City of Buenaventura Toxicity and Chemical Evaluation July 04 Dry Weather Sampling Event Santa Clara River Estuary

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INTRODUCTION

Toxicity tests and chemical analyses were conducted on estuarine ambient water samples collected on 20 July 2004 from the Santa Clara River Estuary located in the City of San Buenaventura, CA. This third sampling effort for the project was characterized as a "dry weather" event; the sand berm was closed to tidal flushing and the estuary was full of water. Dr. Howard Bailey, Mr. Chris Stransky, and Mr. John Rudolph of Nautilus Environmental, LLC (Nautilus) along with Mr. Nick Buhbe of AMEC Earth & Environmental (AMEC) coordinated the collection effort, toxicity testing, and chemical testing programs. Ambient water toxicity was evaluated using the freshwater alga *Selenastrum capricornutum*, the water flea *Ceriodaphnia dubia*, and the fathead minnow *Pimephales promelas*. Ambient water toxicity to marine organisms was tested using giant kelp *Macrocystis pyrifera*, the blue mussel *Mytilus galloprovincialis* (formerly *Mytilus edulis*), the opossum shrimp *Americamysis bahia* (formerly *Mysidopsis bahia*), and the Pacific topsmelt *Atherinops affinis*. Bioassays were conducted between 21 and 28 July 2004 at Nautilus located in San Diego, CA. Chemical analyses were performed by Calscience Environmental Laboratories (CEL) located in Garden Grove, CA.

METHODS AND MATERIALS

SAMPLE COLLECTION AND TRANSPORT

Ambient water samples were collected from four of the eleven sampling locations (A-2, B-1, B-3, and C-2). Sites for water collection were selected based on location within the estuary and water depth (i.e. centrally located sites with enough water to provide an adequate sample volume for testing). Sample collection time, global positioning system (GPS) coordinates, water depth, temperature, dissolved oxygen (DO), salinity, and pH were recorded in a field logbook (Appendix G).

All equipment used for water collection was cleaned thoroughly with Alconox soap and rinsed with site water. Collections were performed using a hand pump connected to ½" clear PVC tubing. The end of the tubing was held at mid-depth to collect the water and pumped into 20-L plastic lined buckets; a total of five buckets were collected at each site. Nautilus personnel transported all samples to the laboratory where samples were placed in a 4°C cold room overnight. The following day, each sample was composited and water quality parameters of temperature, DO, conductivity, salinity, pH, total residual chlorine, alkalinity, and hardness were measured and recorded in a logbook. A portion

of each composited sample was then removed for test initiation and the remainder of each sample was held at 4 °C until used for testing.

ORGANISM PROCUREMENT AND HANDLING

Freshwater Species

Fathead Minnow

Fish larvae (1 day old) were purchased from Aquatic Biosystems, Inc. of Fort Collins, CO. The organisms were placed in plastic bags containing oxygenated culture water, packed in insulted containers, and transported to Nautilus via overnight delivery service. Upon arrival at Nautilus, temperature, pH, DO, and conductivity were measured and recorded in a logbook. Fish larvae condition was also noted. The larvae were then acclimated to test dilution water and temperature, and observed prior to test initiation for any indications of stress (e.g. abnormal swimming behavior) or significant mortality (>10%). Fish larvae were fed *Artemia* nauplii to satiation during holding.

Water Flea

Cultures of *C. dubia* are maintained for use in testing at Nautilus. One week prior to test initiation, neonate (<24 hours old) water fleas were isolated from brood stock from the previous week and placed in individual holding cups containing clean culture water and food. Neonate selection for continuing culture is based on overall health and reproductive performance of the individuals in the current culture. The number of water fleas isolated was equal to the number of neonates required to initiate testing. Cups were held in a polypropylene holder and the entire holder was placed in a temperature-controlled room maintained at 25 °C. Isolated females were transferred to cups containing fresh water and food each day, and on the morning of test initiation. Neonates produced on the day of test initiation were selected for testing if produced by individuals that had at least 3 broods of 8 or more neonates each over the course of the previous week.

Green Alga

A continuous culture of *S. capricornutum* is maintained for use in testing at Nautilus. A new culture is started each week and grown under a cool-white fluorescent light source providing continuous illumination. The culture used to inoculate the effluent and

reference toxicant tests for this study was six days old and in log-phase growth at the time of test initiation.

Marine Species

Blue Mussel

Nautilus personnel collected the blue mussel *Mytilus galloprovincialis* from Mission Bay in San Diego, CA. The mussels were transported from the field to Nautilus in a clean ice chest with blue ice. In the laboratory, the organism receipt date and arrival condition were recorded in a logbook. The mussels then were acclimated to test temperature and salinity, and observed prior to test initiation for any indications of significant mortality (>10%).

Pacific Topsmelt and Opossum Shrimp

Fish (14 days old) and shrimp larvae (7 days old) were purchased from Aquatic Biosystems, Inc. of Fort Collins, CO. The organisms were placed in plastic bags containing oxygenated culture water, packed in insulted containers, and transported to Nautilus via overnight delivery service. Upon arrival at Nautilus, water quality measurements of temperature, pH, DO, and salinity were recorded in a logbook. Organism condition was also noted. The larvae were then acclimated to test salinity and temperature, and observed prior to test initiation for any indications of stress (e.g. abnormal swimming behavior) or significant mortality (>10%). Larvae of both species were fed *Artemia* nauplii to satiation during holding.

Giant Kelp

Giant kelp zoospores are obtained from the reproductive blades (sporophylls) of adult plants. Nautilus personnel collected kelp sporophylls from multiple plants offshore of La Jolla Cove in La Jolla, CA the day prior to test initiation. The blades were transported to Nautilus in a clean cooler with blue ice. Once in the lab, sporophylls were cleaned, rinsed with 0.20-µm filtered seawater, blotted dry, arranged individually in a single layer on paper towels, and allowed to desiccate overnight. Prior to initiation, the blades were rinsed again and placed in a 2-L glass beaker containing 1 L of clean 0.20-µm filtered seawater. The beaker was then placed in a temperature-controlled environmental chamber at 15℃. One hour later, the blades were removed and the resulting solution of

released zoospores allowed to settle. After approximately 30 minutes, the motile zoospores were siphoned from the top layer of seawater into a flask and observed under a compound microscope at 100x to verify their viability. Spore density was determined by direct count of the spore solution with an Improved Nuebauer hemacytometer, and an algal stock solution was prepared to yield an initial cell density of approximately 225,000 cells per ml in each test chamber.

BIOASSAY PROTOCOLS

All freshwater bioassay procedures used for this study followed United States Environmental Protection Agency (US EPA) methods outlined in, "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition (EPA/821/R-02/013)," (US EPA 2002a). Marine bioassays conducted using *Americamysis bahia*, followed "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine organisms, Third Edition (EPA/821/R-02/014)," (US EPA 2002b). The bivalve embryo development test using *Mytilus galloprovincialis* was conducted according to the American Society for Testing and Materials (ASTM) 1999 protocol "Standard guide for conducting static acute toxicity tests starting with embryos of four species of saltwater bivalve molluscs (E-724-98)". Finally, marine bioassays conducted using *Atherinops affinis* and *Macrocystis pyrifera* followed "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA 600/R-95/136)," (US EPA 1995).

Freshwater Species

Fathead Minnow 7-Day Survival and Growth

This test estimates chronic toxicity by evaluating survival and growth of larval fathead minnows over time. Larval fish (one day old at test initiation) were exposed to the samples for a period of seven days. A sample concentration of 100 percent was tested along with a negative control. Because samples were estuarine, additional controls of equal salinity to each sample were also tested to ensure that any observed effects were not due to salinity, rather than other toxic constituents. Three of the samples were received at a pH greater than 9.00 and equal salinity of 3.1 parts per thousand (ppt). As a result, a third control of 3.1 ppt and pH greater than 9.00 was added to the test design. The pH of this control was adjusted using 1.0 N sodium hydroxide (NaOH).

Test solutions were prepared using graduated cylinders and pipettes. Measurements of pH, DO, temperature, and conductivity were measured and recorded for each sample and control. Four replicate test chambers were prepared for each sample and control. Replicates consisted of 400-ml plastic cups containing 250 ml of test solution. Test solutions were acclimated to 25 ℃ in a temperature-controlled environmental chamber prior to initiation.

Ten fish larvae were arbitrarily added to each test chamber. A second technician verified counts and condition of all test organisms before and after addition of the larvae to test chambers. A 16:8 hour light:dark illumination cycle was provided for the duration of the test. Test chambers were covered with a clear plexiglass sheet to prevent test solution contamination.

Test solutions were renewed once per day, and organisms were fed three times per day. Temperature, pH, DO, and conductivity were measured daily in both freshly prepared test solution, and test solution collected from the test chambers for each concentration and control. Survival status was recorded for organisms in each test chamber once per day. At test termination, final observations were made and test animals were prepared for weight determination.

Fish weights were determined by placing fish from each test chamber on individual tared aluminum pans and drying them in an oven at 60 °C for 24 hours. After drying, fish were weighed on a Mettler 240AE balance to the nearest 0.01 mg.

A concurrent copper (II) chloride ($CuCl_2$) reference toxicant test (positive control) was also conducted as a measure of consistent organism sensitivity, as well as continuing laboratory proficiency with the method.

Water Flea 7-Day Survival and Reproduction

This test estimates chronic toxicity by evaluating survival and reproduction of individual water fleas over time. Water fleas (<24 hours old at test initiation) were exposed to the samples for a period of seven days. A sample concentration of 100 percent was tested along with a negative control. Because samples were estuarine, additional controls of equal salinity to each sample were also tested to ensure observed mortality was not due to salinity rather than other toxic constituents. Three of the samples were received at a pH greater than 9.00 and equal salinity of 3.1 parts per thousand (ppt). As a result, a

third control of 3.1 ppt and pH greater than 9.00 was added to the test design. The pH of this control was adjusted using 1.0 N NaOH.

Test solutions were prepared using graduated cylinders and pipettes. A diet of yeast, cerophyll, trout chow (YCT) and *Selenastrum* suspension was added to each test sample and control prior to distribution to test chambers. Measurements of pH, DO, temperature, and conductivity were measured and recorded for each sample and control. Ten replicate test chambers were prepared for each sample and control. Replicates consisted of 30-ml soufflé cups containing 15 ml of test solution. Test solutions were acclimated to 25 ℃ in a temperature-controlled environmental chamber prior to initiation.

Test solutions were renewed, and organisms were fed once per day. Temperature, pH, DO, and conductivity were measured daily in both freshly prepared test solution, and test solution collected from the test chambers for each sample and control. Survival status and reproductive output were recorded for each organism once per day. At test termination, final observations were made, water quality measurements taken, and test solution and organisms discarded.

A concurrent CuCl₂ reference toxicant test (positive control) was also conducted.

96-Hour Algal Growth Inhibition

This test estimates chronic toxicity by measuring algal population response to effluent exposure in terms of changes in cell density over time. Algal cells (six days old and in log-phase growth at test initiation) were exposed to the samples for a period of 96 hours. Prior to test initiation, each sample was inspected under a microscope and found to have native algae present. A portion of each sample was then filtered through a 0.45-µm-nylon membrane filter. Both 100 percent-filtered and 100 percent-unfiltered samples were tested along with a negative control. This was done to ensure sample toxicity was not modified by filtration. Because samples were estuarine, additional controls of equal salinity to the sample were also tested to ensure observed response was not due to salinity alone. Three of the samples were received at a pH greater than 9.00 and equal salinity of 3.1 parts per thousand (ppt). As a result, a third control of 3.1 ppt and pH greater than 9.00 was added to the test design. The pH of this control was adjusted using 1.0 N NaOH.

Test solutions were prepared using graduated cylinders and pipettes. Nutrients to

promote algal growth were added to effluent and dilution water at a ratio of 1 ml/L. Measurements of pH, DO, temperature, and conductivity were measured and recorded for each test concentration and control. Alkalinity and hardness were measured and recorded for each control and sample prior to test initiation. Five replicate test chambers were prepared for each sample and control, one of which was used only as a surrogate for measuring pH and temperature during the exposure period. An additional flask containing filtered sample not inoculated with algae was also tested as a blank to ensure that there was no growth of native algae, or other interference in measuring chlorophyll-a fluorescence at test termination. Test chambers consisted of 125-ml Erlenmeyer flasks containing 50 ml of test solution. Test solutions were acclimated to 25°C in a temperature-controlled environmental chamber prior to inoculation.

Each test chamber was aseptically inoculated with an algal stock solution prepared to yield an initial cell density of approximately 10,000 cells per ml in each test chamber. A cool-white fluorescent light source provided continuous illumination above the test chambers. Each chamber was covered with Parafilm, with a small opening left for gas exchange, to prevent contamination and to minimize evaporation.

Each test chamber was manually swirled three times per day (morning, mid-day, and evening), and rotated to a new location under the light source twice per day (morning and evening) for the duration of the test period. Temperature and pH were measured once per day in the surrogate test chamber for each concentration and control. At test termination, cell density in each test chamber was determined using a Turner Model TD-700 Fluorometer. Chlorophyll-a fluorescence was automatically converted to cell density based on an internal calibration curve that is updated monthly.

A concurrent CuCl₂ reference toxicant test (positive control) was also conducted.

Marine Species

48-hour Bivalve Embryo Development

Blue mussel embryos were exposed to ambient site water for a period of 48 hours to evaluate effects on embryo development. Sample concentrations of 25, 50, and 67 percent were tested along with a negative control. Due to the low salinities of the samples, hypersaline brine was added to each sample to raise the salinity to 30 ppt. The volume of hypersaline brine required to adjust the salinity determined the highest

testable concentration of 67 percent for each sample. Traditionally, this test is sensitive to artificial salts and is only conducted using brine. However, because the highest testable concentration is limited by brine and sample salinity, comparability of results among all test species is limited as well. Therefore, in this study, each sample was also tested undiluted by using Forty Fathoms[™] sea salt to raise the salinity to 30 ppt. Two additional controls were also tested to ensure any observed adverse effects were not due to the addition of hypersaline brine or artificial salt rather than other toxic constituents. One control was composed of hypersaline brine and deionized water, and the other composed of Forty Fathoms[™] sea salt and deionized water.

Test solutions were prepared using graduated cylinders and pipettes. Measurements of pH, DO, temperature, and salinity were measured and recorded for each test concentration and control. Five replicate test chambers were prepared for each test concentration and control. Replicates consisted of 30-ml shell vials containing 10 ml of test solution. Test solutions were acclimated to 15 ℃ in temperature-controlled environmental chambers prior to initiation.

Newly fertilized embryos were added to each test chamber to produce a density of 20 embryos/ml. A 16:8 hour light:dark illumination cycle was provided for the duration of the test. Test chambers were covered with a clear plexiglass sheet to prevent test solution contamination.

Temperature, pH, DO, and salinity were measured daily in surrogate test chambers for each concentration and control. At test termination, larvae in each test chamber were preserved with 1 ml of seawater-buffered Formalin prior to evaluation. The first 100 bivalve embryos in each test chamber were counted under a compound microscope at 100x magnification and classified as normal or abnormal. Normally developed embryos have a distinct D-shape with complete formation of the shell.

A concurrent reference toxicant test (positive control) using $CuCl_2$ was conducted in conjunction with the ambient water tests.

Pacific Topsmelt and Opossum Shrimp 7-Day Survival and Growth

These tests estimate chronic toxicity by evaluating survival and growth of larval Pacific topsmelt or opossum shrimp over time. Organisms were exposed to the samples for a period of seven days. Sample concentrations of 25, 50, 67 (for consistency with species

requiring brine) and 100 percent were tested along with a negative control (30 ppt natural seawater). Due to the low salinities of the samples, Forty Fathoms[™] sea salt was added to each sample to raise the salinity to 30 ppt. An additional control, composed of Forty Fathoms[™] sea salt and deionized water, was also tested to ensure observed mortality was not due to the addition of artificial salt rather than other toxic constituents. This water was also used to prepare the dilutions of full-strength sample.

Test solutions were prepared using graduated cylinders and pipettes. Measurements of pH, DO, temperature, and salinity were measured and recorded for each test concentration and control. Five (Pacific topsmelt) or eight (opossum shrimp) replicate test chambers were prepared for each test concentration and control. Replicates for the topsmelt test consisted of 1-L plastic cups containing 500 ml of test solution. Replicates for the shrimp test consisted of 400-ml plastic cups containing 250 ml of test solution. Test solutions were acclimated to 20 or 25 °C in temperature-controlled environmental chambers prior to initiation, for the topsmelt and shrimp tests respectively.

Five organisms were arbitrarily added to each test chamber for both species. A second technician verified counts and condition of all test organisms before and after addition of the larvae to test chambers. A 16:8 hour light:dark illumination cycle was provided for the duration of the test. Test chambers were covered with a clear plexiglass sheet to prevent test solution contamination and reduce evaporation.

Test solutions were renewed once per day, and organisms were fed two times per day. Temperature, pH, DO, and salinity were measured daily in both freshly prepared test solution, and test solution collected from the test chambers for each concentration and control. Survival status was recorded for organisms in each test chamber once per day. At test termination, final observations were made and test animals were prepared for weight determination.

Dry weights were determined by placing organisms from each test chamber in individual tared aluminum pans and drying them in an oven at 60 °C for 24 hours. After drying, pans were weighed on a Mettler 240AE balance to the nearest 0.01 mg.

A concurrent CuCl₂ reference toxicant test (positive control) was conducted with both species.

48-Hour Giant Kelp Germination and Growth

This test estimates chronic toxicity by evaluating germination rate and growth of individual zoospores over a 48-hour period. Sample concentrations of 25, 50, and 65 percent were tested along with a negative control. Due to the low salinities of the samples, hypersaline brine was added to each sample to raise the salinity to 32 ppt. The volume of hypersaline brine required to adjust the salinity determined the highest testable concentration of 65 percent for each sample. Traditionally, this test is sensitive to artificial salts and is only conducted using brine. However, because the highest testable concentration is limited by brine and sample salinity, comparability of results among all test species is limited as well. Therefore, in this study, each sample was also tested undiluted by using Forty Fathoms[™] sea salt to raise the salinity to 32 ppt rather than hypersaline brine. Two additional controls were also tested to ensure that any observed effects were not due to the addition of hypersaline brine or artificial salt. One control was composed of hypersaline brine and deionized water, and the other composed of Forty Fathoms[™] sea salt and deionized water.

Test solutions were prepared using graduated cylinders and pipettes. Measurements of pH, DO, temperature, and salinity were measured and recorded for each test concentration and control. Five replicate test chambers were prepared for each test concentration and control. Replicates consisted of 50-ml glass petri dishes containing 30 ml of test solution. Test solutions were acclimated to 15 °C in temperature-controlled environmental chambers prior to initiation.

Approximately 225,000 kelp spores were added to each test chamber. A 16:8 hour light:dark illumination cycle was provided for the duration of the test. At test termination, kelp spore germination was scored under a compound microscope at 400x magnification. Ten germinated kelp spores were then arbitrarily selected and measured to the nearest μ m. Test solutions from each replicate were pooled by concentration, and water quality parameters of pH, DO, and salinity were measured and recorded. All test solutions were discarded.

A concurrent CuCl₂ reference toxicant test (positive control) was conducted concurrent to the ambient water tests.

STATISTICAL ANALYSES

Analysis of ambient water and reference toxicant data was conducted using CETISTM Comprehensive Environmental Toxicity Information System and Database Software, Version 1.024. Statisitcal differences from the control and No Observed Effect Concentrations (NOEC) were determined for each test using Dunnett's, Wilcoxon Rank Sum, Steel's Many-One Rank, or Fisher's Exact Multiple Comparisons Tests. Median Lethal Concentration (LC₅₀) or Median Effect Concentration (EC₅₀) values were determined for marine and freshwater reference toxicant bioassays using Maximum Likelihood Probit, Trimmed Spearman-Karber, or Linear Interpolation Analysis. The choice of statistical method used was dependent upon specific assumptions met by the data.

CHEMICAL ANALYSES

Analysis of total organic carbon (TOC), total dissolved carbon (DOC), total suspended solids (TSS), cyanide, copper, nickel, zinc, and selenium was performed by CEL (Appendix F).

RESULTS AND DISCUSSION

Detailed data summaries are contained in Appendix A. Bioassay water quality data, including total ammonia are located in Appendix B. Statistical analyses and raw data can be found in Appendix C, and reference toxicant data are located in Appendix D. Analytical chemistry data reports, field collection data logs, and chain-of-custody information can be found in Appendices E, F, and G, respectively.

FRESHWATER SPECIES

Performing toxicity tests with freshwater organisms on estuary samples was complicated by the fact that the salinity was slightly higher than freshwater and could pose variable levels of stress on the test organisms. Additionally, three of the samples exhibited a pH above 9.00. Consequently, the samples were tested with concurrent salinity and pH controls. To separate salinity and pH effects from other constituents present in the sample, statistical comparisons were made between each full-strength sample and the appropriate salinity or pH control.

Fathead Minnow 7-Day Survival and Growth

Survival of fathead minnow larvae was 90 percent or greater in all samples. Growth results were similar to those for survival; no adverse effects were observed. In fact, average dry weights of larvae exposed to the samples exceeded those of their corresponding salinity controls (Figure 5). The mean dry weight of fish exposed to the samples ranged from 0.41 to 0.53, whereas the weights of the fish in the salinity controls ranged from 0.36 to 0.38.

Water Flea 96-Hour Survival

Due to unforeseen health problems with the *Ceriodaphnia* culture, 7-day results for survival and reproduction were poor in all controls and treatments (see QA/QC section for a detailed explanation). Therefore, results reported are for 96-hour survival. Mean survival was 100 percent for site B-1, which was the site with the lowest salinity. Remaining sites exhibited lower survival with mean values of 30, 40, and 50 percent for sites A-2, B-3, and C-2, respectively (Figure 6). However, none of these data were statistically reduced compared to the appropriate pH or salinity controls. This suggests that the reduced survival observed in samples A-2, B-3, and C-2 can likely be attributed to elevated salinity or pH, rather than the presence of toxic compounds.

96-Hour Algal Growth Inhibition

The results of the *Selenastrum* (green algae) tests are were slightly affected by salinity based on the differences between the lab control (0 ppt) and the samples and salinity controls (1.1 to 3.1 ppt). The mean cell density of both lab controls exceeded 2.0 x 10^6 cells/ml, whereas the salinity and pH controls exhibited growth in the range of only 0.9 to 1.8×10^6 cells/ml. Algae exposed to filtered ambient water samples ranged from 1.4 to 2.0×10^6 cells/ml. Samples from sites A-2, B-3, and C-2 had greater increases in mean cell density than the corresponding salinity or pH controls, whereas sample from site B-1 did not. On the other hand, unfiltered samples from all four sites tested concurrently exhibited low growth, with means ranging from 0.20 to 0.33×10^6 cells/ml, nearly an order of magnitude lower than the filtered samples. Thus, it is likely that native algal species and/or particulate debris in the samples sequestered the added nutrients and prevented the *Selenastrum* from reaching their optimum cell density.



Fathead Survival

Figure 5. Summary of toxicity test results for fathead minnow 7-day survival and growth. Mean (\pm 1SD) values in 100 percent sample are displayed. No statistically significant decreases were observed compared to concurrent salinity controls (t-test, p< 0.05, n=4).



Figure 6. Summary of toxicity test results for water flea 96-hour survival. Mean $(\pm 1SD)$

values in 100 percent sample are displayed (Fisher's Exact, $p \le 0.05$, n=10).





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MARINE SPECIES

Marine toxicity test species included the blue mussel, Pacific topsmelt, opossum shrimp, and giant kelp. Due to the necessity of increasing the salinity of the samples with hypersaline brine in tests with the blue mussel and giant kelp, modest dilutions of the samples occurred. Consequently, the highest brined concentration tested with the bivalve embryo was 67 percent and 65 percent for giant kelp. The samples were also tested up to full strength with the addition of artificial sea salts. All of the salinity adjustments for the Pacific topsmelt and opossum shrimp were performed with artificial salts.

Bivalve Embryo Development

No adverse effects were observed with bivalve larvae, even in full-strength sample (Figure 8). Mean normal development for the embryos exposed to undiluted samples ranged from 84 to 89 percent.

Pacific Topsmelt 7-Day Survival and Growth

Neither survival nor growth of topsmelt larvae was adversely affected by exposure to the samples. Mean survival ranged between 92 and 96 percent and mean biomass ranged from 1.2 to 1.6 mg among all samples tested (Figure 9). Notably, biomass was greater in all four full strength samples than in any of the corresponding salt controls.

Opossum Shrimp 7-Day Survival and Growth

Survival of mysids averaged between 95 and 100 percent across sites, indicating that exposure to the samples did not cause mortality. In addition, no adverse effects were observed for growth, with the mean biomass ranging from 0.26 to 0.49 mg (Figure 10) compared with 0.28 to 0.30 mg in the controls.

48-Hour Giant Kelp Germination and Growth

No adverse effects on the germination of giant kelp spores were observed. Percent germination averaged between 78 and 90 percent in the highest (i.e. full-strength) concentrations of all the samples tested. Growth was also normal, between 11.3 and 16.6 μ m, and averaged higher than the controls in three out of the four samples (Figure 11).



Figure 8. Summary of toxicity test results for bivalve 48-hour embryo development using *Mytilus galloprovincialis*. Mean (\pm 1SD) values in the highest testable concentration are displayed. No statistically significant decreases were observed compared to concurrent brine or salt controls (t-test, p< 0.05, n=5).



Topsmelt Survival

Figure 9. Summary of toxicity test results for Pacific topsmelt 7-day survival and growth. Mean (\pm 1SD) values in 100 percent sample are displayed. (t-test, p< 0.05, n=5).



Mysid Survival

Figure 10. Summary of toxicity test results for mysid 7-day survival and growth. Mean (\pm 1SD) values in 100 percent sample are displayed. No statistically significant decreases were observed compared to concurrent salt controls (t-test, p \leq 0.05, n=8).



Figure 11. Summary of toxicity test results for kelp spore germination and growth. Mean $(\pm 1SD)$ values for each site are displayed. No statistically significant decreases were observed compared to concurrent brine or artificial salt controls (t-test, p< 0.05, n=5).

AMBIENT WATER TRACE METAL AND ANALYTICAL CHEMISTRY RESULTS

Copper concentrations in these samples were low, ranging between 3.4 and 3.7 μ g/L as total copper. At these concentrations, copper would not be expected to result in any adverse effects based on values reported in "Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California," (US EPA 2000). Moreover, concentrations of nickel, selenium, and zinc were relatively low, and all below their respective water quality guidelines. These data suggest that these contaminants were unlikely to be associated with toxicity (Tables 1 and 2). Measurements for cyanide, total organic carbon (TOC), dissolved organic carbon (DOC), and total suspended solids (TSS) are included in Table 3.

Sampla	Бокто	Concentration (µg/L)				
Sample	FOIII	Copper	Nickel	Selenium	Zinc	
A-2	Dissolved	3.44	8.03	2.95*	1.43	
	Total	3.45	8.27	2.21	2.26	
B-1	Dissolved	3.27	6.31	1.26	17.5*	
	Total	3.47	6.66	1.74	17.2	
В-3	Dissolved	3.35	7.85	2.03	2.17	
	Total	3.67	8.11	2.23	3.65	
C-2	Dissolved	3.03	8.38	3.41*	ND	
	Total	3.41	8.85	2.91	1.53	

 Table 1. Summary of Total and Dissolved Trace Metal Concentrations Measured in

 Santa Clara River Estuary Samples Collected 20 July 2004.

*In these cases the dissolved portion exceeds the total. However, the difference is <20% and falls within the RPD confidence limits for chemical analysis.

0	Concentration (µg/L)					
Sample	Copper	Nickel	Selenium	Zinc		
EPA Marine Acute CMC	4.8	74	290	90		
EPA Marine Chronic CCC	3.1	8.2	71	81		
EPA Freshwater Acute CMC ^b	13	470	13-186 [°]	120		
EPA Freshwater Chronic CCC ^b	9.0	52	5 total	120		

 Table 2. EPA Water Quality Criteria for the Protection of Aquatic Life^a

^a Values expressed as a dissolved fraction excluding the EPA freshwater CCC value for selenium

^b Values are hardness dependant and based in this table on a hardness of 100mg/L CaCO₃

^c Freshwater CMC depends on ratio of selenite to selenate, CMC - Criterion Maximum Concentration

CCC - Criterion Continuous Concentration

Table 3. Summary of Analytical Chemistry Measured in Santa Clara	River
Estuary Samples Collected 20 July 2004.	

Sample	Cyanide (mg/L)	TOC (mg/L)	DOC (mg/L)	TSS (mg/L)
A-2	< 0.050	2.3	2.7	28
B-1	< 0.050	5.8	7.3	< 1.0
B-3	< 0.050	2.5	2.8	28
C-2	< 0.050	2.4	2.8	38

Note: DOC levels detected were slightly higher than TOC levels possibly due to the presence of DOC in the filters used during sample preparation at the chemistry lab.

QA/QC

FRESHWATER SPECIES

Laboratory controls met acceptability criteria for all three freshwater species tested. Mean percent survival for the fathead minnow lab controls ranged from 93 to 95 percent (>80 percent criterion); mean dry biomass ranged from 0.42 to 0.47 mg (> 0.25 mg criterion). No mortality was observed in the lab controls for the water flea test, which has a minimum criterion of 90 percent for acute toxicity tests. Finally, the lab controls for the green alga test had mean final densities ranging from 20.4 to 20.8 x 10^5 cells/ml, and variability among control replicates ranged from 5.44 to 8.71 percent. Acceptability criteria for this test are a minimum mean final density of 10×10^5 cells/ml and less than 20 percent variability among control replicates.

Reference toxicant tests conducted using the fathead minnow and green alga met test acceptability criteria, and fell within two standard deviations of laboratory control chart means. The reference toxicant test for the water flea met the test acceptability criterion for survival, but the LC₅₀ was well above two standard deviations of the historical mean (Appendix C). It is possible that the reduced survival and reproduction observed in the Ceriodaphnia culture were caused by an infection from a contaminated food source. When the animals were used for acute and chronic reference toxicant testing, the following observations were made: 1) Mortality was high and reproduction was low in the controls, low, and high concentrations but the animals exposed to the middle concentrations of copper had good survival and reproduction. This suggests that low concentrations of copper inhibited the growth of the infection agent. 2) The acute test showed no effect up to 25 μ g/L, almost twice as high as the mean LC₅₀ for the last 20 tests. Decreases in sensitivity to copper have been previously observed when acute tests wee initiated with food. It is possible that this acute reference toxicant test was initiated with food, since the estimated LC_{50} (50 µg/L) was nearly the same as that for the chronic test (67 μ g/L).

MARINE SPECIES

Laboratory controls met acceptability criteria for all four marine species tested, and fell within two standard deviations of laboratory control chart means. The bivalve development test resulted in lab controls with mean normal development of 91 percent. Currently, no criterion is specified for mussels in the ASTM 1999 protocol. However, the

minimum acceptability criterion for oysters, which is an alternate species for this test, is 70 percent. Therefore, this was used as a guideline for acceptability in the mussel test. Topsmelt mean control survival ranged from 84 to 92 percent and mean dry biomass ranged from 1.1 to 1.4 mg. Both endpoints exceed the minimum requirements of 80 percent survival and 0.85 mg biomass. Mean percent survival for the mysid controls ranged from 95 to 98 percent, which also has a minimum requirement of 80 percent. The mean dry biomass for both mysid controls equaled 0.29 mg (> 0.2 mg criterion). Finally, the kelp test controls exhibited 72 to 74 mean percent germination and 12 to 13 μ m mean spore length, exceeding the criteria of 70 percent and 10 μ m, respectively.

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APPENDIX A TEST RESULT SUMMARIES

FRESHWATER

P. PROMELAS

Appendix Table A-1. Larval Fish 7-Day Survival and Growth Test Results

City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Pimephales promelas

Sample	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
	A	10	100		0.52	
Lab Control #1	В	9	90	95 +/- 5.8	0.51	0 47 +/- 0 05
	С	10	100		0.45	
	D	9	90		0.42	
	A	9	90		0.44	
Lab Control #2	В	10	100	93 +/- 9 6	0.41	0 42 +/- 0.02
	С	10	100		0.44	0.12 77 0.02
	D	8	80		0.40	
Salinity Control #1	А	10	100		0.41	
(3.1 nnt)	В	8	80	85 +/- 13	0.36	0 38 +/- 0 03
A-2, B-3, C-2	С	7	70		0.36	
A-2, B-0, O-2	D	9	90		0.40	
Salinity Control #2	А	9	90		0.38	0.36 +/- 0.02
(1.1 ppt) B-1	В	8	80	90 +/- 8 2	0.36	
	С	9	90	00 07 0.2	0.35	0.00 0, 0.02
	D	10	100		0.37	
	А	9	90		0.38	0.36 +/- 0.04
pH-adjusted Control	В	9	90	95 +/- 5.8	0.39	
A-2, B-3, C-2	С	10	100		0.31	0.30 17- 0.04
	D	10	100		0.34	
	А	9	90		0.50	
A 2	В	9	90	90 +/- 8.2	0.50	0.50 +/- 0.01
A-2	С	10	100		0.50	
	D	8	80		0.51	
	A	9	90		0.45	
D 1	В	10	100	90 +/- 8 2	0.43	0.41 +/- 0.03
D-1	С	8	80	50 47- 0.2	0.39	0.41 1/- 0.03
	D	9	90		0.40	
	А	10	100		0.42	
D 2	В	8	80	95 +/- 10	0.42	0 44 +/- 0 02
B-3	С	10	100	93 17- 10	0.47	0.44 7/- 0.02
	D	10	100		0.45	
	A	8	80		0.50	
C 1	В	9	90	03 +/ 0.6	0.53	0 53 +/- 0 05
0-2	С	10	100	93 7/- 9.0	0.48	0.03 -1- 0.03
	D	10	100		0.59	

^a Mean results are presented +/- 1 standard deviation.

C. DUBIA

Appendix A-2. Water Flea Acute Survival Test Results City of Buenaventura Santa Clara River Estuary Dry Weather Sampling Event Test Initiation Date: 21 July 2004 Test Species: Ceriodaphnia dubia

Sample	Replicate	Percent Survival at 48 Hours	Mean Percent Survival at 48 Hours ^a	Percent Survival at 96 Hours	Mean Percent Survival at 96 Hours ^a
Lab Control #1	1 2 3 4 5 6 7 8 9	100 100 100 100 100 100 100 100 100	100	100 100 100 100 100 100 100 100 100	100
Lab Control #2	1 2 3 4 5 6 7 8 9 10	100 100 100 100 100 100 100 100 100 100	100	100 100 100 100 100 100 100 100 100 100	100
Salinity Control #1 (3.1 ppt) A-2, B-3, C-2	1 2 3 4 5 6 7 8 9 10	0 100 0 100 100 100 0 100 0	60 +/- 52	0 100 100 0 100 100 100 0 100 0	60 +/- 52
Salinity Control #2 (1.1 ppt) B-1	1 2 3 4 5 6 7 8 9 10	0 100 100 100 0 100 100 100 100 100	80 +/- 42	0 100 100 100 0 100 100 100 100 100	80 +/- 42
pH Adjusted Salt Control	1 2 3 4 5 6 7 8 9 10	0 100 0 0 100 100 0 0 100 0 100	50 +/- 53	0 100 0 0 100 100 0 0 100 0 100	50 +/- 53

Appendix A-2 (con'd.). Water Flea Acute Survival Test Results City of Buenaventura Santa Clara River Estuary Dry Weather Sampling Event Test Initiation Date: 21 July 2004 Test Species: Ceriodaphnia dubia

Sample	Replicate	Percent Survival at 48 Hours	Mean Percent Survival at 48 Hours ^a	Percent Survival at 96 Hours	Mean Percent Survival at 96 Hours ^a
A-2	1 2 3 4 5 6 7 8 9	0 100 0 0 100 0 0 0 0	30 +/- 48	0 100 0 0 100 0 0 0 0 0	30 +/- 48
B-1	10 1 2 3 4 5 6 7 8 9 10	0 100 100 100 100 100 100 100 100 100 1	100	0 100 100 100 100 100 100 100 100 100 1	100
В-3	1 2 3 4 5 6 7 8 9 10	0 100 100 100 0 100 0 0 0 0 0	50 +/- 53	0 100 100 0 0 100 0 0 0 0 0 0	40 +/- 52
C-2	1 2 3 4 5 6 7 8 9 10	0 100 0 100 100 0 0 100 0 100 0	50 +/- 53	0 100 0 100 100 0 0 100 0 100 0	50 +/- 53

^a Mean results are presented +/- 1 standard deviation.

Appendix A-2 (con'd.). Water Flea 7-Day Survival and Reproduction Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event Test Initiation Date: 21 July 2004 Test Species: Ceriodaphnia dubia

Sample	Replicate	Percent Survival at 7 Days	Mean Percent Survival at 7 Days ^a	Number of Neonates Produced	Mean Number of Neonates Produced ^a	
	1	0		2		
	2	0		22		
	3	100		12		
	4	0		15		
Lab Control #2	5	100	30 +/- 48	14	12 +/- 6 3	
	6	0	30 1/- 40	7	12 17- 0.0	
	7	0		20		
	8	0		5		
	9	0		11		
	10	100		15		
	1	0		0		
	2	100		26		
	3	100		15		
	4	100		15		
Salinity Control	5	100	70 +/ 49	16	14 +/ 0 1	
#2 (1.1 ppt)	6	0	/0 +/- 40	0	14 +/- 0.1	
	7	0		17		
	8	100		15		
	9	100		15		
	10	100		20		
	1	100		28		
	2	100		32		
	3	0		20		
	4	100		30		
	5	100	70 . / 40	35	05 1/ 44	
B-1	6	100	/0 +/- 48	33	25 +/- 11	
	7	100		34		
	8	0		0		
	9	0		12		
	10	100		25		

^a Mean results are presented +/- 1 standard deviation.

S. CAPRICORNUTUM

Appendix Table A-3. 96-Hour Algal Growth Inhibition Test Results City of Buenaventura Santa Clara River Estuary Dry Weather Sampling Event Test Initiation Date: 21 July 2004 Test Species: Selenastrum capricornutum

Sample	Replicate	Initial Density (10 ⁵ cells/ml)	Final Density (10 ⁵ celis/ml)	Mean Final Density (10 ⁵ cells/ml) ^a	Percent Growth	Mean Percent Growth
	A	0.100	21.4	· · · · · · · · · · · · · · · · · · ·	21300	
Lab Control #1	В	0.100	18.9	20 4 +/- 1 11	18800	20350
	С	0.100	21.0	20.4 1/2 1.11	20900	20000
	D	0.100	20.5		20400	
	A	0.100	20.7		20600	
Lab Control #2	В	0.100	18.7	20.8 +/- 1.81	18600	20675
	С	0.100	23.1		23000	20010
	D	0.100	20.6		20500	
Salinity Control #1	A	0.100	13.7		13600	
(3.1 ppt)	В	0.100	11.2	9.84 +/- 3.62	11100	9370
A-2 B-3 C-2	С	0.100	6.03	0.01 11 0.02	5930	0010
	D	0.100	6.95		6850	
Salinity Control #2	А	0.100	17.2		17100	
(1.1 ppt) B-1	В	0.100	16.9	17 8 +/- 0 883	16800	17700
	С	0.100	18.7	17.0 17 0.000	18600	
	D	0.100	18.4		18300	
pH-adjusted Control A-2, B-3, C-2	А	0.100	7.7		7560	
	В	0.100	15.5	10 6 +/- 5 32	15400	10548
	С	0.100	4.6		4530	
	D	0.100	14.8		14700	
	A	0.100	14.1	14.6 +/- 0.902	14000	
A-2 Filtered	В	0.100	14.0		13900	14525
	С	0.100	15.9		15800	1020
	D	0.100	14.5		14400	
	A	0.100	13.6		13500	
B-1 Filtered	В	0.100	12.6	13 9 +/- 1 42	12500	13775
Derrincered	С	0.100	15.9	10.0 17 1.42	15800	10//0
	D	0.100	13.4		13300	
	A	0.100	9.7		9550	
B-3 Filtered	В	0.100	13.7	14 0 +/- 3 28	13600	13913
B-0 T mered	С	0.100	15.2	11.0 11 0.20	15100	10010
	D	0.100	17.5		17400	
	A	0.100	18.3		18200	
C-2 Filtered	В	0.100	18.8	19.7 +/- 1.61	18700	19600
O-F LUCICO	С	0.100	19.8		19700	
	D	0.100	21.9		21800	
Blank A-2	A	0.100	0.200	NA	100	NA
Blank B-1	A	0.100	0.100	NA	0	NA
Blank B-3	А	0.100	0.040	NA	-60	NA
Blank C-2	А	0.100	0.240	NA	140	NA

^a Mean results are presented +/- 1 standard deviation.

Appendix Table A-3 (con'd). 96-Hour Algal Growth Inhibition Test Results City of Buenaventura Santa Clara River Estuary Dry Weather Sampling Event Test Initiation Date: 21 July 2004

Test Species: Selenastrum capricornutum

Sample	Replicate	Initial Density (10 ⁵ cells/ml)	Final Density (10 ⁵ cells/ml)	Mean Final Density (10 ⁵ cells/ml) ^a	Percent Growth	Mean Percent Growth
	А	0.100	2.20		2100	
A 2 Unfiltorod	В	0.100	2.27	2 28 +/ 0 152	2170	2183
A-2 Offinitered	С	0.100	2.50	2.20 +/- 0.132	2400	2105
	D	0.100	2.16		2060	
B-1 Unfiltered	А	0.100	3.57		3470	
	В	0.100	3.14	3 27 +/- 0 209	3040	2165
	С	0.100	3.12	3.27 +1- 0.209	3020	5105
	D	0.100	3.23		3130	
	A	0.100	2.04		1940	
D 2 Unfiltered	В	0.100	1.25	1 07 1/ 1 05	1150	1072
B-3 Offittered	С	0.100	1.17	1.97 +1- 1.05	1070	1075
	D	0.100	3.43		3330	
C-2 Unfiltered	А	0.100	2.33		2230	
	В	0.100	1.93	2 46 +/ 0 943	1830	2355
	С	0.100	3.82	2.40 +/- 0.943	3720	2000
	D	0.100	1.74		1640	

^a Mean results are presented +/- 1 standard deviation.
MARINE

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A. AFFINIS

Appendix Table A-4. Site A-2 Marine Larval Fish 7-Day Survival and Growth Test Results City of Buenaventura

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Santa Clara River Estuary Dry Weather Sampling Event Test Initiation Date: 21 July 2004

Test Species: Atherinops affinis

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
	А	5	100		1.5	
	В	5	100		1.3	
Lab Control	С	5	100	92 +/- 11	1.6	1.4 +/- 0.24
	D	4	80		1.0	
	E	4	80		1.6	
	А	5	100		1.1	
	В	4	80		1.1	
Salt Control	С	5	100	96 +/- 8.9	1.4	1.3 +/- 0.16
	D	5	100		1.4	
	E	5	100		1.3	
	Α	5	100		1.4	
	В	4	80		1.4	
25%	С	4	80	92 +/- 11	1.5	1.5 +/- 0.13
	D	5	100		1.6	
	E	5	100		1.6	
	Α	4	80		1.4	
	В	5	100		1.6	
50%	С	5	100	96 +/- 8.9	1.6	1.5 +/- 0.16
	D	5	100		1.4	
	E	5	100		1.7	
	А	5	100		1.4	
	В	5	100		1.5	
67%	С	5	100	100	1.5	1.5 +/- 0.09
	D	5	100		1.5	
	E	5	100		1.6	
	A	4	80		1.6	
	В	5	100		1.8	
100%	С	5	100	92 +/- 11	1.7	1.6 +/- 0.20
	D	4	80		1.4	
	E	5	100		1.3	

^a Mean results are presented +/- 1 standard deviation.

Appendix Table A-4 (Con'd). Site B-1 Marine Larval Fish 7-Day Survival and Growth Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Atherinops affinis

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
<u> </u>	A	5	100		1.5	
	В	5	100		1.3	
Lab Control	С	5	100	92 +/- 11	1.6	1.4 +/- 0.24
	D	4	80		1.0	
	E	4	80		1.6	
	А	5	100		1.1	
	В	4	80		1.1	
Salt Control	С	5	100	96 +/- 8.9	1.4	1.3 +/- 0.16
	D	5	100		1.4	
	E	5	100		1.3	
	А	5	100		1.5	
	В	5	100		1.4	
25%	С	5	100	100	1.3	1.4 +/- 0.12
	D	5	100		1.4	
	E	5	100		1.5	
	А	4	80		1.3	
	В	4	80		1.3	
50%	С	5	100	92 +/- 11	1.4	1.4 +/- 0.24
	D	5	100		1.1	
	E	5	100		1.7	
	A	5	100		1.3	
	В	5	100		1.3	
67%	С	5	100	100	1.4	1.3 +/- 0.09
	D	5	100		1.2	
	E	5	100		1.5	
	A	5	100		1.4	
	В	5	100		1.4	
100%	С	5	100	96 +/- 8.9	1.3	1.4 +/- 0.10
	D	4	80		1.3	
	E	5	100		1.5	

^a Mean results are presented +/- 1 standard deviation.

Appendix Table A-4 (Con'd). Site B-3 Marine Larval Fish 7-Day Survival and Growth Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Atherinops affinis

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
	А	5	100		1.6	
	В	5	100		1.3	
Lab Control	С	4	80	84 +/- 17	1.2	1.2 +/- 0.24
	D	4	80		1.3	
	E	3	60		0.88	
	А	5	100		1.2	
	В	4	80		1.1	
Salt Control	С	4	80	84 +/- 17	1.1	1.2 +/- 0.16
	D	3	60		1.0	
	E	5	100		1.4	
	А	5	100		1.1	
	В	5	100		1.4	
25%	С	4	80	96 +/- 8.9	1.2	1.2 +/- 0.15
	D	5	100		1.1	
	E	5	100		1.4	
	А	5	100		1.4	
	В	5	100		1.5	
50%	С	5	100	96 +/- 8.9	1.4	1.3 +/- 0.19
	D	5	100		1.1	
	E	4	80		1.1	
	A	5	100		1.2	
	В	5	100		1.3	
67%	С	5	100	96 +/- 8.9	1.6	1.3 +/- 0.25
	D	4	80		1.0	
	E	5	100		1.6	
	А	4	80		1.2	
	В	5	100		1.3	
100%	С	5	100	92 +/- 11	1.2	1.2 +/- 0.11
	D	5	100		1.0	
	E	4	80		1.3	

⁸ Mean results are presented +/- 1 standard deviation.

Appendix Table A-4 (Con'd). Site C-2 Marine Larval Fish 7-Day Survival and Growth Test Results City of Buenaventura Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Atherinops affinis

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
	А	5	100		1.6	
	В	5	100		1.3	
Lab Control	С	4	80	84 +/- 17	1.2	1.2 +/- 0.24
	D	4	80		1.3	
	E	3	60		0.88	
	Α	5	100		1.2	
	В	4	80		1.1	
Salt Control	С	4	80	84 +/- 17	1.1	1.2 +/- 0.16
	D	3	60		1.0	
	E	5	100		1.4	
	Α	5	100		1.1	
	В	5	100		1.2	
25%	С	4	80	96 +/- 8.9	1.3	1.2 +/- 0.15
	D	5	100		1.5	
	E	5	100		1.2	
	Α	4	80		1.2	
	В	4	80		1.1	
50%	С	5	100	92 +/- 11	1.2	1.2 +/- 0.08
	D	5	100		1.2	
	E	5	100		1.3	
	А	5	100		1.4	
	В	5	100		1.2	
67%	С	5	100	96 +/- 8.9	1.1	1.3 +/- 0.21
	D	4	80		1.1	
	E	5	100		1.6	
	A	5	100		1.7	
	В	4	80		1.5	
100%	С	4	80	92 +/- 11	1.2	1.5 +/- 0.22
	D	5	100		1.3	
	E	5	100		1.6	

^a Mean results are presented +/- 1 standard deviation.

Α. ΒΑΗΙΑ

Appendix Table A-5. Site A-2 Opossum Shrimp 7-Day Survival and Growth Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Americamysis bahia

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
	A	4	80		0.30	
Lab Control	В	5	100		0.36	
	С	5	100		0.22	
	D	5	100		0.29	0.00 . (0.04
Lab Control	E	4	80	95 +/- 9.3	0.30	0.29 +/- 0.04
	F	5	100		0.33	
	G	5	100		0.26	
	н	5	100		0.30	
	А	5	100		0.30	
	В	5	100		0.31	
	С	5	100		0.27	
Salt Control	D	4	80	05 +/ 0 3	0.28	0.28 ±/ 0.02
Salt Control	E	5	100	90 +/- 9.3	0.27	0.20 +/- 0.02
	F	4	80		0.27	
	G	5	100		0.26	
	Н	5	100		0.30	
	A	5	100		0.37	
	В	5	100		0.36	
	С	5	100		0.39	
25%	D	5	100	100	0.33	0.34 +/- 0.04
	E	5	100	100	0.36	
	F	5	100		0.27	
	G	5	100		0.33	
	<u> </u>	5	100		0.32	
	A	5	100		0.40	
	В	5	100		0.42	0.37 +/- 0.17
	C	5	100		0.38	
50%	D	5	100	98 +/- 7.1	0.39	
	E	5	100		0.27	
	F	5	100		0.44	
	G LI	5	100		0.62	
	<u>H</u>	5	100	·····	0.01	
		5	80		0.44	
	C C	4	100		0.20	
		5	100		0.40	
67%	F	5	100	98 +/- 7.1	0.41	0.38 +/- 0.07
	F	5	100		0.42	
	G	5	100		0.39	
	н	5	100		0.31	
	A	5	100		0.38	
	В	4	80		0.33	
	C	5	100		0.50	
4000/	D	4	80	05 / 0.2	0.35	0.20 +/ 0.06
100%	Е	5	100	90 +/- 9.3	0.37	0.39 +/- 0.00
	F	5	100		0.46	
	G	5	100		0.39	
	Н	5	100		0.32	

^a Mean results are presented +/- 1 standard deviation.

Appendix Table A-5 (Con'd). Site B-1 Opossum Shrimp 7-Day Survival and Growth Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event Test Initiation Date: 21 July 2004

Test Species: Americamysis bahia

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
	Α	4	80		0.30	
	В	5	100		0.36	
	Č	5	100		0.22	
	D	5	100		0.29	
Lab Control	E	4	80	95 +/- 9.3	0.30	0.29 +/- 0.04
	F	5	100		0.33	
	G	5	100		0.26	
	н	5	100		0.30	
	A	5	100		0.30	
	В	5	100		0.31	
	С	5	100		0.27	
	D	4	80	05 1/ 0.2	0.28	0.00 1/ 0.00
Salt Control	E	5	100	95 +/- 9.3	0.27	0.28 +/- 0.02
	F	4	80		0.27	
	G	5	100		0.26	
	Н	5	100		0.30	
	А	5	100		0.35	
	В	5	100		0.39	
	С	5	100		0.29	0 30 +/- 0 06
25%	D	4	80	95 +/- 9.3	0.20	
2376	E	5	100		0.29	0.30 17- 0.00
	F	5	100		0.28	
	G	5	100		0.30	
	Н	4	80		0.28	
	А	5	100		0.33	
	В	5	100		0.26	0.26 +/- 0.04
	С	5	100		0.22	
50%	D	4	80	98 +/- 7.1	0.21	
0070	E	5	100		0.23	
	F	5	100		0.30	
	G	5	100		0.28	
	<u>н</u>	5	100	La contra de la cont	0.23	
	A	4	80		0.16	
	В	5	100		0.25	
	С	5	100		0.25	
67%	D	5	100	98 +/- 7.1	0.28	0.25 +/- 0.04
	E	5	100		0.26	
	F	5	100		0.25	
	G	5	100		0.28	
	M	5 F	100		0.20	
	A P	5	20		0.24	
	B	4	100		0.22	
		5	100		0.21	
100%	E	5	100	98 +/- 7.1	0.21	0.26 +/- 0.05
	E	5	100		0.23	
	G	5	100		0.31	
	Н	5	100		0.33	
		~				

^a Mean results are presented +/- 1 standard deviation,

Appendix Table A-5 (Con'd). Site B-3 Opossum Shrimp 7-Day Survival and Growth Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Americamysis bahia

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
	Α	5	100		0.30	
	B	5	100		0.29	
	Č	5	100		0.32	
	D	5	100		0.02	
Lab Control	F	4	80	98 +/- 71	0.20	0.29 +/- 0.02
	F	5	100		0.26	
	G	5	100		0.20	
	н	5	100 100		0.28	
	Δ	5	100		0.20	
	B	5	100		0.30	
	C	5	100		0.00	
	D	5	100		0.27	
Salt Control	F	5	100	98 +/- 7.1	0.26	0.29 +/- 0.03
	F	5	100		0.20	
	Ġ	4	80		0.02	
	н	5	100		0.24	
	Δ	*	*		*	
	B	5	100		0.32	
	C	5	100		0.41	
	D	5	100		0.39	
25%	F	5	100	100	0.33	0.41 +/- 0.05
	F	5	100		0.46	
	G	5	100		0.48	
	н	5	100		0.40	
	Δ	5	100		0.41	
	B	5	100		0.43	
	C	5	100		0.40	0.46 +/- 0.04
	D	5	100		0.46	
50%	F	5	100	100	0.40	
	F	5	100		0.00	
	Ġ	5	100		0.51	
	н	5	100		0.01	
	Δ	5	100		0.47	
	B	5	100		0.44	
	Č	5	100		0.45	
	D	5	100		0.44	
67%	F	5	100	100	0.44	0.44 +/- 0.02
	F	5	100		0.40	
	G	5	100		0.40	
	н	5	100		0.43	
	A	5	100		0.46	
	В	5	100		0.49	
	Č	5	100		0.51	
1000	D	5	100	400	0.46	0 47 1/ 0 04
100%	E	5	100	100	0.48	0.4/ +/- 0.04
	F	5	100		0.52	
	G	5	100		0.39	
	н	5	100		0.45	

^a Mean results are presented +/- 1 standard deviation.

* Replicate spilled during test period.

Appendix Table A-5 (Con'd). Site C-2 Opossum Shrimp 7-Day Survival and Growth Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event Test Initiation Date: 21 July 2004

Test Species: Americamysis bahia

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival ^a	Retained Biomass (mg)	Mean Retained Biomass (mg) ^a
<u></u>	Δ	5	100		0.30	
	R	5	100		0.29	
	C	5	100		0.32	
		5	100		0.25	
Lab Control	F	4	80	98 +/- 71	0.29	0.29 +/- 0.02
	F	5	100		0.26	
	Ġ	5	100		0.29	
	н	5	100		0.28	
	A	5	100		0.30	
	В	5	100		0.30	
	С	5	100		0.31	
	D	5	100	09 1 7 1	0.27	0.00 1/ 0.02
Salt Control	E	5	100	98 +/- /.1	0.26	0.29 +/- 0.03
	F	5	100		0.32	
	G	4	80		0.24	
	н	5	100		0.32	
	A	5	100		0.45	
	В	5	100		0.39	
	С	5	100		0.38	
25%	D	5	100	100	0.39	0 41 +/- 0 02
25 /6	E	5	100	100	0.43	0.41 7 0.02
	F	5	100		0.41	
	G	5	1,00		0.41	
	Н	5	100		0.40	
	A	5	100		0.49	0.48 +/- 0.03
	В	5	100		0.46	
	С	5	100		0.51	
50%	D	5	100	100	0.46	
	E	5	100		0.53	
	F	5	100		0.44	
	G	5	100		0.44	
	<u> </u>	5	100		0.50	
	A	5	100		0.42	
	В	5	100		0.48	
		5	100		0.43	
67%	5	5	100	100	0.47	0.47 +/- 0.03
	с с	5	100		0.53	
	F	5	100		0.48	
	Ч	5	100		0.45	
	Δ	5	100		0.50	
	B	5	100		0.55	
	c	5	100		0.47	
4000	D	5	100	100	0.41	0 49 +/- 0 07
100%	E	5	100	100	0.49	0.43 47- 0.07
	F	5	100		0.39	
	G	5	100		0.59	
	Н	5	100		0.48	

^a Mean results are presented +/- 1 standard deviation.

M. GALLOPROVINCIALIS

Appendix Table A-6. Site A-2 48-Hour Bivalve Embryo Development Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Mytilus galloprovincialis

Concentration ^a	Replicate	Percent Normal Development	Mean Percent Normal Development ^b
	A	92	
	В	92	
Lab Control	С	90	91 +/- 2.3
	D	94	
	E	88	
	А	83	
	В	88	
Brine Control	С	84	85 +/- 4.0
	D	90	
	E	80	
	Α	93	
	В	87	
Salt Control	С	79	85 +/- 5.2
	D	85	
	E	83	
	А	94	
	В	96	
25%	С	88	91 +/- 3.9
	D	88	
	E	88	
	А	89	
	В	94	
50%	С	92	92 +/- 2.0
	D	92	
	E	94	
	A	88	
	В	89	
65%	С	88	90 +/- 2.9
	D	93	
	E	94	
	A	93	
	В	80	
100%	С	79	86 +/- 6.5
	D	92	
	E	85	

^a The 100% test concentration was achieved by the addition of artificial sea salts. All other test concentrations were achieved by the addition of hypersaline brine. NOEC and LOEC statisitcal comparisons were made between the salt control and 100% sample, and between the brine control and remaining test concentrations.

^b Mean results are presented +/- 1 standard deviation.

Appendix Table A-6 (Con'd). Site B-1 48-Hour Bivalve Embryo Development Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Mytilus galloprovincialis

Concentration ^a	Replicate	Percent Normal Development	Mean Percent Normal Development ^b
	А	92	
	В	92	
Lab Control	C	.90	91 +/- 2.3
	D	94	
	E	88	
<u></u>	А	83	
	В	88	
Brine Control	С	84	85 +/- 4.0
	D	90	
	Е	80	
	А	84	
	В	85	
Salt Control	С	86	83 +/- 4.4
	D -	75	
	Е	83	
	А	88	
	В	95	
25%	С	84	89 +/- 4.0
	D	88	
	Е	90	
	A	90	
	В	80	
50%	С	90	87 +/- 4.6
	D	86	
	E,	91	
	A	86	
	В	92	
65%	С	88	86 +/- 4.6
	D	83	
	Ę	80	
	A	87	
	B	79	
100%	С	81	84 +/- 3.4
	D	86	
	Е	85	

^a The 100% test concentration was achieved by the addition of artificial sea salts. All other test concentrations were achieved by the addition of hypersaline brine. NOEC and LOEC statisitcal comparisons were made between the salt control and 100% sample, and between the brine control and remaining test concentrations.

^b Mean results are presented +/- 1 standard deviation.

Appendix Table A-6 (Con'd). Site B-3 48-Hour Bivalve Embryo Development Test Results

City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Mytilus galloprovincialis

Concentration ^a	Replicate	Percent Normal Development	Mean Percent Normal Development ^b
	A	92	
	В	92	
Lab Control	С	90	91 +/- 2.3
	D	94	
	E	88	
	А	83	
	В	88	
Brine Control	С	84	85 +/- 4.0
	D	90	
	E	80	
	А	82	
	В	77	
Salt Control	С	83	82 +/- 3.6
	D	87	
	E	82	
	А	89	
	В	93	
25.0%	С	88	90 +/- 5.6
	D	82	
	Е	97	
	A	89	
	В	90	
50%	С	86	90 +/- 3.4
	D	92	
	E	95	
	Α	84	
	В	88	
65%	С	89	87 +/- 2.0
	D	88	
	E	86	
	A	75	
	В	92	
100%	C	91	86 +/- 8.8
	D	77	
	E	93	

Appendix Table A-6 (Con'd). Site C-2 48-Hour Bivalve Embryo Development Test Results City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: *Mytilus galloprovincialis*

Concentration ^a	Replicate	Percent Normal Development	Mean Percent Normal Development ^b
	А	92	
	В	92	
Lab Control	С	90	91 +/- 2.3
	D	94	
	E	88	
	А	83	
	В	88	
Brine Control	С	84	85 +/- 4.0
	D	90	
	E	80	
	Α , .	82	
	B	82	
Salt Control	С	77	82 +/- 3.6
	D	87	
	E	83	
	А	97	
	В	92	
25.0%	С	81	89 +/- 5.9
	D	88	
	E	89	
	Α	88	***************************************
	В	91	
50%	С	87	88 +/- 1.7
	D	87	
	Ē	89	
	A	92	
	В	90	
65%	С	85	90 +/- 5.1
	D	85	
	E	97	
	A	89	
	В	90	
100%	С	88	89 +/- 1.7
	D	86	
	E	90	
	1		

M. PYRIFERA

Appendix Table A-8. Site A-2 48-Hour Kelp Spore Germination and Growth Test Results

City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Macrocystis pyrifera

Concentration	Replicate	Percent Germinated	Mean Percent Germinated ^a	Spore Length (μm)	Mean Spore Length (μm) ^a
	А	69		12	
	В	69		12	
Lab Control #1	С	68	72 +/- 4.9	13	12 +/- 1.1
	D	80		10	
······	E	72		12	
	А	78		11	
	В	*		*	
Brine Control #1	С	77	73 +/- 5.6	13	13 +/- 1.2
	D	67		14	
	E	69		14	
	A	78		12	
	В	82		11	
Salt Control #1	С	83	81 +/- 2.1	12	12 +/- 0.89
	D	81		13	
	E	79		11	
	Α	79		11	
	В	73		12	
25%	С	62	69 +/- 7.2	8.3	10 +/- 1.3
	D	66		10	
	E	63		10	
	A	74		11	
	В	73		11	
50%	С	59	65 +/- 7.6	13	12 +/- 1.2
	D	60		14	
	E	60		12	
	A	81		14	
	В	74		13	
65%	С	72	75 +/- 4.8	12	13 +/- 0.84
	D	78		14	
	E	69		14	
	A	63		13	
	В	66		12	
100%	С	75	67 +/- 4.8	8.8	11 +/- 1.6
	D	65		13	
	E	64		11	

^a Mean results are presented +/- 1 standard deviation.

Appendix Table A-8 (Con'd). Site B-1 48-Hour Kelp Spore Germination and Growth Test Results

City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Macrocystis pyrifera

Concentration	Replicate	Percent Germinated	Mean Percent Germinated ^a	Spore Length (μm)	Mean Spore Length (μm) ^a
	A	69		12	
	В	69		12	
Lab Control #1	С	68	72 +/- 4.9	13	12 +/- 1.1
	D	80		10	
	E	72		12	
	А	78		11	
	В	*		*	
Brine Control #1	С	77	73 +/- 5.6	13	13 +/- 1.2
	D	67		14	
	E	69		14	
	A	78		12	
	В	82		11	
Salt Control #1	С	83	81 +/- 2.1	12	12 +/- 0.89
	D	81		13	
	E	79		11	
	A	57		14	
	В	60		14	
25%	С	61	62 +/- 4.1	13	14 +/- 0.73
	D	63		14	
	E	68	12	13	
	Α	72		17	
	В	68		17	
50%	С	56	68 +/- 10	20	17 +/- 1.9
	D	83		15	
	E	63		18	
	Α	59		16	
	В	73		17	
65%	С	66	67 +/- 5.3	18	17 +/- 0.86
	D	68		18	
	E	70		17	
	Α	73		16	
	В	81		17	
100%	С	74	73 +/- 5.8	16	17 +/- 0.73
	D	65		17	
	E	75		18	

^a Mean results are presented +/- 1 standard deviation.

Appendix Table A-8 (Con'd). Site B-3 48-Hour Kelp Spore Germination and Growth Test Results

City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Macrocystis pyrifera

Concentration	Replicate	Percent Germinated	Mean Percent Germinated ^a	Spore Length (μm)	Mean Spore Length (μm) ^a
	A	73		13.0	
	В	74		13.3	
Lab Control #2	С	77	74 +/- 6.3	12.3	13 +/- 0.76
	D	81		11.5	
	E	64		13.3	
	A	69		12	
	В	75		15	
Brine Control #2	С	65	72 +/- 6.2	14	14 +/- 1.2
	D	79		13	
	E	*		*	
	А	84		11	
	В	79		15	
Salt Control #2	С	74	82 +/- 5.4	13	13 +/- 1.2
	D	86		12	
	E	87		13	
	А	75		13	
	В	68		12	
25%	С	74	72 +/- 2.7	12	13 +/- 1.7
	D	71		15	
	E	72		16	
	A	71		13	
	В	66		13	
50%	С	61	67 +/- 5.8	13	13 +/- 0.74
	D	75		15	
	E	63		13	
	A	61		16	
	В	64		14	
65%	С	66	66 +/- 8.1	13	14 +/- 1.2
	D	79		13	
	E	58		15	
	Α	75		15	
	В	65		15	
100%	C	79	66 +/- 13	16	15 +/- 0.65
	D	47		14	
	E	62		15	

^a Mean results are presented +/- 1 standard deviation.

Marthalad Swedry - work Rock Bridge

City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Test Initiation Date: 21 July 2004

Test Species: Macrocystis pyrifera

Concentration	Replicate	Percent Germinated	Mean Percent Germinated ^a	Spore Length (μm)	Mean Spore Length (μm) ^a
	A	73		13.0	
	В	74		13.3	
Lab Control #2	С	77	74 +/- 6.3	12.3	13 +/- 0.76
	D	81		11.5	
	E	64		13.3	
	Α	69		12	
	В	75		15	
Brine Control #2	С	65	72 +/- 6.2	14	14 +/- 1.2
	D	79		13	
	E	*		*	
	Α	84		11	
	В	79		15	
Salt Control #2	С	74	82 +/- 5.4	13	13 +/- 1.2
	D	86		12	
	E	87		13	
*****	Α	63		12	
	В	70		12	
25%	С	76	71 +/- 5.1	11	11 +/- 1.1
	D	75		9.3	
	Е	71		11	
	Α	75		13	
	В	60		9.8	
50%	С	72	71 +/- 6.1	13	13 +/- 2.1
	D	73		12	
	E	74		16	
	А	74		9.5	
	В	65		11	
65%	С	77	70 +/- 5.4	14	12 +/- 1.6
	D	65		12	
	E	71		13	
	Α	67		11	
	В	78		16	
100%	С	64	72 +/- 6.2	13	13 +/- 2.3
	D	74		12	
	E	77		16	

^a Mean results are presented +/- 1 standard deviation.

APPENDIX B STATISTICAL ANALYSIS SUMMARIES & RAW BENCH DATASHEETS

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FRESHWATER

P. PROMELAS

CETIS	Report							Report Date: Link:	19 Aug-04 1:01 PM 06-6107-5783/0407-047	
Fathead Min	now 7-d Larval S	Survival a	nd Growth T	est A-7	2				AMEC Bioassay SD	
Test: Start Date: End Date: Setup Date:	06-7756-1654 21 Jul-04 04:00 F 28 Jul-04 03:00 F 21 Jul-04 04:00 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/821/R Diluted Min Not Applica	rvival (7d) -02-013 (200 ieral Water (8 able)2) 3:2)	Duration: Species: Source:	6 Days 23 Ho Pimephales pr Aquatic Biosys	urs omelas stems. CO	
Sample: Sampled: Received: Hold Time:	02-6088-6219 20 Jul-04 02:50 F 21 Jul-04 07:45 A 25 Hours (19.3 °f	PM AM C)	Material: Code: Source: Station:	Estuarine N 0407-047 City of Bue A-2	Aonitoring Sa naventura	ample	Client: Project:	City of Buenav	ventura	
Comparison	Summary									
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method		
08-8786-8038	8 7d Proportion	Survived	100	>10	00	N/A	0.20711	Equal Variand	ce t	
13-4590-803	7		100	>10	00	N/A	0.09401	Equal Variand	ce t	
17-0062-129	1		100	>10	00	N/A	0.09401	Equal Variance t		
04-2289-6644	4 Mean Dry Wei	ight-mg	100	>10	00	N/A	0.10107	Equal Variand	ce t	
11-2848-8668	8		100	>10	00	N/A	0.07060	Equal Variand	ce t	
15-6000-6236	6		100	>10	0	N/A	0.12482	Unequal Varia	ance t	
Test Accepta	ability									
Analysis	Endpoint		Attrib	ute	Statistic	Lower Limit	Upper Limit	Decision		
08-8786-8038	8 7d Proportion	Survived	Contro	Response	0.85	0.8		Passes accep	otability criteria	
13-4590-8031	7				0.95	0.8		Passes accep	otability criteria	
17-0062-129	1				0.95	0.8		Passes accep	otability criteria	
7d Proportio	on Survived Sum	imary	anda ay ayahiya ya kata a							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV		
0	Lab Control	4	0.95000	0.90000	1.00000	0.02887	0.05774	6.08%		
0	pH-adjusted C	4	0.95000	0.90000	1.00000	0.02887	0.05774	6.08%		
0	Salt Control	4	0.85000	0.70000	1.00000	0.06455	0.12910	15.19%		
100		4	0.90000	0.80000	1.00000	0.04082	0.08165	9.07%		
Mean Dry W	eight-mg Summa	ary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV		
0	Lab Control	4	0.47350	0.41800	0.52000	0.02493	0.04987	10.53%		
0	pH-adjusted C	4	0.3552 5	0.31300	0.39000	0.01823	0.03646	10.26%		
0	Sait Control	4	0.38425	0.35900	0.41300	0.01363	0.02727	7.10%		
100		4	0.50000	0 49500	0.50700	0.00300	0.00600	1.20%		
7d Proportio	on Survived Deta	il								
Conc.%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4					
0	Lab Control	1.00000	0.90000	1.00000	0.90000					
0	pH-adjusted C	0.90000	0.90000	1.00000	1.00000					
0	Salt Control	0.80000	0.70000	0.90000						
100		0.90000	0.90 000	1.00000	0.80000					
Mean Dry We	eight-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4					
0	Lab Control	0.52000	0.51100	0.44500	0 41800					
0	pH-adjusted C	0.38100	0.39000	0.31300	0.33700					
0	Salt Control	0.41300	0.36300	0.35900	0.40200					
100		0.49500	0.49500	0.50300	0.50700					

Test Summary:

Report Date:

Page 1 of 1 19 Aug-04 1:01 PM

CETIS	R	anort									Compariso Report Dat	ons: te:	19 Au	Page 6 of 6 g-04 1:01 PM
ULIIC		epon									Analysis:			17-0062-1291
Fathead Min	now	7-d Larval S	Survival	and Grow	th Test	A~7	2						AMEC E	Bioassay SD
Endpoint			Ar	nalysis Ty	ре		Sample	Link	Contro	l Link	Date Analyzed		Version	
7d Proportion	n Surv	ived	Co	omparison			06-6107	-5783	8 06-610	7-5783	19 Aug-04 1:00	PM	CETISV	1.024
Method			AI	tH D	ata T r an	sform	Z	N	OEL L	OEL	Toxic Units	ChV		MSDp
Equal Varian	ce t		С	>T Ar	ngular (C	Corrected)		10	> 00	>100	1.00	N/A		9.40%
Test Accept	ability	1												
Attribute			St	atistic	Lowe	er Limit	Upper Li	mit	Decision	1				
Control Resp	onse		0.9	95	0.8				Passes a	cceptabil	ity criteria			
ANOVA Ass	umpti	ons												
Attribute		Test		St	atistic	Crit	tical	P Lev	vel	Decisio	n(0.01)			
Variances		Variance R	atio	1.	75393	47.4	46723	0.655	584	Equal Va	ariances			
Distribution		Shapiro-W	ilk W	0.	95631	0.74	4935	0.742	224	Normal I	Distribution			
ANOVA Tab	le													
Source		Sum of	Squares	Mean	guare	DF	F Statis	stic	P Level		Decision(0.05)			
Between		0.01161	802	0.0116	180	1	0.95		0.36665		Non-Significant	Effect		
Error		0.07314	242	0.0121	904	6								
Total		0.08476	043	0.0238	084	7								
Group Com	oarisc	ons												
Control	vs	Conc-%		Statistic	Crit	ical	P Level	N	ISD	Dec	ision(0.05)			
Lab Control		100		0.976240	3 1.94	4318	0.18332	0	.1517075	Non	-Significant Effect	ct		
Data Summa	ary					Origi	nal Data				Transf	ormed	l Data	
Conc-%	Cor	ntrol Type	Count	Mean	м	inimum	Maximun	n S	SD	Mean	Minimum	Ma	ximum	SD
0	Lab	Control	4	0.9500) 0.	90000	1.00000	0	.05773	1.33053	3 1.24905	1.4	1202	0.09409
100			4	0.9000	0.	80000	1.00000	0	.08165	1.25431	1.10715	1.4	1202	0.12461

CETIS	ETIS Report									Compariso Report Dat	ns: e:	19 Au	Page 2 of 6 g-04 1:01 PM
	11	epor					Analysis:		C)8-8786-8038			
Fathead Minr	now T	7-d Larval Su	rvival	and Growth	Test Ar	2						AMEC B	ioassay SD
Endpoint			An	alysis Type		Sample	Link	Control	l Link	Date Analyzed		Version	
7d Proportion	Surv	ived	Co	mparison		06-6107-	-5783	3 06-6107	7-5783	19 Aug-04 1:00 I	PM	CETISv1	.024
Method			Alt	t H Data	Transform	Z	N	OEL L	OEL	Toxic Units	ChV		MSDp
Equal Varianc	e t		С ;	>T Angu	lar (Correcter	d)	1(00 >	•100	1.00	N/A		20.71%
Test Accepta	bility	/											
Attribu te			Sta	atistic	Lower Limit	Upper Li	mit	Decision	1				
Control Respo	onse		0.8	35	0.8			Passes a	cceptabili	ity criteria			
ANOVA Assi	ımpti	ions											
Attribu te		Test		Stati	stic Cr	ritical	P Le	vel	Decisio	n(0.01)			
Variances		Variance Rat	io	2.129	911 47	7.46723	0.550	074	Equal Va	ariances			
Distribution		Shapiro-Wilk	W	0.969	∂ 37 0. [°]	74935	0.876	303	Normal (Distribution			
ANOVA Table	e												
Source		Sum of So	quares	Mean Squ	Jare DF	F Statis	stic	P Level		Decision(0.05)			
Between		0.0083133	5	0.0083134	↓ 1	0.34		0.57988		Non-Significant E	Effect		
Error		0.1457636	,	0.024293	9 6								
Total		0.1540769	3	0.0326073	3 7								
Group Comp	arisc	ons											
Control	vs	Conc-%		Statistic	Critical	P Level	N	MSD	Dec	ision(0.05)			
Salt Control		100		-0.5849776	1.94318	0.71006	C	0.2141643	Non	-Significant Effect	st		
Data Su mma	ry				Orig	ginal Data				Transfe	ormed	Data	
Conc-%	Cor	ntrol Type	Count	Mean	Minimum	Maximun	n S	SD	Mean	Minimum	Max	ximum	SD
С	Salt	i Control	4	0.85000	0.70000	1.00000	C).12910	1.18984	4 0.99116	1.4	1202	0.18182
100			4	0.90000	0.80000	1.00000	C	0.08165	1.25431	1.10715	1.41	1202	0.12461



 Comparisons:
 Page 4 of 6

 Report Date:
 19 Aug-04 1:01 PM

 Analysis:
 13-4590-8037

ULIIU	1 \	eport									Analysis:		13-4590-8037
Fathead Min	now	7-d Larval S	Survival	and Growth				AME	C Bioassay SD				
Endpoint			Ar	nalysis Type	, ,		Sample	Lin	k Contro	l Link	Date Analyzed	Vers	ion
7d Proportion	Surv	ived	Co	mparison			06-6107-	-578	3 06-610	7-5783	19 Aug-04 1:00 F	PM CET	ISv1.024
Method			Al	tH Dat	a Transi	form	Z	1	NOEL I	OEL	Toxic Units	ChV	MSDp
Equal Variand	e t		С	>T Ang	ular (Co	rrected)			100 >	>100	1.00	N/A	9.40%
Test Accepta	bility	1											
Attribute			St	atistic	Lower	Limit	Upper Lii	mit	Decision	1			
Control Response 0.95 0.8 Passes accepta									icceptab	ility criteria			
ANOVA Assi	mpti	ons											
Attribute		Test		Sta	tistic	Crit	ical	P Le	evel	Decisio	on(0.01)		
Variances		Variance R	atio	1.75	5393	47.4	6723 (0.65	584	Equal V	ariances		
Distribution		Shapiro-Wi	lk W	0.95	631	0.74	935 (0.74	224	Normal	Distribution	alah di Kacamatan Katalah Kata	
ANOVA Tabl	e												
Source		Sum of s	Squares	Mean Sc	uare	DF	F Statis	tic	P Level		Decision(0.05)		
Between		0.011618	302	0.011618	80	1	0.95		0.36665		Non-Significant E	ffect	
Error		0.073142	242	0.012190)4	6							
Total		0.084760)43	0.023808	34	7							
Group Comp	ariso	ns											
Control	vs	Conc-%		Statistic	Critic	al	P Level		MSD	De	cision(0.05)		
pH-adjusted C	o	100		0.9762408	1.943	18	0.18332		0.1517075	No	n-Significant Effec	t	
Data Summa	ry			Origina		nal Data				Transfo	rmed Data	3	
Conc-% Control Type Count Mean						Minimum Max		Maximum SE		Mean Minimum		Maximu	ım SD
0 pH-adjusted C 4 0.95000 0.90000						0000	1.00000		0.05773	1.3305	3 1.24905	1.41202	0.09409
100			4	0.90000	0.80	0000	1.00000		0.08165	1.2543	1 1.10715	1.41202	0.12461

Approved By aff 8/23/2

 Comparisons:
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 Report Date:
 19 Aug-04 1:01 PM

 Analysis:
 15-6000-6236

Fathead Minr	now 7	-d Larval S	urvival	and Growt	h Test	A-2						AMEC	Bioassay SD
Endpoint			Ar	alysis Typ	e		Sample	Li	nk Contro	ol Link	Date Analyzed	Versi	on
Mean Dry We	ight-m	g	Co	mparison			06-6107	-57	783 06-610	7-5783	19 Aug-04 1:01 P	M CETIS	Sv1.024
Method			Al	tH Dat	a Tran	sform	Z	٦	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Varia	nce t		С	>T Unt	ransfor	med			100	>100	1.00	N/A	12.48%
ANOVA Assu	mptic	ons											
Attribute		Test		Sta	tistic	Crit	ical	ΡI	Level	Decisi	on(0.01)		
Variances	,	Variance Ra	atio	69.	07761	47.4	6723	0.0	00576	Unequ	al Variances		
Distribution		Shapiro-Wil	k W	09	5800	0.74	1935	0.7	76014	Norma	Distribution		
ANOVA Table)												
Source		Sum of S	quares	Mean So	quare	DF	F Statis	stic	P Level		Decision(0.05)		
Between		0.001404	51	0.00140	45	1	1.11		0.33197	,	Non-Significant E	ffect	
Error		0.007568	97	0.00126	15	6							
Total		0.008973	49	0.00266	50	7	_						
Group Comp	ariso	าร											
Control	vs	Conc-%		Statistic	Crit	ical	P Level		MSD	De	cision(0.05)		
Lab Control		100		-1.055164	2.35	53363	0.81559		0.05910399) No	n-Significant Effect		
Data Summa	у					Origi	nal Data				Transfo	rmed Data	
Conc-%	Con	trol Type	Count	Mean	M	inimum	Maximun	n	SD	Mean	Minimum	Maximun	n SD
0	Lab	Control	4	0.47350	0.4	41800	0.52000		0.04987				
100			4	0.50000	0.4	49500	0.50700		0.00600				

 Comparisons:
 Page 3 of 6

 Report Date:
 19 Aug-04 1:01 PM

 Analysis:
 11-2848-8668

Fathead Minr	10w 7	'-d Larval S	urvival	and Growth	Test	A-2	. .					AMEC E	lioassay SD
Endpoint		····	Ar	alysis Type			Sample	Lin	k Contro	l Link	Date Analyzed	Version	
Mean D ry We	ight-n	ng	Co	omparison			06-6107	-578	33 06-6107	7-5783	19 Aug-04 1:01 P	M CETISv1	.024
Method			AI	t H Data	Tran	sform	Z		NOEL L	OEL	Toxic Units	ChV	MSDp
Equal Varianc	e t		С	> T Untr	ansfor	med			100 >	100	1.00	N/A	7.06%
ANOVA Assi	impti	ons			<u></u>								
Attribu te		Test		Stat	istic	Crit	ical	ΡL	evel	Decisio	on(0.01)		
Variances		Variance Ra	atio	20.6	5350	47.4	6723	0.0	3323	Equal \	/ariances		
Distribution		Shapiro-Wil	k W	0.96	720	0.74	1935	0.8	5517	Normal	Distribution		
ANOVA Table	9												
Source		Sum of S	Squares	Mean Sq	uare	DF	F Statis	stic	P Level		Decision(0.05)		
Between		0.026796	614	0.026796	1	1	68.74		0.00017		Significant Effect		
Error		0.002338	376	0.000389	8	6							
Total		0.029134	9	0.027185	9	7							
Group Comp	ariso	ns											
Control	vs	Conc-%		Statistic	Crit	ical	P Level		MSD	De	cision(0.05)		
Salt Control		100		-8.291227	1.94	4318	0.99992	e de la completa	0.02712785	No	n-Significant Effect		
Data Summa	ry					Origi	nal Data				Transfo	rmed Data	
Conc-%	Con	trol Type	Count	Mean	М	inimum	Maximun	n	SD	Mean	Minimum	Maximum	SD
0	Salt	Control	4	0.38425	0.	35900	0.41300		0.02727				
100			4	0.50000	0.4	49500	0.50700		0.00600				

Approved By A S 23

 Comparisons:
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 Report Date:
 19 Aug-04 1:01 PM

 Analysis:
 04-2289-6644

Fathead Minn	iow 7	-d Larval S	Surviva	and Grow	th Test	A-2	-					AMEC E	Bioassay SD
Endpoint			A	nalysis Ty	be		Sample	Link	Contro	l Link	Date Analyzed	Version	
Mean Dry Wei	ght-m	ng	C	omparison			06-6107-	-578	3 06-6107	7-5783	19 Aug-04 1:01 P	M CETISV	1.024
Method			A	It H Da	ata Tran	sform	Z		IOEL L	.OEL	Toxic Units	ChV	MSDp
Equal Variance	e t		С	> T Ui	ntransfor	med		1	00 >	·100	1.00	N/A	10.11%
ANOVA Assu	mptio	ons											
Attribute		Test		St	atistic	Cri	tical	P Le	vel	Decisio	on(0.01)		
Variances		Variance Ra	atio	36	.92997	47.	46723	0.01	442	Equal V	/ariances		
Distribution		Shapiro-Wil	k W	0.	97074	0.7	4935	0.88	871	Normal	Distribution		
ANOVA Table	•												
Source		Sum of S	Squares	s Mean S	Square	DF	F Statis	tic	P Level		Decision(0.05)		
Between		0.041905	53	0.0419	053	1	61.37		0.00023		Significant Effect		
Error		0.004096	676	0.0006	328	6							
Total		0.046002	206	0.0425	381	7							
Group Compa	ariso	ns											
Control	vs	Conc-%		Statistic	Crit	ical	P Level	I	MSD	De	cision(0.05)		
pH-adjusted C	0	100		-7.834116	1.94	4318	0.99989	(0.03590398	Nor	n-Significant Effect		
Data Summar	у					Origi	nal Data				Transfo	rmed Data	
Conc-%	Con	trol Type	Count	Mean	М	inimum	Maximun	n :	SD	Mean	Minimum	Maximum	SD
0	pH-a	djusted C	4	0.3552	5 0.	31300	0.39000	(0.03646				
100			4	0.5000	0.	49500	0.50700	(0.00600				

Approved By

Freshwater Chronic Bioassay

1 1

Test Species: P. promelas

Client Name:

City of Buenaventura

Test Date: 07/21/2004

Sample ID:

A-2

Test No.: 0407-047

Conc.	Ban				Test	Day				Percent] .	pan wt.	pan + fish	
(%)	Rep.	0	1	2	3	4	5	6	7	Survival		(g)	(g) f&	
Lab	а	10	10	19	1020AS	D	10	D	ÌO	100		0.04924	8-5444	
Control #1	b	10	10 03	9	٩	9	9	à	ġ	96		0.03662	0,04173	
	C	10	910	jo	ю	10	10	10	10	100		004416	0,04861	
	d	10	10	9	٩	9	9	9	9	90		0.03823	0.04241	
Salt	a	10	10	10	10	10	10	10	10	100		0.04000	0,04413	
Control #1	b	10	10	10	10	9	9	8	8	80		0.04285	0.04648	
(3.1 ppt)	C	10	10	10	8	1	1	7	٦	70		0.03690	0,04049	
	d	10	10	9	9	9	9	9	9	90		0.03498	0,03900	
100%	а	10	10	9	٩	9	9	9	9	90		0.03847	0,04342	
	b	10	10	9	9	9	9	9	9	90		0.04029	0.04524	
	С	10	10	10	10	10	10	10	10	100		603778	0.04281	
	d	10	8	8	-8	8	8	8	8	80	-	0.033210	0.03833	
	a													
	b													
	С													
	d													
OH-adrixted	а	10	9	9	9	9	9	9	9	90		0.05015	0.0529.6	
Salt Control	b	10	9	9	4	9	9	9	9	90	-	0.045/02	0.04952	
Sour commu	c	10	10	10	10	10	10	10	10	120	-	0.04472	0.04185	
	d	10	10	10	10	10	10	10	10	ion	-	0.04672	0.114859	
		10	10	<u></u>			10		10	1-0	-	0 01/02	0101021	
	b				<u> </u>								+	
	c	1			<u> </u>						-			
	d										-			
	a		1								-		+	
	b										-		<u> </u>	
······································	c										-			
	d	1				1								
Tech Initials	1	SH	R	18	SH	AH	PS.	AH	Sit	data	211	m ue		
										DI ZALL		Weigt	nt Data:	
Feeding Times	s (day)	:	0	1	2	3	4	5	6	QCONT		Date/Time in:	7-28-04/11	600
			-	0900	0800	0830	0900	0840	0315		D	ate/Time out	8-2-04/1218	
			-	1215	1400	1030	1300	1320	1150		Ov	en Temp (°C):	63	
			1030	1445	11005	1400	1945	1600	1545			Tech Initials	R	
				1	1405	11-100		I	11983					
Comments:												QC Check	AH 810-04	
								-				inal Review	AVEL STOP	3/04
								-			•		man da	107

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Freshwater Chronic Bioassay

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>P. promelas</u>						
Sample ID:	A-2	مناف 31/21/2004 (مناف) Start Date/Time:						
Test No:	0407-047	End Date/Time: 07/28/2004 らのつ						

Concentration	Lab Control #1										
Day		1	2	3	4	5	6	7			
	and the second			Ini	tial			and the second			
pH	8.09	8.24	8.28	8.25	8.25	8.22	8.21	P. States			
DO (mg/L)	7.9	7.7	7.9	7.8	83	7.8	8,0	and and addition of			
Cond. (µmhos/cm)	224	209	207	208	209	210	210	and many of the state			
Temp (°C)	24.7	25.7	24.7	24,8	24.7	24.7	≥મ.1				
	State of the			Fi	nal			Sector Sector			
pН		7.53	7.82	7.68	7-71	7.71	7.73	7,75			
DO (mg/L)	a Dista	6.1	6.5	6.0	62	6.4	6.3	6.2			
Temp (°C)		25.0	24.7	247	25.2	24.7	25.1	25.2			

Concentration	Salt Control #1 (3.1ppt)										
Day	0	1	2	3	4	5	6	7			
And the states of the			No sector Aller	in In	itial						
pH	7,75	7,80	7.76	7.91	7.87	1,80	8.12				
DO (mg/L)	7.9	8.2	8.9	8.3	8.7	1.9	8.0				
Cond. (µmhos/cm)	5750	5510	5530	5530	5520	5530	5610				
Temp (°C)	24.4	25,9	26.0	25.2	24.7	24.7	242				
				F	inal	a standard					
рН		7.74	748	7.72	7.69	7.71	4.74	376			
DO (mg/L)		6.1	6.2	6.2	64	6.6	65	6.3			
Temp (°C)	A. M. Martin	25.4	24.7	24.7	25.3	29.7	25.1	258			

Γ	Concentration		100%								
ľ	Day	0	1	2	3	4	5	6	7		
	~ ~	State State	the start of the start	a training and	lni	tial					
L	рН 🕁	9.70	9.64	9.60	9.65	9.49	9.38	9.29			
Ļ	DO (mg/L)	8.4	8.7	8.9	8.5	9.0	8.6	8.6			
	Cond. (µmhos/cm)	5770	5600	5610	5640	5640	5610	5640	A state of the second		
	Temp (°C)	24.5	25.6	24.7	24.2	25.1	24.9	24.2	L. A.A.		
			A		FI	nal		6			
ŀ	pH		10.91	8,77	8.16	D.M	8.77	0.77	8.79		
-	DO (mg/L)	The second	6.3	4.3	6.0	6.0	6.4	0.5	6.3		
L	Temp (°C)		23.1	24.0	29.6	27.3	129.7	13.1	25.9		
		0	1	2	3	4	5	6	7		
Analysts:	Initial:	ue	AH	SH	SH	Ry	Rypes	5H			
	Final:		AH	nic	SH	Ry	R5	re	SH		
Comment	ts:	Dptt >	9 was	not a	ichuste	d prior	to tes	t initi	ation.		
White OF PH 79 Was Initiated concurrently Animal Source/Date Received: ABS / 7-21-04 Animal Age at Initiation: <48 Hours											
QC Checl	« AH 8-10-0	4					Fin	al Review:	Ofb		

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Freshwater Chronic Bioassay

w/

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Client:		City of	f Buena	ventura		Test Species: <u>P. promelas</u>				
Sample	D:	pH adj	usted S	att Contra	k	Test Date: _7-2\-04				
Test No	:	0407-	- 0473	050	-	Start/End Times: 1600 We 1500				
[Concentration	PH	adjusted	Satt C	ontrol					
	Day	0	1	2	3	4	5	6	7	
					n	itial				
	pH	9.64	9163	9.65	966	9.63	9.65	9.66		
	DO (mg/L)	8.0	8.3	8.9	8.4	8.8	1.1	8,7		
	Cond. (µmhos-cm)	5820	5590	5580	5520	155,80	5570	5590		:
	Temp (°C)	25.7	24.7	24.1	24.6	124.4	24.6	24.1		
					Fi Fi	nal				
	pH	4	8.62	8.57	8.13	8.24	8.23	8.46	8,32	
	DO (mg/L)	4	5.9	Cont	6.0	6.2	6.44	6.3	6.4	
Į	Temp (°C)		25.9	24.7	24.8	24.9	25.0	250	24.9	
r		· · · · · · · · · · · · · · · · · · ·	····							
Į	Concentration									
ſ	Day	0	1	2	3	4	5	6	7	
					ر ب ا	itial				
1	pH	T	1	ſ	1	T	1			
	DO (ma/L)		1			1				
1	Cond. (umhos-cm)					1				
1	Temp (°C)		1			1				
			1		Fi					
t i i i i i i i i i i i i i i i i i i i	рН		1			T				
ł	DO (mg/L)	-			1	1				
	Temp (°C)	-								
			·i		1					
ſ	Concentration	1								
	Concentration		1				E	6		
Ļ	Day		1 1	4	3	4		0		
ļ		-	1	1	ារ	tial	1			
Ļ	рн									
Ļ	DO (mg/L)									
Ļ	Cond. (µmhos-cm)	1				1				
L	Temp (°C)	1				1				
					Fi	nal				
	рН		1							
L	DO (mg/L)									
L	Temp (°C)						1			
		•		-				-	_	
		0	1	2	3	4	5	6	7	
		CI)		CIL	MC	8.0	01	-		
Analysts:	Initial:	DM	AT) DM	MC	HA	KG	24		
			A.1		0.11		00	A.#	- 11	
	Final	:	AH.	ine	I SA	FG	R5		SM	
Comment	5:	samo	DA A.	·2. R-	3 ano	10-2	mad a	0H 29	· Con	that is
Jennen		TH Y	prepa	red a	na i	+C+PAT	mil	rent	WA	
Animal Ca	Data Bassius de	817 ×	ABS	7.21.	04	13/24 (LISI	-
Animai St	uice/Date Received:					. An	imai Age at	initiation:	TON	2
QC Check	: AH 8-10-0	4					Fin	al Review:	AB	A23104
									1	- 1 - 1

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Test Summary:Page 1 of 1Report Date:23 Aug-04 10:59 AM

Link:

CETIS Report

10-3959-9886/0407-048

Fathead Minnow 7-d Larval Survival and Growth Test AMEC Bioassay SD									
Test: Start Date: End Date: Setup Date:	06-7756-1654 21 Jul-04 04:00 F 28 Jul-04 03:00 F 21 Jul-04 04:00 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/821/R Diluted Min Not Applica	vival (7d) -02-013 (20) eral Water (ble	02) 8:2)	Duration: Species: Source:	6 Days 23 Hours Pimephales promelas Aquatic Biosystems, CO	
Sample: 12-8859-0827 Sampled: 20 Jul-04 01:40 PM Received: 21 Jul-04 07:45 AM Hold Time: 26 Hours (18.4 °C)			Material: Code: Source: Station:	Estuarine M 0407-048 City of Bue B-1	1onitoring Sa naventura	ample	City of Buenaventura		
Comparison	Summary								
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method	
05-6077-1382	7d Proportion	Survived	100	>10	0	N/A	0.13547	Equal Variance t	
16-0351-4149			100	>10	0	N/A	0.13636	Equal Variance t	
01-4539-9265	Mean Dry Wei	ght-mg	100	>10	0	N/A	0.08278	Equal Variance t	
14-5156-5174			100	>10	0	N/A	0.07565	Equal Variance t	
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv	
0		4							
0	Lab Control	4	0.92500	0.80000	1.00000	0.04787	0.09574	10.35%	
0	Salt Control	4	0.90000	0.80000	1.00000	0.04082	0.08165	9.07%	
100		4	0.90000	0.80000	1.00000	0.04082	0.08165	9.07%	
Mean Dry We	ight-mg Summa	ary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	n SE	SD	cv	
0		4							
0	Lab Control	4	0.42125	0.40000	0.43900	0.00940	0.01880	4.46%	
0	Salt Control	4	0.36425	0.34500	0.38300	0.00776	0.01552	4.26%	
100		4	0.41375	0.38800	0.44500	0.01344	0.02687	6.50%	
7d Proportion	n Survived Deta	il							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0							****		
0	Lab Control	0.90000	1.00000	1.00000	0.80000				
0	Salt Control	0.90000	0.80000	0.90000	1.00000				
100		0.90000	1.00000	0.80000	0.90000				
Mean Dry We	ight-mg Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0									
0	Lab Control	0.43500	0.41100	0.43900	0.40000				
0	Salt Control	0.38300	0.36400	0.34500	0.36500				
100		0.44500	0.42700	0.38800	0.39500				

Approved By A28 d

000-089-124-1

 Comparisons:
 Page 2 of 6

 Report Date:
 19 Aug-04 1:12 PM

 Analysis:
 05-6077-1382

		cpon								Analysis:		05-6077-1382	
Fathead Min	now	7-d Larval S	Survival	and Growth	Test B-1						AMEC	Bioassay SD	
Endpoint			Ar	alysis Type		Sample	Sample Link Control Link		Link	Date Analyzed	Versio	n	
7d Proportion Survived Comparison 10-3959-9886 10-3959-9886 19 A							19 Aug-04 1:10 F	PM CETIS	/1.024				
Method				It H Data Transform		Z	NO	EL I	OEL	Toxic Units	ChV	MSDp	
Equal Varian	ce t		С	>T Angu	llar (Corrected))	100	;	>100	1.00	N/A	13.55%	
Test Acceptability													
Attribute Statistic Lower Limit Upper Limit Decision													
Control Resp	onse		0.9	925	0.8		I	Passes a	cceptabil	ity criteria			
ANOVA Ass	umpt	ions											
Attribute		Test Statistic Criti					ical P Level Decisi			n(0.01)			
Variances		Variance R	atio	1.39	075 47.4	16723 0.79283			Equal V	ariances			
Distribution		Shapiro-Wi	lk W	0.920	502 0.74	935 0.44859 N			Normal Distribution				
ANOVA Tabl	e												
Source		Sum of	Squares	Mean Squ	are DF	F Statis	tic	P Level		Decision(0.05)			
Between		0.00331	992	0.0033199) 1	0.18		0.68709		Non-Significant Effec		//////////////////////////////////////	
Error		0.11136	35	0.0185614	i 6								
Total		0.11468	342	0.0218813	3 7								
Group Comp	pariso	ons											
Control	vs	Conc-%		Statistic	Critical	P Level	MS	D	Decision(0.05)				
Lab Control		100		0.4229198	1.94318	0.34355	0.1	871991	Non	-Significant Effec	t		
Data Summary Ori					Origi	jinal Data				Transformed Data			
Conc-%	Cor	ntrol Type	Count	Mean	Minimum	Maximum	n SD		Mean	Minimum	Maximum	SD	
0	Lab	Control	4	0.92500	0.80000	1.00000	0.0	9574	1.29506	6 1.10715	1.41202	0.14695	
100			4	0.90000	0.80000	1.00000	0.0	8165	1.25431	1 1.10715	1.41202	0.12461	

Approved By: 23/04
Comparisons:
 Page 6 of 6

 Report Date:
 19 Aug-04 1:12 PM

 Analysis:
 16-0351-4149

Fathead Minn	now 7-0	d Larval S	Survival	and G	rowth T	est F	3-1						A	MEC B	ioassay SD
Endpoint			A	nalysis	Туре			Sample	e Lir	nk Contro	l Link	Date Analyzed	V	/ersion	
7d Proportion	Survive	ed	Co	omparis	on			10-3959	9-98	86 10-395	9-9886	19 Aug-04 1:10	PM C	CETISv1	.024
Method			AI	tН	Data T	ransfo	rm	Z		NOEL	LOEL	Toxic Units	ChV		MSDp
Equal Variance	e t		С	> T	Angula	ar (Corre	ected)			100	>100	1.00	N/A		13.64%
Test Accepta	bility														<u></u>
Attribute			St	atistic	L	ower Li	imit	Upper L	imi	t Decision	ı				
Control Respo	onse		0.	9	0	.8				Passes a	acceptab	ility criteria			
ANOVA Assu	mptio	ns													
Attribute	T	est			Statist	tic	Crit	ical	ΡL	_evel	Decisio	on(0.01)			
Variances	V	ariance R	atio		1.0000	0	47.4	46723	1.0	00000	Equal V	/ariances			
Distribution	S	hapiro-Wil	lk W		0.8473	32	0.74	1935	0.0	9347	Normal	Distribution			
ANOVA Table)														
Source		Sum of S	Squares	s Mea	an Squa	re	DF	F Stati	stic	P Level		Decision(0.05)			
Between		0		0			1	0.00		1.00000)	Non-Significant	Effect		
Error		0.093166	617	0.0	155277		6					-			
Total		0.093166	617	0.0	55277		7								
Group Comp	arison	s													
Control	vs	Conc-%		Statis	tic	Critical	1	P Level		MSD	De	cision(0.05)			
Salt Control		100		0		1.94318	8	0.50000		0.1712189	No	n-Significant Effe	ct		
Data Summar	ry						Origi	nal Data				Transf	formed I	Data	
Conc-%	Contr	rol Type	Count	Mea	an	Minin	num	Maximu	m	SD	Mean	Minimum	Max	imum	SD
0	Salt C	Control	4	0.90	0000	0.800	00	1.00000		0.08165	1.2543	1.10715	1.41	202	0.12461
100			4	0.90	0000	0.800	00	1.00000		0.08165	1.2543	1.10715	1.41	202	0.12461

Page 5 of 6 Comparisons: Report Date: 19 Aug-04 1:12 PM Analysis:

