



Ecotoxicology Research Facility



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November 4, 2014

Jonathan Kopp
Walnut Ridge Wastewater Treatment Plant
216 Southwest 4th Street
Walnut Ridge, AR 72476

Dear Jon,

Please find enclosed the results of the 7-day chronic tests using water collected from Walnut Ridge's plant facilities during the week of October 5, 2014. No lethal or sublethal effects were measured in *Pimephales promelas* or *Ceriodaphnia dubia* exposed to the critical flow concentration (100%) or other treated dilutions from this outfall.

All test conditions and acceptability criteria as suggested by our laboratory and the US EPA were met during these tests.

Please call if you have any questions regarding this particular test series or any other tests conducted in the past.

Sincerely,

Jennifer L. Bouldin, PhD
Director Ecotoxicology Research Facility
PO Box 847
Arkansas State University
State University, AR 72467

Facility Director / Contact: Jennifer L. Bouldin, PhD
Phone: (870) 972-2570

Client: Walnut Ridge Wastewater Treatment Plant
216 Southwest 4th Street
Walnut Ridge, AR 72476

Contact: Jon Kopp
870-866-2312

NPDES Permit #: AR0046566 AFIN#: 38-00040

Effluent Sampling Point/Type: 24hr Composite

Samples Collected:

Sample #	Sampling Times	Received	Arrival Temp
1	10/05/14 0900 hrs to 10/06/14 0900 hrs	10/06/14 1000 hrs	2.0°C
2	10/07/14 0900 hrs to 10/08/14 0900 hrs	10/08/14 1005 hrs	2.5°C
3	10/09/14 0900 hrs to 10/10/14 0900 hrs	10/10/14 1030 hrs	1.5°C

Test Methods:

7-Day Chronic Toxicity, Static renewal, Fathead minnow, EPA 821/R-02/013, Section 11

7-Day Chronic Toxicity, Static renewal, Cladoceran, EPA 821/R-02/013, Section 13

Organisms: *P. promelas* <24hrs, *C. dubia* <24hrs

Culture Source: ASU ERF

Dilutions: 0%, 32%, 42%, 56%, 80%, 100%

Critical Dilution: 100%

Statistical Method: Toxcalc 5.0.25


Results:

	<i>P. promelas</i>	<i>C. dubia</i>
NOEC Survival:	100%	100%
Pass/Fail (0=pass; 1=fail):	0	0
NOEC Growth/Reproduction:	100%	100%
Pass/Fail (0=pass; 1=fail):	0	0
Control Survival:	97.5%	90%
Control % CV Growth/Reproduction:	21.7	19.3
Critical Dilution % CV Growth/Reproduction:	13.5	36.9
Mean Weight/ # Neonates in Control:	0.4884 mg	20.4
Mean Weight/ # of Neonates in Critical Dilution:	0.4337 mg	18.0
MSDp Growth/ Reproduction	0.1947	0.3981
Daily Average Minimum NOEC:	100%	100%
7-Day Minimum NOEC:	100%	100%

Results Summary: Neither lethal nor sublethal effects were measured in *P. promelas* or *C. dubia* exposed to treated effluent or dilution mixtures.

QA/Reference Testing: Data attached

Reviewed By:



Jennifer L. Bouldin, PhD
Director ASU Ecotoxicology Research Facility

Toxicity Test Performed: 7-day *Pimephales promelas* Survival and Growth
 Effluent Sampling Point: Walnut Ridge WWT Plant
 Date Test Started: 10/06/14 *P. promelas*
 Time Test Started: 1210 *P. promelas*
 Date Test Terminated: 10/13/14 *P. promelas*
 Time Test Terminated: 1210 *P. promelas*
 Laboratory Analyst: Kennon/Rosado-Berrios

Toxicity Test Performed: 7-day *Ceriodaphnia dubia* Survival and Reproduction
 Effluent Sampling Point: Walnut Ridge WWT Plant
 Date Test Started: 10/06/14 *C. dubia*
 Time Test Started: 1145 *C. dubia*
 Date Test Terminated: 10/13/14 *C. dubia*
 Time Test Terminated: 1331 *C. dubia*
 Laboratory Analyst: Griffin/Kilmer

I. Test Methods

A. Physical and Chemical Testing - APHA, Standard Methods for the Examination of Water and Wastewater; Vol. 21, 2005.

<u>Test</u>	<u>Method</u>
Alkalinity	2320B
Conductivity	2510B
Dissolved Oxygen (mg/L, DO)	4500-O-G
Hardness (mg/L CaCO ₃)	2340C
pH	4500-H ⁺ B
Temperature (°C)	2550B

B. Toxicity Testing – EPA 821/R-02/013: Short Term Methods for Estimating the Chronic Toxicity of Effluents to Freshwater Organisms

<u>Test</u>	<u>Method</u>
Fathead Minnow Survival and Growth	Section 11
Cladoceran Survival and Reproduction	Section 13

II. Test Organisms

- A. Name: *Pimephales promelas* (Fathead minnow)
 Source: Laboratory Culture
 Age: <24 hours
 Life Stage: Larval

- B. Name: *Ceriodaphnia dubia* (Cladoceran)
Source: Laboratory Culture
Age: <24 hours
Life Stage: Neonate

III. External Factors

A. Incubator

Temperature (°C)

Average: Average: 25.2

Range: 25.0 – 25.5

Light Cycle: 16 hours light/ 8 hours dark

Light Intensity: 100 footcandles

Control Water: Moderately Hard Synthetic Water (#924)

B. *Pimephales promelas*

Test Chambers: 250 ml storage dishes

Volume per Chamber: 200 ml

Number of Organisms per Chamber: 8

Number of Replicates per Concentration: 5

Acclimation: Laboratory control water was added to cultures until >50% of the culture water consisted of control water.

Food: Larval fish were fed 0.15ml of laboratory-cultured *Artemia* brine shrimp one hour prior to test setup and then 3X daily thereafter.

C. *Ceriodaphnia dubia*

Test Chambers: 30 ml Solo cups

Volume per Chamber: 15-20 ml

Number of Organisms per Chamber: 1

Number of Replicates per Concentration: 10

Acclimation: Laboratory control water was added to cultures until >50% of the culture water consisted of control water.

Food: Cladocera were fed *Selenastrum* (#ABS 082714 & 093014) and yeast/cereal/trout chow mix (#YCT 082614-6/7) one hour prior to test setup and once daily thereafter.

IV. Quality Assurance

A. Standard Toxicant: Sodium Chloride

B. Organism: *Pimephales promelas*

Date of Reference Toxicant Test

Start: 10/06/14

Terminated: 10/13/14

Time of Reference Toxicant Test

Start: 1205

Terminated: 1140

Laboratory Analyst: Kennon/Vogt

Dilution Water Used: Moderately Hard Synthetic Water #924

Results: Survival and Growth within control limits

Survival

Growth

LOEC: 4.22 g/L NaCl

LOEC: 5.63 g/L NaCl

EC50: 4.83 g/L NaCl

IC25: 4.55 g/L NaCl

C. Organism: *Ceriodaphnia dubia*

Date and time of Reference Toxicant Test

Start: 10/27/14

Terminated: 11/03/14

Time of Reference Toxicant Test

Start: 1010

Terminated: 0920

Laboratory Analyst: Kennon/Vogt

Dilution Water Used: Moderately Hard Synthetic Water #926

Results: Survival and Reproduction within control limits

SurvivalReproduction

LOEC: 2.60 g/L NaCl

LOEC: 0.89 g/L NaCl

EC50: 1.87 g/L NaCl

IC25: 0.91 g/L NaCl

V. Physical and Chemical Data - See Attached

VI. Survival and Growth Data - See Attached

VII. Statistical Methods - See Attached

SUMMARY REPORTING FORM

WET Testing

Fathead Minnow Larvae (*Pimephales promelas*) Survival and Growth

Permittee: Walnut Ridge WWT Plant

NPDES No.: AR0046566

		<u>Time</u>	<u>Date</u>		<u>Time</u>	<u>Date</u>
Composite 1:	Collected from	0900	10/05/14	to	0900	10/06/14
Composite 2:	Collected From	0900	10/07/14	to	0900	10/08/14
Composite 3:	Collected From	0900	10/09/14	to	0900	10/10/14

