AMERICAN INTERPLEX CORPORATION
LABORATORIES

August 28, 2018

Biomonitoring Testing
for

Control No. 226081-1

Prepared for:

Mr. Scotty Jones
Trumann Water and Sewer Commission
704 Hwy 463 N
Trumann, AR 72472

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

AMERICAN INTERPLEX CORPORATION
LABORATORIES

Trumann Water and Sewer Commission
ATTN: Mr. Scotty Jones
704 Hwy 463 N
Trumann, AR 72472

Re: Chronic*Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*
NPDES Permit No. AR0035602 AFIN 56-00047

Dear Mr. Scotty Jones:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

Method 1000.0 Chronic *Pimephales promelas* (Fathead minnow) Survival and Growth Test: The No Observable Effects Concentration (NOEC) for survival occurred at 12 % effluent, which is above the critical dilution of 9 %. The NOEC for growth occurred at 12 % effluent, which is above the critical dilution of 9 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the Fathead minnow test.**

Method 1002.0 Chronic *Ceriodaphnia dubia* Survival and Reproduction Test: The No Observable Effects Concentration (NOEC) for survival occurred at 12 % effluent, which is above the critical dilution of 9 %. The NOEC for reproduction occurred at 12 % effluent, which is above the critical dilution of 9 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

**AMERICAN INTERPLEX CORPORATION**

John Overbey
Chief Operating Officer

PDF cc: Trumann Water and Sewer Commission
ATTN: Mr. Scotty Jones
scottytpw@gmail.com

Trumann Water and Sewer Commission
ATTN: Ms. Lorre Holt
lorre_holt0201@yahoo.com

FTN Associates, Ltd.
ATTN: Mr. Pat Downey
pjd@ftn-assoc.com

Table of Contents

I. Control Acceptance Criteria

*Pimephales promelas* (Fathead minnow) Method 1000.0

| CRITERIA | RESULTS | PASS/FAIL |
|---|---|---|
| Control Survival > or = 80% | 100 | PASS |
| Control Growth > or = 0.25 mg per Surviving minnow | 0.293 | PASS |
| Control Growth CV < or = 40% | 11.0 | PASS |
| Growth Minimum Significant Difference 12 to 30% | 14.0 | PASS |
| Critical Dilution CV < or = 40% | 4.11 | PASS |

*Ceriodaphnia dubia* Method 1002.0

| CRITERIA | RESULTS | PASS/FAIL |
|---|---|---|
| Control Survival > or = 80% | 100 | PASS |
| Control Reproduction > or = 15 per Surviving Female | 24.7 | PASS |
| Control CV < or = 40% per Surviving Female | 8.33 | PASS |
| Reproduction Minimum Significant Difference 13 to 47% | 18.0 | PASS |
| Critical Dilution CV < or = 40% | 20.6 | PASS |

II. Outlined Report

A. Introduction

1. Permit Number: AR0035602 AFIN 56-00047
2. Test Requirements: Test Methods 1000.0 and 1002.0

B. Source of Effluent/Dilution Water:

1. Effluent Samples:
   a. Sampling Point:
   b. Chemical Data:

| Analysis | Sample 1 | Sample 2 | Sample 3 |
|---|---|---|---|
| Dissolved oxygen (mg/l) | 7.0 | 6.0 | 8.4 |
| pH (standard units) | 8.4 | 8.6 | 9.1 |
| Alkalinity (mg/l as CaCO3) | 120 | 120 | 110 |
| Hardness (mg/l as CaCO3) | 36 | 36 | 44 |
| Conductivity (umhos/cm) | 390 | 400 | 410 |
| Residual Chlorine (mg/l) | 0.12 | 0.14 | 0.12 |
| Ammonia as N (mg/l) | 0.33 | 0.43 | 0.43 |

2. Dilution Water Samples:
   Moderately Hard

| Analysis | 226029 |
|---|---|
| Dissolved oxygen (mg/l) | 6.1 |
| pH (standard units) | 8.2 |
| Alkalinity (mg/l as CaCO3) | 63 |
| Hardness (mg/l as CaCO3) | 82 |
| Conductivity (umhos/cm) | 310 |
| Residual Chlorine (mg/l) | <0.05 |

C. Test Methods
1. Test methods used:
Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Methods 1000.0 and 1002.0, Fathead Minnow Survival and Growth and *Ceriodaphnia dubia* Survival and Reproduction.
2. Endpoint: No Observable Effects Concentration (NOEC)
3. Test Conditions:

*Pimephales promelas* (Fathead minnow) Survival and Growth Method 1000.0

| | |
|---|---|
| Date & Time Test Initiated: | August 14, 2018 at 1645 |
| Date & Time Test Terminated: | Aug 21, 2018 at 0820 |
| Type & Volume of Test Chamber: | 500 ml disposable beaker |
| Volume of Sample: | 250 ml |
| Number of Organisms per replicate: | 8 |
| Number of Replicates per dilution: | 5 |

*Ceriodaphnia dubia* Survival and Reproduction Method 1002.0

| | |
|---|---|
| Date & Time Test Initiated: | August 14, 2018 at 1520 |
| Date & Time Test Terminated: | Aug 21, 2018 at 1430 |
| Type & Volume of Test Chamber: | 30 ml disposable beaker |
| Volume of Sample: | 15 ml |
| Number of Organisms per replicate: | 1 |
| Number of Replicates per dilution: | 10 |

4. Source of test organisms: Obtained from in-house cultures
5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms
1. Scientific Name
a. Test 1000.0 *Pimephales promelas*
b. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat and following EPA method criteria.

*Pimephales promelas* (Fathead minnow) survival data was transformed using the Arc Sine transformation. Normality and homogeneity of variance were checked using Shapiro-Wilk's. The survival data was then analyzed using Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC).

Fathead minnow growth data was analyzed for normality and homogeneity of variance using Shapiro-Wilk's. Steel's Many-One Rank test was used to determine the No Observable Effects Concentration (NOEC) for growth. Dunnett's Test was used to calculate the PMSD.

*Ceriodaphnia dubia* survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Kolmogorov's Test for Normality and Bartlett's test and analyzed with Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC) for Reproduction. Dunnett's Test was used to calculate the PMSD.

IV. Standard Reference Toxicants

The sensitivity of the offspring is determined by performing a standard reference toxicant test monthly. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

*Pimephales promelas* (Fathead minnow)

A chronic reference test was performed on August 1, 2018 at 1545 to Aug 8, 2018 at 0815
The results were as follows: (Control No. 225656-1.)

Survival LC-50: 4221 mg/l
Growth IC-25: 2888 mg/l
Growth PMSD: 17.9

*Ceriodaphnia dubia*

A chronic reference test was performed on at 1620 to Aug 7, 2018 at 1400
The results were as follows: (Control No. 225656-2.)

Survival LC-50: 1823 mg/l
Growth IC-25: 1219 mg/l
Growth PMSD: 16.2

V. Organism History

*Pimephales promelas* (Fathead minnow)

Date: August 14, 2018
Age: <24 hours
Source: In-house culture
Water: Moderately hard synthetic
Temperature: 25 deg.C

*Ceriodaphnia dubia*

Date: August 14, 2018
Age: <24 hours
Source: In-house culture
Water: Moderately hard synthetic
Temperature: 25 deg.C

VII. Results Summary *Pimephales promelas*, Fathead minnow Larval Survival and Growth Test -- Method 1000.0

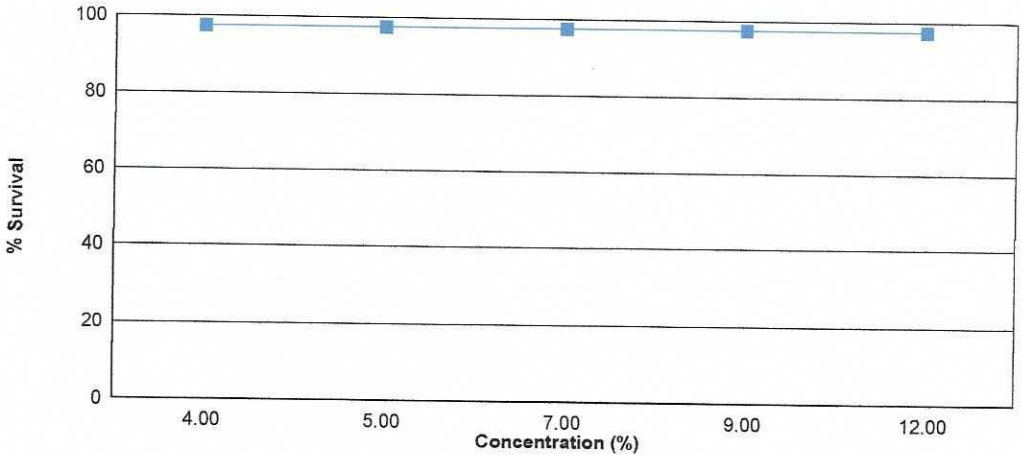
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (weight) of the larvae.