14-5156-5174

Fathead Mini	10w 7	-d Larval S	Survival	and Growth	Test	B-						AMEC	Bioassay SD
Endpoint			Ar	alysis Type			Sample	Lir	nk Contro	Link	Date Analyzed	Versior	1
Mean Dry We	ight-m	g	Co	omparison			10-3959-	-98	86 10-395	9-9886	19 Aug-04 1:10 F	PM CETISV	1.024
Method			Al	tH Data	Trans	form	Z		NOEL I	LOEL	Toxic Units	ChV	MSDp
Equal Variance	e t		С	>T Untr	ansform	ned			100 :	>100	1.00	N/A	7.57%
ANOVA Assi	mptic	ons											
Attribute		Test		Stat	stic	Crit	ical	ΡL	.evel	Decisi	on(0.01)		
Variances	,	Variance R	atio	2.04	265	47.4	6723	0.5	7238	Equal	Variances		
Distribution		Shapiro-Wi	lk W	0.89	744	0.74	1935	0.2	6046	Norma	I Distribution		
ANOVA Table	9										197 <u>5 - 1999 - 1997 - 1997 - 1997</u>		
Source		Sum of	Squares	Mean Sq	uare	DF	F Statis	stic	P Level		Decision(0.05)		
Between		0.000112	25	0.000112	5	1	0.21		0.66353		Non-Significant E	Effect	
Error		0.003227	750	0.000537	9	6							
Total		0.003340	000	0.000650	4	7	_						
Group Comp	arisor	ıs											
Control	vs	Conc-%		Statistic	Criti	cal	P Level		MSD	De	cision(0.05)		
Lab Control		100		0.4573179	1.943	318	0.33177		0.03186807	' No	n-Significant Effec	t	
Data Summa	ry					Origi	nal Data				Transfo	ormed Data	
Conc-%	Con	trol Type	Count	Mean	Mir	nimum	Maximun	n	SD	Mean	Minimum	Maximum	SD
0	Lab	Control	4	0.42125	0.4	0000	0.43900		0.01880				
100			4	0.41375	0.3	8800	0.44500		0.02687				

Approved By A2310

 Comparisons:
 Page 1 of 6

 Report Date:
 19 Aug-04 1:12 PM

 Analysis:
 01-4539-9265

Fathead Minr	10w 7	-d Larval S	Survival	and Growth	Test	B-1						AMEC E	Bioassay SD
Endpoint			Ar	nalysis Type			Sample	Li	nk Contro	l Link	Date Analyzed	Version	
Mean Dry We	ight-m	ng	Co	omparison			10-3959	-98	386 10-395	9-9886	19 Aug-04 1:10 P	M CETISv1	1.024
Method			Al	tH Dat	a Trans	sform	Z		NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Varianc	e t		С	>T Unt	ansform	ned			100 :	>100	1.00	N/A	8.28%
ANOVA Assu	mptio	ons											
Attribute		Test		Stat	istic	Crit	ical	P١	Level	Decisi	on(0.01)		
Variances		Variance R	atio	2.99	791	47.4	16723	0.3	39129	Equal	Variances		
Distribution		Shapıro-Wi	lk W	0.94	133	0.74	1935	0.5	58682	Norma	Distribution		
ANOVA Table	9												
Source		Sum of S	Squares	Mean So	uare	DF	F Statis	stic	P Level		Decision(0.05)		
Between		0.004900)55	0.004900	6	1	10.18		0.01884		Significant Effect		
Error		0 002889	950	0.000481	6	6							
Total		0.007790	006	0.005382	1	7							
Group Comp	ariso	าร											
Control	vs	Conc-%		Statistic	Criti	cal	P Level		MSD	De	cision(0.05)		
Salt Control		100		-3.18997	1.94	318	0.99058		0.03015324	No	n-Significant Effect		
Data Summa	Ŋ					Origi	nal Data				Transfo	rmed Data	
Conc-%	Con	trol Type	Count	Mean	Mir	nimum	Maximur	n	SD	Mean	Minimum	Maximum	SD
0	Salt	Control	4	0.36425	0.3	4500	0.38300		0.01552				
100			4	0.41375	0.3	8800	0.44500		0.02687				

Approved Braff 32304

Client Name:

Sample ID:

Г

	Test Species:	P. promela	S		
City of Buenaventura	Test Date:	07/21/200	4		
B-1	Test No.:	0407-048			
Test Day	nonmen Innissessimmentein sensimisisministe	Percent		pan wt.	pan + fish

Conc.	Bon				Test	Day				Percent		pan wt.	pan + fish
(%)	кер.	0	1	2	3	4	5	6	7	Survival		(g)	(g) (2
Lab	а	10	9	9	9	9	9	9	9	96	(0.04014	0.04449
Control #2	b	10	[0	10	10	10	10	10	10	100		0.03645	0,04056
	C	10	10	(2)	10	10	10	10	10	100	(3.04063	0.04502
	d	10	8	8	8	8	8	8	8	80		0.03463	0.03863
Salt	а	10	9	9	9	9	9	9	9	90	4	D.04065	0.04448
Control #2	b	10	10	9	9	9	9	8	B	80		10398Le	0.04250
(1.1 ppt)	C	10	(0	10	10	10	9	9	9	90	(0.03981	0.04326
	d	10	10	10	10	10	10	10	10	100		0.04008	0.04373
100%	а	10	10	10	10	10	lo	10	q	90	J	0.03796	0.04241
	b	10	10	10	10	10	10	10	10	100	J	0.03937	0.04364
	С	10	10	9	9	8	8	8	8	80		0.03948	0.04336
	d	10	10	10	10	10	9	9	9	90	l	0.04177	0.04572
	а												
	b												
	C												
	d												
pH adjuster H	a	-10-									[
Salt Control	b	+0-											
	С	-10-											
	d	-+0-											
	a												
	b												
	С												
	d												
	a				1								
	b												
	С												
	d												
Tech Initials		SH	PS	B	SH	AH	RS	Att	SH	dont. and	PROCESSION IN	uc	
										· con en	mg	Weigh	t Data: ,
Feeding Times	s (day)	:	0	1	2	3	4	5	6	QC=AH	ĭ	Date/Time in:	7-28-04/1600
			~	0900	0300	0836	0900	0840	0815]	Da	ate/Time out:	1218/8-2-01
			-	1215	1400	1036	1300	1320	1150	1	Ove	n Temp (°C):	63
			1020	11045	11005	1400	1945	1600	1545	1		Tech Initials:	0.8
				110 2	11000	<u>m (***</u>	11		1041-	1			
Comments:												QC Check:	AH 8-10-04.
								-			F	inal Review:	GUR \$12310A
								-					- July
													-

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>P. promelas</u>
Sample ID:	B-1	oo در در Start Date/Time: 07/21/2004
Test No:	0407-048	End Date/Time: 07/28/2004 「ちっつ

Concentration				Lab Co	ntrol #2			
Day	0	1	2	3	4	5	6	7
	a Madatana	Start Start		Ini	tial	a an	Martin Martin	Alexander a
pН	5.24	8.24	8.38	8.26	8.25	8.22	8,24	
DO (mg/L)	7.S	77	7.9	8.0	8.3	7.8	8.0	
Cond. (µmhos/cm)	238	209	209	206	209	210	216	
Temp (°C)	24.8	25.7	25.0	24.9	24.7	24.7	24.5	
		al inter		Fi	nal	and the second second		Sector Charles
pH	and the second	8.00	3.02	7.84	7.79	8.00	4.81	7.88
DO (mg/L)		6.2	Le-le	6.1	62	6.6	4.5	6.4
Temp (°C)		25.5	24.7	24.7	25.3	29.9	25.2	25.2

Concentration		Salt Control #2 (1.1ppt) 0 1 2 3 4 5 6 Initial 5 (6 7, 65 7, 56 7, 60 \$, 16											
Day	0	1	2	3	4	5	6	7					
				In	itial	Strength and a	$F \in \{0, 1\}$, p_i						
рН	7.50	7.65	1.52	7.57	7.59	7.60	8.16						
DO (mg/L)	7.9	8.1	8.7	8.7	8.8	8.8	2 .0						
Cond. (µmhos/cm)	2446	2350	2370	2370	2370	2360	2070						
Temp (°C)	24.8	259	26.0	25.6	24.9	24.9	24.5						
All and the state of the second	water ton in	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	1.5 1.1.1	F	nal	A Line water		T. States and					
pH	1.0	7.75	782	1.72	7.80	7.79	7.82	7.31					
DO (mg/L)	and a state into	b.0	Lelo	6.3	6.3	6.6	64	6.3					
Temp (°C)		25.7	24.6	24.7	25.2	24.9	25.3	25.2					

	Concentration				10	0%			
	Day	0	1	2	3	Ą	5	Ģ	7
					Ini	tial	and the second		
	рН	7.93	7,96	7.95	8.06	3.00	7.99	8.01	
	DO (mg/L)	8.1	8.1	8.7	8.7	B.7	8.3'	8.5	
	Cond. (µmhos/cm)	2700	2600	2620	2630	2460	2640	2620	
	Temp (°C)	24.5	25.8	26,0	25.5	251	24.9	24.3	- Selenation
	Souther the marked and the			the Chief Street of Street	Fi	nal			
	pH	17 mail an phone and	8.26	8.07	8.20	8.19	8.17	817	8.14
	DO (mg/L)		6.3	5.4	6.3	6.2	6.6	(e.4	6.4
	Temp (°C)		25.7	24,5	24.5	25.3	25.0	25.3	25.2
		0	1	2	3	4	5	6	7
Analysts	: Initial:	me	AH	SH	# ∧C	Ry	App 25	SH	
	Final:		AH	m	sh	Ry	RS	m	Sh
Commen	nte'								

Comments:

Animal Source/Date Received:

ABS / 7-21-04

Animal Age at Initiation: <48 Hours

AH 8-10-04 QC Check:

Final Review: The state of the

Test Summary: Page 1 of 1 Report Date: 19 Aug-04 1 18 PM

CETIS	Report							Report Date: Link:	19 Aug-04 1 18 PM 01-1159-0453/0407-049
Fathead Minn	iow 7-d Larval S	Survival a	nd Growth T	est B-	3				AMEC Bioassay SD
Test: 0 Start Date: 2 End Date: 2 Setup Date: 2	06-7756-1654 21 Jul-04 04:00 F 28 Jul-04 03:00 F 21 Jul-04 04:00 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/821/R Diluted Min Not Applica	vival (7d) -02-013 (200 eral Water (8 ble)2) 3:2)	Duration: Species: Source:	6 Days 23 Ho Pimephales pr Aquatic Biosys	urs omelas tems, CO
Sample: 0 Sampled: 2 Received: 2 Hold Time: 2	05-0738-0761 20 Jul-04 10:40 A 21 Jul-04 07:45 A 29 Hours (18.2 °C	M M C)	Material: Code: Source: Station:	Estuarine M 0407-049 City of Bue B-3	lonitoring Sa naventura	ample	Client: Project:	City of Buenav	entura
Comparison	Summary								
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method	
05-2921-9144	7d Proportion	Survived	100	>10	0	N/A	0.22509	Equal Variand	e t
08-8872-6172			100	>10	0	N/A	0.11098	Mann-Whitne	y U
12-6690-0856			100	>10	0	N/A	0.11098	Mann-Whitne	y U
05-9448-8801	Mean Dry Wei	ght-mg	100	>10	0		0.11376	Equal Variance	e t
13 0753 4711			100	>10	0		0.00222	Equal Variance	e l
13-9/33-4/11			100	>10	0		0.03222		
Test Accepta	bility				e				
Analysis	Endpoint	Puruluad	Attribi	ute	Statistic	Lower Limit	Upper Limit	Decision	tobility oritorio
05-2921-9144	70 Proportion :	Survived	Contro	Response	0.85	0.8		Passes accep	tability criteria
12-6690-0856					0.95	0.8		Passes accer	tability criteria
					0.00	0.0			
7d Proportion	Control Turns	mary				05	6 D	<u></u>	
Conc-%	Lob Control	Reps	Niean	Minimum	1 00000	0.02897	SD	CV	
0	nH-adjusted C	4	0.95000	0 90000	1.00000	0.02887	0.05774	6.08%	
0	Salt Control	4	0.85000	0.70000	1.00000	0.06455	0.12910	15 19%	
100		4	0 95000	0.80000	1.00000	0.05000	0.10000	10.53%	
Mean Drv We	ight-mg Summa	arv							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv	
0	Lab Control	4	0.47350	0 41800	0.52000	0.02493	0.04987	10.53%	
0	pH-adjusted C	4	0.35525	0.31300	0.39000	0.01823	0.03646	10.26%	
0	Salt Control	4	0.38425	0.35900	0.41300	0.01363	0.02727	7 10%	
100		4	0.43900	0.41500	0.46700	0.01211	0.02422	5.52%	
7d Proportion	Survived Deta	il							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Lab Control	1.00000	0.90000	1.00000	0.90000				
0	pH-adjusted C	0.90000	0.90000	1.00000	1.00000				
0	Salt Control	1.00000	0.80000	0.70000	0.90000				
100		1 00000	0 80000	1 00000	1.00000				
Mean Dry We	ight-mg Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Lab Control	0.52000	0.51100	0.44500	0.41800				
0	Salt Control	0.38100	0.39000	0.31300	0.33700				
100	Call Control	0.42300	0.41500	0.46700	0.45100				
L		0.42000	0.41000	0 10100	3.45100				

Approved By. A2a/A

 Comparisons:
 Page 5 of 6

 Report Date:
 19 Aug-04 1:18 PM

 Analysis:
 12-6690-0856

AMEC Bioassay SD

Fathead Minnow 7-d Larval Survival and Growth Test B - 3

					<u> </u>	<u> </u>							
Endpoint			An	alysis Typ	e		Sample L	.ink	Contro	l Link	Date Analyzed	Versi	on
7d Proportion	Survi	ved	Co	mparison			01-1159-0)453	01-115	9-0453	19 Aug-04 1:17	PM CETI	Sv1.024
Method			Alt	H Dat	a Transfo	orm	Z	NO	EL I	LOEL	Toxic Units	ChV	MSDp
Mann-Whitne	уU		C >	>T Ang	gular (Cor	rected)		100	:	>100	1.00	N/A	11.10%
Test Accepta	bility												
Attribute			Sta	atistic	Lowerl	imit	Upper Lin	nit l	Decisior	ו			
Control Respo	onse		0.9	5	0.8			I	Passes a	acceptabil	lity criteria		
ANOVA Assu	mpti	ons											
Attribute		Test		Sta	tistic	Crit	ical F	Leve	1	Decisio	n(0.01)		
Variances		Variance R	atio	2.6	2462	47.4	46723 0	.4490	4	Equal V	ariances		
Distribution		Shapıro-Wi	lk W	0 7	3912	0.74	1935 0	0077	3	Non-nor	mal Distribution		
ANOVA Tabl	e												
Source		Sum of S	Squares	Mean Se	quare	DF	F Statist	ic	P Level		Decision(0.05)		
Between		5.5510E	-05	5.551E-0	05	1	0.00		0.95501		Non-Significant	Effect	
Error		0.096267	742	0.01604	46	6							
Total		0.096322	293	0.01610	01	7							
Group Comp	ariso	ns											
Control	vs	Conc-%		Statistic	Critica	al	P Level	Tie	s	Dec	ision(0.05)		
Lab Control		100		7			0.55714	2		Non	-Significant Effe	ct	
Data Summa	ry					Origi	nal Data				Transf	formed Data	
Conc-%	Con	trol Type	Count	Mean	Mini	mum	Maximum	SD		Mean	Minimum	Maximu	n SD
0	Lab	Control	4	0.95000	0.90	000	1.00000	0.0	5773	1.3305	3 1.24905	1.41202	0.09409

 Comparisons:
 Page 1 of 6

 Report Date:
 19 Aug-04 1:18 PM

 Analysis:
 05-2921-9144

AMEC Bioassay SD

Fathead Minnow 7-d Larval Survival and Growth Test B-3

Endpoint			An	alysis Type		Sample L	ink Contro	l Link D	ate Analyzed	Version	
7d Proportion	Surviv	/ed	Co	mparison		01-1159-0	453 01-1159	9-0453 1	9 Aug-04 1:18 P	M CETISV	1.024
			A 14		T			051	Tauia Unita	ChV	MeDa
Method			Alt	H Data	Transform	۷	NOEL L	JOEL	I OXIC UNITS	Chv	WSDp
Equal Varianc	e t		C >	•T Angu	lar (Corrected)	100 >	>100 ^	1.00	N/A	22.51%
Test Accepta	bility										
Attribute			Sta	ntistic	Lower Limit	Upper Lin	it Decision	n			
Control Respo	onse		0.8	5	0.8		Passes a	cceptability	y criteria		
ANOVA Assu	mptic	ons									
Attribute		Test		Stati	stic Cri	tical P	Level	Decision	(0.01)		
Variances	,	Variance Ra	atio	1.422	280 47	46723 0	77894	Equal Var	iances		
Distribution	:	Shapiro-Wil	k W	0.893	354 0.7	4935 0	24117	Normal Di	istribution		
ANOVA Table	9										
Source		Sum of S	Squares	Mean Squ	are DF	F Statist	ic P Level	D	ecision(0.05)		
Between		0.042607	16	0.0426072	2 1	1.51	0.26462	N	Ion-Significant E	ffect	
Error		0.168888	6	0.0281481	6						
Total		0.211495	76	0.0707553	3 7						
Group Comp	arisor	าร									
Control	vs	Conc-%		Statistic	Critical	P Level	MSD	Decis	sion(0.05)		
Salt Control		100		-1.230 316	1.94318	0.86769	0.2305274	Non-S	Significant Effect		
Data Summa	ry				Orig	inal Data			Transfo	rmed Data	
Conc-%	Con	trol Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt	Control	4	0.85000	0.70000	1.00000	0.12910	1.18984	0.99116	1.41202	0.18182

Approved By Bradd

Page 4 of 6 Comparisons: 19 Aug-04 1:18 PM Report Date: 08-8872-6172

AMEC Bioassay SD

Analysis:

Fathead Minnow 7-d Larval Survival and Growth Test $B^{-}3$

Endpoint		Analysis	Туре		Sample L	ink Contr	ol Link [Date Analyzed	Version				
7d Proportion Su	rvived	Comparis	son		01-1159-0	453 01-11	59-0453 1	9 Aug-04 1:17 F	PM CETISv1	1.024			
Method		Alt H	Data Tran	sform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp			
Mann-Whitney U		C > T	Angular (C	orrected)		100	>100	1.00	N/A	11.10%			
Test Acceptabil	ity												
Attribute		Statistic	Lowe	er Limit	Upper Lin	it Decisio	n						
Control Respons	e	0.95	0.8			Passes	acceptabilit	y criteria					
ANOVA Assum	otions												
Attribute	Test		Statistic	Crit	ical P	Level	Decision	(0.01)					
Variances	Variance Ratio		2.62462	47.4	16723 0	44904	Equal Va	riances					
Distribution	Shapiro-Wilk W		0.73912	0.74	1935 0	00773	Non-norm						
Distribution													
ANOVA Table								<u></u>		1577 #####XXXX22121-17771-2-18			
ANOVA Table Source	Sum of Squ	ares Me	an Square	DF	F Statist	ic P Leve	I [Decision(0.05)					
ANOVA Table Source Between	Sum of Squa 5.5510E-05	ares Me	an Square 51E-05	DF	F Statist 0.00	ic P Leve	I [1 N	Decision(0.05) Non-Significant E	ffect				
ANOVA Table Source Between Error	Sum of Squa 5.5510E-05 0.09626742	ares Me 5.5 0.0	an Square 51E-05 160446	DF 1 6	F Statist 0.00	ic P Leve 0.9550	I E 1 N	Decision(0.05) Non-Significant E	ffect				
ANOVA Table Source Between Error Total	Sum of Squa 5.5510E-05 0.09626742 0.09632293	ares Me 5.5 0.0 0.0	an Square 51E-05 160446 161001	DF 1 6 7	F Statist 0.00	ic P Leve 0.9550	I C 1 N	Decision(0.05) Non-Significant E	ffect				
ANOVA Table Source Between Error Total Group Comparis	Sum of Squa 5.5510E-05 0.09626742 0.09632293 sons	ares Me 5.5 0.0 0.0	an Square 51E-05 160446 161001	DF 1 6 7	F Statist 0.00	ic P Leve 0.9550	I [Decision(0.05) Non-Significant E	ffect				
ANOVA Table Source Between Error Total Group Comparin Control ve	Sum of Squa 5.5510E-05 0.09626742 0.09632293 sons s Conc-%	ares Me 5.5 0.0 0.0 Statis	an Square 51E-05 160446 161001 etic Crit	DF 1 6 7 ical	F Statist 0.00 	ic P Leve 0.9550 Ties	I E 1 N	Decision(0.05) Non-Significant E	ffect				
ANOVA Table Source Between Error Total Group Comparis Control vs pH-adjusted Co	Sum of Squa 5.5510E-05 0.09626742 0.09632293 sons sons s Conc-% 100	ares Me. 5.5 0.0 0.0 Statis 7	an Square 51E-05 160446 161001 stic Crit	DF 1 6 7 ical	F Statist 0.00 – P Level 0.55714	ic P Leve 0.9550 Ties 2	I E 1 N Decis	Decision(0.05) Non-Significant E sion(0.05) Significant Effec	ffect				
ANOVA Table Source Between Error Total Group Comparis Control vs pH-adjusted Co Data Summary	Sum of Squa 5.5510E-05 0.09626742 0.09632293 sons s Conc-% 100	ares Me 5.5 0.0 0.0 0.0 Statis 7	an Square 51E-05 160446 161001 tic Crit	DF 1 6 7 ical	F Statist 0.00 P Level 0.55714 mal Data	ic P Leve 0.9550 Ties 2	I E 1 N Decis	Decision(0.05) Non-Significant E sion(0.05) Significant Effec Transfo	ffect t				
ANOVA Table Source Between Error Total Group Comparis Control vs pH-adjusted Co Data Summary Conc-% C	Sum of Squa 5.5510E-05 0.09626742 0.09632293 sons s Conc-% 100 ontrol Type Co	ares Me. 5.5 0.0 0.0 Statis 7 unt Me.	an Square 51E-05 160446 161001 stic Crit	DF 1 6 7 ical Origin	F Statist 0.00 P Level 0.55714 nal Data Maximum	ic P Leve 0.9550 Ties 2 SD	I E 1 N Decis Non Mean	Decision(0.05) Non-Significant E sion(0.05) Significant Effec Transfo Minimum	ffect t ormed Data Maximum	SD			
ANOVA Table Source Between Error Total Group Comparis Control vs pH-adjusted Co Data Summary Conc-% C 0 pt	Sum of Squa 5.5510E-05 0.09626742 0.09632293 sons s Conc-% 100 ontrol Type Co H-adjusted C 4	ares Me. 5.5 0.0 0.0 Statis 7 unt Me. 0.9	an Square 51E-05 160446 161001 stic Crit an Mi 5000 0.3	DF 1 6 7 ical Origin inimum 90000	F Statist 0.00 — P Level 0.55714 mal Data Maximum 1.00000	ic P Leve 0.9550 Ties 2 SD 0.05773	I E 1 N Decis Non-1 Mean 1.33053	Decision(0.05) Non-Significant E sion(0.05) Significant Effec Transfo Minimum 1.24905	ffect t prmed Data Maximum 1.41202	SD 0.09409			

Approved BCTHA dzdbk

 Comparisons:
 Page 6 of 6

 Report Date:
 19 Aug-04 1:18 PM

 Analysis:
 13-9753-4711

Fathead Mini	10w 7	-d Larval S	Survival	and Gro	wth Test	B-3)					AMEC	Bioassay SD
Endpoint			A	nalysis T	уре		Sample	Lir	nk Contro	Link	Date Analyzed	Versior)
Mean Dry We	ight-n	ng	Co	ompariso	ו		01-1159	-04	53 01-115	9-0453	19 Aug-04 1:18 P	M CETISV	1.024
Method			AI	t H	Data Tran	sform	Z		NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Varianc	e t		С	> T	Untransfor	med			100	>100	1.00	N/A	9.22%
ANOVA Assu	mpti	ons											
Attribute		Test			Statistic	Crit	ical	P١	_evel	Decisi	on(0.01)		
Variances		Variance R	atio		1.26747	47.4	16723	0.8	5016	Equal	Variances		
Distribution		Shapiro-Wi	lk W		0 82854	0.74	1935	0.0	6250	Norma	Distribution		
ANOVA Table	Э												
Source		Sum of	Squares	Mean	Square	DF	F Statis	stic	P Level		Decision(0.05)		
Between		0.00599	512	0.005	9951	1	9.01		0.02394		Significant Effect		
Error		0.003990	075	0.000	6651	6							
Total		0.009985	587	0.006	6602	7							
Group Comp	ariso	ns											
Control	vs	Conc-%		Statistic	c Crit	ical	P Level		MSD	De	cision(0.05)		
Salt Control		100		-3.0022	51 1.94	318	0.98803		0.03543643	No	n-Significant Effect		
Data Summa	ry					Origii	nal Data				Transfo	rmed Data	
Conc-%	Con	trol Type	Count	Mean	Mi	nimum	Maximun	n	SD	Mean	Minimum	Maximum	SD
0	Salt	Control	4	0.384	25 0.3	35900	0.41300		0.02727				
100			4	0.439	00 0.4	1500	0.46700		0.02422				

Approved By: Start 2200

 Comparisons:
 Page 2 of 6

 Report Date:
 19 Aug-04 1:18 PM

 Analysis:
 05-9448-8801

	1.	cpon	1							Analysis:		0	5-9448-8801
Fathead Min	now 7	-d Larval S	Survival	and Growth	Test B-3	3					A	MEC B	ioassay SD
Endpoint			Ar	nalysis Type		Sample	e Lir	nk Contro	Link	Date Analyzed	Ve	ersion	
Mean Dry We	ight-n	ng	Co	omparison		01-1159	9-04	53 01-115	9-0453	19 Aug-04 1:18 F	YM CE	ETISv1	.024
Method			Alt	t H Data	Transform	z		NOEL L	OEL	Toxic Units	ChV		MSDp
Equal Variance	e t		C	> T Untra	nsformed			100 >	>100	1.00	N/A		11.38%
ANOVA Assu	umptio	ons											
Attribute		Test		Statis	stic C	ritical	ΡL	evel	Decisio	on(0.01)			
Variances		Variance R	atio	4.239	18 47	7.46723	0.2	6632	Equal V	ariances			
Distribution		Shapiro-Wi	lk W	0.942	96 0.	74935	0.6	0301	Normal	Distribution			
ANOVA Tabl	e												
Source		Sum of	Squares	Mean Squ	are DF	F Stati	stic	P Level		Decision(0.05)			
Between		0.00238	049	0.0023805	1	1.55		0.25970		Non-Significant E	ffect		
Error		0.00922	097	0.0015368	6								
Total		0.01160	146	0.0039173	7								
Group Comp	ariso	ns											
Control	vs	Conc-%		Statistic	Critical	P Level		MSD	Dec	cision(0.05)			
Lab Control		100		1.244574	1.94318	0.12985		0.0538655	Nor	n-Significant Effect			
Data Summa	ry				Orig	ginal Data				Transfo	rmed D	ata	
Conc-%	Con	trol Type	Count	Mean	Minimum	Maximu	m	SD	Mean	Minimum	Maxir	num	SD
0	Lab	Control	4	0.47350	0.41800	0.52000		0.04987					
100			4	0.43900	0.41500	0.46700		0.02422					

Approved Brath dealer

Comparisons: Page 3 of 6 19 Aug-04 1:18 PM Report Date: 07-7359-3925

AMEC Bioassay SD

Analysis:

Fathead Minnow 7-d Larval Survival and Growth Test B-3

Endpoint Mean Dry Weight-mg			alysis Type			Sample	Li	nk Cor	ntrol	Link	Date Analyzed		Version	
Mean Dry Weigh	-mg	Cor	nparison			01-1159	-04	453 01-1	1159	-0453	19 Aug-04 1:18 F	PM	CETISv1	.024
Method		Alt	H Data	Transform	n	Z		NOEL	L	OEL	Toxic Units	ChV	/	MSDp
Equal Variance t		C >	T Untra	nsformed				100	>	100	1.00	N/A		11.97%
ANOVA Assumptions														
Attribute	Test		Statis	stic	Criti	ical	P	Level		Decision(0.01)				
Variances		2.266	33	47.46723			0.51904		Equal V	/ariances				
Distribution Shapiro-Wilk W			0.909	12	0.74	935	0.3	32684		Normal	Distribution			
ANOVA Table														
Source	Sum of Squ	ares	Mean Squ	are D	F	F Statis	stic	c PLe	vel		Decision(0.05)			
Between	0.01402821		0.0140282	1		14.64		0.00	870		Significant Effect	t		
Error	0.00574875		0.0009581	6										
Total	0.01977696		0.0149863	7		_								
Group Comparis	sons													
Control vs	Conc-%	:	Statistic	Critical		P Level		MSD		De	cision(0.05)			
pH-adjusted Co	100		-3.826397	1.94318		0.99565		0.04253	135	No	n-Significant Effec	t		
Data Summary			Origin		nal Data					Transfo	orme	d Data		
Conc-% C	ontrol Type Co	unt	Mean Minimum		Maximum		SD		Mean	Minimum	Ma	aximum	SD	
0 pl	0 pH-adjusted C 4		0.35525 0.31300		0.39000	0.39000 0.03		5						
100 4			0.43900	0.43900 0.41500 0.4		0.46700	0.02422		2					

Approved by aff 4236

Test Species: P. promelas

Client Name:

City of Buenaventura

Test Date: 07/21/2004

Sample ID:

B-3

Test No.: 0407-049

$\begin{array}{c c c c c c c c c c c c c c c c c c c $	(g) (B 0.05444 0.04173 0.04861 0.04241 0.04241 0.04413 0.04648 0.04648 0.04649 0.03900
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.05444 0.04173 0.04861 0.04241 0.04241 0.04413 0.04648 0.04648 0.04049
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	0.04173 0.04861 0.04241 0.04413 0.04648 0.04648 0.04649 0.03900
c 10 910 10 10 10 10 100 0.04416 d 10 10 9 q 9 q 9 q 9 q 9 q 9	0.04861 0.04241 0.04413 0.04648 0.04648 0.04049
d 10 10 9 q 9 10 <th10< th=""> 10 10 <th< td=""><td>0.04241 0.04413 0.04648 0.04049 0.03900</td></th<></th10<>	0.04241 0.04413 0.04648 0.04049 0.03900
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.04049
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.03900
100% a 10 10 10 10 10 10 10 10 00 0.03662	h h 11-0-
	0.04085
b 10 10 10 10 9 9 8 8 8 80 0.03989	0.04404
C 10 10 10 10 10 10 10 10 100 0.02932	0,03299
d 10 10 10 10 10 10 10 10 100 0.04133 1	0,04584
a	
b	
С	
d	
att-adv. a 10 9 9 9 9 9 9 9 9 9 9 0 0.050/5/	0.05396
Salt united b 10 9 9 9 9 9 9 9 9 9 9 9 0 0.04563	0.04953
c 10 10 10 10 10 10 10 10 10 10 100 0.04472	0.04785
d 10 10 10 10 10 10 10 10 10 100 0.04522 1	0.04859
b	
C C	
d	
a	
b b	
C C	
d	
Tech Initials SH BS SH AH RS AH SH ANTA PLATA	
Weight	Data:
Feeding Times (day): 0 1 2 3 4 5 6 Ot Full Date/Time in:	7-28-04/16
- 0900 0800 0830 0900 0840 0915 Date/Time out: §	8-2-04/1218
- 1215 1400 1030 1300 1150 Oven Temp (°C):	63
1630 1645 1605 1400 1945 1600 1545 Tech Initials:	128
Comments: QC Check:	att 8-10-04
Final Review:	1114 81 69/ 4

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u><i>P. promelas</i></u>
Sample ID:	B-3	Start Date/Time: 07/21/2004 \(ょつひ
Test No:	0407-049	End Date/Time: 07/28/2004 1500

Concentration				Lab Co	ontrol #1			
Day	0	1	2	3	4	5	6	7
	Contraction of the	And Area and		in Market	itial	St. States to and	ere and the second	and the state of the
pH	8.09	8.24	8.28	8,25	8.25	8.22	3.21	
DO (mg/L)	7.9	77	7,9	8.0	83	7.8	8.0	
Cond. (µmhos/cm)	224	308	207	209	209	210	210	
Temp (°C)	24.7	2517	24.7	24.5	24.7	24.7	241	
				F	inal		art Contained a	
рН		7.53	7.82	1.68	7.71	7.71	773	175
DO (mg/L)		6,1	4.9	6.0	6.2	6.4	63	6.2
Temp (°C)	S. May Mary	25,0	24.7	24.7	25.2	24.7	25.1	25,2

Concentration								
Day	0	1	2	3	4	5	6	7
a state of the state of the state of	and the second second	Share I good at		In	itial		- Martin -	
pH	7.75	7.80	7.76	7.78	7.87	7.80	8-12	S. J. S. Marrada a
DO (mg/L)	7.9	8.2	8.9	86	8.7	7.7	8.0	
Cond. (µmhos/cm)	5750	5510	5530	5510	5520	5530	5610	
Temp (°C)	24.4	25.9	26.0	25,2	24.7	24.7	242	
	and the state of the	1.1.1		F	nal			
рН		7.74	7.68	7.72	7-69	17.71	7.74	7.76
DO (mg/L)	and the state	6.1	6.2	62	6.4	6.6	6.5	6.3
Temp (°C)		25,4	24.7	24.7	25.3	24.7	25.1	25.3

	Concentration	100%									
	Day	0	1	2	3	4	5	6	7		
	and the second sec	States All	A Market Contra	American Street	ini 🗠 👘	tial		and Southeast			
	рН 😸	9.45	9.35	9.22	9.10	8.11	9.33	9,19			
	DO (mg/L)	8.3	8.9	8.6	8.5	8.6	8.5	8.4			
	Cond. (µmhos/cm)	5380	5280	5280	5290	5 290	5290	5310	State Market		
	Temp (°C)	2510	25.7	25.8	25.5	25.1	25.3	24.1	1. 1. S. 1. S. 1.		
					Fi	nal	Eltras Parsital				
	pH	1. States	8.89	8,78	8.54	8.60	8.43	8150	8'25	1	
	DO (mg/L)		7.0	5.8	5.9	6.1	6.4	6.4	6.2		
	Temp (°C)	Contract (Pro	25.5	24.6	24.8	25.3	24.9	25.2	25.2		
		0	1	2	3	4	5	6	7	_	
Analysts	: Initial:	me	AH	SH	MC	Ry	185 Rg	sh	i Bana		
	Final:		AH	uc	SH	Ry	RS	ne	SH		
Commer	ts: @ sumple	ptt >9,	not go	fusled	prior	to test	t initie	t70h, a	n add	1110hal	control
Animal S	ource/Date Received:	29 10	ABS / 7-	21-04	MICK	An	imal Age a	t Initiation:	<48 Hou	irs	
QC Chec	K: AH 8-10-0	4					Fin	al Review:	aft	5 \$ 23 []	A
AMEC Ear	rth & Environmental Bioas	say Laborat	tory. 5550 M	orehouse Di	r., Ste. B. Sa	an Diego, CA	92121.				

Page 1 of 1 Test Summary: Report Date: 19 Aug-04 1:25 PM

Fathead Minnow 7-d Larval Survival and Growth Test C - 2 AMEC Bioassay SD Test: 06-7756-1634 Test Type: Growth-Survival (7d) Duration: 6 Days 21 Jourds 9 Davids	CETIS	Report							Report Date: Link:	19 Aug-04 1:25 PM 15-1010-3293/0407-050					
Test: 06-7756-1654 Test Type: Growth-Survival (70) Duration: 6 Days 23 Hours Start Date: 21 Jul-36 403 0PM Protocni EPA/821H-02-013 (2002) Species: Primetees pomelas Satur Date: 21 Jul-36 403 0PM Brine: Not Applicable Source: Aquatic Biosystems, CO Sample: 20 Jul-46 90 35 M Source: Clive IIII Clive IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Fathead Minr	Fathead Minnow 7-d Larval Survival and Growth Test C - 2 AMEC Bioassay SD Vest: 06-7756-1654 Test Type: Growth-Survival (7d) Duration: 6 Days 23 Hours													
Sample: 18-0547-1978 Materiat: Estuarine Monitoring Sample Client: City of Buenaventura Sample: 20 Jub-06 075 AM Source: Oddr-050 Project: Project: Readwad: 21 Jub-04 075 AM Source: City of Buenaventura Project: Analysis Endpoint C-2 Comparison Summary Comparison Summary Analysis Endpoint NOEL CDEL ChV MSDp Method 02:3077-3762 70 Proportion Survived 100 >100 N/A 0.10749 Equal Variance 1 03-0376-8162 100 >100 N/A 0.10749 Equal Variance 1 08-032-9301 100 >100 N/A 0.14498 Equal Variance 1 08-032-9301 100 >100 N/A 0.14938 Equal Variance 1 02-2377-3762 7d Proportion Survived Centrol Response 0.8 0.8 Passes acceptability oriteria 03-0376-8162 0.95000 0.90000 1.00000 0.02887 0.05774 6.08% <	Test: Start Date: End Date: Setup Date:	06-7756-1654 21 Jul-04 04:00 F 28 Jul-04 03:00 F 21 Jul-04 04:00 F	PM PM PM	Test Type: Protocol Dil Water: Brine:	Growth-Sun EPA/821/R Diluted Min Not Applica	rvival (7d) -02-013 (200 eral Water (8 able)2) 8:2)	Duration: Species: Source:	6 Days 23 Ho Pimephales pr Aquatic Biosys	urs omelas stems, CO					
Comparison Survived Indext KOPEL LOEL ChV MSDp Method 02-2977-3762 7d Proportion Survived 100 >100 N/A 0.22135 Equal Variance 1 03-0376-3162 100 >100 N/A 0.10749 Equal Variance 1 03-63452901 100 >100 N/A 0.10749 Equal Variance 1 03-63539704 Mean Dry Weight-ms 100 >100 N/A 0.14428 Equal Variance 1 14-6623-99704 Mean Dry Weight-ms 100 >100 N/A 0.14428 Equal Variance 1 14-6623-99704 Mean Dry Weight-ms 100 >100 N/A 0.14428 Equal Variance 1 14-6623-99704 Mean Dry Weight-ms Attribut Statistic Lower Limit Upper Limit Decision 03-0376-8162 7d Proportion Survived Control Response 0.85 0.8 Passes acceptability oriteria 03-0376-8162 7d Proportion Survived Marinum Structure SD CV SD 100-0500 9500	Sample: Sampled: Received: Hold Time:	18-0547-1978 20 Jul-04 09:35 A 21 Jul-04 07:45 A 30 Hours (18.5 °(AM AM C)	Material: Code: Source: Station:	Estuarine M 0407-050 City of Bue C-2	/lonitoring Sa	ample	Client: Project:	City of Buenav	rentura					
Analysis Endpoint NOFL LOEL ChV MSDp Method 02:977:3762 70 Proportion Survived 100 >100 N/A 0.2173 Equal Variance 1 03:636-8162 100 >100 N/A 0.10749 Equal Variance 1 08:6389-9704 Man Dry Weight-ms 100 >100 N/A 0.14498 Equal Variance 1 08:389-9704 Man Dry Weight-ms 100 >100 N/A 0.14498 Equal Variance 1 08:389-14208 Man Dry Weight-ms 100 >100 N/A 0.14498 Equal Variance 1 08:389-14208 Man Dry Weight-ms 100 >100 N/A 0.14498 Equal Variance 1 09:3076-8162 C 100 >100 N/A 0.16936 Passes acceptability oriteria 09:6942-2930 C Control Type Rep Manimum SE SD CV 00 Lab Control 4 0.9500 0.9000 0.02887 0.05774 6.08% 0 <t< td=""><td>Comparison</td><td>Summary</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Comparison	Summary													
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Conc-% Control Type Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 1.00000 0.90000 1.00000 0.90000 0 pH-adjusted C 0.90000 0.90000 1.00000 0.90000 0 Salt Control 1.00000 0.90000 1.00000 0.90000 100 Salt Control 1.00000 0.80000 0.70000 0.90000 100 0.80000 0.90000 1.00000 1.00000 1.00000 100 0.80000 0.90000 1.00000 1.00000 1.00000 Mean Dry Weight-mg Detail Exp 2 Rep 3 Rep 4 Exp 3 Rep 4 0 Lab Control 0.52000 0.51100 0.44500 0.41800 0.33700 0.33700 0.33700 0.33700 0.40200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00200 1.00	7d Proportion	n Survived Deta	il												
0 Lab Control 1.00000 0.90000 1.00000 0.90000 0 pH-adjusted C 0.90000 1.00000 1.00000 1.00000 0 Salt Control 1.00000 0.80000 0.70000 0.90000 100 0.80000 0.90000 1.00000 1.00000 Mean Dry Weight-mg Detail Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 0.52000 0.51100 0.44500 0.41800 0 PH-adjusted C 0.38100 0.39000 0.33700 0 Salt Control 0.41300 0.36300 0.35900 0.40200	Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4									
0 pH-adjusted C 0.90000 1.00000 1 00000 0 Salt Control 1.00000 0.80000 0.70000 0.90000 100 0.80000 0.90000 1 00000 1.00000 Mean Dry Weight-mg Detail Conc-% Control Type Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 0.52000 0.51100 0.44500 0.41800 0 pH-adjusted C 0.38100 0.39000 0.31300 0.33700 0 Salt Control 0.41300 0.36300 0.40200 100 0.52200 0.53300 0.472700 0.59300	0	Lab Control	1.00000	0.90000	1.00000	0.90000									
0 Salt Control 1.00000 0.80000 0.70000 0.90000 100 0.80000 0.90000 1.00000 1.00000 Mean Dry Weight-mg Detail Conc-% Control Type Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 0.52000 0.51100 0.44500 0.41800 0 pH-adjusted C 0.38100 0.39000 0.31300 0.33700 0 Salt Control 0.41300 0.36300 0.40200 100 0.52200 0.53300 0.47700 0.59300	0	pH-adjusted C	0.90000	0.90000	1.00000	1 00000									
Note 0.80000 0.90000 1.00000 1.00000 Mean Dry Weight-mg Detail Conc-% Control Type Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 0.52000 0.51100 0.44500 0.41800 0 pH-adjusted C 0.38100 0.39000 0.31300 0.33700 0 Salt Control 0.41300 0.36300 0.35900 0.40200 100 0.52200 0.53300 0.47700 0.59300	100	Salt Control	1.00000	0.80000	0.70000	0.90000									
Conc-% Control Type Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 0.52000 0.51100 0.44500 0.41800 0 pH-adjusted C 0.38100 0.39000 0.31300 0.33700 0 Salt Control 0.41300 0.36300 0.35900 0.40200		inht ma Datail	0.80000	0.90000	1 00000	1.00000									
Control Control O.52000 O.51100 O.44500 O.41800 0 pH-adjusted C 0.38100 0.39000 0.31300 0.33700 0 Salt Control 0.41300 0.36300 0.35900 0.40200 100 0.50200 0.53300 0.47700 0.59300	Conc.%	Control Type	Pep 1	Pop 2	Pop 3	Pop 4									
0 pH-adjusted C 0.38100 0.39000 0.31300 0.33700 0 Salt Control 0.41300 0.36300 0.40200 100 0.50200 0.53300 0.47700 0.59300	0	Lab Control	0.52000	0.51100	0 44500	0 41800									
0 Salt Control 0.41300 0.36300 0.47700 0.59300	0	pH-adjusted C	0.38100	0.39000	0.31300	0.33700									
100 0.50200 0.53300 0.47700 0.59300	0	Salt Control	0.41300	0.36300	0.35900	0.40200									
0.00000 0.00000 0.00000	100		0.50200	0.53300	0.47700	0.59300									

CETIS	S R	eport	Survival	and Growth	Test (-)					Compariso Report Dat Analysis:	e:	19 Au	Page 1 of 6 g-04 1:25 PM 02-2977-3762 Bioassay SD
Endpoint			Ar	nalysis Type		Sample	Link Co	ntrol Li	nk Da	te Analyzed		Version	
7d Proportion	n Surv	ived	Co	omparison		15-1010	-3293 15-	1010-32	293 19	Aug-04 1:24 I	PM	CETISv	1.024
Method			AI	t H Data	Transform	Z	NOEL	LOE	EL To	oxic Units	ChV		MSDp
Equal Varian	ce t		С	>T Angu	lar (Corrected))	100	>10	01.	00	N/A		22.14%
Test Accept	ability	1											
Attribute			St	atistic	Lower Limit	Upper Li	mit Deci	sion					
Control Resp	onse		0.8	35	0.8		Pass	ses acce	eptability	criteria			
ANOVA Ass	umpti	ons											
Attribute		Test		Stati	stic Crit	tical	P Level	De	ecision(0).01)			
Variances		Variance R	atio	1.53	091 47.4	46723	0.73488	Ec	qual Varia	ances			
Distribution		Shapiro-Wi	ilk W	0.93	653 0.74	4935 0.54076		No	ormal Dis	tribution			
ANOVA Tab	le												
Source		Sum of	Squares	Mean Squ	uare DF	F Statis	stic PL	evel	De	cision(0.05)			
Between		0.02214	034	0.0221403	3 1	0.81	0.40	275	No	n-Significant I	Effect		
Error		0.16396	59	0.027327	7 6								
Total		0.18610	627	0.049468	7								
Group Com	pariso	ons											
Control	vs	Conc-%		Statistic	Critical	P Level	MSD		Decisio	on(0.05)			
Salt Control		100		-0.9001005	1.94318	0.79863	0.2271	43	Non-Si	gnificant Effec	ct		
Data Summa	ary			Origina		nal Data			Transfo		ormed	Data	
Conc-%	Cor	ntrol Type	Count	Mean	Minimum	Maximun	n SD	M	lean	Minimum	Ma	ximum	SD
0	Salt	Control	4	0.85000	0.70000	1.00000	0.1291	0 1.	18984	0.99116	1.4	1202	0.18182
100 4				0.92500	0.80000	1.00000	0.0957	4 1.	.29506	1.10715	1.4	1202	0.14695



CETIS	Re	eport											Comparis Report D Analysis:	sons: ate: :	19 Au	Page 2 of 6 g-04 1:25 PM)3-0376-8162
Fathead Minn	now 7.	-d Larval Survi	val a	and Gr	owth T	est C	-2-								AMEC E	lioassay SD
Endpoint			An	alysis ⁻	Гуре		Ş	Sample	Lin	k Contro	ol Link	Da	te Analyze	d 4 DN4	Version	024
7d Proportion	Surviv	/ed	Cor	mparisc	on 			15-1010-	-329		0-3293	5 19	Aug-04 1.24		CETISV	.024
Method			Alt	н	Data T	ransform	n	z		NOEL	LOEL	Тс	oxic Units	ChV	/	MSDp
Equal Varianc	e t		C >	·Τ	Angula	ar (Correc	ted)			100 :	>100	1.(00	N/A		10.75%
Test Accepta	bility															
Attribute			Sta	tistic	L	ower Lim	nit U	pper Lir	mit	Decisior	n					
Control Respo	onse		0.9	5	0	.8				Passes a	accepta	ability o	criteria			
ANOVA Assu	mptic	ons														
Attribute	1	Test			Statist	tic	Critical	I I	ΡL	evel	Decis	sion(0	.01)			
Variances	١	Variance Ratio			2.4392	27	47.4672	23 (0.48	3316	Equa	I Varia	nces			
Distribution	Ş	Shapiro-Wilk W			0.8758	36	0.7493	5 (0.16	6904	Norm	nal Dist	tribution			
ANOVA Table)															
Source		Sum of Squa	res	Меа	n Squa	ire D	F	F Statis	tic	P Level		De	cision(0.05)		
Between		0.00251685		0.00	25168	1		0.17		0.69841		No	n-Significan	t Effect		
Error		0.09134475		0.01	52241	6										
Total		0.0938616		0.01	7741	7										
Group Comp	arisor	าร														
Control	vs	Conc-%		Statisti	ic	Critical	Р	Level		MSD	C	Decisio	on(0.05)			
Lab Control		100		0.4065	952	1.94318	0.3	34921		0.1695369	Ν	von-Się	gnificant Eff	ect		
Data Summar	ry					0	riginal	Data					Trans	sforme	d Data	
Conc-%	Cont	trol Type Cou	unt	Mea	n	Minimu	ım M	laximum	n	SD	Mea	n	Minimur	n Ma	aximum	SD

1.00000

1.00000

0.05773

0.09574

1.33053

1.29506

1.24905

1.10715

1.41202

1.41202

0.09409

0.14695

0

100

Lab Control

4

4

0.95000

0.92500

0.90000

0.80000

Comparisons: Page 3 of 6 19 Aug-04 1:25 PM Report Date: 06-2639-9704

AMEC Bioassay SD

Analysis:

Fathead Minnow 7-d Larval Survival and Growth Test () - 2

Endpoint			An	alysis T	ype		Sample	Li	nk Control	Link	Date Analyzed	Version	004
Mean Dry Weig	ght-m	ng	Co	mparisor	1		15-1010	-32	293 15-1010)-3293	19 Aug-04 1:25 P	M CENSV	1.024
Method			Alt	tH (Data Tran	sform	Z		NOEL L	OEL	Toxic Units	ChV	MSDp
Equal Variance	e t		C :	>T (Jntransfor	med			100 >	100	1.00	N/A	14.50%
ANOVA Assur	nptie	ons											
Attribute		Test		S	Statistic	Crit	lical	ΡI	Level	Decisio	on(0.01)		
Variances		Variance Ra	itio	-	.00721	47.4	46723	0.9	99542	Equal V	/ariances		
Distribution		Shapiro-Will	< W	(0.92228	0.74	4935	0.4	11886	Normal	Distribution		
ANOVA Table													
Source		Sum of S	quares	Mean	Square	DF	F Statis	stic	P Level		Decision(0.05)		
Between		0.005565	13	0.005	5651	1	2.23		0.18599		Non-Significant E	ffect	
Error		0.014975	75	0.002	496	6							
Total		0.020540	88	0.008	0611	7							
Group Compa	iriso	ns											
Control	vs	Conc-%		Statistic	crit	ical	P Level		MSD	De	cision(0.05)		
Lab Control		100		-1.49320	03 1.94	1318	0.90700		0.06864625	No	n-Significant Effect		
Data Summar	у					Origi	nal Data				Transfo	rmed Data	
Conc-%	Con	trol Type	Count	Mean	Mi	inimum	Maximun	n	SD	Mean	Minimum	Maximum	SD
0	Lab	Control	4	0.473	50 0.4	41800	0.52000		0.04987				
100			4	0.526	25 0.4	47700	0.59300		0.05005				

Approved By and Azado

Page 4 of 6 19 Aug-04 1:25 PM 08-3891-4208

Comparisons:

Report Date:

Analysis:

Fathead Min	10w 7	-d Larval S	Survival	and Grow	h Test	C-;	2					AMEC E	Bioassay SD
Endpoint			Ar	nalysis Typ	e		Sample	Li	nk Contro	l Link	Date Analyzed	Version	
Mean Dry We	ight-m	ng	Co	omparison			15-1010	-32	293 15-101	0-3293	19 Aug-04 1:25 P	PM CETISV	1.024
Method			Al	tH Da	ta Tran	sform	Z		NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance	e t		С	>T Ur	transfo	rmed			100 :	>100	1.00	N/A	14.41%
ANOVA Assu	mptio	ons											
Attribute		Test		Sta	tistic	Crit	lical	Р	Level	Decisi	on(0.01)		
Variances	1	Variance R	atio	3.3	6872	47.4	46723	0.3	34515	Equal	Variances		
Distribution		Shapiro-Wi	lk W	0.9	4922	0.74	4935	0.6	6712	Norma	Distribution		
ANOVA Table	9												
Source		Sum of	Squares	Mean S	quare	DF	F Statis	stic	P Level		Decision(0.05)		
Between		0.04032	795	0.04032	8	1	24.83		0.00249		Significant Effect		
Error		0.00974	554	0.00162	43	6							
Total		0.050073	349	0.04195	22	7							
Group Comp	ariso	าร											
Control	vs	Conc-%		Statistic	Crit	tical	P Level		MSD	De	cision(0.05)		
Salt Control		100		-4.982826	1.9	4318	0.99875		0.0553765	No	n-Significant Effect		
Data Summa	ry					Origi	nal Data				Transfo	rmed Data	
Conc-%	Con	trol Type	Count	Mean	М	inimum	Maximur	n	SD	Mean	Minimum	Maximum	SD
0	Salt	Control	4	0.38425	0.	35900	0.41300		0.02727				
100			4	0.52625	0.	47700	0.59300		0.05005				

CETIS	S R	eport								Compariso Report Dat Analysis:	ns: e: 19 A	Page 5 of 6 ug-04 1:25 PM 09-6942-2930
Fathead Min	now	7-d Larval S	Survival	and Growth	Test C-	2					AMEC	Bioassay SD
Endpoint			A	nalysis Type		Sample	Link	Contro	l Link	Date Analyzed	Versio	n
7d Proportion	n Surv	ived	Co	omparison		15-1010	-3293	15-101	0-3293	19 Aug-04 1:24 I	PM CETIS	v1.024
Method			A	tH Data	Transform	Z	NO	EL I	LOEL	Toxic Units	ChV	MSDp
Equal Varian	ce t		С	>T Angu	Ilar (Corrected)	100) :	>100	1.00	N/A	10.75%
Test Accept	ability	1										
Attribute			St	atistic	Lower Limit	Upper Li	mit	Decisior	า			
Control Resp	onse		0.	95	0.8			Passes a	acceptabil	ity criteria		
ANOVA Ass	umpti	ions										
Attribute		Test		Stati	stic Cri	tical	P Leve	el.	Decisio	n(0.01)		
Variances		Variance R	atio	2.439	927 47.	46723	0.4831	6	Equal Va	ariances		
Distribution		Shapiro-Wi	lk W	0.87	586 0.7	4935	0.1690	4	Normal I	Distribution		
ANOVA Tab	le											
Source		Sum of	Squares	Mean Squ	are DF	F Statis	stic	P Level		Decision(0.05)		
Between		0.00251	685	0.0025168	3 1	0.17		0.69841		Non-Significant E	ffect	
Error		0.09134	475	0.0152241	6							
Total		0.09386	16	0.017741	7							
Group Comp	bariso	ons										
Control	vs	Conc-%		Statistic	Critical	P Level	MS	D	Dec	ision(0.05)		
pH-adjusted	Со	100		0.4065952	1.94318	0.34921	0.1	695369	Non	-Significant Effec	t	
Data Summa	iry				Orig	inal Data				Transfo	ormed Data	
Conc-%	Cor	ntrol Type	Count	Mean	Minimum	Maximun	n SD		Mean	Minimum	Maximum	SD
0	pH-	adjusted C	4	0.95000	0.90000	1.00000	0.0	5773	1.33053	3 1.24905	1.41202	0.09409
100			4	0.92 500	0.80000	1.00000	0.0	9574	1.29506	5 1.10715	1.41202	0.14695

Approved By 944 4246

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Page 6 of 6 Comparisons: 19 Aug-04 1:25 PM Report Date: 14-6623-8901

AMEC Bioassay SD

Analysis:

Fathead Minnow 7-d Larval Survival and Growth Test C-2

Endpoint Mean Dry Weigh	i-mg	Ar Co	alysis Type mparison		Sampl 15-101	e L 0-3	ink Contro 293 15-101	ol Link 0-3293	Date Analyzed 19 Aug-04 1:25 P	Version	1.024
Method		Alt	H Data	Transform	Z		NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t		C :	T Untra	nsformed			100	>100	1.00	N/A	16.94%
ANOVA Assump	otions										
Attribute	Test		Statis	stic Ci	ritical	Ρ	Level	Decisi	on(0.01)		
Variances	Variance Rati)	1 884	00 47	7.46723	0.	61593	Equal	Variances		
Distribution	Shapiro-Wilk	V	0.952	64 0.	74935	0.	70310	Norma	Distribution		
ANOVA Table											
Source	Sum of Sq	Jares	Mean Squ	are DF	F Stat	isti	c P Level		Decision(0.05)		
Between	0.05848214		0.0584821	1	30.50		0.00148	3	Significant Effect		
Error	0.01150354		0.0019173	6							
Total	0.06998568		0.0603994	7							
Group Comparis	sons										
Control vs	Conc-%		Statistic	Critical	P Level		MSD	De	cision(0.05)		
pH-adjusted Co	100		-5.5229 55	1.94318	0.99926		0.0601642	No	n-Significant Effect		
Data Summary				Orig	ginal Data				Transfo	rmed Data	
Conc-% C	ontrol Type C	ount	Mean	Minimum	Maximu	ım	SD	Mean	Minimum	Maximum	SD
ld D	I-adjusted C 4		0.35525	0.31300	0.39000	1	0.03646				
100	4		0.52625	0.47700	0.59300)	0.05005				

Approved By ALA 2220

Test Species: *P. promelas*

Client Name:

City of Buenaventura

Test Date: 07/21/2004

Sample ID:

C-2

Test No.: 0407-050

Conc.	Bon				Test	Day				Percent		pan wt.	pan + fish	1
(%)	Rep.	0	ha	2	.3	4	5	6	7	Survival		(g)	(g) 🕰	
Lab	а	10	96	()	10	10	(0	10	10	100		0.04924	0.05444	
Control #1	b	10	13	9	٩	9	9	9	٩	90		1:03662	0.04173	
	С	10	909	10	10	10	10	10	10	100	C	04416	0.04861	
	d	10	8 D	9	વ	9	9	9	9	90	0	1.0 3823	0.04241	
Salt	а	10	91310	10	10	10	10	10	10	100		9.04000	0.04413	
Control #1	b	10	10	10	10	10	9	9	a A	80		0.04285	0.04648	
(3.1 ppt)	С	10	10	10	8	7	17	7	r	70		0.03690	0,04049	
	d	10	10	9	9	9	9	9	9	90		0.03498	0.03900	
100%	а	10	10	9	9	8	8	8	প্ত	80		0.03684	0.04184	
	b	10	(0	10	9	9	9	9	9	9D		1.03875	0.04408	
	C	10	10	10	10	10	10	10	10	100		0.03749	0.04226	1
	d	10	10	10	10	10	10	10	10	100	6	0.04101	0.04694	
	а													
	b													
	С													
	d													
pH adjusted	а	10	9	9	9	9	9	9	q	90		0.05015	6 635396	1
Salt Control	b	10	9	9	9	9	9	G	9	90		0.04563	0.04953	
Gentre	С	10	10	10	10	16	10	16	10	100		0.04472	0.04785	
	d	10	10	10	10	10	10	D	10	100		0.04522	0.04859	
	а		1	-1		1								
	b											······		
	C										-	an a		l
	d													
	а													
	b													
	С						1							1
	d													1
Tech Initials		SH	128	28	SH	AH	R	AH	SH	date ale		ИС		1
										auaen	ΠY	Weigh	t Data:	
Feeding Time	s (day)		0	1	2	3	4	5	6	QC=AH	Ď	ate/Time in:	7-28-04	1/11.00
_			-	0900	0800	0836	1900	0840	0915		Da	te/Time out:	8-2-04/1210	11000
			-	1215	1400	1030	1300	1320	1150		Over	n Temp (°C):	63	,
			1630	1045	1605	1400	1945	1600	1545		Т	ech Initials:	R	
					<u></u>					1				
Comments:												QC Check:	AH 8-10-04	-1
								-			Fi	nal Review:	GW ST	23/14
								-					the of	107

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>P. promelas</u>	
Sample ID:	<u>C-2</u>	Start Date/Time: 07/21/2004	1400
Test No:	0407-050	End Date/Time: 07/28/2004	1500

Concentration		Lab Control #1												
Day	0	1	2	3	4	5	6	7						
				In	itial		- Alexandra							
рН	8.09	8.24	8.28	8.25	8.25	8.2L	8-21	A State State						
DO (mg/L)	7,9	77	7.9	8.0	8.3	7.8	8.0							
Cond. (µmhos/cm)	224	209	207	209	209	210	210	Profession and the						
Temp (°C)	24.7	25.8	24.7	24.5	247	24.7	241							
				F	inal									
рН	Carling the test	7.53	7.82	7.68	7.71	7.71	7.73	7.75						
DO (mg/L)	Stand and	6.1	6.5	6.0	62	6.4	6.3	6.2						
Temp (°C)	The same	250	24.7	24.7	25.2	24.7	25.1	25.2						

Concentration		Salt Control #1 (3.1ppt)												
Day	0	1	2	3	4	5	6	7						
	A CONTRACTOR OF THE	Y Part Sarah	a the second	in the line	itial .	Set Sheet								
рН	775	7.80	7.76	7.78	7.87	780	8.12							
DO (mg/L)	7.9	8.2	8,9	86	8.7	29	8.0	Territo alterna						
Cond. (µmhos/cm)	5750	5510	5530	5510	5520	5530	5610							
Temp (°C)	24.4	25.9	26.0	25.2	24.7	24.7	24.3							
				F F	linal	and a lateration	a state and	and Materials						
рН		7.74	7.68	7,72	7.69	7.71	7.74	7.76						
DO (mg/L)	and the second second	6.1	6.2	6.2	6.4	6.6	6.5	6.3						
Temp (°C)		25.4	24.7	24.7	25.3	24.7	251	25.3						

Γ	Concentration				10	0%				
Γ	Day	0	1	2	3	4	5	6	7	
		Des the state		and the second	In In	itial			Contraction of the	
L	рН (∕	9.14	9.03	9.01	8.89	891	8.85	8.67	Color to the second	
L	DO (mg/L)	89	8.5	3.4	8.5	6.6	8.7	8.6		
L	Cond. (µmhos/cm)	5540	5320	2330	5330	5330	5390	5410		
	Temp (°C)	25.0	25.8	24.6	25.4	25.2	25.3	24.9		
1	and the second second	and the state of	Contraction of the	a land a star a star	FI	inal		Stranky.	生活的资源 的资源	
Ļ	pH		8.61	8.47	8.27	8.29	8.29	3.32	8.27	
-	DO (mg/L)	and think the	6.3	6.1	5.7	5.6	6.2	6.0	5.7	
L	Temp (°C)	P.P. Constraints	25.5	24.5	25.0	25.1	29.9	253	25.2	
		0	1	2	3	4	5	6	7	
Analysts:	Initial:	me	AH	SH	MC	Kig	AS RIG	SH		
	Final:		AH	Me	SH	Pis	R5 '	ne	SH	
Comment	s: @ gample pt	1>9 no	t adju	sted r	mor ti	test	Initiati	on.cu	n addrt	ional con
	of pHJ9	was	In 1 tio	ter	CONCL	men	tur.	,		
Animal So	ource/Date Received:		ABS / 7-2	21-04		An	imal Age at	Initiation:	<48 Hour	S
QC Check	e AH 870-04					_	Ein	al Review	and A	- A23/14

C. DUBIA

Test Summary: Page 1 of 1

Link:

23 Sep-04 10:31 AM Report Date: 00-3815-4461/0407-051

CETIS Report

AMEC Bioassay SD

Ceriodaphhi	a /-d Survival an	a Reproa	uction lest	A-C						AIVIEU D	oassay SD
Test:	14-5599-8866		Test Type:	Survival (96	ŝh)		Dura	tion: 7	Days 21 Hou	ırs	
Start Date:	21 Jul-04 04:00 P	M	Protocol:	EPA/821/R	-02-013 (200	02)	Spec	cies: C	eriodaphnia d	ubia	
End Date:	29 Jul-04 01:10 P	M	Dil Water:	Diluted Min	eral Water (8	8:2)	Sour	rce: Ir	n-House Cultu	re	
Setup Date:	21 Jul-04 04:00 P	M	Brine:								
Compley	19 0012 8804		Matorial	Estuaring M	Annitoring Sc	mplo	Clier		the of Duopour	nturo	
Sampled	20 JUL 04 02:50 E	N.A	Godo:		ionitoring Se	inple	Droir	n. C	ity of buenave	entura	
Sampleu:	20 Jul-04 02.50 F		Cource:	City of Buor	avontura		Proje				
Receiveu.	21 Jul-04 07.45 A		Station:		aventura						
Hold Time:	25 Hours (19.3 C		Station:	A-2							
Comparison	Summary										
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp		Method		
07-1852-955	96h Proportion	Survived	<100	100		N/A	N/A		Fisher's Exact		
13-8766-1765	5		100	>10	0	N/A	N/A		Fisher's Exact		
15-5022-2154	1		100	>10	0	N/A	N/A		Fisher's Exact		
96h Proporti	on Survived Sun	nmary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	C	v		
0	Lab Control	10	1.00000	1.00000	1.00000	0.00000	0.0000	0 0.	00%		
0	pH-adjusted C	10	0.50000	0.00000	1.00000	0.16667	0.5270	5 10	5.41		
0	Salt Control	10	0.60000	0.00000	1.00000	0.16330	0.5164	0 86	6.07%		
100		10	0.30000	0.00000	1.00000	0.15275	0.4830	5 16	51.02		
96h Proporti	on Survived Deta	ail									
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 Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
0	pH-adjusted C	0.00000	1.00000	1.00000	0.00000	0.00000	1.00000	1.00000	0.00000	0.00000	1.00000
0	Salt Control	0.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000	0.00000	1.00000	0.00000
100		0.00000	1.00000	1.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000



						Comparis	ons:	Page 1 of 3
CETIS Repo	rt					Report Da	te:	23 Sep-04 10:31 AM
OL HO Kopo						Analysis:		07-1852-9551
Ceriodaphnia 7-d Survival	and Reproduction	Test A-2						AMEC Bioassay SD
Endpoint	Analysis T	/pe	Sample L	ink Co	ntrol Link	Date Analyzed		Version
96h Proportion Survived	Comparison		00-3815-4	461 00-	3815-4461	22 Sep-04 12:16	6 PM	CETISv1.024
Method	Alt H I	Data Transform		NOEL	LOEL	Toxic Units	Ch\	/ MSDp
Fisher's Exact	C>T l	Untransformed		<100	100		N/A	
Group Comparisons								
Control vs Conc-%	Statistic	Critical	Decision(0.0	5)				
Lab Control 100	0.00155	0.05000	Significant Ef	fect				
Data Summary								
Conc-% Control Ty	pe Non-Respon	ders Responde	ers Total Ob	served				
0 Lab Contro	10	0	10					
100	3	7	10					
96h Proportion Survived								
1.0 5 0.8								
Proportic Survived								
96 0.4-								
0.2	0	100	ı					
	Conc-%							



CETIS	Report						Comparis Report Da Analysis:	ons: ate:	Page 2 of 3 23 Sep-04 10:31 AM 13-8766-1765
Ceriodaphni	a 7-d Survival and	Reproduction	Test A-2	-					AMEC Bioassay SD
Endpoint		Analysis 1	Гуре	Sample Li	ink Co	ontrol Link	Date Analyzed	1	Version
96h Proportio	n Survived	Compariso	n	00-3815-4	461 00	-3815-4461	22 Sep-04 12:1	6 PM	CETISv1.024
Method		Alt H	Data Transform		NOEL	LOEL	Toxic Units	ChV	/ MSDp
Fisher's Exac	t	C > T	Untransformed		100	>100	1.00	N/A	
Group Comp Control Salt Control	oarisons vs Conc-% 100	Statistic 0.18492	Critical 0.05000	Decision(0.0 Non-Significa	5) Int Effect				
Data Summa Conc-%	ry Control Type	Non-Respor	nders Responde	ers Total Ob	served				
0 100	Salt Control	6 3	4 7	10 10					
96h Proporti	on Survived								
96h Proportion Survived	0.8 0.6 0.4 0.2 0.0		100	1					
		Conc-%							



CETIS	Report						Comparis Report Da	ons: te:	Page 3 of 3 23 Sep-04 10:31 AM 15-5022-2154
Ceriodaphnia	a 7-d Survival and I	Reproductio	n Test A - T	2			Analysis.		AMEC Bioassay SD
Endpoint 96h Proportion	n Survived	Analysis Comparis	Type on	Sample Li 00-3815-4	nk Co 461 00-	ntrol Link 3815-4461	Date Analyzed 22 Sep-04 12:10	6 PM	Version CETISv1.024
Method Fisher's Exact		Alt H C > T	Data Transform Untransformed		NOEL 100	LOEL >100	Toxic Units 1.00	Ch\ N/A	/ MSDp
Group Comp Control pH-adjusted C	arisons vs Conc-% Co 100	Statistic 0.32496	Critical 0.05000	Decision(0.0 Non-Significa	5) Int Effect				
Data Summa Conc-%	ry Control Type pH-adjusted Co	Non-Respo	onders Responde	ers Total Ob 10	eserved				
96h Proportio	on Survived	3	1	10					
96h Proportion Survived	0.5 0.4 0.3 0.2 0.1 0.0 0		100	ı					
		Conc-%	0						



Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>C. dubia</u>	
Sample ID:	A-2	Start Date/Time: 07/21/2004	1600
Test No:	0407-051	29 End Date/Time: <u>07/28/2004</u>	310
		Ан	

Concentration	Lab Control #1											
Day	0	1	2	3	3 4		6	7	8			
			ALAN KANGAT	In	itial		0					
pH	8.09	8.24	8.28	8.25	8.25	822	8.21	(A)				
DO (mg/L)	7.9	7.1	7,9	8.0	83	7.8	8.0					
Cond. (µmhos/cm)	224	209	207	209	209	210	210	and a state of				
Temp (°C)	24.7	25.7	24.7	245	24.7	24.7	24.1					
			1	F	inal	Contraction of the second		8.10				
рН	S-12 (27-23)	2.75	805	18.01	802	8.29	8.10	8098	8.10			
DO (mg/L)	and the second	8.2	8.9	7.9.	7.9	7.9	9.0	8.8	7.6			
Temp (°C)	a de lage	25.6	25:0	25.4	25.9	24.1	24.9	25.0	24.			

Concentration		Salt Control #1 (3.1ppt)											
Day	0	1	2	3	4	5	6	7	18				
			The part	Standing Street	A ROAD								
pH	7.75	7.80	7.76	7.78	7.87	7.87	8.12	a					
DO (mg/L)	7.9	8.2	8.9	8.6	8.7	8.4	8.0	C					
Cond. (µmhos/cm)	5750	5510	5530	55101	254520	5531	5610	The second second					
Temp (°C)	24.4	25.9	26.0	25.2	24.7	29.6	242						
		and the second		Fi	nal								
pH	Second State	7.97	8-13	8.03	7.99	8.02	8.05	8.01	7.99				
DO (mg/L)	and the second se	8.3	8.8	7.8	7.9	7.9	8.9	8.6	7.7				
Temp (°C)	All and Action	25,6	25.0	25.4	25.4	24:7	24.9	25.0	24.1				

[Concentration				10	0%]
	Day	0	1	2	3	4	5	6	7	18
	and the Manual Consider of		ARC REPORT		lni	llal		u se		
	рН	9.70	9.64	9.60	9.44	9.49	9.38	9.29	(4)	
	DO (mg/L) 🔥	103,48.4	8.7	8,9	8.6	9.0	8.6	86		
	Cond. (µmhos/cm)	5770	5600	5610	5510	5640	3610	5640	and the second	
	Temp (°C)	24.5	25.6	24.7	25.3	25.1	24.9	242	- weighter	
	and the second second	and the second			Fi	nal		8.33		
	рН	and all wither a the	8.34	8.40	8.45	8.52	8.23	8.1200	8.33	8.27
	DO (mg/L)		8.1'	9.0	7.9	7.9	1.9	8.0	8.0	7.8
	Temp (°C)	and the second	25.6	25.0	75.4	25.4	24.7	24.9	25.0	24.1
		0	1	2	3	4	5	6	7	_
Analysts	: Initial:	mc	AH	SH	MC	Ky	RG	sh		
	Final:	n de prime Prime prime	RG	SD	mc	Ry	pes	uc	Ø	
Commen	ts: Test not	tend	ed ni	tim	. 2-h	ours	of in	tiatio	n + i	ml.
no rene Animal S	wal dere on de ource/Date Received:	ац7, 00	Internal	imple/NA	`	An	imal Age a	t Initiation:	<24 Hou	irs
QC Chec	K: AH 8-17-0	4					Fin	al Review:	At 1	d17/04

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

A

B/2004

Client/Sample ID:	City of Buenaventura / A-2	Start Date: 07/21/2004	End Date:	07
Test No:	0407-051	Start Time: 1600	End Time:	13

Cono	Bon			Daily F	Reprodu	iction/ S	Survival			Total	QC
Conc.	Rep	1	2	3	4	5	6	7	8	TOLAI	
	1	Ø	0	O	7	9	8	0	0	24	
LC #1	2	O	0	6	0	6	11.	0	2-9	332/d	
	3	D	0	0	0	1	q .	0	0	c16	
	4	0	0	0	3	6	0	9	0-6	18 d	
	5	0	6	0	3	10	6.	0	D-0	(91d	
	6	0	0	0	4	10	3/0		-	7/d.	
Phone and the second	7	D	ð	6	4	0	410	-	-	8/0	
	8	0	0	6	Ö	2	4	0	0	6	OSH
	9	0	0	5	0	9	8	0	9	310	2
	10	0	0	0	0	6	2	Ö	D-4	12/d	
Analyst	me	RG	150	ne	RU	NS.	SH	RS	18	- /	

Conc	Pop			Daily F	Reprodu	uction/S	urvival			Total	00
conc.	Keh	1	2	3	4	5	6	7	8	Total	u cu cu
	1	OD	-	-	e			-	-	010	
SC #1 (3.1ppt)	2	0	0	0	0	0	0	0	0	0	OSH
	3	. 0	0	0	1	6	0	0	D-0	01d	
	4	00	-	•	-	-	-	_		010	
	5	´ 0	0	C	0	D-0	-			old.	
	6	0	0	0	0	D-4	-			4/0	
	7	0	0	0	4	0	2	8-0	-	Gld	
	8	0/0	10	-	-	-	-	-	-	old	
	9	0	0	6	3	8	5	D-0	-	16/d	
	10	00	-	-	-	-			-	hid	

Conc	Ren			Daily F	Reprodu	ction/ S	urvival			Total	00
oone.	Rep	1	2	3	4	5	6	7	8	Total	u C
	1	0/0	-	-	_	-	-	-	-	012	
100%	2	0	0	0	0	0	0	U	D-0		OSH
	3	0	Ø	6	0	0	0	0	10		
	4	0	নত		-	1					
	5	0/0	-	-	-	-	-		-		
	6	0	Q	0	D	0	0	0	0		
	7	0	old	-	-		-		-		
	8	0/0	-	-	-	-	~	-	-		
	9	0/0	-	-		(-				
	10	010	-	-				-	-	V	

Time Fed (day): (0) 1600 (1) 1430 (2) 1100 (3) 1110 (4) 1237 (5) 1306 (6) 1115 (7) 1547(8) 1310 Total Neonates coupted are from first 3 broads only. Comments: Final Review: AP 1017404 AH 8-17-04 QC Check:

Brood Selection Datasheet

Client/Sample ID:	City of Buenaventura / A-2	Start Date:	07/21/2004	
Test Number:	0407-051	Start Time:	.07/28/2004	1600
Test Species:	C. dubia			

Test Rep #	Bro Boa	od rd #	Cup #
1	3	Le	3
2			4
3			17
4			26
5			23
6			25
7			27
8			30
9			32
10	1	ł	33

Comments:

QC Check: AH 8-17-04

Final Review: <u>Att 10/17/04</u>

Test Summary: Page 1 of 1 Report Date: 23 Sep-04 10:32 AM Link:

CETIS Report

09-9167-6551/0407-052

Ceriodaphni	a 7-d Survival an	uction Test	B-1							AMEC B	ioassay SD	
Test:	14-5599-8866		Test Type:	Survival (96	ŝh)		Dura	ation:	7 Day	rs 21 Hou	rs	
Start Date:	21 Jul-04 04:00 F	M	Protocol:	EPA/821/R	-02-013 (20	02)	Spe	cies:	Cerio	daphnia du	ubia	
End Date:	29 Jul-04 01:10 P	M	Dil Water:	Diluted Min	eral Water (B:2)	Sou	rce:	In-Ho	use Cultur	e	
Setup Date:	21 Jul-04 04:00 P	M	Brine:									
Sample:	07-9699-9968		Material:	Estuarine M	Ionitoring Sa	mple	Clie	nt:	City o	f Buenave	ntura	
Sampled:	20 Jul-04 01:40 P	M	Code:	0407-052			Proj	ect:				
Received:	21 Jul-04 07:45 A	M	Source:	City of Buer	naventura							
Hold Time:	26 Hours (18.4 °C)	Station:	B-1								
Comparison	Summary											
Analysis	Endpoint		NOEL	LOI	EL	ChV	MSDp		Met	nođ		
07-8834-6325	96h Proportion	Survived	100	>10	0	N/A	N/A		Fish	er's Exact		
08-5329-8270)		100	>10	0	N/A	N/A		Fish	er's Exact		
13-0898-2306	5		100	>10	0	N/A	N/A		Fish	er's Exact		
96h Proporti	on Survived Sun	nmary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD		CV			
0	Lab Control	10	1.00000	1.00000	1.00000	0.00000	0.000	00	0.00%			
0	pH-adjusted C	10	0.50000	0.00000	1.00000	0.16667	0.5270)5	105.41			
0	Salt Control	10	0.80000	0.00000	1.00000	0.13333	0.4216	54	52.709	6		
100		10	1.00000	1.00000	1.00000	0.00000	0.000	00	0.00%			
96h Proporti	on Survived Deta	ail										
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 Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.0000	00	00000.1	1.00000	1.00000
0	pH-adjusted C	0.00000	1.00000	1.00000	0.00000	0.00000	1.00000	1.0000	00	0.00000	0.00000	1.00000
0	Salt Control	0.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.0000	00	00000.1	1.00000	1.00000
100		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.0000	00	00000.1	1.00000	1.00000



	Depart						Comparise Report Da	ons: te [.]	Page 1 of 3 23 Sep-04 10:32 AM
CEIIS		Analysis:		07-8834-6325					
Ceriodaphni	a 7-d Survival and f	Reproduction T					AMEC Bioassay SD		
Endpoint		Analysis Ty	pe	Sample Li	nk Co	ontrol Link	Date Analyzed		Version
96h Proportio	n Survived	Comparison		09-9167-6	551 09	-9167-6551	22 Sep-04 12:14	4 PM	CETISv1.024
Method		AIt H D	ata Transform		NOEL	LOEL	Toxic Units	ChV	MSDp
Fisher's Exac	t	C>T L	Intransformed		100	>100	1.00	N/A	
Group Comp	oarisons								
Control	vs Conc-%	Statistic	Critical	Decision(0.0	5)				
pH-adjusted (Co 100	1.00000	0.05000	Non-Significa	nt Effect				
Data Summa	iry								
Conc-%	Control Type	Non-Respond	lers Responde	rs Total Ob	served				
0	pH-adjusted Co	5	5	10					
100		10	0	10					
96h Proporti	on Survived								
	1.0 \		1.11						
	-								
E	0.8-								
it p	-								
opo	0.6-								
Pr Sur	-								
961	0.4								



0.2-

0.0

0

Conc-%

100

 Comparisons:
 Page 2 of 3

 Report Date:
 23 Sep-04 10:32 AM

 Analysis:
 08-5329-8270

	_								00 0020 0210	
Ceriodaphni	a 7-d Survival and	Reproductio	n Test B - (AMEC Bioassay SD	
Endpoint		Analysis Type		Sample L	ink Cor	ntrol Link	Date Analyzed		Version	
96h Proportio	n Survived	Comparison		09-9167-6551		167-6551 22 Sep-04 12:14		4 PM	CETISv1.024	
Method		Alt H	Data Transform		NOEL	LOEL	Toxic Units	Ch\	/ MSDp	
Fisher's Exac	t	C > T	Untransformed		100	>100	1.00	N/A		
Group Comp	parisons									
Control	Control vs Conc-%		Statistic Critical		Decision(0.05)					
Lab Control	100	1.00000	0.05000	Non-Significa	int Effect					
Data Summa	iry									
Conc-%	Control Type	Non-Resp	onders Responder	s Total Ob	served					
0	Lab Control	10	0	10						
100		10	0	10						
96h Proportion Survived										
	1.0									
ion	0.8									
port										
Proj urvi	0.6-	-								
S	0.4									
5	0.1									
	0.2-									
	0.0		100							
	0	Conc-%	0							
			-							

Comparisons: Page 3 of 3 Report Date: 23 Sep-04 10:32 AM . Analysis

13-0898-2306

							Anary 313.		10-0000-2000		
Ceriodaphnia 7-d Survival and Reproduction Test <u>B</u> –)									AMEC Bioassay SD		
Endpoint Analysis Type			Туре	Sample Link Control Link		ntrol Link	Date Analyzed		Version		
96h Proportio	n Survived	Comparison		09-9167-65	551 09-9	9167-6551	22 Sep-04 12:14 PM		CETISv1.024		
Method		Alt H Data Transform			NOEL	LOEL	Toxic Units Ch\		MSDp		
Fisher's Exac	t	C > T	Untransformed		100	>100	1.00	N/A			
Group Comp	parisons										
Control vs Conc-%		Statistic Critical		Decision(0.05)							
Salt Control	100	1.00000	0.05000	Non-Significant Effect							
Data Summa	iry										
Conc-%	Control Type Non-Responders Responde		ers Total Observed								
0	Salt Control	8	2	10							
100		10	0	10							
96h Proportion Survived											
	1.0										
lion	0.8-										
port											
Pro	0.6										
96h S	0.4										
	0.2-										
	0.0	1	100								
		Conc-%	D								
				2.2.2.2.2.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4							



Water Quality Measurements

• ..

Client:	City	ag Bu	enau	entur	a Test S	Species:	C.	Libia		
Sample ID:	>H ad	justed	? Salt	Contra	Э) Те	est Date:	7-21-	04		
Test No:	0407-	-051	7054	r ·	Start/End	d Times:	1600	/130	0	
Concentration	ptta	djust	ed Sc	it c	ritrol	•••••••		,]	~	
Day	0	1	2	3	4	5	6	7	8	
nH	Q.52	9 62	915		963	Que	9 (16			
DO (mg/L)	8.9	9,3	8.9	8.4	8.8	8.4	8.2	10		
Cond. (µmhos-cm)	5760	5590	5580	5520	5580	5582	5590			
Temp (°C)	24.4	24.7	24.1	24.6	24.4	24.6	24.1	1		
				Fi	ual		_			
pH		8.30	8.33	8.37	8.41	8.92	8.3	8.43	8.51	
DO (mg/L)	4	0.2	175 12	D-X-	-1.4	200	9.2	8.8	24	
		19.4	04.2.0	125.4	esay	29,7	24.9	23.0	27.1	
				10-7.8	- 1					
Concentration										
Day	0	1	2	3	4	5	6	7		
				lni	tiał					
рН										
DO (mg/L)]		
Cond. (µmhos-cm)										
Temp (°C)	1		1			1				
		1	·	Fi	rai	r				
	4									
	-	25-10						+		
(Temp (C)	1	1,0	1					.I		
	T									
Concentration										
Day	0	1	2	3	4	5	6			
-11	T	1	Τ	ini I	tiał	I				
								-		
								-		
Temp (°C)								-		
Temp (C)	1	1	1	Fi	nal	1		*		
На	Τ			••						
DO (mg/L)	1		1							
Temp (°C)		25.6								
	0		•	•			<u> </u>	-		
		7	2	3	4	<u> </u>	b			
Analysts: Initial:	me	AH	SH	me	AH	RS	SH			
Final		Rц	SD	MC	Ry	123	ue			
comments: pH adjusted to ~9,6 to match site A-2 with highest ptt.										
Animal Source/Date Received:										
ac check: Att 8-17-04 (D) no reneuted on day7, out of sample. Final Review: Att 10/17/04										
~ .

Client/Sample ID: Test No:	Cđ.	Start Time: 1600							04 V		End Date: End Time:	7-29-04 1310
	1_	1		Daily F	Reprodu	ction/S	urvival					
Conc.	Rep	1	2	3	4	5	6	7	8	Total	QC	
ptladjust		0/0	-	-	-	-			1	old		
Fall-1(cm	$\frac{2}{3}$	0	6	6	$\frac{0}{2}$	0	0/0			010		
	4	0	old	-	-	-		-	-			
	5	0	op			- Ch		-	-			
	7	0	6	0	6	010	0	0	0-0			
	8	019		-	~	-	/		-			
	9	0/9	~	à	2	<u> </u>		ò	0-0	$\lambda_{l'}$	054	
Analyst	M10	Ki,	SD	110	Ru	112	5#	12	12	- V	034	
	1100			NCO				-		,		
Conc.	Rep			Daily F	Reprodu	iction/S	urvival			Total	QC	
		1	2	3	4	5	6	7	8			
	2										2	
	3											
	4											
	6											
	7											
	8											
	10											
Cono	Bon	Γ		Daily I	Reprodu	ction/ S	urvival			Total	00	
conc.	Rep	1	2	3	4	5	6	7	8	TOtar	40	
	1										×	
	2											
	4											
	5											
	6											
	8										N	
	9											
	10								l		14	
Time Fed (day): (0 <u>) \ (و (</u> ک		<u>30 (2)</u>	1100	(3)[15_(4)_[3	<u>30</u> (5)_	1300	(6) <u>}}</u>	í (7)_ <u>l</u>	547 (8) 13(0)
Comments:												
QC Check: AH 8-1	7-a	ł							Final	Review:	AH 10/71	54

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>C. dubia</u>	
Sample ID:	B-1	Start Date/Time: 07/21/2004	1600
Test No:	0407-052	End Date/Time: 07/28/2004	1310
		Att	

Concentration		Lab Control #2									
Day	0	1	2	3	4	5	6	7	8		
			and the second	Ini	itial						
рН	8.24	8.24	8.28	8.26	8-25	B 22	8.24	(A)			
DO (mg/L)	7.5	94.7	7.9	8.0	8.3	7.8	8.0				
Cond. (µmhos/cm)	238	209	209	206	209	210	216				
Temp (°C)	24.8	25.1	25-0	249	24.7	24.7	24.5	Allow States			
				FI	nal						
рН		297	8.03	8.04	8.05	8.08	8.13	18.13	8.14		
DO (mg/L)		8.2	85	7.8	27	7.6	9.0	2.8	7,8		
Temp (°C)		25.6	25.0	25.4	25 M	24,7	24.9	25.0	24.1		

Concentration	Salt Control #2 (1.1ppt)									
Day	0	1	2	3	4	5	6	7	8	
		The States	And the second	in In	tial					
pН	7.56	7.65	7.52	7.57	7.59	1.60	8-16	A		
DO (mg/L)	7.9	8.1	8.7	8.7	8.3	8.6	8.0	and the second		
Cond. (µmhos/cm)	2440	2350	2370	2370	2370	2360	2070			
Temp (°C)	24.8	25.9	26.0	25.6	24.9	24.9	24.5			
	a ser an a		0.0	Fi	nal		Provinsion in the			
рН		802	8.15	8.10	7.99	8.20	8.08	12.01	8.0-	
DO (mg/L)		8.3	9.0	7.9	7.7	7.7	8.9	8.8	8.3	
Temp (°C)	and the second	25.6	25.D	25.4	25.4	24.7	24.9	25.0	24,1	

	Concentration				10	0%				
	Day	Q	1	2	3	4	5	6	7	8
				And the state of the	Ini	tial			States of the states	
	pH	7.93	7.96	7.95	8.06	810	7.99	10.8	(A)	
	DO (mg/L)	8.1	8.7	8.7	8.7	8.7	8.3	8-5		
	Cond. (µmhos/cm)	2700	2600	2620	2630	2660	2640	2620	and the state of the	
	Temp (°C)	24.5	25,8	26.4	25.5	25.1	24.9	24.3	and the strength	
		Statis Alex	and the second	and the second	Fi	nal				
	pH	and a grant and the set	8.38	8.44	8.48	8.59	8.36	8.49	8.39	8.41
	DO (mg/L)		8.1	8.9	7.9	7.9	1.6	9.0	8.6	8.0
	Temp (°C)		25.6	25.0	25.4	25.4	24.7	24.9	25.0	24,1
						1				•
		0	1	2	3	4	5	6	7	
Analysts	: Initial:	ME	Ан	SH	me	Ry	RG.	SM		
	Final:		Ry	SD	me	RY	B	uc	22	
Commer	nts: Time at	test	end	not	with	nn	2-ho	ivrs z	of m	tation
(A) No r Animal S	enewall done on Source/Date Received:	day -	Internal	- sampi NA	ę.	An	imal Age a	t Initiation:	<24 Hou	rs
QC Check: $AH B - 17 - 04$ Final Review: $AH 10/17/04$										

Client/Sample ID:	City of Buenaventura / B-1	Start Date:	07/21/2004
Test No:	0407-052	Start Time:	1600

End	Date:	-
End	Time:	-

29 07/28/2004 1310

Conc	Pan			Daily I	Reprod	uction/ S	urvival			Total	00
conc.	Kep	1	2	3	4	5	6	7	8	Total	40
	1	Ø	0	0	2	D-0	-			20	
LC #2	2	0	0	4	0	6	12/0	OTAS	-	22/d	
	3	0	υ	0	4	8	0	0	Ö	12	
	4	0	6	0	6	0	3	0-6	-	15/d	
	5	0	6	0	2	6	6	D	D-0	14/0	OSH
	6	0	0	6	5	0	2/2	-	~	71d	
	7	0	8	0	6	1.	0	D-7	-	20/d	
	8	0	C	2	3	5-0	-	-		5/d	
	9	0	0	0	3	D	8	D-0	-	11/20	
	10	0	0	0	0	5	4	Q	6	15	
Analyst	me	Rb	SA	NO	26	22	SH	125	82		

Conc	Pen			Daily F	Reprod	uction/ S	urvival			Total	00
conc.	Keh	1	2	3	4	5	6	7	8	Totar	w.c
	1	OD	-	-	-	-		-	-	old	
SC #2 (1.1ppt)	2	10	0	. 7	0	90	10	0	10	36	
	3	0	0	0	0	18	0	6	Del	15/d	
	4	0	0	0	Ô	Š	10	0	D-0	15/d.	
	5	0	0	4	Ď	9	3	0	5-0	16/d.	OSH
	6	O/D	-	-	-	1'-	-	-	1	old.	
	7	0	0	0	6	11	40	~	•	ITId.	-
	8	0	0	3	ð	5	1	10	11	#321	2
	9	0	0	0	2	6	7	0	D-18	281 d	15/d
	10	0	0	0	4	8	0	8	D-8	28/8	201d

Conc	Ren			Daily F	Reprodu	uction/ S	urvival			Total	20
conc.	nep	1	2	3	4	5	6	7	8	10tai	
	1	0	0	4	0	6	5	0	11	28	
100%	2	0	0	6	6	9	0	12	5	32	
	3	0	0	0	7	10	3	0-4	-	20/d	
	4	0	0	0	1	8	0	15	0	30	
	5	0	0	5	0	9	10	11	D-0	35/d	
	6	0	0	6	ð	8	0	10	1	33	10 SH
	7	Ŏ	D	2	5	12	0	15	Ó	34	
	8	0	0	D	D	D-0				Old	
	9	U	0	0	0	12	OD		-	12/d	
	10	0	0	0	3	Ŧ	0	5	10	25	

Time Fed (da	y): (0) 160 (1)[430 (2)]	100 (3) 115	(4) 1245	(5) 1300	(6 <u>) 15</u>	(7) 1548 (8)	1310
To fat Comments:	Neonates	counter	are from	the 1	first 3	broods	only.	
QC Check:	Att 8-17-0	4	U			Final Rev	iew: <u>A#/o</u>	17/04

Brood Selection Datasheet

Client/Sample ID:	City of Buenaventura / B-1	Start Date:	07/21/2004	
Test Number:	0407-052	Start Time: _	-07/28/2004	1600
Test Species:	C. dubia			

Test Rep #	Brood Board #	Cup #
1	36	3
2		4
3		1(
4		20
5		23
6		25
7		27
8		36
9		32
10	┢	33

Verified by:

Comments:

QC Check: Att 8-17-04

Final Review: Att 10/17/04

Test Summary: Page 1 of 1 Report Date: 23 Sep-04 10:34 AM 17-5454-3182/0407-053

Link:

CETIS Report

Ceriodaphnia	eriodaphnia 7-d Survival and Reproduction Test $B-3$ AMEC Bioassay SD											
Test: Start Date: End Date: Setup Date:	14-5599-8866 21 Jul-04 04:00 P 29 Jul-04 01:10 P 21 Jul-04 04:00 P	M M M	Test Type:Survival (96h)Protocol:EPA/821/R-02-013 (2002)Dil Water:Diluted Mineral Water (8:2)Brine:					ation: cies: rce:	7 Days 21 Hou Ceriodaphnia di In-House Cultu	rs ubia re		
Sample:19-1973-1584Material:Estuarine Monitoring SampleSampled:20 Jul-04 10:40 AMCode:0407-053Received:21 Jul-04 07:45 AMSource:City of BuenaventuraHold Time:29 Hours (18.2 °C)Station:B-3							Clie Proj	nt: ect:	City of Buenave	ntura		
Comparison	Summary											
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp		Method			
01-0466-3846	96h Proportion	Survived	100	>10	0	N/A	N/A		Fisher's Exact			
08-3665-7121			<100	100	1	N/A	N/A		Fisher's Exact			
15-4630-2471			100	>10	0	N/A	N/A		Fisher's Exact			
96h Proportio	on Survived Sun	nmary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	C	v			
0	Lab Control	10	1.00000	1.00000	1.00000	0.00000	0.000	0 00	.00%			
0	pH-adjusted C	10	0.50000	0.00000	1.00000	0.16667	0.5270	05 1	05.41			
0	Salt Control	10	0.60000	0.00000	1.00000	0.16330	0.5164	40 8	6.07%			
100		10	0.40000	0.00000	1.00000	0.16330	0.516	40 1	29.10			
96h Proportio	on Survived Deta	lit				//////////////////////////////////////						
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 Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0 1.00000	1.00000	1.00000	
0	pH-adjusted C	0.00000	1.00000	1.00000	0.00000	0.00000	1.00000	1.00000	0.00000 0	0.00000	1.00000	
0	Salt Control	0.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000	0.00000 0	1.00000	0.00000	
100		0.00000	1.00000	1.00000	1.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	



CETIS	Report			Comparis Report Da Analysis:	ons: ite:	Page 1 of 3 23 Sep-04 10:34 AM 01-0466-3846			
Ceriodaphnia	a 7-d Survival and	Reproductio	n Test B-3						AMEC Bioassay SD
Endpoint		Analysis	Туре	Sample Li	nk (Control Link	Date Analyzed		Version
96h Proportior	n Survived	Comparis	on	17-5454-3	182 1	7-5454-3182	22 Sep-04 12:1	2 PM	CETISv1.024
Method		Alt H	Data Transform		NOEL	. LOEL	Toxic Units	Ch\	/ MSDp
Fisher's Exact		C > T	Untransformed		100	>100	1.00	N/A	
Group Comp	arisons vs Conc-%	Statistic	Critical	Decision/0.0	5)				
Salt Control	100	0.32814	0.05000	Non-Significa	nt Effec	ət 👘			
Data Summa Conc-% 0	ry Control Type Salt Control	Non-Respo	onders Responde 4	ers Total Ob 10	served				
96h Proportio	on Survived				<u></u>				
96h Proportion Survived	0.8 0.6 0.4- 0.2 0.0 0		100	1					
		Conc-%	D						



CETIS Repor	t					Compariso Report Da Analysis:	ons: te:	Page 2 of 3 23 Sep-04 10:34 AM 08-3665-7121
Ceriodaphnia 7-d Survival a	nd Reproduction Tes	B-3						AMEC Bioassay SD
Endpoint	Analysis Type		Sample Lin	k C	ontrol Link	Date Analyzed		Version
96h Proportion Survived	Comparison		17-5454-31	32 1	7-5454-3182	22 Sep-04 12:12	2 PM	CETISv1.024
Method	Alt H Data	Transform		NOEL	LOEL	Toxic Units	Ch\	/ MSDp
Fisher's Exact	C > T Untr	ansformed		<100	100		N/A	
Group Comparisons								
Control vs Conc-%	Statistic	Critical	Decision(0.05)				
Lab Control 100	0.00542	0.05000	Significant Effe	ect				
Data Summary								
Conc-% Control Typ	e Non-Responders	Responder	s Total Obs	erved				
0 Lab Control	10	0	10					

10

6

96h Proportion Survived

100



4



CETIS F	Report						Compariso Report Dat Analysis:	ons: te:	Page 3 of 3 23 Sep-04 10:34 AM 15-4630-2471
Ceriodaphnia 7-d	l Survival and F	Reproductio	n Test B-3						AMEC Bioassay SD
Endpoint		Analysis	Туре	Sample L	ink Co	ntrol Link	Date Analyzed		Version
96n Proportion Su	rvived	Comparis	on	17-5454-3	182 17-	5454-3182	22 Sep-04 12:12		CETISVI.024
Method Fisher's Exact		Alt H C > T	Data Transform Untransformed		NOEL 100	>100	Toxic Units	ChV N/A	MSDp
Group Comparise Control vs pH-adjusted Co	ons Conc-% 100	Statistic 0.50000	Critical 0.05000	Decision(0.0 Non-Significa	5) ant Effect				
Data Summary Conc-% C	Control Type	Non-Respo	onders Responder	rs Total Ot	oserved				
100		4	6	10					
96h Proportion S	urvived								
0.6 c 0.5	5	7							
roportio	- -								
4 496 0.3 0.2	2-								
0.1									



0

Conc-%

100

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>C. dubia</u>	
Sample ID:	B-3	Start Date/Time: 07/21/2004 いしょくり	
Test No:	0407-053	End Date/Time: 07/28/2004 13/6	-
		AH	Ī

Concentration	Lab Control #1											
Day	0	1	2	3	4	5	6	7	18			
	to the section of the section	the Carlo and		In In	itial							
рН	8.09	18.24	8.28	8.25	8.25	8.22	8,21	A				
DO (mg/L)	7.9	7.7	7.9	8.0	83	7.8	8.0					
Cond. (µmhos/cm)	224	209	207	209	209	210	210					
Temp (°C)	24.7	257	24.7	24.5	24.7	24.7	24.1	The second second				
		and the second second		Fi	nal 8.02	£4			T Margaret			
рН	and the second second	7.75	8.05	8.01	8-50	8.29	8.10	8.00	8.1			
DO (mg/L)	fair and the second	8.2	8.9	7.9	7.9	7.8	9.0	8.8	7.6			
Temp (°C)		25.6	25.0	25.4	2524	29.7	24.9	25.0	24.			

