-18 15:15	30 Sep-18 00:00	2

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
07-9926-5819	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	52	> 52	n/a	1.923	n/a
19-5329-0572	Reproduction	Dunnett Multiple Comparison Test	52	> 52	n/a	1.923	28.9%

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
07-9926-5819	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
19-5329-0572	Reproduction	Control Resp	20.3	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%
16		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
22		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
29		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
39		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
52		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	20.3	16.32	24.28	12	28	1.758	5.559	27.38%	0.00%
16		10	25	20.3	29.7	14	32	2.076	6.566	26.26%	-23.15%
22		10	21.3	16.7	25.9	13	30	2.033	6.43	30.19%	-4.93%
29		10	21.9	16.35	27.45	12	36	2.452	7.752	35.40%	-7.88%
39		10	18.7	15.74	21.66	11	24	1.309	4.138	22.13%	7.88%
52		10	22.2	20.59	23.81	19	25	0.7118	2.251	10.14%	-9.36%

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
16		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
22		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
29		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
39		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
52		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	23	12	14	20	28	18	23	15	22
16		27	29	28	29	14	32	21	25	14	31
22		26	17	13	17	30	27	30	19	14	20
29		18	36	20	14	22	18	28	12	19	32
39		21	14	20	21	11	19	23	15	19	24
52		24	19	20	24	20	20	22	25	24	24

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
16		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
22		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
29		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
39		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
52		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 K1809011						Test Start (Date/Time) 9-26-18 / 1445			
Client: Dumas						Test End (Date/Time) 10-3-18 / 1345			
		Day of Test							
		1	2	3	4	5	6	7	notes
Control	MHS932	9-26	9/27	9/28	9/29	9/30	10/1	10/2	MHS933
D.O. (mg/L)	INITIAL	8.9	8.8	8.6	~~8.3~~ 8.0	8.4	8.5	8.4	used 10/1
	FINAL	8.2	7.4	7.7	7.9	7.0	6.6	7.7	
pH (s.u.)	INITIAL	8.2	8.2	7.9	~~7.3~~ 7.7	7.8	7.8	7.8	
	FINAL	7.7	7.1	7.8	7.4	7.2	7.1	7.2	
temp (C)	INITIAL	20	20	22	~~23~~ 22	23	23	24	
	FINAL	25	25	25	25	25	25	25	
ALKALINITY (mg/L)		68	—	—	—	—	62	—	
HARDNESS (mg/L)		100	—	—	—	—	86	—	
CONDUCTIVITY (umhc		343	—	—	—	—	317	—	
CHLORINE (mg/L)		<0.05	—	—	—	—	<0.05	—	
CONC:	16%								
D.O. (mg/L)	INITIAL	8.9	9.2	8.6	8.5	8.5	8.6	8.4	
	FINAL	8.2	7.4	7.7	7.9	7.3	7.6	7.7	
pH (s.u)	INITIAL	7.9	8.2	7.9	7.6	7.9	7.8	7.8	
	FINAL	7.7	7.2	7.9	7.6	7.4	7.6	7.3	
temp (C)	INITIAL	21	21	22	23	23	23	24	
	FINAL	25	25	25	25	25	25	~~23~~	
CONC:	22%								
D.O. (mg/L)	INITIAL	9.0	9.2	8.6	8.5	8.5	8.6	8.5	
	FINAL	8.3	7.2	7.2	8.1	7.0	7.2	7.7	
pH (mg/L)	INITIAL	8.0	8.3	7.9	7.2	7.8	7.8	7.8	
	FINAL	7.7	7.3	7.7	7.8	7.5	7.6	7.3	
temp (C)	INITIAL	21	22	23	24	23	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC:	29%								
D.O. (mg/L)	INITIAL	9.0	9.4	8.7	8.6	8.5	8.7	8.5	
	FINAL	8.2	7.1	7.0	7.9	7.1	7.2	7.5	
pH (s.u.)	INITIAL	8.0	8.4	7.9	7.3	7.9	7.8	7.7	
	FINAL	7.7	7.5	7.8	7.7	7.5	7.6	7.4	
temp (C)	INITIAL	21	22	22	24	23	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC:	39%								
D.O. (mg/L)	INITIAL	9.0	9.5	8.8	8.6	8.5	8.8	8.6	
	FINAL	8.3	6.9	7.4	7.9	7.0	7.1	7.2	
pH (s.u.)	INITIAL	8.1	8.4	7.9	7.2	7.9	7.8	7.8	
	FINAL	7.7	7.5	7.9	7.8	7.6	7.7	7.4	
temp (C)	INITIAL	21	23	22	25	23	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC:	52%								
D.O. (mg/L)	INITIAL	9.1	9.5	8.5	9.3	8.5	8.8	8.6	
	FINAL	8.3	6.8	7.5	7.7	6.9	6.9	7.2	
pH (s.u.)	INITIAL	8.2	8.5	7.9	7.2	7.9	7.8	7.8	
	FINAL	7.8	7.6	7.4	7.9	7.6	7.7	7.5	
temp (C)	INITIAL	22	23	24	25	24	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC:	100%	A	A	B	B	C	C	C	C
ALKALINITY (mg/L)		140	—	122	—	138	—	—	
HARDNESS (mg/L)		30	—	10	—	34	—	—	
CONDUCTIVITY (umhc		375	—	372	—	375	—	—	
CHLORINE (mg/L)		<0.05	—	<0.05	—	0.05	—	—	

CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING — Ceriodaphnia Dubia

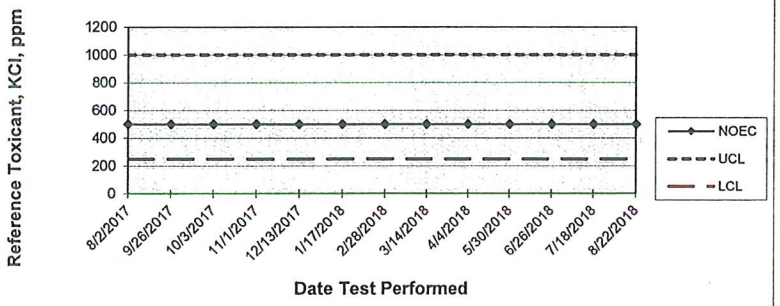
Lab # / Sample ID: K1809011 — Test Start (Date/Time): 9-26-18 / 1030

Client: Dumas — Test End (Date/Time): 10-2-18 / 1310

		Day of Test							
		1	2	3	4	5	6	7	notes/remarks
Control	MHS 932	9-26	9/27	9/28	9/29	9/30	10/1	10/2	MHS 933 used 10/1
D.O. (mg/L)	INITIAL	8.9	8.8	8.6	8.3	8.4	8.5	8.4	
	FINAL	8.3	8.9	8.4	8.8	8.2	8.2	8.1	
pH (s.u.)	INITIAL	8.2	8.2	7.9	7.3	7.8	7.8	7.8	
	FINAL	8.2	8.3	7.3	7.7	7.4	7.4	7.5	
temp (C)	INITIAL	20	20	22	23	23	23	24	
	FINAL	25	25	25	25	25	25	25	
ALKALINITY (mg/L)		68	—			—	62	—	
HARDNESS (mg/L)		100	—			—	86	—	
CONDUCTIVITY (umhos/cm)		343	—			—	317	—	
CHLORINE (mg/L)		<0.05	—			—	<0.05	—	
CONC: 16%									
D.O. (mg/L)	INITIAL	8.9	9.2	8.6	8.5	8.5	8.6	8.4	
	FINAL	8.7	9.0	8.3	8.0	8.1	8.1	8.0	
pH (s.u)	INITIAL	7.9	8.2	7.9	7.6	7.9	7.8	7.8	
	FINAL	8.2	8.4	7.6	7.8	7.6	7.6	7.5	
temp (C)	INITIAL	21	21	22	23	23	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC: 22%									
D.O. (mg/L)	INITIAL	9.0	9.2	8.6	8.5	8.5	8.6	8.5	
	FINAL	8.7	9.1	8.2	8.0	8.1	8.2	8.0	
pH (mg/L)	INITIAL	8.0	8.3	7.9	7.2	7.8	7.8	7.8	
	FINAL	8.2	8.5	7.8	7.9	7.8	7.7	7.5	
temp (C)	INITIAL	21	22	23	24	23	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC: 29%									
D.O. (mg/L)	INITIAL	9.0	9.4	8.7	8.6	8.5	8.7	8.5	
	FINAL	8.7	9.1	8.3	7.8	8.2	8.2	7.9	
pH (s.u.)	INITIAL	8.0	8.4	7.9	7.3	7.9	7.8	7.7	
	FINAL	8.1	8.5	7.9	7.9	7.8	7.8	87.6	on 10/3/18
temp (C)	INITIAL	21	22	22	24	23	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC: 39%									
D.O. (mg/L)	INITIAL	9.0	9.5	8.8	8.6	8.5	8.8	8.6	
	FINAL	8.8	9.1	8.2	7.8	8.1	8.1	8.0	
pH (s.u.)	INITIAL	8.1	8.4	7.9	7.2	7.9	7.8	7.8	
	FINAL	8.1	8.5	8.0	7.9	7.9	7.9	7.7	
temp (C)	INITIAL	21	23	22	25	23	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC: 52%									
D.O. (mg/L)	INITIAL	9.1	9.5	8.5	9.3	8.5	8.8	8.6	
	FINAL	8.7	9.1	8.3	7.8	8.1	8.1	8.0	
pH (s.u.)	INITIAL	8.2	8.5	7.9	7.2	7.9	7.8	7.8	
	FINAL	8.1	8.5	8.0	8.0	7.9	9.0	7.8	
temp (C)	INITIAL	22	23	24	25	25	23	24	
	FINAL	25	25	25	25	25	25	25	
CONC: 100%		A	A	B	B	C	C	C	
ALKALINITY (mg/L)		140	—	122	—	138	—	—	
HARDNESS (mg/L)		30	—	10	—	34	—	—	
CONDUCTIVITY (umhos/cm)		375	—	372	—	375	—	—	
CHLORINE (mg/L)		<0.05	—	20.05	—	0.05	—	—	