Effluent dilutions for this test were 4 %, 5 %, 7 %, 9 %, 12 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 9 % effluent.

The test was initiated on August 14, 2018 at 1645 and continued through Aug 21, 2018 at 0820. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

a.) NOEC survival = 12 % effluent
b.) NOEC growth = 12 % effluent




| Summary of the 7-day Fathead Minnow Survival and Growth | | |
|---|---|---|
| Concentration | Percent Survival | Mean Growth (mg) |
| Control | 100 | 0.293 |
| 4 % | 97.5 | 0.293 |
| 5 % | 97.5 | 0.292 |
| 7 % | 97.5 | 0.276 |
| 9 % | 97.5 | 0.285 |
| 12 % | 97.5 | 0.290 |

VII. Results Summary *Ceriodaphnia dubia*, Cladoceran Survival and Reproduction Test -- Method 1002.0

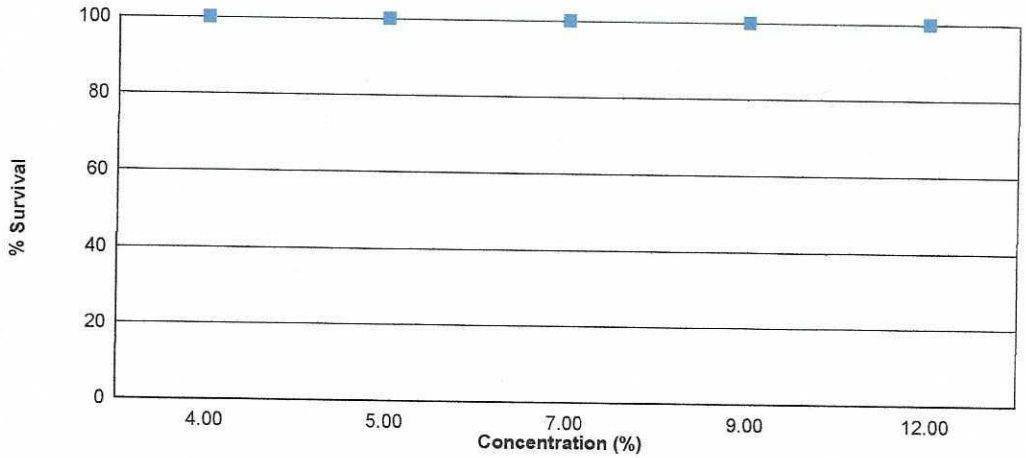
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring or a maximum of eight test days.

Effluent dilutions for this test were 4 %, 5 %, 7 %, 9 %, 12 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 9 % effluent.

The test was initiated on August 14, 2018 at 1520 and continued through Aug 21, 2018 at 1430. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

a.) NOEC survival = 12 % effluent
b.) NOEC reproduction = 12 % effluent




| Summary of the 7-day *Ceriodaphnia dubia* Survival and Reproduction Data | | |
|---|---|---|
| Concentration | Percent Survival | Mean Reproduction |
| Control | 100 | 24.7 |
| 4 % | 100 | 24.4 |
| 5 % | 100 | 26.8 |
| 7 % | 100 | 26.6 |
| 9 % | 100 | 24.4 |
| 12 % | 100 | 25.4 |

Appendix A1: Test 1000.0

*Pimephales promelas* (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: August 14, 2018 at 1645
Date and Time Test Terminated: Aug 21, 2018 at 0820

| Concentration | Replicate | Number of Survivors | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 |
| Control | A | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | B | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | C | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | D | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | E | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 4 % | A | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | B | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | C | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | D | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | E | 8 | 8 | 7 | 7 | 7 | 7 | 7 |
| 5 % | A | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | B | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | C | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | D | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | E | 8 | 8 | 7 | 7 | 7 | 7 | 7 |
| 7 % | A | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | B | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | C | 8 | 8 | 7 | 7 | 7 | 7 | 7 |
| | D | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | E | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 9 % | A | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | B | 8 | 8 | 7 | 7 | 7 | 7 | 7 |
| | C | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | D | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | E | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 12 % | A | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | B | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | C | 8 | 8 | 7 | 7 | 7 | 7 | 7 |
| | D | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | E | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

Appendix A1: Test 1000.0

*Pimephales promelas* (Fathead Minnow) 7-Day Growth

Test Initiated: August 14, 2018 at 1645
Test Terminated: Aug 21, 2018 at 0820

| Concentration | Replicate | Weight of pan | Weight of pan + fish | Total weight of fish (g) | Original # of fish | Mean dry weight (mg) |
|---|---|---|---|---|---|---|
| Control | A | .93599 | .93878 | 0.00279 | 8 | 0.349 |
| | B | .92593 | .92821 | 0.00228 | 8 | 0.285 |
| | C | .92703 | .92929 | 0.00226 | 8 | 0.282 |
| | D | .93143 | .93357 | 0.00214 | 8 | 0.268 |
| | E | .92617 | .92840 | 0.00223 | 8 | 0.279 |
| 4 % | A | .93267 | .93558 | 0.00291 | 8 | 0.364 |
| | B | .93078 | .93306 | 0.00228 | 8 | 0.285 |
| | C | .93032 | .93238 | 0.00206 | 8 | 0.258 |
| | D | .92643 | .92868 | 0.00225 | 8 | 0.281 |
| | E | .93235 | .93455 | 0.00220 | 8 | 0.275 |
| 5 % | A | .92838 | .93072 | 0.00234 | 8 | 0.292 |
| | B | .92635 | .92895 | 0.00260 | 8 | 0.325 |
| | C | .93212 | .93424 | 0.00212 | 8 | 0.265 |
| | D | .93048 | .93269 | 0.00221 | 8 | 0.276 |
| | E | .92979 | .93222 | 0.00243 | 8 | 0.304 |
| 7 % | A | .92775 | .92988 | 0.00213 | 8 | 0.266 |
| | B | .92545 | .92762 | 0.00217 | 8 | 0.271 |
| | C | .93151 | .93363 | 0.00212 | 8 | 0.265 |
| | D | .92973 | .93215 | 0.00242 | 8 | 0.302 |
| | E | .93015 | .93237 | 0.00222 | 8 | 0.278 |
| 9 % | A | .93337 | .93577 | 0.00240 | 8 | 0.300 |
| | B | .93054 | .93273 | 0.00219 | 8 | 0.274 |
| | C | .93451 | .93682 | 0.00231 | 8 | 0.289 |
| | D | .93294 | .93525 | 0.00231 | 8 | 0.289 |
| | E | .93373 | .93591 | 0.00218 | 8 | 0.272 |
| 12 % | A | .93125 | .93342 | 0.00217 | 8 | 0.271 |
| | B | .92922 | .93141 | 0.00219 | 8 | 0.274 |
| | C | .93144 | .93358 | 0.00214 | 8 | 0.268 |
| | D | .92781 | .93050 | 0.00269 | 8 | 0.336 |
| | E | .92950 | .93192 | 0.00242 | 8 | 0.302 |