Test Initiated: 1210

Date: 10/06/14

Time Terminated: 1210

Date: 10/13/14

Dilution H₂O: MH 924

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Replicate Chambers					Mean % Survival			CV%
	A	B	C	D	E	24h	48h	7days	
Control	100	87.5	100	100	100	100	100	97.5	6.1
32	100	100	100	100	100	100	100	100	0.0
42	100	100	100	100	100	100	100	100	0.0
56	100	100	100	87.5	100	100	100	97.5	6.1
80	100	87.5	100	100	100	97.5	97.5	97.5	6.1
100	100	100	100	100	100	100	100	100	0.0

DATA TABLE FOR GROWTH

Effluent Conc %	Replicate Chambers (mg)					Mean Dry Weight (mg) CV%	
	A	B	C	D	E		
Control	0.4475	0.5871	0.6050	0.3525	0.4500	0.4884	21.7
32	0.4588	0.4675	0.5300	0.5325	0.5613	0.5100	8.8
42	0.5250	0.5600	0.6225	0.5637	0.6187	0.5780	7.2
56	0.5625	0.5300	0.6150	0.4986	0.5137	0.5440	8.5
80	0.4762	0.4943	0.5275	0.4338	0.5987	0.5061	12.2
100	0.4812	0.3425	0.4087	0.4625	0.4737	0.4337	13.5

Coefficient of Variation = Standard Deviation x 100/Mean

Fathead Minnow Larvae (*Pimephales promelas*) Survival and Growth

1. FISHER'S EXACT TEST:

Is the mean survival for the critical dilution (100%) at 7 days significantly different ($p=0.05$) than the control survival?

_____ Yes X No

2. DUNNETT'S PROCEDURE OR STEEL'S MANY-ONE RANK TEST AS APPROPRIATE:

Is the mean growth by *P. promelas* in the critical dilution (100%) significantly different ($p=0.05$) than the growth in control exposures?

_____ Yes X No

3. If the NOEC for survival is less than the critical dilution, enter [1], otherwise enter [0] for parameter #TGP6C: 0

4. If the NOEC for growth is less than the critical dilution, enter [1], otherwise enter [0] for parameter #TLP6C: 0

5. Report the NOEC value for survival, Parameter #TOP6C:
NOEC survival 100 % effluent

6. Report the NOEC value for growth, Parameter #TPP6C:
NOEC growth 100 % effluent

7. Report the % coefficient of variation (largest of critical and control dilutions), Parameter #TQP6C: CV % growth 21.7% (control)

Whole Effluent Lethality Values

1. Report the Whole Effluent Lethality values for the 30-Day average minimum, Parameter #22414:

Daily Average Minimum NOEC: 100%

2. Report the Whole Effluent Lethality values for the 7-day minimum, Parameter #22414:

7-Day Minimum NOEC: 100%

SUMMARY REPORTING FORM

WET Testing

Fathead Minnow Larvae (*Pimephales promelas*) Survival and Growth

Permittee: Walnut Ridge WWT Plant

Sample No. 1 Collected Ending Date: 10/06/14 Time: 0900

NPDES No.: AR0046566

Sample No. 2 Collected Ending Date: 10/08/14 Time: 0900

Contact: Jon Kopp

Sample No. 3 Collected Ending Date: 10/10/14 Time: 0900

Analyst: Kennon/Rosado-Berrios

Test Begin: Date: 10/06/14 Time: 1210 Test End: Date: 10/13/14 Time: 1210

Initial Water Chemistry for Chronic Tests

Project: Walnut Ridge – *P. promelas*/C. *dubia*

Test day		0	1	2	3	4	5	6
Date		10/6/2014	10/7/2014	10/8/2014	10/9/2014	10/10/2014	10/11/2014	10/12/2014
H ₂ O #		MH 924	MH 924	MH 924	MH 924	MH 924	MH 924	MH 924
Temp (°C)	Control	21.7	22.0	23.0	22.0	23.0	21.5	21.0
	32%	21.7	22.0	23.0	22.0	23.0	21.5	21.0
	42%	21.7	22.0	23.0	22.0	22.7	21.4	21.0
	56%	21.7	22.0	23.0	22.0	22.7	21.4	21.0
	80%	21.8	22.0	23.0	22.0	22.7	21.5	21.0
	100%	22.0	22.0	23.0	22.0	22.7	21.5	21.0
pH (Standard Units)	Control	8.09	8.22	8.09	8.15	8.26	7.77	8.05
	32%	8.15	8.16	8.00	8.12	7.92	7.88	8.12
	42%	8.13	8.17	7.98	8.11	7.91	7.86	8.12
	56%	8.10	8.16	7.95	8.09	7.89	7.83	8.09
	80%	8.16	8.01	8.02	8.03	7.86	7.72	7.92
	100%	8.09	7.89	8.02	7.97	7.99	7.64	7.79
DO (mg/L)	Control	9.1	9.2	9.1	9.0	8.7	8.9	8.8
	32%	9.1	9.0	9.1	8.9	8.5	8.4	8.6
	42%	9.0	9.0	9.0	8.9	8.6	8.3	8.4
	56%	8.9	9.0	9.0	8.9	8.6	8.4	8.3
	80%	8.9	9.0	9.0	8.9	8.7	8.3	8.3
	100%	8.8	9.0	9.0	8.9	8.6	8.4	8.4
Cond (μS/cm)	Control	331	333	333	334	334	334	333
	32%	425	422	437	427	435	435	436
	42%	453	452	457	459	469	466	467
	56%	495	494	503	502	508	512	513
	80%	568	566	575	576	593	588	593
	100%	627	626	636	637	658	654	658
Alk (mg/L)	Control	61		61		61		
	100%	102		114		104		
Hard (mg/L)	Control	90		90		90		
	100%	190		200		200		

SUMMARY REPORTING FORM

WET Testing

Fathead Minnow Larvae (*Pimephales promelas*) Survival and Growth

Permittee: Walnut Ridge WWT Plant

Sample No. 1 Collected Ending Date: 10/06/14 Time: 0900

NPDES No.: AR0046566

Sample No. 2 Collected Ending Date: 10/08/14 Time: 0900

Contact: Jon Kopp

Sample No. 3 Collected Ending Date: 10/10/14 Time: 0900

Analyst: Kennon/Rosado-Berrios

Test Begin: Date: 10/06/14 Time: 1210 Test End: Date: 10/13/14 Time: 1210

Final Water Chemistry for Chronic Tests								
Project: Walnut Ridge – <i>P. promelas</i>								
Test day		1	2	3	4	5	6	7
Date		10/7/2014	10/8/2014	10/9/2014	10/10/2014	10/11/2014	10/12/2014	10/13/2014
H ₂ O #		MH 924	MH 924	MH 924	MH 924	MH 924	MH 924	MH 924
Temp (°C)	Control	24.0	24.0	24.0	23.6	23.2	23.2	22.3
	32%	24.5	24.0	24.0	23.6	23.2	23.0	22.4
	42%	24.0	24.0	24.0	23.8	23.2	23.2	22.3
	56%	24.0	24.0	23.2	23.8	23.2	23.2	22.0
	80%	24.7	24.0	23.2	23.2	23.0	23.2	22.0
	100%	23.9	24.0	23.2	23.2	23.0	23.0	22.1
pH (Standard Units)	Control	7.75	7.48	7.53	7.50	7.55	7.33	7.78
	32%	7.83	7.71	7.61	7.59	7.70	7.49	7.80
	42%	7.89	7.73	7.77	7.63	7.74	7.50	7.81
	56%	7.84	7.78	7.90	7.58	7.73	7.58	7.84
	80%	7.92	7.87	7.75	7.66	7.81	7.63	7.89
	100%	7.93	7.92	7.83	7.68	7.84	7.66	7.94
DO (mg/L)	Control	7.4	6.5	6.2	5.6	6.8	7.1	7.2
	32%	7.4	6.4	5.9	5.4	6.8	6.6	6.8
	42%	7.4	6.5	6.3	5.4	7.1	6.7	6.6
	56%	7.4	6.3	6.8	5.4	6.7	6.4	6.5
	80%	7.2	6.3	6.0	5.1	6.5	6.4	6.5
	100%	7.2	6.4	5.8	5.5	6.5	6.4	6.4