Concentration		Salt Control #1 (3.1ppt)											
Day	0	1	2	3	4	5	6	7	18				
With Street Street		A State of the second	Without the Start	Ini	tial	7.87		and the second second					
рН	7.75	7.80	7.76	7.70	7.87	7.80	8,12	A					
DO (mg/L)	7.9	8.2	8.9	8.6	6.7	8.4	8.0	and the second					
Cond. (µmhos/cm)	5750	5510	5530	5510	5520	5531	5610	APPALY OF A STATE					
Temp (°C)	24.4	23.9	26.0	25.2	24.7	24.6	24.2	成为194 4年2月					
	1 Property and		Contraction of the	Fi	nal								
pH		7.97	5.11	8.03	7.99	8.02	8.05	8.02	7.99				
DO (mg/L)		3.3	8.8	7.8	7.9	7.7	8.9	8.8	7,7				
Temp (°C)	· HILL CONTRACT	25.6	25.0	25.4	25-4	24.7	24.9	25.0	24.1				



					29
Client/Sample ID:	City of Buenaventura / B-3	Start Date:	07/21/2004	End Date:	07/28/2004
Test No:	0407-053	Start Time:	11000	End Time:	AH
			10.00		1310

Conc	Pan			Daily F	Reprodu	ction/ S	Survival			Total	00
Conc.	Rep	1	2	3	4	5	6	7	8	Total	QC.
	1	0	0	0	27	9	8	0	0	24	
LC #1	2	0	6	6	90	6	11	0	D-9	23/d	
	3	\mathcal{O}	6	0	40	1	9	0	0	16	
	4	0	Õ	0	63	6	0	9	D-6	180	
	5	O	0	6	23	(0	6	0	D-0	19/2	
	6	0	0	6	54	0	3/0		1	7/d	
	7	0	0	0	64	0	4/0	-	-	81d	
	8	0	0	O	\$10	2	4	0	Q	6	OSH
	9	0	0	5	0 11	9	8	0	9	22	
	10	Ŭ	0	Ô	0	6	2	O	D-4-	12/d	
Analyst	me	RG	Ge	nec	Rg	125	SH	22	RS		

Cono	Pen			Daily F	Reprodu	ction/S	urvival			- Total	00
Conc.	Rep	1	2	3	4	5	6	7	8	Total	40
	1	OD	•	-	-	-	-	-	-	0/0	
SC #1 (3.1ppt)	2	10	6	6	0	0	O	0	0	U	OSH
	3	\circ	Ø	6	1	0	0	0	D-0	Vd	
	4	010	1	-	-	-	-	-	(010	
	5	` 0	0	0	0	OID	-	1	ŧ	old	
and the second	6	0	Q	8	0	4/0	-	-	1	HId	
	7	0	Ö	0	φ	Ó	2	B2D	-	610	
	8	0/0	1	-	1	-	-	-		old	
	9	0	0	0	3	8	5	0,500	-	16/d	
	10	DID	-	-	_	-		-	-	old	

Conc	Rep			Daily F	Reprodu	ction/ S	urvival			Total	00
00110.	Кер	1	2	3	4	5	6	7	8	1000	40
	1	010	-	-	-	-	-)	-	old	
100%	2	0	0	4	2	0	0	D-O		61d	
	3	D	0	0	4	B	0	D	D-0	12/d	ost
	4	0	Ð	0	Ø	4	910	ł	(HID	
	5	0	0	0	D/C	-	1	1		Old	
	6	Õ	0/2	-		-	,	1	-	01d.	
	7	0	0	0	2	7	0	0	D-0	9/d	
	8	01.0		-	1	f	į	1	1	old	
	9	0/0					1	i	-	1.	
	10	2	010			-	-	I	1	8	

Time Fed (da	y): (0) <u>1600</u>	(1) <u> </u>	100 (3)	1115 (4) 1245	(5)	<u>1306 (6)11:5 (7)</u>	1548 (8) 1310
Comments:	Peonates	counter	d are	from	first	3	broods only	•
QC Check:	AH 8-17	-ay		0.12			Final Review:	AH 10/17/04

Brood Selection Datasheet

Client/Sample ID:	City of Buenaventura / B-3	Start Date:	07/21/2004
Test Number:	0407-053	Start Time:	07/28/200 4 പ്രശാ
Test Species:	C. dubia		

Test Rep #	Br Bo	ood ard #	Cup #
1	3	له	3
2			4
3			(
4			20
5			23
6			25
7			27
8			36
9			32
10	``	ł	33

Verified by: Att

Comments:

QC Check: Alt 8-17.04

Final Review: AH 1017/04

CETIS	S Report	•						Repo Link:	rt Date:	23 Sep 12-7262-40	-04 10:35 AM 031/0407-054
Ceriodaphni	a 7-d Survival an	d Reprod	uction Test	C-2	-					AMEC B	lioassay SD
Test: Start Date: End Date: Setup Date:	14-5599-8866 21 Jul-04 04:00 F 29 Jul-04 01:10 F 21 Jul-04 04:00 F	M M M	Test Type: Protocol: Dil Water: Brine:	Survival (96 EPA/821/R Diluted Min	5h) -02-013 (20 eral Water (02) 8:2)	Duratio Species Source	n: 7 Da s: Cerio : In-Ho	ys 21 Ho odaphnia c ouse Cultu	urs dubia ure	
Sample: Sampled: Received: Hold Time:	14-3932-3197 20 Jul-04 09:35 A 21 Jul-04 07:45 A 30 Hours (18.5 °C	.M .M 2)	Material: Code: Source: Station:	Estuarine M 0407-054 City of Buer C-2	lonitoring Sa naventura	ample	Client: Project	City :	of Buenav	entura	
Comparison Analysis	Summary Endpoint		NOEL	LOI	EL	ChV	MSDp	Met	thod		
04-5472-3169 06-5697-868 10-0807-314	9 96h Proportion 8 1	Survived	100 100 <100	>10 >10 100	10 10	N/A N/A N/A	N/A N/A N/A	Fist Fist Fist	ner's Exac ner's Exac ner's Exac	t t t	
96h Proporti Conc-%	on Survived Sun Control Type	nmary Reps	Mean	Minimum	Maximur	n SE	SD	cv			
0 0 0 100	Lab Control pH-adjusted C Salt Control	10 10 10 10	1.00000 0.50000 0.60000 0.50000	1.00000 0.00000 0.00000 0.00000	1.00000 1.00000 1.00000 1.00000	0.00000 0.16667 0.16330 0.16667	0.00000 0.52705 0.51640 0.52705	0.00% 105.4 86.07 105.4	6 1 1% 1		
96h Proporti	on Survived Deta	ail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6 R	ep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000 1.	00000	1.00000	1.00000	1.00000
0	pH-adjusted C	0.00000	1.00000	1.00000	0.00000	1.00000	1.00000 1.	00000	0.00000	1.00000	0.00000
100	Sall Control	0.00000	1.00000	1.00000	0.00000	1.00000	1.00000 0.	00000	0.00000	1.00000	0.00000

Test Summary:

Page 1 of 1

CETIS	Report						Comparis Report Da Analysis:	ions: ate:	Page 1 of 3 23 Sep-04 10:35 AM 04-5472-3169
Ceriodaphni	a 7-d Survival and	Reproductio	n Test 🕜 – Ə	<u> </u>					AMEC Bioassay SD
Endpoint		Analysis	Туре	Sample Li	ink C	ontrol Link	Date Analyzed		Version
96h Proportio	n Survived	Comparis	on	12-7262-4	031 12	2-7262-4031	22 Sep-04 12:0	7 PM	CETISv1.024
Method		Alt H	Data Transform		NOEL	LOEL	Toxic Units	Ch\	/ MSDp
Fisher's Exac	t	C > T	Untransformed		100	>100	1.00	N/A	
Group Comp	oarisons								
Control	vs Conc-%	Statistic	Critical	Decision(0.0	5)				
Salt Control	100	0.50000	0.05000	Non-Significa	int Effect				
Data Summa	iry								
Conc-%	Control Type	Non-Respo	onders Responde	ers Total Ob	served				
0	Salt Control	6	4	10					
100		5	5	10					
96h Proporti	on Survived								
	0.8-								
E E									
ed	0.6-								
rviv V									
Su	0.4								
96									
	0.2-								
	0.0	T	100	1					
		Conc-%	0						



CETIS	Report						Comparis Report Da Analysis:	ons: ite:	Page 2 of 3 23 Sep-04 10:35 AM 06-5697-8688
Ceriodaphnia	a 7-d Survival and	Reproductio	on Test C - Ə	、 、					AMEC Bioassay SD
Endpoint	- Cupilized	Analysis	з Туре	Sample Li	nk C	ontrol Link	Date Analyzed	7.014	Version
9611 Proportion		Compans	son	12-7202-4	031 12	2-7262-4031	22 Sep-04 12:0		CETISV1.024
Method		Alt H	Data Transform		NOEL	LOEL	Toxic Units	Ch	/ MSDp
Fisher's Exact	t	C > T	Untransformed		100	>100	1.00	N/A	
Group Comp	arisons								
Control	vs Conc-%	Statistic	Critical	Decision(0.0	5)				
pH-adjusted C	.0 100	0.07100	0.05000	Non-Significa	nt Effect				
Data Summa	ry								
Conc-%	Control Type	Non-Resp	onders Responde	rs Total Ob	served				
0	pH-adjusted Co	5	5	10					
100		5	5	10					
96h Proportio	on Survived								
	0.6-								
	0.0								
Ę	0.5-								
d ti									
opo	0.4-								
Pro Sur	0.3-								
96h									
	0.2								
	0.1								
	0.1								
	0.0								
	0		100						
		Conc-%	0						



 Comparisons:
 Page 3 of 3

 Report Date:
 23 Sep-04 10:35 AM

 Analysis:
 10-0807-3141

	report						Analysis:		10-0807-3141
Ceriodaphn	ia 7-d Survival and	Reproduction T	est C-Z						AMEC Bioassay SD
Endpoint		Analysis Ty	pe	Sample Li	nk Co	ntrol Link	Date Analyzed		Version
96h Proporti	on Survived	Comparison		12-7262-4	031 12-	7262-4031	22 Sep-04 12:07	PM	CETISv1.024
Method		Alt H D	ata Transform		NOEL	LOEL	Toxic Units	ChV	MSDp
Fisher's Exa	ot	C>T U	ntransformed		<100	100		N/A	
Group Com	parisons								
Control	vs Conc-%	Statistic	Critical	Decision(0.0	5)				
Lab Control	100	0.01625	0.05000	Significant Ef	fect				
Data Summ	ary								
Conc-%	Control Type	Non-Respond	lers Responde	ers Total Ob	served				
0	Lab Control	10	0	10					
100		5	5	10					
96h Proport	ion Survived								
	1.0								
5	0.8-								
/ed									
rop	0.6								
St St									
Ő	0.4-								
	0.2-								
	0.0			1					
	0		100						
		Conc-%							



Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u><i>C. dubia</i></u>	
Sample ID:	C-2	Start Date/Time: $\frac{07/21/2004}{29}$	-
Test No:	0407-054	End Date/Time: 07/28/2004 1310	
		AH	

Concentration	Lab Control #1									
Day	0	1	2	3	4	5	6	7	18	
				In	itial	1 41 - 1 M	Contraction of the second		3	
рН	8.09	8.24	8.28	8.25	8.25	8,22	8.2	A		
DO (mg/L)	7.9	7.7	7.9	8.0	8.3	7.9	8.0			
Cond. (µmhos/cm)	224	209	207	209	209	218	210			
Temp (°C)	24.7	25,8	247	24.5	24.7	24.7	24.1	765 22 7 - 0		
				Fi	nal					
рН		7.75	8:05	8.01	802	8.29	5.10	8.10	8,11	
DO (mg/L)	a start of	82	89	7.9	7.9	7.6	9.0	8.8	7, 6	
Temp (°C)		25.6	25.0	25,4	25.4	24.7	24.9	25.0	24,	

Concentration		Salt Control #1 (3.1ppt)										
Day	0	1	2	3	3 4 5			7				
	The second	13 - 5 M	and the seal	Ini	tial							
pН	7.75	7.80	7.76	7.78	7.87	127.87	8.12	a				
DO (mg/L)	7.9	8.2	8.9	8.4	8.7	1.8.1	8-0	4				
Cond. (µmhos/cm)	5750	5510	5530	5510	5520	20 5531	5610					
Temp (°C)	24.4	25.9	26.0	25.2	24.7	24.6	24.3	the state of the				
and the second second	and the second	States and a	and the second	F	nal							
pН		7-97	8.11	8.03	7.99	8.02	8.05	8.01				
DO (mg/L)	Child Line of any of the	8.3	818	7.8	7.9	7.8	8.9	8.6				
Temp (°C)	15152215 155	25.6	25.0	25.4	25.4	24.1	24.9	25.0				

	Concentration				10	0%				
	Day	0	1	2	3	4	5	6	7	8
	and the state of the state of the		All a Marine	Standing and	Ini	tial		All Street Areas	Starting 1	
	pH	9.14	9,03	9,01	8.89	891	8.85	8.67	B	
	DO (mg/L)	8.9	8.)	8,4	8.5	8.6	3.7	8.6		
	Cond. (µmnos/cm)	5540	5320	5330	5330	5 330	5 390	5410		
1		25.0	125.0	24.6	125.4	25.2	25.3	24.3		
	Цa		\$ 71	526		DUA	1925	4 32	220	212
	DO (ma/L)		79	an	0.5T	70	7.9	88	33	8.1
	Temp (°C)		261	250	15.4	5511	247		25.0	ed i
1			67.10	0.0	23.4	13.4		2-1-1	63.0	104.1
		0	1	2	3	4	5	6	7	
Analysts	: Initial:	me	AH	514	me	Ry	£49	sh	and the second	
	Final:		RY	SD	MC	ky	ps.	HC	PS	
comments: Test not ended within 2 hours of initiation time.										
(A) No re Animal S	newcl done on source/Date Received:	day 7	محب م Internal	of sa~ ∕NA	ple.	An	imal Age at	t Initiation:	<24 Hou	Irs
QC Chec	K: AH 8-17	104					Fin	al Review:	AHIC	17/04

2004

310

Client/Sample ID:	City of Buenaventura / C-2	Start Date: 07/21/2004	End Date:
Test No:	0407-054	Start Time: 1600	End Time:

Cono	Bon				Total	00					
Conc.	Kep	1	2	3	4	5 .9	6	7	8	Total	40
	1	6	0	0	7	89	8	U	0	17	4 2.
LC #1	2	0	0	6	0	6	N	υ	D-9	32/0	230
	3	0	0	0	0	7	9	0	Ó.	16	
	4	0	0	6	3	6	0	9	0-6 F	0#/d	18/d
and the second	5	0	0	0	3	105	+316	+0	040	19/0	
	6	0	0	Ō	4	0	BID	-	-	7/d	
	7	0	0	0	4	0	410	-	-	8/d	
	8	0	0	0	0	2	548 4	0	0	.6	OSH
	9	0	0	5	0	9	8	0	9 "	134 9	-2
Care Wile Cools	10	0	0	0	0	6	2	0	D-4	12/0	
Analyst	ALC	P6	SO	me	Ry	123	SH	18	NS		

Cono	Pop		Daily Reproduction/ Survival									
Conc.	Keh	ing a start	2	3	4	5	6	7	8	Total	40	
	1	do	-	-	-				~	old		
SC #1 (3.1ppt)	2	6	0	0	0	0	0	0	0	0	OSH	
	3	0	0	0	(0	0	0	D-0	1/d		
and the second	4	D/D	-	-	-	- 1	-	-	-	0/1		
	5	Ъ	0	0	6	OID	-	-	*	0/d		
and the second second	6	D	0	0	0	HID	-	-02	-	41d.		
A Charles	7	D	6	6	Y	0	2	D-02	1	61d		
	8	Olo	-	-	-	-	-	-100	-	010		
	9	6	0	0	3	8	5	0'5	-	16/d		
	10	0/0	~	+	-	-	-	-	-	old		

Conc	Rep			Daily F	Reprodu	iction/ S	urvival			Total	20
cono.	nop	1	2	3	4	5	6	7	8	10tai	
	1	0/0	-	-	-	-	-	-	-	0/d	
100%	2	6	0	O	D	5	5	Dru	-	10/d	
	3	0	Q	0	D	3	2/0	-	-	51d	
	4	0	old	1	1		-	-	1	old	
	5	0	12	0	D	7	4	0	0	.11	
	6	D		6	2	6	1	O'	5	149	0 SH
	7	D,	old	1	1		-		1	old	
	8	0/0	- '	-	-	-			-	0/d	
	9	Ū,	0	D	D	D	1	Ö	O	1	
	10	00	-	-		-	-		-	old	

Time Fed (day)): (0) 1 (2) (1) 1430 (2) 1100 (3) 1115 (4) 1330 (5) 1213	(6) 1115 (7) 1548 (8) 1310
Comments: 1	Stonates counted are from the first 3	bracks only.
QC Check:	AH 8-17-04	Final Review: <u>AH 10/17/04</u>

Brood Selection Datasheet

Client/Sample ID:	City of Buenaventura / C-2	Start Date:	07/21/2004	
Test Number:	0407-054	Start Time:	07/28/2004	1600
Test Species:	C. dubia			

Test Rep #	Br Boa	ood ard #	Cup #
1	3	لو	3
2			4
3			11
4			20
5			23
6			25
7			27
8			36
9			32
10	0		33

Verified by: <u>AH</u>

Comments:

Final Review: _AH 10/17/84

S. CAPRICORNUTUM

Test Summary: Page 1 of 1 Report Date: 23 Aug-04 3:43 PM 07-5136-7464/0407-055 Link:

Selenastrum	Growth Test	A- 7	L					AMEC Bioassay SD
Test:	17-4198-9895		Test Type:	Cell Growth			Duration:	4 Days 1 Hours
Start Date: 2	21 Jul-04 04:40 F	M	Protocol:	EPA/821/R-	-02-013 (200	2)	Species:	Selenastrum capricornutum
End Date:	25 Jul-04 05:40 F	PM	Dil Water:	Nutrient En	riched Water	r	Source:	In-House Culture
Setup Date: 2	21 Jul-04 04:40 F	PM	Brine:	Frozen Sea	water			
Comment:	Salt Control #1 =	3.1 ppt						
Sample:	03-0936-6046		Material:	Estuarine N	Ionitoring Sa	Imple	Client:	City of Buenaventura
Sampled: 2	20 Jul-04 02:50 F	PM	Code:	0407-055			Project:	
Received: 2	21 Jul-04 07:45 A	٨M	Source:	City of Buer	naventura			
Hold Time: 2	26 Hours (19.3 °C	C)	Station:	A-2				
Comparison	Summary							
Analysis	Endpoint		NOEL	LOE	EL	ChV	MSDp	Method
01-8697-3595	Cell Density		100	>10	0	N/A	0.38250	Equal Variance t
04-9747-8215			100	>10	0	N/A	0.49391	Equal Variance t
03-5566-8128			<101	101		N/A	0.59000	Unequal Variance t
06-4077-5686			<101	101		N/A	0.44990	Unequal Variance t
Test Accepta	bility							
Analysis	Endpoint		Attrib	ute	Statistic	Lower Limit	Upper Limit	Decision
01-8697-3595	Cell Density		Contro	ICV	0.3820		0.2	Fails acceptability criteria
03-5566-8128					0.5012		0.2	Fails acceptability criteria
04-9747-8215					0.5012		0.2	Fails acceptability criteria
06-4077-5686					0.3820		0.2	Fails acceptability criteria
01-8697-3595	Cell Density		Contro	I Response	947750	1E+06		Fails acceptability criteria
03-5566-8128					1E+06	1E+06		Passes acceptability criteria
04-9747-8215					1E+06	1E+06		Passes acceptability criteria
06-4077-5686					947750	1E+06		Fails acceptability criteria
01-8697-3595	Cell Density		MSDp		0.3825	0.091	0.29	Fails acceptability criteria
03-5566-8128					0.59	0.091	0.29	Fails acceptability criteria
04-9747-8215					0.4939	0.091	0.29	Fails acceptability criteria
06-4077-5686					0.4499	0.091	0.29	Fails acceptability criteria
Cell Density	Summary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv
0	Lab Control	4	204325 0 - ()	1885000.0	213900D.	55594.3	111188.	5.44%
0	pH-adjusted C	4	106175 0. Ü	463000. 👌	1551000.0	266076.	532153.	50.12%
0	Salt Control	4	947750.0	603000.\$	137300 0 .	181025.	362050.	38.20%
100		4	146275 <i>0.</i> 0	139800 0. Ú	159400 0.0	45083.9	90167.8	6.16%
-101 100%. UN	filtered	4	228250.0	216000. 🗘	250000.0	7597.97	15195.9	6.66%
Cell Density I	Detail							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	213900	0.01885000.	(209600 <i>0.</i> (2053000.0			
0	pH-adjusted C	766000.	0 155100O-	¢ 463000.Ú	146700 0.0			
0	Salt Control	137300	D. () 1120000.	0 603000. 🕻	695000. ()			
100	C. LL A	141000	2.01398000.	01594000.0	1449000-0			
-10+ 100% W	ntiltered	220000.	0 227000.0	250000.0	216000.0			

 Comparisons:
 Page 1 of 4

 Report Date:
 23 Aug-04 3:43 PM

 Analysis:
 01-8697-3595

Selenastrum	Grov	vth Test	4-3	2									AMEC	Bioassay SD
Endpoint			A	nalysis	Туре			Sample I	Lin	k Control	Link	Date Analyzed	Versior)
Cell Density			С	omparis	on			07-5136-	74	64 07-5136	6-7464	23 Aug-04 3:43 PI	M CETISV	1.024
Method			A	lt H	Data T	ransforn	ı	Z		NOEL L	.OEL	Toxic Units	ChV	MSDp
Equal Varianc	e t		С	> T	Untran	sformed				100 >	100	1.00	N/A	38.25%
Test Accepta	bility	1												
Attribute			S	tatistic	L	ower Lin	nit	Upper Lin	nit	Decision				
Control CV			0.	3820				0.2		Fails acce	eptabilit	y criteria		
Control Respo	nse		94	47750	1	E+06				Fails acce	eptabilit	y criteria		
MSDp			0.	3825	0	.091		0.29		Fails acce	eptabilit	ty criteria		
ANOVA Assu	mpti	ons												
Attribute		Test			Statist	ic	Criti	cai F	۲	evel	Decisi	on(0.01)		
Variances		Variance Ra	itio		16.122	62	47.4	6723 C	0.0	4707	Equal	Variances		
Distribution		Shapiro-Will	κW		0.9710	6	0.74	935 C).8	9159	Norma	I Distribution		
ANOVA Table)													
Source		Sum of S	quare	s Mea	an Squa	re D	F	F Statist	tic	P Level		Decision(0.05)		
Between		5.3045E+	11	5.30	05E+11	1		7.62		0.03283		Significant Effect		
Error		4.1763E+	11	6.96	61E+10	6								
Total		9.4808E+	11	6.00	01E+11	7		-						
Group Compa	ariso	ns												
Control	vs	Conc-%		Statis	tic	Critical		P Level		MSD	De	ecision(0.05)		
Salt Control		100		-2.760	579	1.94318		0.98359		362510.1	No	on-Significant Effect		
Data Summary Origi					rigin	al Data				Transfor	med Data			
Conc-%	Cor	ntrol Type	Coun	t Mea	an	Minimu	ım	Maximum)	SD	Mean	Minimum	Maximum	SD
0	Salt	Control	4	947	750. D	603000	.0	1373000.	U	362050.0				
100			4	146	2750. ()	139800	D.Ò	159400 0 ,	υ	90167.6				



Comparisons:Page 3 of 4Report Date:23 Aug-04 3:43 PMAnalysis:04-9747-8215

Selenastrum	Gro	wth Test	A-	7									AMEC	Bioassay SD
Endpoint			A	nalysis	Гуре			Sample	Lir	nk Contro	ol Link	Date Analyzed	Versio	n
Cell Density			C	ompariso	n			07-5136	-74	64 07-513	6-7464	23 Aug-04 3:43 P	M CETIS	v1.024
Method			A	It H	Data Tra	ansform	n	Z	٦٢	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Varianc	e t		С	> T	Untrans	formed				100	>100	1.00	N/A	49.39%
Test Accepta	bility	,												
Attribute			St	tatistic	Lo	wer Lim	nit	Upper Li	mit	Decisio	n			
Control CV			0.	5012				0.2		Fails ac	ceptabili	ty criteria		
Control Respo	onse		16	E+06	1E-	+06				Passes	acceptal	bility criteria		
MSDp	0.4939 0.091					0.29		Fails ac	ceptabili	ty criteria				
ANOVA Assu	mpt	ions												
Attribute		Test			Statistic	C	Criti	cal	ΡL	.evel	Decis	ion(0.01)		
Variances		Variance R	atio		34.8313	5	47.40	6723	0.0	1570	Equal	Variances		
Distribution		Shapiro-Wi	lk W		0.96134		0.749	935	0.7	9544	Norma	al Distribution		
ANOVA Table	Э													
Source		Sum of S	Square	s Mea	n Squar	e D	F	F Statis	stic	P Leve	1	Decision(0.05)		
Between		3.2160E-	+11	3.21	6E+11	1		2.21		0.1878	5	Non-Significant E	ffect	
Error		8.7395E-	+11	1.45	7E+11	6								
Total		1.1956E-	+12	4.67	3E+11	7		-						
Group Comp	ariso	ons												
Control	vs	Conc-%		Statisti	ic C	ritical		P Level		MSD	De	ecision(0.05)		
pH-adjusted C	0	100		-1.4859	04 1	.94318		0.90607		524404.8	No	on-Significant Effect		
Data Summary				Origin				al Data				Transfo	rmed Data	
Conc-%	Co	ntrol Type	Count	t Mea	n	Minimu	ım	Maximur	n	SD	Mean	n Minimum	Maximum	SD
0	pH-	adjusted C	4	1061	75D.	463000		155100 <i>D</i>).	532153.				
100			4	1462	750.	139800	0.	1594000	•	90167.6				



CETIS	R	eport										Compariso Report Dat Analysis:	ons: :e:	23 Au	Page g-04 3: 06-407	4 of 4 43 PM 7-5686
Selenastrum	Grow	/th Test	A -	2										AMEC B	Bioassa	ay SD
Endpoint			A	nalysis	Туре		Sample	e Lir	nk Co	ontro	l Link	Date Analyzed		Version		
Cell Density			Co	omparis	on		07-513	6-74	64 07	7-5136	6-7464	23 Aug-04 3:43	PM	CETISv1	1.024	
Method			AI	tΗ	Data Tra	insform	Z		NOEL	L	OEL	Toxic Units	ChV		MSDp	>
Unequal Varia	ince t		С	> T	Untransf	ormed			<101	1	01		N/A		44.99	%
Test Accepta	bility															
Attribute			St	atistic	Lov	ver Limit	Upper L	.imit	Dec	ision						
Control CV			0.3	3820			0.2		Fail	s acce	eptability	criteria				
Control Respo	onse		94	7750	1E+	-06			Fail	s acce	eptability	criteria				
MSDp			0.4	4499	0.09	91	0.29		Fail	s acce	eptability	criteria				
ANOVA Assu	mptio	ons														
Attribute		Test			Statistic	Cr	itical	ΡL	.evel		Decisio	n(0.01)				
Variances		Variance R	atio		567.6547	70 47	.46723	0.0	0025		Unequa	I Variances				
Distribution		Shapiro-Wi	lk W		0.93466	0.7	4935	0.5	2349		Normal	Distribution				
ANOVA Table	9															
Source		Sum of s	Squares	s Mea	an Square	DF	F Stati	istic	PL	evel		Decision(0.05)				
Between		1.0354E	+12	1.03	35E+12	1	15.77		0.0	0736		Significant Effec	t			
Error		3.9394E	+11	6.56	66E+10	6										
Total		1.4293E-	+12	1.10	01E+12	7										
Group Comp	ariso	ns														
Control	vs	Conc-%		Statis	tic Cı	ritical	P Level		MSD		Dec	sision(0.05)				
Salt Control		101		3.9710	082 2.	353363	0.01427		42639	3.8	Sig	nificant Effect				
Data Summai	ry					Orig	inal Data					Transfo	ormed	l Data		
Conc-%	Con	trol Type	Count	Mea	an l	Minimum	Maximu	m	SD		Mean	Minimum	Ма	ximum	SD	
0	Salt	Control	4	947	750. 6	603000.	1373000),	36205	0.						
-10+ 100%. U	nfil	tered	4	228	250. 2	216000.	250000.		15195	.9						

 Comparisons:
 Page 2 of 4

 Report Date:
 23 Aug-04 3:43 PM

 Analysis:
 03-5566-8128

OF HO Kepon					Analysis:	03-5566-8	8128
Selenastrum Growth Test	-2					AMEC Bioassay	SD
Endpoint	Analysis Type		Sample L	ink Control	Link Date Analyzed	Version	
Cell Density	Comparison		07-5136-7	464 07-5136	5-7464 23 Aug-04 3:43 F	PM CETISv1.024	
Method	Alt H Data	Transform	Z	NOEL L	OEL Toxic Units	ChV MSDp	
Unequal Variance t	C > T Untra	ansformed		<101 1	01	N/A 59.00%	,
Test Acceptability							
Attribute	Statistic	Lower Limit	Upper Lim	it Decision			
Control CV	0.5012		0.2	Fails acce	eptability criteria		
Control Response	1E+06	1E+06		Passes a	cceptability criteria		
MSDp	0.59	0.091	0.29	Fails acce	eptability criteria		
ANOVA Assumptions							
Attribute Test	Stati	stic Crit	ical P	Level	Decision(0.01)		
Variances Variance Ratio	1226	.36300 47.4	16723 0.	00008	Unequal Variances		
Distribution Shapiro-Wilk V	V 0.92	144 0.74	1935 0.	43583	Normal Distribution		
ANOVA Table							
Source Sum of Squ	uares Mean Squ	uare DF	F Statisti	c P Level	Decision(0.05)		
Between 1.3894E+12	1.389E+1	2 1	9.80	0.02029	Significant Effect	(
Error 8.5026E+11	1.417E+1	1 6					
Total 2.2397E+12	1.531E+1	2 7					
Group Comparisons							
Control vs Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)		
pH-adjusted Co 101	3.131277	2.353363	0.02601	626430.8	Significant Effect		
Data Summary		Origi	nal Data		Transfo	ormed Data	
Conc-% Control Type C	ount Mean	Minimum	Maximum	SD	Mean Minimum	Maximum SD	
0 pH-adjusted C 4	1061750.	463000.	1551000.	532153.			
107 1001 unfiltered 4	228250.	216000.	250000.	15195.9			



000-089-124-1

Data Workshe	et: Page 1 of 1
Report Date:	21 Jul-04 10:43 AM
Link:	07-5136-7464/0407-055

CETIS Worksheet

Page 1 of 1

Selenastrur	Selenastrum Growth Test AMEC Bioassay SD												
Start Date:	21.	Jul-(04		Species:	Selenastru	m capricornuti	um	Sample Code:	0407-055			
End Date:	25 .	Jul-(04		Protocol:	EPA/821/R	-02-013 (2002	2)	Sample Source:	City of Buenaventi	ura		
Sampled:	20 Jul-04				Material: Estuarine Monitoring Sample				Sample Station:	A-2			
Conc-%	6 Code Rep Pos C		Cell Density	ensity Absorbance Biomass Chlorophyll		Chlorophyll a		Notes					
	0 L(0	1	6									
	0 L(С	2	7									
	0 L(С	3	1									
	0 L(С	4	2									
	0 S(С	1	4									
	0 S(С	2	10									
	0 S(С	3	12									
	0 S(С	4	9									
10	0		1	8									
10	0		2	11									
10	0		3	5									
10	0		4	3									
6	20	ير	AH	t	deta	ent	m Q(=,	44					

Reviewed By: AH 8-10-04

Fluorometric & Microscopic Determination of Cell Density **Turner Fluorometer Model TD-700**

Client: City of Buenaventura Sample ID: <u>A-2, B-1; B-3, C-7</u>

Test Species: S. apricornutum

Test Date: <u>1-21-04</u>

Start/End Times: 16:40/ 17:40

Test No: <u>0407-055→058</u>

Analyst: _____

	Random Number	Dilution	Cell Density (fluorometric) (cells/ml *10 ⁶)	Cell Density (microscopit) (cells/mi *104)
	Blank	NA		
	Cal Check 1 (NEW, Solid, Effluent Blanks)	0.00,2.18	21;	
HIMA 7.66	1		21.39	
B 15.51	2		18.85	
C 4.63	3		14.10	
D 14.67	4		3.73	
Filtered	5		13.98	
16knk 0.20	6		20.96	
5-1 x 0.10	7		20.53	
3-3" 0.04	8		15.94	
2-2" 0.24	9		11.20	
	10		6.03	
	11		14.49	
	12-		6.95	
	Cal Check 2 (NEW, Solid, Effluent Blanks)		0,00, 2.18	
	13		9.65	
	14		13.65	
	15		15.15	
	16		17.46	
	17		18.28	
	18		18,83	
	19		19.81	
	ĴO		2194	
	21		13.58	
	27		2.60	
	23		20.72	
	24		18.69	
-	Cal Check 3 (NEW, Solid, Effluent Blanks)			

Comments:

QC Check: AH B/10/04

Final Review: 944 825104

Fluorometric & Microscopic Determination of Cell Density **Turner Fluorometer Model TD-700**

Test Species: S. capri coruntum

Client: <u>City of Buenaventura</u> Test Date: 7-21-04Sample ID: <u>A-2</u>, <u>B-1</u>, <u>B-3</u>, <u>C-3</u> Start/End Times: <u>16:40/17:40</u>

Test No: 0407-055 → 058

Analyst: _____

Random Number	Dilution	Cell Density (fluorometric) (cells/ml *10 ⁶)	Cell Density (microscopic) (cells/ml *10 ⁴)
Blank	NA		
Cal Check 1 (NEW, Solid, Effluent Blanks)	- 0 ,	0,00,218	
25		17.17	
26		16,88	
27		15.90	
28		18.66	
29		23.11	
30		8.40	
31		13.40	
32		20.62	
A-ZunfiltA		2.20 ¥	
A-Zunfilt B		2,27	
A-JunfiltC		2.50	
A-2 unfilt D		2.16	
Cal Check 2 (NEW, Solid, Effluent Blanks)		0.00,2-18	
B-Iunfilt A		3.57	
B-1 unfilt B		3.14	
B-1 unfiltC		3.12	
B-1 unfilt D		3.23	
B-3 unfill A		2.04	
B-3 " B		1.25	
B-3 " C		1.17	
B-3 . D		3.43	
C-2 " A		2.33	
C-7 " B		1.93	
C-2 " C		3,82	
C-2 1. D		1.74	
Cal Check 3 (NEW, Solid, Effluent Blanks)			

unfiltered gumples. Comments: <u>A lot of algae stuck to bottom of flask evenafter</u> shaking AH 810-04 Final Review: <u>AH 810-04</u>

Client :	City of Buenaventura

Sample ID: A-2, B-1, B-3, C-2

Test No: 0407-055, 056, 057, 058

Source/Date Stock Culture Started:

Internal / 7-15-04 32.32

Stock Cell Density Measurements:

(mean no. * 100,000)/(500,000) = x (dilution factor):

Prepare inoculum according to the dilution factor. This yields a solution with the desired cell density of 500,000 cells/ml.

32.19

32,26

32.10

32.18

(35 * 100,000)/(500,000) = 7 (e.g. 25 ml Sele stock + 150 ml NEW) Example:

Inoculate 1 ml into 3 initial count flasks containing 50 ml of NEW, stir and count on the hemacytometer. Flasks should contain a final density of 10,000 cells/ml ± 10%.

Inoculum Cell Density	Confirmation Counts:	Mean:	1.3
Test Initiation Time: Test Termination Tim	<u>16:40</u> e: <u>17:40</u>		·
Comments:		 	
QC Check:	AH 8-10-04	 Final Review	N: 5767 \$/29/09

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Algal Growth Inhibition Worksheet

Test Species: S. capricornutum

Test Date: 07/21/2004

Analyst: AH

Mean: 32,21

Client:

Water Quality Measurements Algal Growth Inhibition

Test Species: S. capricornutum

Test Date: 07/21/2004

Sample ID: A-2, B-1, B-3, C-2

Test No: 0407-055, 056, 057, 058

City of Buenaventura

Start/End Times: 07/25/2004 16:40/17:40

Analyst: AH

		Initial R		Final Readings					
Concentration	D.O. (mg/L)	Conductivity (umhos-cm)	Alkalinity (mg/L)	Hardness (mg/L)	D.O. (mg/L)	Conductivity (umhos-cm)			
Lab Control									
	7.4	110	16	36	9.2	255			
Salt Control #1 (3.1 ppt)	1.3	5710	-	~	9.0	5440			
Salt Control #2 (1.1 ppt)	₩.8	2430	(_	9,1	2310			
A-2	7.4	5790	171	917	9.3	5510			
B-1	7.1	2750	184	540	9.1	2650			
B-3	7.5	5520	183	813	9.2	5290			
C-2	7.2	5570	147	882	A.D	5330			
pHadjsc	7.4	6730			8.9	6000			
	•	0 Hour	24 Hour	48 Hour	72 Hour	96 Hour			
pH/Temperature (°C):	Lab control	7.46 1250	7.09/25.5	713/25.3	7.31 /25.6	915/25.2			
pH/Temperature (°C):	Salt Cont. #1	7.68/250	\$ 7.26/25.6	7,46/25.7	8.31 /25.6	8.85/25.2			
pH/Temperature (°C):	Salt Cont. #2	7.63125.0	7.30 /25.8	7.56/25.8	8.32 / 25.5	9,06 125.2			
pH/Temperature (°C):	A-2	9.591250	8.50 125.8	8.46 / 25.6	8.78 / 258	9.00/25.2			
pH/Temperature (°C):	B-1	8.10/250	8.43/25,8	8.52 125.5	8.85/25.7	9.22125.2			
pH/Temperature (°C):	B-3	9.38/250	8.45 125.8	8.49 1253	8.83 / 25.4	9.06/252			
pH/Temperature (°C):	C-2	9.06/25.0	8.31 1261	8.44 /25.8	8.81 / 25.4	9.13/252			
F#/remp	pHadjsc,	9.62 25.0	7.59/25.8	8.00 25.8	8.18 25,4	897 262			
Comments:	samples prior to t	A-2 B-3, (und C-2 ution. An	had phis	>9 and	Were not of phyq			
QC Check:	AH 8-10-	04		Final Review:	appt .	5/25/04			

Test Summary:Page 1 of 1Report Date:23 Aug-04 3:35 PM

Link:

15-6595-9011/0407-056

Selenastrun	n Growth Test	3-1						AMEC Bioassay SD		
Test:	13-7888-5444		Test Type:	Cell Growth	1		Duration:	4 Days 1 Hours		
Start Date:	21 Jul-04 04:40 F	PM	Protocol:	EPA/821/R-	-02-013 (200	02)	Species:	Selenastrum capricornutum		
End Date:	25 Jul-04 05:40 F	PM	Dil Water:	Nutrient En	riched Wate	r	Source:	In-House Culture		
Setup Date:	21 Jul-04 12:00 A	M	Brine:	Frozen Sea	water					
Comment:	Salt Control #2 =	1.1 ppt								
Sample:	04-7882-9801		Material:	Estuarine N	Ionitoring Sa	ample	Client:	City of Buenaventura		
Sampled:	20 Jul-04 01:40 F	PM	Code:	0407-056			Project:			
Received:	21 Jul-04 07:45 A	١M	Source:	City of Buer	naventura					
Hold Time:	10 Hours (18.4 °	C)	Station:	B-1						
Comparison Summary										
Analysis	Endpoint		NOEL	LOE	EL	ChV	MSDp	Method		
08-3889-593	0 Cell Density		<100	100		N/A	0.09134	Equal Variance t		
10-5680-928	0		<101	101		N/A	0.04961	Equal Variance t		
Test Accept	ability				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
Analysis	Endpoint		Attribu	ute	Statistic	Lower Limit	Upper Limit	Decision		
08-3889-593	0 Cell Density		Contro	ICV	0.0497		0.2	Passes acceptability criteria		
10-5680-928	0				0.0497		0.2	Passes acceptability criteria		
08-3889-593	0 Cell Density		Contro	I Response	2E+06	1E+06		Passes acceptability criteria		
10-5680-928	0				2E+06	1E+06		Passes acceptability criteria		
08-3889-593	0 Cell Density		MSDp		0.0913	0.091	0.29	Passes acceptability criteria		
10-5680-928	0				0.0496	0.091	0.29	Fails acceptability criteria		
Cell Density	Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv		
0		4								
0	Lab Control	4	207850 0. C	186900 <i>D</i> ,Q	231100 0 .	0 90489.8	180979.	8.71%		
0	Salt Control	4	177775 0. ()	168800 0. Ú	1866000-	0 44167.0	88334.1	4.97%		
100		4	138700 0.Ú	126000 0 .V	159000 0 .	0 70938.9	141877.	10.23%		
100% U	nfiltered	4	326500.0	312000. ()	357000.0	10444.2	20888.5	6.40%		
Cell Density	Cell Density Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4					
0										
0	Lab Control	207200	0.0186900 <i>0</i> .	ù 231100 0 , (،206200 0	0				
0	Salt Control	171700	0.01688000.	(† 186600 0. (2 184000 0 . ()				
100	C 1 .	135800	0.0 1260000.	() 159000 0. (1340000	c				
1.1001.1	er 100% unfiltered 357000. U 314000. U 312000. U 323000. C									

	_										Compariso	ns:		Page 1 of 2
CEIIS	5 4	leport									Report Date Analysis:	e:	23 Au (g-04 3:35 PM 08-3889-5930
Selenastrum	n Gro	wth Test	3-1										AMEC E	Bioassay SD
Endpoint		•	Δ	nalysis Typ)e		Sample Link Control			l Link	Link Date Analyzed			
Cell Density			C	omparison			15-6595-9011 15-6595		5-9011	23 Aug-04 3:33 F	PM	CETISv1	1.024	
Method			A	lt H Da	ita Trar	nsform	Z NOE		OEL I	LOEL	Toxic Units	ChV	/	MSDp
Equal Variand	ce t		C	> T Untransformed				<1	100 ~	100		N/A		9.13%
Test Accepta	abilit	у												
Attribute			s	tatistic	Low	er Limit	Upper Lin	nit	Decision	ı				
Control CV			0	.0497			0.2		Passes a	cceptabi	lity criteria			
Control Resp	onse		2	E+06	+06 1E+06				Passes a	cceptabi	lity criteria			
MSDp			0	0.091 0.091			0.29		Passes a	icceptabi	lity criteria			
ANOVA Assu	ump	ions												
Attribute		Test		St	atistic	Criti	cal F	P Lev	/el	Decisio	on(0.01)			
Variances		Variance R	atio	2.57972 47.			6723 0.45693		Equal V	ariances				
Distribution		Shapiro-Wi	lk W	0.9	2549	0.74	74935 0.444		29	Normal	Distribution			
ANOVA Tabl	le													
Source		Sum of	Square	s Mean S	quare	DF	F Statis	tic	P Level		Decision(0.05)			
Between		3 0537E	+11	3.054E	+11	1	21.87		0.00341		Significant Effect	t		
Error		8.3797E	+10	1.397E	+10	6								
Total		3.8917E	+11	3.193E	+11	7								
Group Comp	oaris	ons												
Control	vs	Conc-%		Statistic	Cri	tical	P Level	N	ISD	Dec	cision(0.05)			
Salt Control		100		4.676016	1.9	4318	0.00171	1	62381.3	Sigi	nificant Effect			
Data Summary						Origir	nal Data				Transfo	orme	d Data	
Conc-%	Co	ntrol Type	Coun	t Mean	M	linimum	Maximum	n S	D	Mean	Minimum	Ma	aximum	SD
0 Salt Control 4			4	177775	0.0 10	688000. D	186600D.	08	8334.1					
100 4				138700	0.0 1	26000 <i>D</i> . D	1590000	0 1	41877.					

 Comparisons:
 Page 2 of 2

 Report Date:
 23 Aug-04 3:35 PM

 Analysis:
 10-5680-9280

Selenastrum Growth Test B-1 AMEC Bioassay SD											
Endpoint		A	nalysis Type		Sample I	Lir	nk Contro	l Link	Date Analyzed	Version	1
Cell Density		С	omparison		15-6595-	90	11 15-6595	5-9011	23 Aug-04 3:33 F	PM CETISV	1.024
Method		A	lt H Data	Transform	Z		NOEL L	OEL	Toxic Units	ChV	MSDp
Equal Variance t		С	> T Untra	insformed			<101 1	01		N/A	4.96%
Test Acceptabil	ity										
Attribute		S	tatistic	Upper Lin	ni	Decision					
Control CV		0.	0497		0.2		Passes a	cceptabi	lity criteria		
Control Respons	e	28	E+06	1E+06			Passes a	cceptabi	lity criteria		
MSDp		0.	0496	0.091	0.29		Fails acce	eptability	criteria		
ANOVA Assum	ptions										
Attribute	Test		Stati	ical P Level		Decision(0.01)					
Variances	Variance R	latio	17.88	3293 47.4	47.46723 0.0		4071	Equal V	ariances		
Distribution	Shapiro-W	ilk W	0.971	86 0.74	935 0).8	9879	Normal	Distribution		
ANOVA Table											
Source	Sum of	Square	s Mean Squ	are DF	F Statistic		P Level		Decision(0.05)		
Between	4.2123E	+12	4.212E+12	2 1	1022.48		0.00000		Significant Effect		
Error	2.4718E	+10	4.12E+09	6							
Total	4.237E+	12	4.216E+12	2 7							
Group Compari	sons										
Control v	s Conc-%		Statistic	Critical	P Level		MSD	Dec	cision(0.05)		
Salt Control	101		31.97631	1.94318	0.00000		88191.55	Sig	nificant Effect		
Data Summary				Origir	nal Data				Transfo	rmed Data	
Conc-% C	Conc-% Control Type Co		Mean	Minimum	Maximum		SD	Mean	Minimum	Maximum	SD
0 S	Salt Control 4		1777750.	0 1688000.0	1866000,	0	88334.1				
10+ 100%. unfil	tered	4	326500. U	312000. ပဲ	357000. ()		20888.5				



CETIS Worksheet

Data Worksheet: Page 1 of 1 Report Date: 21 Jul-04 10:49 AM Link: 15-6595-9011

Selenastru	Selenastrum Growth Test AMEC Bioassay SD												
Start Date:	2	1 Jul-	04		Species:	Selenastru	m capricornuti	um	Sample Code:	0407-056			
End Date:	2	25 Jul-	04		Protocol	: EPA/821/F	2-02-013 (2002	?)	Sample Source:	City of Buenaventura			
Sampled:	20 Jul-04				Material: Estuarine Monitoring Sample				Sample Station:	B-1			
Conc-%	Code Rep Pos			Pos	Cell Density Absorbance Biomass Chlorophyll a					Notes			
	0	LC	1	24									
	0	LC	2	32									
	0	LC	3	23									
	0	LC	4	29									
	0	SC	1	30									
	0	SC	2	26									
	0	SC	3	28									
	0	SC	4	25									
10	00		1	22									
1(00		2	27			na a anti-district dan angle di sanan kanan angle di sanan kanan kanan kanan kanan kanan kanan kanan kanan kan						
1(00		3	21					ng Mart ng mang sa kanang sa kanang sa sa sa kanang sa sa sa kanang sa				
1(00		4	31									
10	00		4	31									

QCEAH

data entry-oc-AH



Reviewed By: AH 8-10-0

Test Summary:Page 1 of 1Report Date:23 Aug-04 3.46 PM

Link: 13-9674-1566/0407-057

Selenastrum	Growth Test	B-3)					AMEC Bioassay SD
Test: 1	17-4198-9895		Test Type:	Cell Growth)		Duration:	4 Days 1 Hours
Start Date: 2	21 Jul-04 04:40	РМ	Protocol:	EPA/821/R-	-02-013 (200)2)	Species:	Selenastrum capricornutum
End Date: 2	25 Jul-04 05:40	РМ	Dil Water:	Nutrient En	riched Wate	r	Source:	In-House Culture
Setup Date: 2	21 Jul-04 04:40	PM	Brine:	Frozen Sea	water			
Comment: S	Salt Control #1 =	: 3.1 ppt						
Sample: 0	07-7207-8087		Material:	Estuarine M	Ionitoring Sa	ample	Client:	City of Buenaventura
Sampled: 2	20 Jul-04 10:40 /	AM	Code:	0407-057			Project:	
Received: 2	21 Jul-04 07:45	AM	Source:	City of Buer	naventura			
Hold Time: 3	30 Hours (18.2 °	C)	Station:	B-3				
Comparison	Summary							
Analysis	Endpoint		NOEL	LOE	EL	ChV	MSDp	Method
03-4334-3103	Cell Density		100	>10	0	N/A	0.57219	Equal Variance t
04-3087-3172			100	>10	0	N/A	0.50104	Equal Variance t
08-9088-1776			<101	101		N/A	0.49632	Equal Variance t
13-0004-6989			<101	101		N/A	0.38639	Equal Variance t
Test Accepta	bility							
Analysis	Endpoint		Attribu	ute	Statistic	Lower Limit	Upper Limit	Decision
03-4334-3103	Cell Density		Contro	ICV	0.5012		0.2	Fails acceptability criteria
04-3087-3172					0.3820		0.2	Fails acceptability criteria
08-9088-1776					0.5012		0.2	Fails acceptability criteria
13-0004-6989					0.3820		0.2	Fails acceptability criteria
03-4334-3103	Cell Density		Contro	Response	1E+06	1E+06		Passes acceptability criteria
04-3087-3172					947750	1E+06		Fails acceptability criteria
08-9088-1776					1E+06	1E+06		Passes acceptability criteria
13-0004-6989					947750	1E+06		Fails acceptability criteria
03-4334-3103	Cell Density		MSDp		0.5722	0.091	0.29	Fails acceptability criteria
04-3087-3172	2				0.5010	0.091	0.29	Fails acceptability criteria
08-9088-1776					0.4963	0.091	0.29	Fails acceptability criteria
13-0004-6989					0.3864	0.091	0.29	Fails acceptability criteria
Coll Donsity S				<u></u>				
Conc-%	Control Type	Rens	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	2043250 0	1885000. 0	2139002	0 55594.3	111188	5 44%
	pH-adjusted C	4	1061750 D	463000 ()	155100/0	0 266076	532153	50 12%
	Salt Control	4	947750 D	403000.0	1373000	1) 181025	362050	38 20%
100	Gait Control	4	1207750	065000.0	174600/2	0 161023.	220214	22 40%
101,001,001	Ameril 1:20	4	107250	117000 l)	242000	E 104157.	320314.	23.49%
	MATRICA	4	197250.0	117000. V	343000.0	52399.7	104799.	55.15%
Cell Density [Detail							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	A		
0	Lab Control	2139000	» O 188500O	v 2096000.0	2053000.0)		
0	pH-adjusted C	766000.	0 1551000.0	463000.0	1467000. ())		
0	Salt Control	1373000	[,] , 0 1120000.0	0 603000.0	695000. v			
100		965000.) 136500 <i>0</i> .() 1515000.0	1746000.0	>		
1-101/00/. UI	Atiltered	204000.	రి 125000.0	117000.0	343000.0			

Comparisons: Page 1 of 4 Report Date: 23 Aug-04 3:46 PM 03-4334-3103

Analysis:

Selenastrum G	AMEC Bioassay SD														
Endpoint			A	nalysis T	уре			Sample	Li	nk Contro	ol Link	Date Analyzed		Version	
Cell Density			Co	ompariso	n			13-9674	-15	66 13-967	4-1566	23 Aug-04 3:46 F	PM	M CETISv1.024	
Method			AI	t H	Data Tr	ansfor	m	z		NOEL	LOEL	Toxic Units	ChV		MSDp
Equal Variance	t		С	> T	Untrans	formed				100	>100	1.00	N/A		57.22%
Test Acceptabi	lity														
Attribute	St	Statistic Lower Limit			nit	Upper Li	mi	Decisio	n						
Control CV	0.	5012				0.2		Fails acc	eptabilit	y criteria					
Control Respons	1E	+06	1E	+06				Passes a	acceptab	oility criteria					
MSDp		0.	5722	0.0	091		0.29		Fails acc	eptabilit	y criteria				
ANOVA Assum	ption	IS													
Attribute	Τe	est		Statistic Cri			Crit	ical	P١	.evel	Decisi	on(0.01)			
Variances	Va	ariance Ra	atio		2.62721		47.4	6723	0.4	4859	Equal	Variances			
Distribution	Sł	napiro-Wil	lk W	(0.92971		0.74	935	0.4	7952	Norma	Distribution			
ANOVA Table															
Source		Sum of S	Squares	Mean	an Square		DF	F Statisti		P Level		Decision(0.05)			
Between		2.2579E+	+11	2.258	E+11	1		1.16		0.32381		Non-Significant E	ffect		
Error		1.1729E+	+12	1.955	E+11	e	6								
Total		1.3987E+	+12	4.213	E+11	7	7								
Group Compari	isons														
Control v	s (Conc-%		Statistic	: C	ritical		P Level		MSD	De	cision(0.05)			
pH-adjusted Co	-	100		-1.0747	15 1	.94318		0.83810		607518.1	Non-Significant Effec		t		
Data Summary						C	Drigir	nal Data				Transfo	rmed	l Data	
Conc-% C	ontro	ol Type	Count	Mean		Minim	um	Maximur	n	SD	Mean	Minimum	Ma	ximum	SD
0 p	H-adj	usted C	4	10617	750.0	463000	0.0	1551000	0	532153.					
100 4			4	13977	750-0	965000	Q.Q	1746000	٠Ø	328314.					



 Comparisons:
 Page 2 of 4

 Report Date:
 23 Aug-04 3:46 PM

 Analysis:
 04-3087-3172

											Analysis:		04-3087-3172	
Selenastrum Growth Test B^{-3}												AMEC	Bioassay SD	
Endpoint				nalysis		Sample	Sample Link Control		l Link	k Date Analyzed		Version		
Cell Density				omparis		13-9674	13-9674-1566 13-9674			23 Aug-04 3:46 P	M CETISV	1.024		
Method			A	lt H	Data T	ransform	Z		NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t			С	C > T Untransformed					100	>100	1.00	N/A	50.10%	
Test Acceptability														
Attribute				tatistic	ower Limit	Upper L	Upper Limit Decision							
Control CV				3820		0.2	0.2 Fails acceptability criteria							
Control Response				947750 1E+06				Fails acceptal			y criteria			
MSDp			0.	0.5010		.091	0.29	0.29 F		ceptability criteria				
ANOVA Assumptions														
Attribute	Test			Statistic Cr			itical	Ρl	_evel	Decisio	on(0.01)			
Variances	Variance Ratio			1.21607 4			.46723	0.8).87605 Equa		/ariances			
Distribution	istribution Shapiro-Wilk W			0.94064			0.74935		0.58005 Norma		Distribution			
ANOVA Table														
Source Sum of Squa			Square	res Mean Square			F Statistic		P Level		Decision(0.05)			
Between		4.05E+1	1	4.05	E+11	1	3.39		0.11515		Non-Significant E	ffect		
Error	r 7.1661E+11			1.194E+11										
Total		1.1216E	+12	5.24	4E+11	7								
Group Comparisons														
Control	vs	Conc-%		Statist	ic	Critical	P Level		MSD	De	cision(0.05)			
Salt Control		100		-1.841	453	1.94318	0.94243		474859.3	No	n-Significant Effect	ł		
Data Summa				Orig	jinal Data	nal Data			Transformed Data					
Conc-%	Con	trol Type	Count	Mea	n	Minimum	Maximu	m	SD	Mean	Minimum	Maximum	SD	
0	Salt	Control	4	947	750.0	603000.0	137300		362050.					
100			4	139	7750.0	965000.0	174600		328314.					

Approved By: att 4291
Comparisons: Page 3 of 4 Report Date: 23 Aug-04 3:46 PM 08-9088-1776

Analysis:

Selenastrum	Grov	wth Test	3-3												AMEC B	lioassay SD
Endpoint			A	nalysis Ty	pe			Sample	Li	nk	Contro	Link	Date Analyzed		Version	
Cell Density			С	omparison				13-9674	-15	666	13-967	4-1566	23 Aug-04 3:46	PM	CETISv1	.024
Method			A	It H C	ata Tr	ansfor	m	Z		NOE	EL I	OEL	Toxic Units	ChV	/	MSDp
Equal Varianc	e t		С	> T U	Intrans	formed				<10	1 '	101		N/A		49.63%
Test Accepta	bility	/														
Attribute			S	tatistic	Lo	wer Li	nit	Upper L	imi	t D	Decision)				
Control CV			0.	5012				0.2		F	ails acc	eptabilit	y criteria			
Control Respo	Control Response /ISDp				1E	+06				F	Passes a	cceptab	oility criteria			
MSDp	ISDp NOVA Assumptions				0.0	091		0.29		F	ails acc	eptabilit	y criteria			
ANOVA Assu	mpti	ions														
Attribute		Test		s	tatisti	с	Crit	ical	P١	_eve	I	Decisi	on(0.01)			
Variances		Variance R	atio	2	5.7843	37	47.4	6723	0.0	2422	2	Equal	Variances			
Distribution		Shapiro-Wi	k W	0	.96760)	0.74	935	0.8	35912	2	Norma	I Distribution			
ANOVA Table																
Source		Sum of S	Square	s Mean	Squar	e l	DF	F Stati	stic	:	P Level		Decision(0.05)			
Between		1.4947E-	+12	1.495	E+12		1	10.16			0.01889		Significant Effec	t		
Error		8.8251E	+11	1.4716	E+11	e	5									
Total		2.3772E	+12	1.642	E+12		7	_								
Group Comp	arisc	ons														2 10
Control	vs	Conc-%		Statistic	C	Critical		P Level		MS	D	De	cision(0.05)			
pH-adjusted C	o	101		3.187832	2 1	.94318		0.00944		526	966.1	Sig	gnificant Effect			
Data Summa	ry					(Origin	nal Data					Transf	orme	d Data	
Conc-%	Сог	ntrol Type	Coun	t Mean		Minim	um	Maximu	m	SD		Mean	Minimum	Ma	aximum	SD
0	pH-	adjusted C	4	10617	50.0	46300	0.0	1551000	,Û	532	2153.					
-101 100% UN	1fil	tered	4	19725	0. ز,	11700	0.()	343000.	ΰ	104	799.					

Approved By:

101 100% unfiltered

4

197250.0

117000.0

Comparisons: Page 4 of 4 23 Aug-04 3:46 PM Report Date: 13-0004-6989

Analysis:

Selenastrum Growth Test B-2 AMEC Bioassay SD Endpoint Analysis Type Sample Link **Control Link** Date Analyzed Version 23 Aug-04 3:46 PM CETISv1.024 Cell Density Comparison 13-9674-1566 13-9674-1566 NOEL MSDp Method Data Transform LOEL **Toxic Units** ChV Alt H Z 38.64% 101 N/A Equal Variance t C > T Untransformed <101 Test Acceptability Attribute Statistic Lower Limit Upper Limit Decision Control CV 0.3820 0.2 Fails acceptability criteria Control Response 947750 1E+06 Fails acceptability criteria **MSD**p 0.3864 0.091 0.29 Fails acceptability criteria **ANOVA Assumptions** Critical Attribute Test Statistic P Level Decision(0.01) Variances Variance Ratio 47.46723 0.07127 11.93498 Equal Variances Distribution Shapiro-Wilk W 0.97402 0.74935 0.91716 Normal Distribution **ANOVA** Table Source Sum of Squares Mean Square DF **F** Statistic P Level Decision(0.05) Between 0.00726 1.1265E+12 1.127E+12 1 15.86 Significant Effect Error 4.2619E+11 7.103E+10 6 Total 1.5527E+12 1.198E+12 7 Group Comparisons Control vs Conc-% Statistic Critical P Level MSD Decision(0.05) Salt Control 101 3.982345 1.94318 0.00363 366205.5 Significant Effect Data Summary **Original Data** Transformed Data Conc-% Control Type Count Mean Minimum Maximum SD Mean Minimum Maximum SD Salt Control 0 4 947750.0 603000, D 1373000.0 362050

343000.0

104799.



									Data Worksheet:	: F	Page 1 of 1
CETIS	: \//	orl	rch	ippt					Report Date:	21 Jul-0	4 10:45 AM
OLINC	/	011	101						Link:	13	-9674-1566
Selenastrum	Grow	th Te	st							AMEC Bio	assay SD
Start Date:	21 Jul-	04		Species	: Selenastru	im capricornut	um	Sample Code:	0407-057		
End Date:	25 Jul-	04		Protoco	I: EPA/821/F	R-02-013 (2002	2)	Sample Source:	City of Buenaven	tura	
Sampled:	20 Jul-	04		Material	I: Estuarine	Monitoring Sar	mple	Sample Station:	B-3		
0	0.1	-	0	<u> </u>			011				
Conc-%	Code	кер	POS	Cell Density	Absorbance	Biomass	Chiorophyll a		Notes		procession of
100 tonc-%))	кер 1	16	Cell Density	Absorbance	Biomass	Chiorophyll a		Notes		an a
100 100))	кер 1 2	16 14	Cell Density	Absorbance	Biomass	Chiorophyll a		Notes		an a
100 100 100	Code))	кер 1 2 3	16 14 15	Cell Density	Absorbance	Biomass	Chiorophyll a		Notes		
100 100 100 100 100	Code)))	Кер 1 2 3 4	16 14 15 13		Absorbance	Biomass	Chiorophyli a		Notes		

Analyst: AH

Test Summary: Page 1 of 1 Report Date: 23 Aug-04 4:09 PM 11-4020-2553/0407-058 Link:

Selenastrum Growth Test	()- J	-					AMEC Bioassay SD
Test: 17-4198-9895		Test Type:	Cell Growth)		Duration:	4 Days 1 Hours
Start Date: 21 Jul-04 04:40) PM	Protocol:	EPA/821/R-	-02-013 (200	02)	Species:	Selenastrum capricornutum
End Date: 25 Jul-04 05:40) PM	Dil Water:	Nutrient En	riched Wate	r	Source:	In-House Culture
Setup Date: 21 Jul-04 04:40	PM	Brine:	Frozen Sea	water			
Comment: Salt Control #1	= 3.1 ppt						
Sample: 05-7998-4298		Material:	Estuarine M	1onitoring Sa	ample	Client:	City of Buenaventura
Sampled: 20 Jul-04 09:3	5 AM	Code:	0407-058			Project:	
Received: 21 Jul-04 07:45	5 AM	Source:	City of Buer	naventura			
Hold Time: 31 Hours (18.5	°C)	Station:	C-2				
Comparison Summary							
Analysis Endpoint		NOEL	LOE	EL	ChV	MSDp	Method
03-4732-9431 Cell Density		<101	101		N/A	0.49455	Equal Variance t
03-5600-7815		100	>10	0	N/A	0.50883	Equal Variance t
08-2822-9665		<101	101		N/A	0.38353	Equal Variance t
13-0612-3396		100	>10	0	N/A	0.40631	Equal Variance t
Test Acceptability							
Analysis Endpoint		Attribu	ute	Statistic	Lower Limit	Upper Limit	Decision
03-4732-9431 Cell Density		Contro	ICV	0.5012		0.2	Fails acceptability criteria
03-5600-7815				0.5012		0.2	Fails acceptability criteria
08-2822-9665				0.3820		0.2	Fails acceptability criteria
13-0612-3396				0.3820		0.2	Fails acceptability criteria
03-4732-9431 Cell Density		Contro	I Response	1E+06	1E+06		Passes acceptability criteria
03-5600-7815				1E+06	1E+06		Passes acceptability criteria
08-2822-9665				947750	1E+06		Fails acceptability criteria
13-0612-3396				947750	1E+06		Fails acceptability criteria
03-4732-9431 Cell Density		MSDp		0.4945	0.091	0.29	Fails acceptability criteria
03-5600-7815				0.5088	0.091	0.29	Fails acceptability criteria
08-2822-9665				0.3835	0.091	0.29	Fails acceptability criteria
13-0612-3396				0.4063	0.091	0.29	Fails acceptability criteria
Cell Density Summary							
Conc-% Control Type	e Reps	Mean	Minimum	Maximum	ו SE	SD	cv
0 Lab Control	4	2043250.0	1885000.0	2139000+	¢ 55594.3	111188.	5.44%
0 pH-adjusted	24	1061750.0	463000.0	1551000-	0 266076.	532153.	50.12%
0 Salt Control	4	947750.0	603000.0	1373000.	0 181025.	362050.	38.20%
100	4	1971500.0	182800 <i>0.</i> 0	219400 <i>O</i>	0 80633.4	161266.	8.18%
101100/.unfiltered	4	245500. (J	174000. ()	382000.0	47131.9	94263.8	38.40%
Cell Density Detail							
Conc-% Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0 Lab Control	2139000	v. 0188500₽.¢) 2096000.0	2053000.	0		
0 pH-adjusted	766000.	0 1551000.0	ð 463000. <i>Ö</i>	1467000,	0		
0 Salt Control	137300 0). 0 112000 <i>0.</i> (0 603000. 0	695000.1			
100	182800 <i>c</i>	». C 1883000/	U 1981000. O	2194000-	0		
100% unfiltered	233000.	0 193000. <i>U</i>	382000.∂	174000. Ü			

Approved By: A 29K

CETIS Report							Compariso Report Date	ns: e:	23 Au	Page 1 of 4 g-04 4:09 PM
Selenastrum Growth Test	-2						Analysis:		AMEC E	Bioassay SD
Endpoint	Analysis Type		Sample L	link	Contro	Link	Date Analyzed		Version	0.004
Cell Density	Comparison		11-4020-2	2553	11-4020	0-2553	23 Aug-04 4:07 F	-M	CETISV	1.024
Method	Alt H Data	Transform	Z	NO	EL L	OEL	Toxic Units	ChV		MSDp
Equal Variance t	C > T Untra	ansformed		<10	1 1	101		N/A		49.45%
Test Acceptability										
Attribute	Statistic	Lower Limit	Upper Lin	nit	Decision	1				
Control CV	0.5012		0.2		Fails acc	eptability	criteria			
Control Response	1E+06	1E+06			Passes a	cceptabil	ity criteria			
MSDp	0.4945	0.091	0.29		Fails acc	eptability	criteria			
ANOVA Assumptions										
Attribute Test	Stati	istic Crit	ical P	Leve	1	Decisio	n(0.01)			
Variances Variance Ratio	31.8	7016 47.4	46723 0	.0178	5	Equal V	ariances			
Distribution Shapiro-Wilk W	0.96	335 0.74	4935 0	.8163	7	Normal	Distribution			
ANOVA Table										
Source Sum of Sau	ares Mean So	uare DF	F Statist	ic	P Level		Decision(0.05)			
Between 1.3325E+12	1.333E+1	2 1	9.12		0.02338		Significant Effect			
Error 8.7622E+11	1.460E+1	1 6					9			
Total 2.2087E+12	1.479E+1	2 7								
Group Comparisons	andro u manada di shinan shi cikaca ta									
Control vs Conc-%	Statistic	Critical	P Level	MS	D	Dec	ision(0.05)			
pH-adjusted Co 101	3.020698	1.94318	0.01169	52	5084.3	Sigr	nificant Effect			
Data Summary		Oriai	nal Data				Transfo	ormed	l Data	
Conc-% Control Type Co	ount Mean	Minimum	Maximum	SD)	Mean	Minimum	Ma	ximum	SD
0 pH-adjusted C 4	1061750	·0 463000. ℃	155100/2. (0 532	2153.					
101100% unfiltered 4	245500.0	174000. ()	382000.0	942	263.8					

 Comparisons:
 Page 2 of 4

 Report Date:
 23 Aug-04 4:09 PM

 Analysis:
 03-5600-7815

Selenastrum	Gro	wth Test	C-2	\mathbf{r}								AME	C Bioassay SD
Endpoint			A	nalysis Typ	e		Sample	Lir	nk Contro	l Link	Date Analyzed	Versi	on
Cell Density			C	omparison			11-4020	-25	53 11-402	0-2553	23 Aug-04 4:07 P	M CETI	Sv1.024
Method			A	It H Dat	ta Transf	orm	Z		NOEL I	OEL	Toxic Units	ChV	MSDp
Equal Varianc	e t		С	>T Un	ransform	ed			100 >	>100	1.00	N/A	50.88%
Test Accepta	bility	,					- <u></u>						
Attribute			St	tatistic	Lower	Limit	Upper Li	imit	Decision	1			
Control CV			0.	5012			0.2		Fails acc	eptabilit	y criteria		
Control Respo		16	E+06	1E+06				Passes a	icceptab	ility criteria			
			0.	5088	0.091		0.29		Fails acc	eptability	y criteria		
ANOVA Assu	mpti	ons											
Attribute		Test		Sta	tistic	Crit	ical	ΡL	.evel	Decisi	on(0.01)		
Variances		Variance R	atio	10.	88890	47.4	16723	0.0	8070	Equal \	/ariances		
Distribution		Shapiro-Wi	k W	0.9	7203	0.74	1935	0.9	0023	Norma	Distribution	<u> </u>	
ANOVA Table	;												
Source		Sum of S	Square	s Mean S	quare	DF	F Stati	stic	P Level		Decision(0.05)		
Between		1.6553E	+12	1.655E+	12	1	10.71		0.01699		Significant Effect		
Error		9.2758E-	⊦11	1.546E+	11	6							
Total		2.5829E-	+12	1.81E+1	2	7							
Group Comp	arisc	ons				- aide e iste			<u></u>				
Control	vs	Conc-%		Statistic	Critica	al	P Level		MSD	De	cision(0.05)		
pH-adjusted C	0	100		-3.272172	1.943	18	0.99151		540255.3	No	n-Significant Effect		
Data Summa	γ					Origi	nal Data				Transfo	rmed Data	
Conc-%	Cor	ntrol Type	Count	Mean	Mini	mum	Maximur	n	SD	Mean	Minimum	Maximun	n SD
0	pH-	adjusted C	4	1061750	.0 4630	<i>0</i> .000	1551000	.0	532153.				
100 4				1971502), U 1828	3000. 8	219400 <i>C</i>	o. d	161266.				



 Comparisons:
 Page 3 of 4

 Report Date:
 23 Aug-04 4:09 PM

 Analysis:
 08-2822-9665

	1 1	spon										Analysis:		C	08-2822-9665
Selenastrum	Grow	th Test	C	2										AMEC B	ioassay SD
Endpoint			A	nalysis	Туре			Sample L	in	k Contro	I Link	Date Analyzed		Version	
Cell Density			С	omparis	on			11-4020-2	255	53 11-402	0-2553	23 Aug-04 4:08 F	PM	CETISv1	.024
Method			A	lt H	Data T	ransform		Z	1	NOEL I	OEL	Toxic Units	ChV		MSDp
Equal Variance	e t		С	> T	Untran	sformed			ŀ	<101	101		N/A		38.35%
Test Accepta	bility														
Attribute			s	tatistic	L	ower Limi	it	Upper Lin	nit	Decisior	1				
Control CV			0	.3820				0.2		Fails acc	eptability	y criteria			
Control Respo		9	17750 1E+06 Fails acceptability criteria						y criteria						
MSDp		0	.3835	0.	091		0.29		Fails acc	eptabilit	y criteria				
ANOVA Assu															
Attribute		Test			Statist	ic (Critic	cal P	Ľ	evel	Decisi	on(0.01)			
Variances	,	Variance R	atio		14.751	95 4	17.46	6723 0	.05	5326	Equal V	/ariances			
Distribution		Shapiro-Wi	lk W		0.9723	4 (0.749	935 0	.90	0297	Norma	Distribution			
ANOVA Table	e														
Source		Sum of S	Square	s Mea	n Squa	re DF	:	F Statist	ic	P Level		Decision(0.05)			
Between		9.8631E-	+11	9.86	3E+11	1		14.09		0.00946		Significant Effect			
Error		4.199E+	11	6.99	8E+10	6									
Total		1.4062E	+12	1.05	6E+12	7		-							
Group Comp	ariso	าร													
Control	vs	Conc-%		Statist	ic	Critical	I	P Level		MSD	De	cision(0.05)			
Salt Control		101		3.7541	32	1.94318		0.00473		363492.4	Sig	nificant Effect			
Data Summa	ry					Or	igina	al Data				Transfo	ormed	Data	
Conc-%	Con	trol Type	Coun	t Mea	n	Minimu	m	Maximum		SD	Mean	Minimum	Ma	ximum	SD
0 Salt Control 4 94					750.0	603000.	0	137300 <i>D</i> ,	0	362050.					
101-100%. L	anfi	Hered	4	245	500. <u>0</u>	174000.	Û	382000 <i>U</i>		94263.8					



 Comparisons:
 Page 4 of 4

 Report Date:
 23 Aug-04 4:09 PM

 Analysis:
 13-0612-3396

Selenastrum	Grov	vth Test	C-3	\mathcal{L}								AMEC E	Bioassay SD
Endpoint			A	nalysis Type			Sample I	.inl	c Contro	l Link	Date Analyzed	Version	
Cell Density			Co	omparison			11-4020-2	255	3 11-4020	0-2553	23 Aug-04 4:08 P	M CETISv1	1.024
Method			AI	tH Data	Transf	orm	Z	1	NOEL I	OEL	Toxic Units	ChV	MSDp
Equal Variance	e t		С	> T Untra	ansform	ed			00 >	>100	1.00	N/A	40.63%
Test Accepta	bility	,											
Attribute			St	atistic	Lower I	_imit	Upper Lin	nit	Decision	ł			
Control CV			0.3	3820		0.2 Fails acceptability criteria							
Control Respo	onse		94	7750	1E+06				Fails acc	eptability	y criteria		
MSDp			0.4	4063	0.091		0.29		Fails acc	eptability	y criteria		
ANOVA Assu	mpti	ons											
Attribute		Test		Stati	stic	Criti	ical F	Le	evel	Decisi	on(0.01)		
Variances		Variance R	atio	5.04022 47.			46723 0.21700		Equal \	/ariances			
Distribution		Shapiro-Wi	lk W	0.97228 0.7			4935 0.90247			Normal	Distribution		
ANOVA Table)			• ••••••••••••••••••••••••••••••••••••					- <u></u>				
Source		Sum of S	Squares	Mean Squ	uare	DF	F Statist	ic	P Level		Decision(0.05)		
Between		2.0961E-	+12	2.096E+1	2	1	26.69		0.00208		Significant Effect		
Error		4.7126E-	+11	7.854E+1	0	6							
Total		2.5674E-	+12	2.175E+1	2	7							
Group Comp	ariso	ns											
Control	vs	Conc-%		Statistic	Critica	al	P Level		MSD	De	cision(0.05)		
Salt Control		100		-5.165977	1.943	18	0.99896		385083.1	No	n-Significant Effect		
Data Summary Orig					Origir	nal Data				Transfor	rmed Data		
Conc-%	Cor	trol Type	Count	Mean	Mini	mum	Maximum		SD	Mean	Minimum	Maximum	SD
0 Salt Control 4				947750.0	6030	O.00	1373000.0	, :	362050.				an a chuir air air an an Arabhaile
100			4	1971500.	<i>0</i> 1828	800 <i>0.(</i>)	2194000.0)	161266.				

Approved By

								Data Worksheet:	Page 1 of 1
CETIS	S Worl	rch	loot					Report Date:	21 Jul-04 10:46 AM
								Link:	11-4020-2553
Selenastrun	n Growth Te	st							AMEC Bioassay SD
Start Date:	21 Jul-04		Species	: Selenastru	m capricornut	um	Sample Code:	0407-058	
End Date:	25 Jul-04		Protoco	I: EPA/821/R	-02-013 (2002	2)	Sample Source:	City of Buenaven	tura
Sampled:	20 Jul-04		Materia	: Estuarine N	Aonitoring Sa	mple	Sample Station:	C-2	
Conc-%	Code Rep	Pos	Cell Density	Absorbance	Biomass	Chlorophyll a		Notes	
Conc-% 10	Code Rep 0 1	Pos 18	Cell Density	Absorbance	Biomass	Chlorophyll a		Notes	
Conc-% 10 10	Code Rep 0 1 0 2	Pos 18 17	Cell Density	Absorbance	Biomass	Chlorophyll a		Notes	
Conc-% 10 10 10	Code Rep 0 1 0 2 0 3	Pos 18 17 19	Cell Density	Absorbance	Biomass	Chlorophyll a		Notes	
Conc-% 10 10 10 10	Code Rep 0 1 0 2 0 3 0 4	Pos 18 17 19 20	Cell Density	Absorbance	Biomass	Chlorophyll a		Notes	

MARINE

A. AFFINIS

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CETIS Repo

Test Summary: Page 1 of 1 23 Aug-04 1:56 PM Report Date: Link:

15-1869-6060/0407-031

Pacific Tops	melt 7-d Surviva	l and Gro	wth Test	A-2				AMEC Bioassay SD
Test: Start Date: End Date: Setup Date:	11-9894-1671 21 Jul-04 02:30 F 28 Jul-04 02:00 F 21 Jul-04 02:30 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/8 21/R - Laboratory	vival (7d) 02-012 (20 Seawater	1995	Duration: Species: Source:	6 Days 23 Hours Atherinops affinis Aquatic Biosystems, CO
Sample: Sampled: Received: Hold Time:	13-3511-5267 20 Jul-04 02:50 F 21 Jul-04 07:45 A 24 Hours (19.3 °C	PM MM C)	Material: Code: Source: Station:	Estuarine M 0407-031 City of Buen A-2	lonitoring S naventura	ample	Client: Project:	City of Buenaventura
Comparison	Summary							
Analysis	Endpoint		NOEL	LOE	ΞL	ChV	MSDp	Method
08-1166-3340	7d Proportion	Survived	100	>10	0	N/A	0.10369	Steel's Many-One Rank
12-1992-642	1 Mean Dry Wei	ght-mg	100	>10	0	N/A	0.17089	Dunnett's Multiple Comparison
7d Proportio	on Survived Sum	mary						
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv
0	Lab Control	5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%
0	Salt Control	5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%
25		5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%
50		5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%
67		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%
Mean Dry W	eight-mg Summa	ary						
Conc-%	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	cv
0	Lab Control	5	1.40880	1.04600	1.61800	0.10862	0.24289	17.24%
0	Salt Control	5	1.28280	1.11200	1.44000	0.07036	0.15732	12.26%
25		5	1.49200	1.35200	1.64000	0.05678	0.12697	8.51%
50		5	1.53120	1.35400	1.72800	0.07192	0.16083	10.50%
67		5	1.49840	1.35600	1.59800	0.04027	0.09004	6.01%
100		5	1.55720	1.31800	1.82200	0.08798	0.19674	12.63%
7d Proportio	on Survived Deta	il						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	1.00000	1.00000	1.00000	0.80000	0.80000		
0	Salt Control	1.00000	0.80000	1.00000	1.00000	1.00000		
25		1.00000	0.80000	0.80000	1.00000	1.00000		
50		0.80000	1.00000	1.00000	1.00000	1.00000		
67		1.00000	1.00000	1.00000	1.00000	1.00000		
100		0.80000	1.00000	1.00000	0.80000	1.00000		
Mean Dry W	eight-mg Detail							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	1.49800	1.28200	1.61800	1.04600	1.60000		
0	Salt Control	1 11200	1.11800	1.44000	1.40400	1.34000		
25		1.37200	1.35200	1.51400	1.58200	1.64000		
50		1.35400	1.60400	1.59400	1.37600	1.72800		
100		1.35600	1.48000	1.53200	1.52600	1.59800		
100		1.57200	1.02200	1.03200	1.42200	1.31000		

 Comparisons:
 Page 1 of 2

 Report Date:
 18 Aug-04 12:29 PM

 Analysis:
 08-1166-3340

Pacific Tops	melt 7	7-d Survival ar	ıd Gr	owth Te	st A-	2								AMEC N	W Bioassay
Endpoint			An	alysis T	уре		Sampl	le Li	ink	Contro	l Link	Date Analyzed		Version	
7d Proportion	Survi	ived	Co	mparisor	ı		15-186	9-6	060	15-1869	9-6060	18 Aug-04 12:27	' PM	CETISv1	1.024
Method			Alt	н	Data Tran	sform	z		NOE	Ll	LOEL	Toxic Units	Ch\	1	MSDp
Steel's Many-	One F	Rank	С >	•T /	Angular (C	corrected)			100	>	>100	1.00	N/A		10.37%
ANOVA Assu	impti	ons													
Attribute		Test		5	Statistic	Crit	ical	Р	Level		Decisio	n(0.01)			
Variances		Modified Lever	ie	1	1.51429	4.43	3069	0.:	23592		Equal Va	ariances			
Distribution		Shapiro-Wilk W	J	C	0.80172	0.88	3746	0.	00014		Non-nor	mal Distribution			
ANOVA Table	e														
Source		Sum of Squ	ares	Mean	Square	DF	F Stat	tisti	c f	P Level		Decision(0.05)			
Between		0.03175642		0.007	9391	4	0.70		(0.60101		Non-Significant	Effect		
Error		0.2268316		0.011	3416	20									
Total		0.25858802		0.019	2807	24									
Group Comp	ariso	ns													
Control	vs	Conc-%		Statistic	: Crit	tical	P Level		Ties	6	Dec	ision(0.05)			
Salt Control		25		25	17		>0.05		2		Non	-Significant Effect	ct		
		50		27.5	17		>0.05		2		Non	-Significant Effect	ct		
		67		30	17		>0.05		1		Non	-Significant Effect	ct		
		100		25	17		>0.05		2		Non	-Significant Effect	ct		
Data Summa	ry					Origiı	nal Data					Transfe	orme	d Data	
Conc-%	Con	trol Type Co	ount	Mean	м	inimum	Maxim	um	SD		Mean	Minimum	M	aximum	SD
0	Salt	Control 5		0.960	00 0.	80000	1.00000)	0.08	944	1.29766	5 1.10715	1.3	34528	0.10650
25		5		0.920	00 0.	80000	1.00000)	0.10	954	1.25003	3 1.10715	1.	34528	0.13043
50		5		0.960	00 0.	80000	1.00000)	0.08	944	1.29766	5 1.10715	1.3	34528	0.10650
67		5		1.000	00 1.	00000	1.00000)	0.00	000	1.34528	1.34528	1.3	34528	0.00020
100		5		0.920	00 0.	80000	1.00000)	0.10	954	1.25003	3 1.10715	1.3	34528	0.13043



 Comparisons:
 Page 2 of 2

 Report Date:
 18 Aug-04 12:29 PM

 Analysis:
 12-1992-6421

	ricpe								Analysis:		1	2-1992-6421
Pacific Tops	melt 7-d Sur	vival and C	Growth Test	A. 2						A	MEC	N Bioassay
Endpoint		A	nalysis Type		Sample	Link	Contro	ol Link	Date Analyzed	v	ersion	
Mean Dry We	eight-mg	C	omparison		15-1869	-6060	15-186	9-6060	18 Aug-04 12:28	BPM C	ETISv1	.024
Method		A	lt H Data	Transform	z	NO	EL I	LOEL	Toxic Units	ChV		MSDp
Dunnett's Mul	Itiple Compar	rison C	> T Untr	ansformed	udina - 1 10, 101, 11, 11, 17 - 19 - 90 - 19 - 19	100	:	>100	1.00	N/A		17.09%
ANOVA Assu	umptions											
Attribute	Test		Stat	istic Cri	tical	P Leve	I	Decisi	on(0.01)			
Variances	Bartlett		2.26	695 13.	27671	0.6867)	Equal	Variances			
Distribution	Shapiro	o-Wilk W	0.94	084 0.8	8746	0.1639	7	Norma	Distribution			
ANOVA Tabl	e											
Source	Sum	of Square	s Mean Sq	uare DF	F Statis	stic	P Level		Decision(0.05)			
Between	0.23	82839	0.059571	059571 4 2.62 0.06544 No		Non-Significant	Effect					
Error	0.45	42017	0.022710	1 20								
Total	0.69	248562	0.082281	1 24								
Group Comp	arisons											
Control	vs Conc	:-%	Statistic	Critical	P Level	MS	D	De	cision(0.05)			
Salt Control	25		-2.194938	2.3	>0.05	0.2	192135	No	n-Significant Effect	ct		
	50		-2.606227	2.3	>0.05	0.2	192135	No	n-Significant Effect	ct		
	67		-2.262087	2.3	>0.05	0.2	192135	No	n-Significant Effect	ct		
	100		-2.879021	2.3	>0.05	0.2	192135	No	n-Significant Effec	ct		
Data Summa	ry			Orig	inal Data				Transf	ormed [Data	
Conc-%	Control Ty	pe Coun	t Mean	Minimum	Maximun	n SD		Mean	Minimum	Maxi	mum	SD
0	Salt Contro	15	1.28280	1.11200	1.44000	0.1	5732					
25		5	1.49200	1.35200	1.64000	0.1	2697					
50		5	1.53120	1.35400	1.72800	0.1	5083					
67		5	1.49840	1.35600	1.59800	0.0	9004					
100		5	1.55720	1.31800	1.82200	0.1	9674					

Linear Interpolation: Page 1 of 1 Report Date: 18 Aug-04 12:29 PM Analysis: 16-6272-1125

Pacific To	psmelt 7-d Surv	ival and C	Growth Test	A-2					AMEC NW Bioassay
Endpoint		A	nalysis Type	Sample I	Sample Link Cor		Date Analyzed	Version	
Mean Dry \	Weight-mg	L	inear Interpola	tion	15-1869-	6060	15-1869-6060	18 Aug-04 12:28 PM	CETISv1.024
Linear Interpolation Options									
X Transform Y Transform			eed	Resamples	Expande	ed CL	Method		
Linear Linear			090378	200	Yes		Two-Point Inter	rpolation	
Point Estir	nates								
% Effect	Conc-%	95% LC	L 95%	UCL					
10	>100	N/A	N/A						
20	>100	N/A	N/A						
25	>100	N/A	N/A						
50	>100	N/A	N/A						
Data Sumr	nary			Cal	culated Varia	ite			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	-	
0	Salt Control	5	1.28280	1.11200	1.44000	0.032	11 0.15732		
25		5	1.49200	1.35200	1.64000	0.0259	92 0.12697		
50		5	1.53120	1.35400	1.72800	0.0328	83 0.16083		
67		5	1.49840	1.35600	1.59800	0.0183	38 0.09004		
100		5	1.55720	1.31800	1.82200	0.0401	16 0.19674		

••

Concentration

Day

pН

DO (mg/L)

Salinity (ppt)

Temp (°C)

0

78

30.3

1

1.6

29.8

8.06 7.97 798 8.01

20.9 20.7 202 20,0

Water Quality Measurements

8.44 8.32

5.6

2A

K5

Rb

54

820

54

8.37 8.35

5.8

5.9

n di

Client:	City of Buenaventura	Test Species: A. affinis
Sample ID:	A-2	Start Date/Time: 07/21/2004
Test No:	0407-031	End Date/Time: 07/28/2004

3

7.9

30.0

2

48

301

Lab Control 世

Initia

4

93.06

7.9

30-1

20.1 20.7

5

30.2

6

Ù

20.7

7.9

29

7

pH

DO (mg/L)

Analysts:

Initial

1230 50% Concentration Day 0 1 2 3 4 5 6 7 Initia 8.50 8.63 8.66 8.61 833 858 8.75 pH 7.5 4.6 6.5 DO (mg/L) 6.0 6.4 6 5.5 30.0 30.4 Salinity (ppt) 30.8 29.9 30.1 30.1 30.2 20.6 20.1 20.2 20.6 20.0 20.4 70.7 Temp (°C)

8.51 8.38 8.38

6.0 5.9

1430

pН		1.70	7.62	2.74	7.61	8.06	8.09	8.05
DO (mg/L)		63	64	6.2	6.2	5.7	61	5.8
Temp (°C)		20.9	20.6	20.7	70.7	20.9	20.8	20.7
		ia.						
Concentration				Salt C	ontrol	生1		
Day	0	1	2	3	4	5	6	7
	N 4 2 4 4 7 7	199	Prost of About	Ini	hal	Star Person	Soll & Torres	5.40.1
ρH	8.41	8.15	8.29	8.33	8.37	8.25	R.38	的制度计
DO (mg/L)	70	6.7	7.2	7.2	7.1	6.5	5.7	
Salinity (ppt)	30.3	29.4	30.2	30.2	30.2	30.5	30.1	Company Cont
Temp (°C)	20.9	20.6	20.8	20.0	20.1	20.1	20.6	
		1.0		Fir	nal	and the second		
рН		8.14	7.94	8.02	8.01	8.07	809	8.07
DO (mg/L)		6.9	5.7	6.1	6.2	5.7	6-1	6.0
Temp (°C)		20.8	20.60	20.7	20.7	20.7	20.3	207

Concentration				2	5%			
Day	0	1	2	3	4	5	6	7
STATISTICS AND	REPART OF		C. C. Marine	ini lini	tial 🔬 🖄			
pН	8.62	8.37	8.46	8-50	8.44	8.41	8-45	
DO (mg/L)	7.4	6.5	6.6	6.8	7.0	6.1	5.7	T. S. Ser 1
Salinity (ppt)	301	29.9	30,0	30.0	300	30.3	301	
Temp (°C)	20.9	20.4	201	20:0	20.1	20.4	20,5	
		Sec. Sell		Fi	nal			
pH		8.34	8.19	8.21	8.26	8.23	8,23	8,24
DO (mg/L)		6.1	60	5.6	5.4	6.7	5%	5.8
Temp (°C)		20,8	20.6	20-7	20.%	20.8	20.7	207

Animal Source/Date	e Received:

14 days

ABS / 7-17-04

Final:	AH	nc	SH	RG

0

uc

RIS

Comments:

Animal Age at Initiation:

QC Check:

AH 8-10-04

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Temp (°C)		70.8	20.7	20.7	20.6	20.8	20.8	20.7
Concentration				(£77.			
Day	0	1	2	3	4	5	6	7
and the second				in In	Lial	She at a	S	
рН	8.83	8.45	8.70	8.75	8.6	855	8.57	
DO (mg/L)	7.7	5.9	6.Z	6.5	6.7	5.2	5,1	
Salinity (ppt)	30.6	29.9	30.1	30.0	36.1	30.3	30.3	
Temp (°C)	20.3	10.5	20.3	20,0	20.3	20.2	20.7	
		See a love of		ĥ	nal	1.58.12		
pН		8.62	8.46	8,45	849	8.41	8-44	8.44
DO (mg/L)		5.8	6.0	5,2	5.2	5.4	5.6	5.7
Temp (°C)	200.53	20.9	20.7	20.7	20-5	20.9	208	20.7

5.3

Concentration		100%												
Day	0	1	2	3	4	5	6	7						
一下行 的复数计算机计算机 医中心的	KERS STORE	all and the second	an the first start	1	tal 🚽		See See See	Adden Station						
pН	8.94	8.80	8.82	8.81	8.74	2.46	8.59							
DO (mg/L)	8,1	5.2	6.0	6-4	6.6	6.1	5.2							
Salinity (ppt)	36.4	30.0	30.2	30.1	30.2	80.1	30.2							
Temp (°C)	19.6	20.6	20.3	20.0	20.3	20.4	20.6	Mar He						
		N 19 19		1	nal	Art Partie		All the second						
pН		8.69	8,50	8.57	8.60	8.49	8.52	8.51						
DO (mg/L)		5.6	5,8	5.1	5.2	5.4	5.6	5.7						
Temp (°C)		20,8	20.7	20.8	20.7	20.9	20.8	20.7						

3

SH

Final Review:

RG

Client Name:		City o	f Buen	aventu	Ira		Test Species: <i>A. affinis</i>						
Sample ID:		A-2					Start Date/Time: 07/21/2004 /႞ၛခၟ၀						
Test No.:		0407-0	031				En	d Date	/Time:	07/28/2004 / 1230			
Conc.				S	urviva	l on Te	st Dav	:		Percent	pan wt.	pan + fish	
(%)	Rep.	0		2	3	4	5	6	7	Survival	(a)	(a)	
Lab Control	a	5	5	5	5	£	5	5	E C	100	0.041310	0 64885	
#1	b	5	5	5	5	3	5	5	5	100	A A4746	0,5381	
	c	5	5	5	5	5	5	S S	5	100	0.034710	0.04285	
	d	5	5	5	5	5	5	SHYL	4	80	0.02974	0.03397	
	е	5	4	4	4	4	Ý	4	4	80	0.03142	0.03942	-
Salt Control	а	5	5	5	5	5	5	5	5	100	0.03122	1.03678	
#1	b	5	5	4	મ	4	4	H H	4	80	0.02915	0.03-174	
	С	5	5	5	5	5	5	5	5	100	0.03249	0.03969	
	d	5	5	5	5	5	5	5	5	100	0.03716	0.04418	
	е	5	5	5	5	5	5	5	5	100	0.03792	0.04442	
25	a	5	5	5	5	5	5	5	5	100	0.05049	0.05735	
	b	5	MEA	4	4	Ч	Ч	4	4	80	0.04590	0.05266	
	С	5	5	5	5	5	5	5	4	80	0.04426	0.05183	
	d	5	5	5	5	7	2	5	5	100	0.05031	0.05822	
	е	5	5	5	5	5	5	5	5	100	0.045 32	0.05352	
50	а	5	4	4	4	Ч	4	4	4	୫୦	0.04150	0.04833	
	b	5	5	5	5	5	5	5	5	$) \infty$	0.04050	0.04852	
	С	5	2	S	5	5	5	5	5	100	0.04118	0.04913	
	d	5	S	5	5	5	5	5	5	00	0.04165	0.04853	
	е	5	5	5	5	5	5	5	5	100	0.04645	0.05509	
67	а	5	5	5	5	5	5	5	5	100	0.04428	0.05106	
	b	5	5	5	5	5	5	5	5	(00)	0.04220	0.04960	
τ	С	5	5	5	5	5	5	5	5	100	0.04182	0.049.48	
	d	5	5	5	5	7	5	5	5	100	0.03538	0.01301	
	е	5	5	5	5	5	5	5	5	100	0.04050	0.04849	
100	а	5	5	4	4	4	Y	4	4	80	0.64590	0.05374	
	b	5	5	5	5	S	5	5	5	100	0.04485	0.05394	
	C	5	5	5	5	5	5	5	5	100	0.05073	0.05899	
	d	5	5	5	5	5	4	4	٩	80	0.04855	0,05566	
	e	5	5	5	5	5	5	5	5	100	0.63912	0.04571	
	a						ļ	ļ	ļ				
	D						ļ						
	C .					ļ							
	d							· · · ·					
Tach Initiat	e e			011		-				1			
Tech Initials		SH	Inc	SH	SM	IRG	Ry	SH	SH	Anto ent	γ		
Feeding Time	e (dav	۱.	0	1	2	3	Λ	5	6	Q(=AL)	· 9 weigr	11 Data:	1230
recung rine	s (uay).		10010	APrix	100.20	ham	Intun		l set	Date/Time out:	7.2001	
			11.2	1.4.6	1000	0630	1945	1600	0310		Date/Time out:	1.30.091	1430
			1630	IUM?	1005	ILLIN	1143	1000	1201()] 0		50	
											i ech initials:		
Commente											OC Charles	AU B-ID-	
connents.										-	Final Poview	ALL A	A
										-		Ad de	14

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

CETIS	Ronart							Test Summary: Report Date:	Page 1 of 1 23 Aug-04 1:56 PM
		and Gro	with Test	R -1				Link: 0	5-6415-1320/0407-032
Facilie Topsi				p-I					
Test:	11-9894-1671		Test Type:	Growth-Sur	vival (7d)	A 2-1	Duration:	6 Days 23 Hour	rs
Start Date: 2	21 Jul-04 02:30 F	PM	Protocol:	EPA/821/R	02 012 (20)	1995	Species:	Atherinops affin	is
End Date: 2	28 Jul-04 02:00 F	PM	Dil Water:	Laboratory	Seawater	T.	Source:	Aquatic Biosyste	ems, CO
Setup Date: 2	21 Jul-04 02:30 F	PM	Brine:						
Sample: (09-2601-7028		Material:	Estuarine N	Aonitoring Sa	ample	Client:	City of Buenave	ntura
Sampled: 2	20 Jul-04 01:40 F	РМ	Code:	0407-032	9	•	Project:	•	
Received: 2	21 Jul-04 07:45 A	٨M	Source:	City of Bue	naventura				
Hold Time: 2	25 Hours (18.4 °0	C)	Station:	B-1					
Comparison	Summary		2010/04/2010/06/2010						
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method	
14-7555-0366	7d Proportion	Survived	100	>10	0	N/A	0.08423	Steel's Many-O	ne Rank
00-4884-7347	Mean Dry Wei	ght-mg	100	>10	0	N/A	0.17082	Dunnett's Multi	ple Comparison
7d Proportion	n Survived Sum	mary				<u></u>			
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv	
0	Lab Control	5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%	
0	Salt Control	5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%	
25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
50		5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%	
67		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
100		5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%	
Mean Dry We	ight-mg Summa	ary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	CV	
0	Lab Control	5	1.40880	1.04600	1.61800	0.10862	0.24289	17.24%	
0	Salt Control	5	1.28280	1.11200	1.44000	0.07036	0.15732	12.26%	
25		5	1.41920	1.25200	1.54600	0.05347	0.11957	8.43%	
50		5	1.35480	1.06000	1.71200	0.10631	0.23772	17.55%	
67		5	1.33720	1.22400	1.45000	0.04129	0.09233	6.90%	
100		5	1.37240	1.28000	1.52400	0.04331	0.09683	7.06%	
7d Proportion	Survived Deta	il							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.00000	1.00000	1.00000	0.80000	0.80000			
0	Salt Control	1.00000	0.80000	1.00000	1.00000	1.00000			
25		1.00000	1.00000	1.00000	1.00000	1.00000			
50		0.80000	0.80000	1.00000	1.00000	1.00000			
67		1.00000	1.00000	1.00000	1.00000	1.00000			
100		1.00000	1.00000	1.00000	0.80000	1.00000			
Mean Dry We	ight-mg Detail	Den 1	Dam 2	D	Den	Dans			
0	Lab Control	1 40900	1 29200	1 61900	1 04600	1 60000			
0	Salt Control	1 11200	1 11900	1.01000	1.04000	1.00000			
25	Salt Control	1.11200	1 38000	1.44000	1 39/00	1.54000			
50		1.30200	1 28400	1 41600	1.06000	1 71200			
67		1.31000	1.29000	1.41200	1.22400	1.45000			
100		1.40000	1.35600	1.30200	1.28000	1.52400			

 Comparisons:
 Page 2 of 2

 Report Date:
 18 Aug-04 12:57 PM

 Analysis:
 14-7555-0366

Pacific Topsr	nelt 7-d Survi	val and G	rowth Test	B-1						AMEC	₩Bioassay
Endpoint		Aı	nalysis Type		Sample	Sample Link Control			ate Analyzed	Version	
7d Proportion	Survived	Co	omparison		05-6415-	05-6415-1320 05-6415			3 Aug-04 12:56	PM CETISV	1.024
Method		AI	tH Data	Transform	Z	N	IOEL I	LOEL 1	oxic Units	ChV	MSDp
Steel's Many-	One Rank	С	>T Angu	lar (Corrected	(k	1	00 :	>100 1	.00	N/A	8.42%
ANOVA Assu	mptions										
Attribute	Test		Stati	stic Cr	ritical P Level			Decision(0.01)		
Variances	Modified	Levene	1.720	000 4.4	43069 (0.18	510	Equal Vari	iances		
Distribution	Shapiro-	Wilk W	0.78	117 0.8	88746 (0.00	005	Non-norm	al Distribution		
ANOVA Table)										
Source	Sum	of Squares	Mean Squ	uare DF	F Statis	tic	P Level	D	ecision(0.05)		
Between	0.031	75642	0.0079391	1 4	1.00		0.43068	N	on-Significant E	ffect	
Error	0.158	7821	0.0079391	1 20							
Total	0.190	53853	0.0158782	2 24							
Group Comp	arisons										
Control	vs Conc-	%	Statistic	Critical	P Level	7	Ties	Decis	ion(0.05)		
Salt Control	25		30	17	>0.05	-	1	Non-S	Significant Effect	t	
	50		25	17	>0.05	2	2	Non-S	Significant Effect	t	
	67		30	17	>0.05		1	Non-S	Significant Effect	t	
	100		27.5	17	>0.05	2	2	Non-S	Significant Effect	t	
Data Summa	Ŋ			Orig	jinal Data				Transfo	rmed Data	
Conc-%	Control Typ	e Count	Mean	Minimum	Maximum	1 5	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.96000	0.80000	1.00000	(0.08944	1.29766	1.10715	1.34528	0.10650
25		5	1.00000	1.00000	1.00000	(0.00000	1.34528	1.34528	1.34528	0.00020
50		5	0.92000	0.80000	1.00000	(0.10954	1.25003	1.10715	1.34528	0.13043
67		5	1.00000	1.00000	1.00000	(0.00000	1.34528	1.34528	1.34528	0.00020
100		5	0.96000	0.80000	1.00000	C	0.08944	1.29766	1.10715	1.34528	0.10650