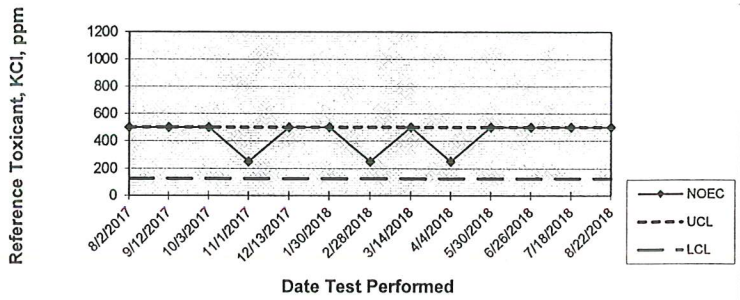
ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW SURVIVAL 7 Day
QUALITY ASSURANCE



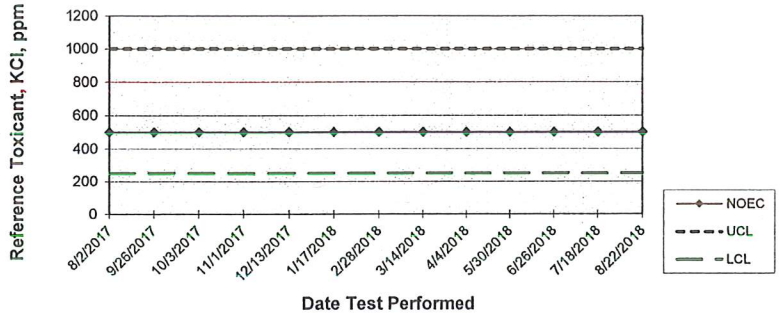
ARKANSAS ANALYTICAL, INC.

CERIODAPHNIA DUBIA SURVIVAL
QUALITY ASSURANCE



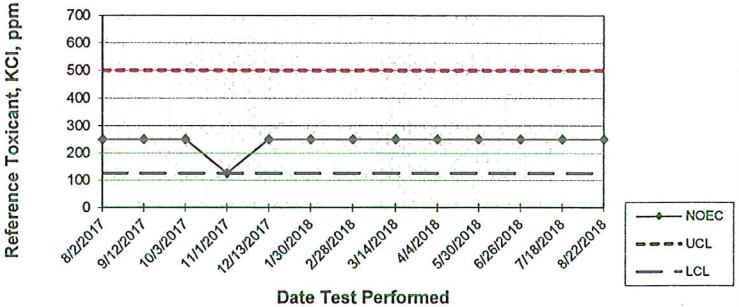
ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW GROWTH 7 Day
QUALITY ASSURANCE



ARKANSAS ANALYTICAL, INC.

CERIODAPHNIA DUBIA REPRODUCTION
QUALITY ASSURANCE



Arkansas Analytical, Inc.