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: August 14, 2018 at 1520
Date and Time Test Terminated: Aug 21, 2018 at 1430

| Concentration: Control | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Replicate | | | | | | | | | | No. of Young | No. of Adults | Young per Adult |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 4 | 4 | 5 | 3 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 44 | 10 | 4.40 |
| 5 | 7 | 0 | 0 | 9 | 0 | 7 | 0 | 9 | 0 | 0 | 32 | 10 | 3.20 |
| 6 | 0 | 9 | 8 | 11 | 9 | 1 | 8 | 12 | 7 | 9 | 74 | 10 | 7.40 |
| 7 | 12 | 13 | 12 | 0 | 14 | 9 | 10 | 0 | 15 | 12 | 97 | 10 | 9.70 |
| 8 | | | | | | | | | | | | | |
| TOTAL | 23 | 27 | 23 | 25 | 27 | 22 | 22 | 25 | 27 | 26 | 247 | 10 | 24.7 |

| Concentration: 4 % | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Replicate | | | | | | | | | | No. of Young | No. of Adults | Young per Adult |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 4 | 4 | 4 | 5 | 5 | 4 | 0 | 3 | 4 | 5 | 3 | 37 | 10 | 3.70 |
| 5 | 6 | 0 | 0 | 11 | 9 | 4 | 0 | 9 | 0 | 0 | 39 | 10 | 3.90 |
| 6 | 0 | 11 | 9 | 12 | 5 | 10 | 7 | 0 | 9 | 11 | 74 | 10 | 7.40 |
| 7 | 11 | 16 | 10 | 0 | 9 | 0 | 11 | 12 | 12 | 13 | 94 | 10 | 9.40 |
| 8 | | | | | | | | | | | | | |
| TOTAL | 21 | 31 | 24 | 28 | 27 | 14 | 21 | 25 | 26 | 27 | 244 | 10 | 24.4 |

| Concentration: 5 % | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Replicate | | | | | | | | | | No. of Young | No. of Adults | Young per Adult |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 10 | 0.300 |
| 4 | 4 | 6 | 4 | 5 | 3 | 5 | 4 | 0 | 6 | 6 | 43 | 10 | 4.30 |
| 5 | 8 | 0 | 0 | 10 | 9 | 0 | 8 | 9 | 0 | 0 | 44 | 10 | 4.40 |
| 6 | 0 | 11 | 7 | 14 | 0 | 8 | 0 | 12 | 8 | 9 | 69 | 10 | 6.90 |
| 7 | 12 | 16 | 14 | 0 | 14 | 13 | 13 | 0 | 14 | 13 | 109 | 10 | 10.9 |
| 8 | | | | | | | | | | | | | |
| TOTAL | 24 | 33 | 25 | 29 | 26 | 26 | 25 | 24 | 28 | 28 | 268 | 10 | 26.8 |

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: August 14, 2018 at 1520
Date and Time Test Terminated: Aug 21, 2018 at 1430

| Concentration: 7 % | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Replicate | | | | | | | | | | No. of Young | No. of Adults | Young per Adult |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 4 | 6 | 5 | 5 | 4 | 4 | 4 | 6 | 4 | 4 | 6 | 48 | 10 | 4.80 |
| 5 | 7 | 1 | 0 | 9 | 8 | 9 | 0 | 10 | 0 | 0 | 44 | 10 | 4.40 |
| 6 | 0 | 10 | 10 | 12 | 0 | 0 | 7 | 10 | 8 | 9 | 66 | 10 | 6.60 |
| 7 | 13 | 15 | 15 | 0 | 12 | 12 | 13 | 0 | 15 | 13 | 108 | 10 | 10.8 |
| 8 | | | | | | | | | | | | | |
| TOTAL | 26 | 31 | 30 | 25 | 24 | 25 | 26 | 24 | 27 | 28 | 266 | 10 | 26.6 |

| Concentration: 9 % | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Replicate | | | | | | | | | | No. of Young | No. of Adults | Young per Adult |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 4 | 5 | 4 | 5 | 5 | 0 | 0 | 2 | 4 | 5 | 7 | 37 | 10 | 3.70 |
| 5 | 9 | 0 | 0 | 10 | 6 | 6 | 8 | 8 | 1 | 0 | 48 | 10 | 4.80 |
| 6 | 0 | 10 | 10 | 11 | 10 | 11 | 0 | 9 | 7 | 9 | 77 | 10 | 7.70 |
| 7 | 14 | 15 | 12 | 0 | 0 | 0 | 12 | 0 | 16 | 13 | 82 | 10 | 8.20 |
| 8 | | | | | | | | | | | | | |
| TOTAL | 28 | 29 | 27 | 26 | 16 | 17 | 22 | 21 | 29 | 29 | 244 | 10 | 24.4 |

| Concentration: 12 % | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Replicate | | | | | | | | | | No. of Young | No. of Adults | Young per Adult |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0.00 |
| 4 | 4 | 6 | 5 | 4 | 2 | 3 | 6 | 3 | 0 | 5 | 38 | 10 | 3.80 |
| 5 | 0 | 0 | 0 | 11 | 0 | 6 | 0 | 9 | 0 | 0 | 26 | 10 | 2.60 |
| 6 | 11 | 10 | 11 | 12 | 17 | 1 | 9 | 10 | 3 | 8 | 92 | 10 | 9.20 |
| 7 | 14 | 16 | 12 | 0 | 15 | 12 | 5 | 0 | 8 | 16 | 98 | 10 | 9.80 |
| 8 | | | | | | | | | | | | | |
| TOTAL | 29 | 32 | 28 | 27 | 34 | 22 | 20 | 22 | 11 | 29 | 254 | 10 | 25.4 |

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Survival

Transformation of Data — Transform: Arc Sin(Square Root(Y))

| Group | Identification | Rep | Value | Transformed |
|---|---|---|---|---|
| 1 | Control | 1 | 1.00000 | 1.39310 |
| 1 | Control | 2 | 1.00000 | 1.39310 |
| 1 | Control | 3 | 1.00000 | 1.39310 |
| 1 | Control | 4 | 1.00000 | 1.39310 |
| 1 | Control | 5 | 1.00000 | 1.39310 |
| 2 | 4 % | 1 | 1.00000 | 1.39310 |
| 2 | 4 % | 2 | 1.00000 | 1.39310 |
| 2 | 4 % | 3 | 1.00000 | 1.39310 |
| 2 | 4 % | 4 | 1.00000 | 1.39310 |
| 2 | 4 % | 5 | 0.87500 | 1.20940 |
| 3 | 5 % | 1 | 1.00000 | 1.39310 |
| 3 | 5 % | 2 | 1.00000 | 1.39310 |
| 3 | 5 % | 3 | 1.00000 | 1.39310 |
| 3 | 5 % | 4 | 1.00000 | 1.39310 |
| 3 | 5 % | 5 | 0.87500 | 1.20940 |
| 4 | 7 % | 1 | 1.00000 | 1.39310 |
| 4 | 7 % | 2 | 1.00000 | 1.39310 |
| 4 | 7 % | 3 | 0.87500 | 1.20940 |
| 4 | 7 % | 4 | 1.00000 | 1.39310 |
| 4 | 7 % | 5 | 1.00000 | 1.39310 |
| 5 | 9 % | 1 | 1.00000 | 1.39310 |
| 5 | 9 % | 2 | 0.87500 | 1.20940 |
| 5 | 9 % | 3 | 1.00000 | 1.39310 |
| 5 | 9 % | 4 | 1.00000 | 1.39310 |
| 5 | 9 % | 5 | 1.00000 | 1.39310 |
| 6 | 12 % | 1 | 1.00000 | 1.39310 |
| 6 | 12 % | 2 | 1.00000 | 1.39310 |
| 6 | 12 % | 3 | 0.87500 | 1.20940 |
| 6 | 12 % | 4 | 1.00000 | 1.39310 |
| 6 | 12 % | 5 | 1.00000 | 1.39310 |

