*Supplemental Report*

# NPDES Compliance Acute and Chronic Toxicity Testing of the "EFF-003" Effluent

Samples collected March 4, 2008

Prepared For:

Precision Analytical
321 19th Street
Bakersfield, CA 93301

Prepared By:

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

**June 2008**

PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

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July 31, 2008

**NPDES PERMIT NO. CA0082295**
**WDR ORDER #R5-2007-0170**
**Toxicity Testing - Supplemental**

Mr. Dale Harvey
Senior Engineer
California Regional Water Quality Control Board - Fresno
1685 E Street
Fresno, Ca 93706-2020

Dear Mr. Harvey,

Enclosed you will find a report entitled "Supplemental Report, NPDES Compliance Acute and Chronic Toxicity Testing of the "EFF-003" Effluent", dated June 2008. The samples for this report were collected March 4, 2008. This report replaces the April 2008 "NPDES Compliance Acute and Chronic Toxicity Testing of the "EFF-001" Effluent" report previously sent to you. The sampling location of the original report was erroneously reported as EFF-001, when in fact the actual sampling point was EFF-003, as required by our permit. In addition, the sampling date was wrong. We have taken steps to prevent this from happening in the future. I apologize for any confusion this may have caused.

In addition, I am enclosing supplemental acute toxicity information for our Cawelo effluent (EFF-001) and Carrier Canal receiving water. These samples were collected on February 5 and April 23, 2008. Although this testing was not required by our permit, we wanted to know if additional dilution water at Reservoir B would have a positive effect on any toxicity. As the report shows, there was significant acute toxicity effects related to the test with Fathead minnows using pure effluent from our discharge at EFF-001 (Discharge into Reservoir B prior to any mixing effects). In addition we tested water from the Carrier Canal, essentially Kern River water. Not surprisingly, there was a 95% survival rate indicating no acute toxicity.

If you have any questions regarding the reports, please contact me at (661) 654-7122.

Sincerely,

Jim Waldron

Enclosures

cc: David Ansolabehere, Manager, Cawelo Water District
Ede Pacaldo. Chevron

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# 1. INTRODUCTION

Precision Analytical has contracted Pacific EcoRisk (PER) to perform NPDES compliance evaluations of the acute and chronic toxicity of an effluent. These evaluations consist of performing the following US EPA freshwater acute and chronic toxicity tests:

- 96-hour acute survival test with fathead minnows;
- 96-hour algal growth test with the green alga *Selenastrum capricornutum;*
- 3-brood (6-8-day) survival and reproduction test with the crustacean *Ceriodaphnia dubia;* and
- 7-day survival and growth test with larval fathead minnows (*Pimephales promelas*).

This suite of freshwater acute and chronic toxicity tests was conducted on an effluent and receiving water sample collected on March 4, 2008. In order to assess the sensitivity of the test organisms to chronic toxic stress, reference toxicant tests were also performed. This report describes the performance and results of these effluent and reference toxicant tests.

# 2. TOXICITY TEST PROCEDURES

The methods used in conducting these tests followed the guidelines established by the EPA manual "Methods for Estimating the Acute Effects of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition" (EPA/821/R-02/012) and "Short-Term Methods for Estimating the Chronic Effects of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA/600/4-91/002).

## 2.1 Sample Receipt and Handling

On March 4, Precision Analytical staff collected samples of effluent and receiving water into appropriately cleaned containers. These samples were transported, on ice and under chain-of-custody, to the PER laboratory in Fairfield. Upon receipt at the testing laboratory, aliquots of each sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of the samples being stored at 4°C except when being used to prepare test solutions. The chain-of-custody records for the collection and delivery of these samples are provided in Appendix A.

Table 1. Initial water quality characteristics of the effluent and receiving water samples.

| Date Received | Sample ID | Temp (°C) | pH | D.O. (mg/L) | Alkalinity (mg/L) | Hardness (mg/L) | Conductivity ($\mu$S/cm) | Total Ammonia (mg/L N) |
|---|---|---|---|---|---|---|---|---|
| 3/4/07 | RSW-001 | 19.9 | 7.90 | 13.8 | 90 | 90 | 266 | <1.0 |
| 3/4/07 | EFF-003 | 19.7 | 7.61 | 15.4 | 232 | 90 | 857 | <1.0 |

### 2.2 Acute Toxicity Testing with Fathead Minnows

The fathead minnows used in this test were obtained from a commercial supplier (Aquatic Biosystems, Fort Collins, CO). These fish were maintained at 20°C in aerated aquaria containing EPA synthetic moderately-hard water prior to their use in this test. During this pre-test period, the fish were fed brine shrimp nauplii *ad libitum*.

The Lab Control water for this test consisted of EPA synthetic "moderately-hard" water, prepared by addition of reagent-grade chemicals to reverse-osmosis, de-ionized water. The receiving water (RSW-001) and the effluent sample (EFF-003) were tested at the 100% effluent concentration only. Water quality characteristics (pH, dissolved oxygen [D.O.], and conductivity) were determined for each test treatment test solution prior to use in this test.

There were two replicates for each test treatment, each replicate consisting of 400 mL of test solution in a 600-mL glass beaker. The test was initiated by randomly allocating 10 fathead minnows into each replicate beaker. The beakers were placed in a temperature-controlled room at 20°C under a 16L:8D photoperiod.

Each day, each replicate container was examined, and the number of live fish in each was recorded. Routine water quality characteristics (pH, D.O., and conductivity) of the treatment waters were measured and recorded for one randomly selected replicate per treatment each day.

On Day 2 of the 4-day test, fresh test solutions were prepared and characterized as before, and the fish were fed brine shrimp nauplii. Approximately 2 hrs after feeding, the number of live fish in each replicate was determined and then approximately 80% of the test media in each beaker was carefully poured out and replaced with fresh test solution, after which the "old" water quality characteristics (pH, D.O., and conductivity) were measured on the old test solution that had been discarded from one randomly-selected beaker at each treatment.

After 96 (±2) hrs, the test was terminated and the number of live fish in each replicate beaker was determined. The resulting survival data were analyzed to evaluate any impairment due to the wastewater; all statistical analyses were performed using the CETIS® statistical software (Version 1.1.2revL, TidePool Scientific, McKinleyville, CA).

### 2.3 Algal Growth Toxicity Testing with *Selenastrum capricornutum*

The chronic algal toxicity test consists of a 96-hr bioassay in which the green alga *Selenastrum capricornutum* is exposed to effluent or receiving water and the effects on cellular reproduction determined. The specific procedures used in this test are described below.

The receiving water served as the Control treatment for this test. The effluent sample was tested at the 100% concentration only. As an additional QA measure, a Lab Water Control treatment,

consisting of reverse osmosis, de-ionized (RO/DI), was also tested. Aliquots of the receiving water, effluent sample, and Lab Control water were spiked with nutrients and then filtered (using sterile 0.45 $\mu$m filters) before use in the algal test, as per EPA guidelines. Routine water quality characteristics (pH, D.O., and conductivity) were measured on these test solutions prior to their use in the test.

There were 4 replicates for each test treatment, each consisting of a 250-mL glass Erlenmeyer flask containing 100 mL of test solution. Each flask was inoculated to an initial cell density of 10,000 cells/mL of *Selenastrum* from an ongoing PER laboratory culture that is maintained in log growth phase. These flasks were loosely capped and randomly positioned within a temperature-controlled room at 25°C, under continuous cool-white fluorescent illumination. Each day, the flasks were gently shaken in the morning and in the afternoon and re-positioned within the room.

After 96 (±2) hours exposure, the algal cell density in each replicate flask was determined by spectrophotometric analysis. The resulting cell density data were analyzed to evaluate any impairment of algal growth caused by the effluent; all statistical analyses were performed using the CETIS® statistical software.

### 2.3.1 Reference Toxicant Testing of the *Selenastrum capricornutum*

In order to assess the sensitivity of the *Selenastrum* to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test except that test solutions consisted of Lab Control water spiked with NaCl at concentrations of 0.5, 1, 2, 4, and 8 gm/L. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., $IC_{50}$); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the typical response range established by the mean ± 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

## 2.4 Survival and Reproduction Toxicity Testing with *Ceriodaphnia dubia*

The short-term chronic *Ceriodaphnia* test consists of exposing individual females to effluent or receiving water for the length of time it takes for the Lab Control treatment females to produce 3 broods (typically 6-8 days), after which effects on survival and reproduction are evaluated. The specific procedures used in this test are described below.

The receiving water served as the Control treatment for this test. The effluent sample was tested at the 100% concentration only. As an additional QA measure, a Lab Water Control treatment, consisting of a mixture of commercial spring waters (80% Arrowhead:20% Evian) was also tested. Aliquots of the receiving water, the effluent sample, and the Lab Water Control water were used to prepare daily test solutions; for each treatment, 200 mL of test solution was amended with the alga *Selenastrum capricornutum* and Yeast-Cerophyll-Trout Food (YCT) to

provide food for the test organisms. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these food-amended test solutions prior to use in this test. Each day of the test, fresh test solutions and a "new" set of replicate cups were prepared and characterized, as before.

There were 10 replicates for each test treatment, each replicate consisting of 15 mL of test solution in a 30-mL plastic cup. This "3-brood" test was initiated by allocating one neonate (< 24 hours old) *Ceriodaphnia*, obtained from ongoing laboratory cultures, into each replicate. The replicate cups were placed into foam boards that floated in a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod.

Each test replicate cup was examined daily, with surviving "original" individual organisms being transferred to the corresponding new cup containing fresh test solution. The contents of each remaining "old" replicate cup were carefully examined, and the number of neonate offspring produced by each original organism was determined, after which "old" water quality characteristics (pH, D.O., and conductivity) were measured for the "old" media from one randomly-selected replicate at each treatment.

After it was determined that ≥ 60% of the *Ceriodaphnia* in the Lab Control treatment had produced their third brood of offspring, the test was terminated. The resulting survival and reproduction (number of offspring) data were analyzed to evaluate any impairment(s) caused by the effluent; all statistical analyses were performed using the CETIS® statistical software.

### 2.4.1 Reference Toxicant Testing of the *Ceriodaphnia dubia*

In order to assess the sensitivity of the *Ceriodaphnia* test organisms to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test except that test solutions consisted of Lab Control water spiked with NaCl at test concentrations of 250, 500, 1000, 1500 and 2000 mg/L. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., $EC_{50}$); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the typical response range established by the mean ± 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

## 2.5 Survival and Growth Toxicity Testing with Larval Fathead Minnows

The chronic fathead minnow test consists of exposing larval fish to effluent or receiving water for 7 days, after which effects on survival and growth are evaluated. The specific procedures used in this test are described below.

The receiving water served as the Control treatment for this test. The effluent sample was tested at the 100% concentration only. As an additional QA measure, a Lab Water Control treatment, consisting of US EPA synthetic moderately-hard water, was also tested. "New" water quality

characteristics (pH, D.O., and conductivity) were measured on these test solutions prior to use in the test. Each day of the test, fresh test solutions were prepared and characterized as before.

There were 4 replicates at each test treatment, each replicate consisting of 400 mL of test media in a 600-mL glass beaker. This test was initiated by randomly allocating 10 larval fathead minnows (<48 hrs old) into each replicate. The replicate beakers were placed in a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod. The test fish were fed brine shrimp nauplii twice daily.

Each replicate was examined daily, with any dead animals, uneaten food, wastes, and other detritus being removed. The number of live fish in each replicate was determined and then approximately 80% of the test media in each beaker was carefully poured out and replaced with fresh test solution. "Old" water quality characteristics (pH, D.O., and conductivity) were measured on the old test water that had been discarded from one randomly-selected replicate at each treatment.

After 7 days exposure, the number of live fish in each replicate beaker was recorded. The fish from each replicate were then carefully euthanized in methanol, rinsed in de-ionized water, and transferred to a pre-dried and pre-tared weighing pan. These fish were then dried at 100°C for 24 hrs and re-weighed to determine the total weight of fish in each replicate; the total weight was then divided by the initial number of fish per replicate (n=10) to determine the "biomass value". The resulting survival and growth ("biomass value") data were analyzed to evaluate any impairment(s) caused by the effluent; all statistical analyses were performed using the CETIS® statistical software.

### 2.5.1 Reference Toxicant Testing of the Larval Fathead Minnows

In order to assess the sensitivity of the fish to toxic stress, a reference toxicant test was performed concurrently with the effluent test. The reference toxicant test was performed similarly to the effluent test except that test solutions consisted of Lab Control media spiked with copper (as $CuSO_4$) at test concentrations of 6.25, 12.5, 25, 50, and 100 $\mu$g/L. The resulting test response data were analyzed to determine key dose-response point estimates (e.g., $EC_{50}$); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the typical response range established by the mean ± 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.

# 4. RESULTS

## 3.1 Acute Effects of the Effluent on Fathead Minnows

The results of this test are summarized in Table 2. There was 100% survival in the Receiving Water Control treatment; there was also 100% survival in the effluent treatment, which was not significantly less than the Receiving Water Control, indicating that there was no acute toxicity to fathead minnows present in the effluent sample.

There was 100% survival in the Lab Water Control treatment.

The test data and summary of statistics for this test are presented in Appendix B.

Table 2. Acute effects of the effluent on fathead minnows.

| Test Treatment | Mean % Survival |
|---|---|
| Lab Water Control | 100 |
| Receiving Water Control | 100 |
| 100% Effluent | 100 |

## 3.2 Chronic Effects of the Effluent on *Selenastrum capricornutum*

The results of this test are summarized below in Table 3. There was a mean final algal cell density of 4,990,000 cells/mL at the Receiving Water Control treatment; there were no significant reductions in algal cell density in the effluent. The NOEC was 100% effluent, resulting in 1.0 TUc (where TUc =100/NOEC).

There was a mean final algal cell density of 3,070,000 cells/mL in the Lab Control.

The test data and summary of statistical analyses for this test are presented in Appendix C.

Table 3. Effects of the effluent on *Selenastrum capricornutum* growth.

| Effluent Treatment | Mean Cell Density (cells/mL x $10^6$) |
|---|---|
| Lab Water Control | 3.07 |
| Receiving Water Control | 4.99 |
| 100% Effluent | 4.57 |

### 3.2.1 Reference Toxicant Toxicity to *Selenastrum capricornutum*

The results of this test are summarized below in Table 4. There was a mean of 2,620,000 cells/mL in the Lab Control treatment. The $IC_{50}$ was 1.94 gm/L NaCl.

These reference toxicant test results are consistent with previous *Selenastrum* reference toxicant tests performed in this laboratory, indicating that these organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix D.

Table 4. Reference toxicant testing: effects of NaCl on *Selenastrum capricornutum* growth.

| NaCl Treatment (gm/L) | Mean Algal Density (cells/mL x $10^6$) |
|---|---|
| Lab Control | 2.62 |
| 0.5 | 2.65 |
| **1** | **2.17*** |
| **2** | **1.26*** |
| **4** | **0.349*** |
| **8** | **0.034*** |
| **Summary of Statistics** | |
| $IC_{50}$ = 1.94 gm/L NaCl | |

* Significantly less than the Lab Control treatment response at $p < 0.05$.

### 3.3 Chronic Effects of the Effluent on *Ceriodaphnia dubia*

The results for this test are summarized below in Table 5. There was 100% survival and a mean of 19.5 offspring per female at the Receiving Water Control treatment; there were no significant reductions in survival or reproduction in the effluent. The NOECs of 100% effluent resulted in 1.0 TUc (where TUc =100/NOEC) for both test endpoints.

Due to problems encountered with the Lab Water Control test solution on Day 6 of the test, test organism survival in the Lab Control treatment was unacceptably low; however, the Receiving Water Control met all the test acceptability criteria and the effluent test results are considered valid.

The test data and summary of statistical analyses for this test are presented in Appendix E.

Table 5. Effects of the effluent on *Ceriodaphnia dubia* survival and reproduction.

| Effluent Treatment | % Survival | Reproduction (# neonates/female) |
|---|---|---|
| Lab Water Control | 0 | 5.5 |
| Receiving Water Control | 100 | 19.5 |
| 100% Effluent | 100 | 19.4 |

#### 3.3.1 Reference Toxicant Toxicity to *Ceriodaphnia dubia*

Due to problems encountered with the Lab Water Control test solution on Day 6 of the test, test organism survival in the control treatment was unacceptable low. As a result, and in order to provide confirmatory weight-of-evidence as to the quality of the test organisms, the results of the reference toxicant tests that were performed immediately prior to and immediately following the current effluent test are presented below.

Results of the reference toxicant test initiated on February 12, 2008, are summarized below in Table 6a. There was 100% survival and a mean of 25.6 neonates per female at the Lab Control treatment. The survival $EC_{50}$ was 1842 mg/L NaCl, and the reproduction $IC_{25}$ was 981 mg/L NaCl.

The reference toxicant test results were consistent with the reference toxicant test database, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and the summary of statistical analyses for this test are presented in Appendix F.

| Table 6a. Reference toxicant testing (2/12/08): Effects of NaCl on *Ceriodaphnia dubia* | | |
|---|---|---|
| Treatment (mg/L NaCl) | % Survival | Reproduction (# neonates/female) |
| Lab Control | 100 | 25.6 |
| 250 | 100 | 25.5 |
| 500 | 100 | 24.4 |
| **1000*** | 100 | **19.00*** |
| **1500*** | 100 | **8.9*** |
| **2000*** | **30*** | 0 |
| **Summary of Key Statistics** | | |
| Survival $EC_{50}$ or Reproduction $IC_{25}$ = | 1842 mg/L NaCl | 981 mg/L NaCl |

* Significantly less than the Lab Control treatment response at $p < 0.05$.