Toxicity Test Results

CITY OF DUMAS
NPDES PERMIT NUMBER: AR0033987
Fourth Quarter 2018
AFIN # 21-00045

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

Ceriodaphnia dubia, Survival and Reproduction Test
Test 1002.0

Prepared for: **Pat Fitzgerald**
City of Dumas
155 E. Waterman
Dumas, Arkansas, 71639

Prepared by: Arkansas Analytical,
8100 National Drive
Little Rock, Arkansas 72209
Lab Number K1811011

Wednesday, December 19, 2018

Plant Location

City of Dumas. The plant is located in Dumas, Arkansas, Highway 165 North in Section 25, Township 9 South, Range 4 West in Desha 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%, 16%, 22%, 29%, 39%, 52%
- 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%, 16%, 22%, 29%, 39%, 52%
- Dilution water: Moderately hard synthetic
- No deviation from method

Reference Toxicant Data

REFERENCE TOXICANT (Potassium Chloride)

Ceriodaphnia dubia 10/31/18-11/6/18		*Pimephales promelas* 10/31/18-11/7/18	
NOEC Survival:	500 ppm KCl	NOEC Survival:	500 ppm KCl
LOEC Survival:	1000 ppm KCl	LOEC Survival:	1000ppm KCl
NOEC Reproduction:	250 ppm KCl	NOEC Growth:	500ppm KCl
LOEC Reproduction:	500 ppm KCl	LOEC Growth:	1000 ppm KCl

Summary of Results

City of Dumas

Ceriodaphnia dubia		*Pimephales promelas*	
NOEC Survival Parameter: **TOP3B**	52%	NOEC Survival Parameter: **TOP6C**	52%
Pass/Fail Survival Parameter: **TLP3B**	Pass	Pass/Fail Survival Parameter: **TLP6C**	Pass
NOEC Reproduction Parameter: **TPP3B**	52%	NOEC Growth Parameter: **TPP6C**	52%
Pass/Fail Reproduction Parameter: **TGP3B**	Pass	Pass/Fail Growth Parameter: **TGP6C**	Pass
%CV Reproduction Parameter: **TQP3B**	13.4%	%CV Growth Parameter: **TQP6C**	9.99%
PMSD Reproduction	23.8%	PMSD Growth	10.2%

Conclusion

Pimephales promelas, (Method 1000.0): The permit issued to the City of Dumas, specifies that the **critical dilution is 39% 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 Dumas, specifies that the **critical dilution is 39% 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, Clint Wood

Reviewed by:

Melissa Bird

Melissa Bird

Appendices

Arkansas Analytical Inc.

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

CHAIN OF CUSTODY RECORD

CLIENT INFORMATION	BILLING INFORMATION	Project Description	Turnaround Time
McClelland Consulting Engineers	McClelland Consulting Engineers	Chronic Toxicity	1 Day (100%)
1311 W 2nd St.	P.O. Box 34087	City of Dumas	2 Day (50%)
Little Rock, AR 72201	Little Rock, AR 72203-4087	Reporting Information	3 Day (25%)
		Telephone: 501-378-7808	Routine
Attn: Matt Bienvenu		Fax: 501-376-4677	Preservative Code: 1
		Email: mbienvenu@mcclelland-engrs.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

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

Sampler(s) Signature: [signature]

Sampler(s) Printed: Jesse James

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity	Arkansas Analytical Work Order Number:
	11/26-11/27	7A-7A		X	4	Water	Final Discharge	X	K1811011 A

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
[signature]	11/27/16 1445	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
[signature]		Amanda Forbush

SAMPLE CONDITION UPON RECEIPT IN LAB

1. CUSTODY SEALS:	Y 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	BILLING INFORMATION
McClelland Consulting Engineers	McClelland Consulting Engineers
1311 W 2nd St.	P.O. Box 34087
Little Rock, AR 72201	Little Rock, AR 72203-4087
Attn: Matt Bienvenu	

Project Description: Chronic Toxicity; City of Dumas

Reporting Information: Telephone: 501-378-7808; Fax: 501-376-4677; Email: mbienvenu@mcclelland-engrs.com

Turnaround Time: 1 Day (100%); 2 Day (50%); 3 Day (25%); Routine

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

Preservative Code: 1 | Bottle Type: P

Sampler(s) Signature: [signature] Sampler(s) Printed: Jesse James

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	TEST PARAMETERS: Chronic Toxicity	Bottle Type Code
	11/27 - 11/28	8A-8A		X	4	Water	Final Discharge	X	B

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

Arkansas Analytical Work Order Number: K18/1011

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
[signature]	11/28/16 1452	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		[signature]

