ADEQ

ARKANSAS
Department of Environmental Quality

Memorandu

TO: Melanie Foster, Enforcement Manager, Hazardous Waste

THROUGH: Mo Shafii, NPDES Permits, Water Division

FROM: Sarah Clem, Water Quality Planning Section, Water Division

DATE: June 21, 2005

SUBJECT: Cedar Chemical Toxicity Testing Reduction
NPDES Permit: AR0036412

A review of toxicity test results from the last four consecutive tests has been completed. These data for *Pimephales promelas* (*P. promelas*) and *Daphnia pulex* (*D. pulex*), indicate no lethal effects at the critical dilution.

In accordance with the permit, the Water Division has determined that toxicity testing shall be performed annually for *D. pulex* and *P. promelas*.

The results of the second quarter toxicity tests for both organisms satisfies the annual testing requirements for 2005. However, if new information becomes available which indicates toxicity, additional testing may be required. The frequency and duration of any additional testing will be determined at that time. The next analyses for *D. pulex* and *P. promelas* shall be completed between January 1, 2006 and December 31, 2006.

cc: Steve Drown, Assistant Chief, Water Division
Dick Cassat, Chief, Environmental Preservation & Tech. Services
Mike Bates, Chief, Hazardous Waste Division

FIN # 54-00068 PERMIT NO.
MEDIA: HAZARDOUS SUPERFUND, BROWNFIELDS
ENFORCEMENT, COMPLIANCE, PERMITTING
DATE: 6-23-05

Response

JUN 23 2005
37383

9545414

ADEQ

A R K A N S A S
Department of Environmental Quality

MEMO

DATE: **May 11, 2005**

TO: **Mo Shafii, Engineer Supervisor, NPDES Permits, Water Division**

THROUGH: **Steve Drown, Assistant Chief, Water Division** SD
Dick Cassat, Chief, Environ. Preservation & Tech. Services Division
Mike Bates, Chief, Hazardous Waste Division MB

FROM: **Melanie Foster, Enforcement Manager, TASB, Hazardous Waste Division** MF

RE: **Cedar Chemical Corporation Biomonitoring Frequency Reduction**

As you are aware, ADEQ has been discharging stormwater from Cedar's wastewater treatment system into the Mississippi River on an as-needed basis for the past year. Samples have been taken for acute biomonitoring in each quarter in which discharging has occurred. In April, ADEQ completed its fourth quarter of biomonitoring. All samples have achieved a "PASS" for both the *Daphnia pulex* and the Fathead minnow (copies of all results have been previously distributed). Therefore, per Cedar Chemical Corporation's NPDES Permit #AR0036412, I am requesting for a testing frequency reduction for biomonitoring. If granted, ADEQ will no longer test for either species during the discharge events except on an annual basis beginning in the third quarter of 2006. Please let me know as soon as possible if the reduced biomonitoring schedule is acceptable.

cc: Vivian Hare, 6EN-WC, USEPA Region 6, 1445 Ross Ave., Suite 1200, Dallas, TX 75202
Mary Leath, Chief Deputy Director, ADEQ
Becky Keogh, Deputy Director, ADEQ
Mark Waller, Attorney, Legal Division, ADEQ
Records, AFIN #54-00068

DICK-
PLEASE FORWARD TO STEVE IF YOU CONCUR.
ok
THANKS!
Melanie

STEVE-
PLEASE RETURN TO ME AFTER YOUR REVIEW SO I CAN FORWARD COPIES TO EVERYONE.
THANKS! Melanie

ADEQ

A R K A N S A S
Department of Environmental Quality

MEMORANDUM

DATE: **August 2, 2004**

TO: **Bob Hampton, Purchasing Officer, FD**

THROUGH: **Mike Bates, Chief, HWD**

FROM: **Melanie Foster, Enforcement Section Manager, TASB, HWD**

SUBJECT: **Cedar Purchase Request for Acute Biomonitoring**

Please find attached a Purchase Request for American Interplex, Inc. to do the analysis of the 48 Hr. Acute Biomonitoring at Cedar Chemical. American Interplex was selected because of their price ($150 per sample) and their location here in Little Rock. ADEQ Water Division and Technical Services Division personnel will be assisting in the collection of the samples and will be returning to Little Rock so delivery of the samples to the laboratory will easily be accomplished.

I also received a quote from Jennifer Bouldin with Arkansas State University in Jonesboro for $255 per organism for the same analysis. Norma James with Arkansas Analytical in Little Rock quoted me $200 per organism.

Please let me know if you have any questions.

August 12, 2004

Test Results of
Third Quarter
Acute 48-Hour
Biomonitoring Testing
for
Outfall 002
Cedar Chemical

Control No. 83392

Prepared for:

Ms. Melanie Foster
Arkansas Depepartment of Environmental Quality
Post Office Box 8913
Little Rock, AR 72219-8913

Received
AUG 19 2004
34100
Hazardous Waste

Prepared by:

American Interplex Corporation
8600 Kanis Road
Little Rock, AR 72204-2322

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

August 12, 2004

Arkansas Department of Environmental Quality
ATTN: Ms. Melanie Foster
Post Office Box 8913
Little Rock, AR 72219-8913

Re: Acute Biomonitoring, *Pimephales promelas* and *Daphnia pulex*
Outfall 002 - Cedar Chemical
American Interplex Corporation Control No. 83392
P.O. No. 4500375525

Dear Ms. Melanie Foster:

Please find attached the report for acute Biomonitoring for samples submitted to American Interplex Corporation on August 10, 2004. Acute 48-Hour Static Renewal Biomonitoring Tests using *Pimephales promelas* and *Daphnia pulex* were conducted. Test results are summarized below:

Acute Fathead minnow Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Acute *Daphnia pulex* Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Sincerely,

AMERICAN INTERPLEX CORPORATION

John Overbey
Laboratory Director

JO/ss

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August 12, 2004
Control No. 83392

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AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

I. INTRODUCTION AND SUMMARY

Biomonitoring testing of 48-hour renewal definitive toxicity tests using *Daphnia pulex* and *Pimephales promelas* were performed.

The tests were initiated on August 10, 2004, and continued through August 12, 2004, in accordance with EPA-821-R-02-012. Statistical analyses were performed on the observed data.

The tests were conducted in temperature and light cycle controlled Equatherm environmental chambers. The test temperature was 20 degrees C +/- 1 degree for the *Daphnia pulex* and 25 degrees C +/- 1 degree for the *Pimephales promelas*.

II. CONTROL ACCEPTANCE CRITERIA

ORGANISM	CRITERIA	RESULTS	PASS/ FAIL
Daphnia pulex	Control Survival = or > 90%	100	Pass
Pimephales promelas	Control Survival = or > 90%	97.5	Pass

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

III. OUTLINED REPORT

A. Introduction

1.	Facility:	AR Department of Environ. Quality
2.	Test Requirements:	48-hour static renewal definitive toxicity test using *Daphnia pulex* and fathead minnows
3.	Sample Source:	Outfall 002
4.	Plant Location:	Little Rock, AR 72219
5.	Receiving Stream:	Mississippi River
6.	Contract Laboratory:	American Interplex Corporation 8600 Kanis Road Little Rock, AR 72204-2322 (501) 224-5060

B. Plant Operations: Information unavailable

C. Source of Effluent and Dilution Water

1. Effluent Samples

a. Sampling Point:	Outfall 002
b. Collection Dates: Sample 1:	 8/9-10/04
c. Sample Collection Method:	Composite
d. Flow at Time of Sampling:	Information unavailable

e. Chemical and Physical Data

Parameter	Sample 1
pH (standard units)	7.7
Dissolved Oxygen (mg/l)	8.4
Alkalinity (mg/l as CaCO3)	140
Hardness (mg/l as CaCO3)	46
Conductivity (umhos/cm)	350
Residual Chlorine (mg/l)	0.12

2. Dilution Water Sample: Synthetic Moderately Hard Water

a. Sampling Point: NA
b. Dates Prepared: 8/4/04
c. Sample Collection Method: NA
d. Flow at Time of Sampling: NA
e. Chemical and Physical Data:

Parameter	Sample 1
pH (standard units)	7.6
Dissolved Oxygen (mg/l)	8.0
Alkalinity (mg CaCO3/l)	61
Hardness (mg CaCO3/l)	93
Conductivity (umhos/cm)	350
Residual Chlorine (mg/l)	<0.05

D. Test Methods

1. Methods for Measuring the Acute Toxicity of Effluents to Freshwa Marine Organisms, (Fourth Ed.), EPA-821-R-02-012, 48-hour acu definitive test.

a. Endpoints:
Death; the criteria employed to establish death are:
i. No movement
ii. No reaction to gentle prodding

b. Deviations from method: Grab samples were composited.

	Pimephales promelas	*Daphnia pulex*
Type and Volume of Test Chamber	500 ml disposable beaker	30 ml disposable beaker
Volume of Sample	250 ml	25 ml
Organisms per chamber	8	8
Replicates per dilution	5	5
Test Temperature	25 deg. C	20 deg. C
Test Initiated	8/10/04 1545	8/10/04 1535
Test Terminated	8/12/04 1545	8/12/04 1535
Feeding	None required	None required
Age of Test Organisms	<24 hours	<24 hours

2. Chemical Methods Employed:

Methods for the Chemical Analysis of Water and Wastes, EPA/600/4-790-20.

Parameter	Method
pH (standard units)	EPA 150.1
Dissolved Oxygen (mg/l)	EPA 360.1
Alkalinity (mg/l as CaCO3)	EPA 310.1
Hardness (mg/l as CaCO3	EPA 200.7
Conductivity (umhos/cm)	EPA 120.1
Temperature (deg. C)	EPA 170.1
Residual Chlorine (mg/l)	EPA 330.5

E. Test Organisms

1. Scientific Name
Daphnia pulex
Pimephales promelas

2. Acclimation of test organisms:
Daphnia pulex:
Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Neonates are separated each morning, and are fed 0.1 ml YCT and 0.2 ml *Selenastrum capricornutum* prior to testing.
Pimephales promelas:
Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Larvae are separated each morning, and are fed 0.2 ml Artemia prior to testing.