 Comparisons:
 Page 1 of 2

 Report Date:
 18 Aug-04 12:57 PM

 Analysis:
 00-4884-7347

Pacific Topsmelt 7-d Survival and Growth Test B-1 AMEC											₩ Bioassay			
Endpoint			Ar	alysis Type			Sample	Li	nk Contro	ol Link	Date Analyzed		Version	
Mean Dry We	ight-r	ng	Co	mparison			05-6415	-13	320 05-641	5-1320	18 Aug-04 12:56	PM	CETISv1	.024
Method			Ali	t H Data	Transfo	orm	Z		NOEL	LOEL	Toxic Units	Ch\	/	MSDp
Dunnett's Mul	tiple	Comparison	C	> T Untra	ansforme	ed			100	>100	1.00	N/A		17.08%
ANOVA Assu	impti	ons												
Attribute		Test		Stati	istic	Crit	ical	Ρ	Level	Decisio	on(0.01)			
Variances		Bartlett		4.81	998	13.2	7671	0.3	30627	Equal \	/ariances			
Distribution		Shapiro-Wilk V	V	0.97	490	0.88	3746	0.7	76279	Normal	Distribution			
ANOVA Table	Table													
Source		Sum of Squ	lares	ares Mean Square			F Statistic F		c P Level	Decision(0.05)				
Between	en 0.04969673			0.0124242	2	4	0.55		0.70292 Non-Significa			ffect		
Error	0.4538454			0.0226923	20									
Total		0.50354214	*****	0.035116	5	24								
Group Comp	ariso	ns												
Control	vs	Conc-%		Statistic	Critica	al	P Level		MSD	De	cision(0.05)			
Salt Control		25		-1.431679	2.3		>0.05		0.2191275	No	n-Significant Effec	t		
		50		-0.7557261	2.3		>0.05		0.2191275	No	n-Significant Effec	t		
		67		-0.5709908	2.3		>0.05		0.2191275	No	n-Significant Effec	t		
		100		-0.9404598	2.3		>0.05		0.2191275	No	n-Significant Effec	t		
Data Summa	ry					Origir	nal Data				Transfo	orme	d Data	
Conc-%	Cor	ntrol Type C	ount	Mean	Mini	mum	Maximur	n	SD	Mean	Minimum	M	aximum	SD
0	Salt	Control 5		1.28280	1.11	200	1.44000		0.15732					
25		5		1.41920	1.25	200	1.54600		0.11957					
50		5		1.35480	1.060	000	1.71200		0.23772					
67	5			1.33720	1.22	400	1.45000		0.09233					
100	5			1.37240	1.28	000	1.52400		0.09683					



Linear Interpolation: Page 1 of 1 Report Date: 18 Aug-04 12:57 PM Analysis: 11-9472-0539

Pacific Topsmelt 7-d Survival and Growth Test AMEC ₩ Bioassay B-1 Endpoint **Control Link** Date Analyzed Analysis Type Sample Link Version Mean Dry Weight-mg Linear Interpolation 05-6415-1320 05-6415-1320 18 Aug-04 12:56 PM CETISv1.024 Linear Interpolation Options X Transform Y Transform Expanded CL Seed Resamples Method Linear Linear 453527 200 Yes **Two-Point Interpolation** Point Estimates % Effect Conc-% 95% LCL 95% UCL 10 >100 N/A N/A 20 >100 N/A N/A 25 >100 N/A N/A 50 >100 N/A N/A Data Summary **Calculated Variate** Conc-% Control Type Count Mean Minimum Maximum SD SE 0 Salt Control 5 1.28280 1.11200 1.44000 0.03211 0.15732 25 5 1.41920 1.25200 1.54600 0.02441 0.11957 50 5 1.35480 1.06000 1.71200 0.04852 0.23772 67 5 1.33720 1.22400 1.45000 0.01885 0.09233 100 5 1.37240 1.28000 1.52400 0.01977 0.09683

Approved By:

Water Quality Measurements

Client:	City of Buenaventura
Sample ID:	<u>B-1</u>

Test No: 0407-032 Test Species: A. affinis

Start Date/Time: 07/21/2004 1430

1230 End Date/Time: 07/28/2004

Concentration		Lab Control 上											
Day	0	1	2	3	4	5	6	7					
			A CERTAIN	In	itial			10000					
рН	8.00	1.91	7.98	8.01	8.06	1.98	7.91						
DO (mg/L)	7.8	2.6	7.8	7,9	7.9	1.3	84						
Salinity (ppt)	30.3	29.8	30.1	30.0	301	30.2	29.4						
Temp (°C)	20.9	20.7	20.0	20.0	20.1	201	20.7						
				F	nal	1							
pH		7.70	7.62	7.74	7-69	8.06	8.09	8.05					
DO (mg/L)		63	6.4	6.2	6.2	5.7	61	5.8					
Temp (°C)		20.9	20.6	7.05	20.7	20.9	20.3	20,7					

Concentration	Salt Control 🕁										
Day	0	1	2	3	4	5	6	7			
	C. K. S.		- 1 M (C	In	itial	NELLA SETTE	A MAR ACHIE	北京政制度 (六			
рН	8.4	8.15	8.29	8.33	8.37	8.25	8.38				
DO (mg/L)	7.6	6.7	7.2	7.2	7.1	6.5	5.7				
Salinity (ppt)	30.3	29.9	30.2	30.2	30.2	30.5	32.1				
Temp (°C)	20.9	20.6	20.8	20.0	20.1	201	20.6				
	MALE &			Fi	nal	THE R AND SEC.	and the first	Real Property			
рН		8,14	7.94	8.02	8.0(8.07	8.09	807			
DO (mg/L)		6.9	97	6.1	6.2	5.7	61	60			
Temp (°C)		20.0	20.60	20.7	20.7	20.7	263	20.7			

Concentration		25%												
Day	0	1	2	3	4	5	6	7						
E MERINA STATE	State Office			In	itial									
рН	8.32	8.12	8.14	8.15	820	8.25	8.33							
DO (mg/L)	7.1	6.5	6:4	6.6	6.4	6.2	5.8							
Salinity (ppt)	30.0	29.9	299	30.0	30.1	30.5	30.4	The second						
Temp (°C)	20.8	20,2	20.2	20.0	20.2	20.1	20.1	Real Providence						
	-			. F	nal									
рН		8.18	8.03	8.06	1802	8.14	8-11	8.09						
DO (mg/L)		6.2	6.2	5.6	5.5	5.6	5.7	5.8						
Temp (°C)		20.8	20.7	20.7	20.6	20.9	20,8	20.6						

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Concentration	50%													
Day	0	1	2	3	4	5	6	7						
			S. Bart	n 🖉	itial	and here and		EX REAL						
pН	8.25	B.09	8.14	8.14	8.22	8.25	\$25							
DO (mg/L)	7.2	6.3	le.6	6.6	6.3	6.1	62							
Salinity (ppt)	30.8	30.0	30.1	30.0	32.1	20.6	30.7							
Temp (°C)	20.2	20.4	20.2	20-0	29.3	224	20.5							
STATISTICS AND	这些新闻的问题	and the second	A State State	F	nal	M. Alexandre								
pН	as a file	8.18	8.08	8.09	3.10	8.17	8.18	8.15						
DO (mg/L)		59	61	5.7	5.6	5.7	5.7	5.8						
Temp (°C)	and the second	20.8	20.7	20.7	70.6	20.7	20.3	20.6						

Concentration		67%											
Day	0	1	2	3	4	5	6	7					
N. M. C. S. Martin Street			NY I LAR	In	itial	CARGE TO P	and the state	State - State					
рН	8.20	8.04	8.13	8.14	824	825	822						
DO (mg/L)	7.2	6.2	6.5	6.6	6.4	61	5.9						
Salinity (ppt)	30.5	30.1	30.1	30.1	32.7	327	30.7						
Temp (°C)	19.7	20.5	20,1	20.0	20.3	20.4	20.5						
		and Albert	Sec. Sec.	Fi	nal			A PER P					
рН		8.18	8.10	8.14	8.17	8.18	8.19	8.17					
DO (mg/L)		6.0	6.1	5.7	5.7	5.8	5.8	5.8					
Temp (°C)		26.7	20.7	20.7	20.7	20.7	20.8	20-6					

Concentration				10	0%			
Day	0	1	2	3	4	5	6	7
·····································		27 A.		lin	itia	442 4013	Sale Indiana	13 A. C. S. S.
рН	8.12	800	8.13	8.14	B20	8.25	8.14	
DO (mg/L)	7.5	5.9	6.6	6.5	6.6	4.2	5.9	
Salinity (ppt)	30.2	30.2	30.2	30.1	30.2	30.6	30.9	
Temp (°C)	19.3	20.5	20.5	20.0	20.3	20.5	20.6	
		14 2 1 1 1 2 1 2 1 4 1 4 1 4 1 4 1 4 1 4		Fi	nal	Service Land	4 5 SAL 80	
pН		8.16	8.12	8.16	18.19	8.20	8.19	8.19
DO (mg/L)		6.0	5.9	5.8	5.8	5.8	5.8	5.7
Temp (°C)		20.7	20:7	20.6	20.7	20,0	20,8	20-6
	0	1	2	3	4	5	6	7
								Sector Control

Final Review: afth \$20/64

Animal Source/Date Received:	ABS / 7/17/04	Analysts:	Initial:	me	RG	μc	SH	RG	Fry	RG	
Animal Age at Initiation:	14 days		Final:		AH	ne	SH	RY	rs '	SH	5#

Comments:

QC Check:

AH 8-10-04

Client Name:	City of Buenaventura							Test Species: <u>A. affinis</u>								
Sample ID:		B-1					Sta	rt Date	/Time: _	07/21/2004	/1430					
Test No.:	,	0407-0)32				En	d Date	/Time: _	07/28/2004	1230					
Conc.				S	urviva	on Te	st Day	:		Percent	pan wt.	pan + fish				
(%)	Rep.	0	1	2	3	4	5	6	7	Survival	(a)	(a)				
Lab Control	а	5	5	E	5	C C C C C C C C C C C C C C C C C C C	5	E	E		0.04136	0.04885				
-ti	b	5	5	5	5	5	5	5	5	100	0.04740	0.05381				
	c	5	5	5	5	5	5	5	5	100	0.03476	0.04285				
	d	5	5	5	5	5	5	4	4	80	0.02874	0.03397				
	е	5	4	4	4	Ч	1	4	4	80	0.03142	0.03942				
Salt Control	а	5	5	5	5	5	5	5	5	100	0.03122	0.03678				
出	b	5	5	4	4	4	9	4	4	80	0,02915	0.03474				
	С	5	5	ĸ	5	5	5	5	5	100	0.03249	0.03969				
	d	5	5	5	5	5	5	5	5	100	0.03716	0.04418				
	е	5	Ś	5	5	5	5	5	5	100	0.03792	0.04462				
25	а	5	5	5	5	+	-	5	5	100	0,03932	0.04705				
	b	5	5	5	5	5	7	5	5	100	0.03450	0.04340				
	c	5	5	5	5	5	5	5	5	100	0.03821	0.04447				
	d	5	5	5	5	5	5	5	5	IM	0.04647	0.05244				
	e	5	5	5	5	5	5	5	5	100	0 64079	0.04841				
50	a	5	5	5	5	E		5	A	80	0.04011	00479p				
	b	5	4	Я	4	2	4	<u> </u>	H	80	0.04131	0.01140				
	<u> </u>	5	5	5	F	5	5	5	5	100	0 04021	1.04739				
	d d	5	5	5	5	5	5	- <u> </u>	1	100	0.03486	0.04010				
	e e	5	5		2	<	5	17	5	100	0.000 79	0.04925				
(7	a	5	, F	<u> </u>	2	4	6			100	0.04762	006417				
<u> </u>	h	5	5	2	- <u>-</u>		5	5	а Г	100	0,01791	0.06437				
		5	É	5	2	É	5	5		100	0.04410	0.05487				
	d d	5	5	5	1 =	5	5	5	5	100	0.624.5	0.04280				
	e	5	5	2	- 3 - r	57	5	5	2	100	0.03600	Pretial				
100	a	5	5		5	5/	5	F	2	100	0.00000	Docktog				
100	h	5	5		1		É	5	1	100	0.04160	0 04929				
	6	5	5	-3	2		É	5	2		0.04691	0.048.24				
	d	5	5	1	4	- S	u u	4	<u>د</u> د	80	0.041+3	0 04700				
	e	5	5	5				5	1	100	0.04060	0.041230	0.04712			
	a	<u> </u>				<u>├ \$</u>	<u>↓</u> ⇒		3		<u>D.0315@</u>	0.0 110-	0.0.772			
	b				<u> </u>											
	6				1			 								
	d		+		+											
	e		1	1				1								
Tech Initials		5#	NAC.	54	SU	ni.	012	GIt	<h< td=""><td></td><td>1 DR</td><td></td><td>I</td></h<>		1 DR		I			
				1011	1 - 1	- M	1 Ruf	1.201	1 3 4 1	' data en	thy Weig	ht Data:				
Feeding Time	es (dav):	0	1	2	3	4	5	6	Q(=AH	Date/Time in	:7-28-04/	1330			
		/-	-	0900	asco	0830	12900	0840	415		Date/Time out	7.30.04/14	136			
			1620	11045	ilm	1400	1945	1600	17115		Oven Temp (°C)	:004				
				100 12	1.40.5	00-11-100	11 173		1171	1	Tech Initials	: 50				
Comments:											QC Check	AH 8-10-0	ú			
seminority.										-	Final Review	G AL AT	DA.			
												- Hr da	101			

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

CETIS	Report							Report Date: Link:	23 Aug-04 1:57 PM 13-2732-6785/0407-033
Pacific Tops	melt 7-d Surviva	al and Gro	wth Test	3-3					AMEC Bioassay SD
Test: Start Date: End Date: Setup Date:	11-9894-1671 21 Jul-04 02:30 F 28 Jul-04 02:00 F 21 Jul-04 02:30 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/ 821/R Laboratory	vival (7d) -02-012 (20) Seawater	1995	Duration: Species: Source:	6 Days 23 Ho Atherinops aff Aquatic Biosys	nurs inis stems, CO
Sample: Sampled: Received: Hold Time:	06-4069-9812 20 Jul-04 10:40 / 21 Jul-04 07:45 / 28 Hours (18.2 °(AM AM C)	Material: Code: Source: Station:	Estuarine M 0407-033 City of Buen B-3	Aonitoring Sa naventura	ample	Client: Project:	City of Buenav	ventura
Comparison	Summary								
Analysis 06-1191-8487 16-3500-0247	Endpoint 1 7d Proportion 1 Mean Dry Wei	Survived ght-mg	NOEL 100 100	LOE >10 >10	EL 0 0	ChV N/A N/A	MSDp 0.19476 0.22005	Method Steel's Many Dunnett's Mu	One Rank Itiple Comparison
7d Proportio	on Survived Sum	mary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	se SE	SD	CV	
0 0 25	Lab Control Salt Control	5 5 5	0.84000 0.84000 0.96000	0.60000 0.60000 0.80000	1.00000 1.00000 1.00000	0.07483 0.07483 0.04000	0.16733 0.16733 0.08944	19.92% 19.92% 9.32%	
50 67 100		5 5 5	0.96000 0.96000 0.92000	0.80000 0.80000 0.80000	1.00000 1.00000 1.00000	0.04000 0.04000 0.04899	0.08944 0.08944 0.10954	9.32% 9.32% 11.91%	
Mean Drv We	eiaht-ma Summ	arv							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	1.24520	0.88200	1.55200	0.10682	0.23886	19.18%	
0 25 50 67 100	Salt Control	5 5 5 5	1.16040 1.24600 1.30440 1.34120 1.20920	1.00200 1.10400 1.08800 1.02400 1.03200	1.41200 1.41000 1.52600 1.61400 1.31800	0.06946 0.06514 0.08424 0.10980 0.05092	0.15533 0.14566 0.18836 0.24551 0.11386	13.39% 11.69% 14.44% 18.31% 9.42%	
7d Proportio	n Survivad Data			1.00200		0.00002	0.11000	5.4270	
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0 25 50 67 100	Lab Control Salt Control	1.00000 1.00000 1.00000 1.00000 1.00000 0.80000	1.00000 0.80000 1.00000 1.00000 1.00000 1.00000	0.80000 0.80000 0.80000 1.00000 1.00000 1.00000	0.80000 0.60000 1.00000 1.00000 0.80000 1.00000	0.60000 1.00000 0.80000 1.00000 0.80000			
Mean Dry We	eight-mg Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0 0 25 50 67	Lab Control Salt Control	1.55200 1.17000 1.10400 1.41400 1.20400	1.27000 1.07200 1.39600 1.52600 1.30800	1.23800 1.14600 1.17600 1.36400 1.55600	1.28400 1.00200 1.14400 1.08800 1.02400	0.88200 1.41200 1.41000 1.13000 1.61400			
100		1.19000	1.30000	1.20600	1.03200	1.31800			



Page 1 of 1

Test Summary:

CETIS	Report	t							Report Da Analysis:	ite:	18 Au (g-04 1:14 PN 06-1191-8481
Pacific Tops	melt 7-d Surviva	al and G	rowth Test	B-3							AMEC E	lioassay SD
Endpoint		A	nalysis Type		Sample	Link	Contro	Link	Date Analyzed		Version	
7d Proportion	Survived	Co	omparison		13-2732-	6785	13-273	2-6785	18 Aug-04 1:13	PM	CETISv	.024
Method		AI	tH Data	Transform	Z	NO	EL I	OEL	Toxic Units	ChV	,	MSDp
Steel's Many	-One Rank	С	>T Angu	lar (Corrected	d)	100) ;	>100	1.00	N/A		19.48%
ANOVA Ass	umptions				11,59,7,5 ^{,1} ,5 ^{,1}							
Attribute	Test		Stati	stic Cr	ritical	P Leve	el	Decisio	n(0.01)			
Variances	Bartlett		2.25	717 13	3.27671	0.6885	58	Equal V	ariances			
Distribution	Shapiro-W	ilk W	0.85	585 0.8	88746	0.0019	99	Non-nor	mal Distribution			
ANOVA Tabl	e										<u></u>	
Source	Sum of	Squares	Mean Squ	uare DF	F Statis	tic	P Level		Decision(0.05)			
Between	0.07359	371	0.0183984	4 4	1.04		0.41077		Non-Significant	Effect		
Error	0.35341	18	0.0176706	5 20								
Total	0 42700	551	0.0360690) 24								
Group Comp	parisons											
Control	vs Conc-%		Statistic	Critical	P Level	Ti	es	Dec	ision(0.05)			
Salt Control	25		33	17	>0.05	2		Non	-Significant Effe	ect		
	50		33	17	>0.05	2		Non	-Significant Effe	ect		
	67		33	17	>0.05	2		Non	-Significant Effe	ect		
	100		31	17	>0.05	2		Non	-Significant Effe	ect		
Data Summa	ıry			Orig	ginal Data				Transf	formed	l Data	
Conc-%	Control Type	Count	Mean	Minimum	Maximun	n SE)	Mean	Minimum	n Ma	iximum	SD
0	Salt Control	5	0.84000	0.60000	1.00000	0.1	16733	1.15819	9 0.88608	1.3	4528	0.19317
25		5	0.96000	0.80000	1.00000	0.0	08944	1.2976	6 1.10715	1.3	4528	0.10650
50		5	0.96000	0.80000	1.00000	0.0	08944	1.2976	6 1.10715	1.3	4528	0.10650
67		5	0.96000	0.80000	1.00000	0.0	08944	1.2976	6 1.10715	1.3	4528	0.10650
100		5	0.92000	0.80000	1.00000	0.1	10954	1.25003	3 1.10715	1.3	4528	0.13043

Approved By: 910 - 5/20/0k

Comparisons: Page 1 of 2

Comparisons: Page 2 of 2 Report Date: 18 Aug-04 1:14 PM 16-3500-0241

AMEC Bioassay SD

Analysis:

Pacific Topsmelt 7-d Survival and Growth Test	B-3)
		-

Endpoint			Ar	alysis Type			Sample	e Li	ink (Contro	l Link	Date Analyzed	d	Version	
Mean Dry We	ght-m	ng	Co	mparison			13-2732	2-67	785 ´	13-2732	2-6785	18 Aug-04 1:13	3 PM	CETISv1	.024
Method			Al	tH Data	Transfo	rm	Z		NOEL	- L	OEL	Toxic Units	Ch	v	MSDp
Dunnett's Mult	iple C	Comparison	С	> T Untr	ansforme	d			100	>	>100	1.00	N/A	4	22.00%
ANOVA Assu	mptio	ons													
Attribute Test				Statistic			Critical P Level				Decisio	on(0.01)			
Variances		Bartlett		2.44	139	13.2	27671	0.6	65516		Equal V	/ariances			
Distribution		Shapiro-Wilk	W	0.97	034	0.88	8746	0.6	65213		Normal	Distribution			
ANOVA Table)														
Source		Sum of S	quares	Mean Sq	uare	DF	F Stati	sti	c P	Level		Decision(0.05)		
Between		0.1048022	2	0.026200	6	4	0.85	_	0	.51013		Non-Significan	t Effec	t	
Error		0.6162474		0.030812	4	20									
Total		0.7210495	i9	0.057012	9	24									
Group Comp	ariso	ns													
Control	vs	Conc-%		Statistic	Critica	1	P Level		MSD	1	Dee	cision(0.05)			
Salt Control		25		-0.7710477	2.3		>0.05		0.25	53409	No	n-Significant Eff	ect		
		50		-1.297086	2.3		>0.05		0.25	53409	Nor	n-Significant Eff	ect		
		67		-1.628567	2.3		>0.05		0.25	53409	No	n-Significant Eff	ect		
		100		-0.4395698	2.3		>0.05		0.25	53409	Nor	n-Significant Eff	ect		
Data Summa	у					Origi	nal Data					Trans	forme	ed Data	
Conc-%	Con	trol Type	Count	Mean	Minir	num	Maximu	m	SD		Mean	Minimur	n N	laximum	SD
0	Salt	Control	5	1.16040	1.002	200	1.41200		0.15	533					
25			5	1.24600	1.104	100	1.41000		0.14	566					
50			5	1.30440	1.088	300	1.52600		0.188	336					
67			5	1.34120	1.024	00	1.61400		0.24	551					
100			5	1.20920	1.032	200	1.31800		0.113	386					

Approved By A2du

Water Quality Measurements

Client:	City of Buenaventura
Sample ID:	<u>B-3</u>
Test No:	0407-033

Test Species: A. affinis

Start Date/Time: 07/21/2004 / H30

1230 End Date/Time: 07/28/2004

Concentration		Lab Control サテ										
Day	0	1	2	3	4	5	6	7				
		Strawy	1253	Ini	tial	的知道的人		Section -				
pH	8.00	7.97	798	10,8	8.06	1.98	7.91	1.323				
DO (mg/L)	7.8	1.6	7.8	7.9	7.9	7.3	8.4					
Salinity (ppt)	36.1	29.8	30.1	30.0	30.1	30.2	29.6					
Temp (°C)	20.5	201	20.0	26.0	20.1	20.7	20.7					
		A starter		Fil	nal	際に対応	1. S. B.					
Hq		7.78	761	7.76	7-69	7.81	8.09	8.03				
DO (mg/L)		6.2	6.0	6.0	6.2	6.0	6.1	5.8				
Temp (°C)		20.7	20.7	20.7	20.7	20.7	203	207				

Concentration	Salt Control かみ												
Day	0	1	2	3	4	5	6	7_					
A SHARE AND A SHARE A	States and a	建 制的 (4)		in Ini	tial	「「なんた」「気か	and the set						
pH	8.41	8.15	8.29	8.33	8.32	8.25	6.38						
DO (mg/L)	7.6	6.7	7.2	7.2	7.1	6.5	5.7						
Salinity (ppt)	30.3	29.9	30.2	302	30.2	30.5	30.1						
Temp (°C)	209	2010	20.8	28.8	201	20.1	20.4						
				Fi	nal	12	and the second						
pH		8.20	8.00	8.06	8.01	\$1.92	8.09	8.08					
DO (mg/L)		5.8	5.7	6.2	6.2	6.0	6.1	5.9					
Temp (°C)		20.7	20.7	20,7	20.7	20.7	20%	2071					

Concentration		25%												
Day	0	1	2	3	4	5	6	7						
and states the based	the set water and			ini 🖉	itial.			$\mathcal{N} = \{i, j\}$						
рН	8.56	843	8.41	8.46	Ϊ Άλ.ΨΨ	8.44	8.50							
DO (mg/L)	7.3	6.6	6.3	6.5	6.6	6.1	6.0							
Salinity (ppt)	30.0	29.9	299	30.0	30.1	30.4	30.3							
Temp (°C)	20.8	20.4	20.3	20.0	20.1	20.1	20.4							
				Fi	nal									
pH		1 8.34	18.14	13:14	8.22	8.21	821	8.24						
DO (mg/L)	and the	5.1	5.8	6.0	6	5.6	5.6	57						
Temp (°C)		20.7	20.7	20.7	10.0	20.8	2077	20.8						

Concentration	50%									
Day	0	1	2	3	4	5	6	7		
				in la	itial	and the		2 A		
pН	8.68	8.49	8.56	8.56	8-57	853	6.52			
DO (mg/L)	7.5	6.4	6.3	6.5	6.6	6.1	6,2			
Salinity (ppt)	30.7	29.9	30.0	30.0	30:1	30.5	303			
Temp (°C)	20.6	20.6	20.1	20.0	20.2	20.1	20.4			
たったまたのであってあ		Sal 2 Start		Fi	nal	and the s				
pH		8.46	8.34	8.35	\$.40	18.36	8.41	8.41		
DO (mg/L)		5.7	5.6	5.3	5.7	5.6	5.6	5.7		
Temp (°C)		20.7	20.7	20.7	20.6	20.8	20.7	20.7		

Concentration	677.												
Day	0	1	2	3	4	5	6	7					
一些 由 200 年 1973年 1993年			のないの	ni Ini	tial			235 B.C.C.S.					
рН	8.74	8.59	8.64	8.67	8.61	8,60	8.5%	12 M					
DO (mg/L)	7.9	5.9	6.4	6.5	6.5	6.1	6.4	in Mar					
Salinity (ppt)	30.5	30.0	30.1	30.0	30.L	30.6	30.5						
Temp (°C)	20.3	20.5	20.1	20.0	20.2	20.1	2. P. Z						
	2-2-21 Sec.		at store a	Fi	nal	Con A	1	100 C 100 C					
рН		8.56	8.41	8.42	8.44	8.38	8.42	8.44					
DO (mg/L)		5.Z	5.4	5.2	5.1	5.4	5.5	5.6					
Temp (°C)		20,8	20.7	20.7	22.7	20.8	20.8	20.7					

Concentration	100%												
Day	0	1	2	3	4	5	6	7					
Contraction of the second		il comp	Ploy to be	ni	tial								
pH	8.83	8.67	8.74	8.0	8.74	8.61	8.45						
DO (mg/L)	8.4	5.7	6.2	6.3	6.4	6.2	7,1						
Salinity (ppt)	30.2	30.1	30.2	301	30.2	30.7	30.7						
Temp (°C)	19.2	20.5	20.8	20.0	20.2	20.1	20.1						
and the second second second	A TRACK		States and	Fi	nal								
рН		8,12	8.52	8.54	335	8.48	8.49	8,51					
DO (mg/L)		5.4	5.6	5.2	5.1	5.2	5.5	5.4					
Temp (°C)		20.8	20.7	20.7	2017	20.8	20.8	20.8					

				0	1	2	3	4	5	6	1		
Animal Source/Date Re	eceived:	ABS / 7/17/04		Analysts:	Initial:	мс	RG	ne	5#	RG	25 Ry	RG	
Animal Age at Initiation		14 days		·	Final:		AH	Le	SH	RG	R4	5H	SH
Comments:	-									<u> </u>			
QC Check:	AH 8-10-04							Fina	l Review:	at	A	120	of
do oncom										-1		• •	

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Client Name:	ne: <u>City of Buenaventura</u> Test Species								ecies:	A. affinis						
Sample ID:		B-3					Sta	rt Date	/Time:	07/21/2004	1	1430				
Test No.:		0407-(033				En	d Date	/Time:	07/28/2004	•	1230				
Conc.				S	urvival	on Te	st Dav	:	I	Percent		pan wt.	pan + fish			
(%)	Rep.	0	1	2	3	4	5	6	7	Survival		(a)	(a)			
Lab Control	а	5	5	T	5	5	<	Ľ	5	100		0.03404	204270			
#2	b	5	, ,	5	5	5	5	5	E S	100		0.03484	0.04119			
e	С	5	5	5	5	5	4	4	4	<u>h0</u>		0.03953	0.01572			
	d	5	4	4	4	ч	Y	4	4	80		0.04001	0.04643			
	е	5	5	5	5	5	4	3	3	60		0.03534	0.03975			
Salt Control	a	5	5	5	5	5	5	5	5	100		0.04103	0.04688			
#2	b	5	5	5	4	4	Y	4	4	.80		0.03748	0.04284			
	С	5	4	4	4	ч	4	4	4	80		0.03796	0.04369			
	d	5	5	4	4	Ч	3	3	3	60		0.03457	0.03958			
	е	5	5	5	5	5	MY 5	5	5	100		0.03731	0.04437	50		
25	а	5	5	5	5	5	5	Б	5	100		0.04555	0.05755	0.05107		
	b	5	5	5	5	5	5	5	5	100		0.03573	0.05266	0.04271		
	С	5	5	5	4	Ч	4	4	4	'ଡଠ		0.02736	0.5183 -	0.05183		
	d	5	5	5	5	5	5	5	5	100		0.03839	0.0 582	0.0332		
	е	5	5	5	5	5	5	5	5	100		0.03715	0.05352	0.04477		
50	а	5	5	5	#55	5	5	5	5	100		0.04531	0.01833	0.05238		
	b	5	5	5	5	5	5	5	5	100		0.04058	0.04852	0.04821		
	С	5	5	5	5	5	5	5	5	100		0.04029	0.04711			
	d	5	5	5	5	5	5	5	5	100		0.04054	0.04598			
	е	5	5	4	4	4	LY_	Ч	4	60		0.03958	0,04523			
67	а	5	5	5	5	5	5'	5	5	100		0.04052	0.04654			
	b	5	5	5	5	5	5	5	5	100		0.03917	0,04571			
	С	5	5	5	5	5	5	5	5	100		6.04014	0.04792	k		
	d	5	9	5	5	5	5	5	4	80		0.04281	0,04793			
	e	5	5	5	5	5	5	5	5	(00		0.04172	0.04979			
100	a	5	4	4	4	4	4	4	4	80		0.03913	0.04508]		
	b	5	5	5	5	5	5	5	5	100		0.03053	0.04303			
	C	5	13	5	5	>	5	5	5	100		0.03571	0.04174			
	d	5	12	5	5	5	5	5	5	100		0.03298	0.09814			
	e	5	<u> </u>	5	5	<u> </u>	2	1-1-	9	00		0.03177	0.058.50	4		
	a L															
	D															
	C															
							+				B	1		{		
Tech Initials	e		11/		<++		1/10	CH	en	at de ar			<u> </u>	1		
recir initials		1 DN	me	124	31	Klq	ING	1.51	124	dava en	tn	1 Weigh	nt Data:			
Feeding Time	veh) ac)·	0	1	2	3	4	5	6	QC=AH		Date/Time in	1-28-04	1330		
, coung rine	uay	,.		0900	ACTON	109.14	0900	0840	Doir	1	n	ate/Time out	7.3001	1430		
			11.20	LINIA	11.00	100.00	194	1600	150-	ł	Ov	en Temp (°C)	Tay			
			1430	10-17	1,0025	11400	נדיין	1.00-	1011	1		Tech Initials	50	-		
														-		
Comments:												QC Check:	: AH 8-10	-04		
										-	F	inal Review:	ALLA A	201/4		
										-	-		-Tu of	- 101		

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

CETIS	6 Report							Report Date: Link:	23 Aug-04 1:57 PM 17-3531-6143/0407-034
Pacific Tops	smelt 7-d Surviva	and Gro	wth Test	-2					AMEC Bioassay SD
Test: Start Date: End Date: Setup Date:	11-9894-1671 21 Jul-04 02:30 F 28 Jul-04 02:00 F 21 Jul-04 02:30 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/ 821/R Laboratory	rvival (7d) -02 012 (20) Seawater	1995	Duration: Species: Source:	6 Days 23 Ho Atherinops aff Aquatic Biosys	urs inis stems, CO
Sample: Sampled: Received: Hold Time:	16-8186-3116 20 Jul-04 09:35 21 Jul-04 07:45 29 Hours (18.5 °	AM AM C)	Material: Code: Source: Station:	Estuarine M 0407-034 City of Bue C-2	Aonitoring Sa naventura	ample	Client: Project:	City of Buenav	ventura
Comparison	Summary								
Analysis	Endpoint		NOEL	LOI	EL	ChV	MSDp	Method	
13-4805-418 17-7579-168	 7d Proportion Mean Dry Wei 	Survived ght-mg	100 100	>10 >10	0 0	N/A N/A	0.20159 0.21275	Dunnett's Mu Dunnett's Mu	Itiple Comparison Itiple Comparison
7d Proportic	on Survived Sum	mary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv	
0	Lab Control	5	0.84000	0.60000	1.00000	0.07483	0.16733	19.92%	
0	Salt Control	5	0.84000	0.60000	1.00000	0.07483	0.16733	19.92%	
25		5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%	
50		5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%	
67		5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%	
100		5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%	
Mean Dry W	eight-mg Summ	ary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	1.24520	0.88200	1.55200	0.10682	0.23886	19.18%	
0	Salt Control	5	1.16040	1.00200	1.41200	0.06946	0.15533	13.39%	
25		5	1.23840	1.08400	1.46400	0.06574	0.14/01	11.87%	
50		5	1.19800	1.11600	1.31400	0.00347	0.07530	0.29%	
100		5	1.20000	1.00200	1.30000	0.09247	0.20077	15.36%	
			1.40020	1.17000	1.72200	0.00000	0.22027	13.00 //	
	on Survived Deta								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.00000	1.00000	0.80000	0.80000	0.60000			
25	Sall Control	1.00000	1.00000	0.80000	1.00000	1.00000			
50		0.80000	0.80000	1 00000	1.00000	1.00000			
67		1.00000	1.00000	1.00000	0.80000	1.00000			
100		1.00000	0.80000	0.80000	1.00000	1.00000			
Mean Dry W	eight-mg Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.55200	1.27000	1.23800	1.28400	0.88200			
0	Salt Control	1.17000	1.07200	1.14600	1.00200	1.41200			
25		1.08400	1.15800	1.29400	1.46400	1.19200			
50		1.19800	1.11600	1.15000	1.21200	1.31400			
67		1.35400	1.19600	1.14600	1.06200	1.58600			
100		1.72200	1.49800	1.17800	1.27800	1.59000			

Test Summary: Page 1 of 1

 Comparisons:
 Page 1 of 2

 Report Date:
 18 Aug-04 1:40 PM

 Analysis:
 13-4805-4181

Pacific Tops	nelt 7	'-d Survival a	nd Gi	rowth Test	C-2	7							AMEC E	Bioassay SD
Endpoint			An	alysis Typ	е		Sample L	ink	Contro	l Link	Date Analyzed		Version	
7d Proportion	Survi	ved	Co	mparison			17-3531-6	5143	3 17-3531	1-6143	18 Aug-04 1:39	PM	CETISv1	1.024
Method			Alt	Alt H Data Transform			Z	N	OEL L	.OEL	Toxic Units	ChV	,	MSDp
Dunnett's Mul	tiple (Comparison	C :	>T An	gular (Co	rrected)		1	00 >	100	1.00	N/A		20.16%
ANOVA Assu	mpti	ons												
Attribute Test				Sta	atistic	Crit	ical F	al P Level Decision(0.01)						
Variances		Bartlett		1.9	1381	13.2	27671 0	.75′	161	Equal V	ariances			
Distribution		Shapiro-Wilk V	V	0.8	8850	0.88	3746 0	.010	055	Normal	Distribution			
ANOVA Table	,					<u></u>								
Source		Sum of Squ	lares	Mean S	quare	DF	F Statist	ic	P Level		Decision(0.05)			
Between		0.06484551		0.01621	14	4	0.86		0.50348		Non-Significant			
Error		0.376095		0.01880	48	20								
Total		0.44094048		0.03501	61	24								
Group Comp	ariso	ns												
Control	vs	Conc-%		Statistic	Critic	ai	P Level	ſ	MSD	Dec	ision(0.05)			
Salt Control		25		-1.608092	2.3		>0.05	0	0.1994764	Non	-Significant Effect	ct		
		50		-1.058946	2.3		>0.05	C	0.1994764	Non	-Significant Effect	ct		
		67		-1.608092	2.3		>0.05	C	0.1994764	Non	-Significant Effect	ct		
		100		-1.058946	2.3		>0.05	C	0.1994764	Non	-Significant Effect	ct		
Data Summa	ry					Origiı	nal Data				Transf	ormed	d Data	
Conc-%	Con	trol Type C	ount	Mean	Min	imum	Maximum	5	SD	Mean	Minimum	Ma	iximum	SD
0	Salt	Control 5		0.84000	0.60	0000	1.00000	C	0.16733	1.1581	9 0.88608	1.3	4528	0.19317
25		5		0.96000	0.80	0000	1.00000	C	0.08944	1.2976	5 1.10715	1.3	4528	0.10650
50		5		0.92000	0.80	0000	1.00000	C	0.10954	1.2500	3 1.10715	1.3	4528	0.13043
67		5		0.96000	0.80	0000	1.00000	C	0.08944	1.2976	5 1.10715	1.3	84528	0.10650
100		5		0.92000	0.80	0000	1.00000	(0.10954	1.2500	3 1.10715	1.3	4528	0.13043

 Comparisons:
 Page 2 of 2

 Report Date:
 18 Aug-04 1:40 PM

 Analysis:
 17-7579-1683

Pacific Tops	nelt 7-d Survi	val and G	rowth Test	C-2							AMEC B	lioassay SD
Endpoint		A	nalysis Type		Sample	Lir	nk Contro	l Link	Date Analyzed		Version	
Mean Dry We	ight-mg	C	omparison		17-3531	-61	43 17-353	1-6143	18 Aug-04 1:40	PM	CETISv1	.024
Method	Method Alt H Data Transform Z NOEL					NOEL I	LOEL	Toxic Units	Ch\	/	MSDp	
Dunnett's Mul	tiple Comparis	on C	> T Untra	ansformed			100 :	>100 1.00 N/A 21.			21.27%	
ANOVA Assu	Imptions											
Attribute Test			Stati	stic Cr	itical	ical P Level Decision(0.01)						
Variances	Bartlett		4.167	772 13	3.27671 0.38378 Equal Variances							
Distribution	Shapiro-	Wilk W	0.965	587 0.8	38746	0.5	4640	Norma	Distribution			
ANOVA Tabl	9											
Source	Sum o	of Squares	s Mean Squ	uare DF	F Statis	stic	P Level		Decision(0.05)			
Between	0.2578	3187	0.0644547	7 4	2.24		0.10129)	Non-Significant	Effect	t	
Error	0.5760	557	0.0288028	3 20								
Total	0.8338	37443	0.0932575	5 24								
Group Comp	arisons											
Control	vs Conc-%	6	Statistic	Critical	P Level		MSD	De	cision(0.05)			
Salt Control	25		-0.7266861	2.3	>0.05		0.2468738	No	n-Significant Effe	ect		
	50		-0.3502983	2.3	>0.05		0.2468738	No	n-Significant Effe	ect		
	67		-1.009908	2.3	>0.05		0.2468738	No	n-Significant Effe	ect		
	100		-2.727871	2.3	>0.05		0.2468738	No	n-Significant Effe	ect		
Data Summa	ry			Oriç	jinal Data		a da da ang da		Trans	forme	d Data	
Conc-%	Control Type	e Count	Mean	Minimum	Maximur	n	SD	Mean	Minimum	n Ma	aximum	SD
0	Salt Control	5	1.16040	1.00200	1.41200		0.15533					
25		5	1.23840	1.08400	1.46400		0.14701					
50		5	1.19800	1.11600	1.31400		0.07530					
67		5	1.26880	1.06200	1.58600		0.20677					
100		5	1,45320	1,17800	1,72200		0.22327					

Water Quality Measurements

Client:	City of Buenaventura	Test Species: A. affinis
Sample ID:	C-2	Start Date/Time: <u>07/21/2004</u> /ใหรอ
Test No:	0407-034	End Date/Time: 07/28/2004 ノリンス〇

Concentration		Lab Control # 2											
Day	0	1	2	3	4	5	6	7					
				ln ln	itial			Contraction in					
рН	8.00	7.91	7.98	10.8	8.06	7.98	7.91						
DO (mg/L)	7.8	7.6	7.8	7.9	7.9	7.3	8.4						
Salinity (ppt)	30.1	29.8	30.1	30.0	30.1	30.2	22.4						
Temp (°C)	20.5	20.7	20.0	20.0	201	20.7	20.7						
				i F	inal		6-19-28-3 19-19-28-3						
pН		178	7.61	7.76	7.72	7.81	P0.8	8.08					
DO (mg/L)		6.2	6.0	60	6.1	6.0	6.1	5.9					
Temp (°C)		20.7	20.7	20.7	20.8	20.7	20.8	20.7					

Concentration		Salt Control 2											
Day	0	1	2	3	4	5	6	7					
		Mar Andrew	1 . A .	ln In	itial		1. A.L	and the second					
рН	8.41	8.15	8.19	8.33	8.37	B.25	8.38						
DO (mg/L)	4,0	6.7	7.2	7.2	7.1	6.5	5.7						
Salinity (ppt)	30.3	29.9	30.2	30.2	30.2	30.5	30.1						
Temp (°C)	20.9	20.6	20.8	20,0	20.1	201	20.6						
	and the second second		Constant of	Ei Fi	nal		「たい」						
pН		8.20	8.00	8.06	\$.00	1.92	8.09	8.08					
DO (mg/L)		5.8	5.7	6.2	60	6.0	6A	5,9					
Temp (°C)		201	20.7	20.7	20.7	26.7	20.8	20.7					

Concentration				2	5%			
Day	0	1	2	3	4	5	6	7
	HAR I AN	All states	See and	ln In	itial	語語はないと言		
рН	8,50	B.29	8.3	8.41	8.37	\$32	8.37	
DO (mg/L)	7.2	6.3	6.4	6.5	6.4	6.1	5.9	
Salinity (ppt)	30.7	29.9	30.0	30.0	30.1	30.5	30,2	
Temp (°C)	20.7	20.2	20.2	20.0	20.2	20-1	20.2	
			ALL AND	F	inal	Usile -		
рН		8.27	8.12	8.12	8.14	3.230	8.18	8.20
DO (mg/L)	Star Star	5.8	5.0	5,3	5.3	5.6	57	5.8
Temp (°C)		20.8	20.9	20.7	20.4	20.7	20.6	2071

Concentration		50%											
Day	0	1	2	3 4			6	7					
and the second second		1200	的这个问题	In	tial	AL L		· · · · · · · · · · · · · · · · · · ·					
pH	8.56	8.31	8.41	8,48	8.44	8.25	8.34						
DO (mg/L)	7,4	6.1	6.3	6.5	6.5	6.2	5.9						
Salinity (ppt)	30.7	29,9	30.1	30.0	30.1	30.6	302	1000					
Temp (°C)	20.4	20.3	20.3	20.0	20.2	202	20.2						
	1000 BU			Fi	nal	2.25							
pН		8.34	8.36	8,22	8.27	8.360	8.19	1.21					
DO (mg/L)		5.5	5.4	5.4	5.5	5.7	56	5.7					
Temp (°C)		20.7	20.7	20.7	20.6	20.8	20.8	20.7					

Concentration		671.											
Day	0	1	1 2 3 4		5	6	7						
のなどのない。		同時にないので		In	tial .	14 5	1. T						
рН	8.59	8.35	8.46	8.51	8.50	0.00	8.30						
DO (mg/L)	7.7	55	6.1	6.3	6.4	6.0	5.9	1					
Salinity (ppt)	30.5	30.1	30.2	30.1	30.2	30.7	30.3						
Temp (°C)	20.1	20.4	20.7	20.0	20.3	20.2	25.7.						
· · · · · · · · · · · · · · · · · · ·	Start Carlo			Fi	nal	8.24							
pН		8.40	8.27	8.25	8.29	8-3802	821	8.21					
DO (mg/L)		5.5	5,2	5.0	5.1	5.7	56	5,7					
Temp (°C)		20.7	20.9	20.3	20.6	20.7	20.8	20.7					

Concentration		100%												
Day	0	1	2	3	4	5	6	7						
		The second	and the	In	itial			74 J 75						
рН	8.65	8.47	8.53	8.56	8.55	18.59	8.54							
DO (mg/L)	8.3	5.3	ie.1	63	6.6	6.2	6.1							
Salinity (ppt)	30.2	30.3	30.3	30.1	30.2	30:7	30.4							
Temp (°C)	19.4	20.5	203	20.0	20.3	10.3	20.2							
		The second second	and the second	E THE F	inal Contract	3.26	19 - 19 C - 19 C							
рН		8.45	8.31	8,29	8.29	1-4902	8.22	8,24						
DO (mg/L)		5.4	5.1	4.6	4.9	4.8	53	5.5						
Temp (°C)		20.8	20,9	20.7	20.4	20.9	20.8	20.7						

				0	1	2	3	4	5	6	7
Animal Source/Date Received:	ABS / 7/17/04	Analysts:	Initial:	MC	Ry	me	SĦ	KG	Ry	Ry	
Animal Age at Initiation:	14 days		Final:		AH	ne	SH	RG	RS	sh	SH

Comments:

QC Check:

AH 8-10-04

Final Review: A 20104

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Client Name:		City of Buenaventura Test Spec						ecies:	A. affinis				х.	
Sample ID:		C-2					Sta	rt Date	/Time:	07/21/2004	• /	1480		
Test No.:		0407-	034				En	d Date	e/Time:	07/28/2004	1	1230		
Conc.	_			S	urviva	l on Te	st Day	:		Percent		pan wt.	pan + fish	
(%)	Rep.	0	1	2	3	4	5	6	7	Survival		(g)	(g)	
Lab Control	а	5	5	۲ ۲	5	\$	6	5	5	100		0.03494	0.04270	
#2	b	5	5	5	5	5	3	5	5	100		0.03484	0.04119	
	С	5	5	5	5	5	4	4	4	80		0.03953	0.04572	
	d	5	4	4	4	9	4	4	4	80		0.04001	0.04643	
	е	5	5	5	5	5	4	ર	3	60		0.03534	0.03975	
Salt Control	а	5	5	5	5	5	5	5	5	100		0.04103	0.04688	
#2	b	5	5	5	4	Ч	Ϋ́.	4	4	80		0.03748	0.04284	
	С	5	4	4	4	4	4	4	4	80		0.03796	0.04369	
	d	5	5	4	4	4	3	З	3	60		0.03457	0.03958	
	е	5	5	5	5	5	5	5	5	100		0.03731	0.04437	
25	а	5	5	5	5	5	5	5	5	100		0.03843	0.04385	
	b	5	5	5	5	5	5	5	5	100		0.03436	004015	
	С	5	5	5	5	5	5	4	4	80	_	0.03489	0.04136	
	d	5	5	5	5	5	5	5	5	100		0.03795	2.04527	
	е	5	5	5	5	5	5	5	5	1.00		0.03472	0.04068	
50	a	5	4	4	4	4	LY_	4	4	80		0.04087	0.04686	
	b	5	4	4	4	4	4	4	4	80		0.04154	0.04712	ł
	С	5	5	5	5	5	3	5	5	100	_	0.03,616	0.04191	
	d	5	5	5	5	5	5	5	5	100		0.05000	0,04612	
	е	5	5	5	5	5	5	5	5	100		0.03496	0.04153	
67	а	5	5	5	5	5	5	Б	5	100		0.04933	0.05610	
	b	5	5	5	5	5	5	5	5	100	_	0.04664	005262	
	c	5	5	5	5	5	5	5	5	100	_	0.03935	0.04166	0.04208
	d	5	5	4	4	4	4	4	4	80		0,04089	0.04620	
	e	5	5	5	5	5	5	5	5	100	-	0.03839	0.04632	
100	a	5	5	5	5	5	3	5	5	100	-	0.03868	0.04729	
	D	5	5	4	4	<u> </u>	<u> </u>	4	4	80	-	10-04159	0.07908	4
	C	5	>	5	4	14	4	19	4	00	-	0.035-1-	007166	-
		5	13	5	5	12	12	5	12	100		0.04450	0.05049	-
		- 5	<u> </u>	5	12	 '		5	5	100	-	12.035 70	0.07565	4
	a b										-			4
									+		-			1
		+			+		+				-			4
				+						+	-			1
Tech Initials		ςü	110.	<#	GH		1010	CH	SIL		- indexed			1
recirinitiais		1.24	nae	151	151	Ky	TRQ	DN	124	Jaatae	nt	Weigh	t Data	
Feeding Time	es (dav):	0	1	2	3	4	5	6	QC=AH		Date/Time in:	7-28-04	1330
		,.		0900	0500	10820	0900	0840	1815	7	D	ate/Time out:	8.1.041	
			1632	11.45	1105	1400	1945	1600	1415	-	Ov	en Temp (°C):	65	
					- July		11:13			-		Tech Initials:	55	-
														-
Comments:												QC Check:	AH 8-10-	04
										_	F	inal Review:	GXAA 3	2010
										_				

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

A. BAHIA

Test Summary:Page 1 of 1Report Date:19 Aug-04 8:42 AM

Link:

19-1830-8935/0407-035

Chronic Mysid Survival and Growth Test A - 2 AMEC Bioassay SD										
Test: 1 Start Date: 2 End Date: 2 Setup Date: 2	etup Date: 21 Jul-04 04:45 PM 10-4928-7581 10-4928-758 10-4928-7581			Growth-Survival (7d)DurationEPA/821/R-02-014 (2002)SpeciesLaboratory SeawaterSourceNot ApplicableSource				tion: 6 D ies: Am ce: Aqu	ays 22 Hours ericamysis bał uatic Biosysten	nia ns. CO
Sample: 03-0997-3942 Sampled: 20 Jul-04 02:50 PM Received: 21 Jul-04 07:45 AM Hold Time: 25 Hours (19.3 °C)			Material: Code: Source: Station:	Estuarine M 0407-035 City of Buer A-2	lonitoring Sa	ample	Clier Proje	it: City ect:	/ of Buenavent	ura
Comparison Summary										
Analysis	Endpoint		NOEL	LOE	EL.	ChV	MSDp	Me	ethod	
07-1107-2556 03-4631-7063	25567d Proportion Survived7063Mean Dry Weight-mg		100 100	>100 >100		N/A 0.06394 N/A 0.36076		Steel	Steel's Many-One Rank Steel's Many-One Rank	
7d Proportion Survived Summary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv		
0	Lab Control	8	0.95000	0.80000	1.00000	0.03273	0.0925	8 9.75	5%	
0	Salt Control	8	0.95000	0.80000	1.00000	0.03273	0.0925	8 9.75	5%	
25		8	1.00000	1.00000	1.00000	0.00000	0.0000	0 0.00)%	
50		8	0.97500	0.80000	1.00000	0.02500	0.0707	1 7.25	5%	
67		8	0.97500	0.80000	1.00000	0.02500	0.0707	1 7.25	5%	
100		8	0.95000	0.80000	1.00000	0.03273	0.0925	8 9.75	5%	
Mean Dry Weight-mg Summary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv		
0	Lab Control	8	0.29400	0.21800	0.35800	0.01469	0.0415	4 14.1	3%	
0	Salt Control	8	0.28225	0.25800	0.31200	0.00659	0.0186	5 6.61	%	
25		8	0.34100	0.27000	0.39400	0.01326	0.0374	9 10.9	9%	
50		8	0.36625	0.01000	0.62000	0.06137	0.1735	8 47.3	9%	
67		8	0.38125	0.25800	0.47600	0.02603	0.0736	3 19.3	51%	
100		8	0.38725	0.31800	0.50200	0.02257	0.0638	3 16.4	.8%	
7d Proportion Survived Detail										
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	
0	Lab Control	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	
0	Salt Control	1.00000	1.00000	1.00000	0.80000	1.00000	0.80000	1.00000	1.00000	
25		1 00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	
50		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	
100		1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	
Mean Dry We	ight mg Detail	1.00000	0.60000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	
	Control Topo	David							-	
Conc-%	Lob Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Kep 6	Rep 7	Rep 8	
0	Salt Control	0.29800	0.35800	0.21800	0.28600	0.30000	0.32800	0.26400	0.30000	
25		0.29000	0.31200	0.27200	0.20200	0.20000	0.27000	0.20000	0.30000	
50		0.39800	0.42200	0.38400	0.39200	0.26800	0.43600	0.62000	0.02000	
67		0.44400	0.25800	0.47600	0.33600	0.41200	0.42200	0.39200	0.31000	
100		0.38000	0.33000	0.50200	0.34800	0.36800	0.46000	0.39200	0.31800	

 Comparisons:
 Page 2 of 2

 Report Date:
 19 Aug-04 8:42 AM

 Analysis:
 07-1107-2556

Chronic Mysid Survival and Growth Test A-2 AMEC Bioassay SD												
Endpoint		A	nalysis Type	Sample L	Sample Link Contro		l Link D	Link Date Analyzed		Version		
7d Proportion Survived		C	omparison	19-1830-8	19-1830-8935 19-1830		0-8935 1	-8935 18 Aug-04 2:16 PM		CETISv1.024		
Method		A	tH Data	Z	NO	EL I	LOEL .	Toxic Units	ChV	MSDp		
Steel's Many-One Rank		С	>T Angı	lar (Corrected)	100	:	>100	1.00	N/A	6.39%	
ANOVA Assumptions												
Attribute	Attribute Test		Statistic Critic		itical F	cal P Level		Decision	(0.01)			
Variances	/ariances Modified Levene		0.64474 3.908		0824 0	0.63427		Equal Var	iances			
Distribution	Shapiro-	Wilk W	0.646	882 0.00000			Non-norm	al Distribution				
ANOVA Table												
Source	Sum	of Squares	s Mean Squ	uare DF	F Statist	ic	P Level	D	ecision(0.05)			
Between	0.019	84776	0.0049619 4		0.64	0.64 0.63427			Ion-Significant E	Effect		
Error	0.269	3625	0.007696	1 35								
Total	0.289	21027	0.0126580) 39								
Group Comparisons												
Control	vs Conc-%		Statistic	Critical	P Level	evel Ties		Decis	sion(0.05)			
Salt Control	25		76	47	>0.05	2		Non-S	Non-Significant Effect			
	50		72	47	>0.05	2		Non-Significant Effect		t		
	67		72	47	>0.05	>0.05 2		Non-S	Significant Effec	t		
	100		68	47	>0.05	2		Non-S	Significant Effec	t		
Data Summa	ry		Original Data					Transformed Data				
Conc-%	Control Typ	e Count	Mean	Minimum	Maximum	SE)	Mean	Minimum	Maximum	SD	
0	Salt Control	8	0.95000	0.80000	1.00000	0.0	9258	1.28575	1.10715	1.34528	0.11023	
25		8	1.00000	1.00000	1.00000	0.0	0000	1.34528	1.34528	1.34528	0.00019	
50		8	0.97500	0.80000	1.00000	0.0	7071	1.31552	1.10715	1.34528	0.08419	
67		8	0.97500	0.80000	1.00000	0.0	7071	1.31552	1.10715	1.34528	0.08419	
100		8	0.95000	0.80000	1.00000	0.0	9258	1.28575	1.10715	1.34528	0.11023	

Approved By
CETIS	R	eport								Compariso Report Da Analysis:	ons: te:	19 Aug 0	Page 1 of 2 g-04 8:42 AM 3-4631-7063
Chronic Mysi	d Su	rvival and G	Browth	Test A-	2							AMEC B	ioassay SD
Endpoint			An	alysis Type		Sample	Lir	nk Contro	l Link	Date Analyzed		Version	
Mean Dry We	ght-m	ng	Co	mparison		19-1830)-89	35 19-183	0-8935	18 Aug-04 2:17	PM	CETISv1	.024
Method			Alt	H Data	Transform	Z		NOEL I	OEL	Toxic Units	ChV	,	MSDp
Steel's Many-	One F	Rank	C :	> T Untra	insformed			100 >	>100	1.00	N/A		36.08%
ANOVA Assu	mptic	ons			<u> </u>								
Attribute		Test		Stati	stic Cr	itical	ΡL	_evel	Decisio	on(0.01)			
Variances		Bartlett		31.66	5066 13	.27671	0.0	0000	Unequa	al Variances			
Distribution		Shapiro-Will	< W	0.856	558 0.9	91882	0.0	00011	Non-no	rmal Distribution			
ANOVA Table	;												
Source		Sum of S	quares	Mean Squ	are DF	F Stati	stic	P Level		Decision(0.05)			
Between		0.058291	54	0.0145729) 4	1.76		0.15888		Non-Significant	Effect		
Error		0.289662	2	0.0082761	35								
Total		0.347953	78	0.0228489) 39								
Group Comp	ariso	ns											
Control	vs	Conc-%		Statistic	Critical	P Level		Ties	De	cision(0.05)			
Salt Control		25		95	47	>0.05		0	No	n-Significant Effe	ct		
		50		85.5	47	>0.05		1	No	n-Significant Effe	ct		
		67		92	47	>0.05		0	No	n-Significant Effe	ct		
		100		100	47	>0.05		0	No	n-Significant Effe	ct		
Data Summa	γ				Orig	jinal Data				Transf	orme	d Data	
Conc-%	Con	trol Type	Count	Mean	Minimum	Maximu	m	SD	Mean	Minimum	Ma	aximum	SD
0	Salt	Control	8	0.28225	0.25800	0.31200		0.01865					

0.39400

0.62000

0.47600

0.50200

0.03749

0.17358

0.07363

0.06383

25

50

67

100

8

8

8

8

0.34100

0.36625

0.38125

0.38725

0.27000

0.01000

0.25800

0.31800

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>A. bahia</u>
Sample ID:	A-2	Start Date/Time: 07/21/2004 - 1600
Test No:	0407-035	End Date/Time: 07/28/2004

Concentration				Lab C	ontrol :	#1		
Day	0	1	2	3	4	5	6	7
	1. 19 . 19 m	and the second	A Trank	in In	itial	We have her		
рН	8.00	7.97	7.98	8.01	8.00	1.98	7.91	No.
DO (mg/L)	7.8	7.6	7.8	7.9	7.9	7.3	B.Y	
Salinity (ppt)	30.3	29.8	301	30,0	80.1	30.2	29.6	Sec.
Temp (°C)	20.90	24.7	250	25.1	25.1	25.2	25.7	
	24.4			F	<u>nal</u>			17.195
pH		7.87	770	7.62	2.69	7.73	7.71	1.71
DO (mg/L)		5.5	5.4	4,7	4.9	5.3	5.0	5.1
Temp (°C)		29.2	25.4	25.3	25.2	25.4	25.5	25.6

Concentration				Salt C	Control	- 1		
Day	0	1	2	3	4	5	6	7
A Strand and A Sector President	9-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1		1 . H. S. S.	In	itial	and the second	As as to the	
pH	8.41	8.15	8.29	8.33	\$.37	8.25	8.38	
DO (mg/L)	7.0	6.7	7.2	72	21	6.5	5.7	
Salinity (ppt)	30.3	29.9	30.2	30.2	30.2	30.5	32.1	
Temp (°C)	Et. 9M	24.7	25,0	25.3	25.2	25.1	246	
	231		41 SH	Fi	nal	and the second sec	1	
pH		8.4	7.97	2.95	2.94	7.90	7.97	7.91
DO (mg/L)		4.0	4.9	5.2	4.9	5.4	5.2	5.1
Temp (°C)		25.6	25.4	25.1	25.2	25.4	25.5	256

Concentration				2	5%			
Day	0	1	2	3	4	5	6	7
142.2 自由公司规范的资料			Sec. 1	, In	itial		lug	
рН	8.62	8.37	8.46	8,50	3.49	8.41	8.33	8.45
DO (mg/L)	7.4	6.5	6.6	6,8	7.0	6.1	50	57.
Salinity (ppt)	30.1	29.9	306	30,0	30,0	30.3	30.4	30.1
Temp (°C)	25.8	24.6	25.0	25.1	251	25.1	22+	185
	Call a Start	a ser la tra	22.01 2.4	* Fi	inal .	Regently of the	- 新教会社会	ale for the set
рН		8.31	8.17	8.15	8,21	8.21	8.19	8.19
DO (mg/L)		4.0	4.5	2.3	4.7	5.4	5.4	5.6
Temp (°C)		25.5	25.5	25.1	25.2	25.3	27.2	25.5

Animal Source/Date Received:

Animal Age at Initiation:

Comments:

QC Check:

Ą	BS/7	71-04	
7	days	old	

Concentration	Τ			50)%			
Day	0	1	2	3	4	5	6	7
and the second			12 P 3 P	Ini	tial	en al antipation de la companya de l	Eq.	
рН	8.75	8.5%	8.63	8.66	8.61	8.53	8.25	8.5%
DO (mg/L)	7.5	6.0	6.4	6.5	46	6.6	60	5.5
Salinity (ppt)	30.8	29.9	30.1	30.0	30.(30.4	30.7	30.2
Temp (°C)	25.8	24.6	25.0	25.2	25.1	25.2	205	25.5
			家庭5月 村美国	Fi	nal	2. 2. 2. 2. 2.	Section 1 March	
pH		8.46	8,20	8,29	8.27	8.31	8.53	8.28
DO (mg/L)		4.7	4.5	5.0	4.9	5.3	5.1	5.0
Temp (°C)		26.4	25.4	25.2	25.2	25,3	25.2	25.4

Concentration				ن	71.			
Day	0	1	2	3_	4	5	6	7
A State of the second		State of the	治外 体 1.440	ច្រា	tial		Kly	
pH	8.03	8.65	8.70	8.75	8:76	8.55	8.22	8.57
DO (mg/L)	7.7	5.9	6.2	6.5	6.7	5.2	5.1	
Salinity (ppt)	30.10	29.9	301	30.0	30.1	30.3	30.3	
Temp (°C)	25.9	24.5	25.0	25.2	25.0	25.2	25.6	
		and the	A Designation	Fi	nal	and the set		
pН	Sec. No.	8.55	8,39	4.38	8.40	8.39	8.41	8.36
DO (mg/L)		4.7	5.0	4.8	4.9	9.7	5.0	51
Temp (°C)		25,4	25.6	2512	25.3	25.5	25.3	25.6

Concentration	100%											
Day	0	1	2	3	4	5	6	7				
	1.1.2.2.2.2.2.2	1	Server Contraction	Ini	tial 👘 👘	Distance of the	har destricts	2.24				
рН	894	8.80	8.82	8.81	8.79	3.66	8.59					
DO (mg/L)	8.1	5.2	6.1.	6.4	66	6.1	5.2					
Salinity (ppt)	30.4	30.0	30.2	30.1	30.2	30.1	30.2					
Temp (°C)	259	246	25.0	25,2	25.0	25-3	25.4	1. Jan 1				
			and the second	FI	nal	1 States	ACTING STOP	A ST SEA				
pH		8.45	8.53	8,56	851	8.46	8-51	8.49				
DO (mg/L)		4.9	50	4.4	4.5	4.7	4.6	4.7				
Temp (°C)		25.6	25.7	25.3	25.3	25,5	25.)	25.6				

		0	1	2	3	4	5	6	7
Analysts:	Initial:	мс	Ry	ne	Sit	RG	PH ASS	Rly	
-	Final:		AH	re	SH	Ris	£5	Ky.	Sit

Final Review: Att 8/20/04

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

AH 8-10-04

Client Name:	City of Buenaventura T						-	Fest Sp	ecies:	A. bahia			
Sample ID:		A- 2					Sta	rt Date	/Time:	07/21/2004	- 1600		
Test No.:		0407-0	035				_ Er	nd Date	/Time:	07/28/2004	1500		
Conc.	Den		<u></u>	S	urviva	l on Te	st Day	:		Percent	pan wt.	pan + mysid]
(%)	кер.	0	1	2	3	4	5	6	7	Survival	(g)	(g)	
Lab Control	а	5	5	5	5	5	¥	4	4	80	0.04290	0.04439	
#1	b	5	5	5	5	5	5	5	5	100	0.03323	0.03502	1
	С	5	5	5	S	5	5	5	5	100	0.03705	D.03814]
	d	5	S	5	5	5	will 5	5	5	100	0.03590	0.03733	
	е	5	5	5	S	5	14	I Y	4	80	0.03420	0.03570	
	f	5	5	5	5	4	5	5	5	100	0.03671	0.03835	30
	g	5	5	5	5	5	5	5	5	100	0.03290	0.03423	0.03422
	h	5	5	5	5	4	5	5	5	100	0.03305	0.03455	
Salt Control	а	5	5	5	5	5	5	5	5	100	0.03642	0.03790	
#1	b	5	5	5	5	5	5	5	5	100	0.02547	0.02703]
	C	5	5	5	5	5	445	5	5	100	0.03585	0.03721]
	d	5	5	5	5	5	14	4.	4	80	0.03548	D.D3689	
	е	5	S	5	5	5	5	254	5	100	0.03448	0.03582	1
	f	5	5	5	5	5	50	5484	4	80	0.03397	A03532	1
	g	5	5	5	5	5	5	5	5	100	0.04006	0,04135	
	h	5	5	5	5	5	5	5	5	100	0.03298	0.63448	
25	а	5	5	5	5	5	5	5	5	100	0.05011	0.05194	1
	b	5	5	<	5	5	5	5	5	100	0.03498	0.0367	
	С	5	5	5	5	5	5	5	5	100	0.03703	0.0350	0.03910
	d	5	5	5	5	5	5	5	5	100	0.03370	0.03537	1
	е	5	5	5	5	5	5	5	5	100	0.03270	0.03450	1
	f	5	5	6	5	5	5	5	5	100	0.03780	0.03915	1
	g	5	5	5	5	5	5	5	5	100	0.03867	0.04030	1
	h	5	5	5	5	5	5	5	5	100	0.03709	0.03869	1
50	a	5	5	5	5	5	5	5	5	100	0.03801	0.04000	1
	b	5	5	5	5	5	5	5	5	100	0.03792	0.04003	1
	С	5	5	5	5	5	5	5	5	100	0.04054	0.04246	1
	d	5	5	5	5	5	5	5	5	$ \alpha\rangle$	0.04220	0.04416	1
	е	5	5	5	5	5	5	5	5	100	0.03735	0.03201	1
	f	5	5	5	5	5	5	5	5	TOD	0.03635	0.03853	1
	g	5	5	5	5	5	5	5	5	100	0.03362	0.03672	1
	h	5	5	4	4	4	4	454	4	80	003490	0.03495	
Tech Initials		SD	R	net	SH	AH	RG	Rby	LLC		TR		-
				R.	}					- data entr	୍ୟ Weigl	nt Data:	
Feeding Time	s (day)	:	0	1	2	3	4	5	6	QC=AH	Date/Time in:	7/28/04/	530
			-	0900	0820	0830	0900	0840	DBUT]	Date/Time out:	7.30.04/	415
			1430	1045	1605	1400	1945	1600	1545] (Oven Temp (°C):	Lay .	-
										_	Tech Initials	50	
Comments:					Ŋ						QC Check	AH 8-10-0	F
											Final Review:	At Shi	14
										_		0	v~1

Client Name:		City o	f Buen	aventu	ra		-	Test Sp	ecies:	A. bahia		
Sample ID:		A -2					Sta	art Date	/Time:	07/21/2004	1600	
Test No.:		0407-	035				. EI	nd Date	/Time:	07/28/2004	1500	
Conc.	Bon			S	Surviva	on Te	st Day	1		Percent	pan wt.	pan + mysid
(%)	кер.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
67	a	5	5	A5	RG#5	5	5	5	5	100	0.04264	0.04486
· · · · · · · · · · · · · · · · · · ·	b	5	5	5	55	4	4	4	4	.80	0.04773	0.04902
	C	5	5	5	5	5	5	PX5	5	100	0.03704	0.03942
	d	5	5	45	737	5	5	5	5	100	0.04151	0,04319
	e	5	5	5	5	5	5	5	5	100	0.04031	0.04237
	f	5	5	5	5	5	5	5	5	100	0.03966	12,041-77
	g	5	5	5	5	15	5	5	5	100	0.04843	0.05039
	<u>h</u>	5	5	S	5	5	5	5	5	100	0.04409	0.01361
100	a	5	5	5	5	5	5	5	5	100	0.048.35	0.05025
	b	5	5	4	4	4_	14	14_	9	80	0.03880	0.04045
	C	5	15	5	5	5	5	5	5	100	0.03147	0.03398
	d	5	5	4	4	4	<u> </u>	14	4	80	0.03820	0.03994
	e	5	5	5	5	12	5	5	5	100	0.04601	0.04785
	f	5	5	5	5	5	12	5	5	100	0.04036	0.042466
	g	5	5	5	5	15	12	5	5	100	0.04429	0.04625
	h	5	5	.5	5	5	5	5	5	100	0,039.30	0.04089
	a											
	b											
	С		ļ									
	d			ļ								
	e	ļ										
	T						ļ					
	g				ļ						·	
	n						ļ					
	a				ļ							
	D	 					ļ					
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	a											
	e											
									<u> </u>			
	b b											
Tech Initials		60	00	04	<14	An	01	100	110			L
reen initials		1.78	16	K2	[Sn	MH	IK9	1 Fq	Inc	data th	JYY Weigh	t Data:
Feeding Time	s (dav)	•	0	1	2	3	4	5	R	CREAT	Date/Time in:	alachil max
. county rane		•	-	nam	ners.	108-21	n m	Intri-	mars	1	Date/Time out	7 30 24 15 30
			11.20	LING	1100	10000	10100	1600	UTIS	1 ~	Von Torra (PC):	1.0-11415
			1430	1042	1405	1400	1147	1000	11342] 0	Tooh Initiala	8
											rech initials:	
Comments:											OC Check	ALL BAR AL
- on nonton										-	Final Poviow	Stor dasta
										-	rinal review:	ANA 2000

Test Summary:Page 1 of 2Report Date:18 Aug-04 2:57 PM

Link:

15-9798-8746/0407-036

Chronic Mysi	hronic Mysid Survival and Growth Test B- AMEC Bioassay SD											
Test: 1 Start Date: 2 End Date: 2 Setup Date: 2	10-4928-7581 21 Jul-04 04: 15 F 28 Jul-04 03:00 F 21 Jul-04 04: 15 F	PM PM &f 64 PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/821/R- Laboratory Not Applica	vival (7d) -02-014 (200 Seawater ble)2)	Duration: Species: Source:	6 Days 22 Hours Americamysis bahia Aquatic Biosystems, CO				
Sample: 0 Sampled: 2 Received: 2 Hold Time: 2	00-5042-2330 20 Jul-04 01:40 F 21 Jul-04 07:45 F 27 Hours (18.4 °(PM AM C)	Material: Code: Source: Station:	Estuarine M 0407-036 City of Buer B-1	lonitoring Sa naventura	ample	Client: Project:	City of Buenaventura				
Comparison	Summary											
Analysis	Endpoint		NOEL	LOE	EL	ChV	MSDp	Method				
11-8539-1561	7d Proportion	Survived	100	>10	0	N/A	0.07032	Steel's Many-One Rank				
19-4990-6605	Mean Dry Wei	ght-mg	100	>10	0	N/A	0.16603	Dunnett's Multiple Comparison				
Point Estimat	te Summary											
Analysis	Endpoint		% Effe	ect Con	nc-%	95% LCL	95% UCL	Method				
11-0542-1642	7d Proportion	Survived	10	>10	0	N/A	N/A	Linear Interpolation				
			20	>10	0	N/A	N/A					
			25	>10	0	N/A	N/A					
			50	>10	0	N/A	N/A					
05-1053-2167	Mean Dry Wei	ght-mg	10	46.9	1288	37.64388	N/A	Linear Interpolation				
			20	>10	0	N/A	N/A					
			25	>10	0	N/A	N/A					
			50	>10	0	N/A	N/A					
7d Proportion	n Survived Sum	mary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv				
0	Lab Control	8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%				
0	Salt Control	8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%				
25		8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%				
50		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%				
67		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%				
100		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%				
Mean Dry We	Nean Dry Weight-mg Summary											
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	n SE	SD	CV				
0	Lab Control	8	0.29400	0.21800	0.35800	0.01469	0.04154	14.13%				
0	Salt Control	8	0.28225	0.25800	0.31200	0.00659	0.01865	6.61%				
25		8	0.29625	0.20000	0.38800	0.01949	0.05513	18.61%				
50		8	0.25625	0.20600	0.32600	0.01499	0.04239	16.54%				
67		8	0.24925	0.16200	0.28400	0.01333	0.03770	15.13%				
100		8	0.25600	0.21400	0.33400	0.01643	0.04646	18.15%				

 Test Summary:
 Page 2 of 2

 Report Date:
 18 Aug-04 2:57 PM

 Link:
 15-9798-8746/0407-036

7d Proportion Survived Detail B-												
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
0	Lab Control	0.80000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000			
0	Salt Control	1.00000	1.00000	1.00000	0.80000	1.00000	0.80000	1.00000	1.00000			
25		1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	0.80000			
50		1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000			
67		0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000			
100		1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000			
Mean Dry We	ight-mg Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
0	Lab Control	0.29800	0.35800	0.21800	0.28600	0.30000	0.32800	0.26400	0.30000			
0	Salt Control	0.29600	0.31200	0.27200	0.28200	0.26800	0.27000	0.25800	0.30000			
25		0.35000	0.38800	0.29000	0.20000	0.28800	0.28000	0.29600	0.27800			
50		0.32600	0.25600	0.22200	0.20600	0.22600	0.29800	0.28400	0.23200			
67		0.16200	0.25200	0.25200	0.28000	0.26200	0.25200	0.28400	0.25000			
100		0.23600	0.22400	0.21400	0.21400	0.28200	0.23400	0.31000	0.33400			

 Comparisons:
 Page 1 of 2

 Report Date:
 18 Aug-04 2:57 PM

 Analysis:
 11-8539-1561

Chronic Mys	AMEC Bioassay SD														
Endpoint			A	nalysis	Туре		Sample	Li	nk Contr	ol Link	Date	e Analyzed	Ve	ersion	
7d Proportion	Survi	ved	С	omparis	on		15-9798	8-87	746 15-97	98-8746	18 A	ug-04 2:33 F	PM CI	ETISv1	.024
Method			A	lt H	Data Tra	nsform	Z		NOEL	LOEL	То	cic Units	ChV		MSDp
Steel's Many-	One f	Rank	С	> T	Angular (Corrected))		100	>100	1.0	0	N/A		7.03%
ANOVA Assu	impti	ons													
Attribute		Test			Statistic	Crit	tical	Ρ	Level	Decisi	on(0.0)1)			
Variances		Bartlett			1.18248	13.3	27671	0.8	88097	Equal V	Varian	ces			
Distribution		Shapiro-Will	Ŵ		0.58195	0.9	1882	0.0	00000	Non-no	ormal	Distribution			
ANOVA Table	ANOVA Table Source Sum of						<u>1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997</u>								
Source		Sum of S	quare	s Mea	an Square	DF	F Stati	sti	c P Leve	el	Dec	ision(0.05)			
Between	etween 0.00850				21265	4	0.23		0.9177	2	Non	-Significant E	Effect		
Error	etween 0.008500 ror 0.318981				91138	35									
Total		0.327488	10	0.01	12403	39									
Group Comp	ariso	ns													
Control	vs	Conc-%		Statis	tic Cr	itical	P Level		Ties	De	cisio	n(0.05)			
Salt Control		25		68	47	,	>0.05		2	No	n-Sigi	nificant Effec	t		
		50		72	47		>0.05		2	No	n-Sigi	nificant Effec	ct		
		67		72	47		>0.05		2	No	n-Sigi	nificant Effec	t		
		100		72	47		>0.05		2	No	n-Sigi	nificant Effec	t		
Data Summa	ry					Origi	nal Data					Transfo	ormed D	ata	
Conc-%	Con	trol Type	Coun	t Mea	in N	Minimum	Maximu	n	SD	Mean		Minimum	Maxir	num	SD
0	Salt	Control	8	0.95	000 0	0.80000	1.00000		0.09258	1.2857	75	1.10715	1.345	28	0.11023
25			8	0.95	000 0	0.80000	1.00000		0.09258	1.2857	75	1.10715	1.345	28	0.11023
50			8	0.97	'500 C	0.80000	1.00000		0.07071	1.3155	52	1.10715	1.345	28	0.08419
67			8	0.97	500 0	0.80000	1.00000		0.07071	1.3155	52	1.10715	1.345	28	0.08419
100			8	0.97	'500 C	0.80000	1.00000		0.07071	1.3155	52	1.10715	1.345	28	0.08419

Approved By A2di

Linear Interpolation: Page 2 of 2 Report Date: 18 Aug-04 2:57 PM Analysis: 11-0542-1642

AMEC Bioassay SD Chronic Mysid Survival and Growth Test B-1 Version Endpoint Analysis Type Sample Link **Control Link Date Analyzed** CETISv1.024 7d Proportion Survived Linear Interpolation 15-9798-8746 15-9798-8746 18 Aug-04 2:54 PM Linear Interpolation Options X Transform Y Transform Seed Resamples Expanded CL Method Linear Linear 7055475 200 Yes Two-Point Interpolation **Point Estimates** % Effect Conc-% 95% LCL 95% UCL 10 >100 N/A N/A 20 >100 N/A N/A 25 >100 N/A N/A 50 >100 N/A N/A Data Summary Calculated Variate(A/B) Conc-% Control Type Count Mean Minimum Maximum SE SD в Α 0 Salt Control 8 0.95000 0.80000 1.00000 0.01890 0.09258 38 40 25 8 0.95000 0.80000 1.00000 0.01890 0.09258 38 40 50 8 0.97500 0.80000 1.00000 0.01443 0.07071 39 40 67 8 0.97500 0.80000 1.00000 0.01443 0.07071 39 40 100 8 0.97500 0.80000 1.00000 0.01443 0.07071 39 40



 Comparisons:
 Page 2 of 2

 Report Date:
 18 Aug-04 2:57 PM

 Analysis:
 19-4990-6605

Chronic Mysi	d Sui	vival and Gr	owth	Test	B-1											AMEC B	ioassay SD
Endpoint			Ar	alysis	Туре			Sam	ple Li	ini	k Contro	l Link	Date	Analyzed		Version	
Mean Dry Wei	ight-m	ıg	Co	mparis	on			15-9	798-8	74	46 15-9798	3-8746	18 A	ug-04 2:35	PM	CETISv1	.024
Method	*)=++++++++++++++++++++++++++++++++++++		Al	t H	Data 1	ransfo	rm		z	ſ	NOEL L	OEL	Тох	ic Units	Ch	v	MSDp
Dunnett's Mult	tiple C	Comparison	C	> T	Untrar	sforme	d				100 >	•100	1.00)	N/A	\	16.60%
ANOVA Assu	mptio	ons															
Attribute		Test			Statis	tic	Crit	ical	Ρ	Le	evel	Decisi	on(0.0	1)			
Variances		Bartlett			6.9070)4	13.2	27671	0.	14	4088	Equal	Varian	ces			
Distribution		Shapiro-Wilk	N		0.9771	0	0.91	1882	0.0	67	7475	Norma	I Distri	bution			
ANOVA Table	OVA Table Irce Sum of S																
Source	NOVA Table purce Sum of etween 0.013078				n Squa	re	DF	FS	tatisti	с	P Level		Deci	sion(0.05)			
Between	Sum of Sum of tween 0.01307 for 0.061357			0.00	32695		4	1.8	7		0.13854		Non-	Significant	Effec	t	
Error	tween 0.013078 or 0.061354			0.00	0.001753		35										
Total	Error 0.061354 Fotal 0.074432			0.00	50225		39										
Group Comp	ariso	ns									++						
Control	vs	Conc-%		Statist	ic	Critica	I	P Lev	eł		MSD	De	cisior	n(0.05)			
Salt Control		25		-0.668	757	2.2385	71	>0.05			0.04686286	No	on-Sign	ificant Effe	ct		
		50		1.2419	84	2.2385	71	>0.05			0.04686286	No	on-Sign	ificant Effe	ct		
		67		1.5763	65	2.2385	71	>0.05			0.04686286	No	on-Sign	ificant Effe	ct		
		100		1.2539	29	2.2385	71	>0.05			0.04686286	No	on-Sign	ificant Effe	ct		
Data Summa	Ŋ						Origi	nal Dat	а	_				Transf	orme	d Data	
Conc-%	Con	trol Type C	ount	Mea	n	Minir	num	Maxi	mum		SD	Mean		Minimum	M	aximum	SD
0	Salt	Control 8		0.28	225	0.258	00	0.312	200		0.01865						
25		8		0.29	625	0.200	000	0.388	800		0.05513						
50		8		0.25	625	0.206	600	0.326	600		0.04239						
67	٤			0.24	925	0.162	200	0.284	00		0.03770						
100		8		0.25	600	0.214	00	0.334	00		0.04646						

Approved By AP - 220

 Linear Interpolation:
 Page 1 of 2

 Report Date:
 18 Aug-04 2:57 PM

 Analysis:
 05-1053-2167

Chronic M	hronic Mysid Survival and Growth Test B-1 AMEC Bioassay SD												
Endpoint		A	nalysis Type		Sample I	Link	Control Link	Date Analyzed	Version				
Mean Dry \	Neight-mg	Li	near Interpola	tion	15-9798-	8746	15-9798-8746	18 Aug-04 2:35 PM	CETISv1.024				
Linear Inte	erpolation Optio	ns											
X Transfor	m Y Transf	orm Se	ed	Resamples	Expande	ed CL	Method						
Linear	Linear	53	34240	200	Yes		Two-Point Inter	rpolation					
Point Estir	nates				, <u>, , , , , , , , , , , , , , , , , , </u>								
% Effect	Conc-%	95% LCI	95%	JCL									
10	46.91288	37.64388	3 N/A										
20	>100	N/A	N/A										
25	>100	N/A	N/A										
50	>100	N/A	N/A										
Data Sumr	nary			Cal	culated Varia	te							
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	-					
0	Salt Control	8	0.28225	0.25800	0.31200	0.0038	81 0.01865						
25	8 0.29625 0.			0.20000	0.38800	0.0112	25 0.05513						
50 8			0.25625	0.20600	0.32600	0.0086	65 0.04239						
67 8			0.24925	0.16200	0.28400	0.0077	70 0.03770						
100		8	0.25600	0.21400	0.33400	0.0094	48 0.04646						

Approved By aft S 20/4

0

8.00

7.8

30.3

24.4

0

8.41

70

30.3

0

8.32

7.1 30.0 1

7.97

29.8

7.87

5.5

25.2

1

8.15

67

29.9

5.0

256

29.9

8.17

25.3

4.9

258 24.4

24,4 247 25.0 35.3

4.0

Concentration

Dav

pН

DO (mg/L)

Salinity (ppt)

Temp (°C)

pН

DO (mg/L)

Temp (°C)

Concentration

Day

pН

DO (mg/L)

Salinity (ppt)

Temp (°C)

pН

DO (mg/L)

Temp (°C)

Concentration

Day

pН

DO (mg/L)

Salinity (ppt)

Temp (°C)

pН

DO (mg/L)

Temp (°C)

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>A. bahia</u>
Sample ID:	<u>B-1</u>	Start Date/Time: 07/21/2004 - \600
Test No [.]	0407-036	End Date/Time: 07/28/2004

6

791

8.4

29.6

25.7

5.0

6

5.7

30.1

25.10

7.97 7.91

5.2 51

25.5 25.6

8.25 0.30

25.1

7

771

5.1

55/

7

5

7.98

7.3

30.2

25.2

7.69 7.13 271

5.3

25.4

5

6.5

30.5

7.90

5.4

25.4

Lab Control 📥

Initia

4

8.a

3001

Ψ

25.1

4

8.37

21

30,2

744

49

25.2

252 251

Salt Control

251

٦,

3

8,01

7.9

30.0

\$*5.24.1

3

8.33

7.2

30,2

5.2

3

8.15

6-6

30-0

25.1

T0,8

5,2

niti

2

7.98

7.8

30.1

247 25.0 251

5.4

25.4

2

8.29

7.2

30.2

8.11 7.97 7.95

4.9

2

8.14

10.4

79.9

25.0

8.04

4.8

2516 252

25.4 25.1

7,76 7.62

50% Concentration 0 2 3 4 5 6 7 Day 1 nitial B.09 8.14 8.14 8.22 8.25 8.25 pН 8.25 63 Q. 6.0 DO (mg/L) 7.2 la la 6.0 6.(30.0 30.1 30.7 Salinity (ppt) 30.8 30.0 30.1 30.6 25.8 24.4 25.0 25.1 25.2 25.3 75.5 Temp (°C) 8.10 8.11 pН 8.17 8.10 8.11 8.12 8.15 4.9 DO (mg/L) 4.8 5.3 5-2 5.5 5.2 5,2 Temp (°C) 255 25,8 25.0 25.2 25.6 25.1 253

Concentration	671,													
Day	0	1	2	3	4	5	6	7						
的目的是人们的自己的	変化する			n i	lial									
pН	8.20	8.04	8.13	8.14	3.24	8,25	BUL							
DO (mg/L)	7.2	6.2	6.5	6-6	6.4	10.1	5.9							
Salinity (ppt)	30.5	36.1	30.1	301	80.2	30.7	30.7							
Temp (°C)	25.9	24.6	25.0	25.2	25.2	25.3	25.5							
	and the second	Wart and the	and the second	l)	nal			14 2 - 12						
рH		8.18	8.12	8.15	1 63.14	18,14	0.16	8.14						
DO (mg/L)		5.2	5.1	5.4	5.4	5,6	5.3	5.4						
Temp (°C)		25.4	25.7	25.4	25.2	25.2	25.2	25.1						

2	5%				Concentrat	tion			10	0%		
	4	5	6	7	Day	0	1	2	3	4	5	6
Inf	tial		184 A 2 1	12/12/2010			新新教室 。		hi	ial		
5	8.20	8.25	8.33		pH	8.12	8.06	8.13	8.14	8,20	8.25	8.14
,	6.4	6.2	5.8		DO (mg/l) 7.5	5.9	6.6	6.5	6.6	6.2	5.9
)	30.1	30.5	30.4	A TANKA	Salinity (p	pt) 30.2	30.2	30.2	30.1	30.2	30.4	30.9
	251	25.3	25.4		Temp (°C	c) 25.9	24.5	25.0	25,3	25,2	75.3	25.10
FI	nal		A AL	A TONG		The Content		1. 日本一世	Fir	nal		
1	16.06	8.13	8.02	8.04	pH		18,20	8.18	8.18	8,19	8.17	8.15
	EI	5.4	5.2	52	DO (mg/l	L)	5.4	5.6	5.1	5.2	5,4	5.4
	25.1	25.5	25.1	25.4	Temp (°C	C) (C	25-3	25.3	25.6	25.3	25/2	25.2
						0	1	2	3	4	5	6
-	7-21.	<i>0</i> 4			Analysts:	Initial: MC	Ry	MC	SH	RG	PSR4	RG

Final:

A A

Me

SH

Animal Source/Date Received:

Animal Age at Initiation:

Comments:

QC Check:

AH 8-10-04

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Brinnale

Final Review:

R5

Rla

7

8.16

5.4

25/

SH

RG

7

Client Name:		City o	f Buena	aventu	a		- 1	Fest Sp	ecies:	A. bahia		
Sample ID:		B-1					Sta	rt Date	Time:	07/21/2004	1600	
Test No.:		0407-0)36				. Er	d Date	Time:	07/28/2004	1500	
Conc.				S	urviva	l on Te	st Day:			Percent	pan wt.	pan + mysid
(%)	Rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
Lab Control	а	5	5	5	5	5	4	4	4	80	0.04290	1.04439
#1	b	5	5	5	5	5	5	5	5	100	0.03323	0.03502
	С	5	5	5	5	5	5	5	5	100	0.03705	0.03814
	d	5	5	5	5	5	12445	5	5	100	0.03590	0.03733
	е	5	5	5	5	5	RASY	4	4	80	0.03420	0.03570
	f	5	5	5	5	4	5	5	5	100	0.03671	0.03835
	g	5	5	5	5	5	5	5	5	100	0.03290	0:03422
	h	5	5	5	5	4	5	3	5	100	0.03305	0.03455
Salt Control	a	5	5	5	5	5	5	5	5	100	0.03642	0.03790
#1	b	5	5	5	5	5	5	5	5	100	0.02547	0.02703
	С	5	5	5	5	5	5	5	5	100	0.03585	0.03721
	d	5	5	5	5	5	Y	ч	4	80	0,03548	0.03689
	е	5	5	5	5	5	5	2445	5	100	0.03448	0.03582
	f	5	5	5	5	5	5	248-4	4	80	0.03397	0.03532
	g	5	5	5	5	5	5	5	5	100	0.04006	0.04135
	h	5	5	5	5	5	5	5	5	100	0.03298	0.03448
25	a	5	5	5	5	5	5	5	5	100	0.04777	0.04952
	b	5	5	5	5	5		5	5	100	0.041042	0.04836
	C	5	5	5	5	5	5	5	5	100	0.041310	0.04281
	d	5	5	4	HX4	4	4	4	4	80	0.03560	0.03600
	е	5	5	5	5	5	5	5	5	100	0.63443	0.03587
	f	5	5	5	5	5	5	5	5	100	0.04588	0.04725
	g	5	5	5	5	5	5	5	5	100	0.04269	0.04357
	h	5	5	4	4	4	Y	Y	4	80	0.04305	0.04444
50	а	5	5	5	5	5	5	5	5	100	0.05612	0.05175
	b	5	5	5	5	5	5	5	5	100	0.03866	0.03994
	С	5	5	5	Ś	5	5	-	5	100	Q.933936	0.03947
	d	5	5	5	5	5	5	4	4	80	0.03633	0.03736
	е	5	5	5	5	5	5	5	5	100	6.03476	0.03589
	f	5	5	5	5	5	5	5	5	100	0.03932	0.04081
	g	5	5	5	5	5	5	5	5	100	0.03475	0.03617
	h	5	5	5	5	5	5	5	5	100	0.03604	0.03720
Tech Initials		35	p2	ue	SH	AH	Ry	Ry	me	dot an	he we	
										- auta ent	Weig	ht Data;
Feeding Time	s (day)	:	0	1	2	3	4	5	6	QCJAH	Date/Time in	:7/28/04/1530
				0900	080	0830	1900	0840	0815		Date/Time out	7.30 01/100
			162	1645	1605	1400	1945	1600	1545	1 (Oven Temp (°C)	: 64
										_	Tech Initials	: SA
Commenter												Ail Ann all
comments:										-	Einal Baview	Call day
	-						- 18-12-19-13-13-13-13-13-13-13-13-13-13-13-13-13-			-	rinai Keview	· yor quile

Larval Mysid Survival & Weights

Marine Chronic Bioassay

Client Name:		City o	f Buena	aventu	ra		-	Test Sp	pecies:	A. bahia					
Sample ID:		B-1					Sta	art Date	e/Time:	07/21/2004	160	J			
Test No.:		0407-0	036				Er	nd Date	e/Time:	07/28/2004	18				
Conc.	Pop			S	urviva	l on Te	st Day	:		Percent	pan wt.	pan + mysid			
(64%)	rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)			
67	а	5	5	4	4	4	4	q	4	во	0.04078	0.04159			
	b	5	5	5	5	5	5	5	5	100	0.03970	0.04096			
	c	5	5	5	5	15	5	B	5	100	0.03072	0.03198			
	d	5	5	5	5	15	1.2	5	5	100	0.03399	0.03535			
	e	5	5	5	5	5	5	5	5	(00	0.0 3294	0.03925			
	T	5	12-	2	5	5	12	S)	100	0.03391	0.03523			
	g b	5	13	2	5	13	2	5	5	100	0.04017	0.09159			
400	n	5	5	5	5	15	12	5	5	100	0.03350	0.03481			
100	a L	5	5	5	5	15	5	5	5	100	0.04686	0.04804			
	D	5	5	4	4	4	ΙΨ_	4	4	80	0.03919	0.04041			
	C	5	5	5	5	2)		5	100	0.03855	0.0 9140			
	<u>a</u>	5	5	7	5	5	5	15-	5	100	6.0 585	0.09766			
	e f	5	12	-	0	12		<u> </u>	5	100	0.03011	0.03652			
	1	5	15	2	5	5	13	5	2	100	0.04353	0,01970			
	g b	5	5	7	5			<u> </u>	2	100	0,03350	0.04005			
		<u> </u>	12	~	3	12	12	5	5	100	0.04043	0.01210			
	a b							}	+						
	- d														
								+							
	f							+							
	a		+			<u> </u>		<u> </u>							
	h		<u> </u>												
	а							<u> </u>							
	b		1					1				+			
	C					1	1	1							
	d														
	е														
	f														
	g														
	h														
Tech Initials	39	12	LIC	SH	AH	RG	Ry	ul	dataen	the se					
Feeding Time	s (day)	:	0	1	2	3	4	5	6	QC = At	Date/Time in	1ht Data: n:7/20041530	5		
			-	0900	080	0830	0900	0840	085		Date/Time ou	t: 7.30.01 111	00		
			1630	1645	1605	1400	1945	1600	1545	c)ven Temp (°C): (ay			
											Tech Initials	<u>s: 50</u>			
Comments:											QC Check	: Att. B-10-04			
											Final Review	" 4 41'	101		

 Test Summary:
 Page 1 of 1

 Report Date:
 19 Aug-04 8:44 AM

 Link:
 09-6754-4780/0407-037

Chronic Mysi	AMEC Bioassay SD AMEC Bioassay SD AMEC Bioassay SD											
Test: Start Date: 2 End Date: 2 Setup Date: 2	10-4928-7581 21 Jul-04 04 :15 F 28 Jul-04 03:00 F 21 Jul-04 04: 15 F	PM KH PM KH PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/821/R- Laboratory Not Applica	vival (7d) 02-014 (200 Seawater ble)2)	Durat Spec Sourc	tion: 6 D ies: Am ce: Aqu	ays 22 Hours ericamysis bahia iatic Biosystems, CO			
Sample: 0 Sampled: 2 Received: 2 Hold Time: 2	05-1945-9466 20 Jul-04 10:40 A 21 Jul-04 07:45 A 30 Hours (18.2 °C	M M C)	Material: Code: Source: Station:	Estuarine M 0407-037 City of Buer B-3	lonitoring Sa naventura	ample	Clien Proje	t: City ct:	of Buenaventura			
Comparison	Summary											
Analysis	Endpoint		NOEL	LOE	ËL	ChV	MSDp	Me	ethod			
11-3646-5502	7d Proportion S	Survived	100	>10	0	N/A	0.02421	0.02421 Bonferroni Adj Wilcoxon Rank Se				
13-7114-1536	Mean Dry Wei	ght-mg	100	>10	0	N/A	0.15168	Bo	nferroni Adj t			
7d Proportio	n Survived Sum	mary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv				
0	Lab Control	8	0.97500	0.80000	1.00000	0.02500	0.0707	1 7.25	%			
0	Salt Control	8	0.97500	0.80000	1.00000	0.02500	0.0707	1 7.25	%			
25		8	1.00000	1.00000	1.00000	0.00000	0.0000	0.00	%			
50	50 8 37 8			1.00000	1.00000	0.00000	0.0000	0 0.00	%			
67		8	1.00000	1.00000	1.00000	0.00000	0.0000	0 0.00	%			
100		8	1.00000	1.00000	1.00000	0.00000	0.0000	0 0.00	%			
Mean Dry We	ight-mg Summa	ary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	CV				
0	Lab Control	8	0.28600	0.25200	0.32200	0.00819	0.0231	8 8.10	%			
0	Salt Control	8	0.28950	0.24000	0.32200	0.01010	0.0285	6 9.87	%			
25		8	0.41343	0.31600	0.48400	0.02048	0.0541	8 13.1	1%			
50		8	0.45500	0.39000	0.50800	0.01386	0.0391	9 8.61	%			
100		8	0.43925	0.40400	0.47400	0.00684	0.0193	5 4.41	%			
100		8	0.47175	0.39400	0.51600	0.01401	0.0396	2 8.40	%			
7d Proportion	n Survived Deta	il										
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
0	Lab Control	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000			
0	Salt Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000			
25		1 00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000			
50		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			
Maan Dry Ma	interne Detail	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1 00000	1.00000			
Wean Dry We	light-mg Detail	_										
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
0	Lab Control	0.30400	0.28600	0.32200	0.25200	0.29000	0.25600	0.29400	0.28400			
25	Salt Control	0.29600	0.30200	0.30600	0.27000	0.20400	0.32200	0.24000	0.31000			
50		0 47900	0.31000	0.40000	0.39200	0.42000	0.40200	0.40400	0.47200			
50 0.4780 37 0.4740		0.47400	0.43800	0.45000	0.43800	0.33000	0.42200	0.44000	0.43200			
	50 0.4 37 0.4		0.40000	0.70000	50000	5	3,13400	5.44000				

* replicate spilled during test.