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	BILLING INFORMATION
McClelland Consulting Engineers	McClelland Consulting Engineers
1311 W 2nd St.	P.O. Box 34087
Little Rock, AR 72201	Little Rock, AR 72203-4087
Attn: Matt Bienvenu	

Project Description: Chronic Toxicity; City of Dumas

Reporting Information
Telephone: 501-378-7808
Fax: 501-376-4677
Email: mbienvenu@mcclelland-engrs.com

Turnaround Time: 1 Day (100%); 2 Day (50%); 3 Day (25%); (Routine)

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

Preservative Code: 1
Bottle Type: P

Sampler(s) Signature: [signature]
Sampler(s) Printed: Jesse James

Field Number	SAMPLE COLLECTION Date/s	Time/s	Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Chronic Toxicity	Bottle Type Code
	11/28-11/29	9A-9A		X	4	Water	Final Discharge	X	C

TEST PARAMETERS

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

Arkansas Analytical Work Order Number: K181101

1. Relinquished by: (Signature)	Date/Time	2. Received by: (Signature)
[signature]	11/29/18 1456	
3. Relinquished by: (Signature)	Date/Time	4. Received by lab: (Signature)
		Amanda Forbush

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

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

Batch ID:	02-3351-7136	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Melissa Bird
Start Date:	28 Nov-18 12:50	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	05 Dec-18 12:29	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	7d	**Source:**	Aquatox, AR	**Age:**	<24
Sample ID:	07-7223-4867	**Code:**	K1811011FH	**Client:**	City of Dumas
Sample Date:	27 Nov-18 07:00	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (4Q)
Receipt Date:	27 Nov-18 14:45	**Source:**	City of Dumas (AR0033987)		
Sample Age:	30h (1 °C)	**Station:**	Final Discharge		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1811011B	28 Nov-18 08:00	28 Nov-18 14:52	30 Nov-18 00:00	1
2	K1811011C	29 Nov-18 09:00	29 Nov-18 14:56	01 Dec-18 00:00	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
00-7022-2060	7d Survival Rate	Steel Many-One Rank Sum Test	52	> 52	n/a	1.923	5.46%
18-3222-2433	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	52	> 52	n/a	1.923	10.2%

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
00-7022-2060	7d Survival Rate	Control Resp	0.98	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	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
16		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.04%
22		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.04%
29		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.04%
39		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	0.00%
52		5	0.9400	0.8720	1.0000	0.9000	1.0000	0.0245	0.0548	5.83%	4.08%

Mean Dry Weight-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.5562	0.4872	0.6252	0.509	0.636	0.02486	0.05559	9.99%	0.00%
16		5	0.554	0.5108	0.5972	0.507	0.596	0.01557	0.03482	6.29%	0.40%
22		5	0.5836	0.5439	0.6233	0.543	0.617	0.01431	0.032	5.48%	-4.93%
29		5	0.6692	0.6338	0.7046	0.632	0.702	0.01276	0.02853	4.26%	-20.32%
39		5	0.5894	0.5575	0.6213	0.558	0.617	0.0115	0.02572	4.36%	-5.97%
52		5	0.5882	0.5336	0.6428	0.535	0.647	0.01966	0.04396	7.47%	-5.75%

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	1.0000	1.0000	1.0000	1.0000	0.9000
16		1.0000	1.0000	1.0000	1.0000	1.0000
22		1.0000	1.0000	1.0000	1.0000	1.0000
29		1.0000	1.0000	1.0000	1.0000	1.0000
39		1.0000	1.0000	1.0000	0.9000	1.0000
52		1.0000	0.9000	1.0000	0.9000	0.9000

Mean Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.636	0.522	0.521	0.509	0.593
16		0.56	0.574	0.533	0.507	0.596
22		0.617	0.613	0.583	0.543	0.562
29		0.702	0.664	0.693	0.655	0.632
39		0.588	0.613	0.558	0.571	0.617
52		0.615	0.647	0.562	0.582	0.535

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	10/10	10/10	10/10	10/10	9/10
16		10/10	10/10	10/10	10/10	10/10
22		10/10	10/10	10/10	10/10	10/10
29		10/10	10/10	10/10	10/10	10/10
39		10/10	10/10	10/10	9/10	10/10
52		10/10	9/10	10/10	9/10	9/10

CETIS Summary Report

Cladoceran 7-d Survival and Reproduction Test — **Arkansas Analytical, Inc.**

Batch ID:	00-8400-7366	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Melissa Bird
Start Date:	28 Nov-18 11:07	**Protocol:**	EPA/600/4-91/002 (1994)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	04 Dec-18 10:25	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	5d 23h	**Source:**	In-House Culture	**Age:**	<24