Results of the reference toxicant test initiated on March 11, 2008, are summarized below in Table 6b. There was 80% survival and a mean of 20 neonates per female at the Lab Control treatment. The survival $EC_{50}$ was 1732 mg/L NaCl, and the reproduction $IC_{25}$ was 1121 mg/L NaCl.

The reference toxicant test results were consistent with the reference toxicant test database, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and the summary of statistical analyses for this test are also presented in Appendix F.

| Table 6b. Reference toxicant testing (3/11/08): Effects of NaCl on *Ceriodaphnia dubia* | | |
|---|---|---|
| Treatment (mg/L NaCl) | % Survival | Reproduction (# neonates/female) |
| Lab Control | 80 | 20.0 |
| 250 | 100 | 19.6 |
| 500 | 100 | 20.8 |
| **1000*** | 100 | **16.7*** |
| **1500*** | 100 | **10.1*** |
| **2000*** | **0*** | 0 |
| **Summary of Key Statistics** | | |
| Survival $EC_{50}$ or Reproduction $IC_{25}$ = | 1732 mg/L NaCl | 1121 mg/L NaCl |

* Significantly less than the Lab Control treatment response at $p < 0.05$.

### 3.4 Chronic Effects of the Effluent on Fathead Minnows

The results of this test are summarized below in Table 7. There was 92.5% survival at the Receiving Water Control treatment; there was 62.5% survival in the 100% effluent treatment, which was significantly less than the Receiving Water Control. The NOEC was <100% effluent, resulting in >1.0 TUc (where TUc =100/NOEC).

The mean fish biomass value was 0.47 mg at the Receiving Water Control treatment; due to the significant reduction in survival, the growth endpoint is not evaluated, as per EPA guidelines.

There was 100% survival and a mean fish biomass value of 0.52 mg at the Lab Control treatment.

It should be noted that the fish in the effluent treatment replicates exhibited pathogen-related mortality (PRM), which is characterized by dead fish encased in a 'corona' of fungal filaments and inter-replicate variability. It is recommended that future testing be performed using an alternative approved EPA method that reduces the impact of PRM on fathead minnow toxicity tests.

The test data and the summary of statistical analyses for this test are presented in Appendix G.

Table 7. Effects of the effluent on fathead minnow survival and growth.

| Effluent Treatment | Mean % Survival | Mean Fish Biomass Value (mg) |
|---|---|---|
| Lab Water Control | 100 | 0.52 |
| Receiving Water Control | 92.5 | 0.47 |
| 100% Effluent | **62.5*** | 0.08 |

* Significantly less than the Receiving Water Control treatment response at $p < 0.05$.

### 3.4.1 Reference Toxicant Toxicity to Fathead Minnows

The results of this test are summarized below in Table 8. There was 100% survival and a mean biomass value of 0.54 mg at the Lab Control treatment. The survival $EC_{50}$ value was 17.7 $\mu$g/L Cu, and the growth $IC_{50}$ was 18.4 $\mu$g/L Cu.

These reference toxicant test results are consistent with previous fathead minnow reference toxicant tests performed in this laboratory, indicating that these organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix H.

Table 8. Reference toxicant testing: effects of copper on fathead minnows.

| Copper Treatment ($\mu$g/L) | Mean % Survival | Overall Mean Biomass Value |
|---|---|---|
| Lab Control | 100 | 0.54 |
| 6.25 | 97.5 | 0.57 |
| 12.5 | 97.5 | 0.50 |
| **25** | **7.7*** | 0.02 |
| **50** | **0*** | 0.00 |
| **100** | **0*** | 0.00 |
| **Summary of Statistics** | | |
| Survival $EC_{50}$ or Growth $IC_{50}$ = | 17.7 $\mu$g/L Cu | 18.4 $\mu$g/L Cu |

* Significantly less than the Lab Control treatment response at $p < 0.05$.

# 4. SUMMARY AND CONCLUSIONS

**Acute Effects of "EFF-003" Effluent on Fathead Minnows**
There were *no significant reductions* in survival, indicating that the effluent was *not* acutely toxic to fathead minnows.

**Chronic Effects of "EFF-003" Effluent on *Selenastrum capricornutum***
There were *no significant reductions* in algal growth in the effluent sample; the NOEC was 100% effluent, resulting in 1.0 TUc (where TUc =100/NOEC).

**Chronic Effects of "EFF-003" Effluent on *Ceriodaphnia dubia***
There were *no significant reductions* in survival or reproduction in the effluent sample. The NOECs of 100% effluent resulted in 1.0 TUc (where TUc =100/NOEC) for both test endpoints.

**Chronic Effects of "EFF-003" Effluent on Fathead Minnows**
There was a significant reduction in fathead minnow survival in the effluent; the NOEC was <100% effluent, resulting in >1.0 TUc. The significant reductions in fathead minnow survival were likely due to PRM; it is recommended that future testing be performed using an alternative approved EPA method that reduces the impact of PRM on fathead minnow toxicity tests.

## 4.1 QA/QC Summary

**Test Conditions** – Test conditions (pH, D.O., temperature, etc.) were all within acceptable limits for these effluent tests. All analyses were performed according the laboratory Standard Operating Procedures.

**Negative Lab Control** – Due to problems encountered with the Lab Water Control test solution on Day 6 of the test, *Ceriodaphnia dubia* survival in the control treatment was unacceptably low; however, since the Receiving Water Control met test acceptability criteria and is the basis for evaluating the presence or absence of toxicity, the poor survival in the Lab Water Control does not affect the interpretation of the effluent test. The biological responses for the *Selenastrum capricornutum* and fathead minnows at the Lab Control treatments were within acceptable limits.

**Positive Control** – As a result, and in order to provide confirmatory weight-of-evidence as to the quality of the test organisms, the results of the *Ceriodaphnia dubia* reference toxicant tests that were performed immediately prior to and immediately following the current effluent test were presented. The results for the reference toxicant tests were consistent with the reference toxicant test databases, indicating that these test organisms were responding to toxic stress in a typical fashion.

**Concentration Response Relationships** – There were valid concentration-response relationships for the reference toxicant, which were therefore deemed acceptable for this testing.

# Appendix A

# Chain-of-Custody Records for the Collection and Delivery of the Effluent and Receiving Water Samples

**Precision Analytical**

# Chain of Custody Form

Page 1 of 1

| Client Information | | | |
|---|---|---|---|
| Company: | PACIFIC ECORISK | | |
| Address: | | | |
| City: | | State: | Zip: |
| Report To: | Tel: | Fax: | Email: |
| Report To: | Tel: | Fax: | Email: |

Client Instructions: ACUTE & CHRONIC TOXICITY ACCORDING TO TELCON W/ COTSIFAS

Lab No:

Report Delivery ("x" where applicable): Fax | Email | US Post [X]

Project ID:

| Log-In/Project Billing Information (lab use only) | |
|---|---|
| Log-In Date: | 3/4/08 |
| Logged-In By: | STEVE HARRIS |
| Field Sampling: | hours miles |
| Precision Analytical Quote No: | |
| Client P.O. No: | |

Matrix Codes: (column below)
AQ = Aqueous
W = Water S = Solid
G = Gas M = Multi-phasic
A = Air O = Oil
F = Filter U = Unknown

| Temperature Readings: | °C | °F |
|---|---|---|
| Cooler (Inside) | | |
| Bacteriological Container | | |
| VOA Vial #1 | 33.0 | |
| Other: #2 | 19.5 | |

Preserved: Y = Yes N = No
Container: P = Plastic G = Glass

Priority Codes: (column below)
IM = Immediate 24 = 24 hour
48 = 48 hour N = 10 day

| Sample No. | Sample Description | Matrix Code | Date Sampled | Time Sampled | CHRONIC TOXICITY | ACUTE TOXICITY | Priority Code | Sampled By | (MI) Preserved | (G/P) Container |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ~~EFF-001~~ EFF-003 | W | 3/4/08 | 1120 | X | X | N | STEVE HARRIS | | P |
| 2 | ~~RSW-004~~ | W | 3/4/08 | 1145 | X | X | N | STEVE HARRIS | | P |

Steve Harris 6/27/08

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1, Relinquished By: | Steve Harris | Date: 3/4/08 | Time: 1430 | Received By: | Marlita Cruz | Date: 3-5-08 | Time: 1100 |
| 2, Relinquished By: | | Date: | Time: | Received By: | | Date: | Time: |
| 3, Relinquished By: | | Date: | Time: | Received By: | | Date: | Time: |

...al, 321 19th Street, Bakersfield, CA, 93301-4905, Tel: 661 323 1682, Fax 661 323 1684 or 661 323 1682, Email: sharris@bak.rr.com

# Appendix B

# Test Data and Summary of Statistics for the Evaluation of the Acute Toxicity of the Effluent to Fathead Minnows

# CETIS Test Summary

Report Date: 03 Apr-08 10:46 AM
Test Link: 07-8250-3673/27770

**Acute Fish Survival Test** — **Pacific EcoRisk**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 15-4113-8302 | **Test Type:** | Survival (96h) | **Duration:** | 94h |
| **Start Date:** | 05 Mar-08 05:00 PM | **Protocol:** | EPA/600/4-90/027F (1991) | **Species:** | Pimephales promelas |
| **Ending Date:** | 09 Mar-08 03:15 PM | **Dil Water:** | Not Applicable | **Source:** | Aquatic Biosystems, CO |
| **Setup Date:** | 05 Mar-08 05:00 PM | **Brine:** | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 02-8216-0966 | **Code:** | 13054 | **Client:** | Precision Analytical |
| **Sample Date:** | 04 Mar-08 11:20 AM | **Material:** | Effluent | **Project:** | NPDES |
| **Receive Date:** | 05 Mar-08 11:00 AM | **Source:** | Precision Analytical | | |
| **Sample Age:** | 30h (19.7 °C) | **Station:** | EFF-001 | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 10-1153-6079 | 96h Proportion Survived | 100 | > 100 | N/A | N/A | Fisher Exact |

**96h Proportion Survived Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 2 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 2 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |

**96h Proportion Survived Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 |
|---|---|---|---|
| 0 | Lab Water | 1.00000 | 1.00000 |
| 100 | | 1.00000 | 1.00000 |

# CETIS Analysis Detail

**Acute Fish Survival Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| 96h Proportion Survived | Comparison | 07-8250-3673 | 07-8250-3673 | 03 Apr-08 10:46 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Fisher Exact | C > T | Untransformed | | 100 | >100 | 1 | N/A | |

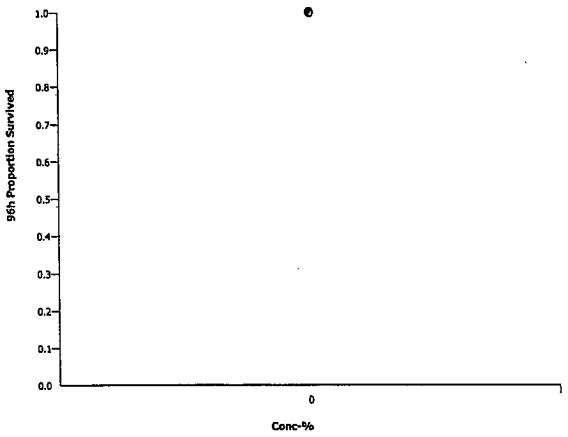
**Group Comparisons**

| Control | vs | Conc-% | Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|
| Lab Water | | 100 | 1.00000 | 1.00000 | Non-Significant Effect |

**Data Summary**

| Conc-% | Control Type | Non-Responders | Responders | Total Observed |
|---|---|---|---|---|
| 0 | Lab Water | 20 | 0 | 20 |
| 100 | | 20 | 0 | 20 |

**Graphics**



# 96 Hour Acute Fathead Minnow Toxicity Test

Client: **Precision Analytical** Organism Log #: 3789 Age: 9d

Test Material: EFF-001 Organism Supplier: ABS

Test ID#: 27770 Project # 13054 Control: EPAHH

Test Date: 3/5/08 Control Water Batch: 1083

Feeding $T_0$ Time: 1000 Initials: CB Feeding T46-hr Time: 0830 Initials CB

| Treatment | Temp (°C) | pH new | pH old | D.O. (mg/L) new | D.O. (mg/L) old | Conductivity (µS/cm) new | Conductivity (µS/cm) old | # Live Organisms Rep A | # Live Organisms Rep B | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|
| Control | 20.4 | 8.26 | | 10.0 | | 294 | | 10 | 10 | Date: 3/5/08<br>Sample ID: 19157<br>Test Solution Prep: QD |
| 100% | 20.4 | 7.88 | | 9.4 | | 852 | | 10 | 10 | New WQ: ES<br>Initiation Time: 1700<br>Initiation Signoff: QD |
| Meter ID | 6A | pH23 | | DO12 | | EC04 | | | | |
| Control | 20.1 | | 8.39 | | 8.7 | | 301 | 10 | 10 | Date: 3-6-08<br>Count Time: 1135<br>Count Signoff: JC |
| 100% | 20.1 | | 8.26 | | 9.2 | | 862 | 10 | 10 | Old WQ: HTA |
| Meter ID | 6A | | pH03 | | DOM | | EC01 | | | |
| Control | 20.2 | 8.23 | 8.54 | 9.5 | 7.4 | 294 | 330 | 10 | 10 | Date: 3/7/08<br>Sample ID: 19157<br>Test Solution Prep: ✓ |
| 100% | 20.2 | 8.08 | 8.64 | 9.9 | 7.1 | 853 | 874 | 10 | 10 | New WQ: MB<br>Renewal Time: 14:15<br>Renewal Signoff: CB |
| Meter ID | 6A | PH12 | PH12 | DO10 | DO10 | EC04 | EC04 | | | Old WQ: MB |
| Control | 20.1 | | 7.90 | | 8.3 | | 304 | 10 | 10 | Date: 3/8/08<br>Count Time: 1015<br>Count Signoff: JJ |
| 100% | 20.1 | | 8.16 | | 8.0 | | 863 | 10 | 10 | Old WQ: HN |
| Meter ID | 6A | | PH11 | | DO10 | | EC01 | | | |
| Control | 20.1 | | 7.87 | | 8.5 | | 327 | 10 | 10 | Date: 3/9/08<br>Termination Time: 1515<br>Termination Signoff: MR |
| 100% | 20.1 | | 8.25 | | 8.5 | | 901 | 10 | 10 | Old WQ: HN |
| Meter ID | 6A | | PH11 | | DO10 | | EC01 | | | |

# CETIS Test Summary

**Report Date:** 03 Apr-08 10:47 AM
**Test Link:** 02-8885-4315/27771

**Acute Fish Survival Test** — **Pacific EcoRisk**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 15-4113-8302 | **Test Type:** | Survival (96h) | **Duration:** | 94h |
| **Start Date:** | 05 Mar-08 05:00 PM | **Protocol:** | EPA/600/4-90/027F (1991) | **Species:** | Pimephales promelas |
| **Ending Date:** | 09 Mar-08 03:15 PM | **Dil Water:** | Not Applicable | **Source:** | Aquatic Biosystems, CO |
| **Setup Date:** | 05 Mar-08 05:00 PM | **Brine:** | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 00-8480-3111 | **Code:** | 13054 | **Client:** | Precision Analytical |
| **Sample Date:** | 04 Mar-08 11:45 AM | **Material:** | Effluent | **Project:** | NPDES |
| **Receive Date:** | 05 Mar-08 11:00 AM | **Source:** | Precision Analytical | | |
| **Sample Age:** | 29h (19.9 °C) | **Station:** | RSW-001 | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 07-7479-0749 | 96h Proportion Survived | 100 | >100 | N/A | N/A | Fisher Exact |

**96h Proportion Survived Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 2 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 2 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |

**96h Proportion Survived Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 |
|---|---|---|---|
| 0 | Lab Water | 1.00000 | 1.00000 |
| 100 | | 1.00000 | 1.00000 |

# CETIS Analysis Detail

**Acute Fish Survival Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| 96h Proportion Survived | Comparison | 02-8885-4315 | 02-8885-4315 | 03 Apr-08 10:47 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Fisher Exact | C > T | Untransformed | | 100 | >100 | 1 | N/A | |

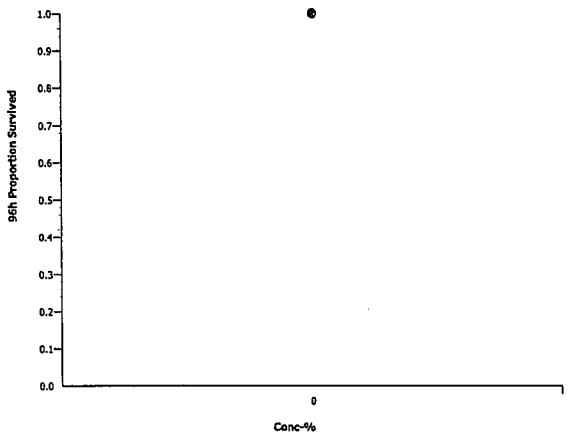
**Group Comparisons**

| Control | vs | Conc-% | Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|
| Lab Water | | 100 | 1.00000 | 1.00000 | Non-Significant Effect |

**Data Summary**

| Conc-% | Control Type | Non-Responders | Responders | Total Observed |
|---|---|---|---|---|
| 0 | Lab Water | 20 | 0 | 20 |
| 100 | | 20 | 0 | 20 |