 Comparisons:
 Page 1 of 2

 Report Date:
 19 Aug-04 8:44 AM

 Analysis:
 11-3646-5502

Chronic Mys	id Su	vival and (Growth	Test B	-3								AMEC	Bioassay SD
Endpoint			Ar	alysis T	уре		Sample	Li	nk Cont	rol Link	Date Ana	lyzed	Version	1
7d Proportion	Survi	ved	Co	mparisor	ו		09-6754	-47	780 09-67	54-4780	18 Aug-0	4 3:30 P	M CETISV	1.024
Method			Al	н с	Data Tra	nsform	Z		NOEL	LOEL	Toxic U	nits	ChV	MSDp
Bonferroni Ad	j Wilc	oxon Rank	Sum C	>T /	Angular ((Corrected)			100	>100	1.00		N/A	2.42%
ANOVA Assu	umpti	ons												
Attribute		Test		5	Statistic	Crit	ical	ΡI	Level	Decisi	on(0.01)			
Variances		Modified Le	vene	(0.96520	3.92	2733	0.4	13918	Equal	Variances			
Distribution		Shapiro-Wil	k W	(0.34950	0.91	742	0.0	00000	Non-no	ormal Distri	bution		
ANOVA Tabl	e													
Source		Sum of S	Squares	Mean	Square	DF	F Statis	stic	C P Lev	el	Decision	(0.05)		
Between	een 0.00563444			0.001	4086	4	0.97		0.4391	8	Non-Sign	ificant E	ffect	
Error	r 0.04961941			0.001	4594	34								
Total		0.055253	385	0.002	8680	38								
Group Comp	ariso	ns												
Control	vs	Conc-%		Statistic	c Cr	ritical	P Level		Ties	De	cision(0.0	5)		
Salt Control		25		59.5			0.61057		1	No	on-Significa	nt Effect		
		50		72			0.63955		1	No	on-Significa	nt Effect		
		67		72			0.63955		1	No	on-Significa	nt Effect		
		100		72			0.63955		1	No	on-Significa	nt Effect		
Data Summa	ry					Origi	nal Data					Transfo	rmed Data	
Conc-%	Control Type Count Mean Minim				Minimum	Maximun	n	SD	Mean	Mir	imum	Maximum	SD	
0	Salt	Control	8	0.975	00 0	0.80000	1.00000		0.07071	1.315	52 1.10	0715	1.34528	0.08419
25			7	1.000	00 1	1.00000	1.00000		0.00000	1.345	28 1.34	4528	1.34528	0.00020
50	0 8			1.000	00 1	1.00000	1.00000		0.00000	1.345	28 1.34	4528	1.34528	0.00019
67			8	1.000	00 1	1.00000	1.00000		0.00000	1.345	28 1.34	4528	1.34528	0.00019
100			8	1.000	00 1	1.00000	1.00000		0.00000	1.345	28 1.34	4528	1.34528	0.00019

CETIS	Repor	t						Report Dat Analysis:	te:	19 Aug 1	g-04 8:44 AM 3-7114-1536
Chronic Mys	id Survival and	d Growth	Test B~	3						AMEC B	ioassay SD
Endpoint		A	nalysis Type		Sample L	ink Contro	l Link	Date Analyzed		Version	
Mean Dry We	eight-mg	Co	omparison		09-6754-4	780 09-675	4-4780	18 Aug-04 3:30	PM	CETISv1	.024
Method		AI	tH Data	Transform	Z	NOEL I	OEL	Toxic Units	ChV		MSDp
Bonferroni Ac	ij t	С	> T Untra	ansformed		100 >	>100	1.00	N/A		15.17%
ANOVA Assi	umptions										
Attribute	Test		Stati	stic Crit	tical P	Level	Decisi	on(0.01)			
Variances	Bartlett		6.77	565 13.3	27671 0.	14823	Equal \	/ariances			
Distribution	Shapiro-V	Vilk W	0.972	245 0.9	1742 0.	53284	Norma	Distribution			
ANOVA Tabl	е										
Source	Sum o	f Squares	Mean Squ	uare DF	F Statisti	c P Level		Decision(0.05)			
Between	0.1692	312	0.0423078	3 4	30.16	0.00000		Significant Effect	t		
Error	0.0476	8679	0.0014026	5 34							
Total	0.2169	1795	0.0437103	3 38		r					
Group Comp	parisons										
Control	vs Conc-%	0	Statistic	Critical	P Level	MSD	De	cision(0.05)			
Salt Control	25		-6.393829	2.345056	1.00000	0.04545319	No No	n-Significant Effe	ct		
	50		-8.838287	2.345056	1.00000	0.04391196	i No	n-Significant Effe	ct		
	67		-7.997179	2.345056	1.00000	0.04391196	i No	n-Significant Effe	ct		
	100		-9.732784	2.345056	1.00000	0.04391196	5 No	n-Significant Effe	ct		
Data Summa	ary			Origi	nal Data			Transf	ormed	Data	
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Ma	ximum	SD
0	Salt Control	8	0.28950	0.24000	0.32200	0.02856					
25		7	0.41343	0.31600	0.48400	0.05418					
50		8	0.45500	0.39000	0.50800	0.03919					
67		8	0.43925	0.40400	0.47400	0.01936					
100		8	0.47175	0.39400	0.51600	0.03962					

Comparisons: Page 2 of 2

Water Quality Measurements

Client:	City of Buenaventura	Test Species: <u>A. bahia</u>
Sample ID:	B-3	Start Date/Time: 07/21/2004 [(D 0
Test No:	0407-037	End Date/Time: <u>07/28/2004 ょくび</u> ひ

Concentration	Lab Control # 2											
Day	0	1	2	3	4	5	6	7				
	De States de la			ln In	itial							
рН	8.00	7.97	7.98	10.8	8.06	7.98	7.91					
DO (mg/L)	7.8	26	7.8	7.9	7.9	7.3	8.4					
Salinity (ppt)	30.1	29.8	30.1	30.0	30.1	30.2	29.6					
Temp (°C)	24.4	24.7	25.0	251	201	25.2	25.7	and and				
				Fi	nal	all of the set						
рН	1. S. 1.	1.18	771	7.72	7.71	8.12	7.99	8.06				
DO (mg/L)		5.1	5.4	5.2	54	5.0	5.0	5.0				
Temp (°C)	A Real	253	255	25.6	25.4	24.5	24.9	25.1				

Concentration	Salt Control # 2-											
Day	0	1	2	3	4	5	6	7				
A CARLES AND A CARL				n in In	itial	States in						
рН	8.41	8.15	8.29	8,33	837	8.25	8.38					
DO (mg/L)	7.0	4.7	7.2	7.2	21	6.5	5.7					
Salinity (ppt)	30.3	29.9	30.2	30.2	30,2	30.5	30.1					
Temp (°C)	24.4	24.7	25.0	253	2512	25.1	25.6					
				Fi	nal							
рН		8.10	8,00	7.98	7.95	8.19	8.20	8.14				
DO (mg/L)		5.3	5.6	5.2	51	9.7	5.1	5.0				
Temp (°C)		25.7	25.5	25,5	25.2	24,5	24.9	25/				

Concentration	25%											
Day	0	1	2	3	4	5	6	7				
		A State State	all and the set	lni 🗧 Ini	itial							
pН	8.56	8.43	8.41	8.46	8,44	8.44	8,50					
DO (mg/L)	7.3	6.4	6.3	6.5	66	6.1	6.0					
Salinity (ppt)	30.0	29.9	29.9	30.0	30.1	30.4	30.3					
Temp (°C)	24.6	24.7	20.3	25.2	25,1	25.2	25.5					
			16.0	inc Fi	nal							
pН		8.30	8.19	8.14	8.17	8.24	3.30	826				
DO (mg/L)		5.0	5.2	5.1	3.2	5.2	4.9	51				
Temp (°C)		25.5	25.8	25:6	25.5	25.4	25.1	25.2				

Animal	Source/Date	Received:

Animal Age at Initiation:

AB5/ 7-21-04	
7 days dd	

Concentration		50%										
Day	0	1	2	3	4	5	6	7				
	12 120 12		- Person	lni	tial			1049 Marte				
рН	8.68	8.49	8.54	8.56	8.57	8.55	8.52					
DO (mg/L)	7.5	6.4	6.3	6.5	6.6	6.1	6.2					
Salinity (ppt)	30.7	29.9	30.0	30.0	30.1	30.5	30.3					
Temp (°C)	24.4	24.6	25.0	25.2	25.2	2.3	25.4					
				Fill Fil	nal		and the second second	STATISTICS.				
рН	a the second	8,40	8.26	8.53	8.27	8.30	5.33	8.31				
DO (mg/L)		5.1	4.9	5.0	5.2	5.5	5.6	5.1				
Temp (°C)		25.4	25.8	25.5	8.5	25.4	25.2	25.2				

Concentration		677.										
Day	0	1	2	3	4	5	6	7				
	all of the second	1.1.24.14	ST WESS	Ini	tial							
рН	8.74	8.59	8.64	8.67	8.61	8,60	8.56					
DO (mg/L)	7.9	5.9	6.4	6.5	4.5	6.1	6.4					
Salinity (ppt)	30.5	30.0	30.1	30.0	30.2	30,6	30.5					
Temp (°C)	24.8	24.4	25.0	2512	252	25.3	25,3					
			-	Fi	nal							
рН		18.47	8.35	8.38	8.31	8.39	8.41	8.36				
DO (mg/L)		47	5.0	5.0	5.1	5.1	5-1	5-1				
Temp (°C)		25.0	24.9	25.5	25.4	25.4	15.2	25.2				

Concentration				10	0%			
Day	0	1	2	3	4	5	6	7
The set of a set of a	22/2 2/2 2/2		Sec. St.	Ini	tial	建筑化学科学会		
pН	8.83	8.67	8.74	8.77	8.74	8.69	8.15	
DO (mg/L)	8.4	5.7	6.2	6.3	4.9	6.2	7.0	23
Salinity (ppt)	30.2	30.1	30.2	30.1	30.2	30.7	30.7	
Temp (°C)	24.7	24.4	25.0	25,2	25.3	25.3	25.3	0.00
				Fil	nal			
pН		8.60	8.47	8.47	8.71	8.45	8,40	8.42
DO (mg/L)		50	5.1	5.3	5.2	5.4	5.1	5-1
Temp (°C)		249	25.4	25.7	254	25.4	25.3	25,3
						1		
	0	1	2	3	4	5	6	7
Analysts: Initial	, he	RG	me	SH	RG	AG &	Rig	

MC

AH

Final:

Final Review:

RS

5#

ŔG

Ku

SH

Comments:

QC Check:

AH 8-10-04

Client Name:		City of	f Buena	aventur	a		ו	est Sp	ecies:	A. bahia			
Sample ID:		B-3					Sta	rt Date	/Time:	07/21/2004	16 00		
Test No.:		0407-0	37				En	d Date	/Time:	07/28/2004	1500	<u></u>	-
Conc.	-			S	urvival	on Te	st Day:			Percent	pan wt.	pan + mysid]
(%)	кер.	0	1	2	3	4	5	6	7	Survival	(g)	so (g)	
Lab Control	а	5	5	5	.5	う	5	5	5	100	0.04044	0.04199	0.04191
#2	b	5	5	5	5	5	5	5	5	100	0.03828	0.03971]
	С	5	5	5	5	5	5	5	5	100	0.04595	0.04754	,
	d	5	5	5	5	5	5	5	5	100	0.04208	0.04334	1
	е	5	5	5	5	J	ý J	4	4	80	0.04015	0.04160	1
	f	5	5	5	5	5	5	5	5	100	0.03545	0.03673	1
	q	5	5	5	5	5	5	5	5	100	0.03445	0.03792]
	h	5	5	5	5	5	5	5	5	100	0.03615	0.03757	1
Salt Control	a	5	5	5	5	5	5	5	5	100	0.03794	0.0394	2
#2	b	5	5	5	5	5	5	5	5	100	0,03948	0.04099	1
	С	5	5	5	5	5	3	5	5	100	0.03940	0.04093	1
	d	5	5	5	5	5	5	5	5	IVO	0.04087	0.04228]
	е	5	5	S	5	5	5	5	5	100	0.03750	0.03882	1
	f	5	5	5	5	5	5	5	5	100	0.03716	0.03877	1
	g	5	5	5	5	4	4	4	4	80	0.03318	0.03438	
	h	5	5	5	5	5	12	5	5	100	0.03301	0.63459	1
25	а	3.5		_				~				-	1
	b	5	5	5	5	5	5	5	5	100	0.03439	0.03597	1
	C	5	5	5	5	5	5	5	5	100	0.04910	0.05/13	1
	d	5	5	5	5	5	5	5	5	100	0 0 3926	0.04122	1
	е	5	5	5	5	5	E	5	5	100	0.035760	DIOHOR	0.0409
	f	5	5	5	5	5	5	5	5	100	0.03930	0.04/61	1 '
	q	5	5	5	5	5	5	5	5	100	0.03948	0.04090	1
	h	5	5	5	5	5	5	5	5	100	0.037010	0.03909	1
50	а	5	5	5	5	5	5	5	5	100	0.02790	0.03029	
	b	5	5	S	5	5	5	5	5	100	0.03340	0,03553	
	С	5	5	5	5	5	5	5	5	100	0.04020	0,14263	
	d	5	5	S	5	5	5	5	5	100	0.02983	0.03212]
	е	5	5	5	5	5	5	5	5	100	0.03864	0.04059	
	f	5	5	5	5	5	5	5	5	100	0.03644	0.0386	
	g	5	5	5	5	5	5	5	5	100	0.03687	0.03941	
	h	5	5	5	5	5	5	5	5	100	0.04035	0.0426	0,012-
Tech Initials		52	RS	ine	SH	AH	R E	RY	uc	data ada	nc	515	
Fooding Time	e (dev)		0	4	2	2		E	e	QCEAH	1 Weigi	nt Data:	32
reeding rime	s (uay)		U	0905	4	3	4	5	10.5	7	Date/Time out	1120104 13	
				0100	0500	0830	Valle	0840	815		Date/Time Out	1.11	100
			1030	llens	11005	1400	1993	1000	154	<u>5</u> C	Tech Initials	30	-
0	(D)-	5.160	2 -	0								All Que	/
comments:	2	op in the	(ar	γ <i>.</i>						_		AL 010-0	
										_	rinai Keview	app Al	<u>e</u> [04

4

Client Name:		City o	f Buena	aventu	a		-	Test Sj	pecies:	A. bahia		
Sample ID:		B-3					Sta	rt Date	e/Time:	07/21/2004	1600	
Test No.:		0407-0	037				_ Er	nd Date	e/Time:	07/28/2004	1500	
Conc.	Bon			S	urviva	l on Te	st Day:			Percent	pan wt.	pan + mysid
(61%)	rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
Lé7	а	5	5	5	S	5	5	5	45	100	0.047627	0.05004
	b	5	5	S	5	5	5	5	\$5	100	0.04697	0.04916
	c	5	5	5	5	5	5	5	55	100	0.03544	0.08769
	d	5	5	5	5	15	5	15	55	100	0.037433	0.03962
	e	5	5	5	5	12	13	5	55	100	0.03615	0.03844
	T	5	5	5	5	5	2	5	92	100	0.04813	0.05015
	g b	5	5	2	5	12	5	12	15	(00)	0.03635	0.03877
100	<u> </u>	5	12	5	5	2		5	<i>p</i> 5	100	0.04528	0.04747
100	a	5	5	5	5	12	5	5	35	100	0.04070	0,04 30 2
	D	5	5		5	15	5	2	5	-100	0.03190	003745
	C d	5	10	>	5	12-	5	5	22	(ω)	0.04129	0,04309
		5	12-	5	2	12	5	1-2-	122	100	0.03538	0.03707
	f	5	2	1 ÷	5	2	13-	5	17,	100	0.09259	0.01501 0.660 R(a)
	- i	5	5	5	<u>)</u>	5	15	1 5	+7	100	0.048.00	1225040
	h h	5	5	-	5	5	12	12	123	100	0.04051	004070
		<u> </u>	<u> </u>		- 3-			<u> </u>	Du 3	100	0.04092	0.072/9
	a h		+						P		-	
	<u> </u>											
	d		+								-	
	e	1	1		<u> </u>		1	t			-	
	f	1				1		1			-	
	a	1									-	
	h			1			1				-	
	а				1	1		1				
	b						1					
	С											
	d											
	е											
	f											
	g											
	h							ſ				
Tech Initials		SD	B	He	SH	AH	RE	Rla	LPG 1	ue	ue	
For diam Times	- (-1)	-	•		•	•		_	•	Clata enti	M Weigi	it Data:
reeding Time	s (day)	:	0	1	2	3	4	5	6 Aller	QCEAH	Date/ I ime in:	1128/04 15:30
			1/	100	USCI	10830	0100	1400	15015	1	Date/ I Ime out	- 130.04 145t
			1630	1049	1605	11400	11945	1000	1/341	J		<u> </u>
											rech initials	
Commente											OC Check	AH 8-10-12L
Johnneilta.										-	Final Review	Star and
										-		- Ary Shole

Test Summary:Page 1 of 1Report Date:19 Aug-04 8:45 AM

Link: 17-0073-0026/0407-038

Chronic Mysid Survival and Growth Test (-2 AMEC Bioassay SD											
Test: Start Date: End Date: Setup Date:	10-4928-7581 21 Jul-04 04:15 F 28 Jul-04 03:00 F 21 Jul-04 04:15 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/821/R Laboratory Not Applica	vival (7d) -02-014 (20 Seawater ble	02)	Dura Spec Sour	tion: 6 [ies: An ce: Aq	Days 22 Hours nericamysis bahia uatic Biosystems, CO		
Sample: (Sampled: 2 Received: 2 Hold Time: 2	03-9694-7306 20 Jul-04 09:35 A 21 Jul-04 07:45 A 31 Hours (18.5 °C	AM AM C)	Material: Code: Source: Station:	Estuarine Monitoring Sample 0407-038 City of Buenaventura C-2			Clien Proje	nt: Cit ect:	y of Buenaventura		
Comparison	Summary										
Analysis	Endpoint		NOEL	LOE	EL	ChV	MSDp	M	ethod		
07-0450-5931	7d Proportion	Survived	100	>10	0	N/A	0.02269) St	eel's Many-One Rank		
03-2333-8357	Mean Dry Wei	ght-mg	100	>10	0	N/A	0.15317	Di	unnett's Multiple Comparison		
7d Proportion	n Survived Sum	mary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv			
0	Lab Control	8	0.97500	0.80000	1.00000	0.02500	0.0707	1 7.25	5%		
0	Salt Control	8	0.97500	0.80000	1.00000	0.02500	0.0707	1 7.25	5%		
25		8	1.00000	1.00000	1.00000	0.00000	0.0000	0 0.00	0%		
50		8	1.00000	1.00000	1.00000	0.00000	0.0000	0 0.00	0%		
67		8	1.00000	1.00000	1.00000	0.00000	0.0000	0 0.00	0%		
100		8	1.00000	1.00000	1.00000	0.00000	0.0000	0 0.00	0%		
Mean Dry We	ight-mg Summa	ary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv			
0	Lab Control	8	0.28600	0.25200	0.32200	0.00819	0.0231	8 8.10	0%		
0	Salt Control	8	0.28950	0.24000	0.32200	0.01010	0.0285	6 9.87	7%		
25		8	0.40525	0.37600	0.45000	0.00849	0.0240	2 5.93	3%		
50		8	0.47925	0.44000	0.53200	0.01194	0.0337	7 7.05	5%		
67		8	0.46675	0.42000	0.53000	0.01141	0.0322	7 6.91	1%		
100		8	0.48575	0.39200	0.59000	0.02311	0.0653	7 13.4	46%		
7d Proportion	Survived Deta	il									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Lab Control	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000		
0	Salt Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000		
25		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
50		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
67		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		
Mean Dry We	ight-mg Detail										
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Lab Control	0.30400	0.28600	0.32200	0.25200	0.29000	0.25600	0.29400	0.28400		
0	Salt Control	0.29600	0.30200	0.30600	0.27000	0.26400	0.32200	0.24000	0.31600		
25		0.45000	0.38600	0.37600	0.38600	0.42600	0.40600	0.40800	0.40400		
50		0.48600	0.46000	0.51400	0.46200	0.53200	0.44000	0.44200	0.49800		
67		0.42000	0.48200	0.45400	0.47000	0.45200	0.53000	0.47800	0.44800		
100		0.50000	0.55000	0.47400	0.41000	0.49000	0.39200	0.59000	0.48000		

Approved By: Att Stoll

 Comparisons:
 Page 2 of 2

 Report Date:
 19 Aug-04 8:45 AM

 Analysis:
 07-0450-5931

Chronic Mys	id Su	rvival and Gro	owth	Test	(-2									AMEC E	3ioassay SD
Endpoint			Ar	alysis	Туре		Sample	Li	nk Contr	ol Link	Date	Analyzed		Version	
7d Proportion	Survi	ived	Co	mpariso	on		17-0073	-00	026 17-00	73-0026	18 Au	ıg-04 3:52 F	PM	CETISV	1.024
Method			Alt	: H	Data Trar	nsform	Z		NOEL	LOEL	Тохі	c Units	ChV	1	MSDp
Steel's Many-	One F	Rank	С;	> T	Angular (C	Corrected)			100	>100	1.00		N/A		2.27%
ANOVA Assi	ımpti	ons													
Attribute		Test			Statistic	Crit	ical	P	Level	Decisi	on(0.01	1)			
Variances	Variances Modified Levene				1.00000	3.90)824	0.4	42065	Equal \	Varianc	es			
Distribution		Shapiro-Wilk V	N		0.34587	0.91	882	0.0	00000	Non-no	ormal D	istribution			
ANOVA Tabl	e														
Source		Sum of Sq	uares	Mea	in Square	DF	F Stati:	stic	c P Leve	el de la companya de	Decis	sion(0.05)			
Between		0.00567079	,	0.00	14177	4	1.00		0.4206	5	Non-S	Significant E	Effect		
Error		0.04961941		0.00	14177	35									
Total		0.05529020	1	0.00	28354	39									
Group Comp	ariso	ns													
Control	vs	Conc-%		Statist	ic Cri	itical	P Level		Ties	De	cision	(0.05)			
Salt Control		25		72	47		>0.05		1	No	n-Signi	ificant Effec	;t		
		50		72	47		>0.05		1	No	n-Signi	ificant Effec	;t		
		67		72	47		>0.05		1	No	n-Signi	ificant Effec	:t		
		100		72	47		>0.05		1	No	n-Signi	ficant Effec	:t		
Data Summa	ry					Origiı	nal Data					Transfo	orme	d Data	
Conc-%	Con	itrol Type C	ount	Mea	in N	linimum	Maximur	n	SD	Mean		Minimum	Ma	aximum	SD
0	Salt	Control 8		0.97	500 0	.80000	1.00000		0.07071	1.3155	52	1.10715	1.3	34528	0.08419
25		8		1.00	000 1	.00000	1.00000		0.00000	1.3452	28	1.34528	1.3	34528	0.00019
50		8		1.00	000 1	.00000	1.00000		0.00000	1.3452	28	1.34528	1.3	34528	0.00019
67		8		1.00	000 1	.00000	1.00000		0.00000	1.3452	28	1.34528	1.3	34528	0.00019
100		8		1.00	000 1	.00000	1.00000		0.00000	1.3452	28	1.34528	1.3	34528	0.00019

Approved By ALA 424

 Comparisons:
 Page 1 of 2

 Report Date:
 19 Aug-04 8:45 AM

 Analysis:
 03-2333-8357

	ricpon	•							Analysis:		(03-2333-8357
Chronic Mys	id Survival and	Growth	Test C-	2							AMEC E	lioassay SD
Endpoint		Ar	nalysis Type		Sample	e Lir	nk Contro	l Link	Date Analyzed		Version	
Mean Dry We	eight-mg	Co	omparison		17-0073	3-00	26 17-0073	3-0026	18 Aug-04 3:52	PM	CETISV	1.024
Method		AI	tH Data	Transform	Z		NOEL I	OEL	Toxic Units	Ch\	/	MSDp
Dunnett's Mu	Itiple Comparisor	n C	> T Untra	ansformed			100 >	>100	1.00	N/A		15.32%
ANOVA Assi	umptions											
Attribute	Test		Stati	stic Cri	tical	ΡL	.evel	Decisio	on(0.01)			
Variances	Bartlett		9.16	035 13.	27671	0.0	5721	Equal \	/ariances			
Distribution	Shapiro-Wi	ilk W	0.98	226 0.9	1882	0.8	4047	Normal	Distribution			
ANOVA Tabl	e											
Source	Sum of	Squares	Mean Squ	uare DF	F Stati	stic	P Level		Decision(0.05)			
Between	0.21701	2	0.054253	4	34.56		0.00000		Significant Effect	 ct		
Error	0.054930	601	0.0015696	5 35					0			
Total	0.27194	798	0.0558226	5 39								
Group Comp	arisons											
Control	vs Conc-%		Statistic	Critical	P Level		MSD	De	cision(0.05)			
Salt Control	25		-5.843278	2.238571	>0.05		0.04434406	No	n-Significant Effe	ct		
	50		-9.578926	2.238571	>0.05		0.04434406	No	n-Significant Effe	ct		
	67		-8.947903	2.238571	>0.05		0.04434406	No	n-Significant Effe	ct		
	100		-9.907062	2.238571	>0.05		0.04434406	No	n-Significant Effe	ct		
Data Summa	ry			Orig	inal Data				Transf	forme	d Data	
Conc-%	Control Type	Count	Mean	Minimum	Maximu	m	SD	Mean	Minimum	Ma	aximum	SD
0	Sait Control	8	0.28950	0.24000	0.32200		0.02856					
25		8	0.40525	0.37600	0.45000		0.02402					
50		8	0.47925	0.44000	0.53200		0.03377					
67		8	0.46675	0.42000	0.53000		0.03227					
100		8	0.48575	0.39200	0.59000		0.06537					



Water Quality Measurements

Client:	City of Buenaventura	Test Species: A. bahia	
Sample ID:	C-2	Start Date/Time: 07/21/2004	الو الح
Test No:	0407-038	End Date/Time: 07/28/2004	1500

4

Concentration				Lab C	ontro	42-		
Day	0	1	2	3	4	5	6	7
A second particular and particular				In	itial			100 20 C - S-
рН	8.00	7.97	7.98	108	8.06	7.98	7.91	
DO (mg/L)	7.8	2.6	7.8	7.9	7.9	7.3	B.Y	
Salinity (ppt)	30.1	29.3	30.1	30.0	30,	30.2	296	
Temp (°C)	24.4	24.7	25.0	25.1	251	25.2	25.7	a a
			和正常和任	Fi	nal	12000		Carlo States
pН		178	7.71	772	7.71	8.12	7.99	806
DO (mg/L)		5.1	うら	5.2	51	5.0	5-0	5,0
Temp (°C)		25.8	25.5	25%	25.4	24.5	24.9	251

Concentration				Salt C	Control	キン		
Day	0	1	2	3	4	5	6	7
The state of the second			and the second	In	itial	ELLER -		2-16-54 31-5
pH	8.41	8.15	8.29	8.33	8.37	8.25	8.38	The second second
DO (mg/L)	7.0	6.7	7.2	7.2	2.1	6.5	5.7	
Salinity (ppt)	30.3	299	30.2	30.2	30.2	305	30.1	
Temp (°C)	24.4	24.7	25.0	25.3	25.2	25.1	25.10	
A CARL PARTY STOL				F	inal			
рН		\$.10	8.00	7.98	7.95	8.19	8.20	8.14
DO (mg/L)		5.3	5.4	52	5.1	4.7	51	50
Temp (°C)		257	25.5	25,5	25.2	24.5	24.9	251

Concentration		25%											
Day	0	1	2	3	4	5	6	7					
and the second second	I Canada Cara Cara Cara Cara Cara Cara Cara C	Sale Sale	See Serve	ln	itial	Sept. Co.	Section 21	S. S. Sandar					
pH	8.50	8,29	8.3	8.41	B.37	8.32	8.37						
DO (mg/L)	7.2	6.3	64	6.5	60	6.1	5.9						
Salinity (ppt)	30.7	29.9	30.0	30.0	30.1	31.5	20.2						
Temp (°C)	25.0	244	25.0	25.2	75.2	25.3	25.4						
				Fi	nal		AN THERE	1.					
рН	and the des	8.24	8.61	8.03	B.19	8.22	8.20	821					
DO (mg/L)		43	4.7	4.7	5.3	4.7	4.7	4.9					
Temp (°C)		24.8	25.7	25.2	25.5	24.6	25.1	252					

Animal Source/Date Received:

Animal Age at Initiation:

<u>AB5/ 7-71-04</u> 7 days old

Comments:

QC Check: AH 8-

AH 8-10-04

Concentration 50% Day 0 1 2 3 4 5 6 7 Initial 8.56 8.31 8.41 8.48 B.44 8.25 pН 8.34 DO (mg/L) 7.4 6.1 6.3 6.5 6.5 6.2 5.9 Salinity (ppt) 29.9 30.0 30.7 29.9 30.1 30.0 30.7 30.6 30.2 24.9 24.7 75.0 25.3 20.2 JS. 4 Jr. 2 30.1 30.2 Temp (°C) 0.33 8,17 8.17 8.20 8.22 8.21 8.21 4.1 50 4.9 4.9 4.7 4.6 4.7 24.9 25.7 25.5 25.4 24.9 254 25.2 pН DO (mg/L) Temp (°C) 25,2

Concentration		671.											
Day	0	1	2	3	4	5	6	7					
	MEN Standard and			1	tial		12124	1200					
pН	8.59	8.35	8.46	8.51	8.50	8.50	838						
DO (mg/L)	F.F	5.5	6.1	6.3	6.4	10.0	5.9						
Salinity (ppt)	30.5	30.1	30.2	30.1	30,2	30.7	30.3						
Temp (°C)	24.9	24.7	25.0	25.2	263	25.4	252						
14-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	THEF. St. A.			F	hal.	1	the second of	and the state of					
рН		8.37	8.22	8.23	8.25	8.36	8.30	8 27					
DO (mg/L)		4.6	5.0	4.9	4.1	4.6	4.4	4.6					
Temp (°C)		24.9	25.6	25.6	25.5	24.9	25.1	25.2					

Concentration		100%											
Day	0	1	2	3	4	5	6	7					
		1 A Car		In	ital 🐘 🐂								
pH	8.65	8.47	8.53	8.56	Q.55	8.54	8.54						
DO (mg/L)	8.3	5.3	6.1	6.3	1.0	6.2	6.1						
Salinity (ppt)	30.2	30.3	30.3	30.1	30.2	30.7	30.4						
Temp <u>(°C)</u>	24.8	24.8	25.0	25.3	25,2	25.4	253						
- The set of the set	And Aller Aller	1.85 B.S.	Sec. 1	Fi	nal	Here Co	de la classification	State State					
pН		8.44	8.30	8.33	8.36	8.28	\$ 29	8.29					
DO (mg/L)		5.1	50	5.3 \$	5553	4.7	4.6	46					
Temp (°C)		24.8	256	25.6	25.5	24.7	25.2	25.7					

		0	1	2	3	4	5	6	7
nalysts:	Initial:	me	Ry	NC	SĦ	Ky	Ry S	Ry	
	Final:		AH	mc	zh	Rig	RS	Ry	SH

Final Review: 🗶

Larval Mysid Survival & Weights

Client Name:		City of	Buena	aventur	a		ו	'est Sp	ecies:	A. bahia		
Sample ID:		C-2					Sta	rt Date	/Time:	07/21/2004	1615	
Test No.:		0407-0	38				En	d Date	/Time:	07/28/2004	עראו	
Conc.	Ban			S	urviva	on Te	st Day:			Percent	pan wt.	pan + mysid
(%)	кер.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
Lab Control	а	5	5	.5	S	5	5	5	5	100	004044	0.04196
#2	b	5	5	5	5	5	Ś	5	5	100	0.03828	0.03971
	С	5	5	5	5	5	5	5	5	100	0.04595	0.04756
	d	5	5	5	5	5	5	5	3	100	0.04208	0.04334
	е	5	5	5	5	Ý	4	Y	4	80	0.04015	0.04160
	f	5	5	5	5	5	Ś	5	5	100	0.03545	0.03073
	g	5	5	5	5	5	5	5	5	100	0.03645	0.03792
	h	5	5	5	5	5	5	5	5	100	0.03615	0.03757
Salt Control	а	5	5	5	5	5	5	5	5	100	0.03794	0.03942
#2	b	5	5	5	5	5	5	5	5	100	0.03948	0.04099
	C	5	5	5	5	5	5	.5	5	100	0.03940	0.04093
	d	5	5	5	5	5	5	5	5	100	0.04087	0.04222
	е	5	5	5	5	5	5	5	5	100	0:03750	0.03882
	f	5	5	5	5	5	5	5	5	100	0.03716	0.03877
	g	5	5	5	5	4	4	4	4	80	0.03318	0.03438
	h	5	5	5	5	5'	.9	5	5	100	0.03301	0.03459
25	а	5	5	5	5	5	5	5	5	100	0.04469	0.04694
	b	5	5	5	5	5	5	5	5	100	0,03782	0.03975
	С	5	5	5	5	5	5	5	5	100	0.63712	0.03900
	d	5	5	5	5	5	5	5	5	100	0.03234	0.03427
	е	5	5	5	5	5	5	5	5	100	0.03851	0.04070
	f	5	5	5	5	5	5	5	5	100	0.03910	0.04113
	g	5	5	5	5	5	5	5	5	100	0.03476	0.03680
	h	5	5	5	5	5	5	5	5	100	0.03291	0.03493
50	а	5	5	5	5	5	5	5	5	100	0.03795	0.04038
	b	5	5	5	5	5	5	5	5	100	0.03798	0.04028
	C	5	5	5	5	5	5	5	5	100	0.03462	0.03719
	d	5	5	5	5	5	5	5	5	100	0.03550	003781
	e	5	5	5	5	5	5	5	5	100	0.03547	0.03313
	T	5	5	5	5	5	5	3	5	100	0,03455	0.03675
	g	5	5	5	5	3	2	- 3	5	100	0.03732	0.0.3953
Tech Initiale	n	5	5	5	5	2	<u> </u>	3	150	100	0.03333	0,0356
lech initials		I SU	<u>I</u> <u>R</u>	m	SIT	AH	1 Kg	Kg	Inc	1 data enti	M Maint	4 Defe
Fooding Time	(day)		•	4	2	•		F	•	QCEAH	Dete Time in	
reeding rime:	s (uay)	•		1010	ACID	3	4	3	1941	1	Date/Time In:	1128/04 13.30
			1.22	0100	11.00	0000	10900	1600	0315		Date/Time out:	<u>1.50.04 145</u>
			1430	1169 9	1605	1400	1945	1000	1/545] 0	Tech Initials:	30
Comments:											QC Check: Final Review:	Att. 8-10-0 41 AMI
AMEC Earth & E	nvironn	nental B	ioassay	Labora	tory. 55	50 More	ehouse l	Dr., Ste.	B. San	Diego, CA 92121	1.	-

Client Name:		City of	f Buena	aventu	ra		. 1	Fest Sp	pecies:	A. bahia			-
Sample ID:		C-2					Sta	rt Date	/Time:	07/21/2004	1615	-	-
Test No.:		0407-0)38	<u></u>	*****		En	nd Date	/Time:	07/28/2004	1501	9	_
Conc.	Pop			S	urviva	l on Te	st Day:	••*•••••••••••••••••••••••••••••••••••		Percent	pan wt.	pan + mysid	ו
(<u>67</u> %)	Rep.	0	1	2	3	4	5	6	7	Survival	(g)	SP (g)	
67	а	5	5	5	5	5	5	5	5	100	0.03970	10.041-181	0.0418
	b	5	5	5	5	5	5	5	5	100	0.04240	0.04481	4
	C	5	5	5	2	5	5_	5	5	100	0.04126	0.04353	4
	a	5	5	5	5	5	5	5	5	100	0.03950	0.07185	4
	e	5	15	2	0	2		12	12	100	0.03800	0.040-0	4
	1	5	12	5	9	12	2			100	0.04244	0.09509	-
	y b	5	5	,	5	2	2	5	5	100	0.04321	10.0 1500	٩
100		5	5	7	5	12		5		$\frac{10}{100}$	0.01296	0.014.70	-
100	a h	5	5	3	<u>></u>	2	<u> </u>	5	5	100	0.04.300	0.04600	-
	C	5	12-	2		5	2	5	5	100	0.03476	0.14482	-
	b	5	15	F	2	5	3	5	5	100	0.049.03	0.05108	-
	e	5	5	5	r r	5	Š	5	5	100	0.04343	0,04588	-
	f	5	5	Ś	5	5	Š	5	Ś	100	0.04202	0 036 SD	0.0439
	g	5	5	5	5	5	5	5	5	100	0.04661	0.04950	
	h	5	5	5	5	5	3	5	5	100	0.03413	0.03453	1
	a		1										1
	b		1						1				
	С]
	d												
	е												
	f												
	g	ļ							ļ				_
	h			1					l		-		_
	a				ļ				ļ				4
	b								ļ				4
	C			ļ	ļ				 		-		-
	a		 						 				-
	e f												-
			+			<u> </u>			+				-
	h h						1						-
Tech Initials		50	22	LUC.	SH	AH	RI.	PI.	916	dataau	42		
				1 100	1.31	1.4.11	<u> </u>	1.~~4	1.000	- Deciden	any Weig	ht Data:	
Feeding Time	s (day):	:	0	1	2	3	4	5	6	OC AH	Date/Time in	1: 7/28/04/15	30
-			-	0900	0800	0830	0900	0840	OBIS	1	Date/Time out	1:7.30.04 1	130
			1630	1645	1605	1400	1945	1600	1545		Oven Temp (°C)	1:09	-
										_	Tech Initials	: ` S	-
Comments:											QC Check	: AH. B-10-0	\mathcal{A}
										-	Final Review	: CA \$21	Ū4
												v	

M. GALLOPROVINCIALIS

	CETIS	Report							Report Date: Link:	23 Aug-04 1:45 PM 03-9390-9780/0407-043
	Bivalve Larva	al Survival and D	evelopm	ent Test A	-2					AMEC Bioassay SD
	Test: Start Date: End Date: Setup Date:	08-2544-2401 21 Jul-04 04:30 P 23 Jul-04 04:15 P 21 Jul-04 04:30 P	M M M	Test Type: Protocol: Dil Water: Brine:	Developme ASTM E724 Laboratory Frozen Sea	ent 4-98 (1999) Seawater awater		Duration: Species: Source:	48 Hours Mytilis gallopr Field Collecte	rovincialis d
	Sample: (Sampled: 2 Received: 2 Hold Time: 2	04-7641-4711 20 Jul-04 02:50 P 21 Jul-04 07:45 A 26 Hours (19.3 °C	M M C)	Material: Code: Source: Station:	Estuarine M 0407-043 City of Bue A-2	Aonitoring Si naventura	ample	Client: Project:	City of Buena	ventura
	Comparison Analysis 08-6399-4827 15-1354-4639	Summary Endpoint Proportion Nor	mal	NOEL 100 65	LOI >10 >65	EL 90	ChV N/A N/A	MSDp 0.09297 0.07073	Method Equal Varian Dunnett's Mu	ice t Iltiple Comparison
	Proportion N	ormal Summary	Rens	Mean	Minimum	Maximun	n SE	SD	CV	
Þł.	0 0 25 50 65/67 100	Brine Control Lab Control Salt Control	5 5 5 5 5 5 5 5 5 5	0.85000 0.91200 0.85400 0.90800 0.92200 0.90400 0.85800	0.80000 0.88000 0.79000 0.88000 0.89000 0.88000 0.79000	0.90000 0.94000 0.93000 0.96000 0.94000 0.94000 0.93000	0.01789 0.01020 0.02315 0.01744 0.00917 0.01288 0.02922	0.04000 0.02280 0.05177 0.03899 0.02049 0.02881 0.06535	4.71% 2.50% 6.06% 4.29% 2.22% 3.19% 7.62%	
	Proportion N	ormal Detail	Ren 1	Ren 2	Ren 3	Ren 4	Ren 5			
	0 0 25 50 6567 100	Brine Control Lab Control Salt Control	0.83000 0.92000 0.93000 0.94000 0.89000 0.88000 0.93000	0.88000 0.92000 0.87000 0.96000 0.94000 0.89000 0.80000	0.84000 0.90000 0.79000 0.88000 0.92000 0.88000 0.79000	0.90000 0.94000 0.85000 0.88000 0.92000 0.93000 0.92000	0.80000 0.88000 0.83000 0.88000 0.94000 0.94000 0.85000			

Test Summary:

Page 1 of 1

CETIS	R	eport											Compariso Report Dat Analysis:	ons: œ:	19 Aug	Page 2 of 2 -04 11:55 AM 15-1354-4639
Bivalve Larva	al Sur	vival and D	evelop	ment T	est	A-Z	-								AMEC E	Bioassay SD
Endpoint			Ar	nalysis	Туре			Sampl	e Lir	ik Con	trol L	.ink D	ate Analyzed		Version	
Proportion No	rmal		Co	omparis	on			03-939	0-97	80 03-9	390-9	9780 1	9 Aug-04 11:54	AM	CETISv	1.024
Method			AI	tН	Data	Fransfor	m	Z		NOEL	LO	EL	Toxic Units	ChV		MSDp
Dunnett's Mul	tiple C	comparison	С	> T	Angul	ar (Corre	cted)			65	>6	5	1.54	N/A		7.07%
ANOVA Assu	mptio	ons														
Attribute		Test			Statis	tic	Criti	cal	ΡL	.evel	C	ecision	(0.01)			
Variances		Bartlett			1.586	22	11.3	4487	0.6	6252	E	iqual Var	iances			
Distribution		Shapiro-Will	k W		0.920	00	0.86	826	0.0	9927	Ν	lormal D	istribution			
ANOVA Table Source Between Error Total Group Comp. Control Brine Control	arisoi vs	Sum of S 0.037494 0.049943 0.087437 ns Conc-% 25 50	Squares 86 09 95	Me: 0.0 0.00 0.0 Statis -2.635 -3.221	an Squa 124983 031214 156197 tic 307 336	Critical 2.23 2.23	DF 3 16 19	F Stat 4.00 P Level >0.05 >0.05	listic	P Lev 0.026 MSD 0.078797 0.078797	vel 50 753 753	Decis Non-S	ecision(0.05) Significant Effect Sion(0.05) Significant Effect Significant Effect	t ct		
		85 67		-2.348	176	2.23		>0.05		0.078797	'53	Non-S	Significant Effec	ct		
Data Summa	ry						Origir	al Data					Transfo	ormed	d Data	
Conc-%	Con	trol Type	Count	Mea	n	Minim	um	Maximu	ım	SD	 I	Mean	Minimum	Ма	ximum	SD
0	Brine	e Control	5	0.8	5000	0.8000	00	0.90000)	0.04000		1.17567	1.10715	1.2	4905	0.05690
25			5	0.90	0080	0.8800	00	0.96000)	0.03899		1.26879	1.21705	1.3	6944	0.07269
50			5	0.93	2200	0.8900	00	0.94000)	0.02049		1.28949	1.23273	1.3	2333	0.03732
65 67			5	0.90	0400	0.8800	00	0.94000)	0.02881		1.25864	1.21705	1.3	2333	0.05071

 Comparisons:
 Page 1 of 2

 Report Date:
 19 Aug-04 11:55 AM

 Analysis:
 08-6399-4827

Bivalve Larva	al Su	vival and l	Develop	ment Test	A:2	•							AMEC E	Bioassay SD
Endpoint			Ar	alysis Typ	e		Sample	Lir	nk Contro	ol Link	Date Analyzed		Version	
Proportion No	rmal		Co	omparison			03-9390	-97	80 03-939	0-9780	19 Aug-04 11:54	4 AM	CETISv	1.024
Method			Al	tH Da	ta Tran	sform	Z		NOEL	LOEL	Toxic Units	ChV	1	MSDp
Equal Variance	e t		С	>T An	gular (C	orrected))		100	>100	1.00	N/A		9.30%
ANOVA Assu	ANOVA Assumptions													
Attribute		Test		Sta	tistic	Crit	tical	ΡL	.evel	Decisio	on(0.01)			
Variances		Variance R	atio	1.5	7343	23.	15450	0.6	7129	Equal V	ariances			
Distribution		Shapiro-Wi	lk W	0.8	9516	0.78	8055	0.1	8927	Normal	Distribution			
ANOVA Table														
Source		Sum of	Squares	Mean S	quare	DF	F Statis	stic	P Level		Decision(0.05)			
Between		0.000188	877	0.00018	88	1	0.02		0.87969)	Non-Significant	Effect		
Error		0.06184	193	0.00773	02	8								
Total		0.062030	070	0.00791	90	9								
Group Comp	ariso	ns												
Control	vs	Conc-%		Statistic	Crit	ical	P Level		MSD	Dec	cision(0.05)			
Salt Control		100		-0.156267	7 1.85	9548	0.56015		0.1034032	Nor	n-Significant Effe	ct		
Data Summa	ry					Origi	nal Data				Transf	orme	d Data	
Conc-%	Con	trol Type	Count	Mean	Mi	nimum	Maximur	n	SD	Mean	Minimum	Ma	aximum	SD
0	Salt	Control	5	0.85400	0.7	79000	0.93000		0.05177	1.1837	3 1.09476	1.3	30303	0.07751
100			5	0.85800	0.7	79000	0.93000		0.06535	1.1924	2 1.09476	1.3	30303	0.09723

Γ	Bivalve Lar	val Survival a	and De	velopment Tes	t			AMEC Bioassay SD
ř	Start Date:	21 Jul-04		Species:	Mytilis gallo	provincialis	Sample Code:	0407-043
	End Date:	23 Jul-04		Protocol:	ASTM (199	3994 1999	Sample Source:	City of Buenaventura
	Sampled:	20 Jul-04		Material:	Estuarine N	Ionitoring Sample	e Sample Station:	A-2
Ī	Conc-%	Code Rep	Pos	# Counted	# Normal		Notes	5
			41	100	92	RG		
4	AND DESCRIPTION OF TAXABLE PARTY.		42	79	40	55		
+			43	100	29			
			44	100	94			
			45	100	\$O	, j		
			46	100	y j	U		
			47	1,00	0 P	ICG		
			48	100	90	<u> </u>		
-			49	100	43	<u>></u> }		
+			51	100	244	Ky		
			52		88	ZP.		
			53	100	D'O	NY So		
-			54	100	Yd	20		
-	and which it is the second		55		<u> </u>	<u> </u>		
			56	100	$\frac{q}{2}$	K g S h		
			57	200	6J	RIS		
_			58	100	72	50		
			59	100	Æ	J		
-			60	1/20	93	RG		
ŀ			61	001	85	SD		
			62	ias	89			
			63	100	าร่			
			64	100	88	ŘG		
-+			65	100	510	SD		
-			66	IDD	83	J.		
			67	100	92	Ry		
			68	1.00	93	SÓ		
			69	100	94	RG		
			70	100	68	RG		
			71	,100	92	, Řů		
			72	100	00	SD		
			73	100	74	RG		
			75	100		SD		
L			75		04	- KG		

-Sites A-2 and B-3 will share LC and SCI and C-2 and BCI data entry QC=Att





Data Worksheet: Page 1 of 1 Report Date: 19 Jul-04 12:56 PM Link: 03-9390-9780/0407-043

CETIS Worksheet

	Link:	03-9390-9780/0407-0
ivalve Larval Survival and Development Test		AMEC Bioassay S
tart Date: 21 Jul-04 Species: Mytilis galloprovincialis Sample Code	e: 0407-043	
nd Date: 23 Jul-04 Protocol: ASTM (1993) - 199 Sample Sou	rce: City of Bu	enaventura
ampled: 20 Jul-04 Material: Estuarine Monitoring Sample Sample Stati	ion: A-2	
Conc-% Code Rep Pos # Counted # Normal	Notes	
0 B 1 42		
0 B 2 56		
0 B 3 58		
0 B 4 65		
0 B 5 53		
		a de la presidencia de la construcción de la cons
0 1C 5 64		
0 SC 1 49	al - Participation of State and the first sector of the State and the Associate	and a second
0 SC 2 74		
0 SC 3 43		
0 SC 4 59		
0 SC 5 66		
25 1 50		
25 2 48		
25 3 47		
25 4 70		
25 5 52		
50 1 75		
50 2 69		
50 3 41		
. 50 4 71		
50 5 57 65 1 51		
/1/65 2 62		
67()		
1 /1 /1 65 4 68		
65 5 44		an ann an Anthropa ann an Anna
100 1 60		
100 2 45		
100 3 63		
100 4 46		
100 5 61		
$\Delta las = \Delta H$		
area and a second		
A-2 and B-3 will share LCI and SCI.		
A-2 and B-3 will share LCI and SCI. and C-2 and BCI.		

CETIS Worksheet



Data Worksheet:

Report Date: 19 Jul-04 12:56 PM

Page 1 of 1

Water Quality Measurements

Raw Datasheet

Client:	City of Buenaventura
Sample ID:	A-2, B-1
Test No.:	0407-043,044

Test Species: <u>M. galloprovincials</u> Start/End Dates: <u>7-21-04 / 7-23-04</u> Start/End Times: <u>1630 | 1615</u>

	Concentration	Те	mperatu	re		Salinity		Disso	lved Oxy	/gen		pН	
	·/.		(°C)			(ppt)			(mg/L)		(pH units)
		0	24	48	0	24	48	0	24	48	0	24	48
	Lab Control 1	NTO	14.5	14.4	30	30.1	30.6	8,2	8.0	8.7	7,99	7.96	7.89
#1	Brine Control	15.0	14,4	14.3	30	31.2	31.3	7.7	7,8	8.6	8.00	7,96	7.92
	Salt Control1	15.0	14.4	i4.4	30	30.2	31.4	7.4	7.5	8.5	8.41	8,29	8.19
	A.J- 25%.	15.0	14.2	14.4	30	30.6	30.6	8.4	7,9	8.7	8.46	8.25	8.14
	A-2 50%.	15.0	14.3	14.3	30	31.2	30.3	8.6	7.9	8.5	8.65	8.44	8.30
	A-2 67%	15.0	14.3	14.4	30	31,8	31.9	8.7	7.8	8.5	8,73	8.52	8.39
	A-7 100%.	15.0	14.7	14.6	30	30.3	30.4	7.7	7.6	8.4	8.90	8.77	8,66
#Z	Brine Cont. Z	15.0	15.9	16.1	30	30.8	30.5	7,6	7.6	8.3	8.01	7.94	7.90
	B-1 25%	15.0	15.9	15.8	30	30.1	30.1	8.0	7.8	8.5	7,92	8.02	8.04
	B-1 50%	15.0	15.7	15.8	30	31.1	31.1	8.0	7.8	8.5	7.86	8.06	8.10
	B-1 67%	15.0	15.7	15.6	31	31.6	31.5	7.9	7.8	8.5	7.83	8.08	8.15
	B-1 100%	15.0	15.5	15.5	30	30.3	30.2	7.6	7.6	8.4	8.14	8.25	8.29

Technician Initials	0 24 48 JR AH Me	
Animal Source/Da	te Received: Mission Bay Collected T	1/20
Comments:	0 hrs: <u>A-Z, B-3, C² Share LCI, SCI, BI</u> 24 hrs: 48 hrs:	<u>المج الادر المج الادر مح</u> كم AMEC Earth and Environmental Bioassay Laboratory
QC Check:	AH 8-10-04 Final Review:	- $420/4$ 5550 Morehouse Dr., Suite B San Diego, CA 92121

Raw Datasheet

Client:	City c	of Bu	venaventura
Sample ID:	B-3	C-	- ン
Test No.:	0407-	045,	046

Test Species:	M. gallop	rovincialis
Start/End Dates:	7-21-04	17-23-04
Start/End Times:	11630	1615
₹	re	

	Concentration	Temperature			Salinity		Dissolved Oxygen		рН				
	·/.	(°C)		(ppt)			(mg/L)			(pH units)			
		0	24	48	0	24	48	0	24	48	0	24	48
	106 Control Z	15.0	16.2	16.D	30	29.9	29.5	8.1	77	83	8.02	7.92	7.85
#1	Brine Control	150	14.4	ett: 7	30	317	31.3	7.7	7.8	8.6	8.00	796	7.92
	Salt Controlz	15.0	16.1	الدرا	30	31.4	31.2	7.3	7.3	8.1	8.42	४,३०	8.22
	B-3 25%	15.0	14.6	14.7	30	30.5	303	8.3	7,9	8.4	8.37	8.26	8.17
	B-3 50%	15.0	14.7	14.8	30	31.1	31.0	8.4	7.9	8.4	8.53	8.39	8.29
	B-3 67.1,	15.0	14.7	14.8	31	31:0	31.2	8.5	7.8	8.4	8.61	8.47	8.37
	B-3 100%	15.0	14.7	14.9	30	30.0	30.2	8.0	7.5	8.4	8.82	8-72	8.63
#1	Brine Cont. 1	N.0	14.4	14.3	30	31.2	31.3	7.7	7.8	8.6	8.00	7.96	7.92
	1.7 25%	15.0	14.6	15.1	30	30.1	30.0	8.1	7.7	8.5	8.21	8.14	8.07
	(-2 50%	15.0	14.7	15.0	31	30,9	30.9	8.Z	7.7	8.5	8.33	8.22	8.16
	(-2 67%	15.0	14.9	151	31	31.5	31.5	8.1	7.5	8.4	8.37	8,27	8.22
	C-2 100'L	15.0	15.0	15.1	30	30.5	30.5	7.9	7.5	8.3	8.6Z	8.54	8.45
	<u> </u>	1	1										

Technician Initials:

48 0 24 AH he JL

Animal Source/Date Received:

Mission Bay Collected 7/20

Comments:

0 hrs: <u>A-Z, B-J, C-Z share LCI, BCI, SCJ B-1 has LCZ, B</u>CZ, SCZ 24 hrs:

QC Check:

48 hrs: AH 8-10-04 Final Review:

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr., Suite B San Diego, CA 92121

Brine Dilution Worksheet

Client:	City of Buena	/entura	Analyst: JR/AH			
Sample ID: <u>A-2, B-3, C-2</u>			Test Date: <u>07/21/2004</u>			
Test No:	0407-043	,45,46	Test Type: Bivalve Kelp			
Salinity of Effl	uent	3.0				
Salinity of Brine		89				
Target Salinity	, .	30				
Test Dilution Volume		250				
Salinity Adjustment Factor:		TS - SE	TS = target salinity			
		SB - TS	SE = salinity of effluent			
			SB = salinity of brine			
Salinity Adjustment Factor =		0.46				

Concentration %	Effluent Volume (mL)	Salinity Adjustment	Brine Volume (mL)	Dilute to to: (mL)			
Control	NA	NA	NA	250			
6.25	15.6	0.46	7.2	250			
12.5	31.3	0.46	14.3	250			
25	62.5	0.46	28.6	250			
50	125.0	0.46	57.2	250			
67	167.5	0.46	76.7	250			
DI Volume							
Brine Control	151	0.51	76.7	250			

Brine Control Salinity Adjustment Factor

260.7

Brine Control Calculation:

AMEC Earth and Environmental, Inc. San Diego Bioassay Laboratory 5550 Morehouse Drive. Suite B San Diego, CA 92121

Brine Dilution Worksheet							
Client: City of Buena		ventura	Analyst:	JR/AH			
Sample ID: <u>B-1</u>			Test Date:	07/21/2004			
Test No:	0407-04	·4	Test Type:	Bivalve/Kelp			
Salinity of Effluen	nt	1.1					
Salinity of Brine		89					
Target Salinity		30					
Test Dilution Volume		250					
Salinity Adjustment Factor:		TS - SE	TS = target salinity				
		SB - TS	SE = salinity of effl	uent			
			SB = salinity of brir	ne			
Salinity Adjustme	ent Factor =	0.49					

Concentration %	Effluent Volume (mL)	Salinity Adjustment	Brine Volume (mL)	Dilute to to: (mL)			
Control	NA	NA	NA	250			
6.25	15.6	0.49	7.7	250			
12.5	31.3	0.49	15.3	250			
25	62.5	0.49	30.6	250			
50	125.0	0.49	61.2	250			
67	168	0.49	82.2	250			
DI Volume							
Brine Control	162	0.51	82.2	250			

Brine Control Salinity Adjustment Factor

279.2

Brine Control Calculation:

TS - 0 SB - TS

> AMEC Earth and Environmental, Inc. San Diego Bioassay Laboratory 5550 Morehouse Drive. Suite B San Diego, CA 92121
| CETIS | S Report | | |
|-------------|---------------------------|------------|-----------------------------|
| Bivalve Lar | val Survival and Developm | ent Test B | - |
| Test: | 08-2544-2401 | Test Type: | Development |
| Start Date: | 21 Jul-04 04:30 PM | Protocol: | ASTM E724-98 (1999) |
| End Date: | 23 Jul-04 04:15 PM | Dil Water: | Laboratory Seawater |
| Setup Date: | 21 Jul-04 04:30 PM | Brine: | Frozen Seawater |
| Sample: | 05-5463-2478 | Material: | Estuarine Monitoring Sample |
| Sampled: | 20 Jul-04 01:40 PM | Code: | 0407-044 |

	Test: Start Date: End Date: Setup Date:	08-2544-2401 21 Jul-04 04:30 F 23 Jul-04 04:15 F 21 Jul-04 04:30 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Developme ASTM E72 Laboratory Frozen Sea	ent 4-98 (1999) Seawater awater		Duration: Species: Source:	48 Hours Mytilis galloprovincialis Field Collected
	Sample:	05-5463-2478	20.4	Material:	Estuarine N	Aonitoring Sa	ample	Client:	City of Buenaventura
	Sampled:	20 Jul-04 01:40 F		Code:	City of Puo	novontura		Project.	
	Hold Time:	27 Hours (18.4 °C	C)	Station:	B-1	naventura			
	Comparisor	n Summary							
	Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
	09-2290-458	1 Proportion Nor	mal	100	>10	00	N/A	0.05752	Equal Variance t
	20-0943-980	0-0943-9801		65	>65	5	N/A	0.08296	Dunnett's Multiple Comparison
	Proportion I	Normal Summary	,						
	Conc-%	Control Type	Reps	Mean	Minimum	Maximum	n SE	SD	CV
	0	Brine Control	5	0.85000	0.80000	0.90000	0.01789	0.04000	4.71%
	0	Lab Control	5	0.91200	0.88000	0.94000	0.01020	0.02280	2.50%
	0	Salt Control	5	0.82600	0.75000	0.86000	0.01965	0.04393	5.32%
	25		5	0.89000	0.84000	0.95000	0.01789	0.04000	4.49%
	50		5	0.87400	0.80000	0.91000	0.02040	0.04561	5.22%
AH-	65 67		5	0.85800	0.80000	0.92000	0.02059	0.04604	5.37%
	100		5	0.83600	0.79000	0.87000	0.01536	0.03435	4.11%
	Proportion I	Proportion Normal Detail							
	Conc-% Control Type Rep 1 Rep 2				Rep 3	Rep 4	Rep 5		

1						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	0.83000	0.88000	0.84000	0.90000	0.80000
0	Lab Control	0.90000	0.92000	0.88000	0.92000	0.94000
0	Salt Control	0.84000	0.85000	0.86000	0.75000	0.83000
25		0.88000	0.95000	0.84000	0.88000	0.90000
50		0.90000	0.80000	0.90000	0.86000	0.91000
-65 67		0.86000	0.92000	0.88000	0.83000	0.80000
100		0.87000	0.79000	0.81000	0.86000	0.85000



Page 1 of 1 Test Summary: 23 Aug-04 1:45 PM

AMEC Bioassay SD

Report Date: 02-0286-0226/0407-044

Link:

Comparisons:PagReport Date:19 Aug-04 1

Page 2 of 2 19 Aug-04 11:44 AM 20-0943-9801

AMEC Bivalve Larval Survival and Development Test AMEC Endpoint Analysis Type Sample Link Control Link Date Analyzed Version Proportion Normal Comparison 02-0286-0226 02-0286-0226 19 Aug-04 11:44 AM CETISN Method Alt H Data Transform Z NOEL LOEL Toxic Units ChV Dunnett's Multiple Comparison C > T Angular (Corrected) 65 >65 1.54 N/A ANOVA Assumptions Attribute Test Statistic Critical P Level Decision(0.01) Variances Bartlett 0.15082 11.34487 0.98511 Equal Variances 0 Distribution Shapiro-Wilk W 0.97546 0.86826 0.83755 Normal Distribution ANOVA Table Source Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16	Bioassay Sl
EndpointAnalysis TypeSample LinkControl LinkDate AnalyzedVersionProportion NormalComparison02-0286-022602-0286-022619 Aug-04 11:44 AMCETISiMethodAltHData TransformZNOELLOELToxic UnitsChVDunnett's Multiple ComparisonC > TAngular (Corrected)65>651.54N/AANOVA AssumptionsAttributeTestStatisticCriticalP LevelDecision(0.01)VariancesBartlett0.1508211.344870.98511Equal VariancesDistributionShapiro-Wilk W0.975460.868260.83755Normal DistributionANOVA TableSourceSum of SquaresMean SquareDFF StatisticP LevelDecision(0.05)Between0.011165650.003721930.880.47003Non-Significant EffectFror0.067317810.0042074161616Total0.078483460.0079292191910	
Proportion Normal Comparison 02-0286-0226 02-0286-0226 19 Aug-04 11:44 AM CETISN Method Alt H Data Transform Z NOEL LOEL Toxic Units ChV Dunnett's Multiple Comparison C > T Angular (Corrected) 65 >65 1.54 N/A ANOVA Assumptions Attribute Test Statistic Critical P Level Decision(0.01) Variances Bartlett 0.15082 11.34487 0.98511 Equal Variances Distribution Shapiro-Wilk W 0.97546 0.86826 0.83755 Normal Distribution ANOVA Table Source Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16 10 10 10	n
Method Alt H Data Transform Z NOEL LOEL Toxic Units ChV Dunnett's Multiple Comparison C > T Angular (Corrected) 65 >65 1.54 N/A ANOVA Assumptions Attribute Test Statistic Critical P Level Decision(0.01) Variances Bartlett 0.15082 11.34487 0.98511 Equal Variances Distribution Shapiro-Wilk W 0.97546 0.86826 0.83755 Normal Distribution ANOVA Table Source Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16 16 19 11	1.024
Dunnett's Multiple Comparison C > T Angular (Corrected) 65 >65 1.54 N/A ANOVA Assumptions Attribute Test Statistic Critical P Level Decision(0.01) Variances Bartlett 0.15082 11.34487 0.98511 Equal Variances Distribution Shapiro-Wilk W 0.97546 0.86826 0.83755 Normal Distribution ANOVA Table Source Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16 19 19 19	MSDp
ANOVA AssumptionsAttributeTestStatisticCriticalP LevelDecision(0.01)VariancesBartlett0.1508211.344870.98511Equal VariancesDistributionShapiro-Wilk W0.975460.868260.83755Normal DistributionANOVA TableSourceSum of SquaresMean SquareDFF StatisticP LevelDecision(0.05)Between0.011165650.003721930.880.47003Non-Significant EffectError0.067317810.00420741616Total0.078483460.00792921919	8.30%
AttributeTestStatisticCriticalP LevelDecision(0.01)VariancesBartlett0.1508211.344870.98511Equal VariancesDistributionShapiro-Wilk W0.975460.868260.83755Normal DistributionANOVA TableSourceSum of SquaresMean SquareDFF StatisticP LevelDecision(0.05)Between0.011165650.003721930.880.47003Non-Significant EffectError0.067317810.00420741616Total0.078483460.0079292191910	
Variances Bartlett 0.15082 11.34487 0.98511 Equal Variances Distribution Shapiro-Wilk W 0.97546 0.86826 0.83755 Normal Distribution ANOVA Table Source Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16	
Distribution Shapiro-Wilk W 0.97546 0.86826 0.83755 Normal Distribution ANOVA Table Source Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16 16 16 16 Total 0.07848346 0.0079292 19 19 16 16	
ANOVA Table Source Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16 16 10 Total 0.07848346 0.0079292 19 19 10	
Source Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16 Total 0.07848346 0.0079292 19	
Between 0.01116565 0.0037219 3 0.88 0.47003 Non-Significant Effect Error 0.06731781 0.0042074 16 16 19	
Error0.067317810.004207416Total0.078483460.007929219	
Total 0.07848346 0.0079292 19	
Group Comparisons	
Control vs Conc-% Statistic Critical P Level MSD Decision(0.05)	
Brine Control 25 -1.508305 2.23 >0.05 0.09148289 Non-Significant Effect	
50 -0.879038 2.23 >0.05 0.09148289 Non-Significant Effect	
-0.3072069 2.23 >0.05 0.09148289 Non-Significant Effect	
Data Summary Original Data Transformed Data	
Conc-% Control Type Count Mean Minimum Maximum SD Mean Minimum Maximum	SD
0 Brine Control 5 0.85000 0.80000 0.90000 0.04000 1.17567 1.10715 1.24905	0.05690
25 5 0.89000 0.84000 0.95000 0.04000 1.23754 1.15928 1.34528	0.06838
50 5 0.87400 0.80000 0.91000 0.04561 1.21173 1.10715 1.26610	0.06572
65-67 5 0.85800 0.80000 0.92000 0.04604 1.18827 1.10715 1.28404	

Comparisons: Page 1 of 2 Report Date: 19/ Analysis:

Aug-04	1	1	:44	AM
09-2	22	26	90-4	581

Bivalve Larva	al Sur	vival and I	Develop	ment Test	B-								AMEC E	Bioassay SD
Endpoint			Ar	alysis Type			Sample	Li	nk Contro	l Link	Date Analyzed		Version	
Proportion No	rmal		Co	mparison	02-0286-0226 02-0286			6-0226	3-0226 19 Aug-04 11:44 Al			1.024		
Method			Al	It H Data Transform			Z	Z NOEL		LOEL	Toxic Units	ChV	ChV MSDp	
Equal Varianc	ual Variance t			>T Ang	ular (Co	rrected)			100	>100	1.00	N/A		5.75%
ANOVA Assu	mptic	ons												
Attribute		Test		Stat	istic	Crit	ical	P١	_evel	Decisio	on(0.01)			
Variances	,	Variance R	atio	1.45	906	23.1	15450	0.7	2323	Equal V	ariances			
Distribution		Shapiro-Wi	lk W	0.86	428	0.78	3055	0.0	08870	Normal	Distribution		******	
ANOVA Table	9													
Source		Sum of	Squares	Mean Sq	uare	DF	F Statis	stic	P Level		Decision(0.05)			
Between		0.00041	192	0.000411	9	1	0.16		0.70075)	Non-Significant	Effect	R-B-B-Conte-revenuente de la constata	
Error		0.020760	072	0.002595	1	8								
Total		0.021172	264	0.003007	0	9								
Group Comp	arisor	าร												
Control	vs	Conc-%		Statistic	Critic	al	P Level		MSD	Dec	cision(0.05)			
Salt Control		100	****	-0.3984087	1.859	548	0.64962		0.05991197	' Nor	-Significant Effect	ct		
Data Summa	ry					Origi	nal Data				Transfe	ormed	Data	
Conc-%	Con	trol Type	Count	Mean	Min	imum	Maximun	n	SD	Mean	Minimum	Ma	ximum	SD
0	Salt	Control	5	0.82600	0.75	5000	0.86000		0.04393	1.1425	4 1.04720	1.1	8730	0.05549
100			5	0.83600	0.79	9000	0.87000		0.03435	1.1553	7 1.09476	1.2	0193	0.04594

CETIS	Worl	ksh	eet					Report Date: Link:	: 19 Jul-04 1:11 PM 02-0286-0226/0407-044
Bivalve Larv	al Survival	and De	velopment Tes	st					AMEC Bioassay SD
Start Date: End Date: Sampled:	21 Jul-04 23 Jul-04 20 Jul-04		Species: Protocol: Material:	Mytilis gall ASTM (190 Estuarine l	loprovincialis 93) 794 199 Monitoring Sam	9 ple	Sample Code: Sample Source: Sample Station:	0407-044 City of Buena B-1	aventura
Conc-%	Code Rep	Pos	# Counted	# Normal			Note	es.	
		76 77	100	$\frac{q}{g}$	R G				
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		92 93	100	86	rg Sn				
		94	100	90	Ry				
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Data Worksheet:

Page 1 of 1

Analyst: 29/50 Reviewed By AH 8-10-0

							LINK. 02-0200-02	20/0401-0-
Bivalve Lar	val S	Survival	and De	evelopment Tes	t		AMEC B	ioassay SI
Start Date:	21 .	Jul-04		Species:	Mytilis galloprovincialis	Sample Code:	0407-044	
End Date:	23.	Jul-04		Protocol:	АSTM (1993) 1994 1999	Sample Source:	City of Buenaventura	
Sampled:	20.	Jul-04		Material:	Estuarine Monitoring Sample	Sample Station:	B-1	
Conc-%	Co	de Rep	Pos	# Counted	# Normal	Note	S	
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	0 E	3 3	85					
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 Data Worksheet:
 Page 1 of 1

 Report Date:
 19 Jul-04 1:10 PM

 Link:
 02-0286-0226/0407-044

CETIS Worksheet

Test Summary:Page 1 of 1Report Date:23 Aug-04 1:46 PM

Link:

23 Aug-04 1:46 PM 04-3454-4273/0407-045

val Sulvival and	d Developm	ent Test	-3				AMEC Bioassay SD
08-2544-2401 21 Jul-04 04:30 23 Jul-04 04:16 21 Jul-04 04:30	0 PM 5 PM 0 PM	Test Type: Protocol: Dil Water: Brine:	Developme ASTM E724 Laboratory Frozen Sea	nt 4-98 (1999) Seawater water		Duration: Species: Source:	48 Hours Mytilis galloprovincialis Field Collected
14-3889-1352 20 Jul-04 10:40 20 Jul-04 07:45 30 Hours (18.2	0 AM 5 AM 2 °C)	Material: Code: Source: Station:	Estuarine M 0407-045 City of Bue B-3	lonitoring S naventura	ample	Client: Project:	City of Buenaventura
n Summary Endpoint 27 Proportion N 29	Vormal	NOEL 100 65	LOI >10 >65	EL	ChV N/A N/A	MSDp 0.11138 0.08450	Method Equal Variance t Dunnett's Multiple Comparison
Normal Summa Control Type Brine Control Lab Control Salt Control	ary e Reps 5 5 5 5 5 5 5 5 5 5 5	Mean 0.85000 0.91200 0.82200 0.89800 0.90400 0.87000 0.85600	Minimum 0.80000 0.88000 0.77000 0.82000 0.86000 0.84000 0.75000	Maximun 0.90000 0.94000 0.87000 0.97000 0.95000 0.89000 0.93000	n SE 0.01789 0.01020 0.01594 0.02518 0.01503 0.00894 0.03945	SD 0.04000 0.02280 0.03564 0.05630 0.03362 0.02000 0.08820	CV 4.71% 2.50% 4.34% 6.27% 3.72% 2.30% 10.30%
Normal Detail Control Type Brine Control Lab Control Salt Control	e Rep 1 0.83000 0.92000 0.82000 0.89000 0.89000 0.84000	Rep 2 0.88000 0.94000 0.77000 0.93000 0.90000 0.88000	Rep 3 0.84000 0.88000 0.83000 0.88000 0.86000 0.86000 0.89000	Rep 4 0.90000 0.90000 0.87000 0.82000 0.92000 0.88000	Rep 5 0.80000 0.92000 0.82000 0.97000 0.95000 0.86000		
Brin Lab Salt	e Contro Control Control	e Control 0.83000 Control 0.92000 Control 0.82000 0.89000 0.89000 0.84000 0.75000	e Control 0.83000 0.88000 Control 0.92000 0.94000 Control 0.82000 0.77000 0.89000 0.93000 0.89000 0.90000 0.84000 0.88000 0.75000 0.92000	e Control 0.83000 0.88000 0.84000 Control 0.92000 0.94000 0.88000 Control 0.82000 0.77000 0.83000 0.89000 0.93000 0.88000 0.88000 0.89000 0.93000 0.86000 0.86000 0.84000 0.88000 0.89000 0.89000 0.75000 0.82000 0.92000 0.91000	le Control 0.83000 0.88000 0.84000 0.90000 Control 0.92000 0.94000 0.88000 0.90000 Control 0.92000 0.94000 0.88000 0.90000 Control 0.82000 0.77000 0.83000 0.87000 0.89000 0.93000 0.88000 0.82000 0.89000 0.90000 0.86000 0.92000 0.84000 0.88000 0.89000 0.88000 0.75000 0.92000 0.91000 0.77000	le Control 0.83000 0.88000 0.84000 0.90000 0.80000 Control 0.92000 0.94000 0.88000 0.90000 0.92000 Control 0.82000 0.77000 0.83000 0.87000 0.82000 0.89000 0.93000 0.88000 0.82000 0.97000 0.89000 0.90000 0.86000 0.92000 0.95000 0.84000 0.88000 0.88000 0.86000 0.95000 0.75000 0.92000 0.91000 0.77000 0.93000	le Control 0.83000 0.88000 0.84000 0.90000 0.80000 Control 0.92000 0.94000 0.88000 0.90000 0.92000 Control 0.82000 0.77000 0.83000 0.87000 0.82000 0.89000 0.93000 0.88000 0.82000 0.97000 0.89000 0.90000 0.86000 0.92000 0.95000 0.84000 0.88000 0.88000 0.86000 0.95000 0.75000 0.92000 0.91000 0.77000 0.93000



Comparisons: Page 2 of 2 Report Date: 19 Aug-04 11:43 AM Analysis:

08-8801-9129	
AMEC Bissessey SD	

Bivalve Larva	I Survival and	Develop	ment Test	3-3						AMEC	Bloassay SD
Endpoint		Ar	nalysis Type		Samp	le L	ink Contr	ol Link	Date Analyzed	Versior	1
Proportion No	rmal	Co	omparison		04-34	54-4	273 04-34	54-4273	19 Aug-04 11:42	AM CETISV	1.024
Method		AI	t H Data	Transform	2	:	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Mul	tiple Comparisor	С	>T Angu	lar (Correcte	ed)		65	>65	1.54	N/A	8.45%
ANOVA Assu	mptions										
Attribute	Test		Statistic Critical			I P Level			n(0.01)		
Variances	Bartlett		4.798	324 1	1.34487	0.	18718	Equal Va	ariances		
Distribution	Shapiro-W	lk W	0.983	355 0	.86826	0.	95768	Normal	Distribution		
ANOVA Table)										
Source	Sum of	Squares	Mean Squ	iare DF	F Sta	itisti	c P Leve	el 🛛	Decision(0.05)		
Between	0.02557	489	0.008525	3	1.96		0.1610	7	Non-Significant I	Effect	
Error	0.06967	379	0.0043546	5 16							
Total	0.09524	368	0.0128796	5 19							
Group Comp	arisons										
Control	vs Conc-%		Statistic	Critical	P Leve		MSD	Dec	ision(0.05)		
Brine Control	25		-1.935254	2.23	>0.05		0.0930699	7 Non	-Significant Effect	ct	
	50		-2.012979	2.23	>0.05		0.0930699	7 Non	-Significant Effect	ct	
	-65 67		-0.6473308	2.23	>0.05		0.0930699	07 Non	-Significant Effec	ct	
Data Summa	ry			Or	iginal Data				Transfo	ormed Data	
Conc-%	Control Type	Count	Mean	Minimur	n Maxim	um	SD	Mean	Minimum	Maximum	SD
0	Brine Control	5	0.85000	0.80000	0.9000	0	0.04000	1.17567	7 1.10715	1.24905	0.05690
25		5	0.89800	0.82000	0.9700	0	0.05630	1.25644	1.13265	1.39671	0.09910
50		5	0.90400	0.86000	0.9500	0	0.03362	1.25968	3 1.18730	1.34528	0.05916
65 67		5	0.87000	0.84000	0.8900	0	0.02000	1.20268	3 1.15928	1.23273	0.02931

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CETIS	R	eport									Comparis Report Da Analysis:	ons: ate:	19 Aug (Page 1 of 2 -04 11:43 AM)3-1080-2927
Bivalve Larv	Bivalve Larval Survival and Development Test 3-3													
Endpoint			An	alysis Type			Sample L	ink	c Contro	l Link	Date Analyzed		Version	
Proportion No	rmal		Co	mparison			04-3454-4	27:	3 04-345	4-4273	19 Aug-04 11:4	2 AM	CETISv1	.024
Method			Alt	t H Data	Transfor	m	Z	N	IOEL I	LOEL	Toxic Units	ChV	'	MSDp
Equal Variance	e t		C :	>T Angu	lar (Corre	cted)		1	00 :	>100	1.00	N/A		11.14%
ANOVA Assu	ımpti	ons												
Attribute		Test		Stati	stic	Criti	cal P	Le	evel	Decisio	on(0.01)			
Variances		Variance R	atio	7.091	69	23.15	5450 0.	084	409	Equal V	ariances			
Distribution		Shapiro-Wi	ik W	0.924	10	0.780	055 0.	37	178	Normal	Distribution			
ANOVA Tabl	e													
Source		Sum of	Squares	Mean Squ	iare l	DF	F Statisti	с	P Level		Decision(0.05)			
Between		0.00825	634	0.0082563	3	1	0.93		0.36209		Non-Significant	Effect		
Error		0.07070	667	0.0088383	3 8	3								
Total		0.07896	302	0.0170947	' ç	9	-							
Group Comp	ariso	ns												
Control	vs	Conc-%		Statistic	Critical		P Level	1	MSD	De	cision(0.05)			
Salt Control		100		-0.9665151	1.85954	8	0.81895	(0.1105663	No	n-Significant Effe	ect		
Data Summary Original Data Transformed Data														
Conc-%	Con	trol Type	Count	Mean	Minim	um	Maximum	;	SD	Mean	Minimun	n Ma	aximum	SD
0	Salt	Control	5	0.82200	0.7700	00	0.87000	(0.03564	1.1367	3 1.07062	1.2	20193	0.04674
100			5	0.85600	0.7500	00	0.93000	(0.08820	1.1942	1.04720	1.3	30303	0.12447

Bivalve Larval Survival and Development Test AMEC Bioassay SD Star Date: 21 Jul-04 Species: Mydlis gallopspyricialis Sample Code: 0407-045 End Date: 23 Jul-04 Material: Estuarine Monitoring Sample Station: B-3 Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Counted # Normal Notes Code: 40 Code Rep Post & Code Rep Post & Code Rep Post & Code 100 Code Rep Post & Code Rep Post & Code 100 Code Rep Post & Code Rep Post & Code 100 Code Rep Post & Code Rep Post & Code 100 Code Rep Post & Code Rep Post & Code 100 Code Rep Post & Code 110 Code Rep Post & Code 110 Code Rep Post & Code 110 Code Rep Post & Code 111 Code Rep Rep Post & Code 112 Code Rep Post & Code 113 Code Rep Post & Code 114 Code Rep Rep Rep Rep Post & Code 115 Code Rep Post & Code 116 Code Rep Rep Rep Rep Rep Rep Rep Rep Rep Re		CETIS	5 Worl	ksh	eet					Report Date: Link:	19 Jul-04 1:13 PM 04-3454-4273/0407-045
Sur Date: 21 Jul-04 Species: Myrilis galance protocol: A STM + 4020 Material: Estuarine Ministrating Sample Source: City of Buenswentura		Bivalve Lar	val Survival a		AMEC Bioassay SD						
End Date: 23 Julicid Protocol: ASTM. Head-Mid4 [14] Sample Source: CB of Bundler Staurine Monitoring Sample Sample Station: B of Sampl		Start Date:	21 Jul-04	Sample Code:	0407-045						
Sample 2.0 JU-4 material: Estuartine working sample Sample Statut. BS Conc. 10 Code Rep Poer Poer Poer Poer Poer Poer Poer Poer		End Date:	23 Jul-04		Protocol:	ASTM (19	03)-1994 1999		Sample Source:	City of Buenav	entura
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$				104	100	75	29				
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$= \frac{123}{100} \frac{73}{87} \frac{74}{50}$ $= \frac{124}{126} \frac{100}{100} \frac{87}{87} \frac{50}{50}$ $= \frac{125}{126} \frac{100}{91} \frac{91}{84}$ $= \frac{129}{128} \frac{100}{94} \frac{94}{100182} \frac{50}{50}$ $= \frac{130}{131} \frac{100}{100} \frac{84}{51}$ $= \frac{133}{134} \frac{100}{100} \frac{740}{100} \frac{100}{82} \frac{81}{50}$ $= \frac{134}{135} \frac{100}{740} \frac{740}{100} \frac{82}{82} \frac{471}{51}$ $=$				122	100	RA	KG R/e				
$ \frac{124}{125} 00 9 RG 125 00 9 RG 126 00 9 RG 127 00 83 50 128 00 94 00 82 50 130 100 84 00 122 50 132 00 92 RG 133 00 92 RG 134 00 92 100 163 50 134 00 92 100 163 50 135 100 92 100 82 41 135 100 92 100 82 41 135 100 92 100 82 41 136 100 82 100 82 100 82 100 82 100 100 100 100 100 100 100 10$				123	106	93	RG				
$\frac{126}{126} \frac{100}{100} \frac{97}{91} \frac{100}{127}$ $\frac{126}{127} \frac{100}{100} \frac{93}{83} \frac{100}{128} \frac{94}{100} \frac{100}{94}$ $\frac{129}{130} \frac{100}{100} \frac{88}{84}$ $\frac{130}{131} \frac{100}{100} \frac{92}{84} \frac{100}{163} \frac{90}{30}$ $\frac{133}{134} \frac{100}{100} \frac{76}{100} \frac{91}{82} \frac{411}{135}$ $- \text{Sites B-3 and C-7 will Share 1cland Scl.}$ $\frac{and A-2}{and Bc}$ $\frac{100}{82} \frac{100}{83} \frac{100}{83}$	-			124	NOV	8	So				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				126	100	97	RG				
$ \frac{128}{129} \frac{100}{100} \frac{94}{100} \frac{100}{82} \frac{50}{50} $ $ \frac{130}{131} \frac{100}{100} \frac{84}{84} $ $ \frac{132}{132} \frac{100}{100} \frac{92}{740} \frac{86}{100} \frac{50}{50} $ $ \frac{134}{135} \frac{100}{740} \frac{710}{100} \frac{82}{81} \frac{471}{100} $ $ -Sites B3 avel c-2 will Shave icland Scl. $ $ \frac{and A-2}{and Bci} $ $ \frac{7cP}{BciA} \frac{100}{100} \frac{50}{83} $	-			127	100	83	SD				And a second sec
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				128	100	94					
$\frac{131}{132} 100 92 Rb$ $\frac{132}{133} 100 92 Rb$ $\frac{133}{133} 100 92 Rb$ $\frac{134}{135} 100 710 100 82 ATH$ $-Sites B-3 and C-2 will Share Lcland Scl.$ $\frac{and A-2}{and BC}$ $\frac{data \ entry \ Qc = AH}{BCIA}$ $\frac{rep}{BCIA} 100 83$				130	100	88	00102	20			
$\frac{132}{133} - \frac{160}{100} - \frac{92}{100} - \frac{163}{100} - \frac{300}{100} - \frac{100}{100} - \frac$				131	100	84		\bigcirc			
-Sites B-3 and C-2 will Shave usland Scl. and A-2 data entry QCEAH <u>TEP</u> <u>How R2</u> Att <u>Alton</u> A-2 <u>Alton</u> <u>How R2</u> <u>Att</u> <u>Alton</u> <u>Alton</u> <u>BCIA</u> <u>IDD</u> <u>R3</u>		No. 2014 e e como como como concerciono de		132	160	92	Kby 10	2 90			
-Sites B-3 and C-2 will Shave icland SCI. and A-2 data entry QC=AH <u>rep</u> ±cointed ≠ normal BCIA 100 83	_	:		134	100	76					
-Sites B-3 and C-2 will Shave usland Sci. and A-2 and BCI data entry QCEAH <u>rep toconted promel</u> BCIA 100 83				135	ATOD "	9E0	100 87	- AT			
and A-2 and BCI data entry QC=AH <u>rep</u> ±counted = normal BCIA 100 83	-	Sites	B-3 a	m	C-7 V	VIII S	share L	cland	SCI.		
data entry QCEAH <u>rep_tounted</u> = normal BCIA 100 83		SIL	and	A -	ζ		10010	and BC	/		
data entry QCEAH <u>rep ±counted =normal</u> BCIA 100 83		4									
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Page 1 of 1

Data Worksheet:

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Start Date: 21 Jul-04

End Date: 23 Jul-04

Sampled:

Conc-%

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) о в	2	129	-
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0 LC	4	101	
0 LC	5	107	
0 SC	1	105	
0 SC	2	119	
0 SC	3	127	
0 SC	4	124	
0 SC	5	102	
25	1	122	
25	2	123	
25	3	108	
25	4	135	
25	5	126	
50	1	115	
50	2	112	
50	3	114	
50	4	132	
50	5	104	
AH 64	1	131	
66	2	103	
67(, q 5	3	111	
65	4	130	
I 65	5	120	
100	1	113	
100	2	121	
100	3	125	
100	4	109	
100	5	116	

Species: Mytilis galloprovincialis Protocol: ASTM (1993) 1994 1999

Normal

Material:

Counted

Estuarine Monitoring Sample

100 % sample satted, not brined .

Data Worksheet: Page 1 of 1 Report Date: 19 Jul-04 1:13 PM 04-3454-4273/0407-045 Link:

Sample Code:

Sample Station: B-3

Notes

0407-045 Sample Source: City of Buenaventura

CETIS Worksheet

20 Jul-04

Bivalve Larval Survival and Development Test

Code Rep Pos

AMEC Bioassay SD

	CEIIS	Report							Link:	13-0592-7343/0407-046
	Bivalve Larva	al Survival and D)evelopm	ent Test	1-2					AMEC Bioassay SD
	Test: Start Date: End Date: Setup Date:	08-2544-2401 21 Jul-04 04:30 F 23 Jul-04 04:15 F 21 Jul-04 04:30 F	PM PM PM	Test Type:DevelopmentDuration:Protocol:ASTM E724-98 (1999)Species:Dil Water:Laboratory SeawaterSource:Brine:Frozen Seawater				48 Hours Mytilis gallop Field Collect	provincialis ed	
	Sample: Sampled: Received: Hold Time:	Sample: 12-1088-3277 Sampled: 20 Jul-04 09:35 AM Received: 21 Jul-04 07:45 AM Hold Time: 31 Hours (18.5 °C)			Estuarine M 0407-046 City of Bue C-2	Monitoring Sa naventura	ample	City of Buen	aventura	
	Comparison Analysis 18-2157-6921 00-6482-4201	Summary Endpoint Proportion Nor	mal	NOEL 100 65	LO >10 >65	EL 00	ChV N/A N/A	MSDp 0.04275 0.09771	Method Equal Varia Dunnett's M	nce t lultiple Comparison
	Proportion Normal Summary			Mean	Minimum	Maximun	n SE	SD	cv	
Ŕ	0 0 25 50 65 67 100	Brine Control Lab Control Salt Control	5 5 5 5 5 5 5 5 5 5 5 5	0.85000 0.91200 0.82200 0.89400 0.88400 0.89800 0.88600	0.80000 0.88000 0.77000 0.81000 0.87000 0.85000 0.86000	0.90000 0.94000 0.87000 0.97000 0.91000 0.97000 0.90000	0.01789 0.01020 0.01594 0.02619 0.00748 0.02267 0.00748	0.04000 0.02280 0.03564 0.05857 0.01673 0.05070 0.01673	4.71% 2.50% 4.34% 6.55% 1.89% 5.65% 1.89%	
	Proportion N	ormal Detail	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
	0 0 25 50 -05 67 100	Brine Control Lab Control Salt Control	0.90000 0.90000 0.82000 0.97000 0.88000 0.92000 0.89000	0.88000 0.92000 0.82000 0.92000 0.91000 0.90000 0.90000	0.80000 0.88000 0.77000 0.81000 0.87000 0.85000 0.88000	0.83000 0.92000 0.87000 0.88000 0.87000 0.85000 0.85000 0.86000	0.84000 0.94000 0.83000 0.89000 0.89000 0.97000 0.90000			



Page 1 of 1

Report Date: 23 Aug-04 1:46 PM

Test Summary:

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 Comparisons:
 Page 1 of 2

 Report Date:
 19 Aug-04 11:33 AM

 Analysis:
 00-6482-4201

Bivalve Larval Survival and Development Test C-2

AMEC Bioassay SD

Divalve Laive				\underline{C}							
Endpoint		A	nalysis Type		Sample	Link	Contro	ol Link	Date Analyzed	Versio	n
Proportion Normal			omparison		13-0592-7343 13-0592			2-7343	19 Aug-04 10:08	AM CETIS	v1.024
Method			lt H Data	a Transform	Z	NC	DEL I	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison			>T Ang	ular (Corrected)	65	:	>65	1.54	N/A	9.77%
ANOVA Assu	mptions				- H						
Attribute	Test		Stat	istic Cri	tical	P Lev	el	Decisio	n(0.01)		
Variances	Bartlett		5.94	360 11.	34487	0.114	39	Equal Va	ariances		
Distribution	Shapiro	-Wilk W	0.95	308 0.8	6826	0.405	56	Normal (Distribution		
ANOVA Table	9										
Source	Sum	of Square	s Mean Sq	uare DF	F Statis	tic	P Level		Decision(0.05)		
Between	0.019	984455	0.006614	8 3	1.16		0.35559)	Non-Significant E	Effect	
Error	0.091	22786	0.005701	7 16							
Total	0.111	07241	0.012316	6 19							
Group Comp	arisons										
Control	vs Conc-	-%	Statistic	Critical	P Level	М	SD	Dec	ision(0.05)		
Brine Control	25		-1.557782	2.23	>0.05	0.	1064973	Non	-Significant Effec	t	
	50		-1.011042	2.23	>0.05 0.1		1064973	Non-Significant Effect		t	
	NH-05 6	7	-1.665345	2.23	>0.05	0.	1064973	Non	-Significant Effec	t	
Data Summai	ŷ			Orig	inal Data				Transfo	ormed Data	
Conc-%	Control Typ	be Coun	t Mean	Minimum	Maximun	ו S	D	Mean	Minimum	Maximum	SD
0	Brine Contro	ol 5	0.85000	0.80000	0.90000	0.	04000	1.17567	1.10715	1.24905	0.05690
25		5	0.89400	0.81000	0.97000	0.	05857	1.25006	5 1.11977	1.39671	0.10128
50 5			0.88400	0.87000	0.91000	0.	01673	1.22395	i 1.20193	1.26610	0.02679
-05 67		5	0.89800	0.85000	0.97000	0.	05069	1.25520	1.17310	1.39671	0.09271

 Comparisons:
 Page 2 of 2

 Report Date:
 19 Aug-04 11:33 AM

 Analysis:
 18-2157-6921

Bivalve Larval Survival and Development Test C - 2

AMEC Bioassay SD

					~ .									
Endpoint			Ar	alysis T	ype		Sample	e Li	ink Contro	ol Link	Date Analyzed		Version	
Proportion Normal (Co	mparisor		13-0592-7343 13-0592-		2-7343	2-7343 19 Aug-04 10:08 AM CETIS		CETISv	1.024		
Method			AI	Alt H Data		sform	Z		NOEL	LOEL	Toxic Units	ChV	1	MSDp
Equal Varianc	e t		С	> T /	Angular (C	Corrected)			100	>100	100 1.00			4.27%
ANOVA Assu	mpti	ons												
Attribute		Test		5	Statistic	Crit	ical	Ρ	Level	Decisio	on(0.01)			
Variances		Variance Ra	ntio	3	3.26061	23.1	15450	0.3	27881	Equal \	/ariances			
Distribution		Shapiro-Will	κW	0.95701		0.78	3055	0.	72355	Normal	Normal Distribution			
ANOVA Table	•													
Source		Sum of S	quares	Mean	Square	DF	F Stati	isti	c P Level		Decision(0.05)			
Between		0.020387	43	0.020	3874	1	14.28		0.00539)	Significant Effect	t		
Error		0.011418	1	0.001	4273	8								
Total		0.031805	54	0.021	8147	9								
Group Compa	ariso	ns												
Control	vs	Conc-%		Statistic	crit	ical	P Level		MSD	De	cision(0.05)			
Salt Control		100		-3.77945	6 1.8	59548	0.99730		0.04443134	4 No	n-Significant Effect	t		
Data Summary					Origi	nal Data				Transfo	ormed	d Data		
Conc-% Control Type Cou		Count	Mean	м	inimum	Maximu	m	SD	Mean	Minimum	Ma	iximum	SD	
0	Salt	Control	5	0.8220	00 0.	77000	0.87000		0.03564	1.1367	3 1.07062	1.2	20193	0.04674
100			5	0.8860	00 0.	86000	0.90000		0.01673	1.2270	4 1.18730	1.2	4905	0.02588



000.	089.	.124-1	

CETIS™ \	v1.024
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83

Analyst: SP	RGRS	Reviewed	BY AH	8-12-04

	159 160	
Sites B-3 am	and C-2 mill d A-z	Share LClandSCI and BCI
rep	# counted	#normal
LCIA	100	90
LCIB	ŀ	92
LCIC		88
LCID		92
LCIE		94
SCIA		82
SCIB		82
SCIC		77
SCID		87
SCIE	\checkmark	83

data entry ac=AH

Species: Mytilis galloprovincialis Protocol: ASTM (1993) Frat 1999 End Date: 23 Jul-04 Sample Source: City of Buenaventura Sampled: 0k 20 Jul-04 Material: Estuarine Monitoring Sample Sample Station: C-2 # Counted Code Rep # Normal Conc-% Pos Notes rerread 95 136 113 NB 100 86 uc 137 114 102 p8 100 88 138 109 85 81 89 85 NBS 139 112 81 12 104 140 86 ne 89 ě9 19> 141 102 142 109 95 88 RB 92 143 28 100 90 144 106 80 12 83 145 NS 104 77 88 146 89 100 R& 46 147 100 100 148 149 Rh OD 150 100 RU 151 152 100 6 153 100 6 Rb 154 Ò 100 RG 155 97 00 SD 156 SO SO 157 158

CETIS Worksheet

Start Date: 21 Jul-04

Bivalve Larval Survival and Development Test

AMEC Bioassay SD

Sample Code:

0407-046

CETIS Worksheet Report Date: 19 Jul-04 1:15 PM Link: 13-0592-7343/0407-046													
Bivalve La	Bivalve Larval Survival and Development Test AMEC Bioassay SD												
Start Date End Date:	: 2	21 Jul- 23 Jul-	04 04 04	0407-046 City of Buenav	rentura								
Sampled.		20 Jui-				Estuarme Monitoring Sa	npie	Sample Station.	C-2				
Conc-%	0	Code	кер	140	# Counted	# Normal		Note	S				
	0	В	2	145									
$\left n \right\rangle$	0	В	3	156				nachtag far eine ag marter har ad har gerkann samad samad sama sama a sama e rinn a singer var af "Beraka marte		al an			
P	0	в	4	144									
	0	в	5	147									
	25		1	155									
	25		2	142									
	25		3	139									
	25		4	159						9 - 19 - 19 - 19 - 19 - 19 - 19 - 19 -			
	25		5	141									
	50		2	150									
	50		3	160									
	50		4	151									
	50		5	140									
AI	6\$		1	148									
	6 þ		2	154									
67/	\$5		3	138									
	65		4	158									
	65		5	152						and the second			
	100		1	146									
	100		2	153									
	100		3	136									
	100		5	143									
		QC	=A	H									

Sites B-3 and C-2 will share Lcland Scl and A-2 and BCI 100% sample saltal, not brined

Data Worksheet:

Page 1 of 1

M. PYRIFERA

CETIS	S Report							Test Summary Report Date: Link:	Page 1 of 2 23 Aug-04 3:02 PM 02-0826-0660/0407-039
Macrocystis	Germination and	d Germ 1	ube Growth	Test A-	2				AMEC Bioassay SD
Test: Start Date: End Date: Setup Date: Comment:	05-5898-6693 21 Jul-04 02:00 F 23 Jul-04 10:00 A 21 Jul-04 02:00 F 100% concentrat	PM M PM ion obtair	Test Type: Protocol: Dil Water: Brine: ned by using F	Growth-Ge EPA/600/R Laboratory Frozen Sea	rmination -95/136 (199 Seawater awater s artificial sa	95) 1lt.	Duration: Species: Source:	44 Hours Macrocystis py Field Collected	rrifera I
Sample: Sampled: Received: Hold Time:	00-8993-8061 20 Jul-04 02:50 F 21 Jul-04 07:45 A 23 Hours (19.3 °C	PM MM C)	Material: Code: Source: Station:	Estuarine M 0407-039 City of Bue A-2	Aonitoring Sa naventura	ample	Client: Project:	City of Buenav	entura
Comparisor	n Summary								
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method	***
08-1106-708	1 Mean Length		100	>10	0	N/A	0.13235	Equal Variance	e t
10-0873-224	7		65	>65	i i	N/A	0.13850	Bonferroni Ad	jt
02-8313-587	6 Proportion Ger	minated	<100	100		N/A	0.04964	Equal Variance	e t
09-1601-691	4		65	>65) 	N/A	0.14317	Bonferroni Ad	j t
Test Accept	ability								
Analysis	Endpoint		Attrib	ute	Statistic	Lower Limit	Upper Limit	Decision	
02-8313-587	6 Proportion Ger	minated	Contro	ol Response	0.806	0.7		Passes accep	tability criteria
09-1601-691	4				0.7275	0.7		Passes accep	tability criteria
08-1106-708	1 Mean Length				11.65	10		Passes accep	tability criteria
10-0873-224	7				12.938	10		Passes accep	tability criteria
02-8313-587	6 Proportion Ger	minated	MSDp		0.0496		0.2	Passes accep	tability criteria
09-1601-691	4				0.1432		0.2	Passes accep	tability criteria
10 0972 224					0.1323		0.2	Passes accep	tability criteria
10-0873-224	/				0.1365		0.2		
Mean Lengt	h Summary Control Type	Rens	Mean	Minimum	Maximun	n SF	SD	CV	
0	Brine Control	5	12.9375	11,2500	14,0000	0.59839	1.19678	9.25%	
0	Lab Control	5	11.8000	10.0000	13.0000	0.50867	1.13743	9.64%	
0	Salt Control I	5	11.6500	10.7500	12.7500	0.40000	0.89443	7.68%	
25	• • •	5	10.2500	8.25000	11.7500	0.57009	1.27475	12.44%	
50		5	12.0000	10.7500	13.5000	0.54199	1.21192	10.10%	
65		5	13.3500	12.0000	14.2500	0.37583	0.84039	6.30%	
100		5	11.3000	8.75000	12.7500	0.72629	1.62404	14.37%	
Proportion	Germinated Sum	mary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	CV	
0	Brine Control	5	0.72750	0.67000	0.78000	0.02780	0.05560	7.64%	
0	Lab Control 1	5	0.71600	0.68000	0.80000	0.02205	0.04930	6.88%	
0	Salt Control	5	0.80600	0.78000	0.83000	0.00927	0.02074	2.57%	

25

50

65

100

Salt Control

5

5

5

5

5

0.80600

0.68600

0.65200

0.74800

0.66600

0.78000

0.62000

0.59000

0.69000

0.63000

0.83000

0.79000

0.74000

0.81000

0.75000

0.00927

0.03234

0.03397

0.02131

0.02159

0.02074

0.07232

0.07596

0.04764

0.04827

2.57% 10.54%

11.65%

6.37%

7.25%

 Test Summary:
 Page 2 of 2

 Report Date:
 23 Aug-04 3:02 PM

 Link:
 02-0826-0660/0407-039

Mean Length	Detail y	A-2				
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	11.2500	*	13.0000	14.0000	13.5000
0	Lab Control	12.2500	11.5000	13.0000	10.0000	12.2500
0	Salt Control	11.7500	10.7500	12.2500	12.7500	10.7500
25		10.7500	11.7500	8.25000	10.2500	10.2500
50		10.7500	11.0000	13.0000	13.5000	11.7500
65		13.5000	13.2500	12.0000	13.7500	14.2500
100		12.7500	11.7500	8.75000	12.5000	10.7500
Proportion G	erminated Detai	1				
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control I	0.78000	*	0.77000	0.67000	0.69000
0	Lab Control	0.69000	0.69000	0.68000	0.80000	0.72000
0	Salt Control	0.78000	0.82000	0.83000	0.81000	0.79000
25		0.79000	0.73000	0.62000	0.66000	0.63000
50		0.74000	0.73000	0.59000	0.60000	0.60000
65		0.81000	0.74000	0.72000	0.78000	0.69000
100		0.63000	0.66000	0.75000	0.65000	0.64000

* replicate excluded from analysis due to possible cup contamination.