Sample ID:	05-8368-9157	**Code:**	K1811011CD	**Client:**	City of Dumas
Sample Date:	27 Nov-18 07:00	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (4Q)
Receipt Date:	27 Nov-18 14:45	**Source:**	City of Dumas (AR0033987)		
Sample Age:	28h (1 °C)	**Station:**	Final Discharge		

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	K1811011B	28 Nov-18 08:00	28 Nov-18 14:52	30 Nov-18 00:00	1
2	K1811011C	29 Nov-18 09:00	29 Nov-18 14:56	01 Dec-18 00:00	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
06-4505-6789	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	52	> 52	n/a	1.923	n/a
16-9499-9838	Reproduction	Steel Many-One Rank Sum Test	52	> 52	n/a	1.923	23.8%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
06-4505-6789	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
16-9499-9838	Reproduction	Control Resp	27.5	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%
16		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
22		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
29		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
39		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
52		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	27.5	24.86	30.14	22	34	1.167	3.689	13.42%	0.00%
16		10	32.1	29.61	34.59	27	39	1.1	3.479	10.84%	-16.73%
22		10	31.9	27.92	35.88	19	40	1.76	5.567	17.45%	-16.00%
29		10	28	19.6	36.4	0	43	3.715	11.75	41.95%	-1.82%
39		10	29.9	27.34	32.46	24	35	1.13	3.573	11.95%	-8.73%
52		10	27.9	23.48	32.32	14	35	1.952	6.173	22.12%	-1.45%

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
16		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
22		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
29		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
39		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
52		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	26	34	33	26	27	25	29	22	28	25
16		34	35	31	27	39	28	33	30	32	32
22		19	40	32	35	32	34	28	35	34	30
29		25	43	29	33	30	0	20	28	35	37
39		32	35	34	32	28	24	32	28	27	27
52		30	34	35	22	25	14	30	30	30	29

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
16		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
22		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
29		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
39		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
52		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		K1811011				Test Start (Date/Time)		11-28-18 / 1250	
Client:		Dunns				Test End (Date/Time)		12-5-18 / 1229	
		Day of Test							
MHS 942		1	2	3	4	5	6	7	notes
Control	0%	11/28	11/29	11/30	12/1	12/2	12-3	12/4	
D.O. (mg/L)	INITIAL	8.5	8.3	8.4	8.0	7.9	8.5	8.7	
	FINAL	7.8	7.9	6.7	7.9	7.5	7.3	8.2	
pH (s.u.)	INITIAL	9.3	8.3	8.1	7.7	7.8	7.9	7.6	
	FINAL	7.2	6.6	9.5	8.1	9.0	7.5	7.6	
temp (C)	INITIAL	20.7	23	23	24	23	~~23~~ 22	21	
	FINAL	25	25	24	25	25	25	25	
ALKALINITY (mg/L)		64							
HARDNESS (mg/L)		86							
CONDUCTIVITY (umhc		347							
CHLORINE (mg/L)		<0.05							
CONC:	16%								
D.O. (mg/L)	INITIAL	8.7	8.4	8.8	8.2	7.7	8.5	8.9	
	FINAL	7.7	7.6	7.1	~~8.0~~ 7.9	7.1	7.4	8.0	
pH (s.u)	INITIAL	8.7	8.0	7.2	7.9	8.2	7.8	7.7	
	FINAL	7.5	6.7	9.4	~~7.5~~ 8.6	9.1	7.6	7.6	
temp (C)	INITIAL	20.9	24	23	24	25	23	21	
	FINAL	25	25	24	25	25	25	25	
CONC:	22%								
D.O. (mg/L)	INITIAL	8.4	8.5	8.8	8.1	8.1	8.5	8.9	
	FINAL	7.7	7.6	6.8	7.7	7.6	7.4	7.9	
pH (mg/L)	INITIAL	8.7	8.0	7.2	7.8	8.2	7.8	7.7	
	FINAL	7.9	6.8	8.4	8.4	9.3	7.5	7.7	
temp (C)	INITIAL	21.0	23	23	24	24	23	21	
	FINAL	25	25	24	25	25	25	25	
CONC:	29%								
D.O. (mg/L)	INITIAL	8.6	8.5	8.6	8.1	8.0	8.5	9.0	
	FINAL	7.6	6.6	6.9	7.6	6.0	7.0	7.9	
pH (s.u.)	INITIAL	8.7	8.1	7.4	7.9	8.0	7.9	7.7	
	FINAL	8.1	6.9	8.4	8.3	9.2	7.6	7.7	
temp (C)	INITIAL	20.9	24	23	24	24	23	22	
	FINAL	25	25	23	25	25	25	25	
CONC:	39%								
D.O. (mg/L)	INITIAL	8.6	8.6	8.7	8.1	8.1	8.5	9.0	
	FINAL	7.3	6.4	6.8	7.6	5.6	6.4	7.8	
pH (s.u.)	INITIAL	8.8	8.1	7.4	7.8	7.9	7.7	7.7	
	FINAL	8.2	7.1	8.2	8.2	9.2	7.5	7.7	
temp (C)	INITIAL	20.9	24	23	24	24	23	22	
	FINAL	25	25	24	25	25	25	25	
CONC:	52%								
D.O. (mg/L)	INITIAL	8.5	8.6	8.9	8.2	8.6	8.4	9.1	
	FINAL	7.4	6.7	6.6	7.5	5.6	~~6.~~ 7.2	7.8	
pH (s.u.)	INITIAL	8.7	8.1	7.4	7.8	7.9	7.7	7.6	
	FINAL	8.2	7.0	8.5	8.1	9.2	7.6	7.8	
temp (C)	INITIAL	21.1	24	23	24	23	24	22	
	FINAL	25	25	24	25	25	25	25	
CONC:		A	A	B	RC	B	C	C	
ALKALINITY (mg/L)		108	→	78	114	78	114	→	
HARDNESS (mg/L)		32	→	78	28	78	28	→	
CONDUCTIVITY (umhc		342	→	341	340	341	340	→	
CHLORINE (mg/L)		<0.05	→	<0.05	0.05	<0.05	<0.05	→	