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Survival

| Shapiro - Wilk's Test for Normality | | Transform: Arc Sin(Square Root(Y)) |
|---|---|---|
| D = 0.135 | | |
| W = 0.5577 | | |
| Critical W = 0.9 | (alpha = 0.01, N = 30) | |
| Critical W = 0.927 | (alpha = 0.05, N = 30) | |
| Data FAIL normality test (alpha = 0.01). | | |

| Steel's Many-One Rank Test | | | | | Transform: Arc Sin(Square Root(Y)) |
|---|---|---|---|---|---|
| Ho:Control<Treatment | | | | | |
| Group | Identification | Rank Sum | Critical Value | DF | Sig 0.05 |
| 1 | Control | | | | |
| 2 | 4 % | 25.00 | 16.00 | 5.00 | |
| 3 | 5 % | 25.00 | 16.00 | 5.00 | |
| 4 | 7 % | 25.00 | 16.00 | 5.00 | |
| 5 | 9 % | 25.00 | 16.00 | 5.00 | |
| 6 | 12 % | 25.00 | 16.00 | 5.00 | |
| Critical values are 1 tailed (k=5) | | | | | |

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Growth

| Shapiro - Wilk's Test for Normality | | No Transformation |
|---|---|---|
| D = 0.01799 | | |
| W = 0.8722 | | |
| Critical W = 0.9 | (alpha = 0.01, N = 30) | |
| Critical W = 0.927 | (alpha = 0.05, N = 30) | |
| Data FAIL normality test (alpha = 0.01). | | |

| Steel's Many-One Rank Test | | | | | No Transformation |
|---|---|---|---|---|---|
| Ho:Control<Treatment | | | | | |
| Group | Identification | Rank Sum | Critical Value | DF | Sig 0.05 |
| 1 | Control | | | | |
| 2 | 4 % | 26.50 | 16.00 | 5.00 | |
| 3 | 5 % | 28.00 | 16.00 | 5.00 | |
| 4 | 7 % | 21.00 | 16.00 | 5.00 | |
| 5 | 9 % | 29.00 | 16.00 | 5.00 | |
| 6 | 12 % | 25.50 | 16.00 | 5.00 | |
| Critical values are 1 tailed (k=5) | | | | | |

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Growth

Dunnett's Test for PMSD Calculation (excluding deaths if applicable)

ANOVA Table — No Transformation

| SOURCE | DF | SS | MS | F |
|---|---|---|---|---|
| Between | 5 | 0.001056 | 0.0002112 | 0.2819 |
| Within (Error) | 24 | 0.01798 | 0.0007492 | |
| Total | 29 | 0.01904 | | |

Critical F = 3.9 (alpha = 0.01, df = 5,24)
2.62 (alpha = 0.05, df = 5,24)

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Dunnett's Test - Table 1 of 2 — No Transformation

Ho:Control<Treatment

| Group | Identification | Transformed Mean | Mean In Original Units | T Stat | Sig 0.05 |
|---|---|---|---|---|---|
| 1 | Control | 0.2926 | 0.2926 | | |
| 2 | 4 % | 0.2926 | 0.2926 | 0 | |
| 3 | 5 % | 0.2924 | 0.2924 | 0.01155 | |
| 4 | 7 % | 0.2764 | 0.2764 | 0.9358 | |
| 5 | 9 % | 0.2848 | 0.2848 | 0.4506 | |
| 6 | 12 % | 0.2902 | 0.2902 | 0.1386 | |

Dunnett's critical value = 2.36 (1 Tailed, alpha = 0.05, df = 5,24)

Dunnett's Test - Table 2 of 2 — No Transformation

Ho:Control<Treatment

| Group | Identification | Num of Reps | Min Sig Diff (In Orig. Units) | % of Control | Difference From Control |
|---|---|---|---|---|---|
| 1 | Control | 5 | | | |
| 2 | 4 % | 5 | 0.04085 | 14 | 0 |
| 3 | 5 % | 5 | 0.04085 | 14 | 0.0002 |
| 4 | 7 % | 5 | 0.04085 | 14 | 0.0162 |
| 5 | 9 % | 5 | 0.04085 | 14 | 0.0078 |
| 6 | 12 % | 5 | 0.04085 | 14 | 0.0024 |

Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

Fisher's Exact Test

| Identification | Alive | Dead | Total Animals |
|---|---|---|---|
| Control | 10 | 0 | 10 |
| 4 % | 10 | 0 | 10 |
| Total | 20 | 0 | 20 |

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test

| Identification | Alive | Dead | Total Animals |
|---|---|---|---|
| Control | 10 | 0 | 10 |
| 5 % | 10 | 0 | 10 |
| Total | 20 | 0 | 20 |

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test

| Identification | Alive | Dead | Total Animals |
|---|---|---|---|
| Control | 10 | 0 | 10 |
| 7 % | 10 | 0 | 10 |
| Total | 20 | 0 | 20 |

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test

| Identification | Alive | Dead | Total Animals |
|---|---|---|---|
| Control | 10 | 0 | 10 |
| 9 % | 10 | 0 | 10 |
| Total | 20 | 0 | 20 |

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

| Fisher's Exact Test | | | |
|---|---|---|---|
| Identification | Alive | Dead | Total Animals |
| Control | 10 | 0 | 10 |
| 12 % | 10 | 0 | 10 |
| Total | 20 | 0 | 20 |

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

| Summary of Fisher's Exact Test | | | | |
|---|---|---|---|---|
| Group | Identification | Exposed | Dead | Sig 0.05 |
| 0 | Control | 10 | 0 | |
| 1 | 4 % | 10 | 0 | |
| 2 | 5 % | 10 | 0 | |
| 3 | 7 % | 10 | 0 | |
| 4 | 9 % | 10 | 0 | |
| 5 | 12 % | 10 | 0 | |

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

| Kolmogorov Test for Normality | No Transformation |
|---|---|
| D = 0.1228<br>D* = 0.9635<br>Critical D* = 1.035 (alpha = 0.01, N = 60) | |
| Data PASS normality test (alpha = 0.01). | |

| Bartlett's Test for Homogeneity of Variance | No Transformation |
|---|---|
| Calculated B1 statistic = 18.23<br>Critical B = 15.086 (alpha = 0.01, df = 5) | |
| Data FAIL B1 homogeneity test at 0.01 level. | |

| Steel's Many-One Rank Test | | | | | No Transformation |
|---|---|---|---|---|---|
| Ho:Control<Treatment | | | | | |
| Group | Identification | Rank Sum | Critical Value | DF | Sig 0.05 |
| 1 | Control | | | | |
| 2 | 4 % | 107.50 | 75.00 | 10.00 | |
| 3 | 5 % | 126.00 | 75.00 | 10.00 | |
| 4 | 7 % | 124.50 | 75.00 | 10.00 | |
| 5 | 9 % | 111.00 | 75.00 | 10.00 | |
| 6 | 12 % | 115.50 | 75.00 | 10.00 | |
| Critical values are 1 tailed (k=5) | | | | | |

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

Dunnett's Test for PMSD Calculation (excluding deaths if applicable)

ANOVA Table — No Transformation

| SOURCE | DF | SS | MS | F |
|---|---|---|---|---|
| Between | 5 | 58.88 | 11.78 | 0.633 |
| Within (Error) | 54 | 1005 | 18.61 | |
| Total | 59 | 1064 | | |

Critical F = 3.38 (alpha = 0.01, df = 5,54)
2.38 (alpha = 0.05, df = 5,54)

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Dunnett's Test - Table 1 of 2 — No Transformation

Ho:Control<Treatment

| Group | Identification | Transformed Mean | Mean In Original Units | T Stat | Sig 0.05 |
|---|---|---|---|---|---|
| 1 | Control | 24.7 | 24.7 | | |
| 2 | 4 % | 24.4 | 24.4 | 0.1555 | |
| 3 | 5 % | 26.8 | 26.8 | -1.089 | |
| 4 | 7 % | 26.6 | 26.6 | -0.9848 | |
| 5 | 9 % | 24.4 | 24.4 | 0.1555 | |
| 6 | 12 % | 25.4 | 25.4 | -0.3628 | |

Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,54)