F. Quality Assurance

1. Toxicity Tests
   a. Reference Toxicant: Sodium Chloride
   b. Date of test: 8/3-5/04
   c. Synthetic moderately hard dilution water used
   d. Results:

	LC50	Warning Limits
Daphnia pulex	2.67 g/l	2.03-3.11 g/l
Fathead minnow	8.16 g/l	6.43-9.49 g/l

2. Chemical and Physical Analyses

Parameter	% Recovery	Relative % Difference
Alkalinity	NA	0.65
Hardness	94.2	0.22
pH	100	0.14
Conductivity	99.9	0.28
Residual Chlorine	--	--

G. Statistical Analysis

1. Method used to calculate the LC50 (median lethal effluent concentration):
NA

2. To determine if a significant difference existed between sample and control, Steel's Many-One Rank Test was used.

IV. RESULTS SUMMARY - *DAPHNIA PULEX*

Daphnia pulex are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, and 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival 24 hours	48 hours
Control	100	100
0.001%	100	100
0.01%	100	100
0.1%	100	100
1.0%	100	100
10%	100	100

V. RESULTS SUMMARY - *PIMEPHALES PROMELAS*

Pimephales promelas are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, and 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival	
	24 hours	48 hours
Control	100	97.5
0.001%	100	100
0.01%	100	100
0.1%	100	100
1.0%	100	100
10%	100	100

Appendix A
Raw Data

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

Chemical Data for 48-hour Acute

Date and Time Test Initiated: 8/10/04 1434
Date and Time Terminated: 8/12/04 1545

Day 1 (0 hour)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	25.9	25.5	25.5	26.0	25.5	25.5
	2*	20.0	19.5	20.5	20.5	20.2	19.8
DO, mg/l	Initial	8.0	7.8	7.9	7.9	7.9	7.9
	Final 1*	7.8	7.5	7.5	7.5	7.5	7.4
	Final 2*	7.9	7.9	8.0	8.1	8.2	8.2
pH, su	Initial	7.6	7.7	7.7	7.8	7.8	7.8
	Final 1*	7.8	7.7	7.7	7.7	7.7	7.8
	Final 2*	7.7	7.7	7.8	7.8	7.8	7.8
Alkalinity, mg/l		61		61			
Hardness, mg/l		93		94			
Conductivity,umho/cm		350		340			
Residual Chlorine,mg/l		<0.05		<0.05			

Day 2 (24 hours)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	25.2	25.2	25.2	25.2	25.2	25.2
	2*	20.2	20.5	20.2	20.5	20.5	20.2
DO, mg/l	Initial	8.1	8.1	8.1	8.1	8.1	8.1
	Final 1*	7.8	7.7	7.7	7.6	7.4	7.1
	Final 2*	8.5	8.6	8.4	8.4	8.5	8.5
pH, su	Initial	7.7	7.7	7.8	7.8	7.8	7.8
	Final 1*	7.8	7.8	7.7	7.7	7.7	7.7
	Final 2*	7.7	7.7	7.7	7.7	7.7	7.8

*1 data from *Pimephales promelas* *2 data from *Daphnia pulex*

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

Daphnia pulex
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 30 ml

Age of organism: <24 hours
Volume of test solution: 25 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 83392 Daphnia pulex Survival
File: 83392DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0000
W = 0.0000

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 83392 Daphnia pulex Survival
File: 83392DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 83392 Daphnia pulex Survival
File: 83392DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	1.0000	1.3931
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	1.0000	1.3931
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 83392 Daphnia pulex Survival
File: 83392DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.3931	1.3931	1.3931
2	0.001%	5	1.3931	1.3931	1.3931
3	0.01%	5	1.3931	1.3931	1.3931
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.3931	1.3931	1.3931

Title: 83392 Daphnia pulex Survival
File: 83392DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0000	0.0000	0.0000	0.0000
2	0.001%	0.0000	0.0000	0.0000	0.0000
3	0.01%	0.0000	0.0000	0.0000	0.0000
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 83392 Daphnia pulex Survival
File: 83392DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3931				
2	0.001%	1.3931	27.50	16.00	5.00	
3	0.01%	1.3931	27.50	16.00	5.00	
4	0.1%	1.3931	27.50	16.00	5.00	
5	1.0%	1.3931	27.50	16.00	5.00	
6	10%	1.3931	27.50	16.00	5.00	

Critical values are 1 tailed (k = 5)

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

Pimephales promelas
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 500 ml

Age of Organism: <24 hours
Volume of test solution: 250 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	97.5	5.7	
	rep. B	8	8			
	rep. C	8	7			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 83392 Fathead Minnow Survival
File: 83392 .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0270
W = 0.4161

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 83392 Fathead Minnow Survival
File: 83392 .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 83392 Fathead Minnow Survival
File: 83392 .TXT Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	0.8750	1.2094
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	1.0000	1.3931
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 83392 Fathead Minnow Survival
File: 83392 .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.2094	1.3931	1.3564
2	0.001%	5	1.3931	1.3931	1.3931
3	0.01%	5	1.3931	1.3931	1.3931
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.3931	1.3931	1.3931

Title: 83392 Fathead Minnow Survival
File: 83392 .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0067	0.0821	0.0367	6.0556
2	0.001%	0.0000	0.0000	0.0000	0.0000
3	0.01%	0.0000	0.0000	0.0000	0.0000
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 83392 Fathead Minnow Survival
File: 83392 .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3564				
2	0.001%	1.3931	30.00	16.00	5.00	
3	0.01%	1.3931	30.00	16.00	5.00	
4	0.1%	1.3931	30.00	16.00	5.00	
5	1.0%	1.3931	30.00	16.00	5.00	
6	10%	1.3931	30.00	16.00	5.00	

Critical values are 1 tailed (k = 5)

Appendix B
Organism History

	Daphnia pulex	*Pimephales promelas*
Date:	8/10/04	8/10/04
Age:	<24 hours	<24 hours
Source:	In-house culture	In-house culture
Water Chemistry		
Alkalinity:	60-70 mg/l	60-70 mg/l
Hardness:	80-100 mg/l	80-100 mg/l
Temperature:	20 degrees C	25 degrees C

Appendix C
Completed Data Sheets for DEQ

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

Daphnia pulex

Permitee: Arkansas Depepartment of Environm NPDES NO.: AR0036412
Composite Collected From: 8/9/04 To: 8/10/04
From: To:
Test Initiated: 8/10/04 1535
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
Coeff. Of Var.		0.0	0.0	0.0	0.0	0.0	0.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% _____ Yes X No
   b) 1/2 Low Flow (NA): _____ Yes _____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0 (TEM3D)

3. NOEL Lethal Value: 10% (TOM3D)

4. Enter lowest value, coefficient of variation, for control or Low Flow: 0.0 (TQM3D)

5. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION
48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

CHEMICAL PARAMETERS CHART
Daphnia pulex

PERMITTEE: Arkansas Depepartment of Environmental Quality

NPDES NO.: AR0036412

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243, 249

SAMPLE COLLECTED: DATE: 8/9-10/04 TIME: 130, 1630, 2230, 0430
DATE: TIME:

TEST BEGIN: DATE: 8/10/04 TIME: 1535

TEST END: DATE: 8/12/04 TIME: 1535

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.0	8.1	8.5	20	20	20	61			93			7.6	7.7	7.7
0.001%	7.8	8.1	8.6	20	20	20							7.7	7.7	7.7
0.01%	7.9	8.1	8.4	20	20	20	61			94			7.7	7.8	7.7
0.1%	7.9	8.1	8.4	20	20	20							7.8	7.8	7.7
1.0%	7.9	8.1	8.5	20	20	20							7.8	7.8	7.7
10%	7.9	8.1	8.6	20	20	20							7.8	7.8	7.8

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

Pimephales promelas

Permittee: Arkansas Depepartment of Environm NPDES NO.: AR0036412
Composite Collected: From: 8/9/04 To: 8/10/04
From: To:
Test Initiated: 8/10/04 1545
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	87.5	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
Coeff. Of Var.		5.7	0.0	0.0	0.0	0.0	0.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% ____ Yes X No
   b) 1/2 Low Flow (NA): ____ Yes ____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0 (TEM6C)

3. NOEL Lethal Value: 10% (TOM6C)

4. Enter lowest value, coefficient of variation, for control or Low Flow: 0.0 (TQM6C)

5. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test

ADEQ 8/04 Outfall 002 AR0036412

August 12, 2004
Control No. 83392

CHEMICAL PARAMETERS CHART

Pimephales promelas

PERMITTEE: Arkansas Depepartment of Environmental Quality

NPDES NO.: AR0036412

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243, 249

SAMPLE COLLECTED: DATE: 8/9-10/04 TIME: 130, 1630, 2230, 0430
DATE: TIME:

TEST BEGIN: DATE: 8/10/04 TIME: 1545

TEST END: DATE: 8/12/04 TIME: 1545

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.0	8.1	7.8	25	25	25	61			93			7.6	7.7	7.8
0.001%	7.8	8.1	7.7	25	25	25							7.7	7.7	7.8
0.01%	7.9	8.1	7.7	25	25	25	61			94			7.7	7.8	7.7
0.1%	7.9	8.1	7.6	25	25	25							7.8	7.8	7.7
1.0%	7.9	8.1	7.4	25	25	25							7.8	7.8	7.7
10%	7.9	8.1	7.1	25	25	25							7.8	7.8	7.7

Appendix D
Chains of Custody

ADEQ
ARKANSAS
Department of Environmental Quality

COPY

83392

Function Code	Project Name	
	CEDAR CHEMICAL	AR0036412

Samplers: (Signature) Eric M. [illegible] / Gary L. Hill

Station Number	Date (YYMMDD)	Time (0000 hrs)	Station Description	Number of Containers	Parameters: Acute Biomonitoring						Remarks	Sample L Number / Laborato Use Onl
										preservation		
	04/08/10		OUTFALL 002	5	5					A	TALL BOTTLES	
											450 mls @ 1030	
											450 mls @ 1630	
											450 mls @ 2230	
											450 mls @ 0430	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Gary L. Hill	8/10/04	10:05	[illegible]	8/10/04	1005
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received for Lab by: (Signature)	8/10/04	[illegible]
[illegible]	8/10/04	[illegible]	[illegible]		

Remarks:

Preservatives

A – Cool, 4°C
B – H_2SO_4 to pH<2
C – HNO_3 to pH<2
D – NaOH to pH>12

November 15, 2004

Test Results of
Fourth Quarter
Acute 48-Hour
Biomonitoring Testing
for
Outfall 002
Cedar Chemical

Control No. 85576

Prepared for:

Ms. Melanie Foster
Arkansas Department of Env. Quality
Post Office Box 8913
Little Rock, AR 72219-8913

COPY

Prepared by:

American Interplex Corporation
8600 Kanis Road
Little Rock, AR 72204-2322

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

November 15, 2004

Arkansas Department of Environmental Quality
ATTN: Ms. Melanie Foster
Post Office Box 8913
Little Rock, AR 72219-8913

Re: Acute Biomonitoring, *Pimephales promelas* and *Daphnia pulex*
Outfall 002-Cedar Chemical
American Interplex Corporation Control No. 85567

Dear Ms. Foster:

Please find attached the report for acute Biomonitoring for a sample submitted to American Interplex Corporation on November 10, 2004. Acute 48-Hour Static In-House Renewal Biomonitoring Tests using *Pimephales promelas* and *Daphnia pulex* were conducted. Test results are summarized below:

Acute Fathead minnow Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Acute *Daphnia pulex* Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Sincerely,

AMERICAN INTERPLEX CORPORATION

John Overbey
Laboratory Director

JO/ed

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November 15, 2004
Control No. 85576

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AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412

November 15, 2004
Control No. 85576

I. INTRODUCTION AND SUMMARY

Biomonitoring testing of 48-hour renewal definitive toxicity tests using *Daphnia pulex* and *Pimephales promelas* were performed.

The tests were initiated on November 10, 2004. and continued through November 12, 2004, in accordance with EPA-821-R-02-012. Statistical analyses were performed on the observed data.

The tests were conducted in temperature and light cycle controlled Equatherm environmental chambers. The test temperature was 20 degrees C +/- 1 degree for the *Daphnia pulex* and 25 degrees C +/- 1 degree for the *Pimephales promelas*.