SUMMARY REPORTING FORM
WET Testing
***Ceriodaphnia dubia* Survival and Reproduction**

Permittee: Walnut Ridge WWT Plant

NPDES No.: AR0046566

		<u>Time</u>	<u>Date</u>		<u>Time</u>	<u>Date</u>
Composite 1:	Collected from	0900	10/05/14	to	0900	10/06/14
Composite 2:	Collected From	0900	10/07/14	to	0900	10/08/14
Composite 3:	Collected From	0900	10/09/14	to	0900	10/10/14

Test Initiated: 1145

Date: 10/06/14

Time Terminated: 1331

Date: 10/13/14

Dilution H₂O: MH 924

PERCENT SURVIVAL

Percent Effluent

<u>Time of Reading</u>	<u>Control</u>	<u>32%</u>	<u>42%</u>	<u>56%</u>	<u>80%</u>	<u>100%</u>
24h	100	100	100	100	100	100
48h	100	100	100	100	90	100
7 day	90	80	90	100	80	80

NUMBER OF YOUNG/FEMALE @ 7 DAYS

Percent Effluent

<u>REP</u>	<u>0%</u>	<u>32%</u>	<u>42%</u>	<u>56%</u>	<u>80%</u>	<u>100%</u>
A	20	3	22	21	X/0	18
B	18	8	23	20	18	8
C	23	29	X/6	5	19	13
D	18	X/0	17	21	X/3	X/0
E	X/0	28	26	20	26	22
F	16	15	24	28	11	X/9
G	18	33	22	13	17	19
H	18	17	11	24	20	17
I	26	X/0	18	23	18	*0
J	27	13	23	9	9	29
Mean	20.4	18.3	20.7	18.4	17.3	18.0
CV%*	19.3	58.8	22.2	38.9	30.6	36.9

*Males

*Coefficient of Variation% = Standard Deviation x 100/Mean

***Ceriodaphnia dubia* Survival and Reproduction**

1. FISHER'S EXACT TEST:
Is the mean survival for the critical dilution (100%) at 7 days significantly different ($p=0.05$) than the control survival?
 Yes X No

2. DUNNETT'S PROCEDURE OR STEEL'S MANY-ONE RANK TEST AS APPROPRIATE:
Is the mean number of young produced per female by the critical dilution (100%) significantly different ($p=0.05$) than the control's number of young per female?
 Yes X No

3. If the NOEC for survival is less than the critical dilution, enter [1], otherwise enter [0] for parameter #TGP3B: 0

4. If the NOEC for reproduction is less than the critical dilution, enter [1], otherwise enter [0] for parameter #TLP3B: 0

5. Report the NOEC value for survival, Parameter #TOP3B:
NOEC survival 100 % effluent

6. Report the NOEC value for reproduction, Parameter #TPP3B:
NOEC reproduction 100 % effluent

7. Report the % coefficient of variation (largest of critical and control dilutions), Parameter #TQP3B:
CV % reproduction 36.9% (critical)

Whole Effluent Lethality Values for *Ceriodaphnia dubia*

1. Report the Whole Effluent Lethality values for the 30-Day average minimum, Parameter #22414:
Daily Average Minimum NOEC: 100%

2. Report the Whole Effluent Lethality values for the 7-day minimum, Parameter #22414:
7-Day Minimum NOEC: 100%

CHRONIC TOXICITY SUMMARY FORM
WET Testing *Ceriodaphnia dubia* (Cladoceran)
CHEMICAL PARAMETERS CHART

Permittee: Walnut Ridge WWT Plant

Sample No. 1 Collected Ending Date: 10/06/14 Time: 0900

NPDES No.: AR0046566

Sample No. 2 Collected Ending Date: 10/08/14 Time: 0900

Contact: Jon Kopp

Sample No. 3 Collected Ending Date: 10/10/14 Time: 0900

Analyst: Griffin/Kilmer

Test Begin: Date: 10/06/14 Time: 1145 Test End: Date: 10/13/14 Time: 1331

Initial Water Chemistry for Chronic Tests								
Project: Walnut Ridge – <i>P. promelas/C. dubia</i>								
Test day		0	1	2	3	4	5	6
Date		10/6/2014	10/7/2014	10/8/2014	10/9/2014	10/10/2014	10/11/2014	10/12/2014
H ₂ O #		MH 924	MH 924	MH 924	MH 924	MH 924	MH 924	MH 924
Temp (°C)	Control	21.7	22.0	23.0	22.0	23.0	21.5	21.0
	32%	21.7	22.0	23.0	22.0	23.0	21.5	21.0
	42%	21.7	22.0	23.0	22.0	22.7	21.4	21.0
	56%	21.7	22.0	23.0	22.0	22.7	21.4	21.0
	80%	21.8	22.0	23.0	22.0	22.7	21.5	21.0
	100%	22.0	22.0	23.0	22.0	22.7	21.5	21.0
pH (Standard Units)	Control	8.09	8.22	8.09	8.15	8.26	7.77	8.05
	32%	8.15	8.16	8.00	8.12	7.92	7.88	8.12
	42%	8.13	8.17	7.98	8.11	7.91	7.86	8.12
	56%	8.10	8.16	7.95	8.09	7.89	7.83	8.09
	80%	8.16	8.01	8.02	8.03	7.86	7.72	7.92
	100%	8.09	7.89	8.02	7.97	7.99	7.64	7.79
DO (mg/L)	Control	9.1	9.2	9.1	9.0	8.7	8.9	8.8
	32%	9.1	9.0	9.1	8.9	8.5	8.4	8.6
	42%	9.0	9.0	9.0	8.9	8.6	8.3	8.4
	56%	8.9	9.0	9.0	8.9	8.6	8.4	8.3
	80%	8.9	9.0	9.0	8.9	8.7	8.3	8.3
	100%	8.8	9.0	9.0	8.9	8.6	8.4	8.4
Cond (µS/cm)	Control	331	333	333	334	334	334	333
	32%	425	422	437	427	435	435	436
	42%	453	452	457	459	469	466	467
	56%	495	494	503	502	508	512	513
	80%	568	566	575	576	593	588	593
	100%	627	626	636	637	658	654	658
Alk (mg/L)	Control	61		61		61		
	100%	102		114		104		
Hard (mg/L)	Control	90		90		90		
	100%	190		200		200		

CHRONIC TOXICITY SUMMARY FORMWET Testing *Ceriodaphnia dubia* (Cladoceran)
CHEMICAL PARAMETERS CHART