										Compariso Report Dat	ons:	23 Au	Page 1 of 4	
CE115	R	eport	•								Analysis:		20710	02-8313-5876
Macrocystis	Germ	ination an	d Germ	Tube Gr	owth Tes	st A	-2						AMEC E	Bioassay SD
Endpoint			Ar	nalysis T	ype		Sample Link Control			l Link	Date Analyzed		Version	
Proportion Ge	ermina	ted	Co	ompariso	n		02-0826-0660 02-0826			5-0660	6-0660 23 Aug-04 3:02 PM			1.024
Method			Al	tН	Data Trai	nsform	Z	N	OEL L	OEL	Toxic Units	ChV	,	MSDp
Equal Variance	ce t		C	> T	Angular (Corrected)		<	100 1	00		N/A		4.96%
Test Accepta	bility										*******			
Attribute			St	atistic	Low	er Limit	Upper Li	mit	Decision					
Control Respo	rol Response (0.7				Passes a	cceptabi	lity criteria			
MSDp	Dp C						0.2		Passes a	cceptabi	lity criteria			
ANOVA Assi	umptio	ons												
Attribute		Test			Statistic	Crit	ical	P Le	vel	Decisio	n(0.01)			
Variances		Variance R	atio		4.03222	23.1	5450	0.205	555	Equal V	ariances			
Distribution		Shapiro-Wi	lk W		0.85826	0.78	3055	0.076	628	Normal	Distribution			
ANOVA Tabl	е													
Source		Sum of	Squares	Mear	Square	DF	F Statis	stic	P Level		Decision(0.05)			
Between		0.06370	729	0.063	7073	1	36.92		0.00030		Significant Effect	t		
Error		0.013803	394	0.001	7255	8								
Total		0.07751	123	0.065	4328	9	_							
Group Comp	ariso	ns												
Control	vs	Conc-%		Statisti	c Cri	tical	P Level	Ν	ISD	Dec	ision(0.05)			
Salt Control		100		6.07628	4 1.8	59548	0.00015	C	0.04885329	Sigr	nificant Effect			
Data Summa	ry					Origi	nal Data				Transfo	ormed	l Data	
Conc-%	Con	trol Type	Count	Mean	N N	linimum	Maximun	n S	SD	Mean	Minimum	Ма	ximum	SD
0	Salt	Control I	5	0.806	00 0	78000	0.83000	C	0.02074	1.1151	2 1.08259	1.1	4581	0.02619
100			5	0.666	00 0	.63000	0.75000	0	0.04827	0.95548	8 0.91691	1.0	4720	0.05259

Approved By

												Compariso	ns:		Page 2 of 4
CETIS	R	enort										Report Date	e:	23 Au	g-04 3:02 PM
		choir										Analysis:		(08-1106-7081
Macrocystis	Gerr	nination and	d Germ	1 Tube (Growth	Test 1	A	2						AMEC B	ioassay SD
Endpoint			A	nalysis	Туре			Sample Link Control			ol Link	Date Analyzed		Version	
Mean Length			С	omparis	on			02-0826-0660 02-0826			26-0660	5-0660 23 Aug-04 3:02 PM			1.024
Method			Α	It H	Data ⁻	Transfo	rm	z		NOEL	LOEL	Toxic Units	ChV	,	MSDp
Equal Variand	ce t		С	, > T	Untrar	nsforme	d			100	>100	1.00	N/A		13.23%
Test Accepta	bilit	у У													
Attribute			S	tatistic	L	ower L	imit	Upper Li	mit	Decisio	n				
Control Response				1.65	1			Passes	acceptat	oility criteria					
MSDp	MSDp							0.2		Passes	acceptat	oility criteria			
ANOVA Assu	umpt	ions													
Attribute		Test			Statis	tic	Crit	tical	ΡL	evel	Decisi	on(0.01)			
Variances		Variance Ra	atio		3.2968	88	23.1	15450	0.27	7455	Equal	Variances			
Distribution		Shapiro-Wil	k W		0.926	71	0.78	3055	0.39	9405	Norma	I Distribution			
ANOVA Tabl	e														
Source		Sum of S	Square	s Me	an Squa	are	DF	F Statis	stic	P Leve	I	Decision(0.05)			
Between		0.30625		0.30	0625		1	0.18		0.68406	3	Non-Significant E	Effect		
Error		13.75		1.7	1875		8								
Total		14.05625	500	2.03	250000		9								
Group Comp	ariso	ons													
Control	vs	Conc-%		Statis	tic	Critica	1	P Level		MSD	De	ecision(0.05)			
Salt Control I		100		0.422	1159	1.85954	48	0.34203		1.541856	Nc	on-Significant Effec	;t		
Data Summa	ry						Origi	nal Data				Transfo	ormed	d Data	
Conc-%	Co	ntrol Type	Coun	t Mea	an	Minin	num	Maximun	 n	SD	Mean	Minimum	Ma	ximum	SD
0	Sai	t Control (5	11.6	3500	10.75	00	12.7500		0.89443					
100			5	11.3	3000	8.750	00	12.7500		1.62404					

Approved By

CETIS Report 23 Aug-04 33 Analysis: 09-160										Page 3 of 4 g-04 3:02 PN 09-1601-6914			
Macrocystis	Germ	ination and	d Germ	Tube Growt	h Test A-	2						AMEC E	Bioassay SD
Endpoint			Ar	nalysis Type		Sample L	ink	Contro	l Link	Date Analyzed		Version	
Proportion Ge	ermina	ated	Co	omparison		02-0826-0	0660	02-082	6-0660	23 Aug-04 3:02	PM	CETISv	1.024
Method			AI	tH Data	Transform	Z	NO	EL I	LOEL	Toxic Units	ChV	,	MSDp
Bonferroni Ad	lj t		С	>T Angı	ular (Corrected	1)	65	:	>65	1.54	N/A		14.32%
Test Acceptability													
Attribute			St	atistic	Lower Limit	Upper Lin	nit l	Decisior	า				
Control Respo	onse		0.7	7275	0.7		F	Passes a	acceptabi	lity criteria			
MSDp			0.1	1432		0.2	F	Passes a	icceptabi	lity criteria			
ANOVA Assu	umpti	ons											
Attribute		Test		Stat	istic Cri	itical F	. Leve	1	Decisio	on(0.01)			
Variances		Bartlett		0.69	799 11.	.34487 0	.87368	8	Equal V	ariances			
Distribution		Shapiro-Wi	k W	0.86	894 0.8	36288 0	.01293	3	Normal	Distribution			
ANOVA Table	e												
Source		Sum of S	Squares	Mean Sq	uare DF	F Statist	ic	P Level		Decision(0.05)			
Between		0.031959	995	0.010653	3 3	2.11		0.14184		Non-Significant I	Effect		
Error		0.075736	615	0.005049	1 15								
Total		0.107696	61	0.015702	4 18								
Group Comp	ariso	ns											
Control	vs	Conc-%		Statistic	Critical	P Level	MS	D	Dec	cision(0.05)			
Brine Control	1	25		0.9421287	2.342925	0.18053	0.1	116788	Nor	-Significant Effect	ct		
		50		1.708894	2.342925	0.05404	0.1	116788	Nor	n-Significant Effect	ct		
		65		-0.4872575	2.342925	0.68344	0.1	116788	Nor	-Significant Effect	ct		
Data Summa	ry				Orig	inal Data				Transfo	ormed	d Data	
Conc-%	Con	trol Type	Count	Mean	Minimum	Maximum	SD)	Mean	Minimum	Ma	iximum	SD
0	Brin	e Control	4	0.72750	0.67000	0.78000	0.0	5560	1.0230	9 0.95886	1.0	8259	0.06260
25			5	0.68600	0.62000	0.79000	0.0	7232	0.9781	8 0.90658	1.0	9476	0.07985
50			5	0.65200	0.59000	0.74000	0.0	7596	0.9416	3 0.87589	1.0	3573	0.08093
65			5	0.74800	0.69000	0.81000	0.0	4764	1.0463	2 0.98030	1.1	1977	0.05540

Approved By: A241

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CETIS	Rer	ort								Compariso Report Dat	ns: e:	23 Au	Page 4 of 4 g-04 3:02 PM
Magropustic	Gorminat	ion and Gor	m Tube Gro	with Top	+ Λ	~				Analysis:		AMEC B	ioassav SD
Wacrocysus	Germinat				· A-	V							
Endpoint			Analysis Ty	pe		Sample Link Co		Contro	Link	Date Analyzed		Version	
Mean Length			Comparison			02-0826-	0660	02-0826	5-0660	23 Aug-04 3:02 I	-1VI	CETISVI	.024
Method			Alt H D	ata Tran	sform	Z	NC	DEL L	OEL	Toxic Units	ChV		MSDp
Bonferroni Adj	jt		C>T L	Intransfo	med		65	>	>65	1.54	N/A		13.85%
Test Accepta	bility												
Attribute			Statistic	Lowe	er Limit	Upper Lir	nit	Decision	1				
Control Respo	onse		12.938	10				Passes a	cceptab	ility criteria			
MSDp			0.1385			0.2		Passes a	cceptab	ility criteria			
ANOVA Assu	Imptions		,										
Attribute	Test	t	s	tatistic	Cri	tical f	P Lev	el	Decisio	on(0.01)			
Variances	Bart	lett	0	.68888	11.	34487 (0.875	82	Equal V	/ariances			
Distribution	Sha	piro-Wilk W	0	.94577	0.8	6288 (0.328	03	Normal	Distribution			
ANOVA Table	9												
Source	s	um of Squa	es Mean	Square	DF	F Statis	tic	P Level		Decision(0.05)			
Between	2	7.77944	9.2598	313	3	7.12		0.00337		Significant Effect			
Error	19	9.49688	1.2997	/92	15					5			
Total	4	7.2763157	10.559	9605	18								
Group Comp	arisons												
Control	vs Co	nc-%	Statistic	Crit	tical	P Level	м	SD	De	cision(0.05)			
Brine Control	25		3.514029	2.3	42925	0.00157	1.	791849	Sig	nificant Effect			
	50		1.225824	2.34	42925	0.11958	1.	791849	No	n-Significant Effec	:t		
	65		-0.53936	26 2.34	42925	0.70122	1.	791849	No	n-Significant Effec	:t		
Data Summa	ry				Origi	inal Data				Transfo	ormed	d Data	
Conc-%	Control	Type Cou	nt Mean	М	inimum	Maximum	n S	D	Mean	Minimum	Ma	iximum	SD
0	Brine Co	ntrol 4	12.937	'5 1'	1.2500	14.0000	1.	19678					
25		5	10.250	00 8.	25000	11.7500	1.	27475					
50		5	12.000	00 10	0.7500	13.5000	1.	21192					
65		5	13.350	0 12	2.0000	14.2500	0.	84039					

	Macrocystis	s Germinat	ion and Ger	rm Tube Gr	owth Tes	st						AMEC	Bioassav	Laboratory	- San Diego
	Start Date:	21-Jul-04	I-Jul-04 Species: Macrocystis pyrifera Test ID: 0407-039												
	End Date:	23-Jul-04	ļ		Protocol	: EPA/600/F	R-95/136 (1	1995 West C	oast Manua	al)		Samp	le Source:	City of Buen	aventure
	Sampled:	20-Jul-04								,		oump		City of Duen	aventura
Ī												Sampl	le Station:	A-2	
	Random	Number	Number				Tubalanat							Colibration	Moon Tuba
ļ	Number	Counted	Germinated				Tube Lengt	in weasurer	nents (micro	ometer units)				Factor	l ength (um)
,	36	100	81	6	6	5 7	5	5 6	6	4	4	5	5	2.5	<u>125</u>
6	37	100	70	5	6	6 4	5	5 4	4	5	5	5	5	2.0	13.0
	38	100	62	3	3	5 5	3	3 4	2	3	3	4	3	2.5	8 25
° -	39	100	65	6	5	5	3	7	4	4	6	4	4	2.0	12
ŀ	40	100	66	7	3	5	4	4	5	5	6	5	3	2.5	11 75
ŀ	41	100	69	3	4	3	5	5	6	6	4	4	6	2.5	11.5
ŀ	42	100	60	3	4	4	4	6	6	4	4	5	7	2.5	11.75
5	43	100	59	5	4	4	5	5	5	6	6	5	7	2.5	13
۲ŀ	45	100	60	6	6	1	5	4	5	5	6	5	5	2.5	13.5
H	46	100	72	6	4	6	6	4	6	5	7	5	5	2.5	13.5
F	47	100	72	5	4	4	4	4	5	6	6	6	5	2.5	12.25
H	48	100	63	0	3	6	5	4	4	4	5	4	6	2.5	11.75
F	49	100	69	4		5	6	5	4	5	6	6	6	2.5	12.75
	50	100	79	5	1			6	6	5	5	4	5	2.5	14.25
F	51	100	73		3	4	4	4	4	5	4	5	5	2.5	10.75
F	52	100	65		4	5		5	4	5	5	4	4	2.5	11
	53	100	63	5	4	4	1	8	5	3	4	5	5	2.5	12.5
	54	100	82	5	3	2	4	3			4	4	6	2.5	10.25
	55	100	74	5	5		4	5		5	4	3	5	2.5	10.75
Г	56	100	68	6	3	4		4	5	4	4	5	4	2.5	10.75
6	57	100	71	7	4	6	5	5	5		- 6	6	6	2.5	13
Γ	58	100	73	5	5	4	4	5				4	7	2.5	13.5
	59	100	78	8	6	5	4	7		5		6	6	2.5	11.75
	60	100	80	3	4	4	3	5	3			6	5	2.5	13.75
b	61	100	68	5	3	5	5	3	6			5	6	2.5	10
L	62	100	72	5	6	6	6	3				5	6	2.5	11.75
	63	100	69	4	6	4	5	3	5	6	7			2.5	12
	64	100	83	4	4	4	4	5	5	7			5	2.5	12.25
	65	100	74	5	4	5	6	4	5	7		6	5	2.5	12.25
	66	100	81	3	5	6	4	5	5	6	5	6		2.0	13.25
	67	100	79	4	4	5	4	4	5	5	4	4	4	2.5	12.75
-	68	100	64	5	4	4	3	5	5	4	4	5	4	2.5	10.75
	59	100	75	3	3	4	3	3	3	4	4	5	3	2.5	8 75
	70	100	66	5	3	3	5	5	3	4	4	3	6	2.5	10.25

data entry QC QC Check: All 7-29-04

Macrocystis	s Germina	ermination and Germ Tube Growth Test									AMEC Bioassay Laboratory - San Diego						
Start Date:	21-Jul-04	1	S	Species: M	<i>lacrocystis</i>	; pyrifera		Test ID: 0407-039									
End Date:	23-Jul-04	1	P	rotocol: E	PA/600/R-	95/136 (1	995 West C	oast Manua	al)		Samp	le Source:	City of Buen	aventura			
Sampled:	20-Jul-04	1									Sample Station: A-2						
Random	Number	Number			Т	uhe Lenat	h Measurer	nents (micro	ometer unit	2)			Calibration	Mean Tube			
Number	Counted	Germinated			10	Jbe Lengt	in weasurer			>)			Factor	Length (µm)			
36	100	81	6	6	7	5	6	6	4	4	5	5	2.5	13.5			
37	100	78	4	5	4	4	5	4	5	5	5	4	2.5	11.25			
38	100	62	3	3	5	3	4	2	3	3	4	3	2.5	8.25			
39			*replicate exc	luded due	to possible	e contamir	nation. 0%	germinated									
40	100	66	7	3	5	4	4	5	5	6	5	3	2.5	11.75			
41	100	69	3	4	3	5	5	6	6	4	4	6	2.5	11.5			
42	100	60	3	4	4	4	6	6	4	4	5	7	2.5	11.75			
43	100	59	5	4	4	5	5	5	6	6	5	7	2.5	13			
44	100	77	5	7	4	3	6	5	4	4	7	7	2.5	13			
45	100	60	6	4	6	6	4	6	5	7	5	5	2.5	13.5			
46	100	72	5	4	4	4	4	5	6	6	6	5	2.5	12.25			
47	100	78	6	3	6	5	4	4	4	5	4	6	2.5	11.75			
48	100	63	4	4	5	6	5	4	5	6	6	6	2.5	12.75			
49	100	69	5	7	7	7	6	6	5	5	4	5	2.5	14.25			
50	100	79	5	3	4	4	4	4	5	4	5	5	2.5	10.75			
51	100	73	4	4	5	4	5	4	5	5	4	4	2.5	11			
52	100	65	5	4	4	7	8	5	3	4	5	5	2.5	12.5			
53	100	63	5	3	2	4	3	6	4	4	4	6	2.5	10.25			
54	100	82	5	3	4	4	5	5	5	4	3	5	2.5	10.75			
55	100	74	5	5	5	4	4	3	4	4	5	4	2.5	10.75			
56	100	68	6	3	4	6	6	5	4	6	6	6	2.5	13			
57	100	67	6	7	5	4	4	7	6	6	5	6	2.5	14			
58	100	73	5	5	4	4	4	4	3	6	6	6	2.5	11.75			
59	100	78	8	6	5	4	7	3	5	6	6	5	2.5	13.75			
60	100	80	3	4	4	3	5	3	4	3	5	6	2.5	10			
61	100	69	5	5	7	6	4	5	6	6	5	5	2.5	13.5			
62	100	72	5	6	6	6	3	4	3	4	5	6	2.5	12			
63	100	69	4	6	4	5	3	5	6	7	4	5	2.5	12.25			
64	100	83	4	4	4	4	5	5	7	5	6	5	2.5	12.25			
65	100	74	5	4	5	6	4	5	7	6	6	5	2.5	13.25			
66	100	81	3	5	6	4	5	5	6	5	6	6	2.5	12.75			
67	100	79	4	4	5	4	4	5	5	4	4	4	2.5	10.75			
68	100	64	5	4	4	3	5	5	4	4	5	4	2.5	10.75			
69	100	75	3	3	4	3	3	3	4	4	5	3	2.5	8.75			
70	100	66	5	3	3	5	5	3	4	4	3	6	2.5	10.25			

Note: A-2 brine control did not pass the percent germination criterion. Therefore, the brine control from site B-3 was substituted as BC#1.

Macrocystis	s Germinat	tion and Gei	m Tube G	Frowth Tes	st						AMEC	Bioassay	Laboratory	- San Diego
Start Date:	21-Jul-04	4		Species	: Macrocys	tis pyrifera						Test ID	: 0407-039	
End Date:	23-Jul-04	4		Protocol: EPA/600/R-95/136 (1995 West Coast Manual) Sample Source: City of Buenaventura										
Sampled:	20-Jul-04	1		Sample Station: A-2										
											Cum			
Random	Number	Number				Tube Lengt	th Measure	ments (micr	rometer unit	s)		· · · · · · · · · · · · · · · · · · ·	Calibration	Mean Tube
36	100	R								1		-	Factor	Length (µm)
37	100	70	5						14	14	+	15	2.5	
38	100	(02	2	3		2	1 4	2	2			-3-		
39	100	65	10	5	5	3	7	4			4	$\frac{3}{4}$		
40	100	1060	7	3	5	4	4	5	5	6	5	2	+	
41	100	69	3	L J	3	5	5	6	6	1 U	u	10		
42	100	id	3	L L	L J	- u	6		4	<u> </u>	5	TZ-		
43	100	59	5	4	L L	5	5	1 5	10	10	6	1		
44	100	64	(0	U U	7	5	4	5	5	(0	3	5		
45	100	iao	10	4	6	6	4	6	5	1	5	5		
46	100	42	5	4	4	4	4	5	le	4	(0	5		
47	100	78	ى	3	Ġ	5	4	4	4	5	4	10		
48	100	43	4	4	5	6	5	4	5	6	6	6		
49	100	69	5	7	7	7	i.e	6	5	5	4	5		
50	100	79	5	3	L L	4	4	4	5	4	5	5		
51	100	+3	4	4	5	4	3	4	5	5	4	¢		
52	100	65	5	4	4	7	স	5	3	4	5	5		
53	100	03	5	3	Ż	4	3	Q	Ч	4	Ý	6		
54	100	82	- 5	3	4	4	5	5	5	4	3	5		
55	100	74	5	5	5	4	4	3	4	4 CF	5	Ý		
56	100	68	<u>í</u>		4	6	L Le	5	4	6	le	6		
57	100	- 1	7	4	6	5	5	5	5	G	4	7		
58	100	73	5	5	4	4	4	4	3	6	ie	6		
59	100	84.	8	<u> </u>	5	4	7	3	5	<u>í</u>	(e	5		
61	100	00	2	4	4	3	2	3	4	3	5	10		
62	100	00	2	3	5	5	2		4	4	6	<u></u>		
62	100	+ <u>+</u>	<u> </u>	<u> </u>		0	3	4	3	4	5	Ú		
64	100	22	<u> </u>	<u>a</u>	4	5	3	5	6	7	4	5		
65	100	0.2		4	4	4	2	5	1 1	5	6	5		
66	100	7 7 8 1	7	E	5		- 4	5	+	9	6	5		
67	100	19	U U		G	4	2	7	9	5		6		
68	100	Nº Jul Int	5	4	4			5		<u> </u>	4	<u> </u>		
69	100	75	3	3	4	3	2	3	4		5	2		
70	100	66	5	3	2	5	5	2	4	4	2			
									T 1	-1				

Analyst : Lle

Final Review:

65

100

100

100

100

100

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5 68

Sampled:	20 Ji	1-04		Materia	al: Estuarine	Monitoring Samp	ole	Sample Station: A-2
Conc-%	Code	e Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor	Notes
	0 B	1	61					
	0 B	2	57					
,	0 B	3	44					A, um um
	0 B	4	39					
	0 B	5	37					
	0 LC	1	63	KOD	1.9	12.25	(
	0 LC	2	41	1	69	11.5		
	0 LC	3	56		ĹΒ	13 +075 AH		
	0 LC	4	60		80	10		
	0 LC	5	46		72	12.25		`
	0 SC	1	47	1	78	11.75		
	0 SC	2	54	1	82	10.75		
	0 SC	3	64	1	83	12.25		
	0 SC	4	66	\$	81	12.75		
	0 SC	5	50	4	79	10.75		
	25	1	67					
	25	2	58					
	25	3	38					
	25	4	70					
	25	5	53					
	50	1	55					
	50	2	51					
	50	3	43					
	50	4	45					
	50	5	42					
	65	1	36					
	65	2	65					
	65	3	62					
	65	4	59					

CETIS Worksheet

Start Date: 21 Jul-04

End Date: 23 Jul-04

Macrocystis Germination and Germ Tube Growth Test

Species: Macrocystis pyrifera

Protocol: EPA/600/R-95/136 (1995)

AMEC Bioassay SD

Data Worksheet:

Report Date:

Link:

Sample Source: City of Buenaventura

Sample Code:

0407-039

-SItes A. 2 and B.I Share Lab Control + Salt Control RC-24 Brine control for A-2, B-3, C-2(RG) A+2 share BC W/ B-3

Analyst:

Page 1 of 1 19 Jul-04 1:48 PM 02-0826-0660

Kelp Spore Germination Bioassay Worksheet

Client: City of Buenaventura	Start/End Dates: 7-21-04 / 7-23-04
Test No.: 0407-039 >042	Start/End Times: /(/0) / /0 : 00
Tech Initials: RG	Test Species: Macrocystis pyrifera
Data Collected: 1-20-04	
Allestian Leasting	
Collection Location: <u>La joira cove</u>	HING
Conditions (weather, etc.): <u>Sanny</u> , Sinray, de	
Dilution Water Source (Client I: C. or Branum)	<u>Scripps lier</u>
Dilution Water Source (Client II:):	
Dilution Water Source (Client III:):	
Dilution Water Source (Reference Toxicant):	
Time of Initial Rinsing and Dessication :	$\frac{90.04}{12.00}$ (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers:	315 (keep kelp from each collecting bag separated)
Conditions of Zoospore Density and Motility (beaker 1):	high Drusit, 1 good motility
Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed):	/
Density County (target = 90): 112 115 '99 108	10 <u>)</u> Mean: 107-2
Mean $104 \frac{1}{2}$ * 10,000 = $1,072,000$ spores per ml (Density of Spor	e Release)
·	
Calculate the volume of spore stock to add to each test container:	
(225,000 spores/container)/(density of spore release) = ml stock/	container
In cases of a spore release = $900\ 000$ spores/ml, the volume is 0.25 ml.	
If density > 900 000 spores/ml, calculate a dilution factor, y, and create a n	ew spore stock of 900 000 cells/ml and add 0 25 ml:
	sw spore stock of soo, ood cellarni and add o.20 mil.
	. 10
Density of spore release $\frac{1_1 0.72_1 0.00}{1_1 0.000} * 0.25 \text{ ml} = $	268,000 spores = 1.19 (X)
1 container	225,000 spores
Example: 980,000 * 0.25 / 225,000 = 1.09 (100 ml stock + 9 ml sw)	
In cases of a spore release from 450,000 to 899,000 spores/ml, the volum	e added should not exceed 0.5 ml. (This volume exceeds the EPA
required limit of 0.3 ml in order to achieve the desired spore density).	Jume. However, it may sometimes be necessary to exceed the
If the density of spore release is $< 450\ 000\ spores/ml$, check the density of	the spores in the second release beaker.
11110	
Time of Inoculation: $///W$ Amount inoculated	$1: \underline{25m} = 24$ -hour germination check: $(\underline{a})^{\prime}$,
Comments:	
	AMEC Earth & Environmental
	Bioassay Laboratory
All a 12 all att	5550 Morehouse Drive, Suite B
QC Check: <u>PM 01</u> L-04 Final Review	<u>↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ </u>

Bioassay Laboratory					
5550 Morehouse Drive, Suite					
San Diego, CA 92121					

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr. Suite B San Diego, CA 92121

Client :	City of Buenaventura
Sample ID:	A-2
Test No:	0407-039
Analyst:	R25

	Raw	Datasheet
Water Quality	Mea	surements
Marine Ch	nronio	: Bioassay

Test Species:	Macrocys	tis pyrifera
Start/End Dates:	7-21-04	17-23-04
Start/End Times:	1400	1-1-10:00

Test Type: Kelp Spore Germination and Growth

		1	nitial Reading	S		Final Readings				
	Concentration	D.O. (mg/L)	pH (pH units)	Salinity (ppt)	D.O. (mg/L)	pH (pH units)	Salinity (ppt)			
	Lab Control	8.1	8.02	32.0	9.2	7.99	31, 7 30, 7/2			
À	Brine Control	7.6	7.99	32.4	4 9.7 8.01 0 9.6 8.09		32.1			
	Salt Control	6.7	8.63	32.0	9.6	8.09	32.4			
	25	8.B	8.48	31.9	7.6	8.12	31.7			
	50	8.9	8.65	32.2	7.6	8.19	32.1			
	65	5 8.9		32.4	7.5	8.24	32.6			
	100	8.3	8.93	32,0	7.3	8.37	31.5			

Comments: 100%. Sample Salted, not brined

A Brine Control Shured w/ B-3/2-2-Att 8-12-04 QC Check:

Final Review:

Brine Dilution Worksheet

Client:	City of Buenav	ventura	Analyst:	RG			
Sample ID:	A-2, B-3, C-2		Test Date:	07/21/2004			
Test No:	0407-03	39,041,04	Z Test Type:	Kelp			
Salinity of Effl	uent	3.0					
Salinity of Brin	ne	89					
Target Salinity	,	32					
Test Dilution V	/olume	250					
Salinity Adjustn	nent Factor:	TS - SE	TS = target salinity				
		SB - TS	SE = salinity of efflu	ient			
			SB = salinity of brin	e			
Salinity Adjus	tment Factor = _	0.51					

Concentration %	Effluent Volume (mL)	Salinity Adjustment	Brine Volume (mL)	Dilute to to: (mL)
Control	NA	NA	NA	250
6.25	15.6	0.51	7.9	250
12.5	31.3	0.51	15.9	250
25	62.5	0.51	31.8	250
50	125.0	0.51	63.6	250
65	164	0.51	83.0	250
	DI Volume			
Brine Control	148	0.56	83.0	250

Brine Control Salinity Adjustment Factor

285.2

Brine Control Calculation:

TS	5-0	
SB	- TS	

AMEC Earth and Environmental, Inc. San Diego Bioassay Laboratory 5550 Morehouse Drive. Suite B San Diego, CA 92121

CETIS Report

Page 1 of 2 Test Summary: 23 Aug-04 2:47 PM Report Date: Link:

15-3143-6103/0407-040

Macrocystis Germination and Germ Tube Growth Test $\beta - l$ AMEC Bioassay SD												
Test:05-5898-6693Test Type:Growth-GerminationDuration:44 HoursStart Date:21 Jul-04 02:00 PMProtocol:EPA/600/R-95/136 (1995)Species:Macrocystis pyriferaEnd Date:23 Jul-04 10:00 AMDil Water:Laboratory SeawaterSource:Field CollectedSetup Date:21 Jul-04 02:00 PMBrine:Frozen SeawaterField CollectedComment:100% concentration obtained by using Forty Fathoms artificial salt.Field Collected												
Sample: 0 Sampled: 2 Received: 2 Hold Time: 2	09-5840-1227 20 Jul-04 01:40 P 21 Jul-04 07:45 A 24 Hours (18.4 °C	PM M C)	Material: Code: Source: Station:	Estuarine M 0407-040 City of Buer B-1	lonitoring Sa naventura	Client: Project:	City of Buenaventura					
Comparison Summary												
Analysis	Endpoint		NOEL	LOE	EL	ChV	MSDp	Method				
09-7937-6089	Mean Length		100	>10	0	N/A	0.08234	Equal Variance t				
02-0116-8857	0		65	>65		N/A	0.15547	Bonferroni Adj t				
13-9177-3350	Proportion Ger	minated	<100	100		N/A	0.06003	Equal Variance t				
11-3039-8818			65	>65		N/A	0.14928	Bonferroni Adj t				
Test Accentability												
Analysis	Endpoint		Attrib	ute	Statistic	Lower Limit	Upper Limit	Decision				
11-3039-8818	Proportion Ger	minated	Contro	Response	0.7275	0.7		Passes acceptability criteria				
13-9177-3350				· · · · · · · · · · · · · · · · · · ·	0.806	0.7		Passes acceptability criteria				
02-0116-8857	Mean Length				12.938	10		Passes acceptability criteria				
09-7937-6089	5				11.65	10		Passes acceptability criteria				
11-3039-8818	Proportion Ger	minated	MSDp		0.1493		0.2	Passes acceptability criteria				
13-9177-3350					0.0600		0.2	Passes acceptability criteria				
02-0116-8857	Mean Length		0.1555				0.2	Passes acceptability criteria				
09-7937-6089					0.0823		0.2	Passes acceptability criteria				
Mean Length	Summary											
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	n SE	SD	CV				
0	Brine Control	5	12.9375	11.2500	14.0000	0.59839	1.19678	9.25%				
0	Lab Control i	5	11.8000	10.0000	13.0000	0.50867	1.13743	9.64%				
0	Salt Control	5	11.6500	10.7500	12.7500	0.40000	0.89443	7.68%				
25		5	13.5220	12.7400	14.3000	0.32770	0.73275	5.42%				
50		5	17.2520	14.5000	19.7600	0.87021	1.94585	11.28%				
65		5	17.0500	16.1200	18.2000	0.38580	0.86267	5.06%				
100		5	16.6240	15.8600	17.7500	0.32571	0.72831	4.38%				
Proportion G	erminated Sum	mary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	n SE	SD	CV				
0	Brine Control	5	0.72750	0.67000	0.78000	0.02780	0.05560	7.64%				
0	Lab Control	5	0.71600	0.68000	0.80000	0.02205	0.04930	6.88%				
0	Salt Control	5	0.80600	0.78000	0.83000	0.00927	0.02074	2.57%				
25		5	0.61800	0.57000	0.68000	0.01828	0.04087	6.61%				
50		5	0.68400	0.56000	0.83000	0.04523	0.10114	14.79%				
100		5	0.73400	0.65000	0.81000	0.02581	0.05263	7.86%				

 Test Summary:
 Page 2 of 2

 Report Date:
 23 Aug-04 2:47 PM

 Link:
 15-3143-6103/0407-040

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Mean Length Detail B - (
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
0	Brine Control	11.2500	×	13.0000	14.0000	13.5000						
0	Lab Control	12.2500	11.5000	13.0000	10.0000	12.2500						
0	Salt Control	11.7500	10.7500	12.2500	12.7500	10.7500						
25		14.3000	14.0400	12.7500	13.7800	12.7400						
50		17.1600	16.6400	19.7600	14.5000	18.2000						
65		16.1200	16.5000	17.6800	18.2000	16.7500						
100		15.8600	16.7500	16.1200	16.6400	17.7500						
Proportion G	Proportion Germinated Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
0	Brine Control I	0.78000	*	0.77000	0.67000	0.69000						
0	Lab Control I	0.69000	0.69000	0.68000	0.80000	0.72000						
0	Salt Control	0.78000	0.82000	0.83000	0.81000	0.79000						
25		0.57000	0.60000	0.61000	0.63000	0.68000						
50		0.72000	0.68000	0.56000	0.83000	0.63000						
65		0.59000	0.73000	0.66000	0.68000	0.70000						
100		0.72000	0.81000	0.74000	0.65000	0.75000						

* replicate excluded from analysis due to possible cup contamination.

 Comparisons:
 Page 4 of 4

 Report Date:
 23 Aug-04 2:47 PM

 Analysis:
 13-9177-3350

AMEC Bioassay SD

Macrocystis Germination and Germ Tube Growth Test |B-|

Endpoint Analysis Type						Sample Link Control Link				Date Analyzed	Vers	Version		
Proportion Germ	nina	ted	Co	mparison			15-3143-6103 15-3143-			3-6103	23 Aug-04 2:45	PM CET	M CETISv1.024	
Method	Alt H Data Transform			sform	Z		NOEL L	OEL	Toxic Units	ChV	MSDp			
Equal Variance t	t		C	> T A	ngular (C			<100 1	00		N/A	6.00%		
Test Acceptabil	lity													
Attribute Statistic Lower Limit					er Limit	Upper Li	imi	t Decision	1					
Control Respons	se		0.8	306	0.7				Passes a	cceptabi	lity criteria			
MSDp			0.0	0600			0.2		Passes a	cceptabi	lity criteria			
ANOVA Assum	ptic	ons												
Attribute		Fest		S	tatistic	Crit	Critical P Level			Decisio	on(0.01)			
Variances	١	Variance R	atio	6	6.26219 23.		15450 0.10332 I		Equal V	ariances				
Distribution	;	Shapiro-Wil	k W	0.	.94982	0.78	0.63606		3606	Normal	Distribution			
ANOVA Table														
Source		Sum of S	Squares	Mean	Square	DF	F Statis	stic	: P Level		Decision(0.05)			
Between		0.017803	62	0.0178	036	1	7.15		0.02819		Significant Effec	t		
Error		0.019920	97	0.0024	901	8								
Total		0.037724	59	0.0202	937	9								
Group Compari	isor	is												
Control v	s	Conc-%		Statistic	Crit	ical	P Level		MSD	Dec	cision(0.05)			
Salt Control 1		100		2.673892	1.85	59548	0.01410		0.05868778	Sigi	nificant Effect			
Data Summary						Origi	nal Data		aia di Sun uninter		Transf	ormed Data	3	
Conc-% C	on	rol Type	Count	Mean	М	inimum	Maximur	n	SD	Mean	Minimum	Maximu	m SD	
0 S	Salt	Control I	5	0.8060	0.0.	78000	0.83000		0.02074	1.1151	2 1.08259	1.14581	0.02619	
100			5	0.7340	0.0	65000	0.81000		0.05771	1.0307	3 0.93774	1.11977	0.06553	



CETIS Report Report Analysis:										
Macrocystis	Germination an	d Germ	Tube Growth	Test R-1				Analysis:	AME	C Bioassay SD
				51						
Endpoint	- main at a d	AI	nalysis Type		Sample L	ink Contro	ol Link	Date Analyzed	Vers	on Sul 024
Proportion Ge	erminated		Inpanson		15-3143-0	103 15-314	3-0103	23 Aug-04 2.46 F		371.024
Method		tH Data	Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Bonferroni Ad	lj t	С	>T Angu	lar (Corrected))	65	>65	1.54	N/A	14.93%
Test Accepta	ability									
Attribute		St	atistic	Lower Limit	Upper Lim	it Decision	า			
Control Respo	onse	0.	7275	0.7		Passes a	acceptabili	ty criteria		
MSDp		0.	1493		0.2	Passes a	acceptabili	ty criteria		
ANOVA Assu	umptions									
Attribute	Test		Stati	stic Cri	tical P	Level	Decisior	n(0.01)		
Variances	Bartlett		3.926	596 11.	34487 0.	26946	Equal Va	iriances		
Distribution	Shapiro-W	ilk W	0.973	361 0.8	6288 0.	81885	Normal D	Distribution		
ANOVA Table	e									
Source	Sum of	Squares	s Mean Squ	are DF	F Statisti	c P Level	l	Decision(0.05)		
Between	0.03246	723	0.0108224	4 3	1.98	0.16067	' I	Non-Significant E	Effect	
Error	0.08208	375	0.0054723	3 15						
Total	0.11455	098	0.0162947	7 18						
Group Comp	arisons									
Control	vs Conc-%		Statistic	Critical	P Level	MSD	Deci	sion(0.05)		
Brine Control	1 25		2.381918	2.342925	0.01545	0.1162646	Sign	ificant Effect		
	50		0.9046537	2.342925	0.18997	0.1162646	Non-	Significant Effec	t	
	65		1.234136	2.342925	0.11807	0.1162646	Non-	Significant Effec	t	
Data Summa	ry			Origi	inal Data			Transfo	ormed Data	
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximu	m SD
0	Brine Control (4	0.72750	0.67000	0.78000	0.05560	1.02309	0.95886	1.08259	0.06260
25		5	0.61800	0.57000	0.68000	0.04087	0.90489	0.85563	0.96953	0.04236
50		5	0.68400	0.56000	0.83000	0.10114	0.97820	0.84554	1.14581	0.11264
65		5	0.67200	0.59000	0.73000	0.05263	0.96185	0.87589	1.02440	0.05569

CETIS Report Report Date:											ns: e:	23 Au	Page 2 of 4 g-04 2:47 PM		
		oport	•									Analysis:			09-7937-6089
Macrocystis	Gerr	nination an	d Ge	rm Tub	e Growt	h Test	B-1							AMEC E	Bioassay SD
Endpoint				Analy	sis Type	Sample	Lin	k Contro	ol Link	Link Date Analyzed					
Mean Length				Compa	arison			15-3143	8-61	03 15-314	3-6103	23 Aug-04 2:45 F	PM	CETISv	1.024
Method	Method				Data	Transf	orm	Z		NOEL	LOEL	Toxic Units	ChV		MSDp
Equal Variance	Equal Variance t C			C > T	Untr	ansform	ed			100	>100	1.00	N/A		8.23%
Test Accepta	bility	/													
Attribute				Statist	tic	Lower	Limit	Upper Li	imit	Decisio	n				
Control Respo	onse			11.65		10				Passes	acceptat	oility criteria			
MSDp				0.0823	0.2 Passes acceptabi					oility criteria					
ANOVA Assu	umpt	ions													
Attribute		Test			Stat	istic	Crit	tical	ΡL	evel	Decisi	ion(0.01)			
Variances		Variance R	atio		1.50	821	23.	15450 0.70023 E			Equal	Variances			
Distribution		Shapiro-Wi	lk W		0.90405 0.78			0.23395		Norma	I Distribution				
ANOVA Table	e														
Source		Sum of	Squa	res M	Mean Sq	uare	DF	F Statis	stic	P Level		Decision(0.05)			
Between		61.85169	9	6	61.85169		1	92.98		0.00001		Significant Effect			
Error		5.32172		C	.665215		8								
Total		67.17340	080	e	2.51690	3	9								
Group Comp	arisc	ons													
Control	vs	Conc-%		Sta	tistic	Critic	al	P Level		MSD	De	ecision(0.05)			
Salt Control I		100		-9.6	642614	1.859	548	0.99999		0.9592203	No	on-Significant Effect	t		
Data Summa	ry				Original Data							Transformed Data			
Conc-%	Cor	ntrol Type	Cou	int M	lean	Min	imum	Maximur	n	SD	Mean	Minimum	Ма	ximum	SD
0	Salt	Control (5	1	1.6500	10.7	500	12.7500		0.89443					
100			5	1	6.6240	15.8	600	17.7500		0.72831					

Comparisons: Page 1 of 4 23 Aug-04 2:47 PM **Report Date:** 02-0116-8857

Analysis:

AMEC Bioassay SD B-1 Macrocystis Germination and Germ Tube Growth Test **Control Link** Date Analyzed Version Analysis Type Sample Link Endpoint 15-3143-6103 15-3143-6103 23 Aug-04 2:46 PM CETISv1.024 Mean Length Comparison **Toxic Units** ChV MSDp Data Transform Ζ NOEL LOEL Method Alt H 15.55% Bonferroni Adj t C > T Untransformed 65 >65 1.54 N/A Test Acceptability Attribute Statistic Lower Limit Upper Limit Decision Control Response 12,938 10 Passes acceptability criteria MSDp 0.1555 0.2 Passes acceptability criteria **ANOVA Assumptions** Decision(0.01) Attribute Test Statistic Critical P Level Variances Bartlett 4.19249 11.34487 0.24141 Equal Variances Distribution Shapiro-Wilk W 0.97301 0.86288 0.80767 Normal Distribution **ANOVA** Table Source Sum of Squares DF F Statistic Decision(0.05) Mean Square P Level 72,49455 3 14.75 0.00010 Significant Effect Between 24,16485 Error 24.56664 1.637776 15 Total 97.0611916 25.802626 18 Group Comparisons Control vs Decision(0.05) Conc-% Statistic Critical P Level MSD Brine Control 25 -0.6808493 2.011369 Non-Significant Effect 2.342925 0.74683 50 -5.025705 2.342925 0.99992 Non-Significant Effect 2.011369 65 -4.790407 2.342925 0.99988 2.011369 Non-Significant Effect Transformed Data Data Summary **Original Data** Conc-% Control Type Count Mean Minimum Maximum SD Mean Minimum Maximum SD 0 Brine Control (4 12.9375 11.2500 14.0000 1.19678 25 5 13.5220 12.7400 14.3000 0.73275

Approved By

50

65

5

5

17.2520

17.0500

14.5000

16.1200

19.7600

18.2000

1.94585

0.86267

Macrocystis Germination and Germ Tube Growth Test												AMEC	Bioassay	Laboratory	- San Diego	
Start Date:		21-Jul-04		Species: Macrocystis pyrifera									Test ID: 0407-040 Sample Source: City of Buenaventura			
End	Date:	23-Jul-04	Protocol: EPA/600/R-95/136 (1995 West Coast Manual)									Samp				
San	npled:	20-Jul-04								Sample Station: B-1						
Ran	andom Number Number					Tube Length Measurements (micrometer units)							Calibration	Mean Tube		
Nun	nber	Counted	Germinated											Factor	Length (µm)	
	1	100	68	8	5	4	7	10	7	7	6	4	6	2.6	16.64	
	2	100	63	9	5	7	8	7	4	10	10	5	5	2.6	18.2	
	3	100	68	5	6	1	5	10	8	7	6	8	8	2.6	18.2	
/ 7	4	100	60 57	3	3	5	9	5	1	7	5	4	6	2.6	14.04	
0 7	5	100	57	5	8	4	//	10	5	4	8	8	6	2.6	16.9	
	7	100	51	9	0	4	5	5	8	5	6	1	1	2.6	16.64	
۵ <u> </u>	8	100	57	6		5	5	0	0	8	5	8	/ /	2.6	16.9	
7	9	100	66	7	5	4	5	10	0	0	4	4	5	2.6	14.3	
8	0	100	56	10	10	6	7	10	0	10	5	/ F	/	2.6	17.68	
8	1	100	72	3	7	6	7	7	6	7	0	5	0	2.6	19.76	
8	2	100	47	8		2	5	<u> </u>	5	6	4	3	9	2.0	10.80	
8	3	100	49	9	5	6	3	8	6	4	10	8	6	2.0	11.90	
8	4	100	59	8	8	7	4	7	3	8	3	6	8	2.0	16.9	
8	5	100	63	3	7	6	6	3	3	4	5	8	8	2.0	13 78	
8	6	100	68	5	6	5	5	5	6	3	6	4	4	2.0	12 74	
8	7	100	83	5	7	5	6	6	6	5	7	6	5	2.5	14 5	
8	8	100	72	6	9	5	11	4	9	4	3	8	7	2.6	17.16	
8	9	100	74	4	10	7	8	7	6	8	4	4	4	2.6	16.12	
9	0	100	75	7	7	7	7	6	9	6	6	9	7	2.5	17.75	
9	1	100	73	8	6	8	7	7	5	6	7	6	6	2.5	16.5	
92	2	100	68	4	7	4	4	4	6	5	6	4	6	2.5	12.5	
93	3	100	61	5	4	4	7	6	5	4	4	5	7	2.5	12.75	
94	4	100	70	7	7	8	6	8	6	5	7	7	6	2.5	16.75	
- 9	5	100	81	6	9	7	5	6	6	7	8	6	7	2.5	16.75	
L																

data entry &C ac check: Alt 7-29-04

Final Reviews
Macrocystis	Germinati	ion and Ger	n Tube G	rowth Tes	t						AMEC	Bioassay	Laboratory	- San Dieg
Start Date:	21-Jul-04			Species:	Macrocys	tis pyrifera						Test ID:	0407-040	
End Date:	23-Jul-04			Protocol:	EPA/600/	R-95/136 (1	995 West C	oast Manua	al)		Samp	ole Source:	City of Buen	aventura
Sampled:	20-Jul-04										Samp	ole Station:	B-1	
Random	Number	Number		2		Tube Lengt	h Measurer	nents (micr	ometer units	5)			Calibration	Mean Tube
Number	Counted	Germinated		<u> </u>				<u> </u>	<u> </u>		T G		7/0	
71	100	68	- ``	$\frac{2}{2}$	1 7				15	- X		C		
72	100	U'3	7		+_{		1.5	17	10	10	8	13	<u> </u>	
73	100	60	<u> </u>	2		a	6	<u> </u>		6	- 4	18	 	
74	100	40			tu	+	112		<u> </u>	8	8	19	<u> </u>	
/5	100	24	2	X		- 5	4		5		7			
/6	100		-7	8	4			6	8	5	t &	1-1	 	
70	100	5	- re	10	12			10	0	<u> u</u>	<u> </u>		<u> </u>	
78	100	5/	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		4	15	10			5	7	3	I	
/9	100	لول	ND	10	<u> </u>	+	1-60-	a			5	8		
00	100	36	- 2			<u> </u>	1		1-5-	4	5	3		
01	100	45	 		19	6	ter	1 3	1.	3	2	5		
92	100	ua	- G %	2	1	3	5		4		8	$\overline{1}$		
84	100	69	~	8	3	4	1-2	3	8	1	Ú	8		
85	100	1.3		7	í.	1	3	3	4	5	8	8		
86	100		5	tί	5	5	5	6	3	.0	<u> </u>	14		
-97- 4</td <td>100</td> <td>0नेप</td> <td>4</td> <td>10</td> <td>1-5-</td> <td>\$</td> <td>1 7</td> <td>6</td> <td>8</td> <td>4</td> <td>14</td> <td>4</td> <td></td> <td></td>	100	0नेप	4	10	1-5-	\$	1 7	6	8	4	14	4		
88	100	72		à	1.5	1)	Ý	9	4	3	8	7	V	
-89.50	100	33	5	7	5	L C	6	6	5	7	6	5	2.5	
90	100	75	7	7	7	7	6	9	6	6	q	7		
91	100	73	8	6	প্ত	7	7	5	6	7	6	6		
92	100	69	4	7	4	4	ч	6	5	6	4	6		
93	100	61	5	4	4	1 7	6	5	7	ч	5	7		
94	100	70	7	7	8	6	8	6	5	T	7	6		
95	100	(2)	6	9	7	5	6	6	7	8	6	7	\vee	
	-													

QC Check: AH 7.29-04

Final Review:

Macrocystis	Germinat	ion and Ger	m Tube G	rowth Test	:						AMEC Bi	oassay L	aboratory -	San Diego	
Start Date:	21-Jul-04			Species:	Macrocystis	pyrifera						Test ID:	0407-040		
End Date:	23-Jul-04			Protocol:	EPA/600/R-	95/136 (19	95 West Co	ast Manua	I)		Sample	e Source:	City of Buena	aventura	
	20 1.1 04										Sample	Station:	: B-1		
Sampled:	20-Jui-04										· · · ·				
Dendera	Number	Number								\ \			Calibration	Mean Tube	
Number	Counted	Germinated			T	ube Length	Measurem	ents (micro	meter units)			Factor	Length (µm)	
71	100	68	8	5	4	7	10	7	7	6	4	6	2.6	16.64	
72	100	63	9	5	7	8	7	4	10	10	5	5	2.6	18.2	
72	100	68	5	6	7	5	10	8	7	6	8	8	2.6	18.2	
77	100	60	3	3	5	9	5	7	7	5	4	6	2.6	14.04	
74	100	78	4	5	4	4	5	4	5	5	5	4	2.5	11.25	
76	100	65	9	8	4	5	5	8	5	6	7	7	2.6	16.64	
70	100		*replicate	excluded du	e to possible	e contamin	ation. 0% g	erminated.							
78	100	57	6	5	4	5	10	6	6	4	4	5	2.6	14.3	
70	100	66	7	6	8	5	10	6	7	5	7	7	2.6	17.68	
80	100	56	10	10	6	7	5	9	10	6	5	8	2.6	19.76	
81	100	72	3	7	6	7	7	6	7	4	5	9	2.6	15.86	
82	100	77	5	7	4	3	6	5	4	4	7	7	2.5	1:	
83	100	67	6	7	5	4	4	7	6	6	5	6	2.5	14	
84	100	59	8	8	7	4	7	3	8	3	6	8	2.6	16.1	
85	100	63	3	7	6	6	3	3	4	5	8	8	2.6	13.7	
86	100	68	5	6	5	5	5	6	3	6	4	4	2.6	12.74	
87	100	83	5	7	5	6	6	6	5	7	6	5	2.5		
88	100	72	6	9	5	11	4	9	4	3	8		2.6		
89	100	74	4	10	7	8	7	6	8	4	4	4	2.6	10.1	
90	100	75	7	7	7	7	6	9	6	6	9		2.5		
91	100	73	8	6	8	7	7	5	6	7	6	6	2.5	10.	
92	100	69	5	5	7	6	4	5	6	6	5			10.	
93	100	61	5	4	4	7	6	5	4	4	5		2.3	12.7	
94	100	70	7	7	8	6	8	6	5	1	/			16.7	
95	100	81	6	9	7	5	6	6	7	8	6	1	2.3	10.7	
			I											+	
									1	L					

Note: B-1 brine control did not pass the percent germination criterion. Therefore, the brine control from site B-3 was substituted if a substi

	י אי כ		1911						Link:	15-3143-6103
Macrocysti	s Germ	inatio	n and	Germ Tube	Growth Test				AM	EC Bioassay SD
Start Date:	21 Jul	-04		Specie	s: Macrocyst	tis pyrifera		Sample Code:	0407-040	
End Date:	23 Jul	-04		Protoc	ol: EPA/600/F	R-95/136 (1995)		Sample Source:	City of Buenaventura	
Sampled:	20 Jul	-04		Materi	al: Estuarine	Monitoring Sam	ple	Sample Station:	B-1	
Conc-%	Code	Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor		Notes	
	0 B	1	83							
	0 B	2	82							
	0 B	3	77							
	0 B	4	92							
	0 B	5	75							
	25	1	78							
	25	2	74							
2	25	3	93							
2	25	4	85							
2	25	5	86							
	50	1	88							
	50	2	71							
	50	3	80							
	50	4	87							
	50	5	72							
	65 	1	84							
	55	2	91							
	55	3	79							
	5	4	/3							
10	20	5	94							
		2	01							
		2	90							
10		3	09 76							
10	0	5	0							
		5	90							

Data Worksheet:

Report Date:

Page 1 of 1

19 Jul-04 1:51 PM

Sites A-2 and BI will share Lab control + Salt control

BI will share Brine control W/B-3

Analyst: R

CETIS Workshoot

AMEC Earth and Environmental **Bioassay Laboratory** 5550 Morehouse Dr. Suite B San Diego, CA 92121

Client :	City of Buenaventura
Sample ID:	B-1
Test No:	0407-040
Analyst:	B, KG

Raw Datasheet Water Quality Measurements Marine Chronic Bioassay

Test Species:	Macrocyst	tis p	oyrifera
Start/End Dates: _	7-21-04	1	7-23-04
Start/End Times:	1400	1	AH 1701 1000

Test Type: Kelp Spore Germination and Growth

		J	nitial Reading	S	F	inal Reading	S
	Concentration	D.O. (mg/L)	pH (pH units)	Salinity (ppt)	ρ.ο. (mg/L)	pH (pH units)	Salinity (ppt)
	Lab Control	B. (8.02	32-0	7.2	7.99	31.7
B	Brine Control	7.3	8.02	32.8	7.7	8.01	33.1
C	Salt Control	6.7	8.63	32.0	7.6	8.04	32.4
	25	8.6	8.01	32.3	7.2	8.31	32.6
	50	8.3	7.82	32.7	7.5	8.22	33.6
	65	8.0	7.77	32,8	7.4	8.27	33.9
	1000	7.7	8.(3	32-0	7.5	8.41	33.0

comments: 100% sample salted, not brined.

QC Check: AH 8-12-04

aft Ardot Final Review:

		Brine Dil	ution Wor	ksheet						
Client:	City of Buena	ventura	_	Analyst:	RG					
Sample ID:	B-1		Test Date: 07/21/2004							
Test No:	0407-0	40	Test Type: Kelp							
Salinity of Effl	uent	1.1								
Salinity of Brin	ne	89	-							
Target Salinity	,	32	-							
Test Dilution V	/olume	250	-							
Salinity Adjustn	nent Factor:	TS - SE	TS = target salinity							
		SB - TS	SE = sali	nity of efflu	lent					
Salinity Adjust	tment Factor =	0.54	- 50 - Sali		e					
		Effluent	Salinity	Brine	Dilute to					
Concen	tration %	(mL)	Adjustment	(mL)	(mL)					
Co	ntrol	NA	NA	NA	250					
6	.25	15.6	0.54	8.5	250					
1	2.5	31.3	0.54	16.9	250					
2	25	62.5	0.54	33.9	250					
Ę	50	125.0	0.54	67.8	250					
(65	162	0.54	87.9	250					

	DI Volume			
Brine Control	157	0.56	87.9	250

Brine Control Salinity Adjustment Factor

302.8

Brine Control Calculation:

AMEC Earth and Environmental, Inc. San Diego Bioassay Laboratory 5550 Morehouse Drive. Suite B San Diego, CA 92121

 Test Summary:
 Page 1 of 2

 Report Date:
 07 Sep-04 1:49 PM

 Link:
 12-5631-8141/0407-041

Macrocystis (Germination and	d Germ T	ube Growth	Test B-	3			AMEC Bioassay SD		
Test:05-5898-6693Test Type:Growth-GerminationDuration:44 HoursStart Date:21 Jul-04 02:00 PMProtocol:EPA/600/R-95/136 (1995)Species:Macrocystis pyrifeEnd Date:23 Jul-04 10:00 AMDil Water:Laboratory SeawaterSource:Field CollectedSetup Date:21 Jul-04 02:00 PMBrine:Frozen SeawaterField CollectedComment:100% concentration obtained by using Forty Fathoms artificial salt.Start Seawater										
Comment: 1	100% concentrati	ion obtain	ed by using F	orty Fathoms	s artificial sa	alt.				
Sample: 1 Sampled: 2 Received: 2 Hold Time: 2	18-8453-7373 20 Jul-04 10:40 A 21 Jul-04 07:45 A 27 Hours (18.2 °C	M M C)	Material:Estuarine Monitoring SampleClieCode:0407-041ProgramSource:City of BuenaventuraStation:B-3					City of Buenaventura		
Comparison	Summary									
Analysis	Endpoint		NOEL	LOE	EL	ChV	MSDp	Method		
07-8298-6963 14-2391-9872	Mean Length Proportion Ger	minated	65 65	>65 >65		N/A N/A	0.14780 0.13453	Bonferroni Adj t Bonferroni Adj t		
Test Accepta	bility									
Analysis	Endpoint		Attrib	ute	Statistic	Lower Limit	Upper Limit	Decision		
14-2391-9872	Proportion Ger	minated	Contro	Response	0.72	0.7		Passes acceptability criteria		
07-8298-6963	Mean Length				13.5	10		Passes acceptability criteria		
14-2391-9872	Proportion Ger	minated	MSDp		0.1345		0.2	Passes acceptability criteria		
07-8298-6963	Mean Length				0.1478		0.2	Passes acceptability criteria		
Mean Length	Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv		
0	Brine Control 7	5	13.5000	12.0000	14.7500	0.58630	1.17260	8.69%		
0	Lab Control 🎗	5	12.6500	11.5000	13.2500	0.34095	0.76240	6.03%		
0	Salt Control 2	5	12.7500	11.2500	14.5000	0.54199	1.21192	9.51%		
25		5	13.3000	11.7500	15.7500	0.78022	1.74463	13.12%		
50		5	13.3000	12.5000	14.5000	0.32977	0.73739	5.54%		
65		5	14.1500	13.0000	16.0000	0.53385	1.19373	8.44%		
100		5	14.7000	14.0000	15.7500	0.28940	0.64711	4.40%		
Proportion Ge	erminated Sumr	nary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv		
0	Brine Control 2	5	0.72000	0.65000	0.79000	0.03109	0.06218	8.64%		
0	Lab Control 2	5	0.73800	0.64000	0.81000	0.02818	0.06301	8.54%		
0	Salt Control 2	5	0.82000	0.74000	0.87000	0.02429	0.05431	6.62%		
25		5	0.72000	0.68000	0.75000	0.01225	0.02739	3.80%		
50		5	0.67200	0.61000	0.75000	0.02577	0.05762	8.57%		
65		5	0.65600	0.58000	0.79000	0.03614	0.08081	12.32%		
100		5	0.65600	0.47000	0.79000	0.05600	0.12522	19.09%		



 Test Summary:
 Page 2 of 2

 Report Date:
 07 Sep-04 1:49 PM

 Link:
 12-5631-8141/0407-041

Mean Length	Detail B	-3				
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control 2	12.0000	14.7500	14.0000	13.2500	*
0	Lab Control 2	13.0000	13.2500	12.2500	11.5000	13.2500
0	Salt Control 2	11.2500	14.5000	13.2500	12.2500	12.5000
25		12.5000	11.7500	12.0000	14.5000	15.7500
50		12.5000	13.2500	13.0000	14.5000	13.2500
65		16.0000	14.0000	13.2500	13.0000	14.5000
100		14.7500	14.5000	15.7500	14.0000	14.5000
Proportion G	erminated Detai	1				
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control Z	0.69000	0.75000	0.65000	0.79000	¥
0	Lab Control Z	0.73000	0.74000	0.77000	0.81000	0.64000
0	Salt Control 2	0.84000	0.79000	0.74000	0.86000	0.87000
25		0.75000	0.68000	0.74000	0.71000	0.72000
50		0.71000	0.66000	0.61000	0.75000	0.63000
65		0.61000	0.64000	0.66000	0.79000	0.58000
100		0.75000	0.65000	0.79000	0.47000	0.62000

*replicate excluded from analysis due to possible cup contamination of germinated.



Page 2 of 2 Comparisons: Report Date: 07 Sep-04 1:49 PM 14-2391-9872 Analysis:

Macrocystis (Germina	ation and Germ	Tube Growth	Test B-	-3					А	MEC B	ioassay SD
Endpoint		Ar	nalysis Type		Sample	Li	nk Contro	l Link	Date Analyzed	V	ersion	
Proportion Ger	rminated	d Co	omparison		12-5631-8141 12-5			1-8141 07 Sep-04 1:47 PM			CETISv1.024	
Method		AI	t H Data	Transform	nsform Z		NOEL	LOEL	OEL Toxic Units			MSDp
Bonferroni Adj t			>T Angu	lar (Corrected	1)		65 :	>65	1.54	N/A		13.45%
ANOVA Assu	mptions	6										
Attribute	Tes	st	Stati	stic Cri	itical	P١	Level	Decisio	n(0.01)			
Variances	Bai	rtlett	3.552	231 11	.34487	0.3	31404	Equal V	ariances			
Distribution	Sha	apiro-Wilk W	0.945	61 0.8	6288	0.3	32610	Normal	Distribution			
ANOVA Table	•											
Source	5	Sum of Squares	Mean Squ	are DF	F Statis	stic	P Level		Decision(0.05)			
Between	(0.01760455	0.0058682	2 3	1.35		0.29499		Non-Significant I	Effect		
Error	(0.06506439	0.0043376	5 15								
Total	(0.08266893	0.0102058	3 18								
Group Compa	arisons											
Control	vs C	onc-%	Statistic	Critical	P Level		MSD	Dec	ision(0.05)			
Brine Control	2 2	5	0.03271826	2.342925	0.48717		0.103512	Nor	-Significant Effect	ct		
	5	0	1.196021	2.342925	0.12513		0.103512	Non	-Significant Effect	ct		
	6	5	1.551047	2.342925	0.07086		0.103512	Non	-Significant Effec	ct		
Data Summar	у			Orig	inal Data				Transfo	ormed D	Data	
Conc-%	Contro	l Type Count	Mean	Minimum	Maximur	n	SD	Mean	Minimum	Maxi	mum	SD
0	Brine C	ontrol 2 4	0.72000	0.65000	0.79000		0.06218	1.0150	0 0.93774	1.094	76	0.06969
25		5	0.72000	0.68000	0.75000		0.02739	1.0135	5 0.96953	1.047	20	0.03038
50		5	0.67200	0.61000	0.75000		0.05762	0.9621	6 0.89631	1.047	20	0.06206
65		5	0.65600	0.58000	0.79000		0.08081	0.9464	7 0.86574	1.094	76	0.08859



CETIS	R	eport									Compariso Report Dat Analysis:	ons: :e:	07 Se (Page 1 of 2 p-04 1:49 PM 07-8298-6963
Macrocystis	Gern	nination and	d Germ	Tube Growt	h Test	B-3	3						AMEC B	ioassay SD
Endpoint			Ar	alysis Type			Sample L	ink	Contro	ol Link	Date Analyzed		Version	
Mean Length			Co	omparison			12-5631-8	141	12-563	81-8141	07 Sep-04 1:48	PM	CETISv1	.024
Method			Al	tH Data	Transfor	m	Z	N	OEL	LOEL	Toxic Units	ChV		MSDp
Bonferroni Ad	jt		С	> T Untr	ansformed			65	5	>65	1.54	N/A		14.78%
ANOVA Assu	Impti	ons												
Attribute		Test		Stat	istic	Crit	tical P	Le	vel	Decisi	on(0.01)			
Variances		Bartlett		2.49	037	11.3	34487 0.	477	'03	Equal	Variances			
Distribution		Shapiro-Wil	k W	0.94	561	0.86	6288 0.	326	602	Norma	Distribution			
ANOVA Table	e													
Source		Sum of S	Squares	Mean Sq	uare	DF	F Statist	ic	P Leve	I	Decision(0.05)			
Between		2.430263	6	0.810087	7	3	0.50		0.68618	3	Non-Significant	Effect		
Error		24.175		1.611667		15								
Total		26.60526	23	2.421754	4	18								
Group Comp	arisc	ns												
Control	vs	Conc-%		Statistic	Critical		P Level	N	ISD	De	cision(0.05)			
Brine Control	2	25		0.2348476	2.34292	5	0.40875	1	.995272	No	n-Significant Effe	ct		
		50		0.2348476	2.34292	5	0.00000	1	.995272	Sig	nificant Effect			
		65		-0.7632547	2.34292	5	0.77143	1	.995272	No	n-Significant Effect	ct		
Data Summa	ry				(Origi	nal Data				Transf	ormed	d Data	
Conc-%	Cor	ntrol Type	Count	Mean	Minim	um	Maximum	S	SD.	Mean	Minimum	Ма	ximum	SD
0	Brin	e Control 2	4	13.5000	12.000	00	14.7500	1	.17260					
25			5	13.3000	11.750	00	15.7500	1	.74463					
50			5	13.3000	12.500	00	14.5000	0	.73739					
65			5	14.1500	13.000	00	16.0000	1	.19373					

CETIS	Report								Report Date Analysis:	e: 29 Ju	ul-04 12:32 PM 06-6826-8978
Macrocystis (Germination and (Germ T	ube Growt	h Test B	-3					AMEC	Bioassay SD
Endpoint		Ana	alysis Type		Sample	Link	Contro	l Link 🛛	Date Analyzed	Versio	n
Proportion Ger	minated	Cor	nparison		12-5631	-8141	12-563	1-8141 2	9 Jul-04 12:32 F	PM CETIS	/1.024
Method		Alt	H Data	Transform	Z	N	OEL I	LOEL	Toxic Units	ChV	MSDp
Equal Variance	e t	C >	T Angı	ular (Corrected	i)	<'	100	100		N/A	12.69%
Test Acceptal	oility										
Attribute		Sta	tistic	Lower Limit	Upper Li	mit	Decisior	ı			
Control Respo	nse	0.82	200	0.7			Passes a	acceptabilit	y criteria		
MSDp		0.12	269		0.2		Passes a	acceptabilit	y criteria		
ANOVA Assu	mptions										
Attribute	Test		Stati	istic Cr	itical	P Lev	vel	Decision	(0.01)		
Variances	Variance Rati	0	3.64	711 23	.15450	0.237	'98	Equal Va	riances		
Distribution	Shapiro-Wilk	~	0.97	827 0.7	78055	0.950)43	Normal D	istribution		
ANOVA Table											
Source	Sum of Sq	uares	Mean Sq	uare DF	F Statis	stic	P Level	5	Decision(0.05)		
Between	0.0878595	3	0.087859	6 1	7.85		0.02316	5	Significant Effect		
Error	0.0895780		0.011197	3 8							
Total	0.17743759) 	0.099056	89							
Group Compa	arisons										
Control	vs Conc-%		Statistic	Critical	P Level	N	ISD	Decis	sion(0.05)		
Salt Control 2	· 100		2.801166	1.859548	0.01158	0	.1244495	Signi	ficant Effect		
Data Summar	У			Orig	inal Data				Transfo	rmed Data	
Conc-% [¬]	Control Type	ount	Mean	Minimum	Maximun	n S	SD	Mean	Minimum	Maximum	SD
0	Salt Control 2 5		0.82000	0.74000	0.87000	0	.05431	1.13580	1.03573	1.20193	0.06942
100	5		0.65600	0.47000	0.79000	0	.12522	0.94833	0.75538	1.09476	0.13257
Proportion Ge	erminated										
1.5	٦						0.15-	1			
							0.10				
gle							<mark>ອ</mark> 0.10-				
				Deject		red	4 0.05-				
ctec	1			Reject		nte	0.00				
orre						ပီ	0 05-				
ວ _{0.5}							ö				
							-0.10-				
							-0.15-				
0.0	0		1	00			-0.20-	0 -15 -1	0-05 00 0	5 10 15	 2 0
	Ŭ	Cone	-%				-2	1.3 -1	.0 -0.3 0.0 0. Rankite	.5 1.0 1.5	2.0
		20/10							ixunitit3		

Approved By Apple Apple

Page 1 of 2

Comparisons:

											Compariso	ns:		Page 1 of 2
CETIS		anart									Report Date	e:	: 19 Aug-04 12:06	
ULIIC		epon									Analysis:		1	7-2630-5586
Macrocystis	Gern	nination an	d Germ	Tube Growt	h Test	5.5	3						AMEC B	ioassay SD
Endpoint			A	nalysis Type			Sample L	ink	Contro	l Link	Date Analyzed		Version	
Mean Length			C	omparison			12-5631-8	3141	12-5631	1-8141	19 Aug-04 12:06	PM	CETISv1	.024
Method			A	lt H Data	Transform	n	z	NC	EL L	OEL	Toxic Units	ChV	/	MSDp
Equal Varian	ce t		С	> T Untr	ansformed			100) >	•100	1.00	N/A		8.96%
Test Accept	ability	,												
Attribute			S	atistic	Lower Lin	nit	Upper Lin	nit	Decision	1				
Control Resp	onse		12	2.75	10				Passes a	cceptab	ility criteria			
MSDp			0.	0896			0.2		Passes a	cceptab	ility criteria			
ANOVA Ass	umpt	ons												
Attribute		Test		Stat	istic	Criti	ical F	Leve	el	Decisio	on(0.01)			
Variances		Variance R	atio	3.50	746	23.1	5450 0	.2516	64	Equal \	/ariances			
Distribution		Shapıro-Wi	lk W	0.95	979	0.78	055 0	.7576	51	Normal	Distribution			
ANOVA Tabl	е													
Source		Sum of	Square	s Mean Sq	uare D)F	F Statist	ic	P Level		Decision(0.05)			
Between		9.50625		9.50625	1		10.07		0.01312		Significant Effect			
Error		7.55		0.94375	8									
Total		17 0562	506	10.45000	0 9)	-							
Group Com	pariso	ons												
Control	vs	Conc-%		Statistic	Critical		P Level	M	SD	De	cision(0.05)			
Salt Control	2	100		-3.173775	1.859548	3	0.99344	1.	142525	No	n-Significant Effec	t		
Data Summa	ary				c	Drigir	nal Data				Transfo	orme	d Data	
Conc-%	Co	ntrol Type	Count	Mean	Minim	um	Maximum	SI	 C	Mean	Minimum	Ma	aximum	SD
0	Sal	Control 2	5	12.7500	11.250	0	14.5000	1.	21192					
100			5	14.7000	14.000	0	15.7500	0.	64711					
The second s			the second se	the second s			the second s			the second s		_		

21 Jul- 23 Jul- 20 Jul- Code	-04 -04 -04		Specie Protoc	es: Macrocys	tis pyrifera		Sample Code:	0407-041	
23 Jul- 20 Jul- Code	-04 -04		Protoc	OF EPA/600/					
20 Jul- Code	-04				R-95/136 (1995)	Sample Source:	City of Buenave	ntura
Code			Materia	al: Estuarine	Monitoring San	nple	Sample Station:	B-3	
and the second se	Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor		Notes	
В	1	104							
В	2	130							
В	3	127							
В	4	110							
В	5	114	16	<u></u>					
LC	1	106 -	73°	100	13	1			
LC	2	124	74	1	(3,25				
LC	3	121			12.25				
LC	4	122	81		11.5				
LC	5	119	64		13,25				
SC	1	103	8Y		11.25				
SC	2	101	79		14,5				
SC	3	99	74].	13.25				
SC	4	102			12.25				
SC	5	116	87	¥	12.5				
	1	112							
	2	90							
	3	100							
		120							
	1	105							
	2	126							
	2	108							
	4	129							
	5	113							
	1	100							
	2	97							
	3	107							
	4	109							
	5	120							
	1	125							
	2	117							
	3	115			urpan di ta fonda se constante per e di const	and the second			
	4	98							
	5	111							
	B B LC LC LC LC LC SC SC SC SC	B 3 B 4 B 5 LC 1 LC 2 LC 3 LC 4 LC 5 SC 1 SC 2 SC 3 SC 4 SC 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 1 2 3 4 5 5 1 2 3 4 5 5 1 2 3 4 5 5 1 2 3 4 5 5 1 2 3 4 5 5 1 2 3 4 5 5 1 2 3 4 5 5 5 1 2 3 5 5 5 5 1 2 3 5 5 5 5 1 2 3 5 5 5 5 5 5 1 2 3 5 5 5 5 5 1 2 3 5 5 5 5 1 2 3 5 5 5 5 1 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	B 3 127 B 4 110 B 5 114 LC 1 106 LC 2 124 LC 3 121 LC 4 122 LC 5 119 SC 1 103 SC 2 101 SC 3 99 SC 4 102 SC 5 116 1 112 2 2 96 3 118 4 123 5 128 1 105 2 126 3 108 4 129 5 113 100 2 97 3 107 4 109 5 120 1 125 2 117 3 115 4 98 5 111 98	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	B 3 127 B 4 110 B 5 114 LC 1 106 73 100 LC 2 124 74 1 LC 3 121 77 100 LC 3 121 77 100 LC 4 122 81 100 LC 5 119 64 50 SC 1 103 84 50 SC 2 101 79 50 SC 3 99 74 50 SC 3 116 87 7 SC 5 116 87 7 1 112 2 96 3 118 4 123 5 128 1 105 2 126 3 108 4 129 5 113 1 100 2 97 3 107 4 109 <td< td=""><td>B 3 127 B 4 110 B 5 114 LC 1 106 73 LC 2 124 74 (3,25) LC 3 121 77 (2,25) LC 4 122 81 11.5 LC 5 119 64 13,25 SC 1 103 $8Y$ 11.25 SC 2 101 79 14.5 SC 2 101 79 14.5 SC 2 101 79 14.5 SC 3 99 74 13.25 SC 5 116 87 12.5 SC 5 116 87 12.5 S 112 2 96 3 3 118 4 123 5 5 128 1 100 2 2 97 3 107 4 4 125</td><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>B 3 127 B 4 110 B 5 114 LC 1 106 73 100 13 1 LC 2 124 74 (3,25) 1 1 LC 3 121 77 12.3,25 1 1 1.5 LC 4 122 81 11.5 1 1.2,35 1 1.2,5 SC 1 103 84 11.25 2.5 5 5 1 1.3,25 5 5 5 5 5 1 1.2,5 5 5 5 5 1 1.2,5 5 5 5 5 5 5 1 1.2,5 5 5 5 5 5 1 1.2,5 5 5 1 1.2,5 5 5 1 1.2,5 5 1 1.2,5 1 1.2,5 1 1.2,5 1 1.2,5 1 1.2,5 1 1 1 1.0,5 1 1.1,1 1</td><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td></td<>	B 3 127 B 4 110 B 5 114 LC 1 106 73 LC 2 124 74 (3,25) LC 3 121 77 (2,25) LC 4 122 81 11.5 LC 5 119 64 13,25 SC 1 103 $8Y$ 11.25 SC 2 101 79 14.5 SC 2 101 79 14.5 SC 2 101 79 14.5 SC 3 99 74 13.25 SC 5 116 87 12.5 SC 5 116 87 12.5 S 112 2 96 3 3 118 4 123 5 5 128 1 100 2 2 97 3 107 4 4 125	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	B 3 127 B 4 110 B 5 114 LC 1 106 73 100 13 1 LC 2 124 74 (3,25) 1 1 LC 3 121 77 12.3,25 1 1 1.5 LC 4 122 81 11.5 1 1.2,35 1 1.2,5 SC 1 103 84 11.25 2.5 5 5 1 1.3,25 5 5 5 5 5 1 1.2,5 5 5 5 5 1 1.2,5 5 5 5 5 5 5 1 1.2,5 5 5 5 5 5 1 1.2,5 5 5 1 1.2,5 5 5 1 1.2,5 5 1 1.2,5 1 1.2,5 1 1.2,5 1 1.2,5 1 1.2,5 1 1 1 1.0,5 1 1.1,1 1	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

B-3 will share BC with A-2 and B-1

CETIS Worksheet

Data Worksheet:

Report Date: 19 Jul-04 1:54 PM

Page 1 of 1

AMEC Earth and Environmental **Bioassay Laboratory** 5550 Morehouse Dr. Suite B San Diego, CA 92121

	Raw	Datasheet
Water Quality	Meas	surements
Marine Ch	ronic	Bioassay

Client :	City of Buenaventura
Sample ID:	B-3
Test No:	0407-041
Analyst:	12,129

Test Species:	Macrocystis pyrifera							
Start/End Dates:	7-21-04-	17-23-04						
Start/End Times:	14:00	Att 1 1707 [0:00						

Test Type: Kelp Spore Germination and Growth

		l li	nitial Reading	S		Final Reading	5
	Concentration	D.O. (mg/L)	pH (pH units)	Salinity (ppt)	D.O. (mg/L)	pH (pH units)	Salinity (ppt)
	lab Control	8.1	8.02	32-0	7.7	8.06	31,3
(Á)	Brine Control	7.6	7.89	32-4	7.6	8.03	33.1
\cup	Sult (ontro)	6.7	B.63	32-0	7,5	8:05	32,0
	25	8.9	8.39	32.Y	J.5	8.12	33.2
	50	9-0	8.56	32.4	7.4	8.20	33.1
	65	9.0	8.63	32.4	7.5	8.25	. 33.2
	100	8.5	8.82	31.9	7.3	8.35	33.0

comments: 100% sample salted, not brined

QC Check: Att 8-12-04

Final Review:

Macrocysti	s Germina	tion and Gei	rm Tube Grov	vth Test							AMEC Bio	assay	Laboratory	- San Diego
Start Date:	21-Jul-04	4	s	pecies: Ma	acrocystis py	/rifera					1	est ID:	0407-041	
End Date:	23-Jul-04	4	P	rotocol: EP	A/600/R-95/	/136 (1995	West Coast	t Manual)			Sample S	ource.	City of Buen	aventura
Sampled:	20-Jul-04	1						,			-	ource.	only of Duen	aventura
		•									Sample S	station:	B-3	
Random	Number	Number												
Number	Counted	Germinated			Tube	Length Me	easurement	s (micromet	er units)				Calibration	Mean Tube
96	100	68	5	4	5	5	5	6	4	5	4		Factor	Length (µm)
97	100	64	7	4	6	6	5	7		5		4	2.5	11.75
98	100	47	6	6	6	6	5	5	6		6	5	2.5	14
99	100	74	6	6	4	5	6	5	5	4	7	5	2.5	14
100	100	61	8	7	5	7	7	7	6	5		5	2.5	13.25
101	100	79	7	7	4	5	6	4	8	4	7	0	2.5	16
102	100	86	4	5	6	6	6	6	3	4	1	5	2.5	14.5
103	100	84	5	4	5	4	5	5	6	5			2.5	12.25
104	100	78	4	5	4	4	5	4	5	5	5		2.5	11.25
105	100	71	4	5	6	5	6	5	5	5		- 4	2.5	11.25
106	100	73	5	5	5	8	4	5	5	6	4	5	2.5	12.5
107	100	66	4	6	4	7	4	9	5	6	4		2.5	13
108	100	61	5	5	4	7	4	5	6	5	5	6	2.5	13.20
109	100	79	6	4	3	6	54	5	6	6	5	7	2.5	13
110			*replicate exclu	ded due to	possible co	ntamination	n. 0% germ	inated.				'	2.5	#DIV/0
111	100	62	5	6	7	7	6	5	6	7	4	5	25	#DIV/0!
112	100	75	5	5	5	5	5	5	6	5	6	3	2.5	14.5
113	100	63	5	4	5	6	4	4	6	10	5	4	2.5	12.5
114	100	77	5	7	4	3	6	5	4	4	7	7	2.5	13.23
115	100	79	9	7	6	6	4	5	6	6	8	6	2.5	15 75
116	100	87	6	4	5	4	4	6	5	5	5	6	2.5	12.75
117	100	65	7	4	6	6	6	6	7	5	5	6	2.5	14.5
118	100	74	5	6	6	4	3	5	5	6	4		2.5	14.5
119	100	64	6	6	5	4	6	6	5	5	5	5	2.5	13 25
120	100	58	5	8	6	5	5	7	6	6	6		2.5	14.5
121	100	77	3	4	4	4	7	4	5	6	7	5	2.5	12.25
122	100	81	6	5	6	5	4	3	4	4	5	4	2.5	11.2.3
123	100	71	6	5	6	7	5	6	6	6	4	7	2.5	14.5
124	100	74	5	6	6	6	6	6	4	4	5	- 5	2.5	12.25
125	100	75	7	7	6	5	5	7	5	5	5	7	2.5	14 75
126	100	66	4	6	5	5	4	7	4	6	6	6	2.5	13 25
127	100	67	6	7	5	4	4	7	6	6	5	6	2.5	10.20
128	100	72	7	8	8	5	5	5	6	7	6	6	2.5	15 75
129	100	75	6	4	6	7	5	6	6	5	6	7	2.0	14.5
130	100	69	5	5	7	6	4	5	6	6	5	5	2.5	13.5

data entry ac ac check: At 7-29-04

Final Review:

Macrocystis	s Germinat	tion and Ger	m Tube G	Frowth Tes	st						AMEC	Bioassay	Laborato	ory - San Diego
Start Date:	21-Jul-04	1		Species	: Macrocys	tis pyrifera						Test ID	: 0407-04 ⁻	1
End Date:	23-Jul-04	ţ		Protocol	: EPA/600/	R-95/136 (1	995 West C	Coast Manua	al)		Sam	ole Source	: City of B	uenaventura
Sampled:	20-Jul-04	L				-			,		Com	ala Ctation		
											Samp	ble Station	: B-3	
Random	Number	Number				Calibrat	ion Mean Tube							
Number	Counted	Germinated		Tube Length Measurements (micrometer units)										Length (um
96	100	68	5	4 5 5 5 6 4 5 4 4								2.5	<u>_</u>	
97	100	64	7	4	6	6	5	7	5	5	6	5	Λ	
98	100	5117847	46	26	46	76	55	*5	56	55	56	45		
99	100	74	6	6	4	5	6	5	5	7	7	5		
100	100	61	8	1	5	7	7	7	6	5	6	6		
107	100	79				5	6	4	8	4	<u> </u>	6		
102	100	86	7	5	6	6	6	6	3	4	4	5		
104	100	79	<u>ຈ</u>		5	4		3	G	5	3	3		
105	100		- <u>-</u>		- 4	<u> </u>		4	5	5	5	<u> </u>		
106	100	73	7	5 6 5 6 5 5 5 4 5										
107	100	66	4											
108	100	61	5	5	4	<u> </u>	4	5		5	- <u>4</u>			
109	. 100	79	6	4	3	6	К	5	6				 	
110	100	0	Spores	present b	at hone	germinated		J		b	2	<u> </u>		
111	100	62	5	6	7	7	4	5	6	7	Н	Б		
112	100	75	5	5	5	5	5	5	6	5	6	3		
113	100	63	5	4	5	6	4	4	6	10	5	4		
114	100	77	5	7	4	3	6	5	4	4	٦	7		
115	100	79	9	7	6	6	4	5	6	6	8	6		
116	100	87	6	Ч	5	<u>ч</u>	4	6	5	5	5	6		
117	100	65		4	6	6	6	6		5	5	6		
110	100	74		6	6	н	3	5	5	6	4	4		
120	100	64	6	6	5	4	6	6	5	5	5	5		
121	100	38		8	<u> </u>	5	5	7	e F	6	6	4		
122	100	81	<u>_</u>			Ч		4	<u> </u>	6		5		
123	100	71	6		6	5	- 4 - E	3	- 4	4	5	4		
124	100	74	Б	6	6	4		6	6	6	<u> </u>	1		
125	100	75	7	7	4	5	5	7	-7		<u> </u>			
126	100	66	4	6	Б	5	4	-		6	6			
127	100	67	6	٦	5	4	4	-7	6	Č	4	6		
128	100	72	_ ٦	જ	ଟ	5	5	5	6	7	6	6		
129	100	75	6	4	6	7	5	6	6	5	6	7		
130	100	69	5	5	7	6	4	5	6	6	5	5	V	

QC Check: <u>AH 7-29-04</u>

Final Review: 44 5/20/04

Macrocystis	s Germina	tion and Ger	m Tube Gro	wth Test							AMEC B	ioassay L	.aboratory -	San Diego
Start Date:	21-Jul-04		Ś	Species: Ma	acrocysti	is pyrifera						Test ID:	0407-041	
End Date:	23-Jul-04		P	rotocol: EF	PA/600/F	R-95/136 (19	995 West Co	oast Manua	al)		Sample	e Source:	City of Buena	aventura
Sampled:	20-Jul-04										Sample	e Station:	B-3	
Random	Number	Number			_		Moosurom	onte (miere	motor units	•)			Calibration	Mean Tube
Number	Counted	Germinated			l l	rube Lengu	i weasuren			<i>י</i> ן			Factor	Length (µm)
96	100	68	5	4	5	5	5	6	4	5	4	4	2.5	11.75
97	100	64	7	4	6	6	5	7	5	5	6	5	2.5	14
98	100	47	6	6	6	6	5	5	6	5	6	5	2.5	14
99	100	74	6	6	4	5	6	5	5	4	7	5	2.5	13.25
100	100	61	8	7	5	7	7	7	6	5	6	6	2.5	16
101	100	79	7	7	4	5	6	4	8	4	7	6	2.5	14.5
102	100	86	4	5	6	6	6	6	3	4	4	5	2.5	12.25
103	100	84	5	4	5	4	5	5	6	5	3	3	2.5	11.25
104	100	69	5	5	5	4	4	4	5	5	6	5	2.5	12
105	100	71	4	5	6	5	6	5	5	5	4	5	2.5	12.5
106	100	73	5	5	5	8	4	5	5	6	4	5	2.5	13
107	100	66	4	6	4	7	4	9	5	6	4	4	2.5	13.25
108	100	61	5	5	4	7	4	5	6	5	5	6	2.5	13
109	100	79	6	4	3	6	5	5	6	6	5	7	2.5	13.25
110	100	79	7	3	7	6	5	4	5	5	4	7	2.5	13.25
111	100	62	5	6	7	7	6	5	6	7	4	5	2.5	14.5
112	100	75	5	5	5	5	5	5	6	5	6	3	2.5	12.5
113	100	63	5	4	5	6	4	4	6	10	5	4	2.5	13.25
114			*replicate exc	cluded due to	o possib	le contamin	ation. 0% g	germinated.						
115	100	79	9	7	6	6	4	5	6	6	8	6	2.5	15.75
116	100	87	6	4	5	4	4	6	5	5	5	6	2.5	12.5
117	100	65	7	4	6	6	6	6	7	5	5	6	2.5	14.5
118	100	74	5	6	6	4	3	5	5	6	4	4	2.5	12
119	100	64	6	6	5	4	6	6	5	5	5	5	2.5	13.25
120	100	58	5	8	6	5	5	7	6	6	6	4	2.5	14.5
121	100	77	3	4	4	4	7	4	5	6	7	5	2.5	12.25
122	100	81	6	5	6	5	4	3	4	4	5	4	2.5	11.5
123	100	71	6	5	6	7	5	6	6	6	4	7	2.5	14.5
124	100	74	5	6	6	6	6	6	4	4	5	5	2.5	13.25
125	100	75	7	7	6	5	5	7	5	5	5	7	2.5	14.75
126	100	66	4	6	5	5	4	7	4	6	6	6	2.5	13.25
127	100	65	6	5	7	6	4	4	6	6	6	6	2.5	14
128	100	72	7	8	8	5	5	5	6	7	6	6	2.5	15.75
129	100	75	6	4	6	7	5	6	6	5	6		2.5	14.5
130	100	75	8	5	6	6	6	6	8	4	5	5	2.5	14.75

Note: Site B-3 sharing LC#2, BC#2, and SC#2 with site C-2.

Final Review:

 Test Summary:
 Page 1 of 2

 Report Date:
 23 Aug-04 2:03 PM

 Link:
 16-4604-8990/0407-042

Macrocystis	Macrocystis Germination and Germ Tube Growth Test 2 - 2 AMEC Bioassay SD										
Test: C Start Date: 2 End Date: 2 Setup Date: 2 Comment: 2	05-5898-6693 21 Jul-04 02:00 P 23 Jul-04 10:00 A 21 Jul-04 02:00 P 100% concentrati	PM M PM on obtain	Test Type: Protocol: Dil Water: Brine: ed by using F	Growth-Gerr EPA/600/R- Laboratory S Frozen Seav orty Fathoms	mination 95/136 (199 Seawater water artificial sal	5) t.	Duration: Species: Source:	44 Hours Macrocystis pyrifera Field Collected			
Sample: 0 Sampled: 2 Received: 2 Hold Time: 2	02-3789-2942 20 Jul-04 09:35 A 21 Jul-04 07:45 A 28 Hours (18.5 °C	.M .M C)	Material: Code: Source: Station:	Estuarine M 0407-042 City of Buen C-2	onitoring Sa aventura	mple	Client: Project:	City of Buenaventura			
Comparison Analysis	Summary Endpoint		NOEL	LOE	L (ChV	MSDp	Method			
13-4206-1229 14-0009-1221 00-2683-8555 11-7345-7450 17-5253-3107	Mean Length Proportion Ger	minated	100 65 <100 65 65	>100 >65 100 >65 >65) 	N/A N/A N/A N/A N/A	0.16804 0.18469 0.08061 0.12722 0.12722	Equal Variance t Bonferroni Adj t Equal Variance t Bonferroni Adj t Bonferroni Adj t			
Mean Length	Summary										
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv			
0 0 25 50 65 100	Brine Control 2 Lab Control 2 Salt Control 2	5 5 5 5 5 5 5 5	13.5000 12.6500 12.7500 10.9500 12.5000 11.9000 13.4500	12.0000 11.5000 9.25000 9.75000 9.50000 11.2500	14.7500 13.2500 14.5000 12.2500 15.5000 13.5000 16.2500	0.58630 0.34095 0.54199 0.49624 0.95197 0.72715 1.01673	1.17260 0.76240 1.21192 1.10962 2.12867 1.62596 2.27349	8.69% 6.03% 9.51% 10.13% 17.03% 13.66% 16.90%			
Proportion G	erminated Sumr	nary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv			
0 0 25	Brine Control 2 Lab Control 2 Salt Control 2	5 5 5 5	0.72000 0.73800 0.82000 0.71000	0.65000 0.64000 0.74000 0.63000	0.79000 0.81000 0.87000 0.76000	0.03109 0.02818 0.02429 0.02302	0.06218 0.06301 0.05431 0.05148	8.64% 8.54% 6.62% 7.25%			

 Test Summary:
 Page 2 of 2

 Report Date:
 23 Aug-04 2:03 PM

 Link:
 16-4604-8990/0407-042

Mean Length	Detail (`- Ə-				
Conc-%	Control Type Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control 2 13.2500	14.0000	14.7500	12.0000	*
0	Lab Control 2 13.0000	13.2500	12.2500	11.5000	13.2500
0	Salt Control 2 11.2500	14.5000	13.2500	12.2500	12.5000
25	12.2500	11.5000	10.7500	9.25000	11.0000
50	12.5000	9.75000	13.2500	11.5000	15.5000
65	9.50000	11.2500	13.5000	12.0000	13.2500
100	11.2500	15.5000	12.5000	11.7500	16.2500
Proportion G	erminated Detail				
Conc-%	Control Type Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control 2 0.79000	0.65000	0.75000	0.69000	¥
0	Lab Control 2 0.73000	0.74000	0.77000	0.81000	0.64000
0	Salt Control 2 0.84000	0.79000	0.74000	0.86000	0.87000
25	0.63000	0.70000	0.76000	0.75000	0.71000
50	0.75000	0.60000	0.72000	0.73000	0.74000
65	0.74000	0.65000	0.77000	0.65000	0.71000
100	0.67000	0.78000	0.64000	0.74000	0.77000

* Replicate excluded from analysis due to possible cup contamination, 01. germinated.