II. CONTROL ACCEPTANCE CRITERIA

ORGANISM	CRITERIA	RESULTS	PASS/ FAIL
Daphnia pulex	Control Survival = or > 90%	97.5	Pass
Pimephales promelas	Control Survival = or > 90%	100	Pass

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412

November 15, 2004
Control No. 85576

III. OUTLINED REPORT

A. Introduction

1.	Facility:	Arkansas Department of Env. Quality
2.	Test Requirements:	48-hour static renewal definitive toxicity test using *Daphnia pulex* and fathead minnows
3.	Sample Source:	Outfall 002
4.	Plant Location:	Little Rock, AR 72219-8913
5.	Receiving Stream:	Information unavailable
6.	Contract Laboratory:	American Interplex Corporation 8600 Kanis Road Little Rock, AR 72204-2322 (501) 224-5060

B. Plant Operations: Information unavailable

C. Source of Effluent and Dilution Water

1. Effluent Samples

a. Sampling Point:	Outfall 002
b. Collection Dates: Sample 1:	11/8-9/04
c. Sample Collection Method:	24-hour Composite
d. Flow at Time of Sampling:	Information unavailable

e. Chemical and Physical Data

Parameter	Sample 1
pH (standard units)	7.8
Dissolved Oxygen (mg/l)	8.7
Alkalinity (mg/l as CaCO3)	160
Hardness (mg/l as CaCO3)	47
Conductivity (umhos/cm)	510
Residual Chlorine (mg/l)	<0.05

2. Dilution Water Sample: Synthetic Moderately Hard Water

a. Sampling Point: NA
b. Dates Prepared: 11/8/04
c. Sample Collection Method: NA
d. Flow at Time of Sampling: NA
e. Chemical and Physical Data:

Parameter	Sample 1	Sample 2
pH (standard units)	7.6	7.7
Dissolved Oxygen (mg/l)	8.2	8.4
Alkalinity (mg CaCO3/l)	63	62
Hardness (mg CaCO3/l)	99	96
Conductivity (umhos/cm)	350	350
Residual Chlorine (mg/l)	<0.05	<0.05

D. Test Methods

1. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, (Fourth Ed.), EPA-821-R-02-012, 48-hour acute definitive test.

a. Endpoints:
Death; the criteria employed to establish death are:
i. No movement
ii. No reaction to gentle prodding

b. Deviations from method: None

	Pimephales promelas	*Daphnia pulex*
Type and Volume of Test Chamber	500 ml disposable beaker	30 ml disposable beaker
Volume of Sample	250 ml	25 ml
Organisms per chamber	8	8
Replicates per dilution	5	5
Test Temperature	25 deg. C	20 deg. C
Test Initiated	11/10/01 1435	11/10/01 1435
Test Terminated	11/12/01 1435	11/12/01 1435
Feeding	None required	None required
Age of Test Organisms	<24 hours	<24 hours

2. Chemical Methods Employed:

Methods for the Chemical Analysis of Water and Wastes, EPA/600/4-790-20.

Parameter	Method
pH (standard units)	EPA 150.1
Dissolved Oxygen (mg/l)	EPA 360.1
Alkalinity (mg/l as CaCO3)	EPA 310.1
Hardness (mg/l as CaCO3	EPA 200.7
Conductivity (umhos/cm)	EPA 120.1
Temperature (deg. C)	EPA 170.1
Residual Chlorine (mg/l)	EPA 330.5

E. Test Organisms

1. Scientific Name
Daphnia pulex
Pimephales promelas

2. Acclimation of test organisms:
   Daphnia pulex:
   Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Neonates are separated each morning, and are fed 0.1 ml YCT and 0.2 ml Selenastrum capricornutum prior to testing.
   Pimephales promelas:
   Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Larvae are separated each morning, and are fed 0.2 ml Artemia prior to testing.

F. Quality Assurance

1. Toxicity Tests
   a. Reference Toxicant: Sodium Chloride
   b. Date of test: 11/2-4/04
   c. Synthetic moderately hard dilution water used
   d. Results:

	LC50	Warning Limits
Daphnia pulex	2.47 g/l	2.05- 3.09 g/l
Fathead minnow	8.08 g/l	6.64- 9.38 g/l

2. Chemical and Physical Analyses

Parameter	% Recovery	Relative % Difference
Alkalinity	NA	0.68
Hardness	95.8	0.80
pH	102	0.27
Conductivity	98.4	0.59
Residual Chlorine	--	--

G. Statistical Analysis

1. Method used to calculate the LC50 (median lethal effluent concentration):
   NA

2. To determine if a significant difference existed between sample and control, Steel's Many-One Rank Test was used.

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412
November 15, 2004
Control No. 85576

IV. RESULTS SUMMARY - *DAPHNIA PULEX*

Daphnia pulex are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, a 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival 24 hours	48 hours
Control	97.5	97.5
0.001%	100	100
0.01%	100	97.5
0.1%	100	100
1.0%	100	100
10%	100	100

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412
November 15, 2004
Control No. 85576

V. RESULTS SUMMARY - *PIMEPHALES PROMELAS*

Pimephales promelas are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, a 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival	
	24 hours	48 hours
Control	100	100
0.001%	100	100
0.01%	100	100
0.1%	100	100
1.0%	100	100
10%	100	100

Appendix A
Raw Data

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412
November 15, 2004
Control No. 85576

Chemical Data for 48-hour Acute

Date and Time Test Initiated: 11/10/01 1327
Date and Time Terminated: 11/12/01 1435

Day 1 (0 hour)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	25.5	26.0	26.0	26.0	26.0	26.0
	2*	21.0	20.0	20.0	20.0	21.0	20.0
DO, mg/l	Initial	8.2	8.3	8.3	8.3	8.3	8.4
	Final 1*	7.7	7.9	7.9	7.9	7.9	7.7
	Final 2*	8.2	8.1	8.1	8.2	8.3	8.3
pH, su	Initial	7.6	7.6	7.7	7.7	7.7	7.8
	Final 1*	7.9	7.9	7.9	7.9	7.9	7.9
	Final 2*	7.8	7.8	7.8	7.8	7.8	7.9
Alkalinity, mg/l		63		62			
Hardness, mg/l		99		100			
Conductivity,umho/cm		350		350			
Residual Chlorine,mg/l		<0.05		<0.05			

Day 2 (24 hours)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	25.2	25.0	25.0	25.0	25.0	25.0
	2*	20.0	20.2	20.0	20.2	19.8	20.0
DO, mg/l	Initial	8.4	8.4	8.4	8.4	8.4	8.5
	Final 1*	8.5	8.5	8.5	8.4	8.2	7.8
	Final 2*	8.6	8.6	8.7	8.7	8.7	8.7
pH, su	Initial	7.7	7.8	7.9	7.9	7.9	7.9
	Final 1*	7.8	7.9	7.9	7.9	7.9	8.0
	Final 2*	7.6	7.6	7.6	7.6	7.6	7.7
Alkalinity, mg/l		62		62			
Hardness, mg/l		96		80			
Conductivity,umho/cm		350		350			
Residual Chlorine,mg/l		<0.05		<0.05			

*1 data from *Pimephales promelas* *2 data from *Daphnia pulex*

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412
November 15, 2004
Control No. 85576

Daphnia pulex
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 30 ml

Age of organism: <24 hours
Volume of test solution: 25 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	97.5	5.7	
	rep. B	8	8			
	rep. C	7	7			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	97.5	5.7	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	7			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 85576 Daphnia pulex Survival
File: 85576ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0540
W = 0.5466

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 85576 Daphnia pulex Survival
File: 85576ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 85576 Daphnia pulex Survival
File: 85576ds.txt Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	0.8750	1.2094
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	0.8750	1.2094
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 85576 Daphnia pulex Survival
File: 85576ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.2094	1.3931	1.3564
2	0.001%	5	1.3931	1.3931	1.3931
3	0.01%	5	1.2094	1.3931	1.3564
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.3931	1.3931	1.3931

Title: 85576 Daphnia pulex Survival
File: 85576ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0067	0.0821	0.0367	6.0556
2	0.001%	0.0000	0.0000	0.0000	0.0000
3	0.01%	0.0067	0.0821	0.0367	6.0556
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 85576 Daphnia pulex Survival
File: 85576ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3564				
2	0.001%	1.3931	30.00	16.00	5.00	
3	0.01%	1.3564	27.50	16.00	5.00	
4	0.1%	1.3931	30.00	16.00	5.00	
5	1.0%	1.3931	30.00	16.00	5.00	
6	10%	1.3931	30.00	16.00	5.00	

Critical values are 1 tailed (k = 5)

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412

November 15, 2004
Control No. 85576

Pimephales promelas
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 500 ml

Age of Organism: <24 hours
Volume of test solution: 250 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 85576 Fathead Minnow Survival
File: 85576fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0000
W = 0.0000

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 85576 Fathead Minnow Survival
File: 85576fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 85576 Fathead Minnow Survival
File: 85576fs.txt Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	1.0000	1.3931
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	1.0000	1.3931
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 85576 Fathead Minnow Survival
File: 85576fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.3931	1.3931	1.3931
2	0.001%	5	1.3931	1.3931	1.3931
3	0.01%	5	1.3931	1.3931	1.3931
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.3931	1.3931	1.3931

Title: 85576 Fathead Minnow Survival
File: 85576fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0000	0.0000	0.0000	0.0000
2	0.001%	0.0000	0.0000	0.0000	0.0000
3	0.01%	0.0000	0.0000	0.0000	0.0000
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 85576 Fathead Minnow Survival
File: 85576fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3931				
2	0.001%	1.3931	27.50	16.00	5.00	
3	0.01%	1.3931	27.50	16.00	5.00	
4	0.1%	1.3931	27.50	16.00	5.00	
5	1.0%	1.3931	27.50	16.00	5.00	
6	10%	1.3931	27.50	16.00	5.00	

Critical values are 1 tailed (k = 5)

Appendix B
Organism History

	Daphnia pulex	*Pimephales promelas*
Date:	11/10/01	11/10/01
Age:	<24 hours	<24 hours
Source:	In-house culture	In-house culture
Water Chemistry		
Alkalinity:	60-70 mg/l	60-70 mg/l
Hardness:	80-100 mg/l	80-100 mg/l
Temperature:	20 degrees C	25 degrees C

Appendix C
Completed Data Sheets for DEQ

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412

November 15, 2004
Control No. 85576

Daphnia pulex

Permitee: Arkansas Department of Env. Quality NPDES NO.: AR00036412
Composite Collected From: 11/8/04 0300 To: 11/9/04 0300
From: To:
Test Initiated: 11/10/01 1435
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	87.5	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	87.5	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	87.5	100	100	100

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% _____ Yes X No
   b) 1/2 Low Flow (NA): _____ Yes _____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0

3. Enter response to item 2 on the DMR Form, parameter #TEM3D.

4. NOEL Daphnia Pulex lethality: 10% #TOM3D

5. Coefficient of variation for Daphnia Pulex survival: 0.0 #TQM3D

6. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

C1

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test

Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412

November 15, 2004
Control No. 85576

CHEMICAL PARAMETERS CHART

Daphnia pulex

PERMITTEE: Arkansas Department of Env. Quality

NPDES NO.: AR00036412

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243, 249

SAMPLE COLLECTED: DATE: 11/8-9/04 TIME: 0300
DATE: TIME:

TEST BEGIN: DATE: 11/10/01 TIME: 1435

TEST END: DATE: 11/12/01 TIME: 1435

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.2	8.4	8.6	20	20	20	63	62		99	96		7.6	7.7	7.6
0.001%	8.3	8.4	8.6	20	20	20							7.6	7.8	7.6
0.01%	8.3	8.4	8.7	20	20	20							7.7	7.9	7.6
0.1%	8.3	8.4	8.7	20	20	20							7.7	7.9	7.6
1.0%	8.3	8.4	8.7	20	20	20	62	62		100	80		7.7	7.9	7.6
10%	8.4	8.5	8.7	20	20	20							7.8	7.9	7.7

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412

November 15, 2004
Control No. 85576

Pimephales promelas

Permittee: Arkansas Department of Env. Quality NPDES NO.: AR00036412
Composite Collected: From: 11/8/04 0300 To: 11/9/04 0300
From: To:
Test Initiated: 11/10/01 1435
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% ____ Yes X No
   b) 1/2 Low Flow (N/A): ____ Yes ____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0