Permittee: Walnut Ridge WWT Plant

Sample No. 1 Collected Ending Date: 10/06/14 Time: 0900

NPDES No.: AR0046566

Sample No. 2 Collected Ending Date: 10/08/14 Time: 0900

Contact: Jon Kopp

Sample No. 3 Collected Ending Date: 10/10/14 Time: 0900

Analyst: Griffin/Kilmer

Test Begin: Date: 10/06/14 Time: 1145 Test End: Date: 10/13/14 Time: 1331

Final Water Chemistry for Chronic Tests								
Project: Walnut Ridge - <i>C. dubia</i>								
Test day		1	2	3	4	5	6	7
Date:		10/7/2014	10/8/2014	10/9/2014	10/10/2014	10/11/2014	10/12/2014	10/13/2014
H ₂ O #		MH 924	MH 924	MH 924	MH 924	MH 924	MH 924	MH 924
Temp (°C)	Control	22.0	24.0	22.0	23.1	22.0	22.0	23.5
	32%	22.0	23.9	22.5	23.1	21.8	22.0	23.3
	42%	22.0	23.5	22.0	23.0	21.8	22.0	23.0
	56%	22.0	23.5	22.3	22.9	21.8	22.0	23.0
	80%	22.0	23.5	22.2	22.7	21.8	22.0	23.0
	100%	22.0	23.5	22.2	22.7	22.0	22.0	23.0
pH (Standard Units)	Control	8.30	8.29	8.29	8.26	7.87	7.89	8.17
	32%	8.46	8.65	8.51	8.54	8.01	7.97	8.25
	42%	8.43	8.60	8.46	8.55	8.06	8.03	8.36
	56%	8.47	8.65	8.46	8.58	8.08	7.98	8.42
	80%	8.46	8.62	8.48	8.56	8.09	8.04	8.45
	100%	8.51	8.65	8.53	8.64	8.13	8.29	8.44
DO (mg/L)	Control	9.2	8.2	9.3	8.7	8.7	8.2	8.3
	32%	9.1	9.5	9.0	8.9	8.5	8.4	8.2
	42%	9.1	9.6	9.2	9.0	8.5	8.5	8.2
	56%	9.1	9.6	9.1	9.0	8.5	8.4	8.3
	80%	9.1	9.6	9.1	9.0	8.4	8.3	8.2
	100%	9.1	9.6	9.1	8.9	8.4	8.4	8.2

Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 10/6/2014 12:10	Test ID: Oct-14	Sample ID: NPDES Permit #AR0046566
End Date: 10/13/2014 12:10	Lab ID: ASU ERF	Sample Type: EFF1-POTW
Sample Date: 10/05/2014	Protocol: EPAF 02	Test Species: PP-Pimephales promelas
Comments: 4th Quarter WET Testing		

Conc-%	1	2	3	4	5
D-Control	1.0000	0.8750	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
42	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	0.8750	1.0000
80	1.0000	0.8750	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000

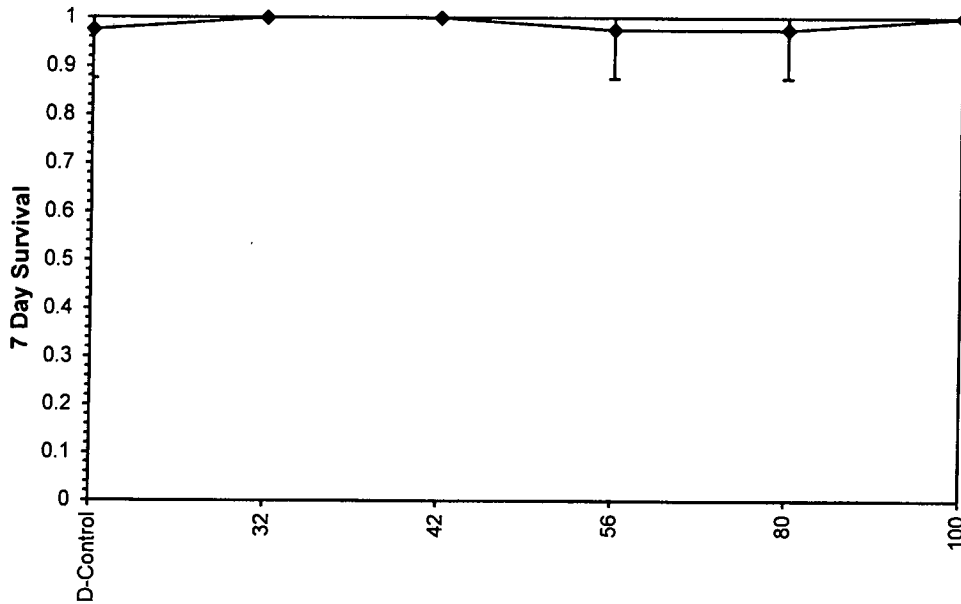
Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%				
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5			
32	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	
42	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	
56	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	16.00	
80	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	16.00	
100	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	

Auxiliary Tests

Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	Statistic	Critical	Skew	Kurt
Equality of variance cannot be confirmed	0.59678	0.9	-2.23464	4.3922

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Dose-Response Plot



Larval Fish Growth and Survival Test-7 Day Growth

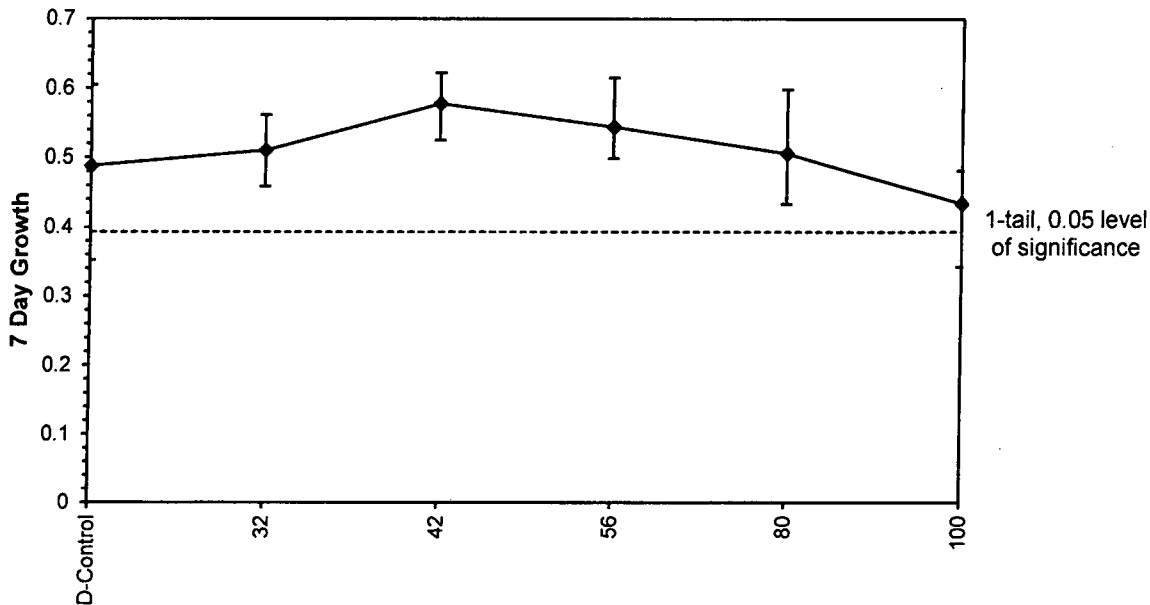
Start Date: 10/6/2014 12:10	Test ID: Oct-14	Sample ID: NPDES Permit #AR0046566
End Date: 10/13/2014 12:10	Lab ID: ASU ERF	Sample Type: EFF1-POTW
Sample Date: 10/05/2014	Protocol: EPAF 02	Test Species: PP-Pimephales promelas
Comments: 4th Quarter WET Testing		

Conc-%	1	2	3	4	5
D-Control	0.4475	0.5871	0.6050	0.3525	0.4500
32	0.4588	0.4675	0.5300	0.5325	0.5613
42	0.5250	0.5600	0.6225	0.5637	0.6187
56	0.5625	0.5300	0.6150	0.4986	0.5137
80	0.4762	0.4943	0.5275	0.4338	0.5987
100	0.4812	0.3425	0.4087	0.4625	0.4737

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed Critical	MSD
			Mean	Min	Max	CV%					
D-Control	0.4884	1.0000	0.4884	0.3525	0.6050	21.707	5				
32	0.5100	1.0442	0.5100	0.4588	0.5613	8.750	5	-0.535	2.360	0.0951	
42	0.5780	1.1834	0.5780	0.5250	0.6225	7.226	5	-2.223	2.360	0.0951	
56	0.5440	1.1137	0.5440	0.4986	0.6150	8.503	5	-1.378	2.360	0.0951	
80	0.5061	1.0362	0.5061	0.4338	0.5987	12.223	5	-0.439	2.360	0.0951	
100	0.4337	0.8881	0.4337	0.3425	0.4812	13.460	5	1.357	2.360	0.0951	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98121	0.9	-0.0174	-0.06962						
Bartlett's Test indicates equal variances (p = 0.40)	5.14501	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.09509	0.19468	0.01207	0.00406	0.0315	5, 24

Dose-Response Plot



CHRONIC TEST DATA SHEET
Pimephales promelas

Project: Walnut Ridge Beginning Date: 100614 Time: 1210 Test Species: P. promelas
Dilution H₂O: MH424 Ending Date: 101314 Time: 1210 Age: < 24 hrs.