**Graphics**



# 96 Hour Acute Fathead Minnow Toxicity Test

Client: **Precision Analytical** Organism Log #: 3789 Age: 9d

Test Material: RSW-001 Organism Supplier: ABS

Test ID#: 27771 Project # 13054 Control: EPA Mill

Test Date: 3/5/08 Control Water Batch: 1083

Feeding $T_0$ Time: 1000 Initials: CB Feeding T46-hr Time: 8:50 Initials CB

| Treatment | Temp (°C) | pH new | pH old | D.O. (mg/L) new | D.O. (mg/L) old | Conductivity (µS/cm) new | Conductivity (µS/cm) old | # Live Organisms Rep A | # Live Organisms Rep B | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|
| Control | 20.4 | 8.26 | | 10.0 | | 294 | | 10 | 10 | Date: 3/5/08<br>Sample ID: 19158<br>Test Solution Prep: QD |
| 100% | 20.4 | 8.02 | | 9.5 | | 275 | | 10 | 10 | New WQ: CES<br>Initiation Time: 1700<br>Initiation Signoff: QD |
| Meter ID | 6A | pH03 | | D012 | | EC04 | | | | |
| Control | 20.1 | | 8.39 | | 8.7 | | 301 | 10 | 10 | Date: 3-6-08<br>Count Time: 1135<br>Count Signoff: |
| 100% | 20.1 | | 8.41 | | 9.2 | | 274 | 10 | 10 | Old WQ: HEA |
| Meter ID | 6A | | PH03 | | D014 | | EC01 | | | |
| Control | 20.2 | 8.23 | 8.54 | 9.5 | 7.4 | 294 | 330 | 10 | 10 | Date: 3/7/08<br>Sample ID: 19158<br>Test Solution Prep: |
| 100% | 20.2 | 8.14 | 8.52 | 9.8 | 7.2 | 266 | 280 | 10 | 10 | New WQ: MB<br>Renewal Time: 14:15<br>Renewal Signoff: CB |
| Meter ID | 6A | PH12 | PH12 | D010 | D010 | EC04 | EC04 | | | Old WQ: MB |
| Control | 20.1 | | 7.90 | | 8.3 | | 304 | 10 | 10 | Date: 3/8/08<br>Count Time: 1015<br>Count Signoff: JJ |
| 100% | 20.1 | | 8.05 | | 8.2 | | 279 | 10 | 10 | Old WQ: HM |
| Meter ID | 6A | | PH11 | | D010 | | EC01 | | | |
| Control | 20.1 | | 7.87 | | 8.5 | | 327 | 10 | 10 | Date: 3/9/08<br>Termination Time: 1515<br>Termination Signoff: MR |
| 100% | 20.1 | | 8.20 | | 8.4 | | 305 | 10 | 10 | Old WQ: HN |
| Meter ID | 6A | | PH11 | | D010 | | EC05 | | | |

# Appendix C

# Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Effluent to *Selenastrum capricornutum*

# CETIS Test Summary

**Report Date:** 03 Apr-08 10:55 AM
**Test Link:** 00-9902-9290/27817

**Selenastrum Growth Test** — **Pacific EcoRisk**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 11-2795-3534 | **Test Type:** | Cell Growth | **Duration:** | 95h |
| **Start Date:** | 05 Mar-08 03:05 PM | **Protocol:** | EPA/600/4-91/002 (1994) | **Species:** | Selenastrum capricornutum |
| **Ending Date:** | 09 Mar-08 02:00 PM | **Dil Water:** | Receiving Water | **Source:** | In-House Culture |
| **Setup Date:** | 05 Mar-08 03:05 PM | **Brine:** | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 02-8216-0966 | **Code:** | 13054 | **Client:** | Precision Analytical |
| **Sample Date:** | 04 Mar-08 11:20 AM | **Material:** | Effluent | **Project:** | NPDES |
| **Receive Date:** | 05 Mar-08 11:00 AM | **Source:** | Precision Analytical | | |
| **Sample Age:** | 28h (19.7 °C) | **Station:** | EFF-001 | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 15-6467-1194 | Cell Density | 100 | >100 | N/A | 16.62% | Equal Variance t Two-Sample |
| 19-5276-9472 | | 0 | >0 | N/A | 20.66% | Equal Variance t Two-Sample |

**Cell Density Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 4 | 3.07E+6 | 2.51E+6 | 3.71E+6 | 2.59E+5 | 5.18E+5 | 16.89% |
| 0 | Receiving Wat | 4 | 4.99E+6 | 4.66E+6 | 5.49E+6 | 1.98E+5 | 3.97E+5 | 7.95% |
| 100 | | 4 | 4.57E+6 | 4.50E+6 | 4.68E+6 | 4.18E+4 | 8.37E+4 | 1.83% |

**Cell Density Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | Lab Water | 3.71E+6 | 3.23E+6 | 2.83E+6 | 2.51E+6 |
| 0 | Receiving Wat | 5.12E+6 | 4.68E+6 | 5.49E+6 | 4.66E+6 |
| 100 | | 4.68E+6 | 4.59E+6 | 4.51E+6 | 4.50E+6 |

# CETIS Analysis Detail

**Selenastrum Growth Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Cell Density | Comparison | 00-9902-9290 | 00-9902-9290 | 03 Apr-08 10:55 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 16.62% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Lab Water | | 100 | -5.7125 | 1.94318 | 0.9994 | 510247 | Non-Significant Effect |

**ANOVA Table**

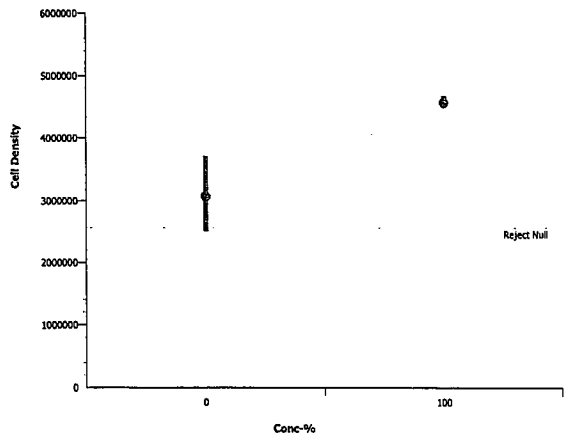
| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4.5E+12 | 4.5E+12 | 1 | 32.63 | 0.00125 | Significant Effect |
| Error | 8.274E+11 | 1.379E+11 | 6 | | | |
| Total | 5.3274E+12 | 4.638E+12 | 7 | | | |

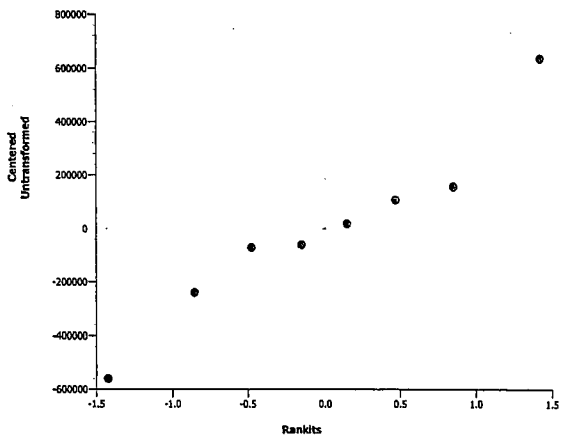
**ANOVA Assumptions**

| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 38.40000 | 47.46723 | 0.01362 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95440 | | 0.75536 | Normal Distribution |

| Data Summary | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Lab Water | 4 | 3.07E+6 | 2.51E+6 | 3.71E+6 | 5.18E+5 | | | | |
| 100 | | 4 | 4.57E+6 | 4.50E+6 | 4.68E+6 | 8.37E+4 | | | | |

**Graphics**



# CETIS Analysis Detail

**Selenastrum Growth Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Cell Density | Comparison | 00-9902-9290 | 00-9902-9290 | 03 Apr-08 10:55 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 0 | >0 | N/A | N/A | 20.66% |

**Group Comparisons**

| Control | vs | Control | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Lab Water | | Receiving Water/Effl | -5.8751 | 1.94318 | 0.9995 | 634212 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 7.354E+12 | 7.354E+12 | 1 | 34.52 | 0.00108 | Significant Effect |
| Error | 1.278E+12 | 2.130E+11 | 6 | | | |
| Total | 8.6319E+12 | 7.567E+12 | 7 | | | |

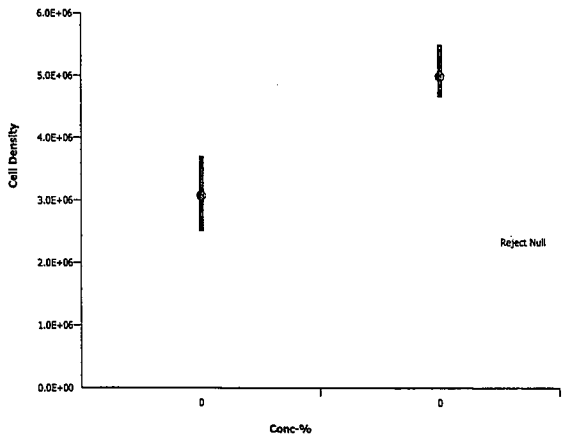
**ANOVA Assumptions**

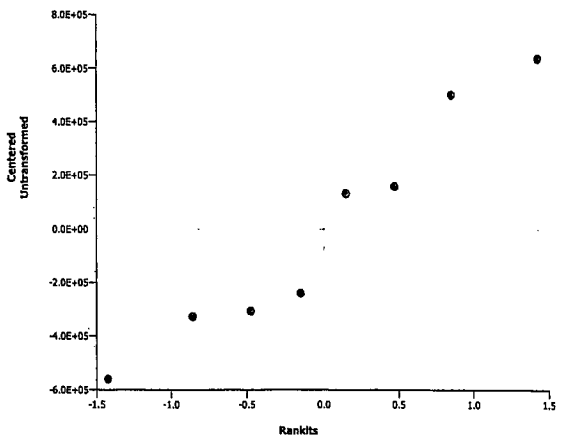
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.70893 | 47.46723 | 0.67064 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93203 | | 0.53474 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Lab Water | 4 | 3.07E+6 | 2.51E+6 | 3.71E+6 | 5.18E+5 | | | | |
| 0 | Receiving Wat | 4 | 4.99E+6 | 4.66E+6 | 5.49E+6 | 3.97E+5 | | | | |

**Graphics**



# *Selenastrum capricornutum* Algal Toxicity Test Data Sheet

Client: **Precision Analytical** Sample ID: Effluent

Test Start Date: 3/5/08 Test ID #: 27817 Project #: 13054

Test End Date: 3/9/08 Control/Diluent: Algal medium w/o EDTA Location: RSS1

All Control Water is unfiltered

| Test Treatment | Temp (°C) | pH | D.O. (mg/L) | Conductivity (µS/cm) | Sign-Off |
|---|---|---|---|---|---|
| Lab Water Control | 25.0 | 7.59 | 9.2 | 99 | Date: 3/5/08 |
| Receiving Water | 25.0 | 8.11 | 9.4 | 349 | Sample ID #: 19157 |
| 100% | 25.0 | 7.99 | 9.2 | 914 | Test Solution Prep: MR |
| | | | | | New WQ: AB for CCS |
| | | | | | Inoculation Time: 1505 |
| Meter ID | 6 | pH03 | DO12 | EC04 | Innoculation Signoff: MR |
| Lab Water Control | 25.6 | 7.86 | | | Date: 3·6·08 |
| Receiving Water | 25.6 | 8.34 | | | WQ Time: 0950 |
| 100% | 25.6 | 8.39 | | | WQ Signoff: BB |
| Meter ID | 9A | PH11 | | | |
| Lab Water Control | 25.3 | 9.43 | | | Date: 3-7-08 |
| Receiving Water | 25.3 | 8.94 | | | WQ Time: 1325 |
| 100% | 25.3 | 8.90 | | | WQ Signoff: AB for CCS |
| Meter ID | 6 | pH11 | | | |
| Lab Water Control | 25.1 | 10.05 | | | Date: 3/8/08 |
| Receiving Water | 25.1 | 9.71 | | | WQ Time: 1340 |
| 100% | 25.1 | 9.41 | | | WQ Signoff: AS |
| Meter ID | 6 | pH11 | | | |
| Lab Water Control | 25.3 | 10.20 | 16.2 | 148 | Date: 3-9-08 |
| Receiving Water | 25.3 | 10.37 | 720.0 | 349 | WQ Time: 955 |
| 100% | 25.3 | 9.86 | 720.0 | 842 | WQ Signoff: ~~AS~~ MM |
| Meter ID | 6 | pH12 | DO14 | EC04 | WQ Signoff: MM |

Initial Count: 10,000 cells/mL Termination Time: 1400 Enumerating Scientist: MR

| Treatment | Cell Density ( cells/mL x $10^6$) | | | | Mean Cell Density ( cells/mL x $10^6$) |
|---|---|---|---|---|---|
| | Rep A | Rep B | Rep C | Rep D | |
| Lab Water Control | 3.71 | 3.23 | 2.83 | 2.51 | 3.07 |
| Receiving Water | 5.12 | 4.68 | 5.49 | 4.66 | 4.99 |
| 100% | 4.68 | 4.59 | 4.51 | 4.50 | 4.57 |

This datasheet has been reviewed for completeness and consistency with Test Acceptability Criteria and/or other issues of concern.

| | Control Mean Density (cells/mL x $10^6$) | % CV | Date: | Time: | Signoff: |
|---|---|---|---|---|---|
| Lab Water Control | 3.07 | 16.9 | 3/9/08 | 1415 | MR |
| Receiving Water | 4.99 | 7.9 | 3/9/08 | 1415 | MR |
| 100% | ~~4.57~~ | — | — | — | — |

| Initial Test Conditions | Alkalinity | Hardness | Light Intensity (ftc) |
|---|---|---|---|
| | ✓ 231 | ✓ 101 | 412 |

# Appendix D

# Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Selenastrum capricornutum*

# CETIS Test Summary

Report Date: 10 Mar-08 1:19 PM
Test Link: 14-2422-6748/27814

**Selenastrum Growth Test** — **Pacific EcoRisk**

| | | | | | |
|---|---|---|---|---|---|
| Test No: | 04-7884-2458 | Test Type: | Cell Growth | Duration: | 4d 0h |
| Start Date: | 05 Mar-08 01:30 PM | Protocol: | EPA/821/R-02-013 (2002) | Species: | Selenastrum capricornutum |
| Ending Date: | 09 Mar-08 02:00 PM | Dil Water: | Laboratory Water | Source: | In-House Culture |
| Setup Date: | 05 Mar-08 01:30 PM | Brine: | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| Sample No: | 03-6829-9659 | Code: | 13057 | Client: | |
| Sample Date: | 05 Mar-08 01:30 PM | Material: | Sodium chloride | Project: | |
| Receive Date: | 05 Mar-08 01:30 PM | Source: | Reference Toxicant | | |
| Sample Age: | N/A (25 °C) | Station: | In House | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 14-2808-7569 | Cell Density | 0.5 | 1 | 0.70711 | 11.20% | Steel Many-One Rank |

**Point Estimate Summary**

| Analysis | Endpoint | % Effect | Conc-g/L | 95% LCL | 95% UCL | Method |
|---|---|---|---|---|---|---|
| 06-8484-2301 | Cell Density | 1 | 0.5280933 | N/A | 0.5483798 | Linear Interpolation |
| | | 5 | 0.6404667 | 0.07697 | 0.7418988 | |
| | | 10 | 0.7809333 | 0.4148443 | 0.9837978 | |
| | | 15 | 0.9214 | 0.6336427 | 1.164672 | |
| | | 20 | 1.064266 | 0.8177669 | 1.300168 | |
| | | 25 | 1.21018 | 0.9674854 | 1.44352 | |
| | | 40 | 1.647922 | 1.396043 | 1.919051 | |
| | | 50 | 1.939751 | 1.66115 | 2.383147 | |

**Cell Density Summary**

| Conc-g/L | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 4 | 2.62E+6 | 2.25E+6 | 2.84E+6 | 1.33E+5 | 2.65E+5 | 10.12% |
| 0.5 | | 4 | 2.65E+6 | 2.40E+6 | 3.01E+6 | 1.31E+5 | 2.62E+5 | 9.91% |
| 1 | | 4 | 2.17E+6 | 2.11E+6 | 2.21E+6 | 2.22E+4 | 4.43E+4 | 2.05% |
| 2 | | 4 | 1.26E+6 | 1.06E+6 | 1.51E+6 | 9.59E+4 | 1.92E+5 | 15.20% |
| 4 | | 4 | 3.49E+5 | 3.20E+5 | 3.70E+5 | 1.10E+4 | 2.21E+4 | 6.33% |
| 8 | | 4 | 3.35E+4 | 3.07E+4 | 3.55E+4 | 1.03E+3 | 2.06E+3 | 6.14% |

**Cell Density Detail**

| Conc-g/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | Lab Water | 2.78E+6 | 2.25E+6 | 2.84E+6 | 2.61E+6 |
| 0.5 | | 2.65E+6 | 2.40E+6 | 2.53E+6 | 3.01E+6 |
| 1 | | 2.15E+6 | 2.21E+6 | 2.19E+6 | 2.11E+6 |
| 2 | | 1.18E+6 | 1.51E+6 | 1.06E+6 | 1.30E+6 |
| 4 | | 3.43E+5 | 3.61E+5 | 3.20E+5 | 3.70E+5 |
| 8 | | 3.44E+4 | 3.07E+4 | 3.55E+4 | 3.33E+4 |