3. Enter respose to item 2 on the DMR Form, parameter #TEM6C.

4. NOEL Pimephales promelas lethality: 10% #TOM6C

5. Coefficient of variation for Pimephales promelas survival: 0.0 #TQM6C

6. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION

48-Hour Static In-House Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 11/04 Outfall 002 AR0036412

November 15, 2004
Control No. 85576

CHEMICAL PARAMETERS CHART
Pimephales promelas

PERMITTEE: Arkansas Department of Env. Quality

NPDES NO.: AR00036412

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243, 249

SAMPLE COLLECTED: DATE: 11/8-9/04 TIME: 0300
DATE: TIME:

TEST BEGIN: DATE: 11/10/01 TIME: 1435

TEST END: DATE: 11/12/01 TIME: 1435

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.2	8.4	8.5	25	25	25	63	62		99	96		7.6	7.7	7.8
0.001%	8.3	8.4	8.5	25	25	25							7.6	7.8	7.9
0.01%	8.3	8.4	8.5	25	25	25							7.7	7.9	7.9
0.1%	8.3	8.4	8.4	25	25	25							7.7	7.9	7.9
1.0%	8.3	8.4	8.2	25	25	25	62	62		100	80		7.7	7.9	7.9
10%	8.4	8.5	7.8	25	25	25							7.8	7.9	8.0

Appendix D
Chain of Custody

To: American Interplan 85576

Arkansas Department of Environmental Quality
Technical Services Division
Chain of Custody Record

Function Code

Project Name: AR0036412 CEDAR CHEMICAL

Samplers: (Signature) Gary L. Hill

Station Number	Date (YYMMDD)	Time (HHMM)	Station Description	Number of Containers	Parameters: Acute Biomonitoring				Preservation Method (See codes below)	Sample Remarks	Sample Log Number (This column for Laboratory Use Only)
1	04/11/08		OUTFALL 002	5	5				A	ALL JUGS	
										450 mls @ 09:00	
										450 mls @ 15:00	
										450 mls @ 21:00	
										450 mls @ 03:00	
					P						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Gary Hill	11/9/04	14:00			
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received for Lab by: (Signature)	11/10/04	0815

Preservation method codes:
A - Cool to 4°C
B - H_2SO_4 to pH<2
C - HNO_3 to pH<2
D - NaOH to pH>12

Remarks:

January 7, 2005

Test Results of
First Quarter
Acute 48-Hour
Biomonitoring Testing
for
Outfall 002
Cedar Chemical

Control No. 86698

Prepared for:

Ms. Melanie Foster
ADEQ
49 Phillips Road 311
Helena, AR 72342

Prepared by:

American Interplex Corporation
8600 Kanis Road
Little Rock, AR 72204-2322

Received
JAN 10 2005
35169
Hazardous Waste

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

January 7, 2005

Arkansas Department of Environmental Quality
ATTN: Ms. Melanie Foster
Post Office Box 8913
Little Rock, AR 72219-8913

Re: Acute Biomonitoring, *Pimephales promelas* and *Daphnia pulex*
Outfall 002-Cedar Chemical
American Interplex Corporation Control No. 86698

Dear Ms. Foster:

Please find attached the report for acute Biomonitoring for samples submitted to American Interplex Corporation on January 5, 2005. Acute 48-Hour Static In-House Renewal Biomonitoring Tests using *Pimephales promelas* and *Daphnia pulex* were conducted. Test results are summarized below:

Acute Fathead minnow Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Acute *Daphnia pulex* Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Sincerely,

AMERICAN INTERPLEX CORPORATION

John Overbey
Laboratory Director

JO/ed

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January 7, 2005
Control No. 86698

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AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412

January 7, 2005
Control No. 86698

I. INTRODUCTION AND SUMMARY

Biomonitoring testing of 48-hour renewal definitive toxicity tests using *Daphnia pulex* and *Pimephales promelas* were performed.

The tests were initiated on January 5, 2005, and continued through January 7, 2005, in accordance with EPA-821-R-02-012. Statistical analyses were performed on the observed data.

The tests were conducted in temperature and light cycle controlled Equatherm environmental chambers. The test temperature was 20 degrees C +/- 1 degree for the *Daphnia pulex* and 25 degrees C +/- 1 degree for the *Pimephales promelas*.

II. CONTROL ACCEPTANCE CRITERIA

ORGANISM	CRITERIA	RESULTS	PASS/ FAIL
Daphnia pulex	Control Survival = or > 90%	97.5	Pass
Pimephales promelas	Control Survival = or > 90%	100	Pass

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412
January 7, 2005
Control No. 86698

III. OUTLINED REPORT

A. Introduction

1.	Facility:	ADEQ
2.	Test Requirements:	48-hour static renewal definitive toxicity test using *Daphnia pulex* and fathead minnows
3.	Sample Source:	Outfall 002
4.	Plant Location:	Little Rock, AR 72219
5.	Receiving Stream:	Mississippi River
6.	Contract Laboratory:	American Interplex Corporation 8600 Kanis Road Little Rock, AR 72204-2322 (501) 224-5060

B. Plant Operations: Information unavailable

C. Source of Effluent and Dilution Water

1. Effluent Samples

a. Sampling Point:	Outfall 002
b. Collection Dates:	
Sample 1:	1/3-4/05
Sample 2:	
c. Sample Collection Method:	24-hour Composite
d. Flow at Time of Sampling:	Information unavailable

e. Chemical and Physical Data

Parameter	Sample 1
pH (standard units)	8.3
Dissolved Oxygen (mg/l)	8.8
Alkalinity (mg/l as CaCO3)	120
Hardness (mg/l as CaCO3)	50
Conductivity (umhos/cm)	390
Residual Chlorine (mg/l)	<0.05

2. Dilution Water Sample: Synthetic Moderately Hard Water

a. Sampling Point: NA
b. Dates Prepared: 12/29/04, 1/3/05
c. Sample Collection Method: NA
d. Flow at Time of Sampling: NA
e. Chemical and Physical Data:

Parameter	Sample 1	Sample 2
pH (standard units)	7.4	7.5
Dissolved Oxygen (mg/l)	8.3	8.6
Alkalinity (mg CaCO3/l)	60	62
Hardness (mg CaCO3/l)	94	92
Conductivity (umhos/cm)	350	340
Residual Chlorine (mg/l)	<0.05	<0.05

D. Test Methods

1. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, (Fourth Ed.), EPA-821-R-02-012, 48-hour acute definitive test.

a. Endpoints:
Death; the criteria employed to establish death are:
i. No movement
ii. No reaction to gentle prodding

b. Deviations from method: Composite samples prior to use.

	Pimephales promelas	***Daphnia pulex***
Type and Volume of Test Chamber	500 ml disposable beaker	30 ml disposable beaker
Volume of Sample	250 ml	25 ml
Organisms per chamber	8	8
Replicates per dilution	5	5
Test Temperature	25 deg. C	20 deg. C
Test Initiated	1/5/05 1040	1/5/05 1045
Test Terminated	1/7/05 1040	1/7/05 1045
Feeding	None required	None required
Age of Test Organisms	1 day	<24 hours

2. Chemical Methods Employed:

Methods for the Chemical Analysis of Water and Wastes, EPA/600/4-790-20.

Parameter	**Method**
pH (standard units)	EPA 150.1
Dissolved Oxygen (mg/l)	EPA 360.1
Alkalinity (mg/l as CaCO3)	EPA 310.1
Hardness (mg/l as CaCO3	EPA 200.7
Conductivity (umhos/cm)	EPA 120.1
Temperature (deg. C)	EPA 170.1
Residual Chlorine (mg/l)	EPA 330.5

E. Test Organisms

1. Scientific Name
Daphnia pulex
Pimephales promelas

2. Acclimation of test organisms:
Daphnia pulex:
Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Neonates are separated each morning, and are fed 0.1 ml YCT and 0.2 ml *Selenastrum capricornutum* prior to testing.
Pimephales promelas:
Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Larvae are separated each morning, and are fed 0.2 ml Artemia prior to testing.

F. Quality Assurance

1. Toxicity Tests
   a. Reference Toxicant: Sodium Chloride
   b. Date of test: 1/4-6/05
   c. Synthetic moderately hard dilution water used
   d. Results:

	LC50	Warning Limits
Daphnia pulex	3.13 g/l	2.04- 3.16 g/l
Fathead minnow	8.18 g/l	6.74- 9.35 g/l

2. Chemical and Physical Analyses

Parameter	% Recovery	Relative % Difference
Alkalinity	NA	0.42
Hardness	105	1.51
pH	102	0.26
Conductivity	99.9	0.88
Residual Chlorine	--	--

G. Statistical Analysis

1. Method used to calculate the LC50 (median lethal effluent concentration):
NA

2. To determine if a significant difference existed between sample and control, Steel's Many-One Rank Test was used.

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412

January 7, 2005
Control No. 86698

IV. RESULTS SUMMARY - *DAPHNIA PULEX*

Daphnia pulex are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, and 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival 24 hours	48 hours
Control	100	97.5
0.001%	90.0	90.0
0.01%	95.0	95.0
0.1%	100	100
1.0%	100	100
10%	97.5	97.5

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412
January 7, 2005
Control No. 86698

V. RESULTS SUMMARY - *PIMEPHALES PROMELAS*

Pimephales promelas are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, and 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:
NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival 24 hours	48 hours
Control	100	100
0.001%	100	100
0.01%	100	100
0.1%	100	100
1.0%	100	100
10%	100	100

Appendix A
Raw Data

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412

January 7, 2005
Control No. 86698

Chemical Data for 48-hour Acute

Date and Time Test Initiated: 1/5/05 0949
Date and Time Terminated: 1/7/05 1045

Day 1 (0 hour)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	24.5	24.5	24.2	24.2	24.2	24.2
	2*	20.5	20.2	20.5	20.0	20.2	20.2
DO, mg/l	Initial	8.3	8.2	8.2	8.2	8.2	8.4
	Final 1*	8.0	8.1	8.1	8.3	8.3	8.3
	Final 2*	8.5	8.4	8.5	8.6	8.7	8.7
pH, su	Initial	7.4	7.5	7.5	7.7	7.7	7.8
	Final 1*	7.8	7.8	7.8	7.8	7.8	7.9
	Final 2*	7.8	7.8	7.8	7.8	7.8	7.8
Alkalinity, mg/l		60		59			
Hardness, mg/l		94		96			
Conductivity,umho/cm		350		330			
Residual Chlorine,mg/l		<0.05		<0.05			

Day 2 (24 hours)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	24.2	24.0	24.0	24.0	24.0	24.2
	2*	20.0	20.0	20.0	21.0	20.0	21.0
DO, mg/l	Initial	8.6	8.5	8.6	8.6	8.5	8.7
	Final 1*	8.0	8.0	8.0	8.0	7.9	7.6
	Final 2*	8.2	8.3	8.4	8.4	8.4	8.3
pH, su	Initial	7.5	7.7	7.8	7.8	7.8	7.9
	Final 1*	7.6	7.6	7.6	7.6	7.7	7.6
	Final 2*	7.8	7.8	7.8	7.8	7.8	7.8
Alkalinity, mg/l		62		61			
Hardness, mg/l		92		94			
Conductivity,umho/cm		340		350			
Residual Chlorine,mg/l		<0.05		<0.05			

*1 data from *Pimephales promelas* *2 data from *Daphnia pulex*

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412
January 7, 2005
Control No. 86698