Test Type: (*)Static Renewal () Flowthrough Toxicant/Effluent

Conc.	Rep	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Pan #
Control	1	8/0	8/0	8/0	8/0	8/0	8/0	8/0	1
	2	8/0	8/0	8/0	8/1	7/0	7/0	7/0	2
	3	8/0	8/0	8/0	8/0	8/0	8/0	8/0	3
	4	8/0	8/0	8/0	8/0	8/0	8/0	8/0	4
	5	8/0	8/0	8/0	8/0	8/0	8/0	8/0	5
32%	1	8/0	8/0	8/0	8/0	8/0	8/0	8/0	6
	2	8/0	8/0	8/0	8/0	8/0	8/0	8/0	7
	3	8/0	8/0	8/0	8/0	8/0	8/0	8/0	8
	4	8/0	8/0	8/0	8/0	8/0	8/0	8/0	9
	5	8/0	8/0	8/0	8/0	8/0	8/0	8/0	10
42%	1	8/0	8/0	8/0	8/0	8/0	8/0	8/0	11
	2	8/0	8/0	8/0	8/0	8/0	8/0	8/0	12
	3	8/0	8/0	8/0	8/0	8/0	8/0	8/0	13
	4	8/0	8/0	8/0	8/0	8/0	8/0	8/0	14
	5	8/0	8/0	8/0	8/0	8/0	8/0	8/0	15
56%	1	8/0	8/0	8/0	8/0	8/0	8/0	8/0	16
	2	8/0	8/0	8/0	8/0	8/0	8/0	8/0	17
	3	8/0	8/0	8/0	8/0	8/0	8/0	8/0	18
	4	8/0	8/0	8/0	8/0	8/0	8/0	8/0	19
	5	8/0	8/0	8/0	8/0	8/0	8/0	8/0	20
Date		100614 100614	100814	100914	101014	101114	101214	101314	
Initials		JRM	MK	MK	MK	MK	MK	WRB	

CHRONIC TEST DATA SHEET
Pimephales promelas

Project: Walnut Ridge Beginning Date: 100614 Time: 1210 Test Species: P.promelas
Dilution H₂O: MH924 Ending Date: 101314 Time: 1210 Age: < 24 hrs.

Test Type: (*)Static Renewal () Flowthrough Toxicant/Effluent: _____

Conc.	Rep	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Pan #
80%	1	8/0	8/0	8/0	8/0	8/0	8/0	8/0	21
	2	8/1	7/0	7/0	14 7/0	7/0	7/0	7/0	22
	3	8/0	8/0	8/0	8/0	8/0	8/0	8/0	23
	4	8/0	8/0	8/0	8/0	8/0	8/0	8/0	24
	5	8/0	8/0	8/0	8/0	8/0	8/0	8/0	25
100%	1	8/0	8/0	8/0	8/0	8/0	8/0	8/0	26
	2	8/0	8/0	8/0	8/0	8/0	8/0	8/0	27
	3	8/0	8/0	8/0	8/0	8/0	8/0	8/0	28
	4	8/0	8/0	8/0	8/0	8/0	8/0	8/0	29
	5	8/0	8/0	8/0	8/0	8/0	8/0	8/0	30
Date		100614	100814	100914	101014	101114	101214	101314	
Initials		JRM	MK	MK	MK	MP	MP	LRB	

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

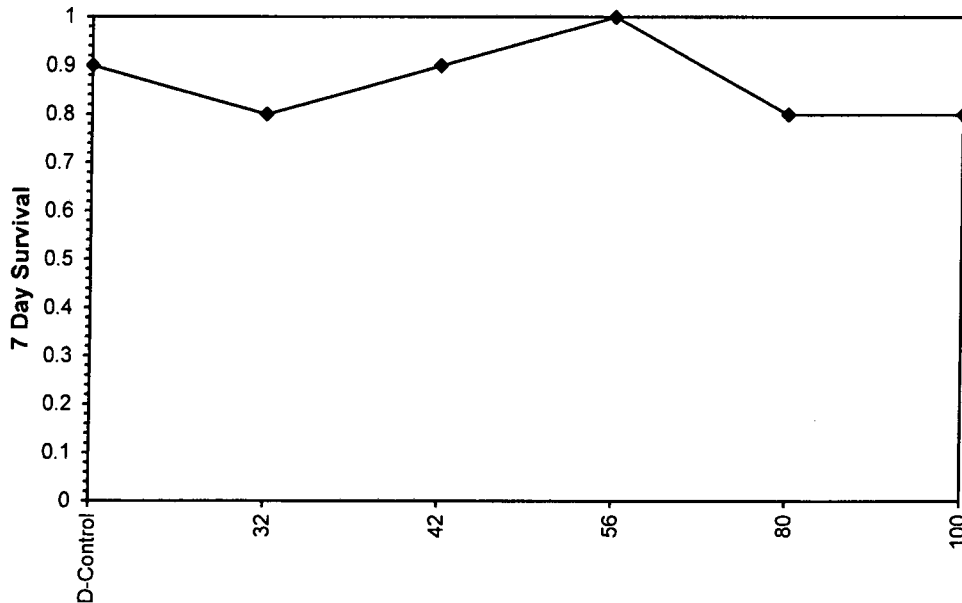
Start Date: 10/6/2014 11:45 Test ID: Oct-14 Sample ID: NPDES Permit #AR0046566
 End Date: 10/13/2014 13:31 Lab ID: Sample Type: EFF1-POTW
 Sample Date: 10/05/14 Protocol: EPAF 02-EPA Freshwater Test Species: CD-Ceriodaphnia dubia
 Comments: 4th Quarter WET Testing

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
42	1.0000	1.0000	0.0000	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
80	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
D-Control	0.9000	1.0000	1	9	10	10		
32	0.8000	0.8889	2	8	10	10	0.5000	0.0500
42	0.9000	1.0000	1	9	10	10	0.7632	0.0500
56	1.0000	1.1111	0	10	10	10	0.5000	0.0500
80	0.8000	0.8889	2	8	10	10	0.5000	0.0500
100	0.8000	0.8889	2	8	10	10	0.5000	0.0500

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	100	>100		1

Dose-Response Plot



Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 10/6/2014 11:45 Test ID: 4th Sample ID: NPDES Permit #AR0046566
 End Date: 10/13/2014 13:31 Lab ID: ASU ERF Sample Type: EFF1-POTW
 Sample Date: 10/05/2014 Protocol: EPAF 02-EPA Freshwater Test Species: CD-Ceriodaphnia dubia
 Comments: 4th Quarter WET Testing

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	20.000	18.000	23.000	18.000	16.000	18.000	18.000	26.000	27.000	
32	3.000	8.000	29.000	28.000	15.000	33.000	17.000	13.000		
42	22.000	23.000	17.000	26.000	24.000	22.000	11.000	18.000	23.000	
56	21.000	20.000	5.000	21.000	20.000	28.000	13.000	24.000	23.000	9.000
80	18.000	19.000	26.000	11.000	17.000	20.000	18.000	9.000		
100	18.000	8.000	13.000	22.000	19.000	17.000	29.000			