*HF 12-2-18

em 11-24-18
em 12-3-18

CHEMICAL DATA SHEET FOR CHRONIC TOXICITY TESTING — Ceriodaphnia Dubia

Lab # / Sample ID K1811011 — Test Start (Date/Time) 11-28-18/1107

Client: Dumas — Test End (Date/Time) 12-4-18/1055

		Day of Test							
		1	2	3	4	5	6	7	notes/remarks
Control	MHS 942	11-28	11/29	11/30	12-1	12-2	12-3	12/4	
D.O. (mg/L)	INITIAL	8.5	8.3	8.4	8.0	7.9	8.5	8.7	
	FINAL	8.1	8.6	8.6	8.21	9.1	8.3	—	
pH (s.u.)	INITIAL	9.3	8.3	8.1	7.7	7.8	7.9	7.6	
	FINAL	8.6	7.9	8.2	9.3	8.3	7.7	—	
temp (C)	INITIAL	20.7	23	23	24	23	22	21	
	FINAL	25	25	25	25	25	25	—	
ALKALINITY (mg/L)		64	—					→	
HARDNESS (mg/L)		86	—					→	
CONDUCTIVITY (umhos/cm)		347	—					→	
CHLORINE (mg/L)		<0.05	—					→	
CONC:	16								
D.O. (mg/L)	INITIAL	8.7	8.4	8.8	8.2	7.7	8.5	8.9	
	FINAL	8.1	8.5	8.5	8.3	8.6	8.2	—	
pH (s.u)	INITIAL	8.7	8.0	7.2	7.9	8.2	7.8	7.7	
	FINAL	8.6	8.1	9.0	9.3	8.1	7.8	—	
temp (C)	INITIAL	20.9	24	25	24	25	23	21	
	FINAL	25	25	25	25	25	25	—	
CONC:	22								
D.O. (mg/L)	INITIAL	9.4	8.5	8.8	8.1	8.1	8.5	8.9	
	FINAL	8.0	8.5	8.5	8.3	8.6	8.2	—	
pH (mg/L)	INITIAL	8.7	8.0	7.2	7.8	8.2	7.8	7.7	
	FINAL	8.6	7.9	9.2	9.4	8.1	7.7	—	
temp (C)	INITIAL	21	23	23	24	24	23	21	
	FINAL	25	25	25	25	25	25	—	
CONC:	29								
D.O. (mg/L)	INITIAL	8.6	8.5	8.6	8.1	8.0	8.5	9.0	
	FINAL	8.0	8.5	8.5	8.3	8.5	8.2	—	
pH (s.u.)	INITIAL	8.7	8.1	7.4	7.9	8.0	7.9	7.7	
	FINAL	8.6	8.1	9.1	9.2	8.1	7.7	—	
temp (C)	INITIAL	21	24	23	24	24	23	22	
	FINAL	25	25	25	25	25	25	—	
CONC:	39								
D.O. (mg/L)	INITIAL	8.6	8.6	8.7	8.1	8.1	8.5	9.0	
	FINAL	8.0	8.5	8.5	8.3	8.4	8.3	—	
pH (s.u.)	INITIAL	8.8	8.1	7.4	7.8	7.9	7.7	7.7	
	FINAL	8.7	8.0	9.1	9.2	8.1	7.7	—	
temp (C)	INITIAL	20.9	24	23	24	24	23	22	
	FINAL	25	25	25	25	25	25	—	
CONC:	52								
D.O. (mg/L)	INITIAL	8.5	8.6	8.9	8.2	8.6	8.4	9.1	
	FINAL	8.0	8.5	8.4	8.3	8.3	8.2	—	
pH (s.u.)	INITIAL	8.7	8.1	7.4	7.8	7.9	7.7	7.6	
	FINAL	8.7	8.0	9.1	9.2	8.1	7.7	—	
temp (C)	INITIAL	21	24	23	24	23	24	22	
	FINAL	25	25	25	25	25	25	—	
CONC:		A	A	B	BC	B	C	C	
ALKALINITY (mg/L)		108	→	78	114	78	114	→	
HARDNESS (mg/L)		32	→	78	28	78	28	→	
CONDUCTIVITY (umhos/cm)		342	→	341	340	341	340	→	
CHLORINE (mg/L)		<0.05	→	<0.05	0.05	<0.05	0.05	→	