Daphnia pulex
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 30 ml

Age of organism: <24 hours
Volume of test solution: 25 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	97.5	5.7	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	7			
	rep. E	8	8			
0.001%	rep. A	8	8	90.0	11.6	
	rep. B	8	8			
	rep. C	7	7			
	rep. D	7	7			
	rep. E	6	6			
0.01%	rep. A	8	8	95.0	7.2	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	7	7			
	rep. E	7	7			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	97.5	5.7	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	7	7			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 86698 Daphnia pulex Survival
File: 86698ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.1798
W = 0.8990

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 86698 Daphnia pulex Survival
File: 86698ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 86698 Daphnia pulex Survival
File: 86698ds.txt Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	1.0000	1.3931
1	Control	4	0.8750	1.2094
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	0.8750	1.2094
2	0.001%	4	0.8750	1.2094
2	0.001%	5	0.7500	1.0472
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	0.8750	1.2094
3	0.01%	5	0.8750	1.2094
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	0.8750	1.2094

Title: 86698 Daphnia pulex Survival
File: 86698ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.2094	1.3931	1.3564
2	0.001%	5	1.0472	1.3931	1.2504
3	0.01%	5	1.2094	1.3931	1.3196
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.2094	1.3931	1.3564

Title: 86698 Daphnia pulex Survival
File: 86698ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0067	0.0821	0.0367	6.0556
2	0.001%	0.0213	0.1461	0.0653	11.6830
3	0.01%	0.0101	0.1006	0.0450	7.6230
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0067	0.0821	0.0367	6.0556

Title: 86698 Daphnia pulex Survival
File: 86698ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3564				
2	0.001%	1.2504	22.00	16.00	5.00	
3	0.01%	1.3196	25.00	16.00	5.00	
4	0.1%	1.3931	30.00	16.00	5.00	
5	1.0%	1.3931	30.00	16.00	5.00	
6	10%	1.3564	27.50	16.00	5.00	

Critical values are 1 tailed (k = 5)

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412
January 7, 2005
Control No. 86698

Pimephales promelas
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 500 ml

Age of Organism: 1 day
Volume of test solution: 250 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 86698 Fathead Minnow Survival
File: 86698fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0000
W = 0.0000

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 86698 Fathead Minnow Survival
File: 86698fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 86698 Fathead Minnow Survival
File: 86698fs.txt Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	1.0000	1.3931
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	1.0000	1.3931
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 86698 Fathead Minnow Survival
File: 86698fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.3931	1.3931	1.3931
2	0.001%	5	1.3931	1.3931	1.3931
3	0.01%	5	1.3931	1.3931	1.3931
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.3931	1.3931	1.3931

Title: 86698 Fathead Minnow Survival
File: 86698fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0000	0.0000	0.0000	0.0000
2	0.001%	0.0000	0.0000	0.0000	0.0000
3	0.01%	0.0000	0.0000	0.0000	0.0000
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 86698 Fathead Minnow Survival
File: 86698fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3931				
2	0.001%	1.3931	27.50	16.00	5.00	
3	0.01%	1.3931	27.50	16.00	5.00	
4	0.1%	1.3931	27.50	16.00	5.00	
5	1.0%	1.3931	27.50	16.00	5.00	
6	10%	1.3931	27.50	16.00	5.00	

Critical values are 1 tailed (k = 5)

Appendix B
Organism History

	Daphnia pulex	*Pimephales promelas*
Date:	1/5/05	1/5/05
Age:	<24 hours	1 day
Source:	In-house culture	In-house culture
Water Chemistry		
Alkalinity:	60-70 mg/l	60-70 mg/l
Hardness:	80-100 mg/l	80-100 mg/l
Temperature:	20 degrees C	25 degrees C

Appendix C
Completed Data Sheets for DEQ

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412

January 7, 2005
Control No. 86698

Daphnia pulex

Permitee: ADEQ NPDES NO.: AR0036412
Composite Collected From: 1/3/05 To: 1/4/05
From: To:
Test Initiated: 1/5/05 1045
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	87.5	100	100	100	100
	D	100	87.5	87.5	100	100	100
	E	100	75	87.5	100	100	87.5
48 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	87.5	100	100	100	100
	D	87.5	87.5	87.5	100	100	100
	E	100	75	87.5	100	100	87.5
Coeff. Of Var.		5.7	11.6	7.2	0.0	0.0	5.7

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% ____ Yes X No
   b) 1/2 Low Flow (NA): ____ Yes ____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0 (TEM3D)

3. NOEL Lethal Value: 10% (TOM3D)

4. Enter lowest value, coefficient of variation, for control or Low Flow: 7.2 (TQM3D)

5. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test

Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412

January 7, 2005
Control No. 86698

CHEMICAL PARAMETERS CHART

Daphnia pulex

PERMITTEE: ADEQ

NPDES NO.: AR0036412

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243, 249

SAMPLE COLLECTED: DATE: 1/3-4/05 TIME: _____
DATE: _____ TIME: _____

TEST BEGIN: DATE: 1/5/05 TIME: 1045

TEST END: DATE: 1/7/05 TIME: 1045

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.3	8.6	8.2	20	20	20	60	62		94	92		7.4	7.5	7.8
0.001%	8.2	8.5	8.3	20	20	20							7.5	7.7	7.8
0.01%	8.2	8.6	8.4	20	20	20	59	61		96	94		7.5	7.8	7.8
0.1%	8.2	8.6	8.4	20	20	20							7.7	7.8	7.8
1.0%	8.2	8.5	8.4	20	20	20							7.7	7.8	7.8
10%	8.4	8.7	8.3	20	20	20							7.8	7.9	7.8

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412

January 7, 2005
Control No. 86698

Pimephales promelas

Permittee: ADEQ NPDES NO.: AR0036412
Composite Collected: From: 1/3/05 To: 1/4/05
From: To:
Test Initiated: 1/5/05 1040
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
Coeff. Of Var.		0.0	0.0	0.0	0.0	0.0	0.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% ____ Yes X No
   b) 1/2 Low Flow (NA): ____ Yes ____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0 (TEM6C)

3. NOEL Lethal Value: 10% (TOM6C)

4. Enter lowest value, coefficient of variation, for control or Low Flow: 0.0 (TQM6C)

5. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test

Arkansas Department of Environmental Quality 1/05 Outfall 002 AR0036412

January 7, 2005
Control No. 86698

CHEMICAL PARAMETERS CHART

Pimephales promelas

PERMITTEE: ADEQ

NPDES NO.: AR0036412

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243, 249

SAMPLE COLLECTED: DATE: 1/3-4/05 TIME: ____
DATE: ____ TIME: ____

TEST BEGIN: DATE: 1/5/05 TIME: 1040

TEST END: DATE: 1/7/05 TIME: 1040

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.3	8.6	8.0	25	25	25	60	62		94	92		7.4	7.5	7.6
0.001%	8.2	8.5	8.0	25	25	25							7.5	7.7	7.6
0.01%	8.2	8.6	8.0	25	25	25	59	61		96	94		7.5	7.8	7.6
0.1%	8.2	8.6	8.0	25	25	25							7.7	7.8	7.6
1.0%	8.2	8.5	7.9	25	25	25							7.7	7.8	7.7
10%	8.4	8.7	7.6	25	25	25							7.8	7.9	7.6

Appendix D
Chain of Custody

To: AMERICAN INTERPLEX

86698

Arkansas Department of Environmental Quality
Technical Services Division
Chain of Custody Record

Function Code	Project Name AR0036412 CEDAR CHEMICAL
Samplers: (Signature)	Gary L. Hill

Station Number	Date (YYMMDD)	Time (HHMM)	Station Description	Number of Containers	Parameters: ACUTE BIOMONITORING				Preservation Method (See codes below)	Sample Remarks	Sample Log Number (This column for Laboratory Use Only)
1	05/01/03		OUTFALL 002	5	5				A.	ALL JUGS	
										450 mls @ 08:40	
										450 mls @ 14:40	
										450 mls @ 20:40	
										450 mls @ 02:40	
					P						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Gary L. Hill	1/4/05				
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received for Lab by: (Signature) [signature]	1-5-05	8:15

Preservation method codes:
A - Cool to 4°C
B - H_2SO_4 to pH<2
C - HNO_3 to pH<2
D - NaOH to pH>12

Remarks:

Fed-X 1°C

April 15, 2005

Test Results of
Second Quarter
Acute 48-Hour
Biomonitoring Testing
for
Outfall 002

Control No. 89354

Prepared for:

Ms. Melanie Foster
Arkansas DEQ
Post Office Box 8913
Little Rock, AR 72219-8913

AFIN #: 54-00068 PERMIT NO. _____
MEDIA: HAZARDOUS, SUPERFUND, ENGINEERED,
ENFORCEMENT, COMPLIANCE, PERMITTING
DATE: _____

Prepared by:

American Interplex Corporation
8600 Kanis Road
Little Rock, AR 72204-2322

Received
APR 18 2005
36772
Hazardous Waste

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

April 15, 2005

Arkansas Department of Environmental Quality
ATTN: Ms. Melanie Foster
Post Office Box 8913
Little Rock, AR 72219-8913

Re: Acute Biomonitoring, *Pimephales promelas* and *Daphnia pulex*
AR0036412 Cedar Chemical Outfall 002
American Interplex Corporation Control No. 89354

Dear Ms. Foster:

Please find attached the report for acute Biomonitoring for samples submitted to American Interplex Corporation on April 13, 2005. Acute 48-Hour Static Renewal Biomonitoring Tests using *Pimephales promelas* and *Daphnia pulex* were conducted. Test results are summarized below:

Acute Fathead minnow Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Acute *Daphnia pulex* Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Sincerely,

AMERICAN INTERPLEX CORPORATION

John Overbey
Laboratory Director

JO/ss

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AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

I. INTRODUCTION AND SUMMARY

Biomonitoring testing of 48-hour renewal definitive toxicity tests using *Daphnia pulex* and *Pimephales promelas* were performed.

The tests were initiated on April 13, 2005, and continued through April 15, 2005, in accordance with EPA-821-R-02-012. Statistical analyses were performed on the observed data.

The tests were conducted in temperature and light cycle controlled Equatherm environmental chambers. The test temperature was 20 degrees C +/- 1 degree for the *Daphnia pulex* and 25 degrees C +/- 1 degree for the *Pimephales promelas*.