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed Critical	MSD
			Mean	Min	Max	CV%					
D-Control	20.444	1.0000	20.444	16.000	27.000	19.274	9				
32	18.250	0.8927	18.250	3.000	33.000	58.779	8	0.674	2.412	7.848	
42	20.667	1.0109	20.667	11.000	26.000	22.174	9	-0.070	2.412	7.614	
56	18.400	0.9000	18.400	5.000	28.000	38.871	10	0.665	2.412	7.421	
80	17.250	0.8438	17.250	9.000	26.000	30.636	8	0.982	2.412	7.848	
100	18.000	0.8804	18.000	8.000	29.000	36.851	7	0.724	2.412	8.140	

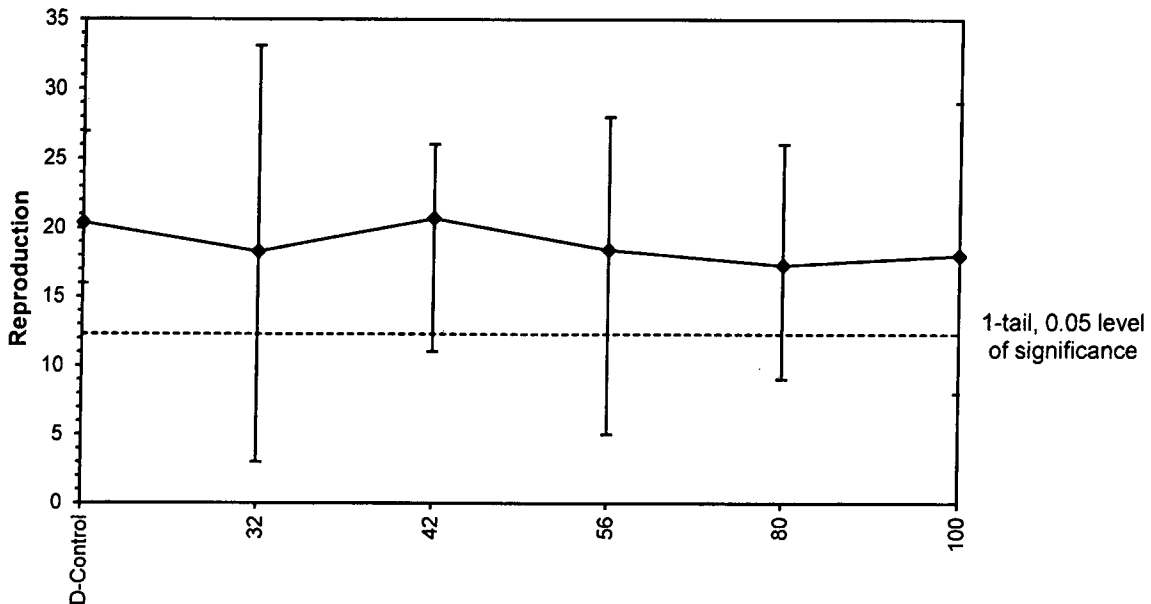
Auxiliary Tests

Kolmogorov D Test indicates normal distribution ($p > 0.01$) Statistic: 0.56291 Critical: 1.035 Skew: -0.15326 Kurt: 0.10179
 Bartlett's Test indicates equal variances ($p = 0.08$) Statistic: 9.68219 Critical: 15.0863

Hypothesis Test (1-tail, 0.05)

	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test	100	>100		1	8.13957	0.39813	16.5775	44.836	0.86667	5, 45

Dose-Response Plot



CHRONIC TEST DATA SHEET
Ceriodaphnia dubia

Project: Walnut Ridge Beginning Date: 100614 Time: 1145 Test Species: C. dubia
Dilution H₂O: MH924 Ending Date: 101314 Time: 1331 Age: <24h

Test Type: (*)Static Renewal () Flowthrough Toxicant/Effluent: _____

Conc.	Rep	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Neonates
Control	1	0	0	0	0	0	6	14	20
	2				0	0	9	9	18
	3				2	0	9	12	23
	4				2	0	7	9	18
	5				0	X/0	→		X/0
	6				2	0	4	10	16
	7				1	0	8	9	18
	8				3	0	5	10	18
	9				5	0	8	13	26
	10	↓	↓	↓	4	0	9	14	27
32%	1	0	0	0	3	0	0	0	3
	2				0	0	0	8	8
	3				0	7	0	7	15
	4				X/0	—			X/0
	5				0	3	0	9	16
	6				0	1	0	8	6
	7				0	4	0	9	20
	8				0	2	0	5	10
	9				X/0	—			X/0
	10	↓	↓	0	0	0	5	8	13
Date		100714	100814	100914	101014	101114	101214	101314	
Initials		MG	MG	MG	MG	KK	KK	MG	

CHRONIC TEST DATA SHEET
Ceriodaphnia dubia

Project: Walnut Ridge Beginning Date: 100614 Time: 1145 Test Species: C. dubia
Dilution H₂O: MH924 Ending Date: 101314 Time: 1331 Age: <24h

Test Type: (*)Static Renewal () Flowthrough Toxicant/Effluent:

Conc.	Rep	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Neonates
42%	1	0	0	0	0	0	8	14	22
	2	↓	↓	↓	5	0	4	14	23
	3	↓	↓	↓	3	0	X/3	→	X/6
	4	↓	↓	↓	1	0	7	9	17
	5	↓	↓	↓	5	0	7	14	26
	6	↓	↓	↓	4	0	7	13	24
	7	↓	↓	↓	1	0	8	13	22
	8	↓	↓	↓	0	0	3	8	11
	9	↓	↓	↓	0	0	5	13	18
	10	↓	↓	↓	2	0	9	12	23
56%	1	0	0	0	3	0	7	11	21
	2	↓	↓	↓	2	0	7	11	20
	3	↓	↓	↓	0	0	1	4	5
	4	↓	↓	↓	4	0	3	14	21
	5	↓	↓	↓	2	0	6	12	20
	6	↓	↓	↓	6	0	8	14	28
	7	↓	↓	↓	0	0	0	13	13
	8	↓	↓	↓	4	0	9	11	24
	9	↓	↓	↓	0	0	11	12	23
	10	↓	↓	↓	0	0	0	9	9
Date		100714	100814	100914	101014	101114	101214	101314	
Initials		MG	MG	MG	MG	KK	KK	MG	

CHRONIC TEST DATA SHEET
Ceriodaphnia dubia

Project: Walnut Ridge Beginning Date: 100614 Time: 1145 Test Species: C. dubia
Dilution H₂O: MH924 Ending Date: 101314 Time: 1331 Age: <24h

Test Type: (*)Static Renewal () Flowthrough Toxicant/Effluent

Conc.	Rep	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Neonates
80%	1	0	X/0	—	—	—	—	—	X/0
	2	0	0	0	0	0	5	13	18
	3	0	0	0	3	0	6	10	19
	4	0	0	0	0	0	X/3	→	X/3
	5	0	0	0	4	0	8	14	26
	6	0	0	0	1	0	2	8	11
	7	0	0	0	0	0	6	11	17
	8	0	0	0	3	0	5	12	20
	9	0	0	0	4	0	4	10	18
	10	↓	↓	↓	4	0	0	5	9
100%	1	0	0	0	5	0	5	8	18
	2	0	0	0	0	0	2	6	8
	3	0	0	0	4	1	4	4	13
	4	0	0	0	0	X/0	→	→	X/0
	5	0	0	0	1	1	8	12	22
	6	0	0	0	0	0	X/9	→	X/9
	7	0	0	0	4	0	5	10	19
	8	0	0	0	2	0	4	11	17
	9	0	0	0	0	0	0	0	0
	10	↓	↓	↓	3	2	8	16	29
Date		100714	100814	100914	101014	101114	101214	101314	
Initials		MG	MG	MG	MG	KK	KK	MG	