# *Selenastrum capricornutum* Cell Density Enumeration Data

Client: **Reference Toxicant** Initial Count: 10,000 cells/ml

Test Material: NaCl Enumerating Scientist: MR

Test Start Date: 3/5/08 Start Time: 1330 Test ID #: 27814

Test End Date: 3/9/08 End Time: 1400 Project #: 13057

| Treatment | Rep A | Rep B | Rep C | Rep D | Mean |
|---|---|---|---|---|---|
| Lab Water Control (W/EDTA) | 2.78 | 2.25 | 2.84 | 2.61 | 2.63 |
| 0.5 | 2.65 | 2.40 | 2.53 | 3.01 | 2.65 |
| 1 | 2.15 | 2.21 | 2.19 | 2.11 | 2.17 |
| 2 | 1.18 | 1.51 | 1.06 | 1.30 | ~~1.01~~ 1.26 MR |
| 4 | 0.343 | 0.361 | 0.320 | 0.370 | 0.349 |
| 8 | 0.0344 | 0.0307 | 0.0355 | 0.0333 | 0.0335 |

| This datasheet has been reviewed for completeness and consistency with Test Acceptability Criteria and/or other issues of concern. | **Control Mean Density (cells/mL x $10^6$)** | **% CV** | **Date:** | **Time:** | **Signoff:** |
|---|---|---|---|---|---|
| | 2.63 | 10.3 | ~~MR~~ HE 3/9/08 | 1415 | MR |

# *Selenastrum capricornutum* Algal Toxicity Test Water Quality Data

Client: **Reference Toxicant** Test ID #: 27814 Test Date: 3/5/08

Test Material: NaCl Project #: 13057 Control/Diluent: Algal Medium-w/ EDTA

| Reference Toxicant Test Treatment (g/L NaCl) | Temp (°C) | pH | D.O. (mg/L) | Conductivity (µS/cm) | Sign-Off |
|---|---|---|---|---|---|
| Lab Water Control | 25.0 | 8.18 | 9.2 | 95 | Date: 3/5/08 |
| 0.5 | 25.0 | 8.08 | 9.2 | 1067 | Test Solution Prep: MR |
| 1 | 25.0 | 8.05 | 9.2 | 2030 | New WQ: CCS |
| 2 | 25.0 | 8.01 | 9.2 | 3890 | Innoculation Time: 1330 |
| 4 | 25.0 | 7.94 | 9.3 | 7540 | Innoculation Signoff: MR |
| 8 | 25.0 | 7.87 | 9.3 | 14440 | |
| Meter ID: | 6 | pH03 | DO10 | EC03 | |
| Lab Water Control | 25.6 | 7.71 | | | Date: 3/6/08 |
| 0.5 | 25.6 | 7.69 | | | WQ Time: 0920 |
| 1 | 25.6 | 7.65 | | | WQ Signoff: MR |
| 2 | 25.6 | 7.64 | | | |
| 4 | 25.6 | 7.60 | | | |
| 8 | 25.6 | 7.56 | | | |
| Meter ID: | 9A | PH12 | | | |
| Lab Water Control | 24.9 | 9.25 | | | Date: 3/7/08 |
| 0.5 | 24.9 | 9.23 | | | WQ Time: 1330 |
| 1 | 24.9 | 9.14 | | | WQ Signoff: CCS |
| 2 | 24.9 | 8.92 | | | |
| 4 | 24.9 | 8.68 | | | |
| 8 | 24.9 | 8.52 | | | |
| Meter ID: | 11 | pH11 | | | |
| Lab Water Control | 24.8 | 9.96 | | | Date: 3/8/08 |
| 0.5 | 24.8 | 9.81 | | | WQ Time: 1535 |
| 1 | 24.8 | 9.65 | | | WQ Signoff: AS |
| 2 | 24.8 | 9.26 | | | |
| 4 | 24.8 | 8.94 | | | |
| 8 | 24.8 | 8.63 | | | |
| Meter ID: | 11 | pH11 | | | |
| Lab Water Control | 24.8 | 10.22 | 14.7 | 128 | Date: 3/9/08 |
| 0.5 | 24.8 | 10.02 | 14.1 | 1048 | Termination Time: 1400 |
| 1 | 24.8 | 9.93 | 13.5 | 1942 | Termination Signoff: MR |
| 2 | 24.8 | 9.07 | 10.4 | 3770 | WQ Time: 940 |
| 4 | 24.8 | 9.10 | 10.9 | 7310 | WQ Signoff: HN |
| 8 | 24.8 | 8.29 | 9.2 | 13890 | |
| Meter ID: | 11 | PH12 | DO14 | EC05 | |

| Initial Test Conditions | Alkalinity | Hardness | Light Intensity (ftc) |
|---|---|---|---|
| | ✓ 9 | ✓ 16 | 415 |

# Appendix E

# Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Effluent to *Ceriodaphnia dubia*

# CETIS Test Summary

Report Date: 03 Apr-08 1:31 PM
Test Link: 17-4826-1760/27821

**Cladoceran Survival and Reproduction Test** — Pacific EcoRisk

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 13-3073-6950 | **Test Type:** | Reproduction-Survival (7d) | **Duration:** | 6d 18h |
| **Start Date:** | 05 Mar-08 06:40 PM | **Protocol:** | EPA/600/4-91/002 (1994) | **Species:** | Ceriodaphnia dubia |
| **Ending Date:** | 12 Mar-08 01:00 PM | **Dil Water:** | Not Applicable | **Source:** | In-House Culture |
| **Setup Date:** | 05 Mar-08 06:40 PM | **Brine:** | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 02-8216-0966 | **Code:** | 13054 | **Client:** | Precision Analytical |
| **Sample Date:** | 04 Mar-08 11:20 AM | **Material:** | Effluent | **Project:** | NPDES |
| **Receive Date:** | 05 Mar-08 11:00 AM | **Source:** | Precision Analytical | | |
| **Sample Age:** | 31h (19.7 °C) | **Station:** | EFF-001 | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 05-5331-4533 | 7d Proportion Survived | 0 | >0 | N/A | N/A | Fisher Exact |
| 12-9326-0252 | | 100 | >100 | N/A | N/A | Fisher Exact |
| 12-6349-7291 | Reproduction | 100 | >100 | N/A | 33.71% | Equal Variance t Two-Sample |
| 14-7054-0837 | | 0 | >0 | N/A | 40.02% | Equal Variance t Two-Sample |

**7d Proportion Survived Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 10 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00% |
| 0 | Receiving Wat | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |

**Reproduction Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 10 | 5.5 | 4 | 11 | 0.67082 | 2.12132 | 38.57% |
| 0 | Receiving Wat | 10 | 19.5 | 13 | 24 | 1.07755 | 3.40751 | 17.47% |
| 100 | | 10 | 19.4 | 15 | 23 | 0.83267 | 2.63312 | 13.57% |

**7d Proportion Survived Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 0 | Receiving Wat | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 100 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |

**Reproduction Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 5 | 6 | 6 | 11 | 4 | 5 | 6 | 4 | 4 | 4 |
| 0 | Receiving Wat | 13 | 19 | 23 | 19 | 15 | 19 | 22 | 20 | 24 | 21 |
| 100 | | 20 | 18 | 17 | 22 | 15 | 19 | 23 | 21 | 22 | 17 |

# CETIS Analysis Detail

**Cladoceran Survival and Reproduction Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Reproduction | Comparison | 17-4826-1760 | 17-4826-1760 | 03 Apr-08 1:30 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 33.71% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Lab Water | | 100 | -13 | 1.73406 | 1.0000 | 1.85418 | Non-Significant Effect |

**ANOVA Table**

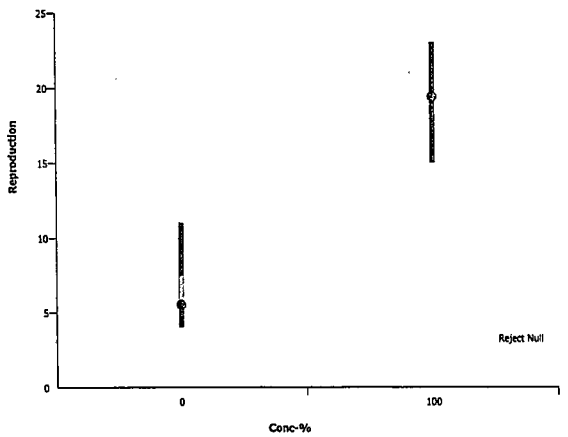
| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 966.05 | 966.05 | 1 | 168.99 | 0.00000 | Significant Effect |
| Error | 102.9 | 5.716667 | 18 | | | |
| Total | 1068.94999 | 971.76665 | 19 | | | |

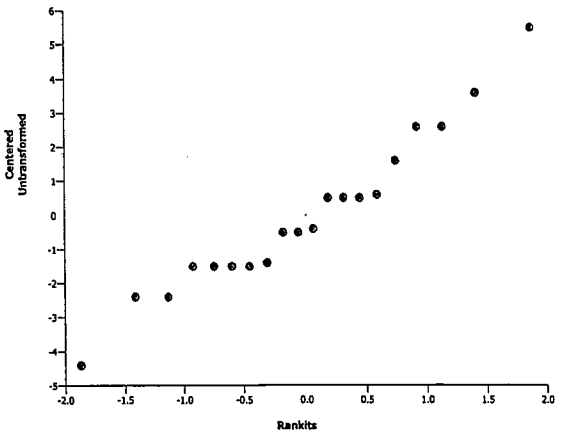
**ANOVA Assumptions**

| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.54074 | 6.54109 | 0.52980 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95914 | | 0.52691 | Normal Distribution |

| Data Summary | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Lab Water | 10 | 5.5 | 4 | 11 | 2.12132 | | | | |
| 100 | | 10 | 19.4 | 15 | 23 | 2.63312 | | | | |

**Graphics**



# CETIS Analysis Detail

**Cladoceran Survival and Reproduction Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Reproduction | Comparison | 17-4826-1760 | 17-4826-1760 | 03 Apr-08 1:30 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 0 | >0 | N/A | N/A | 40.02% |

**Group Comparisons**

| Control | vs | Control | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Lab Water | | Receiving Water/Effl | -11.03 | 1.73406 | 1.0000 | 2.20104 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 980 | 980 | 1 | 121.66 | 0.00000 | Significant Effect |
| Error | 145 | 8.055555 | 18 | | | |
| Total | 1125 | 988.05556 | 19 | | | |

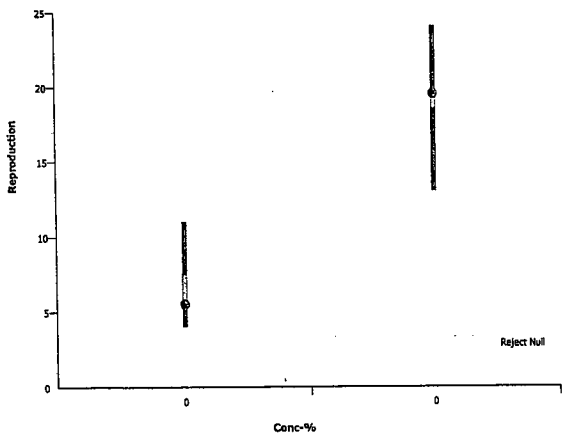
**ANOVA Assumptions**

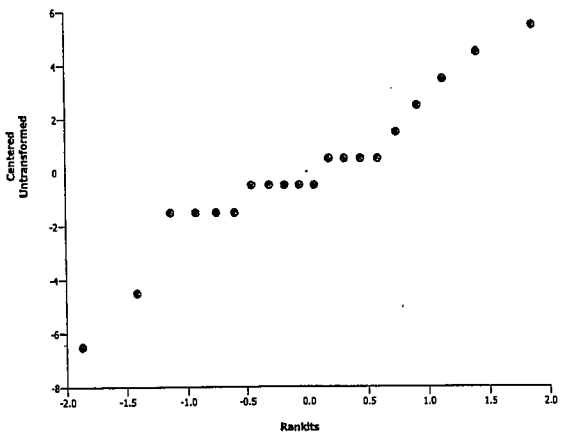
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.58025 | 6.54109 | 0.17414 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94017 | | 0.24153 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Lab Water | 10 | 5.5 | 4 | 11 | 2.12132 | | | | |
| 0 | Receiving Wat | 10 | 19.5 | 13 | 24 | 3.40751 | | | | |

**Graphics**



# CETIS Analysis Detail

**Cladoceran Survival and Reproduction Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| 7d Proportion Survived | Comparison | 17-4826-1760 | 17-4826-1760 | 03 Apr-08 11:03 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Fisher Exact | C > T | Untransformed | | 100 | >100 | 1 | N/A | |

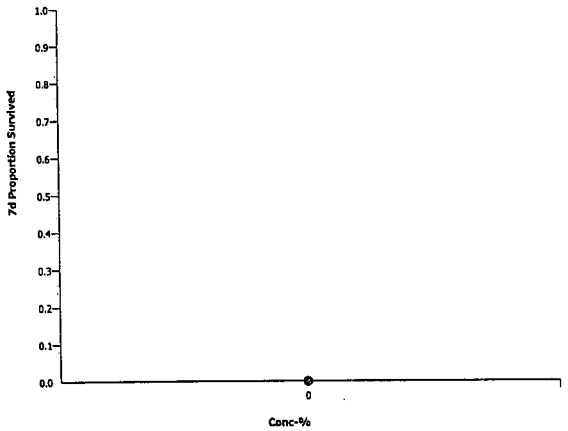
**Group Comparisons**

| Control | vs | Conc-% | Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|
| Lab Water | | 100 | 1.00000 | 1.00000 | Non-Significant Effect |

**Data Summary**

| Conc-% | Control Type | Non-Responders | Responders | Total Observed |
|---|---|---|---|---|
| 0 | Lab Water | 0 | 10 | 10 |
| 100 | | 10 | 0 | 10 |

**Graphics**



# CETIS Analysis Detail

**Cladoceran Survival and Reproduction Test** — Pacific EcoRisk

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| 7d Proportion Survived | Comparison | 17-4826-1760 | 17-4826-1760 | 03 Apr-08 11:03 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Fisher Exact | C > T | Untransformed | | 0 | >0 | N/A | N/A | |

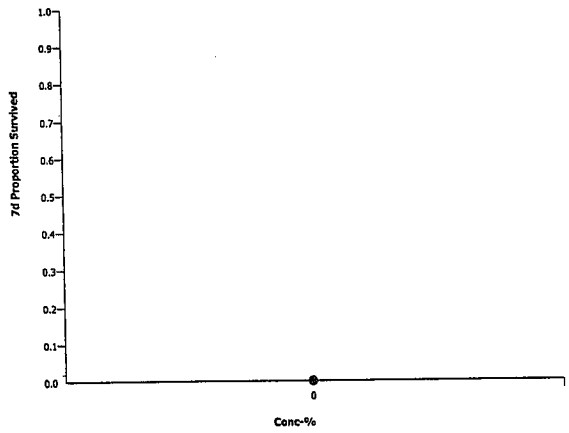
**Group Comparisons**

| Control | vs | Control | Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|
| Lab Water | | Receiving Water/Effl | 1.00000 | 1.00000 | Non-Significant Effect |

**Data Summary**

| Conc-% | Control Type | Non-Responders | Responders | Total Observed |
|---|---|---|---|---|
| 0 | Lab Water | 0 | 10 | 10 |
| 0 | Receiving Wat | 10 | 0 | 10 |

**Graphics**



*Pacific EcoRisk* — Environmental Consulting and Testing

# Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: **Precision Analytical** Sample ID: Effluent Test Date: 3-5-08

Project #: 13054 Test ID: 27820 Control Water: Lab Water (80:20)

## Receiving Water

| Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Temp (°C) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 7.95 | | 9.4 | | 280 | 25.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 8.12 | 8.47 | 9.1 | 8.5 | 300 | 25.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 8.13 | 8.44 | 10.1 | 7.7 | 270 | 25.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 8.06 | 8.30 | 9.0 | 6.7 | 294 | 25.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 8.23 | 8.33 | 9.9 | 8.3 | 275 | 25.6 | 3 | 4 | 5 | 5 | 5 | 4 | 3 | 4 | 4 | 3 |
| 5 | 8.20 | 8.71 | 9.0 | 8.3 | 269 | 25.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 7.96 | 8.06 | 10.5 | 7.3 | 289 | 25.5 | 8 | 9 | 11 | 9 | 10 | 9 | 10 | 10 | 12 | 11 |
| 7 | — | 7.86 | — | 8.2 | 320 | 25.5 | 2 | 6 | 7 | 5 | 0 | 6 | 9 | 6 | 8 | 7 |
| 8 | | | | | | | | | | | | | | | | |
| | | | | | | Total= | [illegible] | [illegible] | 23 | 19 | 15 | 19 | 22 | 20 | 24 | 21 |

SIGN-OFF

Date: 3-5-08 New WQ: [illegible] Test Init.: [illegible]
Sol'n Prep: [illegible] Time: 1840

Date: 3-6-08 New WQ: [illegible] Counts: [illegible]
Sol'n Prep: [illegible] Old WQ: H7A Time: 1515

Date: 3-7-08 New WQ: [illegible] Counts: [illegible]
Sol'n Prep: [illegible] Old WQ: [illegible] Time: 1045