mb 12-1-18

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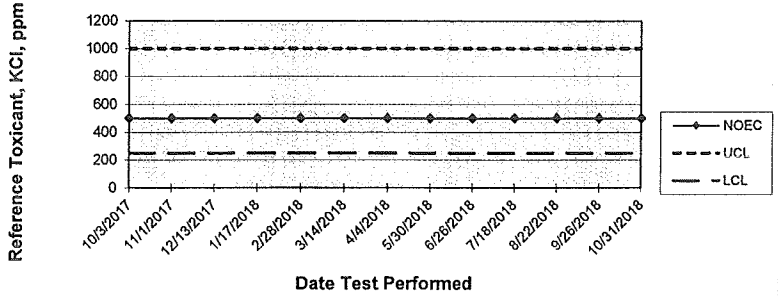
FATHEAD MINNOW SURVIVAL 7 Day
QUALITY ASSURANCE



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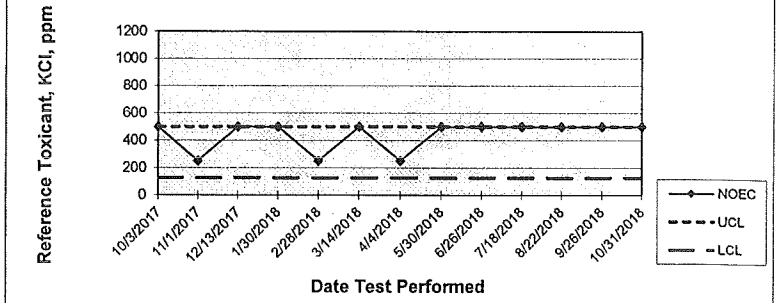
CERIODAPHNIA DUBIA SURVIVAL
QUALITY ASSURANCE



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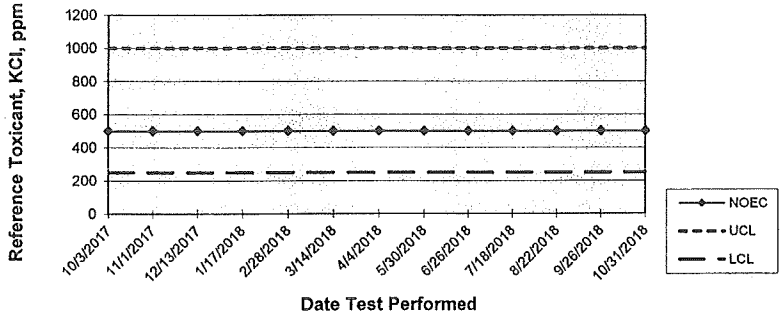
FATHEAD MINNOW GROWTH 7 Day
QUALITY ASSURANCE



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