Initial Water Chemistry for Chronic Tests
Project: Walnut Ridge - *C. dubia* / *P. promelas*

Test Day		0	1	2	3	4	5	6
Date:		10/06/14	10/07/14	10/08/14	10/09/14	10/10/14	10/11/14	10/12/14
H ₂ O Batch #:		MH924	MH924	MH924	MH924	MH924	MH924	MH924
Temp. (°C)	Control	21.7	22.0	23.0	22.0	23.0	21.5	21.0
	32%	21.7	22.0	23.0	22.0	23.0	21.5	21.0
	42%	21.7	22.0	23.0	22.0	22.7	21.4	21.0
	56%	21.7	22.0	23.0	22.0	22.7	21.4	21.0
	80%	21.8	22.0	23.0	22.0	22.7	21.5	21.0
	100%	22.0	22.0	23.0	22.0	22.7	21.5	21.0
pH	Control	8.09	8.22	8.09	8.15	8.26	7.77	8.05 <i>KK</i>
	32%	8.15	8.16	8.00	8.12	7.92	7.88	8.05 8.12 <i>KK</i>
	42%	8.13	8.17	7.98	8.11	7.91	7.86	8.12
	56%	8.10	8.16	7.95	8.09	7.89	7.83	8.02 8.09 <i>KK</i>
	80%	8.16	8.01	8.02	8.03	7.86	7.72	8.09 7.92 <i>KK</i>
	100%	8.09	7.89	8.02	7.97	7.99	7.64	7.79
DO (mg/L)	Control	9.1	9.2	9.1	9.0	8.7	8.9	8.8
	32%	9.1	9.0	9.1	8.9	8.5	8.4	8.6
	42%	9.0	9.0	9.0	8.9	8.6	8.3	8.4
	56%	8.9	9.0	9.0	8.9	8.6	8.4	8.3
	80%	8.9	9.0	9.0	8.9	8.7	8.3	8.3
	100%	8.8	9.0	9.0	8.9	8.6	8.4	8.4
Cond. (µS/cm)	Control	331	333	333	334	334	334	333
	32%	425	422	437	427	435	435	436
	42%	453	452	457	459	469	466	467
	56%	495	494	503	502	508	512	513
	80%	568	566	575	576	593	588	593
	100%	627	626	636	637	658	654	658
Alk. (mg/L)	Control	107		61		61		
	100%	107		114		104		
Hard. (mg/L)	Control	90		90		90		
	100%	190		200		200		
Initials		MG MK	MG	MG	MG/SV	KK	KK	

Final Water Chemistry for Chronic Tests
Project: Walnut Ridge - P. promelas

Test Day:		1	2	3	4	5	6	7
Date:		100714	100814	100914	101014	101114	101214	101314
H ₂ O Batch #:		MH924	MH924	MH924	MH924	MH924	MH924	MH924
Temp. (°C)	Control	24.0	24.0	24.0	23.5	23.7	23.7	22.3
	32%	24.5	24.0	24.0	23.5	23.7	23.0	22.4
	42%	24.0	24.0	24.0	23.8	23.7	23.7	22.3
	56%	24.0	24.0	23.7	23.8	23.7	23.7	22.0
	80%	24.1	24.0	23.7	23.7	23.0	23.7	22.0
	100%	23.9	24.0	23.7	23.7	23.0	23.0	22.1
pH	Control	7.75	7.48	7.53	7.50	7.55	7.33	7.78
	32%	7.83	7.71	7.61	7.59	7.70	7.49	7.80
	42%	7.89	7.73	7.77	7.63	7.74	7.50	7.81
	56%	7.84	7.78	7.90	7.58	7.73	7.58	7.84
	80%	7.92	7.87	7.75	7.66	7.81	7.63	7.89
	100%	7.93	7.92	7.83	7.68	7.84	7.66	7.94
DO (mg/L)	Control	7.4	6.5	6.8	5.6	6.8	7.1	7.2
	32%	7.4	6.4	5.9	5.4	6.8	6.6	6.8
	42%	7.4	6.5	6.3	5.4	7.1	6.7	6.6
	56%	7.4	6.3	6.8	5.4	6.7	6.4	6.5
	80%	7.2	6.3	6.0	5.1	6.5	6.4	6.5
	100%	7.2	6.4	5.8	5.5	6.5	6.4	6.4
Initials		RM	MG	MK	MK, NG	MK, KK	MK	LAB

100614
AF: 1520^{10/5}
BF: 0955^{10/6}

092514 T: 1, 2, 3, 4, 5, 7, 9, 10, 11, 12, 15, 23, 24
092614 T: 2, 4, 5, 16
092714 T: 3, 8, 9, 10, 12, 17, 18, ~~19, 20, 21~~²⁴, 22, 23
092814 T: 1, 3, 5, 6, 7, 8, 10, 12, 16, 17, 18, 19, 20, 21
092914 T: 3, 5, 6, 7, 8, 10, 11, 12, 15, 16, 18, 19, 20, 22, 24
093014 T: 1, 2, 4, 7, 11, 14, 24

CARB

Final Water Chemistry for Chronic Tests
Project: Walnut Ridge - *C. dubia*

Test Day:		1	2	3	4	5	6	7
Date:		10/7/14	10/8/14	10/9/14	10/10/14	10/11/14	10/12/14	10/13/14
H ₂ O Batch #:		MH924	MH924	MH924	MH924	MH924	MH924	MH924
Temp. (°C)	Control	22.0	24.0	22.0	23.1	22.0	22.0	23.5
	32%	22.0	23.9	22.5	23.1	21.8	22.0	23.3
	42%	22.0	23.5	22.0	23.0	21.8	22.0	23.0
	56%	22.0	23.5	22.3	22.9	21.8	22.0	23.0
	80%	22.0	23.5	22.2	22.7	21.8	22.0	23.0
	100%	22.0	23.5	22.2	22.7	22.0	22.0	23.0
pH	Control	8.30	8.29	8.29	8.26	7.87	7.89	8.17
	32%	8.40	8.65	8.51	8.54	8.01	7.97	8.25
	42%	8.43	8.60	8.46	8.55	8.06	8.03	8.36
	56%	8.47	8.65	8.46	8.58	8.08	7.98	8.42
	80%	8.46	8.62	8.48	8.56	8.09	8.04	8.45
	100%	8.51	8.65	8.53	8.64	8.13	8.29	8.44
DO (mg/L)	Control	9.2	8.2	9.3	8.7	8.7	8.2	8.3
	32%	9.1	9.5	9.0	8.9	8.5	8.4	8.2
	42%	9.1	9.6	9.2	9.0	8.5	8.5	8.2
	56%	9.1	9.6	9.1	9.0	8.5	8.4	8.3
	80%	9.1	9.6	9.1	9.0	8.4	8.3	8.2
	100%	9.1	9.0	9.1	8.9	8.4	8.4	8.2
Initials		MG	MG	MG	MG	KK	KK MK	MG



Ecotoxicology Research Facility

SAMPLE CHECK IN

Sample ID Number: WR#1

Fill out this information with each effluent or river water sample coming in for testing. Keep completed sheets with test data and file with the lab QA/QC officer.

Date: 100614 Sampling Date: 10/5-6/14 Arrival Time: 1000

Field Identification Number: _____ Description: Effluent

Shipped by: Federal Express _____ UPS _____ Hand delivered by: WR personnel

Drop-Off Location: ASU-ERF

Storage While Shipped: cooler w/ice

Analysis Requested: ethenic (dielva + promelas)

Initial Water Chemistry Analysis:

Sample Received by: MG

Temperature (°C): 2.0

Ice Present upon delivery: YES NO

Date: 100614

Quality Assurance	Initial	Date	Yes	No
Chain of Custody	<u>MG</u>	<u>100614</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Refrigerated at 4°C	<u>↓</u>	<u>↓</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Field Record Received	<u>↓</u>	<u>↓</u>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Label Affixed Properly	<u>↓</u>	<u>↓</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Project Leader Informed	<u>↓</u>	<u>↓</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Comments: _____



Ecotoxicology Research Facility

SAMPLE CHECK IN

Sample ID Number: WR#2

Fill out this information with each effluent or river water sample coming in for testing. Keep completed sheets with test data and file with the lab QA/QC officer.