Dunnett's Test - Table 2 of 2 — No Transformation

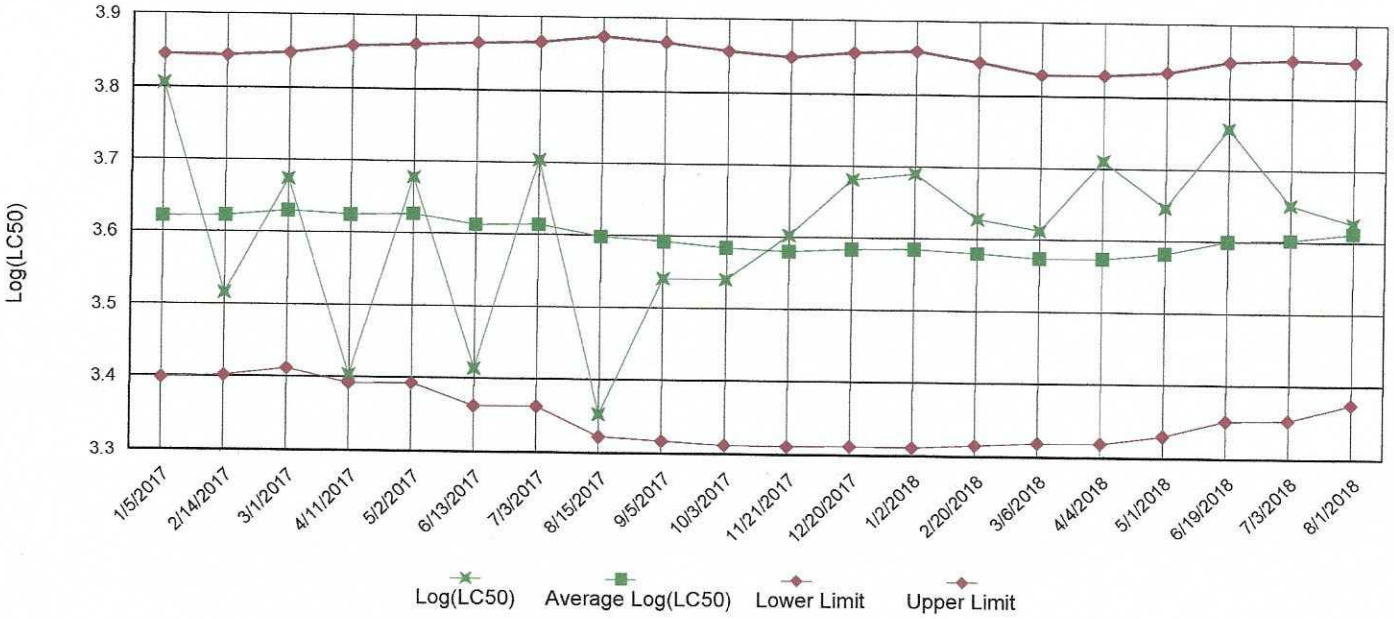
Ho:Control<Treatment

| Group | Identification | Num of Reps | Min Sig Diff (In Orig. Units) | % of Control | Difference From Control |
|---|---|---|---|---|---|
| 1 | Control | 10 | | | |
| 2 | 4 % | 10 | 4.457 | 18 | 0.3 |
| 3 | 5 % | 10 | 4.457 | 18 | -2.1 |
| 4 | 7 % | 10 | 4.457 | 18 | -1.9 |
| 5 | 9 % | 10 | 4.457 | 18 | 0.3 |
| 6 | 12 % | 10 | 4.457 | 18 | -0.7 |

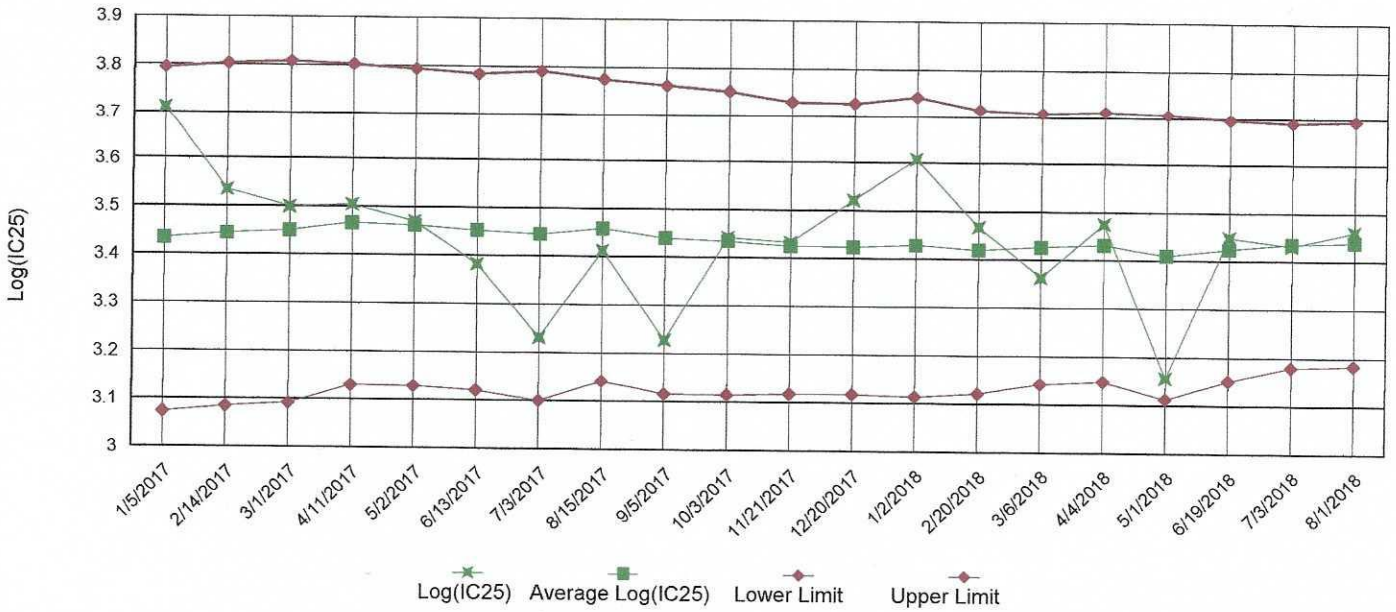
Appendix A3: Test 1000.0

Chronic Reference Toxicant, *Pimephales promelas* (Fathead Minnow)