II. CONTROL ACCEPTANCE CRITERIA

ORGANISM	CRITERIA	RESULTS	PASS/ FAIL
Daphnia pulex	Control Survival = or > 90%	100	Pass
Pimephales promelas	Control Survival = or > 90%	97.5	Pass

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
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III. OUTLINED REPORT

A. Introduction

1.	Facility:	Arkansas DEQ
2.	Test Requirements:	48-hour static renewal definitive toxicity test using *Daphnia pulex* and fathead minnows
3.	Sample Source:	Outfall 002
4.	Plant Location:	Helena, AR
5.	Receiving Stream:	Mississippi River
6.	Contract Laboratory:	American Interplex Corporation 8600 Kanis Road Little Rock, AR 72204-2322 (501) 224-5060

B. Plant Operations: Information unavailable

C. Source of Effluent and Dilution Water

1. Effluent Samples

a. Sampling Point:	Outfall 002
b. Collection Dates: Sample 1:	 4/11-12/05
c. Sample Collection Method:	24-hour Composite
d. Flow at Time of Sampling:	Information unavailable

e. Chemical and Physical Data

Parameter	Sample 1
pH (standard units)	7.8
Dissolved Oxygen (mg/l)	10.6
Alkalinity (mg/l as CaCO3)	96
Hardness (mg/l as CaCO3)	37
Conductivity (umhos/cm)	330
Residual Chlorine (mg/l)	0.05

2. Dilution Water Sample: Synthetic Moderately Hard Water

a. Sampling Point: NA
b. Dates Prepared: 4/8/05
c. Sample Collection Method: NA
d. Flow at Time of Sampling: NA
e. Chemical and Physical Data:

Parameter	Sample 1
pH (standard units)	7.8
Dissolved Oxygen (mg/l)	8.5
Alkalinity (mg CaCO3/l)	63
Hardness (mg CaCO3/l)	89
Conductivity (umhos/cm)	340
Residual Chlorine (mg/l)	<0.05

D. Test Methods

1. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, (Fourth Ed.), EPA-821-R-02-012, 48-hour acute definitive test.

a. Endpoints:
Death; the criteria employed to establish death are:
i. No movement
ii. No reaction to gentle prodding

b. Deviations from method: None

	Pimephales promelas	*Daphnia pulex*
Type and Volume of Test Chamber	500 ml disposable beaker	30 ml disposable beaker
Volume of Sample	250 ml	25 ml
Organisms per chamber	8	8
Replicates per dilution	5	5
Test Temperature	25 deg. C	20 deg. C
Test Initiated	4/13/05 1155	4/13/05 1140
Test Terminated	4/15/05 1155	4/15/05 1140
Feeding	None required	None required
Age of Test Organisms	<24 hours	<24 hours

2. Chemical Methods Employed:

Methods for the Chemical Analysis of Water and Wastes, EPA/600/4-790-20.

Parameter	Method
pH (standard units)	EPA 150.1
Dissolved Oxygen (mg/l)	EPA 360.1
Alkalinity (mg/l as CaCO3)	EPA 310.1
Hardness (mg/l as CaCO3	EPA 200.7
Conductivity (umhos/cm)	EPA 120.1
Temperature (deg. C)	EPA 170.1
Residual Chlorine (mg/l)	EPA 330.5

E. Test Organisms

1. Scientific Name
Daphnia pulex
Pimephales promelas

2. Acclimation of test organisms:
   Daphnia pulex:
   Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Neonates are separated each morning, and are fed 0.1 ml YCT and 0.2 ml *Selenastrum capricornutum* prior to testing.
   Pimephales promelas:
   Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Larvae are separated each morning, and are fed 0.2 ml Artemia prior to testing.

F. Quality Assurance

1. Toxicity Tests
   a. Reference Toxicant: Sodium Chloride
   b. Date of test: 4/5-7/05
   c. Synthetic moderately hard dilution water used
   d. Results:

	LC50	Warning Limits
Daphnia pulex	2.57 g/l	2.06- 3.18 g/l
Fathead minnow	9.07 g/l	7.01- 9.24 g/l

2. Chemical and Physical Analyses

Parameter	% Recovery	Relative % Difference
Alkalinity	NA	2.23
Hardness	90.8	0.80
pH	102	0.13
Conductivity	102	0.00
Residual Chlorine	--	--

G. Statistical Analysis

1. Method used to calculate the LC50 (median lethal effluent concentration): NA

2. To determine if a significant difference existed between sample and control, Steel's Many-One Rank Test was used.

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

IV. RESULTS SUMMARY - *DAPHNIA PULEX*

Daphnia pulex are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, and 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival 24 hours	48 hours
Control	100	100
0.001%	100	100
0.01%	100	100
0.1%	100	100
1.0%	100	100
10%	100	100

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

V. RESULTS SUMMARY - *PIMEPHALES PROMELAS*

Pimephales promelas are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, and 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival 24 hours	48 hours
Control	97.5	97.5
0.001%	100	100
0.01%	100	100
0.1%	100	100
1.0%	100	97.5
10%	100	100

Appendix A
Raw Data

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

Chemical Data for 48-hour Acute

Date and Time Test Initiated: 4/13/05 1053
Date and Time Terminated: 4/15/05 1155

Day 1 (0 hour)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	24.0	24.0	24.0	24.0	24.0	24.0
	2*	21.0	21.0	19.5	19.8	20.0	20.0
DO, mg/l	Initial	8.5	8.5	8.6	8.7	8.7	8.8
	Final 1*	8.3	8.2	8.2	8.2	8.2	8.1
	Final 2*	7.8	7.9	8.0	8.1	8.1	8.2
pH, su	Initial	7.8	7.8	7.8	7.8	7.9	7.9
	Final 1*	7.8	7.9	7.9	7.9	7.9	7.9
	Final 2*	7.8	7.8	7.8	7.8	7.8	7.8
Alkalinity, mg/l		63		63			
Hardness, mg/l		89		88			
Conductivity,umho/cm		340		360			
Residual Chlorine,mg/l		<0.05		<0.05			

Day 2 (24 hours)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	24.0	24.0	24.0	24.0	24.0	24.0
	2*	19.5	19.5	20.8	20.0	20.5	20.0
DO, mg/l	Initial	8.4	8.5	8.5	8.5	8.6	8.6
	Final 1*	7.9	7.9	7.9	7.9	7.9	7.9
	Final 2*	8.5	8.5	8.5	8.5	8.5	8.5
pH, su	Initial	7.6	7.7	7.7	7.8	7.8	7.8
	Final 1*	7.6	7.6	7.6	7.6	7.6	7.6
	Final 2*	7.7	7.7	7.7	7.7	7.7	7.7
Alkalinity, mg/l							
Hardness, mg/l							
Conductivity,umho/cm							
Residual Chlorine,mg/l							

*1 data from *Pimephales promelas* *2 data from *Daphnia pulex*

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48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

Daphnia pulex
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 30 ml

Age of organism: <24 hours
Volume of test solution: 25 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 89354 Daphnia pulex Survival
File: 89354DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0000
W = 0.0000

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 89354 Daphnia pulex Survival
File: 89354DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 89354 Daphnia pulex Survival
File: 89354DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	1.0000	1.3931
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	1.0000	1.3931
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 89354 Daphnia pulex Survival
File: 89354DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.3931	1.3931	1.3931
2	0.001%	5	1.3931	1.3931	1.3931
3	0.01%	5	1.3931	1.3931	1.3931
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.3931	1.3931	1.3931

Title: 89354 Daphnia pulex Survival
File: 89354DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0000	0.0000	0.0000	0.0000
2	0.001%	0.0000	0.0000	0.0000	0.0000
3	0.01%	0.0000	0.0000	0.0000	0.0000
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 89354 Daphnia pulex Survival
File: 89354DS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3931				
2	0.001%	1.3931	27.50	16.00	5.00	
3	0.01%	1.3931	27.50	16.00	5.00	
4	0.1%	1.3931	27.50	16.00	5.00	
5	1.0%	1.3931	27.50	16.00	5.00	
6	10%	1.3931	27.50	16.00	5.00	

Critical values are 1 tailed (k = 5)

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

Pimephales promelas
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 500 ml

Age of Organism: <24 hours
Volume of test solution: 250 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	7	7	97.5	5.7	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	97.5	5.7	
	rep. B	8	7			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 89354 Fathead Minnow Survival
File: 89354FS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0540
W = 0.5466

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 89354 Fathead Minnow Survival
File: 89354FS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 89354 Fathead Minnow Survival
File: 89354FS .TXT Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	0.8750	1.2094
1	Control	2	1.0000	1.3931
1	Control	3	1.0000	1.3931
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	1.0000	1.3931
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	0.8750	1.2094
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 89354 Fathead Minnow Survival
File: 89354FS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.2094	1.3931	1.3564
2	0.001%	5	1.3931	1.3931	1.3931
3	0.01%	5	1.3931	1.3931	1.3931
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.2094	1.3931	1.3564
6	10%	5	1.3931	1.3931	1.3931

Title: 89354 Fathead Minnow Survival
File: 89354FS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0067	0.0821	0.0367	6.0556
2	0.001%	0.0000	0.0000	0.0000	0.0000
3	0.01%	0.0000	0.0000	0.0000	0.0000
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0067	0.0821	0.0367	6.0556
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 89354 Fathead Minnow Survival
File: 89354FS .TXT Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3564				
2	0.001%	1.3931	30.00	16.00	5.00	
3	0.01%	1.3931	30.00	16.00	5.00	
4	0.1%	1.3931	30.00	16.00	5.00	
5	1.0%	1.3564	27.50	16.00	5.00	
6	10%	1.3931	30.00	16.00	5.00	

Critical values are 1 tailed (k = 5)

Appendix B
Organism History

	Daphnia pulex	*Pimephales promelas*
Date:	4/13/05	4/13/05
Age:	<24 hours	<24 hours
Source:	In-house culture	In-house culture
Water Chemistry		
Alkalinity:	60-70 mg/l	60-70 mg/l
Hardness:	80-100 mg/l	80-100 mg/l
Temperature:	20 degrees C	25 degrees C

Appendix C
Completed Data Sheets for DEQ

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

Daphnia pulex

Permitee: Arkansas DEQ NPDES NO.: AR003641
Composite Collected From: 4/11/05 1200 To: 4/12/05 0600
From: -- -- To: -- --
Test Initiated: 4/13/05 1140
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
Coeff. Of Var.		0.0	0.0	0.0	0.0	0.0	0.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% _____ Yes X No
   b) 1/2 Low Flow (NA): _____ Yes _____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0 (TEM3D)

3. NOEL Lethal Value: 10% (TOM3D)

4. Enter highest value, coefficient of variation, for control or Low Flow: 0.0 (TQM3D)

5. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION
48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

CHEMICAL PARAMETERS CHART
Daphnia pulex

PERMITTEE: Arkansas DEQ

NPDES NO.: AR003641

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243, 249

SAMPLE COLLECTED: DATE: 4/11-12/05 TIME: 0600

TEST BEGIN: DATE: 4/13/05 TIME: 1140

TEST END: DATE: 4/15/05 TIME: 1140

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.5	8.4	8.5	20	20	20	63			89			7.8	7.6	7.7
0.001%	8.5	8.5	8.5	20	20	20							7.8	7.7	7.7
0.01%	8.6	8.5	8.5	20	20	20	63			88			7.8	7.7	7.7
0.1%	8.7	8.5	8.5	20	20	20							7.8	7.8	7.7
1.0%	8.7	8.6	8.5	20	20	20							7.9	7.8	7.7
10%	8.8	8.6	8.5	20	20	20							7.9	7.8	7.7

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

Pimephales promelas

Permittee: Arkansas DEQ — NPDES NO.: AR003641
Composite Collected: From: 4/11/05 1200 — To: 4/12/05 0600
From: -- -- — To: -- --
Test Initiated: 4/13/05 1155
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	87.5	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	87.5	100	100	100	100	100
	B	100	100	100	100	87.5	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
Coeff. Of Var.		5.7	0.0	0.0	0.0	5.7	0.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% _____ Yes X No
   b) 1/2 Low Flow (NA): _____ Yes _____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0 (TEM6C)

3. NOEL Lethal Value: 10% (TOM6C)

4. Enter highest value, coefficient of variation, for control or Low Flow: 5.7 (TQM6C)

5. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION
48-Hour Static Renewal Definitive Acute Toxicity Test
Cedar Chemical Corporation 4/05 Outfall 002 AR003641