CETIS	R	eport								Comparisons: Page 1 of Report Date: 29 Jul-04 3:11 Pl Analysis: 17-5253-310				
Macrocystis	Gern	nination and Ge	rm	Tube Growth	Test	<u>C</u> -	2						AMEC E	lioassay SD
Endpoint			Ar	nalysis Type			Sample	Link	Contro	l Link	Date Analyzed		Version	
Proportion Ge	rmin	ated	Сс	omparison			16-4604-	8990	16-4604	1-8990	29 Jul-04 3:11 Pl	М	CETISv1	1.024
Method			AI	t H Data	Transf	orm	z	N	OEL L	OEL	Toxic Units	ChV		MSDp
Bonferroni Ad	jt		С	>T Angı	ılar (Cor	rected))	65	5 >	•65	1.54	N/A		12.72%
Test Accepta	bility	1												
Attribute			St	atistic	Lower	Limit	Upper Lir	nit	Decision					
Control Respo	onse		0.7	72	0.7				Passes a	s acceptability criteria				
MSDp			0.1	1272			0.2		Passes a	cceptabi	lity criteria			
ANOVA Assu	mpti	ons												
Attribute		Test		Stati	stic	Crit	tical	P Lev	vel	Decisio	on(0.01)			
Variances		Bartlett		0.184	196	11.3	34487 (0.979	98	Equal V	ariances			
Distribution		Shapiro-Wilk W		0.940	800	0.8	6288 (0.261	75	Normal	Distribution			
ANOVA Table	•													
Source		Sum of Squa	ares	Mean Squ	lare	DF	F Statis	tic	P Level		Decision(0.05)			
Between		0.00077823		0.0002594	ļ	3	0.07	****	0.97678		Non-Significant E	ffect		
Error		0.05840406		0.0038936	5	15								
Total		0.0591823		0.0041530)	18								
Group Comp	ariso	ns												
Control	vs	Conc-%		Statistic	Critica	al	P Level	N	ISD	Dec	cision(0.05)			
Brine Control	2	25		0.2809151	2.3429	925	0.39131	0	.09807096	Nor	n-Significant Effect	t		
		50		0.3268529	2.3429	925	0.37415	0	.09807096	Nor	n-Significant Effect	t		
		65		0.435034	2.3429	925	0.33487	0	.09807096	Nor	n-Significant Effect	t		
Data Summa	ry					Origi	nal Data				Transfo	rmed	Data	
Conc-%	Cor	trol Type Co	unt	Mean	Mini	mum	Maximum	n S	D	Mean	Minimum	Ma	ximum	SD
0	Brin	e Control 2_4		0.72000	0.65	000	0.79000	0	.06218	1.0150	0 0.93774	1.0	9476	0.06969
25		5		0.71000	0.63	000	0.76000	0	.05148	1.0032	4 0.91691	1.0	5882	0.05617
50		5		0.70800	0.60	000	0.75000	0	.06140	1.0013	2 0.88608	1.0	4720	0.06566



65

J



0.75000

0.77000

0.06140

0.05367

1.00132

0.99679

0.88608

0.93774

1.04720

1.07062

0.06566

0.05909

0.70400

5

0.65000

CETIS	Report								Compariso Report Date Analysis:	ns: e:	29 Ji	Page 1 of 1 ul-04 3:05 PM 00-2683-8555
Macrocystis	Germination and	d Germ	Tube Growt	h Test 🕐 -	- 2						AMEC E	3ioassay SD
Endpoint		Ar	nalysis Type		Sample	Link	Contro	l Link	Date Analyzed		Version]
Proportion Ge	erminated	Co	omparison		16-4604	-8990	16-4604	4-8990	29 Jul-04 3:04 Pl	М	CETISv	1.024
Method	4		t H Data	Transform	Z	NC	DEL L	OEL	Toxic Units	ChV		MSDp
Equal variance		C .	> I Angu	ular (Corrected	1)	<1	00	100		N/A		8.06%
Test Accepta	ability		41-41-	t annual limite	the search is		Destates					
Control Resp		50	atistic	Lower Limit	Upper Li	mit	Decision	contabi				
MSDn	onse	0.0	5200 0806	0.7	0.2		Passes a	cceptabl	ility criteria			
			1000		0.2		Fasses a	Ссертал				
ANOVA ASSI	umptions Test		Stat	istic Cr	itical	PLev	ام	Decisio	op(0.01)			
Variances	Variance R	atio	1.01	798 23	15450	0.986	63	Equal V	/ariances			
Distribution	Shapiro-Wil	lk W	0.86	888 0.7	78055	0.099	46	Normal	Distribution			
ANOVA Tabl	e											
Source	Sum of §	Squares	Mean Sq	uare DF	F Statis	stic	P Level		Decision(0.05)			
Between	0.036471	34	0.036471	3 1	7.64		0.02455		Significant Effect			
Error	0.038211	159	0.004776	4 8								
Total	0.074062	<u>.</u> 92	0.041247	8 9								
Group Comp	arisons											
Control	vs Conc-%		Statistic	Critical	P Level	M	ISD	Dee	cision(0.05)			
Salt Control	2100		2.76327	1.859548	0.01228	0.	.08128117	Sig	nificant Effect			
Data Summa	iry			Orig	inal Data				Transfo	rmed	Data	
Conc-%	Control Type	Count	Mean	Minimum	Maximun	n S	D	Mean	Minimum	Max	cimum	SD
0	Salt Control 2	5	0.82000	0.74000	0.87000	0.	.05431	1.1358	0 1.03573	1.20)193	0.06942
100		5	0.72000	0.64000	0.78000	0.	.06205	1.0150	2 0.92730	1.08	3259	0.06880
Proportion G	erminated											
1.	5-						0.10					
e						4	u 0.05-					
5uV 1.	0					bar	ang of the second secon					
ected	:					enter	0.00					
Corre						Ŭ	-0.05-					
- 0.	5-											
							-0.10-					
0.0	00			100			-0.15-	0 -1.5	-10 -0.5 0.0 0	5 1 (0 1 5	20
	· ·	Cor	۔ ۱c-%				-	.0 1.5	Rankits	.5 1.0	, 1.5	2.0

CETIS	Report						Report Date Analysis:	e: 19 Au	g-04 12:07 PM 13-4206-1229
Macrocystis Ge	ermination and Ge	rm Tube Grow	th Test 📿 -	2				AMEC	Bioassay SD
Endpoint		Analysis Typ	9	Sample L	ink Contro	I Link D	ate Analyzed	Versio	n
Mean Length		Comparison		16-4604-8	8990 16-4604	4-8990 1	9 Aug-04 12:07	PM CETIS	v1.024
Method		Alt H Da	a Transform	Z	NOEL L	_OEL	Toxic Units	ChV	MSDp
Equal Variance	t	C > T Un	ransformed		100 >	>100	1.00	N/A	16.80%
Test Acceptabi	lity								
Attribute		Statistic	Lower Limit	Upper Lin	nit Decision	1			
Control Respons	se	12.75	10		Passes a	cceptabilit	y criteria		
MSDp		0.1680		0.2	Passes a	cceptabilit	y criteria		
ANOVA Assum	ptions								
Attribute	Test	Sta	tistic Cri	tical F	^o Level	Decision	(0.01)		
Variances	Variance Ratio	3.5	1915 23.	15450 0	.25045	Equal Var	riances		
Distribution	Shapiro-Wilk W	0.9	3669 0.7	8055 0	.48905	Normal D	istribution		
ANOVA Table									
Source	Sum of Squa	res Mean S	quare DF	F Statist	tic P Level	0	Decision(0.05)		
Between	1.225	1.225	1	0.37	0.56033	Ν	Ion-Significant E	Effect	
Error	26.55	3.31875	8						
Total	27.7749993	4.54374	99 9						
Group Compar	isons								
Control v	/s Conc-%	Statistic	Critical	P Level	MSD	Decis	sion(0.05)		
Salt Control	_ 100	-0.6075482	1.859548	0.71983	2.142519	Non-S	Significant Effec	t	
Data Summary			Orig	inal Data			Transfo	ormed Data	
Conc-% (Control Type Cou	unt Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0 5	Salt Control 2 5	12.7500	11.2500	14.5000	1.21192				

16.2500

2.27349

Page 1 of 2

Comparisons:

100

5

13.4500

11.2500

CETIS	P	onort							Compariso Report Dat	ons: e:	19 Aug	Page 2 of 2 -04 12:07 PM
ULIIO		epon							Analysis:			14-0009-1221
Macrocystis	Germ	ination and	l Germ	Tube Growth	Test C	-2					AMEC E	Bioassay SD
Endpoint			Ar	nalysis Type		Sample L	ink Contro	ol Link	Date Analyzed		Version	
Mean Length			Co	omparison		16-4604-8	990 16-460	4-8990	19 Aug-04 12:07	PM	CETISv	1.024
Method			AI	t H Data	Transform	Z	NOEL	LOEL	Toxic Units	ChV		MSDp
Bonferroni Ad	j t		С	> T Untra	insformed		65	>65	1.54	N/A		18.47%
Test Accepta	bility											
Attribute			St	atistic	Lower Limit	Upper Lim	it Decisio	า				
Control Respo	onse		13	.5	10		Passes	acceptabil	ity criteria			
MSDp			0.1	1847		0.2	Passes	acceptabil	ity criteria			
ANOVA Assu	ımpti	ons										
Attribute		Test		Stati	stic Ci	ritical P	Level	Decisio	n(0.01)			
Variances		Bartlett		1.908	321 11	1.34487 0.	59168	Equal Va	ariances			
Distribution		Shapiro-Wil	k W	0.980	0.09 0.	86288 0.	92355	Normal	Distribution			
ANOVA Tabl	e											
Source		Sum of S	quares	ն Mean Տգւ	iare DF	F Statisti	c P Level		Decision(0.05)			
Between		15.41447		5.138158	3	2.04	0.15124	,	Non-Significant E	Effect		
Error		37.75		2.516667	15							
Total		53.16447	35	7.6548245	5 18							
Group Comp	ariso	ns										
Control	vs	Conc-%		Statistic	Critical	P Level	MSD	Dec	ision(0.05)			
Brine Control	2	25		2.396189	2.342925	0.01502	2.493316	Sigr	ificant Effect			
		50		0.9396819	2.342925	0.18113	2.493316	Non	-Significant Effec	t		
		65		1.503491	2.342925	0.07674	2.493316	Non	-Significant Effec	t		
Data Summa	ry				Orig	ginal Data			Transfo	rmed	Data	
Conc-%	Cor	trol Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Ma	ximum	SD
0	Brin	e Control2	-4	13.5000	12.0000	14.7500	1.17260					
25			5	10.9500	9.25000	12.2500	1.10962					
50			5	12.5000	9.75000	15.5000	2.12867					
65			5	11.9000	9.50000	13.5000	1.62596					

Macrocystis	6 Germinat	ion and Ger	m Tube G	rowth Test	t						AMEC	Bioassay	Laboratory	- San Diego
Start Date:	21-Jul-04			Species:	Macrocysti	is pyrifera						Test ID:	0407-042	
End Date:	23-Jul-04			Protocol:	EPA/600/F	2-95/136 (19	995 West C	oast Manua	al)		Samp	le Source:	City of Buen	aventura
Sampled:	20-Jul-04										Samr	le Station:	C-2	
oumpiou.	20 001 01										Camp	ie clation.	02	
Random	Number	Number			-	Tube Length	Measuren	nents (micro	ometer unit				Calibration	Mean Tube
Number	Counted	Germinated				ube Lengu	i weasuren			», 			Factor	Length (µm)
131	100	60	3	3	3	4	4	3	3	4	6	6	2.5	9.75
132	100	65	5	6	3	4	7	6	3	6	3	5	2.5	12
133	100	73	5	4	5	6	3	3	4	4	5	7	2.5	11.5
134	100	/4	6	5	4	4	3	4	6	5	4	6	2.5	11.75
135	100	6/	4	5	4	5	5	4	5	5	4	4	2.5	11.25
136	100	/1	4	6	4	5	5	3	6	5	3	3	2.5	11
137	100	12	5	5	5	6	6	3	8	5	5	4	2.5	13.25
138	100	09 75	2	5	5	4	4	4	C C	5	6	5	2.5	12
140	100	74	3	3	3	2	3	3	4	4	4	5	2.5	9.25
140	100	74	7	3	7	6	5	4	5	5	3	7	2.5	9.0
142	100	76	7	5	5	4	3	3	3	3	4	6	2.5	10.25
143	100	64	5	4	4	5	5	4	6	6	5	6	2.0	12.5
144	100	78	7	7	6	5	6	6	6	6	7	6	2.0	15.5
145	100	77	6	7	6	6	8	5	6	7	7	7	2.5	16.25
146	100	70	3	4	4	5	4	6	6	5	4	5	2.5	11.5
147	Rich	uded di	0 +0	00552610	Contar	matic	M. O.	grmin	ukd.					
148	100	65	3	5	4	4	4	7	5	4	5	4	2.5	11.25
149	100	71	6	6	7	6	5	5	5	4	5	4	2.5	13.25
150	100	77	8	6	5	5	6	7	4	3	5	5	2.5	13.5
151	100	63	6	4	4	4	5	6	4	7	4	5	2.5	12.25
152	100	74	6	7	7	7	5	6	6	7	6	5	2.5	15.5
153	100	65	6	5	7	6	4	4	6	6	6	6	2.5	14
154	100	75	4	3	6	5	6	7	5	5	5	4	2.5	12.5
155	100	75	8	5	6	6	6	6	8	4	5	5	2.5	14.75
			·											

data entryoc

QC Check: AH 7-29-04

Final Review: AFA AWIA

Macrocystis	cystis Germination and Germ Tube Growth Test											AMEC Bioassay Laboratory - San Diego			
Start Date:	21-Jul-04			Species:	Macrocyst	is pyrifera						Test ID:	0407-042		
End Date:	23-Jul-04		Protocol: EPA/600/R-95/136 (1995 West Coast Manual) Sample Sour										City of Buen	aventura	
Sampled:	20-Jul-04										Samp	le Station:	C-2		
Random	Number	Number			-	Tube Lengtl	h Measuren	nents (micro	ometer units	3)			Calibration	Mean Tube	
Number	Counted	Germinated					·····						Factor	Length (µm)	
131	100	60	3	3	3	4	4	3	3	4	6	6	7.2		
132	100	60	5	6	3	4	<u></u>	<u> </u>	3	9	3	5			
133	100	+3	5	4	5	6	3	3	4	4	5	+			
134	100	74	6	5	4	4	3	4	6	5	4	6			
135	100	64	4	5	4	5	5	4	5	5	4	4			
136	100	+1	4.	9	4	5	5	3	9	2	3	3			
137	100	+2	6	2		6		3	<u>×</u>	5	5	4			
138	100	67	5	5		4	4	4	5	<u> </u>	6	5			
139	100	+5		3	6	- 2	5	3	4	4	4	0			
140	100	74	4	9	3	2	4	4	5	3		5			
141	100	74	+		+	0	2	<u> </u>		5	4	7			
142	100	+0	+	1		4				3	4	9			
143	100	64		- T	<u> </u>	-5	2	<u> </u>	<u> </u>	<u> </u>		0			
144	100														
145	100														
140	100														
148	100														
140	100														
150	100														
151	100														
152	100														
153	100														
154	100														
155	100														
156	100														
											· ·				

Analyst: MC QC Check: AH 7-29-04

Final Review:

Macrocystis	s Germinati	ion and Geri	n Tube G	rowth Tes	t						AMEC	Bioassay	Laboratory	- San Diego
Start Date:	21-Jul-04	Jul-04 Species: Macrocystis pyrifera Test ID: 0407-042												
End Date:	23-Jul-04			Protocol:	EPA/600/F	8-95/136 (19	995 West C	oast Manua	al)		Samp	le Source:	City of Buena	aventura
Sampled:	20-Jul-04			Sample Station: C-2									C-2	
													Oalibeation	Mann Tuba
Random Number	Number Counted	Number Germinated			-	Tube Lengt	n Measuren	nents (micro	ometer units	5)			Factor	Length (µm)
131	100													
132	100								·					
133	100													
134	100													
135	100													
136	100													
137	100													
138	100													
139	100													
140	100													
141	100													
142	100													
143	100													
144	100	78	7	17	6	5	6	6	6	6	7	6	2.5	
145	100		6	1 7	6	6	8	5	6	7	7	7		
146	100	70	3	4	<u> </u>	5	4	6	6	5	4	5		
147	100	0	Spores	present b	I none o	erminated								
148	100	65	3	5	Ч	4	4		5	<u> </u>	5	4		
149	100		6	6	7	6	5	5	5	4	5	4		
150	100	<u> </u>	8	6	5	5	6	7	4	3	5	->		
151	100	63	6	4	4	4	5	6	4		4	6		
152	100	14	6	1-1	1		5	6	6		G	5		
155	100	65	6	1 2	7	6	4	4	6	6	6	6		
155	100	-15	7	3	6		6		5	5	5	4		
155	100	15	8	<u> </u>		<u> </u>	6	<u>6</u>	8	<u> </u>	<u>_</u>		9	
	- 100			1										
	and the second se			the second s				La construction de la construction		L	L			

QC Check: 41 7-29-04

Final Review: Att \$20/04

$C \in \Pi$	S V	٧O	rks	heet					Report Date:	19 Jul-04 1:56 PM
									Link:	16-4604-8990
Macrocysti	s Ger	minat	ion a	nd Germ Tube	Growth Test					AMEC Bioassay SD
Start Date:	21 .	ul-04		Specie	s: Macrocyst	tis pyrifera		Sample Code:	0407-042	
End Date:	23 .	ul-04		Protoc	ol: EPA/600/F	R-95/136 (1995)		Sample Source:	City of Buenave	entura
Sampled:	20 .	ul-04		Materi	al: Estuarine	Monitoring Sam	ple	Sample Station:	C-2	
Conc-%	Co	ie Re	p Po	s # Counted	# Germinated	Mean Length	CalFactor		Notes	
	0 B	1	14	1						
	0 B	2	15	3						
	0 B	3	15	5						
	0 B	4	13	8						
	0 B	5	14	7						
	25	1	15	1						
	25	2	14	6						
	25	3	14	2						
	25	4	13	9						
-	25	5	13	3				and a state of the		
	50	1	15	4						
	50	2	13	1						
	50	3	13	7						
	50	4	13	3						
	50	5	15	2						
	55	1	14	0						
	55	2	14	В						
	55	3	15							
	55	4	13	2						
	35 	5	14	9						
1	00	1	13	0						
	00	2	14	4						
	00	3	14	3						
	20	4	13	•						
1	10	5	14	0						

Sites B-3 and C-2 will share LC and Sc

Q-C.RG





Data Worksheet: Page 1 of 1

AMEC Earth and Environmental **Bioassay Laboratory** 5550 Morehouse Dr. Suite B San Diego, CA 92121

Client :	City of Buenaventura
Sample ID:	C-7
Test No:	0407-042
Analyst:	ZG

Raw Datasheet
Water Quality Measurements
Marine Chronic Bioassay

Test Species:	Macroc	ystis pyrifera
Start/End Dates:	7-21-0	4,7-23.04
Start/End Times:	14:00	1. Hot 18:00

Test Type: Kelp Spore Germination and Growth

		3	nitial Reading	15		Final Readings		
	Concentration	D.O. (mg/L)	pH (pH units)	Salinity (ppt)	D.O. (mg/L)	pH (pH units)	Salinity (ppt)	
	Lab Control	8. (B.02	32.0	7.7	8.06	31,3	
(\widehat{A})	Brine Control	7-6	7.99	32.4	7.6	8.03	33.1	
\bigcirc	Salt Control	6.7	8.63	32.0	7.5	8.05	32.0	
	25	8.8	8. ZY	32,1	7.6	8.11	32,5	
	50	в.ц	B.34	32.4	7.5	8.16	33,5	
	65	Ĝ.(p	8.39	32.5	7.5	8.21	32.2	
	100	8.0	8.63	32-6	7.5	8.32	33.(

Comments: 100%. sample salted, not brined. ac check: At 8-12-04

Final Review:

APPENDIX C REFERENCE TOXICANT DATA

FRESHWATER

P. PROMELAS



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
04/09/02	82.7708	91.8034	49.8738	7.9443	133.7329	175.6624
05/07/02	55.1305	91.8034	49.8738	7.9443	133.7329	175.6624
08/13/02	45.8862	91.8034	49.8738	7.9443	133.7329	175.6624
01/07/03	155.4388	91.8034	49.8738	7.9443	133.7329	175.6624
02/04/03	140.0516	91.8034	49.8738	7.9443	133.7329	175.6624
02/12/03	67.5523	91.8034	49.8738	7.9443	133.7329	175.6624
03/04/03	136.7841	91.8034	49.8738	7.9443	133.7329	175.6624
03/17/03	78.6469	91.8034	49.8738	7.9443	133.7329	175.6624
04/08/03	79.2207	91.8034	49.8738	7.9443	133.7329	175.6624
04/15/03	38.5448	91.8034	49.8738	7.9443	133.7329	175.6624
05/13/03	149.7478	91.8034	49.8738	7.9443	133.7329	175.6624
06/17/03	39.5091	91.8034	49.8738	7.9443	133.7329	175.6624
09/17/03	56.5391	91.8034	49.8738	7.9443	133.7329	175.6624
09/19/03	144.6815	91.8034	49.8738	7.9443	133.7329	175.6624
10/08/03	43.1912	91.8034	49.8738	7.9443	133.7329	175.6624
11/12/03	104.2762	91.8034	49.8738	7.9443	133.7329	175.6624
12/02/03	117.5399	91.8034	49.8738	7.9443	133.7329	175.6624
12/10/03	55.3737	91.8034	49.8738	7.9443	133.7329	175.6624
02/24/04	156.3174	91.8034	49.8738	7.9443	133.7329	175.6624
03/18/04	108.5512	91.8034	49.8738	7.9443	133.7329	175.6624
07/20/04	72.1174	91.8034	49.8738	7.9443	133.7329	175.6624



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
04/09/02	85.9635	96.6165	59.6169	22.6174	133.6160	170.6155
05/07/02	103.1250	96.6165	59.6169	22.6174	133.6160	170.6155
08/13/02	45.6522	96.6165	59.6169	22.6174	133.6160	170.6155
01/07/03	101.9048	96.6165	59.6169	22.6174	133.6160	170.6155
02/04/03	103.5616	96.6165	59.6169	22.6174	133.6160	170.6155
02/12/03	82.1105	96.6165	59.6169	22.6174	133.6160	170.6155
03/04/03	140.0281	96.6165	59.6169	22.6174	133.6160	170.6155
03/17/03	73.5889	96.6165	59.6169	22.6174	133.6160	170.6155
04/08/03	123.7772	96.6165	59.6169	22.6174	133.6160	170.6155
04/15/03	52.4483	96.6165	59.6169	22.6174	133.6160	170.6155
05/13/03	154.7297	96.6165	59.6169	22.6174	133.6160	170.6155
06/17/03	26.3845	96.6165	59.6169	22.6174	133.6160	170.6155
09/17/03	88.2769	96.6165	59.6169	22.6174	133.6160	170.6155
09/19/03	160.1437	96.6165	59.6169	22.6174	133.6160	170.6155
10/08/03	95.8075	96.6165	59.6169	22.6174	133.6160	170.6155
11/12/03	84.6014	96.6165	59.6169	22.6174	133.6160	170.6155
12/02/03	112.3664	96.6165	59.6169	22.6174	133.6160	170.6155
12/10/03	59.6613	96.6165	59.6169	22.6174	133.6160	170.6155
02/24/04	165.4302	96.6165	59.6169	22.6174	133.6160	170.6155
03/18/04	89.3120	96.6165	59.6169	22.6174	133.6160	170.6155
07/20/04	80.0723	96.6165	59.6169	22.6174	133.6160	170.6155

Test Summary: Page 1 of 2 18 Aug-04 9:42 AM Report Date: 08-2514-0200/040720pprt Link:

AMEC Bioassay SD

Fathead Minnow 7-d Larval Survival and Growth Test AMEC Bioassay SD											
Test: Start Date: End Date: Setup Date:	14-2511-6226 20 Jul-04 03:30 F 27 Jul-04 04:00 F 20 Jul-04 03:30 F	PM PM PM	Test Type:Growth-Survival (7d)Duration:Protocol:EPA/821/R-02-013 (2002)Species:Dil Water:Diluted Mineral Water (8:2)Source:Brine:Source:Source:					7 Days 0 Hours Pimephales promelas Aquatic Biosystems. CO			
Sample:	04-8196-7046		Material: Copper chloride Client:					Client:	Internal		
Sampled:	20 Jul-04		Code:	040720	oprt			Project:			
Received:	20 Jul-04		Source:	Referen	ce loxi	cant					
Hold Time:			Station:								
Comparison Summary											
Analysis	Endpoint		NOEL		LOEL		ChV	MSDp	Method		
07-7781-8423	7d Proportion	Survived	15	:	30		21.21320	0.14160	Dunnett's Multiple Comparison		
12-7368-1059	Mean Dry Wei	ght-mg	<15		15		N/A	0.15395	Dunnett's Multiple Comparison		
Point Estimat	te Summary										
Analysis	Endpoint		% Effe	ect	Conc-µ	g/L	95% LCL	95% UCL	Method		
05-8061-6470 7d Proportion Survived		Survived	25		29.53777		17.53883	41.29267	Linear Regression		
		50	72.11		3	53.34880	97.06013				
03-9398-3747 Mean Dry Weight-mg		10	!	5.61057	3.74925		9.87148	Linear Interpolation			
		20		11.2211	5	7.49850	22.35451				
			25		14.0264	4	9.37313	50.25549			
			50	ł	80.0722	?7	66.12440	91.81736			
Test Accepta	bility										
Analysis	Endpoint		Attrib	ute	Sta	atistic	Lower Limit	Upper Limit	Decision		
05-8061-6470	7d Proportion	Survived	Contro	Respon	se 0.9	75	0.8		Passes acceptability criteria		
07-7781-8423					0.9	975	0.8		Passes acceptability criteria		
7d Proportion	n Survived Sum	mary									
Conc-µg/L	Control Type	Reps	Mean	Minimu	m Ma	aximum	SE	SD	cv		
0	Lab Control	4	0.97500	0.90000	1.0	00000	0.02500	0.05000	5.13%		
15		4	0.87500	0.70000	1.0	00000	0.06292	0.12583	14.38%		
30		4	0.65000	0.50000	0.8	80000	0.06455	0.12910	19.86%		
60		4	0.65000	0.50000	0.8	80000	0.08660	0.17321	26.65%		
120		4	0.30000	0.20000	0.4	40000	0.04082	0.08165	27.22%		
240		4	0.17500	0.10000	0.3	30000	0.04787	0.09574	54.71%		
Mean Dry We	ight-mg Summa	ary									
Conc-µg/L	Control Type	Reps	Mean	Minimu	m Ma	aximum	SE	SD	cv		
0	Lab Control	4	0.48625	0.48000	0.4	49300	0.00269	0.00538	1.11%		
15		4	0.35625	0.29700	0.4	40100	0.02367	0.04734	13.29%		
30		4	0.34150	0.28300	0.4	41700	0.03354	0.06708	19.64%		
120		4	0.30100	0.24900	0.3	33/00	0.01918	0.03837	12.10%		
240		4	0.04075	0.01200	0.	08500	0.02430	0.03121	76.60%		

Approved By AFA 5 20/04

-

 Test Summary:
 Page 2 of 2

 Report Date:
 18 Aug-04 9:42 AM

 Link:
 08-2514-0200/040720ppt

7d Proportion Survived Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4					
0	Lab Control	1.00000	1.00000	1.00000	0.90000					
15		0.70000	1.00000	0.90000	0.90000					
30		0.50000	0.60000	0.70000	0.80000					
60		0.50000	0.80000	0.80000	0.50000					
120		0.30000	0.40000	0.30000	0.20000					
240		0.10000	0.20000	0.30000	0.10000					
Mean Dry We	Mean Dry Weight-mg Detail									
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4					
0	Lab Control	0.48000	0.48700	0.49300	0.48500					
15		0.34000	0.29700	0.38700	0.40100					
30		0.28300	0.28700	0.37900	0.41700					
60		0.24900	0.32100	0.33700	0.29700					
120		0.15800	0.17500	0.11200	0.06700					
240		0.03000	0.03600	0.08500	0.01200					

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CETIS	Report								Compariso Report Dat Analysis:	ns: e: 18 Au	Page 1 of 2 ig-04 9:42 AM 07-7781-8423	
Fathead Min	now 7-d Larval	Surviva	l and Growth	Test						AMEC E	Bioassay SD	
Endpoint Analysis Type Sample Link Control Link								ol Link [Date Analyzed	Version		
7d Proportion	Survived	С	omparison 08-2514-0200 08-2514-0200				4-0200 1	18 Aug-04 9:33 AM CETISv1.024				
Method		A	It H Data Transform		n	z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Dunnett's Mul	tiple Comparisor) C	>T Angu	ular (Correc	cted)		15	30	6.67	21.21320	14.16%	
Test Accepta	bility											
Attribute		S	tatistic	Lower Lin	nit Upp	er Limi	it Decisio	n				
Control Respo	onse	0.	975	0.8			Passes a	acceptabilit	y criteria			
ANOVA Assu	Imptions											
Attribute	Test		Stati	stic	Critical	P	Level	Decision	(0.01)			
Variances	Bartlett		2.76	568	15.08628	0.7	73606	Equal Va	qual Variances			
Distribution	Shapiro-W	lk W	0.940	037	0.88421	0.1	17319	Normal D	Distribution			
ANOVA Table	9											
Source	Sum of	Square	s Mean Squ	uare D	F FS	tatistic	c P Level		Decision(0.05)			
Between	2.65543	3	0.5310866	6 5	27.	89	0.00000) 5	Significant Effect			
Error	0.34274	83	0.0190416 18									
Total	al 2.99818125 0.5501281 23											
Group Comp	arisons											
Control	vs Conc-µg	/L	Statistic	Critical	P Lev	el	MSD	Decis	sion(0.05)			
Lab Control	15		1.495856	2.41	>0.05		0.2351546	Non-	Significant Effec	t		
	30		4.394881	2.41	<=0.0	5	0.2351546	Signi	ficant Effect			
	60		4.355647	2.41	<=0.0	5	0.2351546	Signi	ficant Effect			
	120		8.14108	2.41	<=0.0	5	0.2351546	Signi	ficant Effect			
	240		9.731808	2.41	<=0.0	5	0.2351546	Signi	ficant Effect			
Data Summa	ſŷ			C	riginal Dat	а			Transfo	ormed Data		
Conc-µg/L	Control Type	Count	Mean	Minimu	um Maxi	mum	SD	Mean	Minimum	Maximum	SD	
0	Lab Control	4	0.97500	0.9000	0 1.000	00	0.05000	1.37127	1.24905	1.41202	0.08149	
15		4	0.87500	0.7000	0 1.000	00	0.12583	1.22532	0.99116	1.41202	0.17399	
30		4	0.65000	0.5000	0.800	00	0.12910	0.94245	0.78540	1.10715	0.13825	
60		4	0.65000	0.5000	0.800	00	0.17321	0.94627	0.78540	1.10715	0.18576	
120		4	0.30000	0.2000	0.400	00	0.08165	0.57691	0.46365	0.68472	0.09031	
240		4	0.17500	0.1000	0.300	00	0.09574	0.42170	0.32175	0.57964	0.12475	

CETIS Report Report Date: 18 Aug-04 9:42 AM 05-8061-6470 Analysis: Fathead Minnow 7-d Larval Survival and Growth Test AMEC Bioassay SD Sample Link Control Link Date Analyzed Version Endpoint Analysis Type 08-2514-0200 18 Aug-04 9:35 AM CETISv1.024 7d Proportion Survived Linear Regression 08-2514-0200 Linear Regression Options Threshold Option Lower Threshold Threshold Optimized Reweighted Pooled Groups Heterogeneity Corr. Model Control Threshold 0.025 No No Yes Yes Log-Normal **Regression Parameters** t Statistic Decision(0.05) Parameter Estimate Std Error 95% UCL P Level 95% LCL Threshold 0.02516 0.02458 -0.02302 0.07334 1.024 0.38136 Not Significant 1 73989 0.00757 Slope 0.26989 1.21091 2.26887 6.447 Significant 1.76722 0.50490 0.77761 2.75682 3.500 0.03948 Significant Intercept **Regression Summary** Iters Log Likelihood Mu Sigma G Stat Chi-Sq Critical P Level Decision(0.05) 3 -56.36774 1.01571 0.57475 0.09244 16.36427 28.86930 0.56714 Non-Significant Heterogeneity **Residual Analysis** Attribute Method Statistic Critical P Level Decision(0.05) Modified Levene Variances 0.60403 2.95825 0.69814 Equal Variances Distribution Shapiro-Wilk W 0.88058 0.90456 0.01723 Non-normal Distribution **Test Acceptability** Attribute Statistic Lower Limit **Upper Limit** Decision Control Response 0.975 0.8 Passes acceptability criteria **Point Estimates** % Effect Conc-µg/L 95% UCL 95% LCL 25 29.53777 41.29267 17.53883 50 72,11743 97.06013 53.34880 Data Summary Calculated Variate(A/B) Conc-µg/L Control Type Minimum Count Mean Maximum SE SD Α в 0 Lab Control 4 0.97500 0.90000 1.00000 0.01021 0.05000 39 40 15 4 0.87500 0.70000 1.00000 0.02569 0.12583 35 40 30 4 0.65000 0.50000 0.80000 0.02635 0.12910 26 40 60 4 0.65000 0.50000 0.80000 26 0.03536 0.17321 40 120 4 0.30000 0.20000 0.40000 0.01667 0.08165 12 40 240

Linear Regression:

Page 1 of 1

4

0.17500

0.10000

0.30000

0.01954

0.09574

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CETIS	S Report	•								Report Dat Analysis:	e:	18 Au	g-04 9:42 AN 12-7368-1059
Fathead Min	now 7-d Larval	Survival	and Growth	Test								AMEC B	lioassay SD
Endpoint		٦A	nalysis Type			Sample L	.ink	Contro	l Link	Date Analyzed		Version	
Mean Dry W	eight-mg	Co	omparison			08-2514-0	0200	08-2514	4-0200	18 Aug-04 9:34	AM	CETISv1	.024
Method		AI	tH Data	Transform	n	z	NO	EL L	.OEL	Toxic Units	ChV		MSDp
Dunnett's Mu	Itiple Comparisor	ı C	> T Untr	ansformed			<15	1	5		N/A		15.39%
ANOVA Ass	umptions												
Attribute	Test		Stat	istic	Crit	ical P	Leve	l	Decisio	on(0.01)			
Variances	Bartlett		10.5	0709	15.0	08628 0	.06208	3	Equal V	/ariances			
Distribution	Shapiro-W	ilk W	0.94	796	0.88	3421 0	.25179)	Normal	Distribution			
ANOVA Tab	le												
Source	Sum of	Squares	Mean Sq	uare D	DF	F Statist	ic	P Level		Decision(0.05)			
Between	0.53122	43	0.106244	95	;	55.06		0.00000		Significant Effec	t		
Error	0.03473	327	0.001929	51	8								
Total	0.56595	758	0.108174	52	3								
Group Com	parisons												
Control	vs Conc-µg	/L	Statistic	Critical		P Level	MS	D	De	cision(0.05)			
Lab Control	15		4.185254	2.41		<=0.05	0.0	7485807	Sig	nificant Effect			
	30		4.660117	2.41		<=0.05	0.0	7485807	Sig	nificant Effect			
	60		5.963985	2.41		<=0.05	0.0	7485807	Sig	nificant Effect			
	120		11.53359	2.41		<=0.05	0.0	7485807	Sig	nificant Effect			
	240		14.34254	2.41		<=0.05	0.0	7485807	Sig	nificant Effect			
Data Summa	агу			c	Drigii	nal Data				Transfo	ormed	Data	
Conc-µg/L	Control Type	Count	Mean	Minim	um	Maximum	SD		Mean	Minimum	Ma	ximum	SD
0	Lab Control	4	0.48625	0.4800	0	0.49300	0.0	0538					
15		4	0.35625	0.2970	0	0.40100	0.0	4734					
30		4	0.34150	0.2830	0	0.41700	0.0	5708					
60		4	0.30100	0.2490	0	0.33700	0.0	3837					
120		4	0.12800	0.0670	0	0.17500	0.0	4860					

0.08500

0.03121

Approved By: 421

Page 2 of 2

Comparisons:

240

4

0.04075

0.01200

Linear Interpolation: Page 1 of 1 **CETIS Report** Report Date: 18 Aug-04 9:42 AM 03-9398-3747 Analysis: AMEC Bioassay SD Fathead Minnow 7-d Larval Survival and Growth Test Sample Link **Control Link Date Analyzed** Version Endpoint Analysis Type 08-2514-0200 08-2514-0200 CETISv1.024 Mean Dry Weight-mg Linear Interpolation 18 Aug-04 9:35 AM Linear Interpolation Options X Transform Y Transform Seed Resamples Expanded CL Method Linear Linear 7747400 200 Yes **Two-Point Interpolation Point Estimates** % Effect Conc-µg/L 95% LCL 95% UCL 10 5.610576 3.74925 9.87148 20 11.22115 7.49850 22.35451 25 14.02644 9.37313 50.25549 50 80.07227 66.12440 91.81736 Data Summary **Calculated Variate** Conc-µg/L Control Type Count Mean Minimum Maximum SE SD 0 Lab Control 4 0.48625 0.48000 0.49300 0.00538 0.00110 15 4 0.35625 0.29700 0.40100 0.00966 0.04734 30 4 0.34150 0.28300 0.41700 0.01369 0.06708 60 4 0.30100 0.24900 0.33700 0.00783 0.03837 120 4 0.12800 0.06700 0.17500 0.00992 0.04860

0.08500

0.00637

0.03121

240

4

0.04075

0.01200

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$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Client:	Internal feet tox Culis	Test Species: f. promlas
Start/End Times: $/320$, 10000 Start/End Times: $/320$, 10000 Concentration	Sample ID:	Culla - Ruf tox.	Test Date: 7/20/04
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Test No:	040720PPRT	Start/End Times:
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	1	T	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Concentration	Lub Control	Concentration 60 49/6
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Day	0 1 2 3 4 5 6 7	Day 0 1 2 3 4 5 6 7
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Ha	1921 1825 0 10 19 19 19 19 19 19 19 19 19 19 19 19 19	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	DO (mg/l.)	78 39 84 73 20 01 74	DO (mail) 78 78 8.6 77 70 8.21 8.26 8.20
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Cond. (juntios-cm)	214 218 212 208 207 204 212	Cond. (umhos-cm) 217 21/2 211 205 20(20.7 21)
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Temp (°C)	25.0 25.4 24.9 24.9 24.7 25.1 25.2	Tomp (°C) 24.7 25.2 24.9 25.6 25.5 25.1 25.3
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		Final	Final
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	<u>pH</u>	7.84 7.87 7.88 7.72 7.94 7.52 7.50	PH 8.03 7.85 7.91 7.84 8.01 7.68 7.77
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		7.9 7.6 6.2 6.4 7.9 7.0 5.9	DO (mg/L) 9.2 7.7 7.2 6.9 3.0 75 6.8
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	remp { C}	23,4 25.0 25.2 24.6 25.1 24.6 24.5	Tomp (°C) 25.0 25.3 25.2 24.6 25.1 24.8 24.4
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Concentration	15 0.1.	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Day		Day 0 1 2 3 4 5 6 7
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	pH	8.18 8.22 8.21 8.28 8.27 8.25 8.14	pH 918 813 817 8.28 927 625 0.11
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	DO (mg/L)	7.8 7.9 8.6 7.8 80 41 7.9	DO (ma/L) 7.8 19 21 17 80 41 77
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Cond. (jimhos-cm)	214 218 215 203 206 20.7 212	Cond. (umhos-cm) 211 215 212 204 206 205 210
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Temp (°C)	25.1 25.3 24.8 25.3 25.1 25.1 25.1	Temp (°C) 24.6 25.3 24.9 25.7 25.6 25.1 75.2
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		Final	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	pn	$- \frac{146 - 146 + 86 + 11 - 193 + 59 + 65}{100 - 100 -$	PH 3.05 7.87 7.94 7.74 7.99 7.74 7.72
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Temp (°C)		<u>DO (mg/L)</u> <u>9.1 7.7 7.3 6.8 7.9 7.5 6.7</u>
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		-717 [23:0] 23:3 [24:1] [23:1] [21:1] [29:3]	1000 [C] 1000 [25.2 25.3 25.2 24.5 25 24.7 24.4
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Concentration	32 44/1	Concentration 24/2 Ho//
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Day		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	<u> </u>	Initial	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	рН	8,18 8.23 8.20 8-28 8.26 8.25 8.24	pli 8.17 8.20 8.18 8.25 8.26 5-25 D. 4
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	DO (mg/L)	7.8 7.8 8.6 1.7 80 8D 7.9	DO (mg/L) 7.8 7.9 7.6 7.6 7.9 7.9 7.7
$\frac{1}{1000} \frac{1}{101} 1$	Tomo. (junno: -cm)	$\frac{213}{249}$ $\frac{217}{262}$ $\frac{217}{260}$ $\frac{213}{213}$	Cond. (umbos-cm) 209 212 208 203 205 296 209
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	ramp (c)	127,1 12,3 127,9 125,1 13,1 127,1	Tomp (°C) 24.6 25.0 24.9 25.8 25.9 25.9 25.9
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	pH	8.05 7.87 7.88 7.76 8.01 7.6 7.69	pH 8.03 7.87 12.00 791 700 12 00 12 00
$\frac{\text{Temp (C)}}{25.2 25.2 25.2 25.2 25.3 24.7 25.1 24.8 24.5 1000 25.3 25.3 25.3 25.3 24.5 1000 24.4 $	DO (mg/L)	89 7.6 69 65 79 74 6.7	DO (mg/L) 9.1 7.0 7.6 7.4 7.2 7.5 1.9
Animal Source/Date Roceived: $AR5 / 7-20-04$ Animal Source/Date Roceived: $AR5 / 7-20-04$ Animal Age at Initiation: $-2 days$ Animal Age at Initiation: $-2 days$ Comments: QC Check: $Jc - 8-16-04$ Allec Check I - J	Temp (*C)	25.2 25.2 25.3 217 25.1 248 245	Tomp (°C) 25.3 25.3 25/ 24.5 25.2 24.4 24.4
Animal Source/Date Roceived: $AB5 / 7-20-04$ Analysts: Initial: SH UL P.S. SH MC P.4 C25 Animal Age at Initiation: $\leq 2 days$ $\leq 2 days$ Final: Intel P.S. NL SH P.4 P.4 P.5 P.4 P.5 P.4 P.4 P.5 P.4 P.4 P.5 P.4 P.4 <td></td> <td>,</td> <td></td>		,	
Animal Source/Date Roceived: ABS / 7-20-04 Analysts: Initial: SH ILL PR PL P	,		
Animal Age at Initiation: <u>2 days</u> Comments: QC Check: <u>Je 8-16-od</u> Alfee Final: <u>Ne P8 NC SH P4 P4 AH</u> Final: <u>Ne P8 NC SH P4 P4 AH</u> Final: <u>Final</u> Final Roview: <u>Aff 325 04</u>	Animal Source/Date F	Roceivod: <u>ABS / 7-20-04</u>	Analysts: Initial: DT UL PR SH MC R4 (20
Comments: QC Check: Je 8-10-04 AUGC Final Roview: Aff \$25/04	Animal Age at initiati	on: < <u>2 days</u>	Final: Me RS NC SH RG RG AH
QC Check: Je 8-10-04 Final Roview: Aff \$125/04	Comments:		· · · · · · · · · · · · · · · · · · ·
QC Check: Ye 8-10-04 Final Roview: aff 325/04		0	
	QC Check:		Final Roview AFFF 51751 04

AMEC Earth & Environmental Bloassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

me:	CuCh	fet to	×

Test Species: f. forme (a)

Client Nat

Sample ID:

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Cully KElay

 Test Date:
 7-20-04

 Test No.:
 040720PPRT

Conc.		T			Test	Dav				Percent		pan wt.	pan + fish	1
(09/4)	Rep.	0	影1-	2	3	4	5	6	7	Survival	1	(g) 2	(g)	1
1.6	a	20	10	10	10	10	10	10	12	1000	1	0.01685	0.02165	1
	b	10	10	10	10	10	10	10	10	100	13	10,01750	0.02237	1
	С	12	10	10	10	lis	0	10	10	100		0.01778	0.02271	1
	d	10	10	10	10	9	9	9	9	90		0.01774	0.02257	1
15	а	10	10	8-	8	17	01	17	7	70	2.5	0.01690	0.02030]
	Ь	(0	10	210	10	10	10	10	10	100		0.01927	2820.02	Þ94
	С	U U	10	10	10	9	9	9	٩	90	14	0.01709	0.02096	
	d	(0	10	19	9	9	9	9	9	90		0.01691	0.02092	
30	а	10	10	17	6	5	5	5	5	50		0.01620	0.01903	
	Ь	10	10	9	7	6	6	6	6	60		0.01.557	0.01544	1
	С	10	9	19	8	7	7	17	7	70	÷.	0.01582	0.01961	
	d	10	10	10	19	8	6	8	8	80		0.01677	0.02094	
40	а	w	7	17	5	5	5	5	5	50		0.01604	0.01853	Į
	Ь	15	9	9	8	8	8	8	MO B	80	U.	0.01749	0.02070	
	С	(0	10	9	8	8	8	8	8	80	6	0.01696	0.02033	1
	d	(0	19	5	5	5	5	5	5	50		0.01734	002031	
120	а	10	11_	6	6	5	5	3	3	30		0.017092	0.01866	1
	b	10	8	6	5	4	4	4	4	40		0.01669	0.01844	
	С	10	10	5	3	3	3	3	3	30	4.2	0.01575	0.01687	
	d	10	9	5	14	3	2	2	2	20	5	0.01563	0.0 630	
240	а	10	17	3	3	11		1	1	10		0.01895	101925	ļ
	Ь	10	17	5	5	17	4	3	2	20		0.01856	0.01892	
	С	10	6	5	5	3	3	3	3	30		0.01700	0.01785	Į
	d	(6	17	4	2	1	1		1	10		0.01780	0.01792	
	a				L		l			•	and a			Į
	b		ļ				ļ							Į
	c										語へ			1
	d	~ /											1	
Tech Initials		·24	B	pe	12	SH	AH	28	LRG_	data e	2	ny 6C=1	HT .	
			-		-	•		_		-		' Weigh	it Data:	4 100
Feeding Times	(day):		0	1	2	3	4	5	6	l	_	Date/Time in:	2-26-09/16	s .
		Ð	1610-	var	10900	080	0836	0900	0875		D	ate/Time out:	7-27-09/1001	-
			1425	1423	122	1400	1030	1300	1200		Οve	en Temp (°C):	64 1.30	- 10
		1620	7030	14,30	1Q4	11603	140	1945	1345			Tech Initials:	165	
Commenter												00 04	1. 8	~ 1
comments:								-			-	QC Check:	×C 8-0-	1
								-			F	inal Keview:	and all	let

AMEC Earth & Environmental Bioessey Leboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

C. DUBIA



-1 SD -2 SD +2 SD Dates Values Mean +1 SD 0.0000 08/15/00 12.5782 15.5913 6.0883 25.0942 34,5971 0.0000 25.0942 34.5971 09/19/00 10.1246 15.5913 6.0883 11/28/00 9.2044 15.5913 6.0883 0.0000 25.0942 34.5971 6.0883 0.0000 01/31/01 29.3825 15.5913 25.0942 34,5971 10.8819 15.5913 6.0883 0.0000 25.0942 34.5971 02/13/01 0.0000 03/13/01 8.3448 15.5913 6.0883 25.0942 34.5971 0.0000 06/26/01 23.8124 15.5913 6.0883 25.0942 34.5971 0.0000 9.5998 15.5913 6.0883 25.0942 34.5971 09/13/01 15.5913 0.0000 25.0942 11/14/01 15.5218 6.0883 34.5971 10.4533 15.5913 6.0883 0.0000 25.0942 34,5971 12/11/01 15.5913 6.0883 0.0000 25.0942 34.5971 01/22/02 18.3323 0.0000 02/21/02 17.4677 15.5913 6.0883 25.0942 34.5971 04/12/02 8.1846 15.5913 6.0883 0.0000 25.0942 34.5971 06/04/02 13.7044 15.5913 6.0883 0.0000 25.0942 34.5971 0.0000 07/23/02 17.6777 15.5913 6.0883 25.0942 34.5971 09/27/02 10.2488 15.5913 6.0883 0.0000 25.0942 34.5971 10/29/02 10.8673 15.5913 6.0883 0.0000 25.0942 34.5971 10.8673 15.5913 6.0883 0.0000 25.0942 34.5971 10/29/02 07/17/03 15.3347 15.5913 6.0883 0.0000 25.0942 34.5971 10/21/03 14.8281 15.5913 6.0883 0.0000 25.0942 34.5971 07/21/04 50.0000 15.5913 6.0883 0.0000 25.0942 34.5971

Copper (II) Chloride Reference Toxicant Control Chart -Ceriodaphnia dubia 96-hour Survival

CETIS Analysis Detail

Spearman-Karber: Page 1 of 1

Report Date: Analysis:

18 Oct-04 12:42 PM 07-2672-4742/040721cdra

Ceriodaphnia	a 96-h Acul	te Surviva	Test

Conc-µg/L

nia 96-h Acute Su	irvival Te	st						Nautilu	is Environmental (CA)	
	Ar	alysis Typ	e	Sample I	Link Co	ontrol Link	Date Ar	nalyzed	Version	
tion Survived	Tr	immed Spea	arman-Karber	18-0720-	0531 18	-0720-0531	18 Oct-	04 12:41 PM	CETISv1.025	
-Karber Options						Point Estin	nates			
Option Lower	Thresho	ld Trim	Level Mu	Sigr	ma	EC50/LC50		95% LCL	95% UCL	
eshold 0		50.00	1.6989	07 0		50.00000		50.00000	50.00000	
otability										
	St	atistic	Acceptable R	ange Deci	sion					
sponse	1		0.9 - N/A	Pass	es accepta	bility criteria				
nary			Calcu	lated Variate	(A/B)					
Control Type	Count	Mean	Minimum	Maximum	SE	SD	- A	в		
Lab Control	4	1.00000	1.00000	1.00000	0.00000	0.00000	20	20		
	4	1.00000	1.00000	1.00000	0.00000	0.00000	20	20		
	4	0.90000	0.80000	1.00000	0.02357	0.11547	18	20		
	4	1.00000	1.00000	1.00000	0.00000	0.00000	20	20		
	4	0.90000	0.80000	1.00000	0.02357	0.11547	18	20		
	4	0.50000	0.00000	1.00000	0.09718	0.47610	10	20		
1.00 0.9 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0 0.1		20	40 50							
	nia 96-h Acute Su tion Survived Karber Options Option Lower eshold 0 otability ponse nary Control Type Lab Control 1.0 Control 1.0 Control 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0	nia 96-h Acute Survival Ter Ar tion Survived Tri Karber Options Option Lower Thresho eshold 0 otability Sta ponse 1 nary Control Type Count Lab Control 4 4 4 4 4 4 4 4 1.0 0 0 0 0 0 0 0 0 0 0 0 0 0	nia 96-h Acute Survival Test Analysis Typ tion Survived Trimmed Speat Karber Options Option Lower Threshold Trim eshold 0 50.00 50.00 otability Statistic 50.00 otability Control Type Count Mean Lab Control 4 1.00000 4 0.90000 4 0.50000 1.0 0 0 0.50000 4 0.50000 5 0.7 0.6 0.7 0.4 0.3 0.7 0.4 0.3 0.2 0.4 0.3 0.2 0.4 0.3 0.2 0.4 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.4<	Analysis Type Analysis Type tion Survived Trimmed Spearman-Karber Karber Options Option Lower Threshold Trim Level Mu eshold 0 50.00% 1.6986 Statistic Acceptable R iponse 1 0.9 - N/A mary Calcu Control Type Count Mean Minimum Lab Control 4 1.00000 1.00000 4 0.90000 0.80000 4 0.90000 0.80000 4 0.50000 0.0000 <t< td=""><td>Analysis Type Sample I Ition Survived Trimmed Spearman-Karber 18-0720- Karber Options Option Lower Threshold Trim Level Mu Sign sehold O Option Lower Threshold Trim Level Mu Sign sehold O Option Lower Threshold Trim Level Mu Sign sehold O Statistic Acceptable Range Deci on to J9 - N/A Pass Pass Colspan="2">Calculated Variater Control Type Count Mean Minimum Lab Control 4 1.00000 1.00000 1.00000 1.00000 4 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 <th colspa="</td"><td>Analysis Type Sample Link Coc Consumined Spearman-Karber 18-0720-0531 18 Karber Options Option Link Coc Option Link Coc Option Lower Threshold Trim Level Mu Sigma eshold O Statistic Acceptable Range Decision ponse 1 0.9 Calculated Variate(A/B) Control Type Count Mean Minimum Maximum SE Lab Control 4 1.00000 1.00000 1.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.0000 0.</td><td>Analysis Type Sample Link Control Link tion Survived Trimmed Spearman-Karber 18-0720-0531 18-0720-0531 Karber Options Point Estim CC50/LC50 option Lower Threshold Trim Level Mu Sigma EC50/LC50 oshold 0 50.00% 1.69897 0 50.0000 otability Statistic Acceptable Range Decision EC50/LC50 oponse 1 0.9 - N/A Passes acceptability criteria Point Estim control Type Count Mean Minimum Maximum SE SD Lab Control 4 1.00000 1.00000 0.00000 0.00000 0.00000 4 0.90000 0.80000 1.00000 0.00000 0.00000 4 0.50000 0.00000 0.00000 0.00000 0.00000 0.04 0.50000 0.00000 1.00000 0.09718 0.47610</td><td>Inia 96-h Acute Survival Test Analysis Type Sample Link Control Link Date Ai ition Survived Trimmed Spearman-Karber 18-0720-0531 18-0720-0531 18 Orto-00003 Araber Options Point Estimates EC50/LC50 EC50/LC50 eshold 0 50.00% 1.69897 0 50.0000 50.0</td><td>Inia 96-h Acute Survival Test Nautili Analysis Type Sample Link Control Link Date Analyzed ion Survived Trimmed Spearman-Karber 18-0720-0531 18-0720-0531 18 Oct-04 12:41 PM Karber Options Point Estimates EC50/LC50 95% LCL eshold 0 50.00% 1.69897 0 50.0000 50.0000 Attaber Option Lower Threshold Trim Level Mu Sigma EC50/LC50 95% LCL eshold 0 50.00% 1.69897 0 50.0000 50.0000 Attaber Options Point Estimates EC50/LC50 95% LCL So.00000 sponse 1 0.9 - N/A Passes acceptability criteria </td></th></td></t<>	Analysis Type Sample I Ition Survived Trimmed Spearman-Karber 18-0720- Karber Options Option Lower Threshold Trim Level Mu Sign sehold O Option Lower Threshold Trim Level Mu Sign sehold O Option Lower Threshold Trim Level Mu Sign sehold O Statistic Acceptable Range Deci on to J9 - N/A Pass Pass Colspan="2">Calculated Variater Control Type Count Mean Minimum Lab Control 4 1.00000 1.00000 1.00000 1.00000 4 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 <th colspa="</td"><td>Analysis Type Sample Link Coc Consumined Spearman-Karber 18-0720-0531 18 Karber Options Option Link Coc Option Link Coc Option Lower Threshold Trim Level Mu Sigma eshold O Statistic Acceptable Range Decision ponse 1 0.9 Calculated Variate(A/B) Control Type Count Mean Minimum Maximum SE Lab Control 4 1.00000 1.00000 1.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.0000 0.</td><td>Analysis Type Sample Link Control Link tion Survived Trimmed Spearman-Karber 18-0720-0531 18-0720-0531 Karber Options Point Estim CC50/LC50 option Lower Threshold Trim Level Mu Sigma EC50/LC50 oshold 0 50.00% 1.69897 0 50.0000 otability Statistic Acceptable Range Decision EC50/LC50 oponse 1 0.9 - 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Analysis Type Sample Link Control Link tion Survived Trimmed Spearman-Karber 18-0720-0531 18-0720-0531 Karber Options Point Estim CC50/LC50 option Lower Threshold Trim Level Mu Sigma EC50/LC50 oshold 0 50.00% 1.69897 0 50.0000 otability Statistic Acceptable Range Decision EC50/LC50 oponse 1 0.9 - N/A Passes acceptability criteria Point Estim control Type Count Mean Minimum Maximum SE SD Lab Control 4 1.00000 1.00000 0.00000 0.00000 0.00000 4 0.90000 0.80000 1.00000 0.00000 0.00000 4 0.50000 0.00000 0.00000 0.00000 0.00000 0.04 0.50000 0.00000 1.00000 0.09718 0.47610	Inia 96-h Acute Survival Test Analysis Type Sample Link Control Link Date Ai ition Survived Trimmed Spearman-Karber 18-0720-0531 18-0720-0531 18 Orto-00003 Araber Options Point Estimates EC50/LC50 EC50/LC50 eshold 0 50.00% 1.69897 0 50.0000 50.0	Inia 96-h Acute Survival Test Nautili Analysis Type Sample Link Control Link Date Analyzed ion Survived Trimmed Spearman-Karber 18-0720-0531 18-0720-0531 18 Oct-04 12:41 PM Karber Options Point Estimates EC50/LC50 95% LCL eshold 0 50.00% 1.69897 0 50.0000 50.0000 Attaber Option Lower Threshold Trim Level Mu Sigma EC50/LC50 95% LCL eshold 0 50.00% 1.69897 0 50.0000 50.0000 Attaber Options Point Estimates EC50/LC50 95% LCL So.00000 sponse 1 0.9 - N/A Passes acceptability criteria

CETIS Test Summary

Page 1 of 1 Report Date: 18 Oct-04 12:42 PM Link: 18-0720-0531/040721cdra

Ceriodaphnia	96-h Acute Sur	vival Test						Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	02-7695-5994 21 Jul-04 03:3 25 Jul-04 01:4 21 Jul-04 03:3	0 PM 5 PM 0 PM	Test Type: Protocol: Dil Water: Brine:	Survival (96 EPA/821/R Diluted Min Not Applica	5h) -02-012 (2002 eral Water (8: ble	2) 2)	Duration: Species: Source:	94h Ceriodaphnia dubia In-House Culture
Sample No: Sample Date: Receive Date: Sample Age:	11-7930-1907 21 Jul-04 21 Jul-04 16h		Material: Code: Source: Station:	Copper chic 040721cdra Reference	pride a Toxicant		Client: Project:	internal
Point Estimate Analysis 07-2672-4742	e Summary Endpoint 96h Proportion	Survived	% Effe 50	ct Cor 50.0	nc-µg/L s 00000 s	95% LCL	95% UCL 50.00000	Method Trimmed Spearman-Karber
Test Acceptat Analysis 07-2672-4742	bility Endpoint 96h Proportion	Survived	Attribu Contro	ute Response	Statistic 1	Acceptable 0.9 - N/A	e Range	Decision Passes acceptability criteria
96h Proportion	n Survived Sun	nmary						
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv
0 3.125 6.25 12.5 25 50	Lab Control	4 4 4 4 4	1.00000 1.00000 0.90000 1.00000 0.90000 0.50000	1.00000 1.00000 0.80000 1.00000 0.80000 0.00000	1.00000 1.00000 1.00000 1.00000 1.00000 1.00000	0.00000 0.00000 0.05774 0.00000 0.05774 0.23805	0.00000 0.00000 0.11547 0.00000 0.11547 0.47610	0.00% 0.00% 12.83% 0.00% 12.83% 95.22%
96h Proportio	n Survived Deta	ail						
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0 3.125 6.25 12.5 25 50	Lab Control	1.00000 1.00000 0.80000 1.00000 1.00000 0.00000	1.00000 1.00000 0.80000 1.00000 1.00000 0.20000	1.00000 1.00000 1.00000 1.00000 0.80000 0.80000	1.00000 1.00000 1.00000 1.00000 0.80000 1.00000			

Freshwater 96-hr A	Acute w	ith R	enew	/al						96 I	lou	• To:	xicit	y Te	est D	ata	Shee	et - A	ME	CB	ioas	say	Lab	orat	огу				
Client:	T.	ter		l		•									Start	Date	: & T	'imc:	7	100	704	,	1	57	4)				
Sample ID:	 Lu	<u>(1</u> 2		<u> </u>											End	Date	: & T	ime:	-	1/23	10	1	1	34	5				
Contact:		_													1	fest (Drgan	ism:	C	d	bin								
Test #:	04	107	210	DR	<u>A</u> .											Test	Prot	ocol:		EP.A	97	ew	ei	2007	2_				
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C			N.						D.0). // \					p) (_11_)	11 			.0	ondu	CLIVI	ly		Test	1 cm	peral	lure	[
Concentration	Ran	Ι,			r oi nion				(mg Loir I						(pri t Lisii	inits) Litin				linit	DS-Ch	<u>"</u>			linit				7u Suov
	кер		24	Tax	72	96	-0	24	48	48	72	96	0	24	48	48	72	96	0	48	48	96	0	24	48	48	72	-96	Surv.
Lont	Α	5	5	5	5	2	7.6	8.0	7.8	A)	63	62	3.05	8.4	821	(A)	767	1.70	228	204	(3)	217	7410	25	253	A	241	7.4	140
	B	5	5	5	5	5				÷.														, in the second s					001
	С	5	5	5	5	5																							100
	D	5	5	5	5	5																							100
3,25	<u>^</u>	5	5	5	5	5	7.6	7.8	7.8	Ø	6.7	KL.	3.03	8.14	32	Ð	760	7.79	218	205	Ø	219	24.7	25,2	25.3	(a)	24.2	25.4	100
	B	5	5	5	5	3									<u></u>										<u> </u>				
	$\frac{C}{D}$	5	5	5	5	15																	·						
1.75		1-	5	廿	17	17			74				3 17	811		TAS	7.0	778	1.0		a	7 19		200	1252	A	24.7	254	<u> </u>
Q; Z 3	$\frac{n}{B}$	15	1	4	4	4	1-1-0	6.1	1.0	<u>עש</u>	6.7	<u> 2-1</u>	0.12		0.2		1.61	1-1	43	205			4.6	27.	(25.)			list.	- 80
	C	5	5	5	5	长																							100
	D	5	5	5	5	15																					-	1	150
Technician In	itials	Me	SH	5	M	16											e a unite								Bushka			C. (***********	
Animal Source:	T	nte/	na	L			-					Date	Rece	eived	:		v]F	7			-								
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	72 hrs	i		<u>ج</u>					1		4-2						2				×		•	Sar	Die	go, C	A 92	121	
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reshwater 96-hr A Client: Sample ID: Contact: Test #:	Acute with $\frac{\prod_{n}}{CA}$	ith R tern 	cnew L 7210	cDR	<u>A</u> .					96 I	Iour	To	cicit	y Te	st D Start End T	Date Date Date Cest C Test	& Ti & Ti & T)rgan Proto	t - A imc: imc: ism: ism: bcol:	МЕ 7 7 С.	125 125 125 125	1025	sny / / /	Labo E	157 13	017 250 145				·
									D.	0.					pl	1			. C	ondu	ctivi	ty		Test	Ten	perat	иге		
Concentration			Nu	mbe	r of				(mg	/L)				(pH u	nits)			(umho)s-cn)			(°	<u>C)</u>			%
4/5/2	Rep		Live (Orga	nism	S		24	Init.	Fm.	77	- 06		24	Init.	Fin.	72	- 11		Init.	1-in.	06		24	Init.	I'm.	72	- 11	Surv.
12 5	A	F	<u>-24</u> 5	40	14	50	75	179	40	40	$\frac{12}{2}$	<u>50</u>	2110	113	274	10	7/9	<u>יור ל</u>	218	205	(F)	214	147	251	256	A	200	27.4	(07)
16.1	B	5	5	3	2	3		<u></u>		er/	<u>, -</u>	<u>6.</u> T.	20		041	EX-	151	1-1-1				- 9		-,0	- 30		217	23-4	100
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	D	5	5	3	5	5																							100
25	<u> </u>	5	5	5	5	5	75	<u><u>Y.</u>]</u>	<u>ר .ר</u>	K)	6.2	61	8.16	8.11	8.28	(\mathcal{K})	769	224	217	204	(\mathcal{X})	215	24.6	25.1	25.7	$ \Phi $	24.5	25.4	100
	$\frac{B}{C}$	15	5	12	15	5							<u></u>		<u> </u>														100
	$\frac{c}{b}$	5	4	17	14	7					ann.																		80 80
<u> </u>	A	5	1	17	15	10	7.6	<u>h9</u>	7.8	$\widehat{\mathcal{M}}$	62	6.1	8.18	8.02	82	A	7.68	7.71	1017	203	Θ	217	24.4	240	1.25	B	24.6	254	0
	B	5	Z	2	I	1																							20
	С	5	4	4	4	4																							80
	D	15	5	5	15	5																							100
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Comments:	0 hrs:																												· ·
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S. CAPRICORNUTUM



Copper (II) Chloride Reference Toxicant Control Chart -Selenastrum capricornutum 96-hour Growth-Cell Density

Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/10/04	65.1499	61.1979	56.6993	52.2008	65.6964	70.1949
02/16/04	60.8128	61.1979	56.6993	52.2008	65.6964	70.1949
02/24/04	53.6442	61.1979	56.6993	52.2008	65.6964	70.1949
03/18/04	62.8955	61.1979	56.6993	52.2008	65.6964	70.1949
07/21/04	63.4870	61.1979	56.6993	52.2008	65.6964	70.1949

 Test Summary:
 Page 1 of 1

 Report Date:
 23 Aug-04 11:42 AM

 Link:
 11-5976-2294/040721scrt

AMEC Bioassay SD

Selenastrum Growth Test

Test:	11-3769-7805		Test Type:	Cell Growth	1		Duration:	4 Days 1 Hours
Start Date:	21 Jul-04 04:40 I	PM	Protocol:	EPA/821/R	-02-013 (200	02)	Species:	Selenastrum capricornutum
End Date:	25 Jul-04 05:40 I	PM	Dil Water:	Nutrient En	riched Wate	r	Source:	In-House Culture
Setup Date:	21 Jul-04 04:40 l	PM	Brine:	Not Applica	ble			
Sample:	06-3491-8014		Material:	Copper chi	oride		Client:	Internal
Sampled:	21 Jul-04 04:40 l	PM	Code:	040721scrt			Project:	
Received:	21 Jul-04 04:40 I	РМ	Source:	Reference	Toxicant			
Hold Time:	N/A		Station:					
Comparison	Summary							
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
02-5173-5804	4 Cell Density		<9.4	9.4		N/A	0.12874	Steel's Many-One Rank
Point Estima	ate Summary							
Analysis	Endpoint		% Effe	ct Cor	nc-µg/L	95% LCL	95% UCL	Method
11-4134-4405	5 Cell Density		10	37.6	52901	N/A	43.26496	Linear Interpolation
			20	44.0	9351	35.66358	49.40028	
			25	47.3	32576	38.93421	52.60694	
			50	63.4	87	56.68685	70.55373	
Cell Density	Summary							
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv
0	Lab Control	4	2384250.0	225500 0.0	2500000.0	57530.2	115060.	4.83%
9.4		4	2122250.0	201400 <i>V L</i>	2189000-(37712.4	75424.9	3.55%
18.8		4	2134500-0	204500 (.V	2247000.	0 52028.0	104056.	4.87%
37.5		4	2195000.0	181400 0.0	2606000.	0 173092.	346184.	15.77%
75		4	767500.0	574000. <i>O</i>	963000.0	106135.	212271.	27.66%
150		4	10750.0	9000.00	12000.0	629.152	1258.30	11.71%
Cell Density	Detail							
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	2500000	.0 2322000.0	2460000.0	225500('_)			
9.4		2014000	() 2189000.0	2139000.0	2147000.0			
18 8		204700(. <i>0</i> 2045000.0	224700C.U	2199000.0			
37 5		181400 û	203000°. d	2330000.0	260600 0.0	,		
75		574000.(939000.0	963000. (;	594000.C			
150		9000.00	11000.0	11000.0	12000.0			



											Comparison Report Date	1S: 	Page 1 of 1
CEII	IS R	eport									Analysis:	. 10 A	02-5173-5804
Selenastr	rum Grow	th Test										AMEC	Bioassay SD
Endpoint			Ar	nalysis Typ	e		Sample L	ink	Control	Link	Date Analyzed	Versio	1
Cell Dens	ity		Co	omparison			11-5976-2	2294	4 11-5976	-2294	18 Aug-04 9:06 A	M CETISV	1.024
Method			Al	tH Da	ta Transfo	rm	Z	N	OEL L	OEL	Toxic Units	ChV	MSDp
Steel's Ma	any-One F	Rank	С	>T Un	transforme	d		<	9.4 9	.4		N/A	12.87%
Test Acce	eptability												
Attribute			St	atistic	Lower L	imit	Upper Lin	nit	Decision				
Control C	V		0.0	0483			0.2		Passes a	cceptab	oility criteria		
Control Re	esponse		2E	+06	1E+06				Passes a	cceptab	ility criteria		
MSDp			0.1	1287	0.091		0.29		Passes a	cceptab	ility criteria		
ANOVA A	ssumptio	ons											
Attribute		Test		Sta	atistic	Crit	ical P	' Le	vel	Decisi	on(0.01)		
Variances		Bartlett		31.	94121	15.0	08628 0	.000	001	Unequ	al Variances		
Distributio	on 	Shapiro-Wil	k W	0.9	7371	0.88	3421 0	.747	752	Norma	I Distribution		
ANOVA T	able												
Source		Sum of S	Squares	Mean S	quare	DF	F Statist	ic	P Level		Decision(0.05)		
Between		1.8985E+	13	3.797E+	-12	5	117.03		0.00000		Significant Effect		
Error		5.8398E+	+11	3.244E+	10	18							
Total		1.9569E	+13	3.829E+	•12	23							
Group Co	ompariso	ns								_			
Control	VS	Conc-µg/	L	Statistic	Critica	1	P Level	1	lies	De	cision(0.05)		
Lab Contro	01	9.4		10	10		<=0.05)	Sig	nificant Effect		
		10.0		10	10		<=0.05)	Sig	nificant Effect		
		75		10	10		<=0.05)	Sic	mificant Effect		
		150		10	10		<=0.05	1	1	Sig	nificant Effect		
Data Sum	mary					Origir	nal Data				Transfo	rmed Data	20 mailte Die stationen aus für
Conc-µg/I	L Con	trol Type	Count	Mean	Minin	num	Maximum		 SD	Mean	Minimum	Maximum	SD
0	Lab	Control	4	2384256	22550	000	2500000	1	15060.				
9.4			4	2122250	20140	000	218900 0	7	5423.6				
18.8			4	2134506	20450	000	224700 <i>0</i>	1	04055.				
37.5			4	2195004	2 18140	000	260600 <i>0</i>	3	46185.				
75 4 f 0			4	767500.	57400	00.	963000.	2	12271.				
150			4	10750.0	9000.		12000.0	1	258.30		an a		
Cell Dens	ity												
	3000000				:				50000	רי			
τ	2500000	-							400000	D-1			
me								σ	300000	0-1			
sfor	2000000	<u>-</u>						tere	20000	D-			
tran	1500000-	-						Cent	100000	D-			
Uni								•	Crit	0	.*		
	1000000-	1							-100000	D -			
	500000-	1							-200000)-			
									-300000	2			
	0	0 0	4 19	8 37 5	75 10	50			-400000	2.0 -1	5 -10 -05 00 0	5 10 15	2.0
		5 5	Conc	-ua/I						2.0 1.	Rankite	1.0 1.3	2.0
			conc								Kalikits	-	

Fluorometric & Microscopic Determination of Cell Density Turner Fluorometer Model TD-700

Client :	nternal	
Sample ID:	Cuch	
/	10701	SCIPT

Test Species:	<u>S</u> .	caprilornutum
---------------	------------	---------------

Test Date: 7-21-04

Start/End Times: 16:40 / 17:40

Test No: 040721 SCRT

Analyst:	AH
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Random Number	Dilution	Cell Density (fluorometric) (cells/ml*10 ⁵)	Cell Density (microscopic) (cells/ml *10 ⁴)
Blank	NA		
Cal Check 1			
(NEW, Solid, Effluent Blanks)	0.00,7	0,00,2,18	
33		23.22	
34		20.14	
35		18.14	
36		21.41	
37		0.09	
38		21.99	
39		9.63	
40		20.45	
41		26.06	
42	1	23,30	
43		5.74	
44		21.89	
Cal Check 2		, ,	
(NEW, Solid, Effluent Blanks)		0,00,2.18	
45		20.30	
46		20.47	
47		9.39	
48		0,12	
49		21,39	
50		25.00	
51		22.47	
ちみ		0.11	
53		24.60	
54		5.94	
55		0.11	
56		12,55	
Cal Check 3 (NEW, Solid, Effluent Blanks)			

data entry OC-AH

Comments:

QC Check: AH 8-12-04

Final Review: Att 4- Arold

AMEC Earth & Environmental Bioassey Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

CETIS Worksheet

 Data Worksheet:
 Page 1 of 1

 Report Date:
 21 Jul-04 10:52 AM

 Link:
 11-5976-2294

Selenastrum Growth Test

AMEC Bioassay SD

Start Date: 21	1 Jul-	04		Species	Selenastru	m capricornut	um	Sample Code:	040721scrt
End Date: 25	5 Jul-	04		Protocol	: EPA/821/R	-02-013 (2002	2)	Sample Source:	Reference Toxicant
Sampled: 21	1 Jul-	04		Material	Copper chl	oride		Sample Station:	
Conc-µg/L C	Code	Rep	Pos	Cell Density	Absorbance	Biomass	Chlorophyll a		Notes
0	LC	1	50						
0	LC	2	33						
0	LC	3	53						
0	LC	4	56						
9.4		1	34						
9.4		2	44						
9.4		3	49						
9.4		4	36						
18.8		1	46						
18.8		2	40						
18.8		3	51						
18.8		4	38						
37.5		1	35						
37.5	•	2	45						
37.5		3	42					enne en contra d'aller de la contra de la cont	
37.5		4	41						
75		1	43						
75		2	47						
75		3	39						
75		4	54	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -				*****	
150		1	37						
150		2	55						
150		3	52						
150		4	48						

QC = Art

;



Freshwater Chronic Bioassay

Algal Growth	Inhibition	Workshee
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Client :	City of Buenaventura		
Sample ID:	A-2, B-1, B-3, C-2		
Test No:	0407-055, 056, 057, 058		

Test Species: S. capricornutum

Test Date: 07/21/2004

Analyst: A

Internal / 7-15-04

Stock Cell Density Measurements:

Source/Date Stock Culture Started:

(mean no. * 100,000)/(500,000) = x (dilution factor):

Prepare inoculum according to the dilution factor. This yields a solution with the desired cell density of 500,000 cells/ml.

Example: (35 * 100,000)/(500,000) = 7 (e.g. 25 ml Sele stock + 150 ml NEW)

Inoculate 1 ml into 3 initial count flasks containing 50 ml of NEW, stir and count on the hemacytometer. Flasks should contain a final density of 10,000 cells/ml \pm 10%.

Inoculum Cell Density	Confirmation Counts:		Mean: <u>1,3</u>
Test Initiation Time: Test Termination Time	<u>16;40</u> 17:40	1	·
Comments:			
QC Check:	AH 8-12-0-1	1	Final Review.

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

Freshwater Chronic Bioassay

Water Quality Measurements Algal Growth Inhibition

Test Species: S.capricornutum

Client :	Internal	Test Date: 07/21/2004
Sample ID:	CuCl ₂	
Test No:	040721scrt	Analyst: AH

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	Initial Readings				Final Readings	
Concentration	D.O. (mg/L)	Conductivity (umhos-cm)	Alkalinity (mg/L)	Hardness (mg/L)	D.O. (mg/L)	Conductivity (umhos-em)
Lab Control	7.4	110	16	36	9.6	125
. 9.4	6.6	97	7	9	9,0	97
18.8	(j. 8	97	1		8.9	103
37.5	6.5	97	13	9	8.7	101
75	6.7	96			8.4	101
150	¢.B	96			8.1	99

		0 Hour	24 Hour	48 Hour	72 Hour	96 Hour
pH/Temperature (°C):	Lab Control	7.46125.0	7.21 126.3	752 /260	9.22/25.9	9.08 1 24 8
pH/Temperature (°C):	9.4	7.29/25.0	7.15 126.6	7.39 125.7	8.78 / 26.6	8.751 24.8
pH/Temperature (°C):	18.8	7.501 250	7.11 127.0	7,32/25.7	7.81/26,2	8.71 1 24.8
pH/Temperature (°C):	37.5	7.41125.0	7.09126.9	7,30/255	7.87/26.1	8.991 248
pH/Temperature (°C):	75	7.321250	7.08/26.9	7.42/25.3	7,51/26.0	7.91248
pH/Temperature (°C):	150	1.28 1 25.0	7.07 126,9	7-24/25.3	7.18/26.2	7.30124.8
pH/Temperature (°C):		1	1	1	1	1

Comments:	FTurned up fan	speed at 24 hrs	ble temp > 24.0°C
QC Check:	AH 8-12-04	Final Review:	aft- 8/25/04

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

MARINE

A. AFFINIS



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
03/26/02	119.6742	163.6928	122.0258	80.3587	205.3598	247.0268
04/09/02	155.7269	163.6928	122.0258	80.3587	205.3598	247.0268
05/28/02	157.6964	163.6928	122.0258	80.3587	205.3598	247.0268
06/26/02	120.1115	163.6928	122.0258	80.3587	205.3598	247.0268
09/10/02	215.6806	163.6928	122.0258	80.3587	205.3598	247.0268
09/18/02	220.6823	163.6928	122.0258	80.3587	205.3598	247.0268
10/08/02	136.8843	163.6928	122.0258	80.3587	205.3598	247.0268
11/05/02	136.6628	163.6928	122.0258	80.3587	205.3598	247.0268
01/07/03	229.3396	163.6928	122.0258	80.3587	205.3598	247.0268
02/04/03	128.1337	163.6928	122.0258	80.3587	205.3598	247.0268
02/25/03	137.4615	163.6928	122.0258	80.3587	205.3598	247.0268
04/08/03	250.5491	163.6928	122.0258	80.3587	205.3598	247.0268
05/06/03	190.5418	163.6928	122.0258	80.3587	205.3598	247.0268
06/10/03	134.8645	163.6928	122.0258	80.3587	205.3598	247.0268
09/09/03	145.6062	163.6928	122.0258	80.3587	205.3598	247.0268
10/07/03	161.8443	163.6928	122.0258	80.3587	205.3598	247.0268
11/04/03	233.4041	163.6928	122.0258	80.3587	205.3598	247.0268
12/09/03	153.2281	163.6928	122.0258	80.3587	205.3598	247.0268
02/12/04	145.7969	163.6928	122.0258	80.3587	205.3598	247.0268
03/17/04	145.5798	163.6928	122.0258	80.3587	205.3598	247.0268
07/21/04	118.0799	163.6928	122.0258	80.3587	205.3598	247.0268



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
03/26/02	146.4188	177.5590	131.4703	85.3816	223.6477	269.7364
04/09/02	164.6897	177.5590	131.4703	85.3816	223.6477	269.7364
05/28/02	185.3288	177.5590	131.4703	85.3816	223.6477	269.7364
06/26/02	152.2438	177.5590	131.4703	85.3816	223.6477	269.7364
09/10/02	214.0064	177.5590	131.4703	85.3816	223.6477	269.7364
09/18/02	215.0769	177.5590	131.4703	85.3816	223.6477	269.7364
10/08/02	152.7364	177.5590	131.4703	85.3816	223.6477	269.7364
11/05/02	146.7005	177.5590	131.4703	85.3816	223.6477	269.7364
01/07/03	248.4452	177.5590	131.4703	85.3816	223.6477	269.7364
02/04/03	131.7939	177.5590	131.4703	85.3816	223.6477	269.7364
02/25/03	129.1648	177.5590	131.4703	85.3816	223.6477	269.7364
04/08/03	260.1567	177.5590	131.4703	85.3816	223.6477	269.7364
05/06/03	206.8016	177.5590	131.4703	85.3816	223.6477	269.7364
06/10/03	152.1667	177.5590	131.4703	85.3816	223.6477	269.7364
09/09/03	157.5385	177.5590	131.4703	85.3816	223.6477	269.7364
10/07/03	171.5624	177.5590	131.4703	85.3816	223.6477	269.7364
11/04/03	298.7089	177.5590	131.4703	85.3816	223.6477	269.7364
12/09/03	153.0860	177.5590	131.4703	85.3816	223.6477	269.7364
02/12/04	153.8089	177.5590	131.4703	85.3816	223.6477	269.7364
03/17/04	149.1393	177.5590	131.4703	85.3816	223.6477	269.7364
07/21/04	139.1653	177.5590	131.4703	85.3816	223.6477	269.7364

Test Summary:Page 1 of 2Report Date:18 Aug-04 10:22 AM

Link:

Internal

6 Days 23 Hours

Atherinops affinis

Aquatic Biosystems, CO

19-1876-8605/040721aart

AMEC N Bioassay

CETIS	S Report			
Pacific Top	smelt 7-d Survival and (Growth Test		
Test:	11-9894-1671	Test Type:	Growth-Survival (7d)	Duration:
Start Date:	21 Jul-04 02:30 PM	Protocol:	EPA/821/R-02-012 (2002)	Species:
End Date:	28 Jul-04 02:00 PM	Dil Water:	Laboratory Seawater	Source:
Setup Date	: 21 Jul-04 02:30 PM	Brine:		
Sample:	08-7990-1298	Material:	Copper chloride	Client:
Sampled:	21 Jul-04	Code:	040721aart	Project:
Received:	21 Jul-04	Source:	Reference Toxicant	

Station:

Comparison Summary Method MSDp Analysis Endpoint NOEL LOEL ChV Dunnett's Multiple Comparison 04-1077-0847 7d Proportion Survived 50 100 70,71068 0.16502 Steel's Many-One Rank 14-3680-6435 Mean Dry Weight-mg 100 200 141.42140 0.19197 Point Estimate Summary Analysis Endpoint % Effect Conc-µg/L 95% LCL 95% UCL Method 25 N/A Linear Regression 08-1811-3849 7d Proportion Survived 103.088 N/A 50 109.5876 N/A N/A 17-4645-6128 Mean Dry Weight-mg 10 78.07397 N/A 117,51190 Linear Interpolation 20 102.6644 43.79772 121.15560 25 108.7479 126.08340 66.25540 50 139.1653 119.28740 150.72230

7d Proportion Survived Summary

Hold Time: 14 Hours

Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv
0	Lab Control	5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%
25		5	0.76000	0.60000	1.00000	0.07483	0.16733	22.02%
50		5	0.88000	0.80000	1.00000	0.04899	0.10954	12.45%
100		5	0.72000	0.60000	1.00000	0.08000	0.17889	24.85%
200		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
400		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Mean Dry We	ight-mg Summa	ary						
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv
0	Lab Control	5	1.15440	0.94400	1.57600	0.11011	0.24621	21.33%
25		5	1.10560	0.90400	1.24000	0.06430	0.14377	13.00%
50		5	1.23240	0.99600	1.36200	0.06509	0.14556	11.81%
100		5	0.95680	0.74200	1.16600	0.07718	0.17258	18.04%
200		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
400		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

Approved By: Add Ardon

 Test Summary:
 Page 2 of 2

 Report Date:
 18 Aug-04 10:22 AM

 Link:
 19-1876-8605/040721aart

7d Proportion Survived Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	1.00000	0.80000	1.00000	0.80000	1.00000		
25		1.00000	0.80000	0.60000	0.60000	0.80000		
50		0.80000	1.00000	0.80000	0.80000	1.00000		
100		0.60000	1.00000	0.60000	0.80000	0.60000		
200		0.00000	0.00000	0.00000	0.00000	0.00000		
400		0.00000	0.00000	0.00000	0.00000	0.00000		
Mean Dry W	eight-mg Detail							
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	1.02400	0.94400	1.57600	1.12400	1.10400		
25		1.23400	1.02200	1.24000	0.90400	1.12800		
50		0.99600	1.22600	1.23600	1.36200	1.34200		
100		0.74200	0.89600	0.88200	1.16600	1.09800		
200		0.00000	0.00000	0.00000	0.00000	0.00000		
400		0.00000	0.00000	0.00000	0.00000	0.00000		

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Comparisons: Page 1 of 2 Report Date:

Analysis:

18 Aug-04 10:22 AM

SD⁰⁴⁻¹⁰⁷⁷⁻⁰⁸⁴⁷ AMEC NW Bioassay

Pacific Topsmelt 7-d Survival and Growth Test

Endpoint	Endpoint Analysis Type Sample Link								Date Analyzed	Version	
7d Proportion	Survived	Co	omparison		19-1876-	8605	19-1876	6-8605 1	18 Aug-04 10:20	AM CETISV	1.024
Method		AI	tH Data	Transform	Z	NO	EL L	OEL	Toxic Units	ChV	MSDp
Dunnett's Mu	Itiple Comparisor	n C	>T Angı	lar (Corrected)	50	1	100	2.00	70.71068	16.50%
ANOVA Ass	umptions						********		tear an shi shi var sand		****
Attribute	Test		Stati	stic Cri	itical I	P Leve	1	Decision	(0.01)		
Variances	Modified L	evene	2.69	729 3.8	9507 (0.04520)	Equal Va	riances		
Distribution	Shapiro-W	ilk W	0.920	078 0.8	9981 (0.03498	3	Normal D	istribution		
ANOVA Tabl	e								iki dagan yang bérkenan di sarak 1995		
Source	Sum of	Squares	Mean Squ	are DF	F Statis	tic	P Level	C	Decision(0.05)		
Between	5.69333	6	1.138667	5	60.81		0.00000	S	Significant Effect		
Error	0 44941	54	0.0187256	5 24							
Total	6.14275	137	1.1573929	9 29							
Group Comp	parisons										
Control	vs Conc-µg	/L	Statistic	Critical	P Level	MS	D	Decis	sion(0.05)		
Lab Control	25		2.12236	2.36	>0.05	0.2	042492	Non-	Significant Effec	:t	
	50		0.5503049	2.36	>0.05	0.2	042492	Non-	Significant Effec	t	
	100		2.633235	2.36	<=0.05	0.2	042492	Signi	ficant Effect		
	200		11.83778	2.36	<=0.05	0.2	042492	Signi	ficant Effect		
	400		11.83778	2.36	<=0.05	0.2	042492	Signi	ficant Effect		
Data Summa	ıry			Origi	inal Data				Transfo	ormed Data	
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	n SD		Mean	Minimum	Maximum	SD
0	Lab Control	5	0.92000	0.80000	1.00000	0.10	0954	1.25003	1.10715	1.34528	0.13043
25		5	0.76000	0.60000	1.00000	0.16	5733	1.06635	0.88608	1.34528	0.19113
50		5	0.88000	0.80000	1.00000	0.10	0954	1.20240	1.10715	1.34528	0.13043
100		5	0.72000	0.60000	1.00000	0.1	7889	1.02213	0.88608	1.34528	0.20444
200		5	0.00000	0.00000	0.00000	0.00	0000	0.22551	0.22551	0.22551	0.00003
400		5	0.00000	0.00000	0.00000	0.00	0000	0.22551	0.22551	0.22551	0.00003

Approved By:

Linear Regression: Page 1 of 1 Report Date:

Analysis:

18 Aug-04 10:22 AM

08-1811-3849

Pacific Top	osmelt 7-d Survi	val and Gr	rowth Test							AMEC NW Bioassay
Endpoint		An	alysis Type	3	Sample	Link Co	ntrol Link	Date An	alyzed	Version
7d Proportie	on Survived	Lin	ear Regress	sion	19-1876	-8605 19-	1876-8605	18 Aug-0	4 10:20 AN	CETISv1.024
Linear Reg	ression Options	5								
Model	Threshold	Option	Lower Thr	eshold Th	reshold Optim	ized Rev	veighted	Pooled G	roups H	eterogeneity Corr.
Log-Norma	I Control Th	reshold	0.08	Ye	s	Yes		No	N	0
Regression	n Parameters									
Parameter	Estimate	Std Er	ro r 95	% LCL	95% UCL	t Statistic	c P Leve	el De	cision(0.05	5)
Threshold	0.14667	0.0408	5 0.0	6660	0.22673	3.590	0.0370)1 Sig	nificant	
Slope	25.40111	16316.	80000 -31	955.52000	32006.32000	0.002	0.9988	6 No	t Significant	t
Intercept	-46.81221	32633.	59000 -64	008.65000	63915.03000	-0.001	0.9989	5 No	t Significant	t
Regression	n Summary					2				
Iters	Log Likelihood	Mu	Sigma	G Stat	chi-Sq	Critica	I P Le	vel De	ecision(0.0	5)
25	-34.23513	-1.84292	0.03937	15851	72.0 11.44874	35.172	47 0.978	313 No	on-Significa	nt Heterogeneity
Residual A	nalysis									
Attribute	Method		Stat	tistic	Critical	P Level	Decisi	on(0.05)		
Variances	Modified	Levene	1.65	5434	2.74006	0.19407	Equal	Variances		
Distribution	Shapiro-	/Vilk W	0.46	6062	0.91820	0.00000	Non-no	ormal Distri	bution	
Point Estin	nates									
% Effect	Conc-µg/L	95% LCL	95%	UCL						
25	103 088	N/A	N/A							
50	109.5876	N/A	N/A							
Data Sumn	nary			Cal	culated Variate	e(A/B)		_		
Conc-µg/L	Control Type	Count	Mean	Minimur	n Maximum	SE	SD	A	в	
0	Lab Control	5	0.92000	0.80000	1.00000	0.02236	0.10954	23	25	
25		5	0.76000	0.60000	1.00000	0.03416	0.16733	19	25	
50		5	0.88000	0.80000	1.00000	0.02236	0.10954	22	25	
100		5	0.72000	0.60000	1.00000	0.03651	0.17889	18	25	
200		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	25	
400		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	25	

Approved By Ald 8 2404

Comparisons: Report Date: 18 Aug-04 10:22 AM

Page 2 of 2 14-3680-6435

		cpon									Analysis:			14-3680-6435
Pacific Tops	smelt 7	7-d Surviva	al and G	rowth Test									AMEC	W Bioassay
Endpoint			Ar	nalysis Type)		Sample	Li	nk Cont	rol Link	Date Analyzed		Version	
Mean Dry W	eight-n	ng	Co	omparison			19-1876	-86	605 19-18	76-8605	18 Aug-04 10:21	1 AM	CETISv	1.024
Method			Al	tH Dat	a Transfo	rm	Z	٦	NOEL	LOEL	Toxic Units	Ch	V	MSDp
Steel's Many	-One F	Rank	С	> T Unt	ransforme	d			100	200	1.00	141	.42140	19.20%
ANOVA Ass	umpti	ons										unter anno anno		
Attribute		Test		Stat	tistic	Criti	cal	P	Level	Decisi	on(0.01)			
Variances		Modified Le	evene	4.40	0023	3.89	507	0.0	00552	Unequ	al Variances			
Distribution		Shapiro-Wi	lk W	0.90	0626	0.89	981	0.0	01466	Norma	I Distribution			
ANOVA Tab	le													
Source		Sum of	Squares	Mean So	uare	DF	F Statis	stic	c PLeve	əl	Decision(0.05)			
Between		8.450183	3	1.690037	,	5	76.67		0.0000	0	Significant Effec	t		
Error		0.529046	52	0.022043	86	24					-			
Total		8.979229	915	1.712080)2	29								
Group Com	oariso	ns												
Control	vs	Conc-µg/	Ľ	Statistic	Critical		P Level		Ties	De	cision(0.05)			
Lab Control		25		28	16		>0.05		0	No	n-Significant Effect	ct		
		50		32	16		>0.05		0	No	n-Significant Effect	ct		
		100		21	16		>0.05		0	No	n-Significant Effect	ct		
		200		15	16		<=0.05		1	Sig	nificant Effect			
		400		15	16		<=0.05		1	Sig	nificant Effect			
Data Summa	ary					Origin	al Data				Transf	orme	d Data	
Conc-µg/L	Con	trol Type	Count	Mean	Minim	um	Maximun	n	SD	Mean	Minimum	M	aximum	SD
0	Lab	Control	5	1.15440	0.9440	00	1.57600		0.24621					
25			5	1.10560	0.9040	00	1.24000		0.14377					
50			5	1.23240	0.9960	00	1.36200		0.14556					
100			5	0.95680	0.7420	00	1.16600		0.17258					
200			5	0.00000	0.000	00	0.00000		0.00000					
400			5	0.00000	0.000	00	0.00000		0.00000					

Approved By

Linear Interpolation: Page 1 of 1 Report Date: 18 Aug-04 10:22 AM Analysis:

4

17-4645-6128

AMEC W Bioassay

Pacific Topsmelt 7-d Survival and Growth Test

1 4 4 1 1 1										
Endpoint		Ar	alysis Type)	Sample	Link (Control Link	Date Analyzed	Version	
Mean Dry V	Veight-mg	Lir	near Interpol	ation	19-1876-	8605 1	19-1876-8605	18 Aug-04 10:21 AM	CETISv1.024	
Linear Inte	rpolation Optio	ns								
X Transfor	m Y Transf	orm Se	ed	Resamples	Expande	ed CL	Method			
Linear	Linear	76	07235	200	Yes		Two-Point Inte	rpolation		
Point Estin	nates									
% Effect	Conc-µg/L	95% LCL	95%	UCL						
10	78.07397	N/A	117.	51190						
20	102 6644	43.79772	121.	15560						
25	108.7479	66.25540	126.	08340						
50	139.1653	119.2874	0 150.	72230						
Data Sumn	nary			Cal	culated Varia	ate				
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	-		
0	Lab Control	5	1.15440	0.94400	1.57600	0.0502	6 0.24621			
25		5	1.10560	0.90400	1.24000	0.0293	5 0.14377			
50		5	1.23240	0.99600	1.36200	0.0297	1 0.14556			
100		5	0.95680	0.74200	1.16600	0.0352	3 0.17258			
200		5	0.00000	0.00000	0.00000	0.0000	0.00000			
400		5	0.00000	0.00000	0.00000	0.0000	0 0 0 0 0 0 0			

Approved By: A2012

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr., Suite B San Diego, CA 92121

Client:

Sample ID:

Test No:

040721aart

Internal

Cuch

Concentration		.(
Day	0	1	2	3	4	5	6	7
and the "logic second				Ini	tial			
рН	7.92	7.97	7.97	795	7.90	1.98	7.91	
DO (mg/L)	6.5	7.3	8.0	7.8	74	7.3	8.4	
Salinity (ppt)	30.9	30.0	1.08	30.0	20.1	20.2	296	
Temp (°C)	20.8	21.0	20.2	20.4	20.4	20.1	20.7	
				Fi	nal			
рН		7.73	7.70	7.76	7.72	1.86	7.83	7.81
DO (mg/L)		5.9	6.2	6.4	6.	6.4	6.3	6.1
Tomp (°C)		20.8	209	20.3	20.6	20.8	207	20.7

Concentration	2	-5 _	النور	<u> </u>				
Day	0	1	Ð	3	4	5	6	7
and the second					tlat		200.000	
pH	7.96	7.99	7.95	7.95	7.91	7.97	7.91	
DO (mg/L)	6.5	7.5	7.8	7.8	7.9	7.3	BiL	
Salinity (ppt)	303	79.8	30.0	30.D	30.	30.1	29.6	
Temp (*C)	20.8	21,0	20.3	20.5	70.4	20.2	20.2	
				FI	nal			
рН		7.72	7.70	7.76	7.74	7.86	7.83	7.82
DO (ing/L)		5.7	6.2	6.3	10.2	6.6	6.4	61
Temp (°C)		20.7	20.9	20.9	20.6	20.8	207	20.7

Concentration 50 Day 0 1 g 3 4 5 6 7 Initial 1.86 8.00 pН 7.95 DO (mg/L) 6.5 7.8 79 30.7 Salinity (ppt) 29.6 30.2 30.1 St Temp (°C) 20.3 207 20.4 20 20 1.79 7.76 7.76 pН 7.17 DO (mg/L) 6.26.66.4 6.4 Tomp (°C) 207 20

Test Species: <u>A.affins</u>

Test Date: 7 . 21.04

Start/End Times: 1420, 1400

Concentration	Ι ι	00	isal	L				
Day	0	1	20	3	4	5	6	7
				ini 🕬	tial			
рН	7.80	D.OC	7.46	7.45	7.93	7.94	7.91	
DO (mg/L)	65	7.8	79	7.8	7.9	7.3	8.1	
Salinity (ppt)	307	-29.5	29.9	30.0	30.0	30.0	29.5	* 8
Tomp (°C)	208	20.1	20.5	20.3	20.5	20.2	20.1	운운.
				Fl	nal		88	
рН		7.79	7.77	2.30	7.79	7.81	7.12	7,82
DO (mg/L)		6.2	65	6.6	6.9	6.6	6.6	6.0
Tomp (*C)		20.8	209	20.3	20.6	200	20.7	20.7

Concentration	2	.00	ма	K				
Day	0	1	20	3	4	5	6	1
					Itlal	88737XX	N. 1990 - 1	<u>.</u>
рН	7.87	8.00	7.96					
DO (mg/L)	6.6	7,8	7.9		1.]		19 di
Salinity (ppt)	30.2	29.1	29.3		1			a 4
Temp (°C)	20.3	20,0	20.3			44		× .
				FI	nal			1. A. S.
pH		7.74	7.81	7.82	1	1	\square	
DO (mg/L)		6.0	70	6.3	1			
Temp (°C)		20.8	20.3	20.8				

Concentration	4	W	ILAI	IL				
Day	0	1	25	3	4	5	6	1
				<u>Ini</u>	ial 💮	(986),) 	6,7997	
pH	7.83	8,00						8.
DO (mg/L)	67	7-8		N A				3
Salinity (ppt)	29.7	28.7		T A	Do			\$
Temp (°C)	20.9	20.1			$\overline{\langle}$	42		$\geq \mathbb{N}$
				Fli	ial	~~		
рН		7.76						
DO (mg/L)		6-1					~	
Tomp (°C)		20.8						

					0	1	2	3	4	5	6	7
Animal Source/Date Receive	nd: <u>ABS</u>	4.17.04	Analysts:	Initial:	NC	AH	Sit	SĦ	RY	Ru	RG	
Animal Age at Initiation:	14 20	ys		Final:		AH	nic	SH	R4	RS	SH	sh
Comments:	- 2AH 8-10-04	final revie	W: AR	Sid	01							

Kaw Datasheet Water Quality Measurements Marine Chronic Bioassay

		1	1 1	•	
Test	Species:	А	·al	101	5

Client Name:

Internal CuClz Test Date: 7.21.04

Sample ID:

Test No .: 040721aart

Conc.				S	urviva	I on Te	st Day	:		Percent		pan wt.	pan + fish	
(mull)	Rep.	0	1	2	3	4	5	6	7	Survival	-	(g)	(g)	
16	а	5	5	5	5	5	5	5	5	100		0.01673	0.02185	
	Ь	5	5	5	5	5	5	4	4	80	4	0.01564	0.02030	
	C	5	15	5	5	15	5	5	5	100		0.01580	805-00	
	d	5	5	4	4	4	4_	4	4	80		0.01659	0.02231	
	e	5	5	5	5	15	5	5	5		2	0.01750	0.02310	
25	a	5	12	5	5	5	5	5	5	100		0.01515	0 02132	
	D	5	12	<u> </u>	4	4	<u> </u>		4		2	0.01510	0.02021	
	C A	5	1-2	17	3	2	2	3	3	60		0.01774	0.00112	
	0	2	$\frac{2}{1}$	1.5	13	12	<u> </u>	<u>s</u> 2	1.3	80		0.01546	0.0110	
	6	2	4				1-1-		14	00		0.01473	0 01971	
50	a b	75	4	5	4	12-	7	5	5	100	1	0.01572	072185	
	C	5	6	4	<u> </u>	4	, ,	4	ч	80		0.01484	0 0202	
	Ь	5	14	4	4	1 L	4	4	4	80		0.01518	n. 02199	
	e	5	15	5	5	15	1	5	5	100	1.1	0.01585	0 02256	
IW	a	4	14	4	4	4	Ú Ú	3	3	60		0.01423	0.01794	
	Ь	5	15	5	5	5	5	5	5	100		0.01542	0.01992	
	с	5	3	3	3	3	3	3	3	60	•	0,01496	0.01937	
	d	5	4	4	4	4	14	4	4	80		0.01593	0.0-2176	
	e	5	14	3	3	3	13	3	3	60		0.01495	D.02044	
200	а	5	0	5	-	-	-	-	-	0				
	Ь	5	0	-	-	-	-	~	-	0				
	C	5	1	1	0	-		-	-	0				
	d	5	0	-		-		-	-	0	2			
	e	5	0	-	-					0	1.1			
400	a	5	0	-	·		-	-	-	0	-			
	Ь	5	0				-	-	-	0	5			
	c	5	0		-		-	-		0				
	d	~		-	-									
	е		10	-	-					0				
	a										1			·
	0			·.					<u> </u>	1	4.1			
	4		<u> </u>								1.1			
	e													
Tech Initials		H	AH	SH	SH	AH	RG	SH	Sit	1.1	178-1. 1	TR.		
						<u></u>		<u> </u>		data en	t	∕ Weigh	t Data:	
Feeding Time:	s (day):		0	1	2	3	4	5	6	AC=AI		Bate/Time in:	7.25.04	1400
-			-	0900	0800	0900	0900	0840	1150	KID	D	ate/Time out:	7.30.04	1100
			1630	1645	1605	1945	1945	1600	450	154 6	Ov	en Temp (*C):	64	
						0830						Tech Initials:	SD	
						140	C							
Comments:										_		QC Check:	AH 8-12-0	4.
										-	F	inal Review:	St 420	104
													11 1	

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

A. BAHIA



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
11/16/99	213.4836	244.0347	205.7966	167.5584	282.2729	320.5110
12/14/99	291.6667	244.0347	205.7966	167.5584	282.2729	320.5110
01/26/00	250.8225	244.0347	205.7966	167.5584	282.2729	320.5110
02/24/00	239.3480	244.0347	205.7966	167.5584	282.2729	320.5110
03/21/00	192.2609	244.0347	205.7966	167.5584	282.2729	320.5110
04/12/00	178.0284	244.0347	205.7966	167.5584	282.2729	320.5110
05/09/00	219.8663	244.0347	205.7966	167.5584	282.2729	320.5110
06/27/00	248.8758	244.0347	205.7966	167.5584	282.2729	320.5110
07/26/00	271.1359	244.0347	205.7966	167.5584	282.2729	320.5110
09/07/00	261.6690	244.0347	205.7966	167.5584	282.2729	320.5110
03/20/01	241.0452	244.0347	205.7966	167.5584	282.2729	320.5110
04/17/01	250.3929	244.0347	205.7966	167.5584	282.2729	320.5110
06/12/01	352.2854	244.0347	205.7966	167.5584	282.2729	320.5110
07/06/01	196.0457	244.0347	205.7966	167.5584	282.2729	320.5110
05/30/02	219.6604	244.0347	205.7966	167.5584	282.2729	320.5110
09/24/02	264.5316	244.0347	205.7966	167.5584	282.2729	320.5110
02/26/03	222.0363	244.0347	205.7966	167.5584	282.2729	320.5110
07/01/03	242.4652	244.0347	205.7966	167.5584	282.2729	320.5110
09/30/03	241.8166	244.0347	205.7966	167.5584	282.2729	320.5110
04/27/04	285.2941	244.0347	205.7966	167.5584	282.2729	320.5110
07/21/04	241.9988	244.0347	205.7966	167.5584	282.2729	320.5110

Copper (II) Chloride Reference Toxicant Control Chart -Americamvsis bahia 7-dav Survival



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
11/16/99	226.5416	238.1844	191.0675	143.9506	285.3014	332.4183
12/14/99	302.1623	238.1844	191.0675	143.9506	285.3014	332.4183
01/26/00	290.4538	238.1844	191.0675	143.9506	285.3014	332.4183
02/24/00	289.3590	238.1844	191.0675	143.9506	285.3014	332.4183
03/21/00	198.2542	238.1844	191.0675	143.9506	285.3014	332.4183
04/12/00	162.8546	238.1844	191.0675	143.9506	285.3014	332.4183
05/09/00	241.5893	238.1844	191.0675	143.9506	285.3014	332.4183
06/27/00	211.2319	238.1844	191.0675	143.9506	285.3014	332.4183
07/26/00	199.3708	238.1844	191.0675	143.9506	285.3014	332.4183
09/07/00	241.9449	238.1844	191.0675	143.9506	285.3014	332.4183
03/20/01	270.4733	238.1844	191.0675	143.9506	285.3014	332.4183
04/17/01	256.9593	238.1844	191.0675	143.9506	285.3014	332.4183
06/12/01	336.3583	238.1844	191.0675	143.9506	285.3014	332.4183
07/06/01	226.4535	238.1844	191.0675	143.9506	285.3014	332.4183
05/30/02	236.9212	238.1844	191.0675	143.9506	285.3014	332.4183
09/24/02	255.7012	238.1844	191.0675	143.9506	285.3014	332.4183
02/26/03	237.0166	238.1844	191.0675	143.9506	285.3014	332.4183
07/01/03	142.0844	238.1844	191.0675	143.9506	285.3014	332.4183
09/30/03	192.1008	238.1844	191.0675	143.9506	285.3014	332.4183
04/27/04	276.8337	238.1844	191.0675	143.9506	285.3014	332.4183
07/21/04	207.2086	238.1844	191.0675	143.9506	285.3014	332.4183

Page 1 of 2 Test Summary: 18 Aug-04 10:05 AM Report Date:

02-9063-5042/040721myrt Link:

AMEC NW Bioassay

Chronic Mys	id Survival and	Growth T	est					AMEC NW Bioassay		
Test: Start Date: End Date: Setup Date:	10-4928-7581 21 Jul-04 04:15 28 Jul-04 03:00 21 Jul-04 04:15	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Growth-Su EPA/821/F Laboratory Not Applica	rvival (7d) R-02-014 (20 Seawater able	02)	6 Days 22 Hours Americamysis bahia Aquatic Biosystems, CO			
Sample: Sampled: Received: Hold Time:	18-3168-7833 21 Jul-04 21 Jul-04 16 Hours		Material: Code: Source: Station:	Copper ch 040721my Reference	loride rt Toxicant		Internal			
Comparison	Comparison Summary									
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method		
03-6908-1828	3 7d Proportion	Survived	200	400)	282.84270	0.06373	Steel's Many-One Rank		
20-8659-2559	Mean Dry Wei	ight-mg	<25	25		N/A	0.10831	Steel's Many-One Rank		
Point Estima Analysis	te Summary Endpoint		% Effe	ect Co	nc-µg/L	95% LCL	95% UCL	Method		
15-2505-0324	7d Proportion	Survived	25	202	2.0274	N/A	N/A	Linear Regression		
			50	219	9.7444	N/A	N/A			
05-4210-8804	Mean Dry Wei	ght-mg	10	101	.9837	18.25370	114.04330	Linear Interpolation		
			20	127	7.6892	111.61590	141.29820			
			25	14(0.542	125.16390	153.77760			
			50	207	7.2085	185.17540	237.07120			
7d Proportio	n Survived Sum	imary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv		
0	Lab Control	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%		
25		8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%		
50		8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%		
100		8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%		
200		8	0.77500	0.40000	1.00000	0.07962	0.22520	29.06%		
400		8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%		
Mean Dry We	eight-mg Summa	ary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv		
0	Lab Control	8	0.31425	0.26200	0.34400	0.00920	0.02602	8.28%		
25		8	0.27550	0.23400	0.31400	0.01010	0.02858	10.37%		
50		8	0.29925	0.25400	0.33000	0.01058	0.02993	10.00%		
100		8	0.28525	0.24000	0.32400	0.01013	0.02864	10.04%		
200		8	0.16300	0.11200	0.23400	0.01589	0.04494	27.57%		
400	5/575 mm	8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%		

 Test Summary:
 Page 2 of 2

 Report Date:
 18 Aug-04 10:05 AM

 Link:
 02-9063-5042/040721myrt

/ a Proportio	To Proportion Survived Detail										
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
25		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
50		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		
200		0.40000	1.00000	0.80000	1.00000	0.60000	0.80000	1.00000	0.60000		
400		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
Mean Dry We	eight-mg Detail										
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Lab Control	0.34400	0.32800	0.29200	0.33400	0.31600	0.32000	0.26200	0.31800		
25		0.27800	0.28000	0.24600	0.25400	0.31400	0.29400	0.30400	0.23400		
50		0.31600	0.33000	0.30600	0.29800	0.30800	0.25400	0.32800	0.25400		
100		0.24000	0.27600	0.32400	0.29800	0.27400	0.25600	0.31000	0.30400		
200		0.11200	0.19200	0.20800	0.16200	0.12400	0.11800	0.23400	0.15400		
400		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		

 Comparisons:
 Page 1 of 2

 Report Date:
 18 Aug-04 10:05 AM

 Analysis:
 03-6908-1828

Chronic Mys	id Survival and	Growth	Test							AMEC	W Bioassay
Endpoint		A	nalysis Type		Sample L	.ink	Contro	Link [Date Analyzed	Version	1
7d Proportion	Survived	Co	omparison		02-9063-5	6042	02-906	3-5042 1	18 Aug-04 10:03	AM CETISV	1.024
Method		A	tH Data	Transform	Z	NC	DEL I	LOEL	Toxic Units	ChV	MSDp
Steel's Many-	One Rank	С	>T Angı	ular (Corrected	i)	200	0 4	400	0.50	282.84270	6.37%
ANOVA Assu	umptions										
Attribute	Test		Stati	istic Cr	itical P	Lev	el	Decision	n(0.01)		
Variances	Modified L	evene	16.1	9895 3.4	18823 0	.0000	00	Unequal	Variances		
Distribution	Shapiro-W	ilk W	0.52	369 0.9	92871 0	.0000	00	Non-norn	nal Distribution		
ANOVA Tabl	e										
Source	Sum of	Squares	Mean Squ	uare DF	F Statist	ic	P Level	ſ	Decision(0.05)		
Between	8.03209	5	1.606419	5	152.13		0.00000	5	Significant Effect		
Error	0.44349	68	0.010559	5 42							
Total	8.47559	175	1.6169784	4 47							
Group Comp	arisons										
Control	vs Conc-µg	/L	Statistic	Critical	P Level	Ti	es	Deci	sion(0.05)		
Lab Control	25		68	46	>0.05	1		Non-	Significant Effec	t	
	50		68	46	>0.05	1		Non-	Significant Effec	t	
	100		68	46	>0.05	1		Non-	Significant Effec	t	
	200		48	46	>0.05	3		Non-	Significant Effec	t	
	400		36	46	<=0.05	2		Signi	ificant Effect		
Data Summa	ry			Orig	inal Data				Transfo	ormed Data	
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SI	D	Mean	Minimum	Maximum	SD
0	Lab Control	8	1.00000	1.00000	1.00000	0.0	00000	1.34528	1.34528	1.34528	0.00019
25		8	1.00000	1.00000	1.00000	0.0	00000	1.34528	1.34528	1.34528	0.00019
50		8	1.00000	1.00000	1.00000	0.0	00000	1.34528	1.34528	1.34528	0.00019
100		8	1.00000	1.00000	1.00000	0.0	00000	1.34528	1.34528	1.34528	0.00019
200		8	0.77500	0.40000	1.00000	0.3	22520	1.08838	0.68472	1.34528	0.25171
400		8	0.00000	0 00000	0 00000	0.0	00000	0.22551	0 22551	0 22551	0.00003
Linear Regression: Page 1 of 1

15-2505-0324

Report Date: 18 Aug-04 10:05 AM

Analysis:

Chronic M	ysid Survival ar	nd Growth	Test							AMEC W Bioassa
Endpoint		An	alysis Type		Sample	Link C	ontrol Link	Date Ana	alyzed	Version
7d Proport	on Survived	Lin	iear Regress	ion	02-9063	-5042 02	2-9063-5042	18 Aug-0	4 10:03 AM	CETISv1.024
Linear Reg	gression Option	s								
Model	Threshold	d Option	Lower Thre	shold Thr	eshold Optim	ized Re	eweighted	Pooled G	roups He	terogeneity Corr.
Log-Norma	Control Th	reshold	0	Yes		Ye	s	No	No)
Regressio	n Parameters									
Parameter	Estimate	Std Er	ror 95%	6 LCL	95% UCL	t Statist	ic P Lev	el De	cision(0.05)	
Slope	18.47529	74.908	32 -12	8.34500	165.29560	0.247	0.821	10 Not	t Significant	
Intercept	-38.26762	172.36	860 -37	6.11000	299.57480	-0.222	0.838	56 Not	t Significant	
Regressio	n Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critic	al PLe	vel De	ecision(0.05)
15	-13.42492	-2.07129	0.05413	63.1523	36 10.17929	53.38	354 1.00	000 No	on-Significan	t Heterogeneity
Residual A	nalysis									
Attribute	Method		Stat	istic (Critical	P Level	Decis	ion(0.05)		
Variances	Modified	Levene	6.15	143 2	2.49362	0.00037	Unequ	al Variance	s	
Distribution	Shapiro-	Wilk W	0.61	779 0	.93992	0.00000	Non-n	ormal Distri	bution	
Point Estir	nates									
% Effect	Conc-µg/L	95% LCL	95%	UCL						
25	202.0274	N/A	N/A							
50	219.7444	N/A	N/A							
Data Sumr	nary			Calc	ulated Variate	e(A/B)				
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	в	
0	Lab Control	8	1.00000	1.00000	1.00000	0.00000	0.00000	40	40	
25		8	1.00000	1.00000	1.00000	0.00000	0.00000	40	40	
50		8	1.00000	1.00000	1.00000	0.00000	0.00000	40	40	
100		8	1.00000	1.00000	1.00000	0.00000	0.00000	40	40	
200		8	0.77500	0.40000	1.00000	0.04597	0.22520	31	40	
400		8	0 00000	0 00000	0.00000	0 00000	0 00000	0	40	