LC50 Survival Data



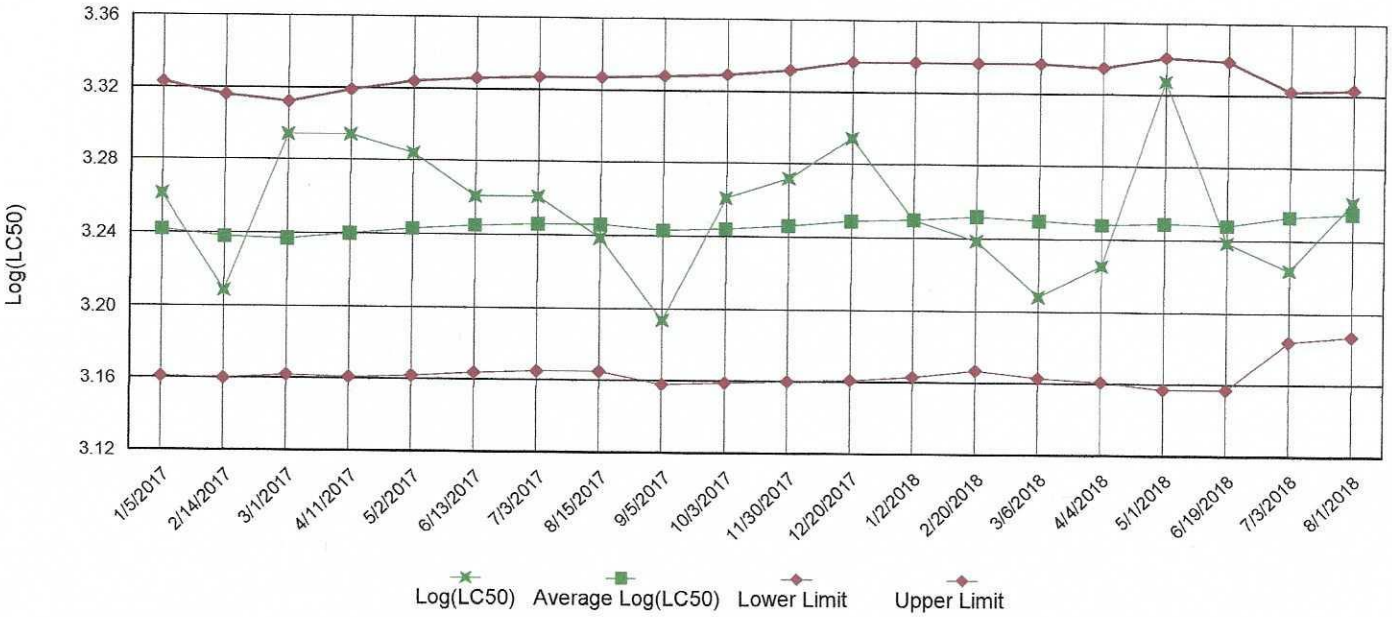

IC25 Growth Data



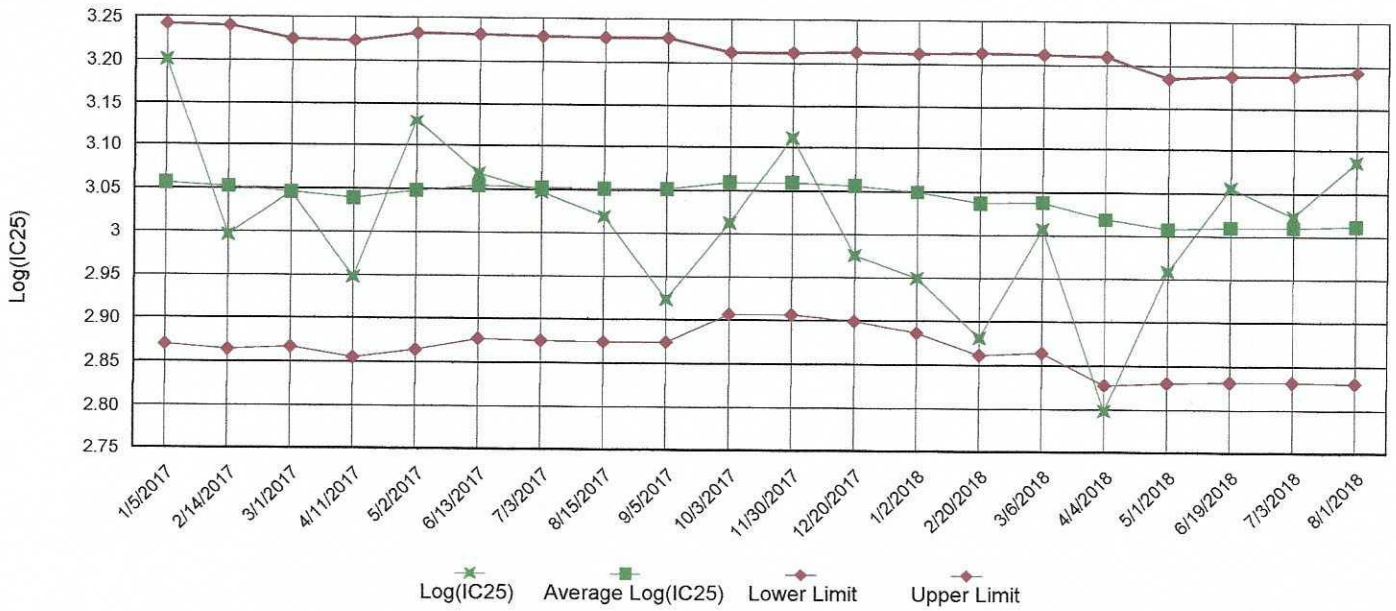
Appendix A3: Test 1002.0

Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data




IC25 Reproduction Data



Appendix B: Test 1000.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
*Pimephales promelas* (Fathead Minnow)
SURVIVAL AND GROWTH

Permittee: Trumann Water and Sewer Commission

NPDES No.: AR0035602 AFIN 56-00047

Date and Time Test Initiated: August 14, 2018 at 1645
Date and Time Test Terminated: Aug 21, 2018 at 0820
Dilution water used: Moderately Hard

DATA TABLE FOR SURVIVAL

| Effluent Conc. % | Percent Survival in replicate chambers | | | | | Mean percent survival | | | CV% |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | 24 hr | 48 hr | 7 days | |
| Control | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.00 |
| 4 % | 100 | 100 | 100 | 100 | 87.5 | 100 | 100 | 97.5 | 5.73 |
| 5 % | 100 | 100 | 100 | 100 | 87.5 | 100 | 100 | 97.5 | 5.73 |
| 7 % | 100 | 100 | 87.5 | 100 | 100 | 100 | 100 | 97.5 | 5.73 |
| 9 % | 100 | 87.5 | 100 | 100 | 100 | 100 | 100 | 97.5 | 5.73 |
| 12 % | 100 | 100 | 87.5 | 100 | 100 | 100 | 100 | 97.5 | 5.73 |

DATA TABLE FOR GROWTH

| Effluent Conc. % | Average dry weight, mg replicate chambers | | | | | Mean dry weight, mg | CV% |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | | |
| Control | 0.349 | 0.285 | 0.282 | 0.268 | 0.279 | 0.293 | 11.0 |
| 4 % | 0.364 | 0.285 | 0.258 | 0.281 | 0.275 | 0.293 | 14.1 |
| 5 % | 0.292 | 0.325 | 0.265 | 0.276 | 0.304 | 0.292 | 8.05 |
| 7 % | 0.266 | 0.271 | 0.265 | 0.302 | 0.278 | 0.276 | 5.50 |
| 9 % | 0.300 | 0.274 | 0.289 | 0.289 | 0.272 | 0.285 | 4.11 |
| 12 % | 0.271 | 0.274 | 0.268 | 0.336 | 0.302 | 0.29 | 9.99 |

CV = Coefficient of variation = standard deviation * 100 / mean

Appendix B: Test 1000.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
*Pimephales promelas* (Fathead Minnow)
SURVIVAL AND GROWTH

1. Steel's Many-One Rank Test:

   Is the mean survival significantly different (p=0.05) than the control survival for the % effluent corresponding to (lethality):

   | | | | |
   |---|---|---|---|
   | a.) LOW FLOW OR CRITICAL DILUTION | (9 %) | ____YES | X NO |
   | b.) 1/2 LOW FLOW DILUTION | (NA) | ____YES | ____NO |

2. Steel's Many-One Rank Test:

   Is the mean dry weight (growth) significantly different (p=0.05) than the control's dry weight (growth) for the % effluent corresponding to (significant non-lethal effects):

   | | | | |
   |---|---|---|---|
   | a.) LOW FLOW OR CRITICAL DILUTION | (9 %) | ____YES | X NO |
   | b.) 1/2 LOW FLOW DILUTION | (NA) | ____YES | ____NO |

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP6C)

4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP6C)

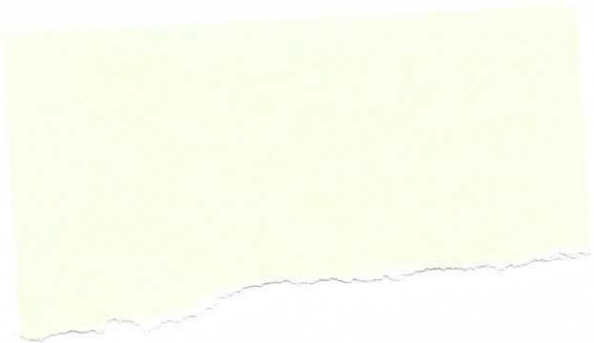
5. NOEC Pimephales Lethality: 12 % (TOP6C)

6. LOEC Pimephales Lethality: 12 % (TXP6C)

7. NOEC Pimephales Sublethality: 12 % (TPP6C)

8. LOEC Pimephales Sublethality: 12 % (TYP6C)

9. Coefficient of variation for Pimephales growth: 11 (TQP6C)



Appendix B: Test 1000.0

CHRONIC TOXICITY SUMMARY FORM
*Pimephales promelas* (Fathead minnow)
CHEMICAL PARAMETERS CHART