April 15, 2005
Control No. 89354

CHEMICAL PARAMETERS CHART
Pimephales promelas

PERMITTEE: Arkansas DEQ

NPDES NO.: AR003641

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243, 249

SAMPLE COLLECTED: DATE: 4/11-12/05 TIME: 1200

TEST BEGIN: DATE: 4/13/05 TIME: 1155

TEST END: DATE: 4/15/05 TIME: 1155

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.5	8.4	7.9	25	25	25	63			89			7.8	7.6	7.6
0.001%	8.5	8.5	7.9	25	25	25							7.8	7.7	7.6
0.01%	8.6	8.5	7.9	25	25	25	63			88			7.8	7.7	7.6
0.1%	8.7	8.5	7.9	25	25	25							7.8	7.8	7.6
1.0%	8.7	8.6	7.9	25	25	25							7.9	7.8	7.6
10%	8.8	8.6	7.9	25	25	25							7.9	7.8	7.6

Appendix D
Chain of Custody

To: AMERICAN INTERPLEX 8935T

ADEQ
ARKANSAS
Department of Environmental Quality

Arkansas Department of Environmental Quality
Chain of Custody
for Compliance or Enforcement Samples

Facility, Project, or Complaint Name and County	AFIN Number (0000000)	ADEQ Division or Other (Describe)	Function Code
CEDAR CHEMICAL AR0036412	5400068	HAZARDOUS WASTE	1527

Printed Names of Sampler(s)

Sample Type
- ☐ CSI
- ☑ ~~Other~~ Compliance
- ☐ Complaint
- ☐ Fish Kill
- ☐ Other (describe)

Media Code
- W - water
- G - groundwater
- L - liquid (not water)
- S - soil or solid
- E - edible tissue
- F - whole fish
- B - other

Preservation Code
- A - Cool to 4°C
- B - Sulfuric acid (pH < 2)
- C - Nitric acid (pH <2)
- D - NaOH (pH >12)
- E- Sodium thiosulfate
- F - Other (specify)

Sample ID	Date Collected (mm/dd/yy)	Time Collected (hh:mm ?m)	Sample Characteristics: Grab	Composite	No. of containers	Preservation code (see codes)	Media (see codes)	Parameters Requested: ACUTE BIOMONITORING					Latitude (dd.dddddd)	Longitude (dd.dddddd)	Log Number (Lab Use Only)
OUTFALL 002	4/12/05	06:00		X	5	A	W	X					34.518027	-90.652879	
ALL JUGS:															
450 MLS (A)	4/11/05	12:00													
450 MLS (B)	4/11/05	18:00													
450 MLS (C)	4/11/05	24:00													
450 MLS (D)	4/12/05	06:00													

Relinquished by	Date	Time	Received by	Date	Time
Gary L. Hill	4/12/05	14:00			
Relinquished to laboratory by: Robert Shoddy	4-13-05	0900	Received for laboratory by		

Remarks: Id as: E Acute Biomonitoring AR0036412 not listed on Chain of Custody

Fed-Ex 1°C

May 22, 2006

Test Results of Second Quarter Acute 48-Hour Biomonitoring Testing for Outfall 002 Cedar Chemical Plant

Control No. 100138

Prepared for:

Ms. Melanie Foster
ADEQ
Post Office Box 8913
Little Rock, AR 72219-8913

COPY

Prepared by:

American Interplex Corporation
8600 Kanis Road
Little Rock, AR 72204-2322

AMERICAN INTERPLEX
CORPORATION
LABORATORIES

May 22, 2006

Arkansas Department of Environmental Quality
ATTN: Ms. Melanie Foster
Post Office Box 8913
Little Rock, AR 72219-8913

Re: Acute Biomonitoring, *Pimephales promelas* and *Daphnia pulex*
Outfall 001-Cedar Chemical
American Interplex Corporation Control No. 130138
P.O. No. 4500573745

Dear Ms. Foster:

Please find attached the report for acute Biomonitoring for a sample submitted to American Interplex Corporation on May 18, 2006. Acute 48-Hour Static In-House Renewal Biomonitoring Tests using *Pimephales promelas* and *Daphnia pulex* were conducted. Test results are summarized below:

Acute Fathead minnow Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Acute *Daphnia pulex* Survival Test: The no observable effects concentration (NOEC) for survival was 10% effluent, and the LC-50 value was >10% effluent; the sample, therefore, PASSED at low flow of 0.01% effluent for lethal effects.

Sincerely,

AMERICAN INTERPLEX CORPORATION

John Overbey
Laboratory Director

JO/ed

5600 Kanis Road • Little Rock, AR 72204 www.americaninterplex.com 501-224-5060 • FAX 501-224-5072

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May 22, 2006
Control No. 100138

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AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ – Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

I. INTRODUCTION AND SUMMARY

Biomonitoring testing of 48-hour renewal definitive toxicity tests using *Daphnia pulex* and *Pimephales promelas* were performed.

The tests were initiated on May 18, 2006, and continued through May 20, 2006, in accordance with EPA-821-R-02-012. Statistical analyses were performed on the observed data.

The tests were conducted in temperature and light cycle controlled Equatherm environmental chambers. The test temperature was 20 degrees C +/- 1 degree for the *Daphnia pulex* and 25 degrees C +/- 1 degree for the *Pimephales promelas*.

II. CONTROL ACCEPTANCE CRITERIA

ORGANISM	CRITERIA	RESULTS	PASS/ FAIL
Daphnia pulex	Control Survival = or > 90%	100	Pass
Pimephales promelas	Control Survival = or > 90%	100	Pass

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

III. OUTLINED REPORT

A. Introduction

1.	Facility:	ADEQ
2.	Test Requirements:	48-hour static renewal definitive toxicity test using *Daphnia pulex* and fathead minnows
3.	Sample Source:	Outfall 002
4.	Plant Location:	Helena, AR
5.	Receiving Stream:	Mississippi River
6.	Contract Laboratory:	American Interplex Corporation 8600 Kanis Road Little Rock, AR 72204-2322 (501) 224-5060

B. Plant Operations: Information unavailable

C. Source of Effluent and Dilution Water

1. Effluent Samples

a. Sampling Point:	Outfall 002
b. Collection Dates:	
Sample 1:	5/15-16/06
Sample 2:	
c. Sample Collection Method:	24-hour Composite
d. Flow at Time of Sampling:	Information unavailable

e. Chemical and Physical Data

Parameter	Sample 1
pH (standard units)	8.1
Dissolved Oxygen (mg/l)	10
Alkalinity (mg/l as CaCO3)	98
Hardness (mg/l as CaCO3)	63
Conductivity (umhos/cm)	430
Residual Chlorine (mg/l)	0.10

2. Dilution Water Sample: Synthetic Moderately Hard Water

a. Sampling Point: NA
b. Dates Prepared: 5/15/06, 5/16/06
c. Sample Collection Method: NA
d. Flow at Time of Sampling: NA
e. Chemical and Physical Data:

Parameter	Sample 1
pH (standard units)	8.2
Dissolved Oxygen (mg/l)	8.6
Alkalinity (mg CaCO3/l)	62
Hardness (mg CaCO3/l)	84
Conductivity (umhos/cm)	300
Residual Chlorine (mg/l)	<0.05

D. Test Methods

1. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, (Fourth Ed.), EPA-821-R-02-012, 48-hour acute definitive test.

a. Endpoints:
Death; the criteria employed to establish death are:
i. No movement
ii. No reaction to gentle prodding

b. Deviations from method: None

	Pimephales promelas	*Daphnia pulex*
Type and Volume of Test Chamber	500 ml disposable beaker	30 ml disposable beaker
Volume of Sample	250 ml	25 ml
Organisms per chamber	8	8
Replicates per dilution	5	5
Test Temperature	25 deg. C	20 deg. C
Test Initiated	5/18/06 1335	5/18/06 1355
Test Terminated	5/20/06 1335	5/20/06 1355
Feeding	None required	None required
Age of Test Organisms	<24 hours	<24 hours

2. Chemical Methods Employed:

Methods for the Chemical Analysis of Water and Wastes, EPA/600/4-790-20.

Parameter	Method
pH (standard units)	EPA 150.1
Dissolved Oxygen (mg/l)	EPA 360.1
Alkalinity (mg/l as CaCO3)	EPA 310.1
Hardness (mg/l as CaCO3	EPA 200.7
Conductivity (umhos/cm)	EPA 120.1
Temperature (deg. C)	EPA 170.1
Residual Chlorine (mg/l)	EPA 330.5

E. Test Organisms

1. Scientific Name
Daphnia pulex
Pimephales promelas

2. Acclimation of test organisms:
Daphnia pulex:
Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Neonates are separated each morning, and are fed 0.1 ml YCT and 0.2 ml *Selenastrum capricornutum* prior to testing.
Pimephales promelas:
Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water. Larvae are separated each morning, and are fed 0.2 ml Artemia prior to testing.

F. Quality Assurance

1. Toxicity Tests
   a. Reference Toxicant: Sodium Chloride
   b. Date of test: 5/2-4/06
   c. Synthetic moderately hard dilution water used
   d. Results:

	LC50	Warning Limits
Daphnia pulex	2.34 g/l	2.24- 3.00 g/l
Fathead minnow	7.71 g/l	7.68- 9.03 g/l

2. Chemical and Physical Analyses

Parameter	% Recovery	Relative % Difference
Alkalinity	NA	0.69
Hardness	97.7	0.25
pH	100	0.00
Conductivity	97.7	0.25
Residual Chlorine	--	--

G. Statistical Analysis

1. Method used to calculate the LC50 (median lethal effluent concentration):
NA

2. To determine if a significant difference existed between sample and control, Steel's Many-One Rank Test was used.

IV. RESULTS SUMMARY - *DAPHNIA PULEX*

Daphnia pulex are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, and 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival	
	24 hours	48 hours
Control	100	100
0.001%	97.5	97.5
0.01%	100	100
0.1%	100	100
1.0%	100	100
10%	100	100

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

V. RESULTS SUMMARY - *PIMEPHALES PROMELAS*

Pimephales promelas are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 0.001%, 0.01%, 0.1%, 1.0%, and 10% effluent. The low-flow concentration was 0.01%. Test results are based on survival.

Statistical analyses:

NOEC = 10% effluent
LC50 = >10% effluent

Summary of 48-hour Definitive Toxicity Test

Concentration	Percent Survival 24 hours	48 hours
Control	100	100
0.001%	100	100
0.01%	100	100
0.1%	100	100
1.0%	100	100
10%	100	100

Appendix A
Raw Data

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

Chemical Data for 48-hour Acute

Date and Time Test Initiated: 5/18/06 1042
Date and Time Terminated: 5/20/06 1355

Day 1 (0 hour)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	24	24	24	24	24	24
	2*	19	19	20	20	21	21
DO, mg/l	Initial	8.6	8.6	8.7	8.7	8.8	8.6
	Final 1*	8.4	8.4	8.4	8.4	8.4	8.4
	Final 2*	8.8	8.8	8.8	8.8	8.8	8.0
pH, su	Initial	8.2	8.3	8.3	8.3	8.3	8.3
	Final 1*	8.2	8.1	8.1	8.1	8.1	8.1
	Final 2*	8.0	8.1	8.1	8.1	8.1	8.1
Alkalinity, mg/l		62		60			
Hardness, mg/l		84		79			
Conductivity,umho/cm		300		300			
Residual Chlorine,mg/l		<0.05		<0.05			

Day 2 (24 hours)		Control	0.001%	0.01%	0.1%	1.0%	10%
Temp. deg.C	1*	24	25	25	25	25	25
	2*	19	19	21	20	19	20
DO, mg/l	Initial	8.6	8.7	8.7	8.6	8.6	8.6
	Final 1*	8.6	8.5	8.4	8.4	8.4	8.4
	Final 2*	8.9	8.9	8.9	8.9	8.9	8.9
pH, su	Initial	8.2	8.3	8.3	8.3	8.3	8.2
	Final 1*	8.2	8.2	8.2	8.2	8.2	8.2
	Final 2*	8.2	8.2	8.2	8.2	8.1	8.2