Date: 3-8-08 New WQ: [illegible] Counts: [illegible]
Sol'n Prep: [illegible] Old WQ: [illegible] Time: [illegible]

Date: 3-9-08 New WQ: [illegible] Counts: [illegible]
Sol'n Prep: [illegible] Old WQ: [illegible] Time: 1550

Date: 3-10-08 New WQ: [illegible] Counts: [illegible]
Sol'n Prep: [illegible] Old WQ: [illegible] Time: 1130

Date: 3-11-08 New WQ: [illegible] Counts: [illegible]
Sol'n Prep: [illegible] Old WQ: [illegible] Time: 1200

Date: 3-12-08 New WQ: — Counts: [illegible]
Sol'n Prep: — Old WQ: [illegible] Time: 1300

Date: New WQ: Counts:
Sol'n Prep: Old WQ: Time:

Mean Neonates/Female = 19.5

## 100%

| Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 7.79 | | 9.3 | | 851 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 8.18 | 8.45 | 9.2 | 8.6 | 872 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 8.15 | 8.55 | 9.9 | 8.0 | 845 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 8.11 | 8.37 | 9.1 | 6.8 | 848 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 8.33 | 8.45 | 10.1 | 8.1 | 8168 | 2 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 0 | 2 |
| 5 | 8.17 | 8.74 | 9.2 | 7.0 | 852 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 8.11 | 8.10 | 10.6 | 7.3 | 837 | 5 | 5 | 5 | 7 | 3 | 4 | 5 | 4 | 6 | 2 |
| 7 | — | 8.39 | — | 7.6 | 876 | 13 | 13 | 12 | 14 | 11 | 13 | 16 | 15 | 16 | 13 |
| 8 | | | | | | | | | | | | | | | |
| | | | | | Total= | 20 | 18 | 17 | 22 | 15 | 19 | 23 | 21 | 22 | [illegible] 17 |

Mean Neonates/Female = [illegible] 19.4

*Pacific EcoRisk* Environmental Consulting and Testing

# Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: **Precision Analytical** Sample ID: EFF-001 Test Date: 3-5-08

Project #: 13054 Test ID #: 27820 Control Water: Receiving Water

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Temp (°C) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab Control Water | 0 | 8.27 | | 9.2 | | 224 | 25.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 3/5/08 Time: 1840 Sol'n Prep: CB<br>New WQ: AB for MS Old WQ: Loading: DR |
| | 1 | 8.50 | 8.32 | 9.2 | 8.9 | 307 | 25.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 3/6/08 Time: 1515 Sol'n Prep: CW<br>New WQ: BB Old WQ: HTA Counts: DR |
| | 2 | 8.31 | 8.15 | 9.8 | 8.3 | 218 | 25.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 3/7/08 Time: 1045 Sol'n Prep: AB for CB<br>New WQ: MS Old WQ: MS Counts: MS |
| | 3 | 8.05 | 7.85 | 8.7 | 6.6 | 230 | 25.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 3/8/08 Time: 1655 Sol'n Prep: W<br>New WQ: HH Old WQ: HH Counts: W |
| | 4 | 8.13 | 8.01 | 9.5 | 7.1 | 225 | 25.6 | 5 | 6 | 6 | 6 | 4 | 5 | 3 | 4 | 4 | 4 | Date: 3/9/08 Time: 1550 Sol'n Prep: MS<br>New WQ: SB Old WQ: HH Counts: DR |
| | 5 | 8.23 | 8.51 | 8.1 | 7.6 | 215 | 25.5 | X/0 | X/0 | X/0 | 2 | X/0 | 0 | 0 | X/0 | X/6 | 0 | Date: 3/10/08 Time: 1130 Sol'n Prep: RV<br>New WQ: Old WQ: W Counts: W |
| | 6 | 7.98 | 7.47 | 9.3 | 8.4 | 225 | 25.5 | — | — | — | X/3 | — | X/0 | X/3 | — | — | X/0 | Date: 3/11/08 Time: 1100 Sol'n Prep: W<br>New WQ: BB Old WQ: HH Counts: JT |
| | 7 | — | — | — | — | — | 25.5 | — | — | — | — | — | — | — | — | — | — | Date: 3-12-08 Time: 1300 Sol'n Prep: —<br>New WQ: — Old WQ: AB for SB Counts: DR |
| | 8 | | | | | | | — | — | — | | — | | | — | — | | Date: Time: Sol'n Prep:<br>New WQ: Old WQ: Counts: |
| | | | | | | | Total = | X/5 | X/6 | X/6 | X/11 | X/4 | X/5 | X/6 | X/4 | X/4 | X/4 | X = 5.5 |

# Appendix F

# Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*

# CETIS Test Summary

Report Date: 19 Feb-08 2:46 PM
Test Link: 08-1141-6140/27258

**Cladoceran Survival and Reproduction Test** — Pacific EcoRisk

| | | | | | |
|---|---|---|---|---|---|
| Test No: | 09-7153-5111 | Test Type: | Reproduction-Survival (7d) | Duration: | 5d 17h |
| Start Date: | 12 Feb-08 05:30 PM | Protocol: | EPA/821/R-02-013 (2002) | Species: | Ceriodaphnia dubia |
| Ending Date: | 18 Feb-08 11:00 AM | Dil Water: | Laboratory Water | Source: | In-House Culture |
| Setup Date: | 12 Feb-08 05:30 PM | Brine: | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| Sample No: | 12-4621-9399 | Code: | 12958 | Client: | Reference Toxicant |
| Sample Date: | 12 Feb-08 05:30 PM | Material: | Sodium chloride | Project: | |
| Receive Date: | 12 Feb-08 05:30 PM | Source: | Reference Toxicant | | |
| Sample Age: | N/A (25 °C) | Station: | In House | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 15-2937-0581 | 6d Proportion Survived | 1500 | 2000 | 1732.05 | N/A | Fisher Exact/Bonferroni-Holm |
| 16-6054-3586 | Reproduction | 500 | 1000 | 707.107 | 14.25% | Dunnett's Multiple Comparison |

**Point Estimate Summary**

| Analysis | Endpoint | % Effect | Conc-mg/L | 95% LCL | 95% UCL | Method |
|---|---|---|---|---|---|---|
| 09-9028-2689 | 6d Proportion Survived | 50 | 1842.185 | 1691.934 | 2005.778 | Trimmed Spearman-Karber |
| 18-6883-8050 | Reproduction | 1 | 285.4546 | 22.58333 | 525.4167 | Linear Interpolation |
| | | 5 | 507.4074 | 112.9167 | 638.1411 | |
| | | 10 | 625.9259 | 225.8333 | 780.0752 | |
| | | 15 | 744.4445 | 498.0769 | 952.8846 | |
| | | 20 | 862.963 | 661.9048 | 1037.143 | |
| | | 25 | 981.4815 | 790.1786 | 1091.595 | |
| | | 40 | 1180.198 | 1072.727 | 1259.434 | |
| | | 50 | 1306.931 | 1217.391 | 1392.473 | |

**6d Proportion Survived Summary**

| Conc-mg/L | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 250 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 500 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 1000 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 1500 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 2000 | | 10 | 0.30000 | 0.00000 | 1.00000 | 0.15275 | 0.48305 | 161.02% |

**Reproduction Summary**

| Conc-mg/L | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 10 | 25.6 | 17 | 29 | 1.17568 | 3.71782 | 14.52% |
| 250 | | 10 | 25.5 | 17 | 30 | 1.20416 | 3.80789 | 14.93% |
| 500 | | 10 | 24.4 | 16 | 28 | 1.08730 | 3.43835 | 14.09% |
| 1000 | | 10 | 19 | 12 | 25 | 1.22020 | 3.85861 | 20.31% |
| 1500 | | 10 | 8.9 | 3 | 16 | 1.11006 | 3.51030 | 39.44% |
| 2000 | | 10 | 0 | 0 | 0 | 0 | 0 | 0.00% |

# CETIS Test Summary

Report Date: 19 Feb-08 2:46 PM
Test Link: 08-1141-6140/27258

**6d Proportion Survived Detail**

| Conc-mg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 250 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 500 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 1000 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 1500 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 2000 | | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 |

**Reproduction Detail**

| Conc-mg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 24 | 27 | 29 | 27 | 28 | 29 | 17 | 27 | 22 | 26 |
| 250 | | 22 | 27 | 30 | 26 | 28 | 29 | 17 | 25 | 24 | 27 |
| 500 | | 24 | 26 | 25 | 24 | 27 | 28 | 16 | 22 | 25 | 27 |
| 1000 | | 21 | 23 | 19 | 22 | 25 | 18 | 12 | 18 | 16 | 16 |
| 1500 | | 10 | 6 | 7 | 3 | 9 | 12 | 8 | 8 | 10 | 16 |
| 2000 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: **Reference Toxicant** Material: Sodium Chloride Test Date: 2/12/08

Project #: 12958 Test ID #: 27258 Control Water / Diluent: Lab Water (80:20)

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Temp (°C) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab Control | 0 | 8.05 | | 9.2 | | 213 | 25.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 2/12/08 Time: 1730 Sol'n Prep: MM<br>New WQ: BB Test Loading: MM |
| | 1 | 8.11 | 8.28 | 9.0 | 9.1 | 222 | 25.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 2/13/08 Time: 1500 Sol'n Prep: MZ<br>New WQ: MZ Old WQ: HTA Counts: RC |
| | 2 | 8.06 | 8.08 | 9.0 | 10.8 | 224 | 25.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 2/14/08 Time: 1145 Sol'n Prep: RV<br>New WQ: LC Old WQ: CS Counts: JJ |
| | 3 | 8.20 | 8.17 | 8.7 | 7.6 | 226 | 25.6 | 4 | 0 | 5 | 0 | 4 | 4 | 1 | 5 | 5 | 0 | Date: 2/15/08 Time: 1600 Sol'n Prep: JJ<br>New WQ: HTA Old WQ: HN Counts: TC |
| | 4 | 8.60 | 8.22 | 11.7 | 8.4 | 254 | 25.8 | 0 | 7 | 0 | 6 | 0 | 13 | 5 | 10 | 0 | 6 | Date: 2/16/08 Time: 1650 Sol'n Prep: W<br>New WQ: HN Old WQ: AS Counts: KO |
| | 5 | 8.54 | 8.62 | 8.9 | 8.7 | 224 | 25.5 | 9 | 11 | 12 | 11 | 13 | 0 | 11 | 0 | 8 | 8 | Date: 2/17/08 Time: 1130 Sol'n Prep: QD<br>New WQ: KZ Old WQ: KZ Counts: QD |
| | 6 | 8.04 | 8.21 8.46 | 9.2 | 8.4 | 214 | 25.8 | 11 | 9 | 12 | 10 | 11 | 12 | 0 | 12 | 9 | 12 | Date: 2-18-08 Time: 1100 Sol'n Prep: QD<br>New WQ: SB Old WQ: CS Counts: QD |
| | 7 | | | | | | | | | | | | | | | | | Date: Time: Sol'n Prep:<br>New WQ: Old WQ: Counts: |
| | 8 | | | | | | | | | | | | | | | | | Date: Time: Sol'n Prep:<br>New WQ: Old WQ: Counts: |
| | | | | | | | Total = | 24 | 27 | 29 | 27 | 28 | 29 | 17 | 27 | ~~23~~ 22 | 26 | X = ~~25.2~~ 25.6 |

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 250 mg/L | 0 | 8.05 | | 8.9 | | 724 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 1 | 8.13 | 8.21 | 9.0 | 8.2 | 703 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 8.12 | 8.18 | 9.1 | 10.5 | 716 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3 | 8.24 | 826 | 8.5 | 8.0 | 724 | 4 | 0 | 6 | 0 | 4 | 4 | 0 | 5 | 5 | 0 |
| | 4 | 8.45 | 8.24 | 11.6 | 8.4 | 715 | 0 | 6 | 0 | 5 | 0 | 12 | 7 | 8 | 0 | 6 |
| | 5 | 8.39 | 8.50 | 8.7 | 8.1 | 718 | 10 | 10 | 11 | 9 | 11 | 0 | 10 | 0 | 10 | 9 |
| | 6 | 8.08 | 8.20 8.45 | 9.4 | 8.3 | 715 | 8 | 11 | 13 | 12 | 13 | 13 | 0 | 12 | 9 | 12 |
| | 7 | | | | | | | | | | | | | | | |
| | 8 | | | | | | | | | | | | | | | |
| | | | | | | | Total = | 22 | 27 | 30 | 26 | 28 | 29 | 17 | 25 | 24 | 27 | X = 25.5 |

*Pacific EcoRisk* Environmental Consulting and Testing

# Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: **Reference Toxicant** Material: Sodium Chloride Test Date: 2/12/08

Project #: 12958 Test ID #: 27258 Control Water / Diluent: Lab Water (80:20)

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 500 mg/L | 0 | 8.02 | | 9.1 | | 1172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 1 | 8.13 | 8.21 | 9.0 | 7.5 | 1185 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 8.13 | 8.20 | 9.2 | 10.5 | 1192 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3 | 8.24 | 8.27 | 8.5 | 7.7 | 1209 | 5 | 4 | 5 | 0 | 5 | 4 | 0 | 4 | 4 | 6 |
| | 4 | 8.36 | 8.29 | 11.8 | 8.6 | 1145 | 0 | 0 | 0 | 5 | 11 | 11 | 7 | 9 | 0 | 0 |
| | 5 | 8.37 | 8.44 | 9.0 | 8.3 | 1192 | 8 | 10 | 10 | 8 | 0 | 0 | 9 | 0 | 9 | 9 |
| | 6 | 8.07 | 8.21 8.44 cs | 9.6 | 8.1 | 1178 | 11 | 12 | 10 | 11 | 11 | 13 | 0 | 9 | 12 | 12 |
| | 7 | | | | | | | | | | | | | | | |
| | 8 | | | | | | | | | | | | | | | |
| | | | | | | | Total = | 24 | 26 | 25 | 24 | 27 | 28 | 16 | ~~28~~ 22 | 25 | 27 |

X = 24.4

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 mg/L | 0 | 8.01 | | 9.0 | | 2059 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 1 | 8.12 | 8.15 | 9.0 | 7.6 | 2132 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 8.12 | 8.20 | 9.4 | 10.4 | 2154 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3 | 8.23 | 8.26 | 8.6 | 7.9 | 2113 | 0 | 0 | 0 | 0 | 5 | 1 | 4 | 3 | 0 | 3 |
| | 4 | 8.25 | 8.21 | 12.4 | 8.8 | 2125 | 4 | 0 | 0 | 5 | 0 | 9 | 0 | 7 | 1 | 0 |
| | 5 | 8.26 | 8.39 | 9.1 | 8.2 | 2138 | 7 | 11 | 8 | 9 | 8 | 0 | 8 | 0 | 7 | 6 |
| | 6 | 8.04 | 8.19 8.43 cs | 9.9 | 8.1 | 2155 | 10 | 12 | 11 | 8 | 12 | 8 | 0 | 8 | 8 | 7 |
| | 7 | | | | | | | | | | | | | | | |
| | 8 | | | | | | | | | | | | | | | |
| | | | | | | | Total = | 21 | 23 | 19 | 22 | 25 | 18 | 12 | 18 | 16 | 16 |

X = 19.0

*Pacific EcoRisk* — Environmental Consulting and Testing

# Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: **Reference Toxicant** Material: Sodium Chloride Test Date: 2/12/08

Project #: 12958 Test ID #: 27258 Control Water / Diluent: Lab Water (80:20)

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1500 mg/L | 0 | 7.99 | | 9.0 | | 3040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 1 | 8.09 | 8.11 | 9.0 | 7.7 | 3110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 8.10 | 8.19 | 9.6 | 10.5 | 3110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3 | 8.21 | 8.19 | 8.6 | 7.8 | 3070 | 0 | 0 | 0 | 0 | 4 | 3 | 0 | 0 | 0 | 0 |
| | 4 | 8.14 | 8.19 | 12.4 | 8.7 | 3060 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 5 | 1 | 2 |
| | 5 | 8.21 | 8.37 | 9.4 | 8.0 | 3080 | 6 | 0 | 5 | 0 | 2 | 0 | 4 | 0 | 3 | 8 |
| | 6 | 7.98 | 8.18 8.42 | 10.0 | 8.0 | 3120 | 4 | 6 | 0 | 3 | 3 | 6 | 4 | 3 | 6 | 6 |
| | 7 | | | | | | | | | | | | | | | |
| | 8 | | | | | | | | | | | | | | | |
| | | | | | | | Total = 10 | 6 | 7 | 3 | 9 | 12 | 8 | 8 | 10 | 16 |

X = 8.9

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 mg/L | 0 | 7.98 | | 9.1 | | 3930 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 1 | 8.08 | 8.09 | 9.1 | 7.7 | 4020 | 0 | 0 | X/0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 8.09 | 8.16 | 10.1 | 10.2 | 4000 | 0 | 0 | – | X/0 | 0 | X/0 | X/0 | 0 | X/0 | X/0 |
| | 3 | 8.18 | 8.16 | 8.8 | 7.6 | 4010 | X/0 | 0 | – | – | 0 | – | – | 0 | – | – |
| | 4 | 8.16 | 8.19 | 12.4 | 8.2 | 3950 | – | 0 | – | – | 0 | – | – | 0 | – | – |
| | 5 | 8.18 | 8.33 | 9.6 | 8.1 | 3980 | – | 0 | – | – | 0 | – | – | 0 | – | – |
| | 6 | 7.92 | 8.16 8.42 | 10.4 10.6 | 8.0 | 4010 | – | 0 | – | – | 0 | – | – | 0 | – | – |
| | 7 | | | | | | – | | – | – | | – | – | | – | – |
| | 8 | | | | | | – | | – | – | | – | – | | – | – |
| | | | | | | | Total = X/0 | 0 | X/0 | X/0 | 0 | X/0 | X/0 | 0 | X/0 | X/0 |