PERMITTEE: Trumann Water and Sewer Commi
NPDES NO.: AR0035602 AFIN 56-00047
CONTACT: Mr. Scotty Jones
ANALYST: 280, 310, 322, 329

Test Initiated: DATE: August 14, 2018 TIME: 1645
Test Terminated: DATE: Aug 21, 2018 TIME: 0820

| DILUTION Control | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.1 | 6.0 | 5.6 | 7.2 | 7.6 | 7.1 | 5.7 |
| Final | 5.7 | 5.4 | 7.3 | 7.2 | 7.3 | 7.6 | 7.6 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.2 | 8.5 | 8.5 | 8.2 |
| Final | 8.2 | 8.2 | 8.2 | 8.7 | 8.1 | 8.3 | 8.1 |

| DILUTION 4 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.2 | 5.8 | 5.5 | 6.8 | 7.6 | 7.3 | 5.9 |
| Final | 5.9 | 5.5 | 7.3 | 7.8 | 7.4 | 7.6 | 7.5 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.2 | 8.5 | 8.5 | 8.2 |
| Final | 8.2 | 8.2 | 8.2 | 8.7 | 8.1 | 8.4 | 8.1 |

| DILUTION 5 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.3 | 5.8 | 5.7 | 7.4 | 7.0 | 7.1 | 7.8 |
| Final | 5.9 | 5.6 | 7.0 | 7.6 | 7.2 | 7.6 | 7.2 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.1 | 8.5 | 8.5 | 8.2 |
| Final | 8.2 | 8.2 | 8.3 | 8.7 | 8.0 | 8.4 | 8.1 |

| DILUTION 7 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.2 | 5.9 | 5.6 | 7.0 | 7.5 | 7.3 | 6.3 |
| Final | 5.8 | 5.7 | 7.2 | 7.6 | 7.4 | 7.7 | 7.2 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.3 | 8.5 | 8.5 | 8.3 |
| Final | 8.2 | 8.3 | 8.3 | 8.7 | 8.0 | 8.4 | 8.0 |

| DILUTION 9 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.2 | 6.0 | 5.6 | 7.3 | 7.5 | 7.4 | 6.4 |
| Final | 5.8 | 5.7 | 7.4 | 7.6 | 7.3 | 7.6 | 7.7 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.3 | 8.6 | 8.5 | 8.3 |
| Final | 8.2 | 8.3 | 8.3 | 8.7 | 8.1 | 8.4 | 7.8 |

| DILUTION 12 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.3 | 5.7 | 5.5 | 7.3 | 7.6 | 7.4 | 6.5 |
| Final | 5.9 | 5.6 | 7.1 | 7.9 | 7.6 | 7.8 | 7.2 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.4 | 8.6 | 8.6 | 8.4 |
| Final | 8.3 | 8.2 | 8.3 | 8.8 | 8.1 | 8.5 | 8.1 |

| Alkalinity | Hardness | Conductivity | Chlorine | Sample ID |
|---|---|---|---|---|
| 120 | 36 | 390 | 0.12 | AR0035602 13-AUG-18 |
| 120 | 36 | 400 | 0.14 | AR0035602 15-AUG-18 |
| 110 | 44 | 410 | 0.12 | AR0035602 17-AUG-18 |

| Alkalinity | Hardness | Conductivity | Chlorine | Sample ID |
|---|---|---|---|---|
| 63 | 82 | 310 | <0.05 | 226029 |

Appendix B: Test 1002.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
*Ceriodaphnia dubia*
SURVIVAL AND REPRODUCTION

Permittee: Trumann Water and Sewer Commission

NPDES No.: AR0035602 AFIN 56-00047

Date and Time Test Initiated: August 14, 2018 at 1520
Date and Time Test Terminated: Aug 21, 2018 at 1430
Dilution water used: Moderately Hard

PERCENT SURVIVAL

| Time of Reading | Control | Percent Effluent 4 % | 5 % | 7 % | 9 % | 12 % |
|---|---|---|---|---|---|---|
| 24 hour | 100 | 100 | 100 | 100 | 100 | 100 |
| 48 hour | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 day | 100 | 100 | 100 | 100 | 100 | 100 |

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

| Replicates | Control | Percent Effluent 4 % | 5 % | 7 % | 9 % | 12 % |
|---|---|---|---|---|---|---|
| A | 23 | 21 | 24 | 26 | 28 | 29 |
| B | 27 | 31 | 33 | 31 | 29 | 32 |
| C | 23 | 24 | 25 | 30 | 27 | 28 |
| D | 25 | 28 | 29 | 25 | 26 | 27 |
| E | 27 | 27 | 26 | 24 | 16 | 34 |
| F | 22 | 14 | 26 | 25 | 17 | 22 |
| G | 22 | 21 | 25 | 26 | 22 | 20 |
| H | 25 | 25 | 24 | 24 | 21 | 22 |
| I | 27 | 26 | 28 | 27 | 29 | 11 |
| J | 26 | 27 | 28 | 28 | 29 | 29 |
| Mean per Adult | 24.7 | 24.4 | 26.8 | 26.6 | 24.4 | 25.4 |
| Mean per Surviving Adult | 24.7 | 24.4 | 26.8 | 26.6 | 24.4 | 25.4 |
| CV % | 8.33 | 19.5 | 10.4 | 9.07 | 20.6 | 26.7 |

CV = Coefficient of variation = standard deviation * 100 / mean
(calculated based on young produced by surviving females)

Appendix B: Test 1002.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
*Ceriodaphnia dubia*
SURVIVAL AND REPRODUCTION

1. Fisher's Exact Test:

   Is the mean survival significantly different (p=0.05) than the control survival for the % effluent corresponding to (lethality):

   a.) LOW FLOW OR CRITICAL DILUTION (9 %) ____YES __X__ NO
   b.) 1/2 LOW FLOW DILUTION (NA) ____YES ____ NO

2. Steel's Many-One Rank Test:

   Is the mean number of young produced per female significantly different (p=0.05) than the control's number of young per female for the % effluent corresponding to (significant non-lethal effects):

   a.) LOW FLOW OR CRITICAL DILUTION (9 %) ____YES __X__ NO
   b.) 1/2 LOW FLOW DILUTION (NA) ____YES ____ NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP3B)

4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP3B)

5. NOEC Ceriodaphnia Lethality: 12 % (TOP3B)

6. LOEC Ceriodaphnia Lethality: 12 % (TXP3B)

7. NOEC Ceriodaphnia Sublethality: 12 % (TPP3B)

8. LOEC Ceriodaphnia Sublethality: 12 % (TYP3B)

9. Coefficient of variation for Ceriodaphnia Reproduction: 20.6 (TQP3B)

AMERICAN INTERPLEX CORPORATION LABORATORIES

Appendix B: Test 1002.0

CHRONIC TOXICITY SUMMARY FORM
*Ceriodaphnia dubia*
CHEMICAL PARAMETERS CHART

PERMITTEE: Trumann Water and Sewer Commi
NPDES NO.: AR0035602 AFIN 56-00047
CONTACT: Mr. Scotty Jones
ANALYST: 280, 310, 322, 329