*1 data from *Pimephales promelas* *2 data from *Daphnia pulex*

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

Daphnia pulex
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 30 ml

Age of organism: <24 hours
Volume of test solution: 25 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	7	7	97.5	5.7	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 100138 Daphnia pulex Survival
File: 100138ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0270
W = 0.4161

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 100138 Daphnia pulex Survival
File: 100138ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 100138 Daphnia pulex Survival
File: 100138ds.txt Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	1.0000	1.3931
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	0.8750	1.2094
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	1.0000	1.3931
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 100138 Daphnia pulex Survival
File: 100138ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.3931	1.3931	1.3931
2	0.001%	5	1.2094	1.3931	1.3564
3	0.01%	5	1.3931	1.3931	1.3931
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.3931	1.3931	1.3931

Title: 100138 Daphnia pulex Survival
File: 100138ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0000	0.0000	0.0000	0.0000
2	0.001%	0.0067	0.0821	0.0367	6.0556
3	0.01%	0.0000	0.0000	0.0000	0.0000
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 100138 Daphnia pulex Survival
File: 100138ds.txt Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3931				
2	0.001%	1.3564	25.00	16.00	5.00	
3	0.01%	1.3931	27.50	16.00	5.00	
4	0.1%	1.3931	27.50	16.00	5.00	
5	1.0%	1.3931	27.50	16.00	5.00	
6	10%	1.3931	27.50	16.00	5.00	

Critical values are 1 tailed (k = 5)

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

Pimephales promelas
Survival Data

No. of organisms per chamber: 8
Volume of test chamber: 500 ml

Age of Organism: <24 hours
Volume of test solution: 250 ml

Effluent Concentration		No. Survivors 24 hr	No. Survivors 48 hr	% Survival	CV %	Observations
Control	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.001%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.01%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
0.1%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
1.0%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			
10%	rep. A	8	8	100	0.0	
	rep. B	8	8			
	rep. C	8	8			
	rep. D	8	8			
	rep. E	8	8			

CV = Coefficient of variance = standard deviation X 100/mean

Title: 100138 Fathead Minnow Survival
File: 100138fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.0000
W = 0.0000

Critical W = 0.9000 (alpha = 0.01 , N = 30)
W = 0.9270 (alpha = 0.05 , N = 30)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: 100138 Fathead Minnow Survival
File: 100138fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

Title: 100138 Fathead Minnow Survival
File: 100138fs.txt Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.3931
1	Control	2	1.0000	1.3931
1	Control	3	1.0000	1.3931
1	Control	4	1.0000	1.3931
1	Control	5	1.0000	1.3931
2	0.001%	1	1.0000	1.3931
2	0.001%	2	1.0000	1.3931
2	0.001%	3	1.0000	1.3931
2	0.001%	4	1.0000	1.3931
2	0.001%	5	1.0000	1.3931
3	0.01%	1	1.0000	1.3931
3	0.01%	2	1.0000	1.3931
3	0.01%	3	1.0000	1.3931
3	0.01%	4	1.0000	1.3931
3	0.01%	5	1.0000	1.3931
4	0.1%	1	1.0000	1.3931
4	0.1%	2	1.0000	1.3931
4	0.1%	3	1.0000	1.3931
4	0.1%	4	1.0000	1.3931
4	0.1%	5	1.0000	1.3931
5	1.0%	1	1.0000	1.3931
5	1.0%	2	1.0000	1.3931
5	1.0%	3	1.0000	1.3931
5	1.0%	4	1.0000	1.3931
5	1.0%	5	1.0000	1.3931
6	10%	1	1.0000	1.3931
6	10%	2	1.0000	1.3931
6	10%	3	1.0000	1.3931
6	10%	4	1.0000	1.3931
6	10%	5	1.0000	1.3931

Title: 100138 Fathead Minnow Survival
File: 100138fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	5	1.3931	1.3931	1.3931
2	0.001%	5	1.3931	1.3931	1.3931
3	0.01%	5	1.3931	1.3931	1.3931
4	0.1%	5	1.3931	1.3931	1.3931
5	1.0%	5	1.3931	1.3931	1.3931
6	10%	5	1.3931	1.3931	1.3931

Title: 100138 Fathead Minnow Survival
File: 100138fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Control	0.0000	0.0000	0.0000	0.0000
2	0.001%	0.0000	0.0000	0.0000	0.0000
3	0.01%	0.0000	0.0000	0.0000	0.0000
4	0.1%	0.0000	0.0000	0.0000	0.0000
5	1.0%	0.0000	0.0000	0.0000	0.0000
6	10%	0.0000	0.0000	0.0000	0.0000

Title: 100138 Fathead Minnow Survival
File: 100138fs.txt Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Control	1.3931				
2	0.001%	1.3931	27.50	16.00	5.00	
3	0.01%	1.3931	27.50	16.00	5.00	
4	0.1%	1.3931	27.50	16.00	5.00	
5	1.0%	1.3931	27.50	16.00	5.00	
6	10%	1.3931	27.50	16.00	5.00	

Critical values are 1 tailed (k = 5)

Appendix B
Organism History

	Daphnia pulex	*Pimephales promelas*
Date:	5/18/06	5/18/06
Age:	<24 hours	<24 hours
Source:	In-house culture	In-house culture
Water Chemistry		
Alkalinity:	57- 64 mg/l	57- 64 mg/l
Hardness:	80-100 mg/l	80-100 mg/l
Temperature:	20 degrees C	25 degrees C

Appendix C
Completed Data Sheets for DEQ

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

Daphnia pulex

Permitee: ADEQ NPDES NO.: NA
Composite Collected From: 5/15/06 0600 To: 5/16/06 0600
From: To:
Test Initiated: 5/18/06 1355
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	87.5	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	100	87.5	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
Coeff. Of Var.		0.0	5.7	0.0	0.0	0.0	0.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% _____ Yes X No
   b) 1/2 Low Flow (NA): _____ Yes _____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0 (TEM3D)

3. NOEL Lethal Value: 10% (TOM3D)

4. Enter lowest value, coefficient of variation, for control or Low Flow: 0.0 (TQM3D)

5. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION
48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

CHEMICAL PARAMETERS CHART
Daphnia pulex

PERMITTEE: ADEQ

NPDES NO.: NA

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243

SAMPLE COLLECTED: DATE: 5/15-16/06 TIME: 0600
DATE: TIME:

TEST BEGIN: DATE: 5/18/06 TIME: 1355

TEST END: DATE: 5/20/06 TIME: 1355

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.6	8.6	8.9	20	20	20	62			84			8.2	8.2	8.2
0.001%	8.6	8.7	8.9	20	20	20							8.3	8.3	8.2
0.01%	8.7	8.7	8.9	20	20	20	60			79			8.3	8.3	8.2
0.1%	8.7	8.6	8.9	20	20	20							8.3	8.3	8.2
1.0%	8.8	8.6	8.9	20	20	20							8.3	8.3	8.1
10%	8.6	8.6	8.9	20	20	20							8.3	8.2	8.2

AMERICAN INTERPLEX CORPORATION

48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

Pimephales promelas

Permittee: ADEQ NPDES NO.: NA
Composite Collected: From: 5/15/06 0600 To: 5/16/06 0600
From: To:
Test Initiated: 5/18/06 1335
Dilution water: Moderately Hard

PERCENT SURVIVAL

TIME	REP	Control	0.001%	0.01%	0.1%	1.0%	10%
24 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
48 hours	A	100	100	100	100	100	100
	B	100	100	100	100	100	100
	C	100	100	100	100	100	100
	D	100	100	100	100	100	100
	E	100	100	100	100	100	100
Coeff. Of Var.		0.0	0.0	0.0	0.0	0.0	0.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:
   a) Low Flow 0.01% _____ Yes X No
   b) 1/2 Low Flow (NA): _____ Yes _____ No

2. If you answered No to 1a) enter [0], otherwise enter [1]: 0 (TEM6C)

3. NOEL Lethal Value: 10% (TOM6C)

4. Enter lowest value, coefficient of variation, for control or Low Flow: 0.0 (TQM6C)

5. Enter percent effluent corresponding to the LC-50 below.
   LC-50 = >10% effluent
   Method of LC-50 calculation: NA

AMERICAN INTERPLEX CORPORATION
48-Hour Static Renewal Definitive Acute Toxicity Test
ADEQ -- Cedar Chemical 5/06 Outfall 002

May 22, 2006
Control No. 100138

CHEMICAL PARAMETERS CHART
Pimephales promelas

PERMITTEE: ADEQ

NPDES NO.: NA

CONTACT: Ms. Melanie Foster

ANALYST 210, 214, 243

SAMPLE COLLECTED: DATE: 5/15-16/06 TIME: 0600
DATE: TIME:

TEST BEGIN: DATE: 5/18/06 TIME: 1335

TEST END: DATE: 5/20/06 TIME: 1335

PARAMETER	D.O.			TEMPERATURE			ALKALINITY			HARDNESS			pH		
DILUT./Time	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.	0 hrs.	24 hrs.	48 hrs.
Control	8.6	8.6	8.6	25	25	25	62			84			8.2	8.2	8.2
0.001%	8.6	8.7	8.5	25	25	25							8.3	8.3	8.2
0.01%	8.7	8.7	8.4	25	25	25	60			79			8.3	8.3	8.2
0.1%	8.7	8.6	8.4	25	25	25							8.3	8.3	8.2
1.0%	8.8	8.6	8.4	25	25	25							8.3	8.3	8.2
10%	8.6	8.6	8.4	25	25	25							8.3	8.2	8.2

Appendix D
Chain of Custody

ADEQ

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY

Arkansas Department of Environmental Quality
Chain of Custody
for Compliance or Enforcement Samples

TO: American Interface 100138

Facility, Project, or Complaint Name and County	AFIN Number (0000000)	ADEQ Division or Other (Describe)	Function Code
CEDAR CHEMICAL AR0036412	5400068	HAZARDOUS WASTE	1527

Printed Names of Sampler(s): GARY L. HILL

Sample Type: ☐ CSI ☐ Other Compliance ☐ Complaint ☐ Fish Kill ☐ Other (describe)

Media Code: W - water; G - groundwater; L - liquid (not water); S - soil or solid; E - edible tissue; F - whole fish; B - other

Preservation Code: A - Cool to 4°C; B - Sulfuric acid (pH < 2); C - Nitric acid (pH <2); D - NaOH (pH >12); E- Sodium thiosulfate; F - Other (specify)

Sample ID	Date Collected (mm/dd/yy)	Time Collected (hh:mm 7m)	Grab	Composite	No. of containers	Preservation code (see codes)	Media (see codes)	ACUTE BIOMONITORING					Latitude (dd.dddddd)	Longitude (dd.dddddd)	Log Number (Lab Use Only)
OUTFALL 002	5/16/06	06:00		X	5	A	W	X					34.518027	-90.652877	
ALL JUGS:															
450 MLS (A)	5/15/06	12:00													
450 MLS (B)	5/15/06	18:00													
450 MLS (C)	5/15/06	24:00													
450 MLS (D)	5/16/06	06:00													
450 MLS (E)															

Relinquished by	Date	Time	Received by	Date	Time	Remarks
Gary L. Hill	5/16/06	14:20				
Relinquished by	Date	Time	Received by	Date	Time	
Relinquished to laboratory by	Date	Time	Received for laboratory by	Date	Time	
			Sharon Purdue	5-18-06	8:00 Am	Fed-X 1°C