X = 0

# CETIS Test Summary

Report Date: 21 Mar-08 2:31 PM
Test Link: 12-5784-5226/27893

**Cladoceran Survival and Reproduction Test** — Pacific EcoRisk

| | | | | | |
|---|---|---|---|---|---|
| Test No: | 16-3498-5251 | Test Type: | Reproduction-Survival (7d) | Duration: | 6d 15h |
| Start Date: | 11 Mar-08 05:30 PM | Protocol: | EPA/821/R-02-013 (2002) | Species: | Ceriodaphnia dubia |
| Ending Date: | 18 Mar-08 09:00 AM | Dil Water: | Laboratory Water | Source: | In-House Culture |
| Setup Date: | 11 Mar-08 05:30 PM | Brine: | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| Sample No: | 07-2897-2190 | Code: | 13072 | Client: | Reference Toxicant |
| Sample Date: | 11 Mar-08 05:30 PM | Material: | Sodium chloride | Project: | |
| Receive Date: | 11 Mar-08 05:30 PM | Source: | Reference Toxicant | | |
| Sample Age: | N/A (25.7 °C) | Station: | In House | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 08-9972-6768 | 7d Proportion Survived | 1500 | 2000 | 1732.05 | N/A | Fisher Exact/Bonferroni-Holm |
| 10-9767-2891 | Reproduction | 500 | 1000 | 707.107 | 28.34% | Steel Many-One Rank |

**Point Estimate Summary**

| Analysis | Endpoint | % Effect | Conc-mg/L | 95% LCL | 95% UCL | Method |
|---|---|---|---|---|---|---|
| 14-7627-3450 | 7d Proportion Survived | 50 | 1732.051 | 1581.436 | 1897.01 | Trimmed Spearman-Karber |
| 04-7124-5636 | Reproduction | 1 | 529.3204 | 11.38095 | 644.1667 | Linear Interpolation |
| | | 5 | 646.6019 | 56.90476 | 1023.246 | |
| | | 10 | 793.2039 | 113.8095 | 1092.5 | |
| | | 15 | 939.8058 | 170.7143 | 1155.838 | |
| | | 20 | 1044.949 | 227.619 | 1207.917 | |
| | | 25 | 1121.212 | 616.6667 | 1272.26 | |
| | | 40 | 1350 | 1091.139 | 1511.927 | |
| | | 50 | 1501.65 | 1273.81 | 1593.272 | |

**7d Proportion Survived Summary**

| Conc-mg/L | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 10 | 0.80000 | 0.00000 | 1.00000 | 0.13333 | 0.42164 | 52.70% |
| 250 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 500 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 1000 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 1500 | | 10 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 2000 | | 10 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00% |

**Reproduction Summary**

| Conc-mg/L | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 10 | 20 | 0 | 27 | 3.37968 | 10.6875 | 53.44% |
| 250 | | 10 | 19.6 | 15 | 27 | 1.60693 | 5.08156 | 25.93% |
| 500 | | 10 | 20.8 | 16 | 25 | 0.98658 | 3.11983 | 15.00% |
| 1000 | | 10 | 16.7 | 12 | 19 | 0.83066 | 2.62679 | 15.73% |
| 1500 | | 10 | 10.1 | 6 | 14 | 0.76667 | 2.42441 | 24.00% |
| 2000 | | 10 | 0 | 0 | 0 | 0 | 0 | 0.00% |

# CETIS Test Summary

Report Date: 21 Mar-08 2:31 PM
Test Link: 12-5784-5226/27893

**7d Proportion Survived Detail**

| Conc-mg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 1.00000 | 0.00000 | 1.00000 | 1.00000 | 0.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 250 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 500 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 1000 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 1500 | | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 2000 | | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |

**Reproduction Detail**

| Conc-mg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 25 | 0 | 26 | 27 | 0 | 24 | 21 | 24 | 26 | 27 |
| 250 | | 17 | 20 | 27 | 15 | 16 | 26 | 27 | 17 | 16 | 15 |
| 500 | | 16 | 23 | 19 | 18 | 20 | 21 | 18 | 23 | 25 | 25 |
| 1000 | | 12 | 16 | 13 | 15 | 18 | 19 | 19 | 17 | 19 | 19 |
| 1500 | | 9 | 6 | 8 | 8 | 10 | 13 | 11 | 14 | 11 | 11 |
| 2000 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: **Reference Toxicant** Material: Sodium Chloride Test Date: 3/11/08

Project #: 13072 Test ID #: 27893 Control Water / Diluent: Lab Water (80:20)

## Lab Control

| Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Temp (°C) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | ~~8.15~~ 8.13 | | 9.2 | | ~~238~~ 228 | 25.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 3-11-08 Time: 17:30 Sol'n Prep: W New WQ: BB Test Loading: CB/DC |
| 1 | 8.34 | 8.24 | 9.0 | 8.1 | 247 | 25.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Date: 3-12-08 Time: 11:30 Sol'n Prep: W New WQ: BB Old WQ: BB Counts: CB |
| 2 | 8.28 | 8.27 | 9.4 | 8.0 | 222 | 25.4 | 0 | x/0 | 0 | 0 | x/0 | 0 | 0 | 0 | 0 | 0 | Date: 3-13-08 Time: 1015 Sol'n Prep: New WQ: [illegible] Old WQ: [illegible] Counts: [illegible] |
| 3 | 8.22 | 8.22 | 8.9 | 7.9 | 230 | 25.4 | 0 | — | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 | Date: 3/14/08 Time: 1215 Sol'n Prep: W New WQ: Ne Old WQ: HN Counts: JJ |
| 4 | 8.36 | 8.70 | 9.3 | 8.7 | 228 | 25.3 | 3 | — | 4 | 4 | — | 4 | 5 | 4 | 5 | 4 | Date: 3/15/08 Time: 1221 Sol'n Prep: New WQ: HN Old WQ: HN Counts: |
| 5 | 8.06 | 7.91 | 9.5 | 7.9 | 223 | 25.3 | 0 | — | 0 | 0 | — | 0 | 6 | 7 | 0 | 0 | Date: 3/16/08 Time: 11:36 Sol'n Prep: JS New WQ: HN Old WQ: HN Counts: RV |
| 6 | 8.30 | 8.23 | 9.4 | 8.8 | 225 | 25.1 | 11 | — | 12 | 11 | — | 9 | 0 | 0 | 9 | 10 | Date: 3/17/08 Time: 1230 Sol'n Prep: New WQ: RV Old WQ: ID Counts: QO |
| 7 | — | 8.161 | — | 8.6 | 227 | 25.2 | 11 | - | 10 | 12 | - | 11 | 10 | 13 | 12 | 13 | Date: 3/18/08 Time: 900 Sol'n Prep: — New WQ: — Old WQ: SB Counts: HR |
| 8 | | | | | | | | | | | | | | | | | Date: Time: Sol'n Prep: New WQ: Old WQ: Counts: |
| | | | | | | Total = | 25 | x/0 | 26 | 27 | x/0 | 24 | 21 | 24 | 26 | 27 | x = 20.0 |

## 250 mg/L

| Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | ~~8.11~~ 8.21 | | ~~8.9~~ 9.5 | | ~~757~~ 725 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 8.23 | 8.20 | 9.1 | 8.1 | 725 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 8.24 | 8.27 | 9.2 | 8.1 | 730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 8.27 | 8.33 | 8.9 | 8.0 | 736 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 8.36 | 8.57 | 9.1 | 8.4 | 725 | 3 | 2 | 5 | 5 | 4 | 5 | 4 | 4 | 7 | 5 |
| 5 | 8.12 | 8.09 | 9.7 | 8.0 | 690 | 0 | 1 | 9 | 2 | 6 | 8 | 10 | 0 | 5 | 3 |
| 6 | 8.31 | 8.21 | 9.4 | 8.2 | 657 | 7 | 8 | 0 | 8 | 6 | 0 | 0 | 0 | 4 | 0 |
| 7 | — | ~~8.46~~ 8.36 | — | 8.3 | 718 | 7 | 9 | 13 | 12* | 10* | 13 | 13 | 13 | 11* | 7 |
| 8 | | | | | | | | | | | | | | | |
| | | | | | Total = | 17 | 20 | 27 | 15 | 16 | 26 | 27 | 17 | 16 | 15 |

x = 19.6

* 4th brood excluded

*Pacific EcoRisk* — Environmental Consulting and Testing

# Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: **Reference Toxicant** Material: Sodium Chloride Test Date: 3/11/08

Project #: 13072 Test ID #: 27893 Control Water / Diluent: Lab Water (80:20)

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 500 mg/L | 0 | ~~8.05~~ 8.15 | | ~~9.0~~ 9.5 | | ~~1182~~ 1180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 1 | 8.16 | 8.17 | 9.2 | 7.9 | 1223 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | |
| | 2 | 8.21 | 8.24 | 9.3 | 8.0 | 1224 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 3 | 8.28 | 8.31 | 9.1 | 7.9 | 1236 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 4 | 8.33 | 8.54 | 9.2 | 8.2 | 1206 | 2 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | |
| | 5 | 8.14 | 8.16 | 9.8 | 8.0 | 1138 | 1 | 0 | 6 | 6 | 0 | 7 | 5 | 8 | 1 | 9 | |
| | 6 | 8.29 | 8.19 | 9.5 | 7.8 | 1155 | 7 | 10 | 0 | 0 | 7 | 0 | 0 | 0 | 8 | 0 | |
| | 7 | — | 8.30 | — | 8.1 | 1244 | 6 | 9 | 9 | 8 | 8 | 9 | 8 | 11 | 11 | 11 | |
| | 8 | | | | | | | | | | | | | | | | |
| | | | | | | Total = | 16 | 23 | 19 | 18 | 20 | 21 | 18 | 23 | 25 | 25 | x = 20.8 |

| | Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 mg/L | 0 | ~~8.04~~ 8.10 | | ~~8.7~~ 8.6 | | ~~2160~~ 2160 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 1 | 8.07 | 8.13 | 9.7 | 8.0 | 2110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 2 | 8.17 | 8.26 | 9.5 | 8.1 | 2122 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 3 | 8.24 | 8.27 | 9.5 | 8.0 | 2110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 4 | 8.31 | 8.46 | 9.2 | 8.2 | 2096 | 0 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | |
| | 5 | 8.14 | 8.18 | 9.8 | 7.9 | 2052 | 1 | 0 | 4 | 4 | 0 | 6 | 7 | 6 | 0 | 1 | |
| | 6 | 8.26 | 8.17 | 9.8 | 7.9 | 2073 | 5 | 5 | 6 | 0 | 7 | 0 | 0 | 0 | 7 | 6 | |
| | 7 | — | 8.26 | — | 8.3 | 2059 | 6 | 8 | 6 | 7 | 7 | 9 | 9 | 7 | 8 | 9 | |
| | 8 | | | | | | | | | | | | | | | | |
| | | | | | | Total = | 12 | 16 | 13 | 15 | 18 | 19 | 19 | 17 | 19 | 19 | x = 16.7 |

*Pacific EcoRisk* — Environmental Consulting and Testing

# Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: **Reference Toxicant** Material: Sodium Chloride Test Date: 3/11/08

Project #: 13072 Test ID #: 27893 Control Water / Diluent: Lab Water (80:20)

## 1500 mg/L

| Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | ~~7.98~~ ~~8.03~~ | | ~~9.6~~ ~~10.1~~ | | ~~3130~~ ~~2700~~ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 8.02 | 8.10 | 10.0 | 8.0 | 3110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 8.10 | 8.23 | 10.1 | 8.1 | 3090 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 8.19 | 8.27 | 10.0 | 8.1 | 3040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 8.28 | 8.40 | 9.2 | 8.3 | 3030 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 1 |
| 5 | 8.13 | 8.28 | 9.8 | 8.1 | 2988 | 3 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 6 | 8.24 | 8.14 | 10.2 | 7.6 | 3040 | 0 | 0 | 2 | 2 | 5 | 4 | 5 | 5 | 6 | 4 |
| 7 | — | 8.20 | — | 8.4 | 3030 | 6 | 5 | 6 | 5 | 4 | 5 | 6 | 7 | 5 | 6 |
| 8 | | | | | | | | | | | | | | | |
| | | | | | Total = | 9 | 6 | 8 | 8 | 10 | 13 mo | 11 | 14 | 11 | 11 |

X = ~~9.9~~ mo 10.1

## 2000 mg/L

| Day | pH New | pH Old | D.O. New | D.O. Old | Cond. (µS/cm) | Survival / Reproduction A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | ~~7.92~~ ~~8.02~~ | | ~~9.4~~ ~~10.0~~ | | ~~3950~~ ~~3930~~ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 7.91 | 8.07 | 10.7 | 8.2 | 4020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 8.09 | 8.20 | 10.4 | 8.2 | 4010 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 | 0 | ~~X~~/0 | 0 | 0 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 |
| 3 | 8.13 | 8.26 | 10.3 | 8.0 | 4010 | — | — | — | 0 | — | 0 | 0 | — | — | — |
| 4 | 8.25 | ~~8.18~~ 8.38 hmo | 9.2 | ~~8.3~~ 8.5 HMO | 3940 | — | — | — | 0 | — | 0 | 0 | — | — | — |
| 5 | 8.12 | 8.18 | 9.9 | 7.9 | 3940 | — | — | — | 0 | — | 0 | 0 | — | — | — |
| 6 | 8.23 | 8.10 | 10.4 | 7.7 | 3940 | — | — | — | ~~0~~ | — | ~~X~~/0 | ~~X~~/0 | — | — | — |
| 7 | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| | | | | | Total = | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 | ~~X~~/0 |

X = 0

# Appendix G

# Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Effluent to Fathead Minnows

# CETIS Test Summary

Report Date: 03 Apr-08 10:42 AM
Test Link: 05-3756-6644/27823

**Chronic Larval Fish Survival and Growth Test** — Pacific EcoRisk

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 03-1980-4782 | **Test Type:** | Growth-Survival (7d) | **Duration:** | 6d 15h |
| **Start Date:** | 05 Mar-08 05:30 PM | **Protocol:** | EPA/821/R-02-013 (2002) | **Species:** | Pimephales promelas |
| **Ending Date:** | 12 Mar-08 09:15 AM | **Dil Water:** | Laboratory Water | **Source:** | Aquatic Biosystems, CO |
| **Setup Date:** | 05 Mar-08 05:30 PM | **Brine:** | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 02-8216-0966 | **Code:** | 13054 | **Client:** | Precision Analytical |
| **Sample Date:** | 04 Mar-08 11:20 AM | **Material:** | Effluent | **Project:** | NPDES |
| **Receive Date:** | 05 Mar-08 11:00 AM | **Source:** | Precision Analytical | | |
| **Sample Age:** | 30h (19.7 °C) | **Station:** | EFF-001 | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 04-3024-1738 | 7d Proportion Survived | 0 | >0 | N/A | 8.82% | Equal Variance t Two-Sample |
| 08-6628-7287 | | <100 | 100 | N/A | 14.26% | Equal Variance t Two-Sample |
| 02-0717-3304 | Mean Dry Biomass-mg | <0 | 0 | N/A | 7.28% | Equal Variance t Two-Sample |
| 07-9677-6942 | | <100 | 100 | N/A | 8.78% | Equal Variance t Two-Sample |

**7d Proportion Survived Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 4 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 0 | Receiving Wat | 4 | 0.92500 | 0.80000 | 1.00000 | 0.04787 | 0.09574 | 10.35% |
| 100 | | 4 | 0.62500 | 0.40000 | 0.90000 | 0.10308 | 0.20616 | 32.98% |

**Mean Dry Biomass-mg Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 4 | 0.51575 | 0.48500 | 0.54600 | 0.01278 | 0.02555 | 4.95% |
| 0 | Receiving Wat | 4 | 0.47275 | 0.44200 | 0.49800 | 0.01450 | 0.02900 | 6.13% |
| 100 | | 4 | 0.08025 | 0.03100 | 0.12000 | 0.01950 | 0.03900 | 48.60% |

**7d Proportion Survived Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | Lab Water | 1.00000 | 1.00000 | 1.00000 | 1.00000 |
| 0 | Receiving Wat | 0.90000 | 0.80000 | 1.00000 | 1.00000 |
| 100 | | 0.60000 | 0.60000 | 0.90000 | 0.40000 |

**Mean Dry Biomass-mg Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | Lab Water | 0.54600 | 0.52300 | 0.50900 | 0.48500 |
| 0 | Receiving Wat | 0.49800 | 0.44200 | 0.45400 | 0.49700 |
| 100 | | 0.12000 | 0.10100 | 0.03100 | 0.06900 |

# CETIS Analysis Detail

**Chronic Larval Fish Survival and Growth Test** — Pacific EcoRisk

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| 7d Proportion Survived | Comparison | 05-3756-6644 | 05-3756-6644 | 03 Apr-08 10:41 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Angular (Corrected) | | <100 | 100 | | N/A | 14.26% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Lab Water | | 100 | 4.13114 | 1.94318 | 0.0031 | 0.22838 | Significant Effect |