Date: 100814 Sampling Date: 10/7-8/14 Arrival Time: 1005
 Field Identification Number: _____ Description: effluent

Shipped by: Federal Express _____ UPS _____ Hand delivered by: WR personnel

Drop-Off Location: ASU-ERF

Storage While Shipped: cooler w/ ice

Analysis Requested: chronic Adultra + Ppromelas

Initial Water Chemistry Analysis:

Sample Received by: MG

Temperature (°C): 2.5 Ice Present upon delivery: YES NO

Date: 100814

Quality Assurance	Initial	Date	Yes	No
Chain of Custody	<u>MG</u>	<u>100814</u>	<input checked="" type="checkbox"/>	
Refrigerated at 4°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Field Record Received				<input checked="" type="checkbox"/>
Sample Label Affixed Properly	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Project Leader Informed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Comments: _____



Ecotoxicology Research Facility

SAMPLE CHECK IN

Sample ID Number: WR#13

Fill out this information with each effluent or river water sample coming in for testing. Keep completed sheets with test data and file with the lab QA/QC officer.

Date: 10/10/14 Sampling Date: 10/9-10/14 Arrival Time: 1030

Field Identification Number: _____ Description: effluent

Shipped by: Federal Express _____ UPS _____ Hand delivered by: WR personnel

Drop-Off Location: ASU-ERF

Storage While Shipped: cooling office

Analysis Requested: chronic Odebra + Ppamelaz

Initial Water Chemistry Analysis:

Sample Received by: MG

Temperature (°C): 1.5 Ice Present upon delivery: YES NO

Date: 10/10/14

Quality Assurance	Initial	Date	Yes	No
Chain of Custody	<u>MG</u>	<u>10/10/14</u>	<input checked="" type="checkbox"/>	
Refrigerated at 4°C	↓	↓	<input checked="" type="checkbox"/>	
Field Record Received				<input checked="" type="checkbox"/>
Sample Label Affixed Properly	↓	↓	<input checked="" type="checkbox"/>	
Project Leader Informed	↓	↓	<input checked="" type="checkbox"/>	

Comments: _____



Ecotoxicology Research Facility

Ecotoxicology Research Facility

Arkansas State University
2645 Caddo Drive
State University, AR 72467
(870) 972-2570 Fax (870) 972-2577

CHAIN OF CUSTODY RECORD



Client Name		Phone: (870) 886-2312		Analyses (List Below)											
Walnut Ridge Wastewater Treatment		Fax:													
Project #		PO #:		<table border="1"> <tr> <td>Chronic C. dubia</td> <td>Chronic P. promelas</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>				Chronic C. dubia	Chronic P. promelas						
Chronic C. dubia	Chronic P. promelas														
Sampler (sign)		Remarks:													
		Contact: Jonathan Kopp													
Cont.#	Sample ID Number	Location	Sample Date	Sample Time	Sample Type		Matrix								
					Comp	Grab	Aqueous	Soil	Other						
1		est 001	10-5-14	9A.m							✓	✓			
			10-6-14	9A.m.											
Ice present at delivery:		✓ Yes ___ No													
Temp:		20 °C		Initials											
1. Relinquished By (sign)		Date	Time	1. Received By (sign)		Date	Time								
		10-6-14	10:00 AM			10/6/14	-1000								
2. Relinquished By (sign)		Date	Time	2. Received By (sign)		Date	Time								



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CHAIN OF CUSTODY RECORD



Client Name		Phone: (870) 886-2312		Analyses (List Below)																
Walnut Ridge Wastewater Treatment		Fax:																		
Project #		PO #:																		
Sampler (sign)		Remarks:		<table border="1"> <tr> <td>Chronic C. dubia</td> <td>Chronic P. promelas</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					Chronic C. dubia	Chronic P. promelas										
Chronic C. dubia	Chronic P. promelas																			
Contact: Jonathan Kopp																				
Cont.#	Sample ID Number	Location	Sample Date	Sample Time	Sample Type		Matrix													
					Comp	Grab	Aqueous	Soil	Other											
1		EFF 001	10-7-14	9 A.m.																
			10-8-14	9 A.m.						✓										
										✓										
Ice present at delivery:		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																		
Temp:		2.5 °C		Initials																
1. Relinquished By (sign)		Date	Time	1. Received By (sign)		Date	Time													
<i>[Signature]</i>		10-8-14	10:05 AM	<i>[Signature]</i>		10/08/14	10:05													
2. Relinquished By (sign)		Date	Time	2. Received By (sign)		Date	Time													



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CHAIN OF CUSTODY RECORD



Client Name Walnut Ridge Wastewater Treatment		Phone: (870) 886-2312		Fax:		Analyses (List Below)							
Project #		PO #:		Remarks:						Chronic C. dubia	Chronic P. promelas		
Sampler (sign) <i>[Signature]</i>		Contact: Jonathan Kopp											
Cont. #	Sample ID Number	Location	Sample Date	Sample Time	Sample Type		Matrix						
					Comp	Grab	Aqueous	Soil	Other				
1		9H001	10-9-14	9A.M									
			10-10-14	9A.M									
Ice present at delivery:		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No											
Temp:		1.5C		Initials									
1. Relinquished By (sign) <i>[Signature]</i>		Date 10-10-14		Time		1. Received By (sign) <i>[Signature]</i>		Date 10/10/14		Time 1030			
2. Relinquished By (sign)		Date		Time		2. Received By (sign)		Date		Time			

earthsmart

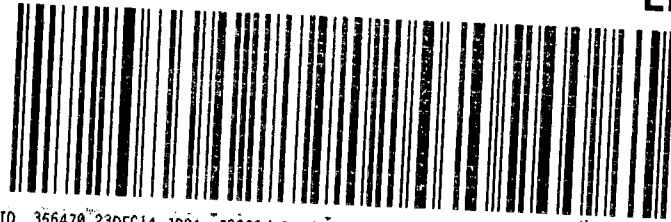
FedEx carbon-neutral envelope shipping

FedEx TRK# 8064 6216 9656

WED - 24 DEC 10:30A PRIORITY OVERNIGHT

72118 AR-US LIT

X2 LITA



FID 356470 23DEC14 JBRA 522C2/DC75/65DD

RT CLSD 10:30 9656 12:26

Package Airbill FedEx Tracking Number 8064 6216 9656

Form ID No. 0200

Recipient's Copy

1 From Date 12/23/12

Sender's Name City Wake Works Company - c/o Coin Postal

Address 112 W Elm St City Walnut Ridge State AR ZIP 72474

2 Your Internal Billing Reference

3 To Recipient's Name ADEQ

Company NPDES Enforcement

Address 5301 Northshore Drive

Address North Little Rock State AR ZIP 72118

4 Express Package Service Packages up to 150 lbs. NOTE: Service order has changed. Please select carefully.

Next Business Day 2 or 3 Business Days FedEx First Overnight, FedEx Priority Overnight, FedEx Standard Overnight, FedEx 2Day A.M., FedEx 2Day, FedEx Express Saver

5 Packaging *Declared value limit \$500. FedEx Envelope, FedEx Pak, FedEx Box, FedEx Tube, Other

6 Special Handling and Delivery Signature Options SATURDAY Delivery, No Signature Required, Direct Signature, Indirect Signature

Does this shipment contain dangerous goods? One box must be checked. No, Yes, Dry Ice, Cargo Aircraft Only

7 Payment Bill to: Sender, Recipient, Third Party, Credit Card, Cash/Check



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