Test Initiated: DATE: August 14, 2018 TIME: 1520
Test Terminated: DATE: Aug 21, 2018 TIME: 1430

| DILUTION Control | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.1 | 6.0 | 5.6 | 7.2 | 7.6 | 7.1 | 5.7 |
| Final | 6.4 | 5.8 | 7.0 | 7.4 | 7.3 | 7.4 | 7.3 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.2 | 8.5 | 8.5 | 8.2 |
| Final | 8.4 | 8.4 | 8.5 | 8.8 | 8.1 | 8.2 | 8.3 |

| DILUTION 4 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.2 | 5.8 | 5.5 | 6.8 | 7.6 | 7.3 | 5.9 |
| Final | 6.2 | 5.9 | 7.3 | 7.8 | 7.3 | 7.6 | 7.5 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.2 | 8.5 | 8.5 | 8.2 |
| Final | 8.5 | 8.5 | 8.5 | 8.8 | 8.1 | 8.3 | 8.3 |

| DILUTION 5 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.3 | 5.8 | 5.7 | 7.4 | 7.0 | 7.1 | 7.8 |
| Final | 6.5 | 5.8 | 7.1 | 7.5 | 7.4 | 7.6 | 7.5 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.1 | 8.5 | 8.5 | 8.2 |
| Final | 8.4 | 8.5 | 8.5 | 8.8 | 8.1 | 8.3 | 8.3 |

| DILUTION 7 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.2 | 5.9 | 5.6 | 7.0 | 7.5 | 7.3 | 6.3 |
| Final | 6.2 | 6.0 | 7.2 | 7.8 | 7.5 | 7.6 | 7.6 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.3 | 8.5 | 8.5 | 8.3 |
| Final | 8.3 | 8.4 | 8.5 | 8.8 | 8.1 | 8.4 | 8.4 |

| DILUTION 9 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.2 | 6.0 | 5.6 | 7.3 | 7.5 | 7.4 | 6.4 |
| Final | 6.1 | 6.0 | 7.1 | 7.5 | 7.5 | 7.7 | 7.6 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.3 | 8.6 | 8.5 | 8.3 |
| Final | 8.3 | 8.5 | 8.5 | 8.8 | 8.1 | 8.4 | 8.4 |

| DILUTION 12 % | DAY 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| D.O. Initial | 6.3 | 5.7 | 5.5 | 7.3 | 7.6 | 7.4 | 6.5 |
| Final | 6.1 | 5.9 | 7.2 | 7.9 | 7.5 | 7.9 | 7.7 |
| pH Initial | 8.2 | 8.2 | 8.3 | 8.4 | 8.6 | 8.6 | 8.4 |
| Final | 8.3 | 8.5 | 8.6 | 8.8 | 8.1 | 8.5 | 8.5 |

| Alkalinity | Hardness | Conductivity | Chlorine | Sample ID |
|---|---|---|---|---|
| 120 | 36 | 390 | 0.12 | AR0035602 13-AUG-18 |
| 120 | 36 | 400 | 0.14 | AR0035602 15-AUG-18 |
| 110 | 44 | 410 | 0.12 | AR0035602 17-AUG-18 |

| Alkalinity | Hardness | Conductivity | Chlorine | Sample ID |
|---|---|---|---|---|
| 63 | 82 | 310 | <0.05 | 226029 |

AMERICAN INTERPLEX CORPORATION
LABORATORIES

# CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: TRUMANN WATER WORKS
Project Reference: AR0035602
Project Manager: Scotty Jones
Sampled By: LORRE Holt

PO No.

Sample Matrix: WATER, SOIL

No of BOTTLES

Analyses Requested: BIOMONITORING-CHRONIC CD+FH

AIC Control No: 226081
AIC Proposal No:
Carrier: FEDX
Received Temperature °C: 2.1

| AIC No. | Sample Identification | Date/Time Collected | GRAB | COMP | WATER | SOIL | No of BOTTLES | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1 | AR0035602 | 8/12/18-8/13/18 8:00 AM - 8:00 AM | | V | V | | 3 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | Container Type | P | | | | | |
| | | Preservative | NO | | | | | |

Field pH calibration on ____ @ ____
Buffer:

G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate
NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate

Turnaround Time Requested: (Please circle)
(NORMAL) or EXPEDITED IN ____ DAYS
Expedited results requested by: ____
Who should AIC contact with questions: LORRE Holt
Phone: 870-483-2882 Fax: 870-483-6525
Report Attention to: LORRE HOLT
Report Address to: 704 Hwy 463 E.
TRUMANN AR. 72472

| Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|
| Lorre Holt | 8/13/18 10:45 AM | | |
| Relinquished By: | Date/Time | Received in Lab By: | Date/Time |
| | | DM336 | 8-14-18 08:50 |

Comments: FEDX: 7827 7187 3564

AMERICAN INTERPLEX CORPORATION
LABORATORIES

# CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: Truman Water Works
Project Reference: AR0035602
Project Manager: Scotty Jones
Sampled By: Lorre Holt

PO No.

Sample Matrix: WATER, SOIL

No of BOTTLES

Analyses Requested: Biomonitoring-Chronic CO+FH

AIC Control No: 22.081
AIC Proposal No:
Carrier: FED X
Received Temperature °C: 2.6

| AIC No. | Sample Identification | Date/Time Collected | GRAB | COMP | WATER | SOIL | No of BOTTLES | Remarks |
|---|---|---|---|---|---|---|---|---|
| 2 | AR0035602 | 8/14/18 8:00 AM - 8/15/18 8:00 AM | | V | V | | 3 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | Container Type | P | | | | | |
| | | Preservative | NO | | | | | |

Field pH calibration on _____ @ _____ Buffer:

G = Glass, P = Plastic, V = VOA vials, H = HCl to pH2, T = Sodium Thiosulfate
NO = none, S = Sulfuric acid pH2, N = Nitric acid pH2, B = NaOH to pH12, Z = Zinc acetate

Turnaround Time Requested: (Please circle)
(NORMAL) or EXPEDITED IN ___ DAYS
Expedited results requested by: _____
Who should AIC contact with questions: Lorre Holt
Phone: 870-483-2882 Fax: 870-483-6525
Report Attention to: Lorre Holt
Report Address to: 704 Hwy 463 S.
Truman, AR. 72472

| Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|
| Lorre Holt | 8/15/18 10:10 | | |
| Relinquished By: | Date/Time | Received in Lab By: D. Bm | Date/Time 8-16-18 0950 |

Comments: 7823 1252 3142

Form 0060 May 2001

J:\COC Templates\Blank COC.xls

AMERICAN INTERPLEX CORPORATION
LABORATORIES

# CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: Trumann Water Works
Project Reference: AR0035602
Project Manager: Scotty Jones
Sampled By: Lorre Holt

PO No.

Sample Matrix: WATER, SOIL

No of BOTTLES

Analyses Requested: Biomonitoring-Chronic CD+FH

AIC Control No: 226081
AIC Proposal No:
Carrier: FedEx
Received Temperature °C: 2.5
Remarks

| AIC No. | Sample Identification | Date/Time Collected | GRAB | COMP | WATER | SOIL | No of BOTTLES |
|---|---|---|---|---|---|---|---|
| 3 | AR0035602 | 8/16/18 8:00 AM - 8/17/18 8:00 AM | | V | V | | 3 |
| | | Container Type | P | | | | |
| | | Preservative | NO | | | | |

Field pH calibration on _____ @ _____
Buffer:

G = Glass, P = Plastic, V = VOA vials, H = HCl to pH2, T = Sodium Thiosulfate
NO = none, S = Sulfuric acid pH2, N = Nitric acid pH2, B = NaOH to pH12, Z = Zinc acetate

Turnaround Time Requested: (Please circle)
(NORMAL) or EXPEDITED IN ___ DAYS
Expedited results requested by: _____
Who should AIC contact with questions: Lorre Holt
Phone: 870-483-2882 Fax: 870-483-6525
Report Attention to: Lorre Holt
Report Address to: 704 Hwy 463 W.
Trumann, AR. 72472

| Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|
| Lorre Holt | 8/17/18 9:45 AM | | |
| Relinquished By: | Date/Time | Received in Lab By: | Date/Time |
| | | SHB | 18 Aug 18 0815 |

Comments:

Form 0060 May 2001

J:\COC Templates\Blank COC.xls

From: American Interplex interplex@americaninterplex.com
Subject: Control Number:226081 (AR0035602)
Date: Aug 28, 2018 at 4:45:41 PM
To: Ms. Lorre Holt lorre_holt0201@yahoo.com

Dear Ms. Lorre Holt,

Your report for control number 226081 (AR0035602) is enclosed as an attachment
to this e-mail.

If you would prefer to receive your reports via our website (https://clients.americaninterplex.com), please call our Client Services
Department or myself at 501-224-5060 for a username and password. Once your
login has been activated you will receive an email notification each time a new
report is available.

Sincerely,
John Overbey
Laboratory Director