**ANOVA Table**

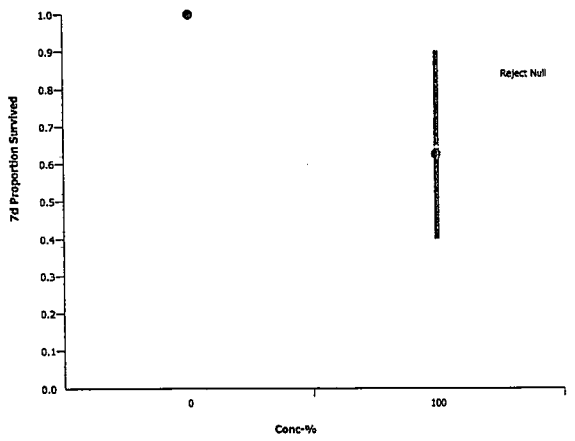
| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.471491 | 0.471491 | 1 | 17.07 | 0.00614 | Significant Effect |
| Error | 0.1657617 | 0.027627 | 6 | | | |
| Total | 0.63725275 | 0.499118 | 7 | | | |

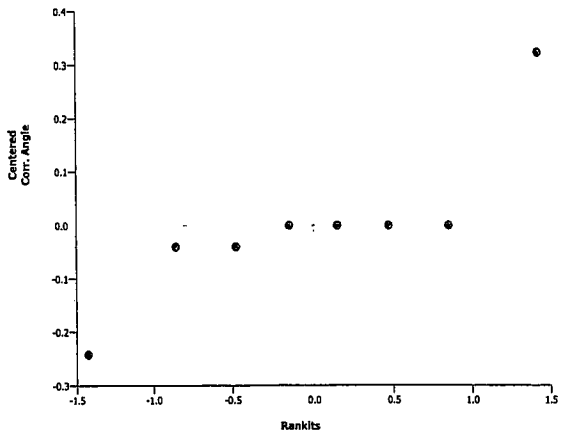
**ANOVA Assumptions**

| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Modified Levene | 2.57726 | 13.74502 | 0.15953 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.78753 | | 0.02102 | Normal Distribution |

| Data Summary | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Lab Water | 4 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 1.41202 | 1.41202 | 1.41202 | 0.00027 |
| 100 | | 4 | 0.62500 | 0.40000 | 0.90000 | 0.20616 | 0.92648 | 0.68472 | 1.24905 | 0.23506 |

**Graphics**



# CETIS Analysis Detail

**Chronic Larval Fish Survival and Growth Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| 7d Proportion Survived | Comparison | 05-3756-6644 | 05-3756-6644 | 03 Apr-08 10:41 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Angular (Corrected) | | 0 | >0 | N/A | N/A | 8.82% |

**Group Comparisons**

| Control | vs | Control | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Lab Water | | Receiving Water | 1.5918 | 1.94318 | 0.0813 | 0.14278 | Non-Significant Effect |

**ANOVA Table**

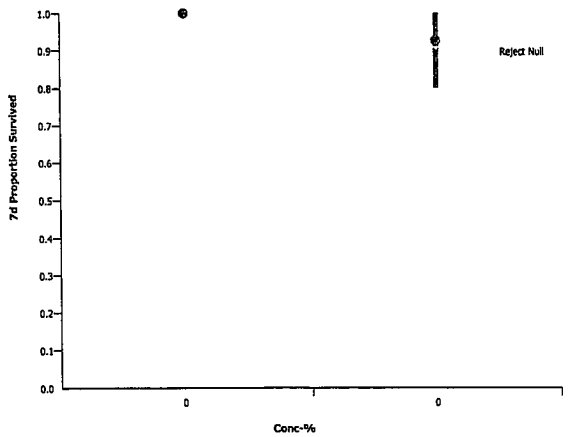
| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0273590 | 0.0273590 | 1 | 2.53 | 0.16254 | Non-Significant Effect |
| Error | 0.0647854 | 0.0107976 | 6 | | | |
| Total | 0.09214444 | 0.0381566 | 7 | | | |

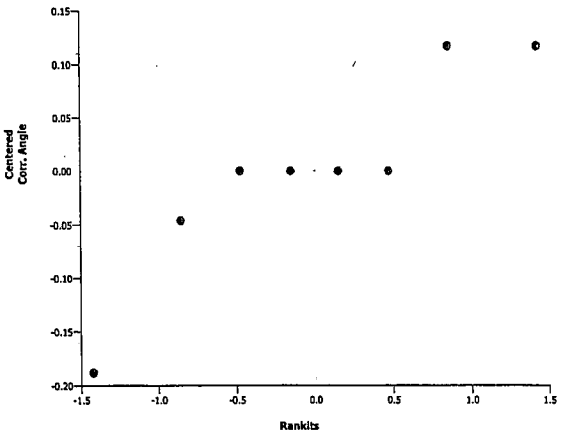
**ANOVA Assumptions**

| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Modified Levene | 10.87036 | 13.74502 | 0.01647 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.85978 | | 0.11948 | Normal Distribution |

| Data Summary | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Lab Water | 4 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 1.41202 | 1.41202 | 1.41202 | 0.00027 |
| 0 | Receiving Wat | 4 | 0.92500 | 0.80000 | 1.00000 | 0.09574 | 1.29506 | 1.10715 | 1.41202 | 0.14695 |

**Graphics**



# CETIS Analysis Detail

**Chronic Larval Fish Survival and Growth Test** — **Pacific EcoRisk**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Mean Dry Biomass-mg | Comparison | 05-3756-6644 | 05-3756-6644 | 03 Apr-08 10:41 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 8.78% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Lab Water | | 100 | 18.6811 | 1.94318 | 0.0000 | 0.04530 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.3793204 | 0.3793204 | 1 | 348.98 | 0.00000 | Significant Effect |
| Error | 0.0065216 | 0.0010869 | 6 | | | |
| Total | 0.38584201 | 0.3804074 | 7 | | | |

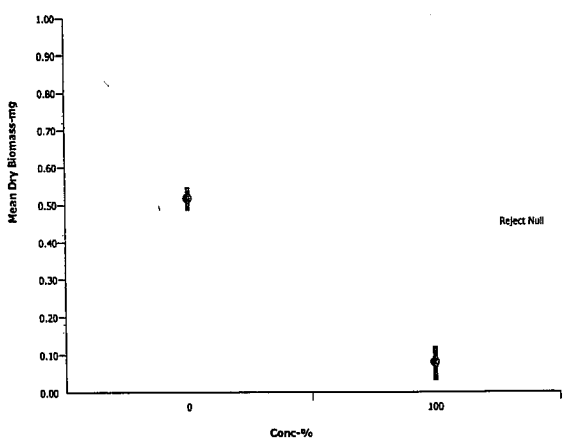
**ANOVA Assumptions**

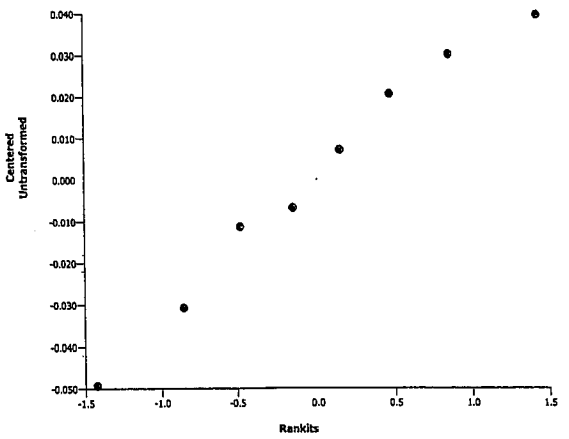
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.32929 | 47.46723 | 0.50548 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97009 | | 0.89874 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Lab Water | 4 | 0.51575 | 0.48500 | 0.54600 | 0.02555 | | | | |
| 100 | | 4 | 0.08025 | 0.03100 | 0.12000 | 0.03900 | | | | |

**Graphics**



# CETIS Analysis Detail

**Chronic Larval Fish Survival and Growth Test** — Pacific EcoRisk

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Mean Dry Biomass-mg | Comparison | 05-3756-6644 | 05-3756-6644 | 03 Apr-08 10:42 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <0 | 0 | | N/A | 7.28% |

**Group Comparisons**

| Control | vs | Control | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Lab Water | | Receiving Water | 2.22504 | 1.94318 | 0.0339 | 0.03755 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.003698 | 0.003698 | 1 | 4.95 | 0.06773 | Non-Significant Effect |
| Error | 0.0044817 | 0.0007469 | 6 | | | |
| Total | 0.00817963 | 0.0044449 | 7 | | | |

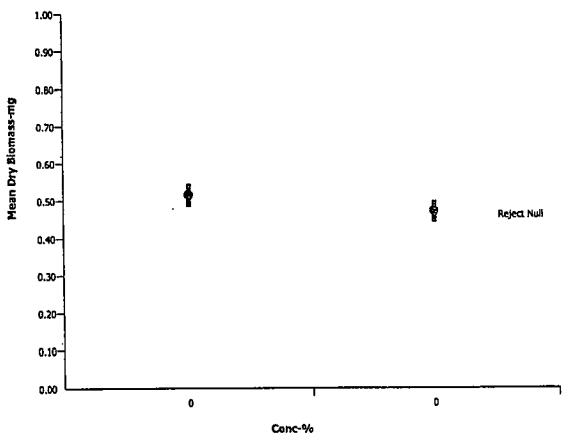
**ANOVA Assumptions**

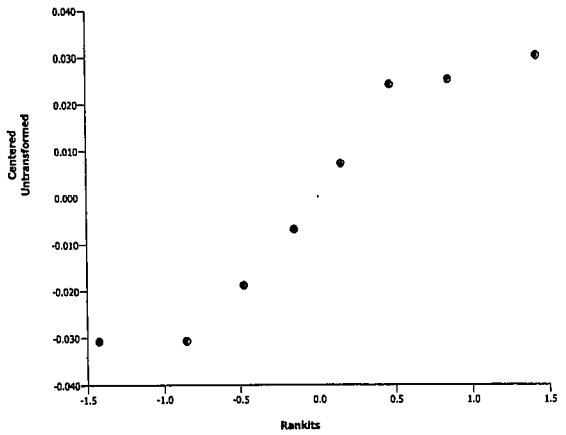
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.28791 | 47.46723 | 0.84020 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.88402 | | 0.20566 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Lab Water | 4 | 0.51575 | 0.48500 | 0.54600 | 0.02555 | | | | |
| 0 | Receiving Wat | 4 | 0.47275 | 0.44200 | 0.49800 | 0.02900 | | | | |

**Graphics**



# 7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical
Test Material: EFF + RW
Test ID#: 27823 Project #: 13054
Test Date: 3-5-08 Randomization: —

Organism Log#: 3788 Age: <48hrs
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1083

| Treatment | Temp (°C) | pH new | pH old | D.O. (mg/L) new | D.O. (mg/L) old | Conductivity (µs/cm) | # Live Organisms A | B | C | D | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab Water Control | 25.4 | ~~8.58~~ 8.26 | | ~~8.2~~ 10.0 | | ~~311~~ 294 | 10 | 10 | 10 | 10 | Date: 3-5-08 |
| Receiving Water | 25.4 | ~~8.37~~ 8.02 | | ~~8.3~~ 9.5 | | ~~296~~ 275 | 10 | 10 | 10 | 10 | Sample ID: 19157 |
| 100% | 25.4 | ~~8.65~~ 8.38 | | ~~8.69~~ 9.4 | | ~~804~~ 852 | 10 | 10 | 10 | 10 | Test Solution Prep: WF01CB |
| | | | | | | | | | | | New WQ: AS |
| | | | | | | | | | | | Initiation Time: 1730 |
| Meter ID | 7A | ~~PH12~~ PH03 | | ~~D012~~ D010 | | ~~EC01~~ EC04 | | | | | Initiation Signoff: QD |
| Lab Water Control | 25.5 | 8.27 | 8.28 | 9.7 | 7.6 | ~~673~~ 673 | 10 | 10 | 10 | 10 | Date: 3-6-08 |
| Receiving Water | 25.5 | ~~8.08~~ 8.00 | 8.39 | ~~9.8~~ 9.8 | 7.8 | ~~281~~ 281 | 10 | 10 | 10 | 10 | Sample ID: 19157 |
| 100% | 25.5 | ~~PH11~~ PH03 | ~~8.39~~ 8.31 | ~~9.8~~ 9.8 | 8.2 | ~~EC03~~ EC03 | 10 | 10 | 10 | 10 | Test Solution Prep: TW QD |
| | | | | | | | | | | | New WQ: BB |
| | | | | | | | | | | | Renewal Time: 1200 |
| | | | | | | | | | | | Renewal Signoff: |
| Meter ID | 7A | PH11 | PH03 | D010 | D014 | ~~EC03~~ EC03 | | | | | Old WQ: HN |
| Lab Water Control | 25.1 | 8.23 | 7.92 | 9.5 | 7.5 | 294 | 10 | 10 | 10 | 10 | Date: 3/7/08 |
| Receiving Water | 25.1 | 8.14 | 8.19 | 9.8 | 7.8 | 266 | 10 | 10 | 10 | 9 10 | Sample ID: 19157 |
| 100% | 25.1 | 8.04 | 8.55 | 9.9 | 7.6 | 853 | 10 | 10 | 10 | 9 | Test Solution Prep: |
| | | | | | | | | | | | New WQ: |
| | | | | | | | | | | | Renewal Time: |
| | | | | | | | | | | | Renewal Signoff: WH DC |
| Meter ID | 7A | PH12 | PH12 | D010 | D010 | EC04 | | | | | Old WQ: |
| Lab Water Control | 25.1 | 8.09 | 8.26 | 8.8 | 7.8 | 295 | 10 | 10 | 10 | 10 | Date: 3/8/08 |
| Receiving Water | 25.1 | 8.05 | 8.29 8.51 | 9.8 9.4 | 7.6 7.3 | 261 | 10 | 10 | 10 | 10 | Sample ID: 19157 |
| 100% | 25.1 | 8.05 | 8.81 | 9.8 | 7.6 | 839 | 10 | 10 | 10 | 9 | Test Solution Prep: |
| | | | | | | | | | | | New WQ: HN |
| | | | | | | | | | | | Renewal Time: 12:24 |
| | | | | | | | | | | | Renewal Signoff: |
| Meter ID | 7A | PH11 | PH11 | D010 | D010 | EC01 | | | | | Old WQ: HN |

# 7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical
Test Material: EFF + RW
Test ID#: 27823 Project #: 13054
Test Date: 3-5-08 Randomization: —

Organism Log#: 3788 Age: <48 hrs
Organism Supplier: AES
Control/Diluent: EPAMH
Control Water Batch: 1083

| Treatment | Temp (°C) | pH new | pH old | D.O. (mg/L) new | D.O. (mg/L) old | Conductivity (µs/cm) | # Live Organisms A | B | C | D | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab Water Control | 25.4 | ~~8.28~~ 7.58 | 7.90 | ~~9.4~~ 8.2 | 6.8 | ~~314~~ 301 | 10 | 10 | 10 | 10 | Date: 3-9-08 |
| Receiving Water | 25.4 | ~~8.10~~ 8.57 | 8.07 | ~~10.2~~ 8.3 | 7.0 | ~~296~~ 268 | 9 | 10 | 10 | 10 | Sample ID: 19157 |
| 100% | 25.4 | ~~8.13~~ 8.05 | ~~8.25~~ 8.38 | ~~10.8~~ 8.6 | 7.2 | 854 | 10 | 8 | 10 | 9 | Test Solution Prep: MR |
| | | | | | | | | | | | New WQ: SB |
| | | | | | | | | | | | Renewal Time: 1230 |
| | | | | | | | | | | | Renewal Signoff: WforDC |
| Meter ID | 7A | PH03 | PH11 | DO12 | DO10 | ECO4 | | | | | Old WQ: HM |
| Lab Water Control | 25.5 | 8.00 | 8.58 | 5.8 | 7.1 | 294 | 10 | 10 | 10 | 10 | Date: 3/10/08 |
| Receiving Water | 25.5 | 8.09 | 8.31 | 9.0 | 7.2 | 262 | 9 | 8 | 10 | 10 | Sample ID: ~~19158~~ 19157 |
| 100% | 25.5 | 8.33 | 8.59 | 8.9 | 7.3 | 825 | 9 | 7 | 10 | 6 | Test Solution Prep: RV |
| | | | | | | | | | | | New WQ: WforDC |
| | | | | | | | | | | | Renewal Time: 14:30 |
| | | | | | | | | | | | Renewal Signoff: RV |
| Meter ID | 7A | pH12 | PH03 | DO14 | DO14 | ~~ECO4~~ ECO1 | | | | | Old WQ: HTA |
| Lab Water Control | 25.3 | NA | 8.58 | NA | 8.2 | 311 | 10 | 10 | 10 | 10 | Date: 3/11/08 |
| Receiving Water | 25.3 | NA | 8.37 | NA | 8.3 | 296 | 9 | 8 | 10 | 10 | Sample ID: N/A |
| 100% | 25.3 | NA | ~~8.25~~ 8.65 | NA | 8.6 | 884 | 9 | ~~6~~ | 9 | 5 | Test Solution Prep: — |
| | | | | | | | | | | | New WQ: — |
| | | | | | | | | | | | Renewal Time: 10:00 |
| | | | | | | | | | | | Renewal Signoff: RV |
| Meter ID | 7A | NA | pH12 | NA | DO10 | ECO | | | | | Old WQ: AS |
| Lab Water Control | 25.0 | | 8.10 | | 7.3 | 318 | 10 | 10 | 10 | 10 | Termination Date: 3/12/08 |
| Receiving Water | 25.0 | | 7.90 | | 7.0 | 293 | 9 | 8 | 10 | 10 | Termination Time: 0915 |
| 100% | 25.0 | | 8.31 | | 7.0 | 928 | ~~7~~ 6 | 6 | 9 | 4 | Termination Signoff: JJ |
| | | | | | | | | | | | Old WQ: BB |
| Meter ID | 7A | | pH11 | | DO14 | ECO4 | | | | | |

# Fathead Minnow Dry Weight Data Sheet

Client: Precision Analytical | Test ID #: 27823 | Project #: 13054
Sample: Eff + RW | Tare Weight Date: 3.11-08 | Sign-off: MC
Test Date: 3/5/08 | Final Weight Date: 3-13-08 | Sign-off: MC

| Pan | Concentration | Replicate | Initial Pan Weight (mg) | Final Pan Weight (mg) | Initial # of Organisms | Biomass Value (mg) |
|---|---|---|---|---|---|---|
| 1 | Control | A | 134.53 | 139.99 | 10 | 0.546 |
| 2 | | B | 154.49 | 159.72 | 10 | 0.523 |
| 3 | | C | 143.36 | 148.45 | 10 | 0.509 |
| 4 | | D | 146.33 | 151.18 | 10 | 0.485 |
| 5 | RW | A | 118.09 | 123.07 | 10 | 0.498 |
| 6 | | B | 147.05 | 151.47 | 10 | 0.442 |
| 7 | | C | 136.38 | 140.92 | 10 | ~~0.544~~ 0.454 |
| 8 | | D | 120.72 | 125.69 | 10 | 0.497 |
| 9 | 100% | A | 141.50 | 142.70 | 10 | 0.120 |
| 10 | | B | 146.63 | 147.64 | 10 | 0.101 |
| 11 | | C | 143.27 | 143.58 | 10 | 0.031 |
| 12 | | D | 140.76 | 141.45 | 10 | 0.069 |
| QA 1 | | | 118.02 | 118.02 | — | 0.00 |
| QA2 | | | 144.25 | 144.22 | — | -0.03 |
| Balance ID | | | 11 | 1 | | |

# Appendix H

# Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Fathead Minnows

# CETIS Test Summary

Report Date: 19 Mar-08 1:15 PM
Test Link: 12-1966-3738/27816

**Chronic Larval Fish Survival and Growth Test** — **Pacific EcoRisk**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 05-6085-4856 | **Test Type:** | Growth-Survival (7d) | **Duration:** | 6d 16h |
| **Start Date:** | 05 Mar-08 06:00 PM | **Protocol:** | EPA/821/R-02-013 (2002) | **Species:** | Pimephales promelas |
| **Ending Date:** | 12 Mar-08 10:45 AM | **Dil Water:** | Not Applicable | **Source:** | Aquatic Biosystems, CO |
| **Setup Date:** | 05 Mar-08 06:00 PM | **Brine:** | Not Applicable | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 08-2813-9422 | **Code:** | 13059 | **Client:** | |
| **Sample Date:** | 05 Mar-08 06:00 PM | **Material:** | Copper sulfate | **Project:** | |
| **Receive Date:** | 05 Mar-08 06:00 PM | **Source:** | Reference Toxicant | | |
| **Sample Age:** | N/A (25.8 °C) | **Station:** | In House | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 16-6694-8479 | 7d Proportion Survived | 12.5 | 25 | 17.6777 | 7.35% | Steel Many-One Rank |
| 17-2495-7769 | Mean Dry Biomass-mg | 12.5 | 25 | 17.6777 | 9.70% | Dunnett's Multiple Comparison |

**Point Estimate Summary**

| Analysis | Endpoint | % Effect | Conc-µg/L | 95% LCL | 95% UCL | Method |
|---|---|---|---|---|---|---|
| 11-0064-8283 | 7d Proportion Survived | 1 | 8.819875 | N/A | N/A | Linear Regression |
| | | 5 | 10.82174 | N/A | N/A | |
| | | 10 | 12.06853 | N/A | N/A | |
| | | 15 | 12.98991 | N/A | N/A | |
| | | 20 | 13.77211 | N/A | N/A | |
| | | 25 | 14.4806 | N/A | N/A | |
| | | 40 | 16.43175 | N/A | N/A | |
| | | 50 | 17.72998 | N/A | N/A | |
| 06-6746-8544 | Mean Dry Biomass-mg | 1 | 6.955677 | N/A | 9.90607 | Linear Interpolation |
| | | 5 | 9.778382 | 7.009964 | 14.66757 | |
| | | 10 | 12.66273 | 9.327955 | 13.98016 | |
| | | 15 | 13.37441 | 12.11425 | 14.6075 | |
| | | 20 | 14.0861 | 12.9419 | 15.24804 | |
| | | 25 | 14.79779 | 13.7378 | 15.92113 | |
| | | 40 | 16.93285 | 16.05587 | 17.8896 | |
| | | 50 | 18.35622 | 17.51128 | 19.11429 | |

**7d Proportion Survived Summary**

| Conc-µg/L | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 4 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 6.25 | | 4 | 0.97500 | 0.90000 | 1.00000 | 0.02500 | 0.05000 | 5.13% |
| 12.5 | | 4 | 0.97500 | 0.90000 | 1.00000 | 0.02500 | 0.05000 | 5.13% |
| 25 | | 4 | 0.07778 | 0.00000 | 0.11111 | 0.02606 | 0.05212 | 67.01% |
| 50 | | 4 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 4 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00% |

**Mean Dry Biomass-mg Summary**

| Conc-µg/L | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Lab Water | 4 | 0.54075 | 0.53300 | 0.55700 | 0.00557 | 0.01115 | 2.06% |
| 6.25 | | 4 | 0.56575 | 0.50500 | 0.61900 | 0.02496 | 0.04993 | 8.83% |
| 12.5 | | 4 | 0.50425 | 0.47400 | 0.55000 | 0.01766 | 0.03531 | 7.00% |
| 25 | | 4 | 0.01839 | 0.00000 | 0.04100 | 0.00927 | 0.01853 | 100.79% |
| 50 | | 4 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 4 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00% |

# 7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: **Reference Toxicant** Organism Log#: 3788 Age: < 48hr
Test Material: Copper Sulfate (µg/L) Organism Supplier: ABS
Test ID#: 27816 Project #: 13059 Control/Diluent: EPAMH
Test Date: 3/5/08 Randomization: — Control Water Batch: 1083

| Treatment | Temp (°C) | pH New | pH Old | D.O. (mg/L) New | D.O. (mg/L) Old | Conductivity (µs/cm) | # Live Organisms A | # Live Organisms B | # Live Organisms C | # Live Organisms D | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | 25.8 | 8.33 | | 9.4 | | 304 | 10 | 10 | 10 | 10 | Date: 3/5/08 |
| 6.25 | 25.8 | 8.29 | | 9.4 | | 306 | 10 | 10 | 10 | 10 | Test Solution Prep: KO |
| 12.5 | 25.8 | 8.24 | | 9.4 | | 305 | 10 | 10 | 10 | 10 | New WQ: CCS |
| 25 | 25.8 | 8.28 | | 9.3 | | 305 | 10 MD | 10 | 10 | 10 | Initiation Time: 1800 |
| 50 | 25.8 | 8.20 | | 9.3 | | 305 | 10 | 10 | 10 | 10 | Initiation Signoff: QP |
| 100 | 25.8 | 8.18 | | 9.3 | | 308 | 10 | 10 | 10 | 10 | |
| Meter ID | 7A | pH03 | | DO10 | | EC03 | | | | | |
| Control | 25.3 | 7.96 | 8.07 | 9.4 | 7.9 | 305 | 10 | 10 | 10 | 10 | Date: 3.6.08 |
| 6.25 | 25.3 | 7.84 | 7.95 | 9.3 | 7.9 | 303 | 10 | 10 | 10 | 10 | Test Solution Prep: KO |
| 12.5 | 25.3 | 7.99 | 7.91 | 9.4 | 8.0 | 302 | 10 | 10 | 10 | 9 | New WQ: BB |
| 25 | 25.3 | 8.00 | 7.89 | 9.3 | 7.9 | 302 | 12 | 3 | 1 | 7 | Renewal Time: 11:15 |
| 50 | 25.3 | 8.00 | 7.87 | 9.3 | 7.8 | 302 | 1 | 2 | 3 | 6 | Renewal Signoff: KO |
| 100 | 25.3 | 7.97 | 7.85 | 9.4 | 7.9 | 303 | 0 | 0 | 0 | 0 | Old WQ: BB |
| Meter ID | 7A | PH11 | PH11 | DO10 | DO10 | EC03 | | | | | |
| Control | 25.2 | 7.74 | 8.45 | 9.8 | 8.2 | 295 | 10 | 10 | 10 | 10 | Date: 3.7.08 |
| 6.25 | 25.2 | 7.85 | 8.35 | 9.5 | 7.8 | 292 | 10 | 10 | 10 | 10 MD | Test Solution Prep: CB |
| 12.5 | 25.2 | 7.92 | 8.28 | 9.4 | 7.6 | 294 | 10 | 10 | 10 | 9 | New WQ: mp |
| 25 | 25.2 | 7.97 | 8.21 | 9.3 | 7.4 | 293 | 1 | 2 | 0 | 5 JT | Renewal Time: 1400 |
| 50 | 25.2 | 8.00 | 8.14 | 9.2 | 7.4 | 292 | 0 | 0 | 0 | 0 | Renewal Signoff: JE |
| 100 | — | — | — | — | — | — | — | — | — | — | Old WQ: mp |
| Meter ID | 7A | PH12 | PH12 | DO10 | DO10 | EC04 | | | | | |
| Control | 25.1 | 8.21 | 7.99 | 8.9 | 8.0 | 299 | 10 | 10 | 10 | 10 | Date: 3/8/08 |
| 6.25 | 25.1 | 8.23 | 7.98 | 8.9 | 8.1 | 296 | 10 | 10 | 10 | 10 | Test Solution Prep: JS |
| 12.5 | 25.1 | 8.22 | 7.97 | 9.1 | 8.0 | 292 | 10 | 10 | 10 | 9 | New WQ: JS |
| 25 | 25.1 | 8.22 | 7.97 | 8.4 | 8.2 | 293 | 1 | 2 | 0 | 5 | Renewal Time: 1045 |
| 50 | — | — | — | — | — | — | — | — | — | — | Renewal Signoff: JJ |
| 100 | — | — | — | — | — | — | — | — | — | — | Old WQ: HH |
| Meter ID | 7A | pH03 | PH11 | DO12 | DO10 | EC04 | | | | | |

# 7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: **Reference Toxicant** Organism Log#: 3788 Age: C 48hr
Test Material: Copper Sulfate (µg/L) Organism Supplier: ABS
Test ID#: 27816 Project #: 13059 Control/Diluent: EPAMH
Test Date: 3/5/08 Randomization: — Control Water Batch: 1083

| Treatment | Temp (°C) | pH new | pH old | D.O. (mg/L) new | D.O. (mg/L) old | Conductivity (µs/cm) | # Live Organisms A | B | C | D | SIGN-OFF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | 25.4 | 8.27 | 7.77 | 8.6 | 7.5 | 292 | 10 | 10 | 10 | 10 | Date: 3-9-08 |
| 6.25 | 25.4 | 8.22 | 7.71 | 8.7 | 7.2 | 293 | 10 | 10 | 10 | 9 | Test Solution Prep: |
| 12.5 | 25.4 | 8.19 | 7.72 | 8.7 | 7.9 | 295 | 10 | 10 | 10 | 9 | New WQ: HN |
| 25 | 25.4 | 8.17 | 7.73 | 8.6 | 7.7 | 292 | 1 | 1 | — | 3 | Renewal Time: 11:25 |
| 50 | — | — | — | — | — | — | — | — | — | — | Renewal Signoff: RV |
| 100 | — | — | — | — | — | — | — | — | — | — | Old WQ: HN |
| Meter ID | 7A | PH11 | PH12 | DO10 | DO10 | EC01 | | | | | |
| Control | 25.4 | 8.04 | 7.86 | 8.8 | 7.3 | 294 | 10 | 10 | 10 | 10 | Date: 3-10-08 |
| 6.25 | 25.4 | 8.07 | 7.82 | 8.8 | 7.3 | 295 | 10 | 10 | 10 | 9 | Test Solution Prep: |
| 12.5 | 25.4 | 8.08 | 7.85 | 8.9 | 7.5 | 296 | 10 | 10 | 10 | 9 | New WQ: RV |
| 25 | 25.4 | 8.08 | 7.87 | 8.6 | 7.7 | 296 | 1 | 1 | — | 2 | Renewal Time: 12:09 |
| 50 | — | — | — | — | — | — | — | — | — | — | Renewal Signoff: RV |
| 100 | — | — | — | — | — | — | — | — | — | — | Old WQ: |
| Meter ID | 7A | PH12 | PH12 | DO10 | DO10 | EC04 | | | | | |
| Control | 25.2 | 8.45 | 8.12 | 9.1 | 8.2 | 310 | 10 | 10 | 10 | 10 | Date: 3/11/08 |
| 6.25 | 25.2 | 8.32 | 8.06 | 9.1 | 8.2 | 296 | 10 | 10 | 10 | 9 | Test Solution Prep: KO |
| 12.5 | 25.2 | 8.16 | 7.91 | 9.1 | 8.1 | 296 | 10 | 10 | 10 | 9 | New WQ: BB |
| 25 | 25.2 | 8.09 | 7.95 | 9.1 | 7.9 | 295 | 1 | 1 | — | 1 | Renewal Time: 10:27 |
| 50 | — | — | — | — | — | — | — | — | — | — | Renewal Signoff: RV |
| 100 | — | — | — | — | — | — | — | — | — | — | Old WQ: RV |
| Meter ID | 7A | PH11 | PH12 | DO12 | DO10 | EC05 | | | | | |
| Control | 25.0 | | 8.44 | | 7.4 | 306 | 10 | 10 | 10 | 10 | Date: 3/12/08 |
| 6.25 | 25.0 | | 8.27 | | 6.8 | 308 | 10 | 10 | 10 | 9 | Termination Time: 1030 |
| 12.5 | 25.0 | | 8.18 | | 6.0 | 304 | 10 | 10 | 10 | 9 | Termination Signoff: JJ |
| 25 | 25.0 | | 8.11 | | 6.4 | 316 | 1 | 1 | — | 1 | Old WQ: YL |
| 50 | — | | — | | — | — | — | — | — | — | |
| 100 | — | | — | | — | — | — | — | — | — | |
| Meter ID | 7A | | PH11 | | DO14 | EC04 | | | | | |

# Fathead Minnow Dry Weight Data Sheet

Client: **Reference Toxicant** Test ID #: 27816 Project # 13059

Sample: Copper Sulfate (µg/L) Tare Weight Date: 3-6-08 Sign-off: ME

Test Date: 3/5/08 Final Weight Date: 3-12-08 Sign-off: ME

| Pan ID | Concentration | Replicate | Initial Pan Weight (mg) | Final Pan Weight (mg) | Initial # of Organisms | Biomass Value (mg) |
|---|---|---|---|---|---|---|
| 1 | Control | A | 116.56 | 121.90 | 10 | 0.534 |
| 2 | | B | 115.87 | 121.44 | 10 | 0.557 |
| 3 | | C | 93.05 | 98.38 | 10 | 0.533 |
| 4 | | D | 108.17 | 113.56 | 10 | 0.539 |
| 5 | 6.25 | A | 116.65 | 122.84 | 10 | 0.619 |
| 6 | | B | 127.68 | 132.73 | 10 | 0.505 |
| 7 | | C | 120.35 | 125.83 | 10 | 0.548 |
| 8 | | D | 129.81 | 135.72 | 10 | 0.591 |
| 9 | 12.5 | A | 118.41 | 123.15 | 10 | 0.474 |
| 10 | | B | ~~123.~~ 104.38 | 109.52 | 10 | 0.514 |
| 11 | | C | 86.94 | 92.44 | 10 | 0.550 |
| 12 | | D | 109.06 | 113.85 | 10 | 0.479 |
| 13 | 25 | A | 103.47 | 103.70 | ~~10~~ mp 9 | 0.026 |
| 14 | | B | 110.36 | 110.43 | 10 | 0.007 |
| 15 | | C | 120.98 | – | 10 | – |
| 16 | | D | 115.87 | 116.28 | 10 | 0.041 |
| 17 | 50 | A | 112.72 | – | 10 | – |
| 18 | | B | 107.31 | – | 10 | – |
| 19 | | C | 115.74 | – | 10 | – |
| 20 | | D | 115.06 | – | 10 | – |
| 21 | 100 | A | 115.43 | – | 10 | – |
| 22 | | B | 119.32 | – | 10 | – |
| 23 | | C | 118.53 | – | 10 | – |
| 24 | | D | 109.55 | – | 10 | – |
| QA1 | | | 99.58 | 99.56 | | -0.02 |
| QA2 | | | ~~104.38~~ 123.45 | 123.42 | | -0.03 |
| QA3 | | | 107.15 | | | |
| Balance ID: | | | 1 | 1 | | |