Approved By AFL \$2:

Page 2 of 2 Comparisons: Report Date: 18 Aug-04 10:05 AM

Analysis:

20-8659-2559

Chronic Mys	id Survival and	Growth	Test									AMEC N	Bioassay
Endpoint		Aı	nalysis Type			Sample L	.in	ik Contro	l Link	Date Analyzed		Version	
Mean Dry We	ight-mg	Co	omparison			02-9063-5	504	42 02-906	3-5042	18 Aug-04 10:04	AM	CETISv1	.024
Method		AI	tH Data	Transform		z][NOEL I	OEL	Toxic Units	Ch	/	MSDp
Steel's Many-	One Rank	С	> T Untra	ansformed			L	<25 2	25		N/A		10.83%
ANOVA Assu	umptions												
Attribute	Test		Stati	stic C	Critica	al P	Ľ	evel	Decisio	on(0.01)			
Variances	Modified Le	evene	3.63	540 3	.4882	23 0	.0	0802	Unequa	I Variances			
Distribution	Shapiro-W	lk W	0.95	309 0	.9287	'1 0	.0	8922	Normal	Distribution			
ANOVA Tabl	e												
Source	Sum of	Squares	Mean Squ	uare DF	:	F Statist	ic	P Level		Decision(0.05)			
Between	0.59280	68	0.118561	4 5		136.02		0.00000		Significant Effect			
Error	0.03660	847	0.000871	6 42									
Total	0.62941	529	0.119433	47									
Group Comp	arisons												
Control	vs Conc-µg	/L	Statistic	Critical	Ρ	Level		Ties	De	cision(0.05)			
Lab Control	25		44	46	<	=0.05		0	Sig	nificant Effect			
	50		56	46	>	0.05		3	No	n-Significant Effec	t		
	100		49	46	>	0.05		0	No	n-Significant Effec	t		
	200		36	46	<	=0.05		0	Sig	nificant Effect			
	400		36	46	<	=0.05		1	Sig	nificant Effect			
Data Summa	ry			Or	iginal	Data	_			Transfo	rme	d Data	
Conc-µg/L	Control Type	Count	Mean	Minimur	n I	Maximum		SD	Mean	Minimum	Ma	aximum	SD
0	Lab Control	8	0.31425	0.26200	(34400		0.02602					
25		8	0.27550	0.23400	C	0.31400		0.02858					
50		8	0.29925	0.25400	C	0.33000		0.02993					
100		8	0.28525	0.24000	C	0.32400		0.02864					
200	8		0.16300 0.11200 0		0.23400		0.04494						
400		8	0.00000	0.00000	C	0.00000		0.00000					



Linear Interpolation: Page 1 of 1 18 Aug-04 10:05 AM Report Date: Analysis:

05-4210-8804

Chronic Mysid Survival and Growth Test

AMEC N Bioassay

Childric in	ysia ourvivar ar	a oroman	1031						-
Endpoint		An	alysis Type	•	Sample i	_ink	Control Link	Date Analyzed	Version
Mean Dry V	Veight-mg	Lin	ear Interpola	ation	02-9063-	5042 (02-9063-5042	18 Aug-04 10:04 AM	CETISv1.024
Linear Inte	rpolation Optio	ns							
X Transfor	m Y Transf	orm See	ed	Resamples	Expande	ed CL	Method		
Linear	Linear	14(0176	200	Yes		Two-Point Inter	polation	
Point Estin	nates								
% Effect	Conc-µg/L	95% LCL	95%	UCL					
10	101.9837	18.25370	114.0	04330					
20	127.6892	111.61590) 141.2	29820					-
25	140.542	125.16390	153.	77760					
50	207.2085	185.17540	237.0	07120					
Data Sumn	nary			Cal	culated Varia	te			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD		
0	Lab Control	8	0.31425	0.26200	0.34400	0.0053	0.02602		
25		8	0.27550	0.23400	0.31400	0.0058	3 0.02858		
50		8	0.29925	0.25400	0.33000	0.0061	1 0.02993		
100		8	0.28525	0.24000	0.32400	0.0058	0.02864		
200		8	0.16300	0.11200	0.23400	0.0091	7 0.04494		
400		8	0.00000	0.00000	0.00000	0.0000	0.00000 00		
1									

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr., Suite B San Diego, CA 92121

Client:

Sample ID:

Test No:

LL Concontration 6 7 0 1 2 3 4 5 Day Initial 7.95 7.89780 7,87 pН 796 197 795 8.2 7.4 19 7,5 7.5 DO (mg/L) 29.3 30.6 21 30,2 29.7 30.0 Salinity (ppt) 153 150 75.2 Temp (*C) Final 7.737.677.727.747.847.90 5.05.4 57 6.0 5.7 51 249243243243244 824.7251 785 pH 5.5 DO (mg/L) Temp ("C)

<u>Linternal</u> - C. Clz <u>CuClz Reftox</u> oyotal MyRT

Concentration		7	50	410	•			
Day	0	1	2	3	4	5	6	7
				in la	lla		<u> </u>	
pH	17.96	797	796	7.95	190	7.90	1.80	
DO (mg/L)	8.1	7.5	7.6	7.6	1.4	7.7	211	
Salinity (ppt)	30.2	30.0	29.8	29.9	30.8	325	29.8	
Temp ("C)	75.L	25.3	25.0	25/	24.6	24,7	241	
				Fi	nal			
pH	יישיאיין איי	7.76	771	1.73	7.75	7.80	7.89	7.84
DO (mg/L)		5.3	5.5	5.6	5.7	5.7	5.1	5.7
Temp (°C)	-1	24.9	24.5	25.1	251	29.5	25.1	25 2

Concentration	Τ	5	0-99	12					
Day	0	1	2'	3	4	5	6	7	
				Ini	lial			<u>pana.</u>	
Ha	17.97	1797	7.95	7.95	2.89	291	7,85		
DO (mg/L)	80	75	7.6	25	7.5	7.7	7.2		
Salinity (ppt)	32.1	300	29.7	2010	30.9	30.5	29.7		
Tomp (°C)	25.2	25.3	250	25.1	24.4	24.7	24.1	L	
				Fl	nal				
pH		7.86	7.78	276	7.79	7.83	7.87	7.86	
DO (mg/L)	-1	5.7	58	5.7	53	5.0	5.2	5.4	
Temp (°C)	-1	250	24.5	25:2	251	29.7	25.1	25.2	

Water Quality Measurements Marine Chronic Bioassay

Test Species: _	Aberhia	•
Test Date:	7.21-04	
Start/End Times:	1615 / 1500	

Concentration	100 U4/L											
Day	0	1	2	3	14	5	6	7				
				Ini	tial		<u>in the state</u>					
рH	7.94	1796	7.95	7.95	7.89	7.92	785	1. 18				
DO (mg/L)	8.2	76	7.5	7,5	7.6	7.7	7.2					
Salinity (ppt)	249	29.8	29.6	29.8	31.0	304	29.5	88 S.				
Tomp (°C)	25.2	25.3	25.0	252	24.2	248	24.3					
				Fl	nal			22				
pH		7.88	7.82	7.31	7.80	7.80	1.87	753				
DO (mg/L)	-1	5.8	59	5.8	6.0	5.8	52	5.5				
Tomp ("C)		25.1	25.0	25.3	25.1	24.7	20.2	25.2				

Concentration	200 061-										
Day	0	1	2	3	4	5	6	7			
				Inl	tlal	1.2020.4		<u></u>			
рН	7.90	7.94	7.95	7.95	7.89	7.42	7,85				
DO (mg/L)	8.2	7.6	73	7.4	1.6	7.7	64	848 - C			
Salinity (ppt)	27.6	19.5	29.3	24.6	340	30,3	\$29.	19			
Temp (*C)	25.2	25.3	250	25.3	24,2	24.9	24.3	<u></u>			
				Fl	nal		Y	<u> 200 2</u>			
pН	1	7.88	7.82	7.81	7.79	7.90	7.87	7.36			
DO (mg/L)		5.8	Le.ć	5.9	59	5.7	SIL	5.5			
Temp (°C)		25.5	249	25.4	25.2	24.7	15,L	252			

Concentration	400 49/2											
Day	0	1	2	3	4	5	6	1				
				<u>Ini</u>	tial	<u>in an an</u>	<u>6 174 - 5</u>					
pH	7.91	7.94	7.95	7.95	7.89							
DO (mg/L)	8.1	712	7.4	7.4	7.6	ALK.		<u>.</u>				
Salinity (ppt)	294	29.3	28.7	29.3	30.9	\geq	00	Ś.				
Temp (°C)	25.1	25.3	25.0	25.1	24.0							
				Fi	nal		<u> </u>	W				
pH		78%	1.81	7,34	7.91	793						
DO (mg/L)		0.1	6.1	6.2	6.0	5.8						
Tomp (°C)		25.5	24.9	25.4	75.3	24.7	I					

1

5

ABS 7-21-04	Analysts:	Initiai:	Ry	m	re	3Ħ	AH	NAS	Ry		
ndays .		Final:		AH	LLC	SH	Ry	25	RG	SH	
	Final	revu	en:	e	y s	120/0	>4	G	X=k	28	-co-oy

Comments:

Animal Source/Date Received:

Animal Age at Initiation:

Client Name:

Sample ID:

<u>Internal</u> <u>CuCh</u> Test Date: <u>7-2(-04</u> <u>CuCh Reftox</u> Test No.: <u>040721MYRT</u>

Test Species: The bahaig A bahia

Conc.				S	urviva	l on Te	st Day:			Percent	pan wt.	pan + mysid	
(y/c)	кер.	0	1	102	3		5	6	7	Survival	(g)	(g)	
ic.	а	1105	5	845	5	5	5	5	5	100	0.01683	001855	
	b	14125	5	5	S	5	5	5	5	1	0.01742	201906	
	C	5	5	5	5	5	5	5	5		0.01775	0.01921	
	d	5	5	5	5	5	5	5	5		0.01846	0.02013	
	e	5	5	5	5	5	5	5	5		0.01810	001968	
	f	5	5	5	5	5	5	5	5		0.01863	0.02023	
	g	5	5	5	5	5	5	5	5		0.01733	0.018310	0.0181
	h	5	5	5	5	5	5	5	5		0.01677	0.01536	
25	а	5	5	5	5	5	5	5	5		0.01718	0.01857	
	Ь	5	5	K	5	5	5	5	5		0.01687	0.01827	
	С	5	5	5	5	5	5	5	5		0.01765	0.01858	
	d	5	5	5	5	5	5	2	5		0.01799	001926	
	е	5	5	5	5	5	5	.5	5		0.01883	0.02040	
	f	5	5	5	5	5	15	5	5		0.01758	0.01905	
	g	5	5	5	5	15	5	5	5		0.01760	0.01912	
	h	5	5	5	5	5	5	5	5		0.01910	0.02027	
50	а	4	5	5	5	5	5	5	5		0.01677	0.01835	
	b	7	5	5	5	5	5	5	5		0.01578	0.01743	
	С	5	5	5	5	5	5	5	5		0.01665	0.01814	
	d	5	5	5	5	5	5	5	5		0.01565	0.01714	50
	e	5	5	5	S	5	5	5	5		0.01743	0.0897	D.018
	f	5	5	5	5	5	5	5	5		0.01593	0.01720	
	g	5	5	5	5	5	5	5	5		0.01800	0.01944	
	h	5	5	5	5	5	3	5	5		0.01714	0.01841	
100	а	5	5	5	5	5	5	5	5		0.01740	0.01860	
	Ъ	5	5	5	5	5	5	5	5		0.01824	201962	
	C	5	5	5	5	5	5	5	5		0.01817	0.01979	
	d	ን	5	5	5	5	5	5	5		0.01874	0.02023	
	е	5	5	5	5	5	5	5	5		0.02038	0.02175	
	f	5	5	5	5	5	5	5	5		0.01873	0.02001	
	g	5	5	- 5	5	5	12	5	5		0.01769	0.01924	
	h	5	5	5	5	5	5	5	5	V	0.01985	0.62137	
Tech Initials		5pt	12	me	SH	AH	Ry	Kb	SH		me TP		
							•	•	6	data in	Weigh	t Data:	
Feeding Times	; (day):			1	2	3	4	5	6	OC-AH	Date/Time in:	1.2504/15	00
				0900	0800	0830	0900	0840	BIS	-	Date/Time out:	7.30 24/11	DD
			1630	lous	1605	1400	1945	1600	1545] 0	ven Temp (°C):	64	
											Tech Initials:	50	
												0.	
Comments:											QC Check:	JA 8-10-01	
						at the formula					Final Review:	••••••	

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

AMEC Earth and Environmental

Raw Datasheet

								Test S	pecies:	1A-6.	ahin	
Client Name:		12.	terna		LUC	2	_	Tes	st Date:	7-21-	07	
Sample ID:			Cuc	lz t	ref T	ok	_	Τe	est No.:	04072	IMYRT	
Conc	1	T			Surviva	l on Te	st Dav	•		Percent	nan wt	pan + mysid
(14/4)	Rep.	0	. 1	2	3	Δ	1 5		7	Survival	(a)	(a)
7.20	a	6	5	2	2	2	2	2	2	40	0.01538	001694
200	b	5	5	5	5	5	5	5	5	100	0.01776	001972
	С	5	5	4	4	4	4	4	4	80	0.01681	0.01785
	d	5	5	5	5	5	5	5	5	100	0.01677	0.01758
	e	5	5	4	14	4	ú	ų	SH#3	60	0.01951	0.02013
	f	5	5	5	4	4	Y Y	4	4	80	0.01708	0.01767
	g	5	5	5	5	5	5	13	5	100	0.01588	2.01705
	h	5	5	3	3	3	3	3	3	60	0.01970	0.02047
400	a	5	3			0		1-	1-	0		
	D)	5	3	10		5	-	-	0		
	C	5	5	0	-	-			-	0		
	a		5	3	2	10	+=		12	U	·	
	e	5	5	4			$ \mathcal{D} $			0		<u>``</u>
	-	5	>		0	-			-	5		
	y b	~~	313	2	1			-		0	ý }	<u> </u>
			154	5								<u>``</u>
	h											
	c											
	d						1					
	е				1		1					
	f				1		1	1			2	
	g						1					
	h					1					•	
	а					1			1			
	b											
	С										· .	
	d											
	е										,	
	f											
	g	-		~	ļ							
T	n											
lech Initials		sP	12	mL	SA	AH	Rg	PG	15H		4r-	
Feeding Times	(1)		•		•	•		-	•		Weigh	t Data:
reeding times	(uay):			Ma	2	3	4	5	6		Date/Time in:	1.28-04/1500
			-	100	0300	0830	0100	0840	0515	-	Date/Time out:	1.30.01/1100
			1650	472	1605	1400	1445	1000	1342	0	ven lemp (°C):	$\frac{\psi \varphi}{\zeta \lambda}$
											iech initials:	30
Comments:											OC Chack	le Gala al
											Final Review	10-0-04
-											That iteview.	

AMEC Earth & Environmental Bioassay Laboratory. 5550 Morehouse Dr., Ste. B. San Diego, CA 92121.

M. GALLOPROVINCIALIS



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
11/19/03	12.3871	10.9546	8.2828	5.6109	13.6264	16.2983
01/09/04	12.8695	10.9546	8.2828	5.6109	13.6264	16.2983
01/13/04	18.9772	10.9546	8.2828	5.6109	13.6264	16.2983
01/28/04	10.6652	10.9546	8.2828	5.6109	13.6264	16.2983
02/09/04	8.5635	10.9546	8.2828	5.6109	13.6264	16.2983
02/18/04	10.9125	10.9546	8.2828	5.6109	13.6264	16.2983
02/19/04	9.8502	10.9546	8.2828	5.6109	13.6264	16.2983
02/19/04	10.1785	10.9546	8.2828	5.6109	13.6264	16.2983
03/11/04	5.2015	10.9546	8.2828	5.6109	13.6264	16.2983
03/19/04	11.2668	10.9546	8.2828	5.6109	13.6264	16.2983
03/23/04	12.2223	10.9546	8.2828	5.6109	13.6264	16.2983
03/25/04	10.5523	10.9546	8.2828	5.6109	13.6264	16.2983
03/25/04	10.5526	10.9546	8.2828	5.6109	13.6264	16.2983
04/03/04	10.7501	10.9546	8.2828	5.6109	13.6264	16.2983
04/03/04	10.7501	10.9546	8.2828	5.6109	13.6264	16.2983
05/08/04	9.5887	10.9546	8.2828	5.6109	13.6264	16.2983
05/18/04	11.6112	10.9546	8.2828	5.6109	13.6264	16.2983
05/27/04	13.1982	10.9546	8.2828	5.6109	13.6264	16.2983
07/15/04	13.6066	10.9546	8.2828	5.6109	13.6264	16.2983
07/21/04	8.1711	10.9546	8.2828	5.6109	13.6264	16.2983
07/22/04	8.1716	10.9546	8.2828	5.6109	13.6264	16.2983

Copper (II) Chloride Reference Toxicant Control Chart -*Mytilus galloprovincialis* 48-hour Proportion Normal

Page 1 of 1 Test Summary: 23 Aug-04 11:36 AM Report Date: 09-2239-2847/040721mgrt Link:

Bivalve Larv	al Survival and	Developm	nent Test					AMEC Bioassay SD
Test: Start Date: End Date: Setup Date:	08-1505-6904 21 Jul-04 04:30 I 23 Jul-04 04:15 I 21 Jul-04 04:30 I	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Developme ASTM E72 Laboratory Not Applica	ent 4-98 (1999) Seawater able		Duration: Species: Source:	48 Hours Mytilis galloprovincialis Carlsbad Aquafarms
Sample: 03-5774-7642 Sampled: 21 Jul-04 04:30 PM Received: 21 Jul-04 04:30 PM Hold Time: N/A			Material: Code: Source: Station:	Copper chi 040721mg Reference	loride rt Toxicant	an a	Client: Project:	Internal
Comparison Analysis 19-1123-3877	Summary Endpoint Proportion Not	rmal	NOEL 5	L0 10	EL	ChV 7.07107	MSDp 0.16829	Method Steel's Many-One Rank
Point Estima Analysis 03-8913-8180	te Summary Endpoint Proportion Nor	mal	% Effe 25 50	ect Co 7.3 8.1	nc-µg/L 26438 71054	95% LCL N/A N/A	95% UCL N/A N/A	Method Linear Regression
Proportion N	ormal Summary	/ 						
0 2.5 5 10 20 40	Lab Control	керs 5 5 5 5 5 5 5 5	0.83200 0.83000 0.83000 0.08800 0.08800 0.00000 0.00000	0.77000 0.79000 0.66000 0.00000 0.00000 0.00000	0.93000 0.86000 0.91000 0.29000 0.00000 0.00000	n SE 0.02691 0.01183 0.04593 0.05435 0.00000 0.00000	0.06017 0.02646 0.10271 0.12153 0.00000 0.00000	7.23% 3.19% 12.38% 138.10 0.00% 0.00%
Proportion N	ormal Detail							
Сопс-µg/L 0 2.5 5 10 20 40	Control Type Lab Control	Rep 1 0.83000 0.79000 0.81000 0.00000 0.00000 0.00000	Rep 2 0.93000 0.86000 0.87000 0.29000 0.00000	Rep 3 0.80000 0.82000 0.66000 0.04000 0.00000 0.00000	Rep 4 0.83000 0.84000 0.91000 0.11000 0.00000 0.00000	Rep 5 0.77000 0.84000 0.90000 0.00000 0.00000 0.00000		

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CETIS Report								Comparisor Report Date Analysis:	ns: 2: 19 Aug	Page 1 of 1 -04 11:21 AM 19-1123-3877
Bivalve Larv	al Survival an	d Develop	ment Test						AMEC E	Bioassay SD
Endpoint		A	nalysis Type		Sample L	ink Cont	rol Link E	Date Analyzed	Version	1
Proportion No	ormal	Co	omparison		09-2239-2	847 09-22	39-2847 1	9 Aug-04 11:21	AM CETISV	1.024
Method		A	t H Data	a Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-	One Rank	С	>T Ang	ular (Corrected	1)	5	10	20.00	7.07107	16.83%
ANOVA Assu	umptions									
Attribute	Test		Stat	istic Cr	itical P	Level	Decision	(0.01)		
Variances	Modified	Levene	7.59	174 3.8	39507 0.	00021	Unequal	Variances		
Distribution	Shapiro-	Wilk W	0.89	0.8	89981 0.	00920	Non-norm	nal Distribution		
ANOVA Tabl	e									
Source	Sum	of Squares	s Mean Sq	uare DF	F Statisti	c P Leve	el C	Decision(0.05)		
Between	7.718	348	1.54367	5	123.03	0.0000	00 5	Significant Effect		
Error	0.301	1282	0.012547	0 24						
Total	8.019	47579	1.556216	6 29						
Group Comp	arisons									
Control	vs Conc-	µg/L	Statistic	Critical	P Level	Ties	Decis	sion(0.05)		
Lab Control	2.5		30	16	>0.05	2	Non-	Significant Effect	t	
	5		29	16	>0.05	1	Non-	Significant Effect	t	
	10		15	16	<=0.05	2	Signi	ficant Effect		
	20		15	16	<=0.05	2	Signi	ficant Effect		
	40		15	16	<=0.05	2	Signi	ficant Effect		
Data Summa	ry			Orig	inal Data		_	Transfo	rmed Data	
Conc-µg/L	Control Typ	e Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	5	0.83200	0.77000	0.93000	0.06017	1.15448	1.07062	1.30303	0.08873
2.5		5	0.83000	0.79000	0.86000	0.02646	1.14665	1.09476	1.18730	0.03486
5		5	0.83000	0.66000	0.91000	0.10271	1.15702	0.94826	1.26610	0.12976
10		5	0.08800	0.00000	0.29000	0.12153	0.24163	0.05002	0.56868	0.21869
20		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
40	0 5		0.00000	0.00000	0.00000	0.00000	0.14137	0.11204	0.19013	0.03910

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Linear Regression: Page 1 of 1 Report Date: 19 Aug-04 11:21 AM

Analysis:

03-8913-8180

Bivalve Larval	Survival and	Development	Test

AMEC Bioassay SD

Endpoint		An	alysis Type			Sample	Link	Contro	ol Link	Date Ana	alyzed	Version
Proportion	Normal	Lin	ear Regress	ion		09-2239	9-2847	09-223	9-2847	19 Aug-0	4 11:21	AM CETISv1.024
Linear Reg	ression Option:	s										
Model	Threshold	d Option	Lower Thre	shold T	hreshol	d Optim	nized	Reweig	ghted	Pooled G	roups	Heterogeneity Corr.
Log-Norma	Control Th	ireshold	0.168	Y	'es			Yes		No		Yes
Regression	n Parameters											i persona de la construcción de la
Parameter	Estimate	Std Err	or 95%	6 LCL	95%	UCL	t Sta	tistic	P Leve	l De	cision(0.	.05)
Threshold	0.16900	0.0253	5 0.1	1656	0.221	44	6.667		0.0068	8 Sig	nificant	
Slope	14.23418	44.083	32 -76.	95911	105.4	2750	0.323		0.7679	7 Not	Significa	ant
Intercept	-7.98553	44.080	14 -99.	17226	83.20	119	-0.18	1	0.86779	9 Not	Significa	ant
Regression	n Summary											
Iters	Log Likelihood	Mu	Sigma	G St	at (Chi-Sq	C	itical	P Lev	vel De	cision(0	0.05)
9	-71.93989	-0.56101	0.07025	41.0	4505	105.5219	90 35	.17247	0.000	00 Sig	gnificant	Heterogeneity
Residual Analysis												
Attribute	Method		Stati	istic	Critica	al	P Leve	1	Decisio	on(0.05)		
Variances	Modified	Levene	12.5	4905	2.7400)6	0.0000	2	Unequa	al Variance	s	
Distribution	Shapiro-V	Wilk W	0.63	268	0.9182	20	0.0000)	Non-no	rmal Distri	bution	
Point Estin	nates											
% Effect	Conc-µg/L	95% LCL	95%	UCL								
25	7.326438	N/A	N/A									
50	8.171054	N/A	N/A									
Data Summ	nary			C	alculated	d Variate	e(A/B)			_		
Conc-µg/L	Control Type	Count	Mean	Minim	um Ma	aximum	SE	S	D	- A	в	
0	Lab Control	5	0.83200	0.7700	0.9	93000	0.012	228 0	.06017	416	500	
2.5		5	0.83000	0.7900	3.0 C	36000	0.005	540 0	.02646	415	500	
5		5	0.83000	0.6600	2.0 C	91000	0.020	097 0	.10271	415	500	
10		5	0.08800	0.0000	0.2	29000	0.024	81 0	.12153	44	500	
20		5	0.00000	0.0000) O.C	00000	0.000	000 0	.00000	0	500	
40		5	0.00000	0.0000	0.0	00000	0.000	000 0	.00000	0	74	

Approved By APA 220

Bivalve Larval Surviv	val ar	nd De	evelopment Tes	t	AMEC Bioassay SD
Start Date: 21 Jul-04	4		Species:	Mytilis galloprovincialis	Sample Code: 040721mgrt
End Date: 23 Jul-04	4		Protocol:	ASTM (1993)	Sample Source: Reference Toxicant
Sampled: 21 Jul-04	4		Material:	Copper chloride	Sample Station:
Conc-µg/L Code R	Rep	Pos	# Counted	# Normal	Notes
0 LC	1	311	100	83	
0 LC	2	301	100	93	
0 LC	3	329	100	80	
0 LC	4	315	100	83	
0 LC	5	309	100	77	
2.5	1	317	100	79	
2.5	2	321	100	86	
2.5	3	319	100	82	
2.5	4	314	100	84	
2.5	5	302	100	84	
5	1	325	100	81	
5	2	320	100	87	
5	3	322	100	66	
5	4	312	100	91	
5	5	306	100	90	
10	1	328	100	υ	
10	2	318	100	29	
10	3	303	100	4	
10	4	326	100	<u>.</u> ()	
10	5	327	100	0	
20	1	308	100	0	
20	2	330	100	0	
20	3	307	100	0	
20	4	324	100	0	
20	5	304	100	0	
40	1	310	7	0	
40	2	305	19	0	
40	3	316	20	0	
40	4	323	20	0	
40	5	313	8	0	

QC= AH

CETIS Worksheet

Analyst: AH



Link:

CETIS	5 Worl	ksh	eet						Report Date:	19 Jul-04 2:44 PM 09-2239-2847
Bivalve Lar	val Survival a	and De	evelopment Te	est						AMEC Bioassay SD
Start Date: End Date: Sampled:	21 Jul-04 23 Jul-04 21 Jul-04		Species Protocol Material	Mytilis gallc : ASTM (199. : Copper chlor	vincialis		Sample (Sample S Sample S	Code: Source Station	040721mgrt Reference Toxica	ant
Conc-µg/L	Code Rep	Pos	# Counted	# Normal	. }	2. 10al	ſ	Not	25	
		301 302	89 123	84	12 12	100 0	34	SVJ		
		303 304	104	1292-18	8		0	1		
		305	19	0	8	iq	0	V		
		307	104	0	12	100	0	KG		
		308	105	0	18	100	0	+-+		
		310	0	96	125	700		-++		
		311	106	91	12	126	83	-+-+		
		312	100	84	RS-	100	91			
		313	4	0	28	. 8	Ö,			
-		314	109	80	22	/ 00	84			
		315	101	64	12	100	83			
		316	32	°	(B)	20	D			
		317	100	57	12	1,00	79			
		310	112	52	12	100	1 6	5		
		320	42		<u></u>	100	;	1-1-		
		321	NOS	795	18	(1)()				
		322	103	27	22	100	6			
		323	28	0	28	10	¥ (5		
		324	104	Ď	B	100		Ø		
		325	94	84	NS	100	B			
		326	98	0	es.	/00				
		327	111	0	NS	100	O			
		328	78	0	28	100				
		329	125	65	Re AC	/00	1 8	\tilde{o}	V	
		330	102	0	125	101				

data entry ac=AH

Analyst: RS

Data Worksheet:

Page 1 of 1



Bivalve Development Bioassay Worksheet
Client: $(i \neq y \text{ of } Buenaventura}$ Start Date/Time: $7/21/64/16i30$ Test No.: $040721 \text{ mgrt} 0407-043 \rightarrow 046$ End Date/Time: $7/20/04/16:15$ Test Species: $M.galloprovincialis$ Date Received: $7/20/04$
Sample Type: Andient Water
Test Chamber Type and Sample Volume: Shell Vicits, 10m1
Spawn Initiation Time:
Male Female Number of Spawners: /
Spawn Condition: Fair
Fertilization Time:
Egg Stock Density Calculation:
Eggs Counted (x): $\begin{array}{c} 6 \\ 7 \\ 17 \\ 15 \\ 16 \\ 16 \\ 11 \\ 17 \\ Mean \\ 11 \\ 17 \\ Mean \\ 1 \\ 12.7 \\ Overall Mean: \\ 11.6 \\ 11.6 \\ \end{array}$
Mean: $11.6 \times 42 = 487.7 \text{ eggs/ml}$
Initial Stock - $\frac{487}{200}$ eggs/ml = $\frac{1.22}{1.22}$ $\frac{100}{1.22}$ moder Inoculum Stock - $\frac{487}{200}$ eggs/ml $\frac{1.22}{1.22}$ $\frac{100}{1.22}$ moder Percent Division Upon Inoculation: $\frac{90}{10}$ Time of Inoculation: $\frac{1630}{100}$
Comments: AMEC Bioassay Laboratory 5550 Morehouse Drive, Suite B San Diego, CA 92121 (858) 458-9044

Marine Chronic Bioassay

Water Quality Measurements

Raw Datasheet

Internal Client: Sample ID: CUC/2 Test No.: 040721 mgRT

Test Species: <u>M. galleprovincial</u>is Start/End Dates: <u>7-21-04</u>/<u>7-23-04</u> Start/End Times: <u>1630/1615</u>

Concentration	Te	Temperature			Salinity	'	Disso	Dissolved Oxygen			рН		
19/2		(°C)			(ppt)			(mg/L)		(pH units)			
	0	24	48	0	24	48	0	2.4		0	24	48	
Lab Control	15.0	14.9	14.3	34	34.6	34.7	8.1	8.0	8.2	8.02	7.99	7.93	
2.5	15.0	14.2	14.2	34	34.6	34.6	8.1	8.2	8.3	8.02	7.99	7,93	
5	15.0	14.2	14.2	34	34.6	34.6	8.0	4.2	8.3	8.02	7,98	7.94	
10	15.0	14.3	14.2	34	34.6	34.6	8.1	8-2	5.3	8:01	7.98	7.94	
20	11.0	14.4	14.2	34	34.5	34.6	8.1	8.2	5.4	8.01	7.98	7.94	
40	1.5.2	14.7	14.6	33	34.7	34.7	8.0	8.1	8.3	8.00	7.98	7.94	
					1								
								1					
					-		1						
											1		

Technician Initials:

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24 48 AH me

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Th

Animal Source/Date Received:

Mission Bay Collected 7/20

Test Summary: Page 1 of 1 Report Date: 23 Aug-04 11:38 AM Link: 10-6041-7464/040722mgrt

Bivalve Lar	val Survival and	Developn	nent Test					AMEC Bioassay SD
Test: Start Date: End Date: Setup Date:	10-0748-9302 22 Jul-04 05:00 24 Jul-04 03:00 22 Jul-04 05:00	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Developme ASTM E72 Laboratory Not Applica	ent 24-98 (1999) Seawater able)	Duration: Species: Source:	46 Hours Mytilis galloprovincialis Field Collected
Sample: 06-7117-4213 Sampled: 22 Jul-04 05:00 PM Received: 22 Jul-04 05:00 PM Hold Time: N/A		PM PM	Material: Code: Source: Station:	Copper chloride 040722mgrt Reference Toxicant			Client: Project:	Internal
Comparisor Analysis	Summary Endpoint		NOEL	LO	EL	ChV	MSDp	Method
14-6839-791	6 Proportion No	rmal	2.5	5		3.53553	0.06057	Steel's Many-One Rank
Point Estima Analysis 12-5495-947	ate Summary Endpoint 5 Proportion Not	rmal	% Effe	ect Co	nc-µg/L 46125	95% LCL 5.88542	95% UCL 7.36043	Method Linear Regression
			50	8.1	70764	7.52133	8.66711	
Proportion N	Normal Summary	/						
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	cv
25	Lab Control	5	0.90600	0.87000	0.93000	0.01122	0.02510	2.77%
5		5	0.82800	0.75000	0.86000	0.02019	0.03421	4 13%
10		5	0.21000	0.14000	0.31000	0.03536	0.07906	37.65%
20		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
40		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Proportion N	lormal Detail							
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	0.92000	0.87000	0.89000	0.93000	0.92000		
2.5		0.80000	0.89000	0.88000	0.85000	0.75000		
5		0.78000	0.81000	0.86000	0.86000	0.83000		
10		0.14000	0.17000	0.28000	0.15000	0.31000		
20		0.00000	0.00000	0.00000	0.00000	0.00000		
40		0.00000	0.00000	0.00000	0.00000	0.00000		

-

7.87171707

Total

Comparisons: 19 Aug-04 11:26 AM Report Date:

Version

ChV

3.53553

CETISv1.024

Page 1 of 1 14-6839-7916

AMEC Bioassay SD

MSDp

6.06%

	(epon								Analysis:	
Bivalve Larval S	Survival and Devel	opmei	nt Test							
Endpoint		Analy	sis Type		Sampl	e Lin	k Contr	ol Link	Date Analyzed	
Proportion Norma	al	Comp	arison		10-604	1-746	64 10-604	1-7464	19 Aug-04 11:25	5 AM
Method		Alt H	Data Trans	form	Z	1	NOEL	LOEL	Toxic Units	Ch
Steel's Many-On	e Rank	C > T	Angular (Co	prrected)		1	2.5	5	40.00	3.53
ANOVA Assum	ptions									
Attribute	Test		Statistic	Criti	ical	PL	evel	Decisi	on(0.01)	
Variances	Bartlett		32.12762	15.0	8628	0.00	0001	Unequ	al Variances	
Distribution	Shapiro-Wilk W		0.98513	0.89	981	0.94	662	Norma	I Distribution	
ANOVA Table										
Source	Sum of Squar	res	Mean Square	DF	F Stat	istic	P Leve	I	Decision(0.05)	
Between	7.794126		1.558825	5	482.1	7	0.0000	0	Significant Effect	t
Error	0.07759104	(0.003233	24						

1.5620581

Group Comparisons Control vs Conc-µg/L Statistic Critical P Level Ties Decision(0.05) Lab Control 2.5 17.5 16 >0.05 2 Non-Significant Effect 5 15 16 <=0.05 2 Significant Effect 10 15 16 <=0.05 1 Significant Effect 15 <=0.05 2 20 16 Significant Effect 40 15 16 <=0.05 2 Significant Effect Data Summary **Original Data Transformed Data** SD Maximum Conc-ua/L Control Type Count Mean Minimum Maximum Mean Minimum SD

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eene pg.e		•••uiii	moun	a.	maximum		moun	am	maximani	
0	Lab Control	5	0.90600	0.87000	0.93000	0.02510	1.26116	1.20193	1.30303	0.04218
2.5		5	0.83400	0.75000	0.89000	0.05857	1.15545	1.04720	1.23273	0.07767
5		5	0.82800	0.78000	0.86000	0.03420	1.14455	1.08259	1.18730	0.04503
10		5	0.21000	0.14000	0.31000	0.07906	0.47086	0.38350	0.59050	0.09608
20		5	0.00000	0.00000	0.00000	0.00000	0.05074	0.05002	0.05363	0.00161
40		5	0.00000	0.00000	0.00000	0.00000	0.09593	0.07077	0.11204	0.01801



		-							Line Reps	ar Regres ort Date:	ssion: 19	Pa 9 Aug-04	ige 1 of 1 11:26 AM
CEII	2 Kebo	rt –							Anal	ysis:		12-5	495-9475
Bivalve La	arval Survival an	d Developr	nent Test								AN	NEC Bioa	ssay SD
Endpoint		An	alysis Type		Sample	Link	Contro	ol Link	Date An	alyzed	Ve	rsion	
Proportion	Normal	Lin	ear Regressior	ו	10-6041-7464 10-604		11-7464	19 Aug-0	4 11:26 A	M CE	TISv1.02	4	
Linear Re	gression Option	s											
Model	Threshold	d Option	Lower Thresh	old Thre	shold Optim	ized	Reweig	ghted	Pooled G	roups	Hetero	geneity (Corr.
Log-Norma	al Control Th	nreshold	0.094	Yes		٢	Yes		No		Yes		
Regressio	n Parameters												
Parameter	Estimate	Std Err	or 95% l	.CL 9	95% UCL	t Stati	istic	P Leve	i De	cision(0.0	05)		
Threshold	0.13143	0.01367	7 0.103	16 (0.15970	9.618		0.00239	9 Sig	nificant			
Slope	8.10604	0.97868	8 6.081	49 1	10.13060	8.283		0.00369	Sig	nificant			
Intercept	-2.39484	0.96156	-4.383	- 999	0.40570	-2.491		0.08844	t No	t Significa	nt		
Regressio	n Summary												
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Cri	tical	P Lev	el De	ecision(0.	.05)		
8	-398.41990	-0.29544	0.12336	0.06238	39.20660	35.	17247	0.038	87 Si	gnificant H	Heterog	eneity	
Residual A	Analysis												
Attribute	Method		Statist	ic C	ritical	P Level		Decisio	on(0.05)				
Variances	Modified	Levene	8.0381	5 2	.74006	0.00032		Unequal Variances		es			
Distribution	n Shapiro-	Wilk W	0.7751	9 0	.91820	0.00004		Non-no	rmal Distr	ibution			
Point Esti	mates												
% Effect	Conc-µg/L	95% LCL	95% UC	CL									
25	6.746125	5.88542	7.36043	3									
50	8.170764	7.52133	8.66711										
Data Sum	mary			Calcu	ulated Variate	e(A/B)			-				
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	5	SD	Α	в			
0	Lab Control	5	0.90600	0.87000	0.93000	0.005	12 0	0.02510	453	500			
2.5		5	0.83400	0.75000	0.89000	0.011	95 C	0.05857	417	500			
5		5	0.82800	0.78000	0.86000	0.006	98 C	0.03420	414	500			
10		5	0.21000	0.14000	0.31000	0.016	14 C	0.07906	105	500			
20		5	0.00000	0.00000	0 00000	0.000	00 C	0.00000	0	487			
40		5	0.00000	0.00000	0.00000	0.000	00 C	00000.	0	150			

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CETIS™ v1.024

Approved By: 271 5/240

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000-089-124-1

Bivalve Lan	val Survival a	and Development Test	:
Start Date:	22 Jul-04	Species:	Mytilis galloprovi

JETIS Worksheet

Data Worksheet: Page 1 of 1 22 Jul-04 11:07 AM Report Date: Link: 10-6041-7464/040722mgrt

AMEC Bioassay SD

Start Date:	22 Jul-	04		Species:	Mytilis gallopro	vincialis	te de la companya de	Sample Code:	040722mgrt	
End Date:	24 Jul-	04		Protocol:	ASTM (1993)	999		Sample Source:	Reference Toxicant	
Sampled:	22 Jul-	04		Material:	Copper chlorid	e		Sample Station:		
Campion					# Manual		A 14 1			
Conc-µg/L	Code	кер	Pos	# Counted	# Normai	~	() Watter	Norm Note		
			- 14 	.100176-	727	2	100	97 97		
	0 LC	2	4		-0-		100	87		
		3	17	105		2	100	89		
		4	12	13		25	100	73		
	0 LC	5	21	10 P	100	Ž	100	92		
2	.D .E	,	11				100	X)		
2	.5 	2	27	75			100	84		
2	5		10	100	88					
2	5		- 10	100	85					
2.	5		20	100	15					
	5	2	29	100	78					
	5 E	2	20	100	رکړ					
	5	3	30	100	86					
	5		24	100	86					
		1	16	100	83					
	0	2	2	100	19					
	0	2	6	100	1/2					
	0	3	4	(DD	128					
	0	4		100	15					
	0			100	.31					
2	0	1	,	100	D					
2	0	2	2	100	0					
2	0	3	19	8.1	D					
2	0	4	22	100	0					
2	0	5	20	100	0					
4	0		13	50	0					
4	0	2	15	20	0					
4	0	3	8	35	0					
4	0	4	9	25	0					
4	0	5	10		0					

Analyst: AH Reviewed By: AH 8-12-12

Start Date: 22 Jul-04

End Date:

Sampled:

Conc-µg/L

2		,				
2	73	0	ß	1 100	0	
3	103	υ	18	100	17	
4	95	74	18	190	87	
5	107	25	NQ.	im	80	1
	109	27	20	in	24	PI
7	101	-1	100	100	20	KG
	15	0	NS	100	2	
°	56	0	&	35		
9	47	0	<u>N</u>	25	0	
10	28	0	<u> </u>	20	0	
11	76	71		100	59	
12	120	109	12	100	93	
13	39	0	8	50	ŏ	
14	96	63	12	100	92	
15	17	0	195	7.2	0	1
16	105	ŽI	28	100	14	
17	100	89	ue	100	17	
18	100	35	1			
19	100	~				
20	0 T					
21		0				
	in					
22	100	0				
23	100	DI				
24	100	86				
25	100	63				
26	ico	3				
27	100	88				
28	100-14	75				
29	100	' 79				
30	(RU)	20				
					~	
			data	entr	100	-Au
			-	-	T	

24 Jul-04

22 Jul-04

Code Rep Pos

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Bivalve Larval Survival and Development Test

Species:

Material:

Counted

176

Mytilis galloprovincialis

RS

Protocol: ASTM (1993) 1999

Normal

27

Copper chloride

AMEC Bioassay SD

10-6041-7464/040722mgrt

22 Jul-04 11:07 AM

Page 1 of 1

Data Worksheet:

Report Date:

040722mgrt

Link:

Sample Source: Reference Toxicant

uc

Sample Code:

Sample Station:

Re-read Notes

100

15



Bivalve Development Bioassay Worksheet
Client: <u>City of Buenauchture</u> Start Date/Time: $\frac{7/22/04}{17:00}$ Test No.: <u>0407-061 > 065, 0407</u> End Date/Time: $\frac{7/22/04}{15:00}$ Test Species: <u>M. salloprovincialis</u> Date Received: $\frac{7/22}{04}$
Sample Type:WER
Test Chamber Type and Sample Volume: <u>JOMI Shell Vials</u> <u>JOMI</u>
Spawn Initiation Time: 1145
Male Female Number of Spawners:
Spawn Condition: Fair to Poor
Fertilization Time: 1530
Egg Stock Density Calculation:
Eggs Counted (x): 7 11 13 18 10 13 6 12 5 12 Mean 8.2 13.2 Overall Mean: 10.7
Mean: $10.7 \times 42 = 449.7 \text{ eggs/ml}$
Initial Stock - $\frac{449.7_{eggs/ml}}{400 eggs/ml} = \frac{1.12}{1.12}$
Percent Division Upon Inoculation: 30
Time of Inoculation: 1700
Comments: AMEC Bioassay Laboratory 5550 Morehouse Drive, Suite B San Diego. CA 92121 -
Reviewed/ Date: 420/01 (858) 458-9044

Marine Chronic Bioassay

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Water Quality Measurements

Raw Datasheet



Test Species:	N. gallop	mincialis
Start/End Dates:	7.22.04	7 Zefreit
Start/End Times:	1700	1500

Concentration	Temperature (°C)			Salinity (ppt)			Disso	olved Oxy (mg/L)	/gen	pH (pH units)			
all'all	0	24	48	0 24		48	0	24	48	0	24	SH 40	
10	Æ	14.6	14.8	Ø	34.5	34,3	00	8.8	9.1	60	793	- LA8	
25	<u> </u>	14.4	15.0	1 34!	thesen	34.3		8.8	9.2		7.97	7.96	
5		14.3	14.7		34.5	34.5		3.8	9.3		797	7.97	
, 		14.4	146		34.5	34.5		3.8	9.3		7:17	2,91	
70		14.4	14.7		34.4	34.0		8.9	9.3		7.97	7,97	
(10	<u> </u>	14.4	14.6	1	34.5	૩૫.૯	1	8.9	9.3	<u>↓</u> <u>→</u>	7.97	2017	
											ļ		

Technician Initials	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
Animal Source/Da	te Received: <u>Uission Bary</u> 7.22.04	
Comments:	0 hrs: <u>Brdep not talen</u> 24 hrs: 48 hrs:	
QC Check:	AH 812-04 Final Review: 244 \$20/04	

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr., Suite B San Diego, CA 92121

M. PYRIFERA



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/04/02	91.6174	151.6023	79.5147	7.4271	223.6899	295.7776
08/06/02	75.4805	151.6023	79.5147	7.4271	223.6899	295.7776
09/10/02	123.3843	151.6023	79.5147	7.4271	223.6899	295.7776
09/23/02	141.3703	151.6023	79.5147	7.4271	223.6899	295.7776
10/08/02	198.6329	151.6023	79.5147	7.4271	223.6899	295.7776
11/05/02	101.1197	151.6023	79.5147	7.4271	223.6899	295.7776
01/07/03	106.2387	151.6023	79.5147	7.4271	223.6899	295.7776
02/25/03	117.3051	151.6023	79.5147	7.4271	223.6899	295.7776
03/26/03	114.8662	151.6023	79.5147	7.4271	223.6899	295.7776
05/20/03	141.9516	151.6023	79.5147	7.4271	223.6899	295.7776
08/06/03	305.9332	151.6023	79.5147	7.4271	223.6899	295.7776
09/03/03	252.7375	151.6023	79.5147	7.4271	223.6899	295.7776
09/09/03	163.1480	151.6023	79.5147	7.4271	223.6899	295.7776
10/07/03	190.3937	151.6023	79.5147	7.4271	223.6899	295.7776
11/04/03	269.9014	151.6023	79.5147	7.4271	223.6899	295.7776
12/09/03	125.8502	151.6023	79.5147	7.4271	223.6899	295.7776
01/06/04	53.0995	151.6023	79.5147	7.4271	223.6899	295.7776
02/11/04	145.1928	151.6023	79.5147	7.4271	223.6899	295.7776
03/09/04	73.3866	151.6023	79.5147	7.4271	223.6899	295.7776
03/16/04	112.1983	151.6023	79.5147	7.4271	223.6899	295.7776
07/20/04	279.8409	151.6023	79.5147	7.4271	223.6899	295.7776

 Test Summary:
 Page 1 of 2

 Report Date:
 23 Aug-04 11:44 AM

 Link:
 16-4174-1254/040720mprt

AMEC Bioassay SD

Macrocystis	Macrocystis Germination and Germ Tube Growth Test AMEC Bloassay 3D												
Test: Start Date: End Date: Setup Date:	13-5040-1536 20 Jul-04 02:45 F 22 Jul-04 01:00 F 20 Jul-04 02:45 F	>М >М >М	Test Type: Protocol: Dil Water: Brine:	Growth-Ger EPA/600/R Laboratory Not Applica	rmination -95/136 (199 Seawater ible	95)	Duration: Species: Source:	46 Hours Macrocystis pyrifera Field Collected					
Sample:	01-5910-8762		Material:	Copper chl	oride		Client:	Internal					
Sampled:	20 Jul-04 02:45 F	PM	Code:	040720mpr	t		Project:						
Received:	20 Jul-04 02:45 F	۶M	Source:	Reference	Toxicant								
Hold Time:	N/A		Station:										
Comparison	Summary												
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method					
08-2764-6956	Mean Length		100	180		134.16410	0.12742	Dunnett's Multiple Comparison					
09-4011-0140	Proportion Ger	rminated	180	320		240.00000	0.16352	Dunnett's Multiple Comparison					
Point Estima	te Summary												
Analysis	Endpoint		% Effe	ect Cor	nc-µg/L	95% LCL	95% UCL	Method					
13-3196-6978	13-3196-6978 Mean Length		10	107	.1864	10.72678	135.09720	Linear Interpolation					
	-		20	142	.8475	101.57630	166.40960						
			25	160	.678	120.50850	189.66100						
			50	272	.4359	240.32620	289.45070						
04-1965-4293	Proportion Ger	rminated	25	236	.8586	201.71510	256.82120	Linear Regression					
			50	279	.8408	258.65920	292.80050						
Mean Length	Summary												
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv					
0	Lab Control	5	13.1500	11.7500	14.2500	0.45139	1.00933	7.68%					
18		5	13.0000	11.5000	14.7500	0.59687	1.33463	10.27%					
32		5	12.8500	11.5000	13.7500	0.39211	0.87678	6.82%					
56		5	12.6000	10.5000	13.5000	0.53385	1.19373	9.47%					
100		5	12.1000	10.0000	13.2500	0.61543	1.37614	11.37%					
180		5	9.15000	7.00000	10.0000	0.54544	1.21963	13.33%					
320		5	5.25000	4.75000	5.50000	0.13693	0.30619	5.83%					
Proportion G	erminated Sum	mary											
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv					
0	Lab Control	5	0.71200	0.64000	0.82000	0.03056	0.06834	9.60%					
18		5	0.66200	0.54000	0.73000	0.03262	0.07294	11.02%					
32		5	0.68600	0.53000	0.76000	0.04032	0.09017	13.14%					
56		5	0.66200	0.56000	0.73000	0.03367	0.07530	11.37%					
100		5	0.71600	0.63000	0.79000	0.02839	0.06348	8.87%					
180		5	0.66200	0.54000	0.76000	0.04030	0.09011	13.61%					
320		5	0.20200	0.13000	0.26000	0.02289	0.05119	25.34%					

<u>¥</u> = 223 Approved By:

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 Test Summary:
 Page 2 of 2

 Report Date:
 23 Aug-04 11:44 AM

 Link:
 16-4174-1254/040720mprt

incun zongu						
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	12.5000	13.7500	14.2500	11.7500	13.5000
18		14.7500	11.5000	12.2500	12.5000	14.0000
32		11.5000	13.5000	12.7500	12.7500	13.7500
56		13.0000	10.5000	13.0000	13.0000	13.5000
100		12.5000	13.2500	13.2500	10.0000	11.5000
180		9.75000	10.0000	9.50000	7.00000	9.50000
320		5.25000	5.50000	5.50000	5.25000	4.75000
Proportion G	ar pro Roades 11 -					
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.68000	0.64000	0.82000	0.73000	0.69000
18		0.54000	0.66000	0.68000	0.73000	0.70000
32		0.73000	0.53000	0.70000	0.71000	0.76000
56		0.73000	0.56000	0.68000	0.61000	0.73000
100		0.68000	0.76000	0.79000	0.72000	0.63000
180		0.54000	0.74000	0.65000	0.76000	0.62000
320		0.26000	0.20000	0.18000	0.13000	0.24000

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CETIS	; Re	port									Comparis Report Da Analysis:	ons: ite:	18 Aug (Page 1 of -04 11:33 / 08-2764-69	2 AM 956
Macrocystis	Germina	ition and Ger	rm Tube (Growth	Test								AMEC B	lioassay S	D
Endpoint			Analysis	Туре			Sample	e Lir	nk Contro	ol Link	Date Analyzed		Version		
Mean Length			Comparis	on			16-4174	16-4174-1254 16-4174-12			18 Aug-04 11:33 AM CET			.024	
Method			Alt H	Data	Transfo	rm	Z		NOEL	LOEL	Toxic Units	Ch	v	MSDp	
Dunnett's Mul	Itiple Con	nparison	C > T Untransformed					100	180	1.00	134	.16410	12.74%		
Test Acceptability															
Attribute			Statistic Lower Limit				Upper L	.imit	t Decisio	n					
Control Response			13.15	1	10				Passes	acceptat	oility criteria				
MSDp			0.1274				0.2		Passes	acceptat	oility criteria				
ANOVA Assu	umptions	\$												•	
Attribute	Tes	st		Statis	stic	Cri	tical	PL	.evel	Decisi	on(0.01)				
Variances	Bar	rtlett		7.222	92	16./	81190	0.30072		Equal Variances					
Distribution	Sha	apiro-Wilk W	0.92207 0.91		1004	0.02247		Norma	I Distribution						
ANOVA Table	e														
Source	ş	Sum of Squa	res Me	an Squ	are	DF	F Stati	istic	PLeve	a l	Decision(0.05)				
Between	2	260.6357	43.4	43929		6	35.91	35.91 0.00000		0	Significant Effect	ct			
Error	3	33.875	1.20)9821		28									
Total	2	294.510712	44.6	349107		34									
Group Comp	arisons														
Control	vs C	onc-µg/L	Statis	tic	Critica	a	P Level		MSD	De	cision(0.05)				
Lab Control	18	8	0.2156	5257	2.4085	71	>0.05		1.675522	Nc	on-Significant Effe	ct			
	32	2	0.4312	2515	2.4085	71	>0.05		1.675522	No	on-Significant Effe	ct			
	56	ò	0.7906	5277	2.4085	71	>0.05		1.675522	No	on-Significant Effe	ct			
	10	00	1.5093	38	2.4085	71	>0.05		1.675522	No	on-Significant Effe	ct			
	18	30	5.7500)2	2.4085	71	<=0.05		1.675522	Sig	gnificant Effect				
	32	20	11.356	529	2.4085	71	<=0.05		1.675522	Siç	gnificant Effect				
Data Summa	ry					Origi	inal Data				Transf	orme	d Data		
Conc-µg/L	Contro	ІТуре Соц	int Mea	an	Minir	num	Maximu	m	SD	Mean	Minimum	M	aximum	SD	
0	Lab Cor	ntrol 5	13.1	500	11.75	00	14.2500		1.00933						
18		5	13.0	0000	11.50	00	14.7500		1.33463						
32		5	12.8	3500	11.50	00	13.7500		0.87678						
56		5	12.6	3000	10.50	00	13.5000		1.19373						
100		5	12.1	000	10.00	00	13.2500		1.37614						
180		5	9.15	5000	7.000	00	10.0000		1.21963						
320		5	5.25	000	4.750	00	5.50000		0.30619						

Approved By a d \$20

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CETIS	Repor	t						Compariso Report Date Analysis:	ns: e: 18 Aug (Page 2 of 2 -04 11:33 AM 09-4011-0140		
Macrocystis	Germination a	and Germ	Tube Growt	h Test					AMEC E	Bioassay SD		
Endpoint		Ar	nalysis Type		Sample I	_ink Contro	ol Link	Date Analyzed	Version	Version		
Proportion Ge	erminated	Cc	omparison		16-4174-	1254 16-417	4-1254	18 Aug-04 11:31	AM CETISV	1.024		
Method		Al	tH Data	Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp		
Dunnett's Multiple Comparison C > T Angular (Corrected) 180				180	320	0.56	240.00000	16.35%				
Test Accepta	ability											
Attribute		St	atistic	Lower Limit	Upper Lin	nit Decisio	n					
Control Respo	onse	0.7	7120	0.7		Passes	acceptab	ility criteria				
MSDp		0.1	1635		0.2	Passes	acceptab	ility criteria				
ANOVA Assu	umptions											
Attribute	Test		Stati	istic Cr	itical F	P Level	Decisio	on(0.01)				
Variances	Bartlett		0.89	001 16	.81190 0	.98944	Equal V	/ariances				
Distribution	Shapiro-\	Wilk W	0.96	146 0.9	91004 C).31368	Normal	Distribution				
ANOVA Tabl	e											
Source	Sum o	of Squares	Mean Sq	uare DF	F Statist	tic P Leve	I	Decision(0.05)				
Between	1.1422	202	0.190367	6	29.22	0.0000	0	Significant Effect	1			
Error	0.1824	212	0.006515	0 28								
Total	1.3246	2335	0.196882	1 34								
Group Comp	arisons											
Control	vs Conc-µ	ıg/L	Statistic	Critical	P Level	MSD	De	cision(0.05)				
Lab Control	18		1.078875	2.408571	>0.05	0.1229556	No	n-Significant Effec	t			
	32		0.5573204	2.408571	>0.05	0.1229556	No	n-Significant Effec	t			
	56		1.073454	2.408571	>0.05	0.1229556	No	n-Significant Effec	t			
	100		-0.0746665	2.408571	>0.05	0.1229556	No	n-Significant Effec	:t			
	180		1.05722	2.408571	>0.05	0.1229556	No	n-Significant Effec	t			
	320		10.64254	2.408571	<=0.05	0.1229556	Sig	nificant Effect				
Data Summa	ry			Orig	inal Data			Transfo	ormed Data			
Conc-µg/L	Control Type	e Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD		

Data Summa	iry			Origi	nal Data		I ransformed Data				
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD	
0	Lab Control	5	0.71200	0.64000	0.82000	0.06834	1.00683	0.92730	1.13265	0.07836	
18		5	0.66200	0.54000	0.73000	0.07294	0.95176	0.82544	1.02440	0.07601	
32		5	0.68600	0.53000	0.76000	0.09017	0.97838	0.81542	1.05882	0.09470	
56		5	0.66200	0.56000	0.73000	0.07530	0.95203	0.84554	1.02440	0.07941	
100		5	0.71600	0.63000	0.79000	0.06348	1.01065	0.91691	1.09476	0.07050	
180		5	0.66200	0.54000	0.76000	0.09011	0.95286	0.82544	1.05882	0.09579	
320		5	0.20200	0.13000	0.26000	0.05119	0.46354	0.36886	0.53507	0.06533	

Approved By

Linear Regression: Page 1 of 1 Report Date: 18 Aug-04 11:33 AM

04-1965-4293

Analysis:

Macrocys	tis Germination	and Germ	Tube Grow	th Test							AMEC Bioassay SD
Endpoint		Ar	alysis Typ	e		Sample	Link	Control L	.ink [Date Analyzed	Version
Proportion	Germinated	Lir	near Regres	sion		16-4174	1-1254	16-4174-1	254 1	8 Aug-04 11:33	AM CETISv1.024
Linear Re	gression Option	s									
Model	Threshold	d Option	Lower Thr	eshold	Thres	hold Optim	ized I	Reweight	ed P	ooled Groups	Heterogeneity Corr.
Log-Norm:	al Control Th	reshold	0.288		Yes		١	'es	N	0	No
Regressio	on Parameters										
Parameter	r Estimate	Std Er	ror 95	% LCL	95	5% UCL	t Stati	stic P	Level	Decision(0	.05)
Threshold	0.31241	0.0092	7 0.2	9423	0.	33058	33.692	0	.00000	Significant	
Siope	9.31333	1.6582	5 6.0	6316	12	2.56351	5.616	0	.00494	Significant	
Intercept	-17.78890	4.1389	4 -25	5.90122	-9	.67658	-4.298	0	.01267	Significant	
Regressio	on Summary										
Iters	Log Likelihood	Mu	Sigma	G S	tat	Chi-Sq	Crit	ical	P Level	Decision(0.05)
7	-675.22360	-1.91005	0.10737	0.12	2179	6.50151	7.8	1473	0.08960) Non-Signif	icant Heterogeneity
Residual	Analysis										
Attribute	Method		Sta	tistic	Cri	itical	P Level	D	ecision	(0.05)	
Variances	Modified	Levene	6.30	0969	2.5	2766	0.00050	υ	negual	Variances	
Distribution	n Shapiro-Y	Wilk W	0.7	5496	0.9	2671	0.00000	N	on-norm	nal Distribution	
Test Acce	ptability										
Attribute		Sta	atistic	Lower L	imit	Upper L	imit D	ecision			
Control Re	sponse	0.7	120	0.7			Pa	asses acc	eptabilit	y criteria	
Point Esti	mates										
% Effect	Conc-µg/L	95% LCL	95%	UCL							
25	236.8586	201.7151	0 256.	82120							
50	279.8408	258.6592	0 292.	80050							
Data Sumi	mary			c	Calcul	ated Variate	e(A/B)				
Conc-µg/L	Control Type	Count	Mean	Minim	um	Maximum	SE	SD		A B	
0	Lab Control	5	0.71200	0.6400	00	0.82000	0.0139	0.06	834	356 500	
18		5	0.66200	0.5400	00	0.73000	0.0148	0.07	294	331 500	
32		5	0.68600	0.5300	00	0.76000	0.0184	0.09	017	343 500	
56		5	0.66200	0.5600	00	0.73000	0.0153	0.07	530	331 500	
100		5	0.71600	0.6300	00	0.79000	0.0129	0.06	348	358 500	
180		5	0.66200	0.5400	00	0.76000	0.0183	0.09	011	331 500	
320		5	0.20200	0.1300	00	0.26000	0.0104	5 0.05	119	101 500	

Approved By aff - 201

Linear Interpolation:Page 1 of 1Report Date:18 Aug-04 11:33 AMAnalysis:13-3196-6978

 Macrocystis Germination and Germ Tube Growth Test

 Endpoint
 Analysis Type
 Sample Link
 Control Link

AMEC Bioassay SD

Endpoint		Ar	alysis Type		Sample I	Link	Control Link	Date Analyzed	Version
Mean Length Linear Interpolation			16-4174-	1254	16-4174-1254	18 Aug-04 11:33 AM	CETISv1.024		
Linear Inte	rpolation Optio	ns							
X Transform Y Transform			ed	Resamples	Expande	ed CL	Method		
Linear	inear Linear 8144900 200		Yes		Two-Point Inter	rpolation			
Test Accer	otability								
Attribute		Sta	atistic	Lower Limit	Upper Lin	nit D	ecision		
Control Res	sponse	13	.15	10		P	asses acceptab	ility criteria	
Point Estin	nates								
% Effect	Conc-µa/L	95% LCL	95%	UCL					
10	107.1864	10.72678	135.0	9720					
20	142.8475	101.5763	0 166.4	0960					
25	160.678	120.5085	0 189.6	6100					
50	272.4359	240.3262	0 289.4	5070					
Data Sumn	nary			Cal	culated Varia	te			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	-	
0	Lab Control	5	13.15000	11.75000	14.25000	0.2060	1.00933		
18		5	13.00000	11.50000	14.75000	0.2724	43 1.33463		
32		5	12.85000	11.50000	13.75000	0.1789	97 0.87678		
56		5	12.60000	10.50000	13.50000	0.2436	57 1.19373		
100		5	12.10000	10.00000	13.25000	0.2809	90 1.37614		
180	5 9.15000 7.		7.00000	10.00000	0.2489	96 1.21963			
320		5	5.25000	4.75000	5.50000	0.0625	50 0.30619		

Approved B

Data Workshe	et: Page 1 of 1
Report Date:	19 Jul-04 11:09 AM
Link: 1	6-4174-1254/040720mprt

CETIS Worksheet

Macrocysti	s Germ	inatio	n and	Germ Tube	Growth Te	st					AMEC Bioassay SD
Start Date:	20 Jul	-04		Specie	s: Macro	cystis pyrifera			Sample Code:	040720mprt	
End Date:	22 Jul	-04		Protoc	ol: EPA/6	00/R-95/136 (1	995)		Sample Source:	Reference Toxica	int
Sampled:	20 Jul	-04		Materia	al: Coppe	er chloride			Sample Station:		
Conc-µg/L	Code	Rep	Pos	# Counted	# Germina	ated Mean Leng	gth Ca	lFactor		Notes	
	0 LC	1	30								
	0 LC	2	5								
	0 LC	3	31								
	0 LC	. 4	26								
	0 LC	5	29								
	18	1	13								
	18	2	8								
	18	3	2								
	10	4	10	1							
	32		11								
	32	2	3								
	32	3	19								
	32	4	28								
	32	5	24							*****	
	56	1	12								
	56	2	27								
	56	3	32								
	56	4	15								-
	56	5	7								
1	00	1	1								
1	00	2	25								
1	00	3	21								
10	00	4	9								
10	00	5	6								
10	30	1	4								
1	30	2	14								
1	30	3	10								
	30		16								
3	20	1	34								
3	20	2	22								
3	20	3	20								
33	20	4	23								
32	20	5	35								

QC=AH

000-089-124-1

Analyst: AH

Reviewed By: Je 8- 10 -0-

Macrocystis	s Germinat	ion and Gern	n Tube Grov	wth Test							AMEC B	lioassay l	_aboratory -	San Diego
Start Date:	20-Jul-04		S	Species: Macrocystis pyrifera Test ID:										
End Date	22- Jul-04		Р	rotocol: F	EPA/600/R-	95/136 (19	95 West Co	oast Manua	l)		Sample	e Source:	Internal	
	22-001-04		•								Sample	e Station.	CuCl ₂	
Sampled:											Janpi		2	
	Muncher	L Mumber I											Calibration	Mean Tube
Random	Counted	Germinated			T	ube Length	Measurem	ents (micro	meter units)			Factor	Length (µm)
1	100	68	6	5	6	4	6	4	6	4	5	4	2.5	12.5
2	100	68	4	4	6	7	4	6	4	5	4	5	2.5	12.25
3	100	53	3	7	5	3	7	7	6	6	6	4	2.5	13.5
4	100	54	3	5	3	2	4	4	5	4	3	6	2.5	9.75
5	100	64	8	3	4	4	7	5	5	6	6	7	2.5	13.75
6	100	63	5	6	6	4	4	4	6	5	3	3	2.5	11.5
7	100	73	5	7	6	7	4	6	5	5	4	5	2.5	13.5
8	100	66	3	4	4	8	5	4	5	3	7	3	2.5	11.5
9	100	72	3	4	4	3	4	4	4	5	4	5	2.5	10
10	100	70	7	4	5	5	7	6	4		5	6	2.5	14
11	100	73	4	4	5	5	4	4	4		5	4 	2.5	11.0
12	100	73	5	6	5	5	5	6		4	0	0 A	2.5	14 75
- 13	100	54		4	6	6	C A	4		5		5	2.5	10
14	100	<u> </u>	3		4	<u>э</u> л	4	5	5	6	5	5	2.5	13
15	100	62	4		3	4	3	4	4	3	4	3	2.5	9.5
17	100	73	4	4	7	5	5	5	7	6	3	4	2,5	12.5
18	100	65	4	3	2	5	6	5	2	3	5	3	2.5	9.5
19	100	70	7	5	6	6	4	4	2	6	5	6	2.5	12.75
20	100	18	3	2	3	2	2	2	2	2	2	2	2.5	5.5
21	100	79	4	7	4	4	6	6	4	8	4	6	2.5	13.25
22	100	20	2	3	2	2	2	3	2	2	2	2	2.5	5.5
23	100	13	2	2	3	2	2	2	2	2	2	2	. 2.5	5.25
24	100	76	5	8	4	5	5	6	4	7	6	5	2.5	13.75
25	100	76	5	4	5	5	7	6	3	5	6	7	2.5	13.25
26	100	73	5	4	5	5	3	5	6	5	5	4	2.5	10.5
27	100	56	2	4	7	5	5	4	3	4	5	3	2.3	12 75
28	100	71	4	8	4	4	5	4	5	8	5	4	2.5	13.5
29	100	69	7	6	6	3	6	5	5	0		5	2.0	12.5
30	100	68	6	6	4	0	5	0	6	7	7	5	25	14.25
31 '	100	82	3			4	4	5	4	6	5	6	2.5	13
32	100	76		2	2	3	2	2	4	3	3	3	2.5	5 7
33	100	26	2	2		2	2	2	2	2	2	2	2.5	5.25
35	100	24	2		2	2	2	2	2	2	2	2	2.5	4.75

QC Check: <u>AH 41904</u>

Final Review: 04 4 20/04

2 2.5 4.75 Oata entry &C Analyst: <u>AH 8-(8-04</u> ~

Ma	crocvstis	Germinati	on and Gerr	n Tube G	rowth Tes	t						AMEC E	Bioassay L	aboratory	- San Diego
St	art Date:	20-Jul-04			Species:	Macrocysti	s pyrifera						Test ID:	040720mpr	t
0.0	art Date.	20 00. 0			Sample Source										
E	nd Date:	22-Jul-04			Protocol:	EPAIOUUR	-95/150 (15	35 1100		~~)		Samr	le Station	CuCl ₂	
S	ampled:											Samp	ne Station.	2	
	T							Calibratic			Calibration	Mean Tub			
R	andom	Number	Number			1	Tube Length	Measurem	ients (micro	ometer units	5)			Factor	Length (µr
N	lumber	Counted	Germinated			10	1	10	4	10	H	5	14	2.5	
	1	100	68	9	3	<u> </u>	<u> </u>	U U	6	4	5	4	5	1	
	2	100	44	4	-7-	. 6			5	10	6	10	9		
	3	100	55	5		<u> </u>	2		4	12	4 Ÿ	3	01		
	4	100	54		5	3	m3L		6	6	10	6	1.7		
	5	100	la	9 4 8	3		-1	11	-2	13	5	2	3		
	6	100	43	5	L CP	6	4	4		2	6	LI	3		
	7	100	73	5	11	<u> </u>		-7	<u> </u>		12	13	3		
	8	100	100	3	4	<u>ч</u>				+11-		iy i	5		
	9	100	うみ	3	4	4	3	1_7_	-1			1-2-			
	10	100	10	⊂ ∩	ч	5	5	<u> </u>		<u> <u>4</u></u>	+	13	1 LIP		
	11	100	73	4	4	5	3	4	и	<u> </u>	<u> </u>				
	12	100	72	5	Le le	5	5	5	<u></u>	1	14		10		
	13	100	54	7	4		ie	5	<u> </u>		2	+	14		
	14	100	74	3	2	4	5	4_	4	1-7-	2		6		
	15	100	iel	H	γ	Ce	4	5	5	1-3	<u> </u>		1 7		
	16	100	1.2	5	5	3	4	*3	4	<u> </u>	1,2	<u> </u>	1		
	17	100	173	1-4	4	7	5	5	5	1	14	-3-	2		
	18	100	105	Ц	3	2	5	Le_	15	+	5	5	12-		
	10	100	70	2	5	6	6	4	4	2	6	+	0		
	20	100	R	2	2	3	2	5	2	3	12	10	17		
\vdash	20	100	179	4	7	4	4	6	j.	4	<u> </u>	4	-6		
-	21	100	20	2	2	2	2	2	3	2	2	1.6	-k-		
\vdash	22	100	1 12	2	2	3	5	2	2	1,2	10	10-	-3-		
-	23	100	1.76	5	8	4	5	5	6	4	17	- 5-			
-	24	100	176	C	4	3	5	7	6	3	5	6	$-\frac{1}{1}$		
\vdash	20	100	172	12	4	5	5	3	5	6	5	5			
-	20	100	1-57		1 U	7.	5	5	4	3	4	-5-	5,		
-	21	100	100	- 9/-	15	4	4	5	4	5	8	5	4		
-	28	100	1/0	17		6	2	6	5	6	6	3	6		
-	29	100	127-	1 6	12	TU U	6	5	5	5	4	4	5		
-	30 ,	100	100-	0	- 0	4	L	4	.9	6	7	7	5		
-	31	100	82			5	L C	4	5	ч	6	5	6		
	32	100	68		2	7	2	2	2	4	3	3	3		
	33	100	16			2	3	7	2	2	2	2	2	-	
	34	100	46				2	2	2	2	ユ	2	2		

QC Check: 1 8-10-04

Final Review: 774 8/20/04

Kelp Spore Germination Bioassay Worksheet

Client: NTECHAL	Start/End Dates: 7-20-04 / 7-22-04
Test No .: 040720 MPRT	Start/End Times: 14.451 / 300
Tech. Initials: Att	Test Species: Macrocystis pyrifera
Date Collected: 7.20-04	
Kelp Collector:	
Collection Location: La Tolla Cove	-
Conditions (weather, etc.): Sunny, Surar	1 2-4' 115.
Dilution Water Source (Client I:):	-Scripps Dierett
Dilution Water Source (Client II:):	
Dilution Water Source (Client III:):	
Dilution Water Source (Reference Toxicant):	SULIDOS DIET
Time of Initial Rinsing and Dessication :	(2.'00 (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers:	13.4 (keep kelp from each collecting bag separated)
Conditions of Zoospore Density and Motility (beaker 1):	
Time of Blade Removal From Release Beaker 1/Reaker 2 (if needed):	
Time of Diade Removal From Release Deaker Theaker 2 (in needed).	
Density Counts (target = 90): $\frac{98}{117}$ <u>117</u> <u>138</u>	79 Mean: 107,8
Man 107.8 + 10 000 = 1.078,0257 shores per ml (Density of Sho	re Release)
Calculate the volume of spore stock to add to each test container: (225,000 spores/container)/(density of spore release) = ml stock	/container
In cases of a spore release = 900,000 spores/ml, the volume is 0.25 ml.	
If density > 900,000 spores/ml, calculate a dilution factor, x, and create a n	ew spore stock of 900,000 cells/ml and add 0.25 ml:
Density of spore release $\frac{1}{1078,000}$ • $\frac{0.25 \text{ ml}}{1 \text{ container}} = \frac{26}{1000000000000000000000000000000000000$	$\frac{29,500}{225,000}$ spores = <u>1.2</u> (X) spores
Example: 980,000 * 0.25 / 225,000 = 1.09 (100 ml stock + 9 ml sw)	
In cases of a spore release from 450,000 to 899,000 spores/ml, the volum and MBP required volume of no greater than 1% of the total test solution v required limit of 0.3 ml in order to achieve the desired spore density).	e added should not exceed 0.5 ml. (This volume exceeds the EPA olume. However, it may sometimes be necessary to exceed the
If the density of spore release is < 450,000 spores/ml, check the density of	f the spores in the second release beaker.
Time of Inoculation: 14:45 Amount inoculated	d: <u>0,75 m(</u> 24-hour germination check: <u>70</u> ² , 5H
Comments: <u>24 br QC: 70%</u>	
	AMEC Earth & Environmental
	Bioassay Laboratory
QC Check: <u>k 8-10-04</u> Final Review:	San Diego, CA 92121

QC Check: __________

Final Review:

AMEC Earth and Environmental **Bioassay Laboratory** 5550 Morehouse Dr. Suite B San Diego, CA 92121

Client :	NTEIZNAL
Sample ID:	CuClz
Test No:	040720 mpp=
Analyst:	AH

Raw Datasheet Water Quality Measurements Marine Chronic Bioassay

Test Species:	Macrocystis pyrifera						
Start/End Dates:	7-20-04	17	-22.04				
Start/End Times:	1445	1	1300%				

Test Type: Kelp Spore Germination and Growth

Concentration $(\frac{1}{2}g/\omega)$	Initial Readings			Final Readings		
	D.O. (mg/L)	pH (pH units)	Salinity (ppt)	D.O. (mg/L)	pH (pH units)	Salinity (ppt)
LabControl	9.2	8.02	34,0	6.9	7.93	34,3
18	9.1	8.02	33.4	6,8	7.91	34.2
32	9.1	B.03	34.0	6.8	7.93	34.4
56	9.2	8.04	34.0	6.7	7.93	34.4
100	9.2	B.04	33.7	۲.۵	7,94	34.3
180	9.1	8.03	33.5	٦.)	7.92	34.0
320 mg/L	9.1	8.03	3 3. 0	6.7		33.6

1

Comments:

QC Check: <u>\$2 8-10-04</u>

Final Review: CHA A2010A

APPENDIX D ANALYTICAL CHEMISTRY DATA




July 29, 2004

Chris Stransky AMEC Earth and Environmental 5510 Morehouse Drive, Suite B San Diego, CA 92121-0000

Subject:	Calscience Work Order No.:	04-07-1119
-	Client Reference:	City of Buenaventure/SCRE

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 07/21/04 and analyzed in accordance with the attached chain-of-custody. An anomaly is apparent in the data whereas the DOC values exceed the TOC values, even though DOC was undetected in the Method Blank. DOC frequently exceeds the TOC values at low levels due to the presence of DOC in the filters used during sample prep. A possible high bias in the DOC results is also indicated by the matrix spike data being above the control range.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The original report of any subcontracted analysis is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Calscience Environmental

Laboratories, Inc. Robert Stearns Project Manager

Michael J. Crisostomo Quality Assurance Manager





ANALYTICAL REPORT



07/21/04 Date Received: AMEC Earth and Environmental 5510 Morehouse Drive, Suite 300 Work Order No.: 04-07-1119 San Diego, CA 92121-3723 Preparation: EPA 3005A Filt. Method: EPA 6020 Unit: ug/L Project: City of Buenaventure/SCRE Page 1 of 2 Client Sample Number Lab Sample Date Date Date Number Collected Matrix Prepared Analyzed QC Batch ID 04-07-1119-1 07/20/04 07/22/04 07/22/04 040722L01 A-2 Aqueous Result RL DF Qual Parameter Result <u>RL</u> DF Qual Parameter 3.44 1.00 Selenium 2.95 1.00 1 1 Copper 8.03 1 43 Nickel 1.00 1 Zinc 1.00 1 07/20/04 07/22/04 040722L01 B-1 04-07-1119-2 Aqueous 07/22/04 Result RL DF Qual Parameter RL DF Qual Parameter Result 3.27 1.00 Selenium 1.26 1.00 Copper 1 1 6.31 17.5 1.00 Nickel 1.00 Zinc 1 1 B-3 04-07-1119-3 07/20/04 Aqueous 07/22/04 07/22/04 040722L01 Parameter Result RL DF Qual Parameter Result RL DF Qual 3.35 1.00 2.03 Selenium 1.00 Copper 1 1 Nickel 7.85 1.00 1 Zinc 2.17 1.00 1 C-2 04-07-1119-4 07/20/04 Aqueous 07/22/04 07/22/04 040722L01 Parameter Result <u>RL</u> DF Qual Parameter RL DF Qual Result Copper 3.03 1.00 Selenium 3.41 1.00 1 1 Nickel 8.38 1.00 ND 1 Zinc 1.00 1

MAAN



ANALYTICAL REPORT



AMEC Earth and Environmental						Date Received: 0									
5510 More	ehouse Drive,	Suite 300				Work Orde	er No.:			04-07-1119					
San Diego	, CA 92121-3	723				Preparation:						EPA 3020A Total			
•						Method:					1	EPA 6020			
						Unit:			•			ug/L			
Project:	City of Buen	aventure/	SCRE								P	age 2 of 2			
Client Sample	Number		Lab Sample		Date		Date		Date						
			Number		Collected	Matrix	Prepared		Analyzed			QC Batch ID			
A-2		04-	07-1119-1		07/20/04	Aqueous	07/22/04		07/22/04		2	040722L01			
Parameter		Result	<u>RL</u>	DF	Qual		Parameter	Result	RL	DF	Qual				
Copper Nickel		3.45 8.27	1.00 1.00	1 1			Selenium Zinc	2.21 2.26	1.00 1.00	1 1					
B-1		04-	07-1119-2		07/20/04	Aqueous	07/22/04		07/22/04			040722L01			
Parameter		Result	<u>RL</u>	DF	Qual		Parameter	Result	<u>RL</u>	DF	Qual				
Copper Nickel		3.47 6.66	1.00 1.00	1 1			Selenium Zìnc	1.74 17.2	1.00 1.00	1 1					
B-3		04-	-07-1119-3		07/20/04	Aqueous	07/22/04		07/22/04			040722L01			
Parameter		Result	RL	DF	Qual		Parameter	Result	RL	DF	Qual				
Copper Nickel		3.67 8.11	1.00 1.00	1 1			Selenium Zinc	2.23 3.65	1.00 1.00	1 1					
C-2		04-	-07-1119-4		07/20/04	Aqueous	07/22/04		07/22/04			040722L01			
Parameter		Result	RL	DF	Qual		Parameter	Result	RL	DF	Qual				
Copper Nickel		3.41 8.85	1.00 1.00	1 1			Selenium Zinc	2.91 1.53	1.00 1.00	1 1					
Method Bla	ank	096-	-06-003-643		N/A	Aqueous	07/22/04		07/22/04			040722L01			
Parameter		Result	RL	DF	Qual		Parameter	Result	RL	DF	Qual				
Copper Nickel		ND ND	1.00	1			Selenium Zinc	ND ND	1.00 1.00	1					

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Allan-



Analytical Report



AMEC Earth and Environmental 5510 Morehouse Drive, Suite B San Diego, CA 92121-0000

Date Received: Work Order No:

Page 1 of 2

Project: City of Buenaventure/SCRE

Client Sample Number			Lab Sample Number	Date Collecte	ed	Matrix		
A-2			04-07-1119-1	07/20/0	4	Aqueous		
Parameter .	Result	<u>RL</u>	DF	Qual	<u>Units</u>	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	28	1.0	1		mg/L	. N/A	07/22/04	EPA 160.2
Cyanide, Total	ND	0.050	1		mg/L	N/A	07/26/04	EPA 335.2
Carbon, Total Organic	2.3	0.5	1		mg/L	. N/A	07/22/04	EPA 415.1
Carbon, Dissolved Organic	2.7	0.5	1		mg/L	, N/A	07/21/04	EPA 415.1
B.1			04-07-1119-2	07/20/0	4	Aqueous		****

B-1			04-07-1119-2	07/2	0/04	Aqueous		
Parameter	<u>Result</u>	RL	DF	Qual	<u>Units</u>	Date Prepared	Date Analyzed	Method
Solids, Total Suspended Cyanide, Total Carbon, Total Organic Carbon, Dissolved Organic	ND ND 5.8 7.3	1.0 0.050 0.5 0.5	1 1 1		mg/L mg/L mg/L mg/L	N/A N/A N/A N/A	07/22/04 07/26/04 07/22/04 07/21/04	EPA 160.2 EPA 335.2 EPA 415.1 EPA 415.1

B-3			04-07-1119-3	07/20/0)4	Aqueous		
Parameter	Result	RL	DF	Qual	<u>Units</u>	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	28	1.0	1		mg/L	N/A	07/22/04	EPA 160.2
Cyanide, Total	ND	0.050	1		mg/L	. N/A	07/26/04	EPA 335.2
Carbon, Total Organic	2.5	0.5	1		mg/L	. N/A ·	07/22/04	EPA 415.1
Carbon, Dissolved Organic	2.8	0.5	1		mg/L	. N/A	07/21/04	EPA 415.1

C-2			04-07-1119-4	07/20)/04 A	queous		
				1				
Parameter	Result	RL	DE	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Suspended Cyanide, Total Carbon, Total Organic Carbon, Dissolved Organic	38 ND 2.4 2.8	1.0 0.050 0.5 0.5	1 1 1		mg/L mg/L mg/L mg/L	N/A N/A N/A N/A	07/22/04 07/26/04 07/22/04 07/21/04	EPA 160.2 EPA 335.2 EPA 415.1 EPA 415.1

RL - Reporting Limit ,

DF - Dilution Factor Qual - Qualifiers

h.M.



ANALYTICAL REPORT



AMEC Earth and Environmental 5510 Morehouse Drive, Suite 300 San Diego, CA 92121-3723 Date Received: Work Order No.:

07/21/04 04-07-1119

Page 2 of 2

Project: City of Buenaventure/SCRE

Client Sample Number:		Lab Sample Number	Date Collected	Ma	ıtrix	•		
Method Blank			N/A	Aqu	eous	•		
Parameter	Result	RL	DF	Qual	<u>Units</u>	Date Prepared	Date Analyzed	Method
Cyanide, Total Carbon, Total Organic Carbon, Dissolved Organic	ND ND ND	0.050 0.50 0.50	1 1 1		mg/L mg/L mg/L	N/A N/A N/A	07/26/04 07/22/04 07/21/04	EPA 335.2 EPA 415.1 EPA 415.1

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers





AMEC Earth and Environmental 5510 Morehouse Drive, Suite B San Diego, CA 92121-0000 Date Received: Work Order No: 07/21/04 04-07-1119

.

Project: City of Buenaventure/SCRE

Matrix: Aqueous						•				,
Parameter	Method	Quality Control Sample ID	<u>Date</u> Analyzed	Date Extracted	MS% REC	MSD % REC	<u>%REC</u> <u>CL</u>	RPD	<u>RPD</u> CL	Qualifiers
Cyanide, Total	EPA 335.2	04-07-1120-1	07/26/04	N/A	82	84	70-130	2	0-25	
Carbon, Total Organic	EPA 415.1	A-2	07/22/04	N/A	129	126	70-130	2	0-25	
Carbon, Dissolved Organic	EPA 415.1	A-2	07/21/04	N/A	140	154	70-130	7	0-25	3

RPD - Relative Percent Difference , CL - Control Limit

Muhhn



AMEC Earth and Environmental 5510 Morehouse Drive, Suite B San Diego, CA 92121-0000

Date Received: Work Order No: N/A 04-07-1119

Project: City of Buenaventure/SCRE

Matrix : Aqueous

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	Conc Added	Conc Recovered	LCS %Rec	<u>%Rec</u> CL	Qualifiers
Cyanide, Total	EPA 335.2	099-05-061-1,471	07/26/04	N/A	0.20	0.21	105	80-120	
Carbon, Total Organic	EPA 415.1	099-05-097-1,698	07/22/04	N/A	5.0	4.9	98	80-120	
Carbon, Dissolved Organic	EPA 415.1	099-05-115-255	07/21/04	N/A	5.0	5.0	100	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Muhhu-



Quality Control - Duplicate



AMEC Earth and Environmental 5510 Morehouse Drive, Suite B San Diego, CA 92121-0000 Date Received: Work Order No: 07/21/04 04-07-1119

Project: City of Buenaventure/SCRE

Matrix: Aqueous								
Parameter	Method	QC Sample ID	Date Analyzed	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
Solids, Total Suspended	EPA 160.2	04-07-1102-2	07/22/04	10	11	10	0-25	

RPD - Relative Percent Difference , CL - Control Limit

hu





RPD - Relative Percent Difference , CL - Control Limit



Quality Control - LCS/LCS Duplicate



AMEC Earth and Environmental 5510 Morehouse Drive, Suite B San Diego, CA 92121-0000

Date Received: Work Order No: Preparation: Method: N/A 04-07-1119 EPA 3020A Total EPA 6020

Project: City of Buenaventure/SCRE

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Da Analy	te /zed	LCS/LCSD Bate Number	h
096-06-003-643	Aqueous	ICP/MS A	MSA 07/22/04		07/22/04 0407221		
Parameter	LCS %	REC LCSD	%REC %	REC CL	RPD	RPD CL	Qualifiers
Copper	100	102		80-120	1	0-20	
Nickel	100	101		80-120	2	0-20	
Selenium	82	84	;	80-120	3	0-20	
Zinc	92	94	1	80-120	2	0-20	

RPD - Relative Percent Difference , CL - Control Limit





Work Order Number: 04-07-1119

Qualifier	Definition
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
` 5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
А	Result is the average of all dilutions, as defined by the method.
в	Analyte was present in the associated method blank.
С	Analyte presence was not confirmed on primary column.
D	The analyte concentration was reported from analysis of the diluted sample.
E	Concentration exceeds the calibration range.
н	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
×	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Ċ	CALSCIENCE E LABORAT 7440 LIN GARDEN GROV	COLN WAY (F, CA 92841-1432)														(CH.	AIN	01 712	F C	. บร . >ฯ	тог	Y	RE	COR	D
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ADDRESS:							PR	OJEC	≠ T CO	BC NTAC) <u>(^</u> G	Vin	Hurd	<u>~ /</u>		CK	12		QUOTE NO.:			-				
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LAB USE	SAMPLE ID	LOCATION/DESCRIPTION	SAM	PLING	MATRIX	NO. OF	Hd	DH (I	TEX	IALO	OCs	VOC	EST	CBs	8	AC,	CPIN	NAs	0Cs	H4 /	E	10	Ŏ	Ĥ	5	
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2	B-1			1340		11																-1	1	+	1-	_
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DISTRIBUTION: White with final report, Green to File, Yellow and Pink to Client. Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Yellow and Pink copies respectively.

02/01/99 Revision



CALSCIENCE COURIER:

Ambient temperature.

°C Temperature blank.

TEMPERATURE - SAMPLES RECEIVED BY:

Chilled, cooler with temperature blank provided. Chilled, cooler without temperature blank. Chilled and placed in cooler with wet ice. Ambient and placed in cooler with wet ice.

Cooler:_____

CLIENT:

WORK ORDER #: 04-07-1119									
Cooler of									
SAMPLE RECEIPT FORM									
DATE: 7/21/4									
RECEIVED BY:									
ature blank provided. °C Temperature blank. perature blank. °C IR thermometer. ar with wet ice. Ambient temperature.									
Initial:									
No (Not Intact) : Not Applicable (N/A):									

SAMPLE CONDITION:

Sample(s): _____

CUSTODY SEAL INTACT:

	Yes	NO N/	A
Chain-Of-Custody document(s) received with samples	<u> </u>	·····	
Sample container label(s) consistent with custody papers		·····	
Sample container(s) intact and good condition	<u> </u>	·····	
Correct containers for analyses requested	<u> </u>	·····	/
Proper preservation noted on sample label(s)	_ <u>/_</u>	·····	\square
VOA vial(s) free of headspace.			\angle
Tedlar bag(s) free of condensation		<u>/</u>	
		Initial:	4/
1			

COMMENTS:

APPENDIX E FIELD COLLECTION DATA

Santa Clara River Estuary Evaluation City of Buenaventura

Field Water Quality Measurement Log

2003 - 2004

Sampl	e Collecti	on Date:	7/20	04			Sampler:	BCS, NB		
	Max depth									
Sampl	e ID	Depth (ft)	Temp ℃	Salinity (ppt)/	Cond. (umhos- cm)	рН	DO (mg/L)	Comments/ Observations		
		Surface	25.1	2.7	5110	8.97	>20	0905-position		
D-1		mid		2.7	5170	8.97	9.97 >20	on mark		
	мах 3'4"	Bottom	24.9	2-8	5210		. —			
		S	25.2	3.0	5540	9.47	>20	0920		
C-1		Μ	25.2	3.0	5550	9.47	>20	position on mark		
	Max 2'6"	B	25.2	3.0	5540	9.44	>20			
		S	25.3	2.9	5460	9.53	>20	0935		
C-2		М	25.2	2.9	5440	9.40	>20	34'14.052		
	max 3'4"	B	25.1	2.9	5340	~	_			
		S	25.1	2.9	5390	9.52	>20	1005 # surface		
C-3	Mari	Μ	25,1	2,9	5400	9,29	>20	Post W/consisent		
	4'8"	B	25.0	7.5	13320*	1		119' 15.391		
		S	25.4	2,8	5250	9.52	>20	1040		
B-3	A 4.0 ×	M	25.4	2.9	5320	9,54	>20	24/14 021		
	5'4"	в	25,8	9.5	9340	1	-	119' 15. 646		
		5.	.26.0	3.0	5640	9.72	>20	1120		
B-4		m	259	3.0	5640	9.69	>20	34/13.893		
	Max 4	B	244	3.2	5890	1	-	119'15.572		

This is a copied version of field log page, actual log page was AMEC Earth and Environmental, 5510 Morehouse Dr. San Diego, CA 92121 Splattered with int, -AH

Santa Clara River Estuary Evaluation City of Buenaventura

Field Water Quality Measurement Log

2003 - 2004

Sample	Collectio	on Date:	7/20	104			Sampler:	ZS NB
	Jepti	• •	•					
Sample	ID V	Depth (ft)	Temp ⁰C	Salinity (ppt)/	Cond. (umhos- cm)	рН	DO (mg/L)	Comments/ Observations
B-2		٢	26.4	2.6	4770	9.27	720	1310 D.O. just myk (+
U		M	-	-	-	-	1	
	2'0	В	26.4	2.7	4840	9.57	>20	119.15.704
B-1		ł	25.9	1.3	2500	7.69	5.0	1340 * double
		M	25.1	1.3	2570	9.04*	4.0	34. 14.094 surface
	4′5"	B	27.0	4.7	8890)	119. 15.793
-A-1		+	26.8	3.1	5830	9.73	>20	1425
, , ,		M	26.7	3.2	5840	9.73	>20	34 13,84
	3'8	В	26.0	4.6	8230	1	-	119 15.872
A7.		Т	26.6	3,0	5620	9.77	720	1450 salinity=6.0
11		M	76.6	3.0	5660	9.75	720	@4'6"
	5"6"	B	26.1	7.7	14570	-	-	34. 13.882
A3		T	27.1	3-1	5790	9.84	720	
		m	27.0	3.1	5850	9.83	720	
	4'3"	В	25.8	3.8 11	7800NB	-		39 15 160
				4.0	7700		:	
	+ mit	er che	ched.	- recols	7.03.	for i	r stand	arel

Santa Clara River Estuary Evaluation City of Buenaventura

Oct 2003 - Oct 2004

FIELD SAMPLE EVENT LOG

Page ____of ___

Agencies: AME	C	Sample Date:	7120/04
Chief Scientist/ scier	ntific crew:1: Chris	Strandy, Wick Bubbe	
Vessel: Ponter,	Longboard		
High Tide (ft):	Time:	High Tide:	Time:
Low Tide (ft):	Time:	Low Tide:	Time:

SAMPLING EVENT NOTES

Dry Season "closed beim" Sampling went Full esturing Wahr only collections at siles A-2, B-1, B-3, ? C-2 toricity (mussel, mysid topanett, talp. Fulhead Nimew, C. dubic Chronic Selenastron) WEIZ - Rivalar Total + Disselmed Analyzed Total (N. (U. Se, N: Zn, PC, DOL, 755

APPENDIX F SAMPLE RECEIPT INFORMATION AMEC Earth & Environmental Aquatic & Terrestrial Toxicology Laboratory 5550 Morehouse Drive, Suite B San Diego, CA 92121

Client: <u>City of Buenavertura</u> Sample ID: <u>A-2/B-1/B-3/C-2</u>

Test Initiation Date: 7-21-04 Test No.(s): <u>0407-031 to 046</u> Test(s) Performed: <u>Mysid/Kelp/Topsmelt/M</u>usse

		Sample (A, B, C, Receiving Water, etc.)					
	A-2	B-1	B-3	C-2			
Alkalinity (mg/L)*	171	184	183	147			
Hardness (mg/L)* *	917	540	813	ଟଟ୍ସ			
Check-In Temp (°C)	19.3	18,4	18.2	18.5			
DO (mg/L)	10.3	77	10.4	9.3			
pH (units)	9.73	7.79	9,55	9.20			
Salinity (ppt)	3.1	1.4	2,9	2.9			
Cond. (µmhos-cm)	5160	2370	4760	4830			
Total Chlorine (mg/L)	0.01	0.03	<0.01	0.02			
Free Chlorine (mg/L)	-	-	-	-			
STS added (g)	~	-	-	-			
Final Free Chlorine (mg/L)	-	~	-	-			
Dilution Water Source: LAB SW W by no Additional Control? Y N Sample Manipulations Required? Y N Sample Salted w/ artificial salt? N Sample salted w/brine? N	ART SW TO oth	30 ppt-f	Alkalinity: <u>95</u> Alkalinity: WENCL Spomelt	2 Salinity: <u>30</u> Salinity:			
Filtration? YN	Filter Pore Size: _	Or	ganisms Debris	Post-check:			
Aeration? $Y(N)$	Length of Time:		Final DO:	Final pH:			
pH Adjustment? Y	Initial pH:		Final pH:				
Subsamples Collected for Additional Chemistry? <u>Y</u> N	Sample Type(s):						
Sample Shipped Via: <u>Hand</u>	derivered						
Comments:							
Analysts: SH			QC Check: _	AH 817-04			

AMEC Earth & Environmental Aquatic & Terrestrial Toxicology Laboratory 5550 Morehouse Drive, Suite B San Diego, CA 92121 Sample Check-In Information Freshwater Test

Client: <u>City of Buenavertura</u> Sample ID: <u>AQ/B-1/B-3/C-2</u>

Test Initiation Date: 7-2(-09 Test No.(s): <u>0407-047 to 058</u> Test(s) Performed: <u>Cerial aphnia / Fathead / Schen</u>str

	Sample (A, B, C, Receiving Water, etc.)					
	A-2	B-1	B-3	C-2		
Alkalinity (mg/L)*	171	184	183	147		
Hardness (mg/L)*	917	540	813	882		
Check-in Temp (°C)	19.3	18.4	18-2	18.5		
DO (mg/L)	10.3	7.7	10.4	9,3		
pH (units)	9,13	7.79	9,55	9.20		
Cond. (µmhos-cm)	5160	At 230	4760	4830		
Total Chlorine (mg/L)	0.01	\$2370 0.03	20.01	0:02		
Free Chlorine (mg/L)			_	-		
STS added (g)		-		-		
Final Free Chlorine (mg/L)		_	-	1		
Sample Description: <u>All · U</u>	ght yellow,	, clear, no a	dor, Light	debris (B		
Dilution Water Source: $\cancel{82}$	culligan Other = <u> </u>	:: (fvo)	Alkalinity: <u>15</u> Alkalinity: <u>@</u>	Hardness:		
ample Manipulations Required? Y(N)	alljusted to	9,6				
Filtration? <u>Y(N)</u>	Filter Pore Size:		ganisms Debri	s Post-check:		
Aeration? <u>Y</u>	Length of Time:		Final DO:	Final pH:		
pH Adjustment? Y (R)	Initial pH:		Final pH:			
Subsamples Collected for Additional Chemistry? Y N	Sample Type(s):					
Sample Shipped Via: Hand	Lewiered					
Comments: <u>A alkal</u>	inity and h	nardness for	pH-adj. cu	ntrol was no		
Analysts: SH			QC Check:	AH 8-170		

APPENDIX G CHAIN-OF-CUSTODY FORMS

7000						Chain of Custody			
CITICS Earth & E AMEC San Dieg 5550 Morehous San Diego, CA Phone: 858-458	Environme go Bioassay Labo e Drive, Suite B 92121 I-9044 FAX 858-583	ental, in ratory 7-3961	С.			Date <u>7-20-04</u> Page of			
Sample Collection by: Churis Str	ransky/Nik	nbe Mail	Report to (i	f different)		ANALYSIS REQUIRED			
Company (ity of BUENQUE AddressStateSSASSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	Zip	Com Addru City Conta	pany ess act ne No	State Zip	flinis cherie adria cheric	Yrifera Chronic Ulloprovincialis anelas chronic ubru chronic ubru chronic			
SAMPLE ID DATE	TIME MATRIX	CONTAINER NUI	MBER OF NTAINERS	COMMENTS	× × ×	M. H. H. B. S.			
A-7 1/20/04/	4:50 Hr	Egal bucket	5		XX				
B-1 1	13:40	1	5		11				
B-3	10:40		5						
C-3. V	09:35	\mathbf{V}	5		VV				
`.									
PROJECT INFORMATION	SAM	PLE RECEIPT		RELINQUISHED BY		RELINQUISHED BY			
CLIENT	TOTAL NO. OF CO	NTAINERS	20	(Signature)	(Time)	(Signature) (Time)			
P.O. NO.	CHAIN OF CUSTO	DY SEALS	<u> </u>	(Printed Name)	(Date)	(Printed Name) (Date)			
SHIPPED VIA: COLLECTED & TRANSPOR-	REC'D. GOOD CO			(Company)		(Company)			
SPECIAL INSTRUCTIONS/COMMENTS:	CONFORMS TO A			RECEIVED BY		RECEIVED BY (LABORATORY)			
Freshwater test	5-100%.	sample	2	(Signature)	(Time)	(Time) (Signature)			
only w salt	control	F		(Printed Name)	(Date)	(Date) (Printed Name) $04 - 0535 \rightarrow 0538$ (Date)			
Salinity of	sample	الإ		(Company)		AMEC Bioassay Lab Log-in No.			

DISTRIBUTION: WHITE, CANARY - AMEC Bioassay Lab, PINK - Originator

City of Buenaventura Water-Effect Ratio Report July 04 Dry Weather Sampling Event Santa Clara River Estuary

Prepared by Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, California 92121 (858) 587-7333

INTRODUCTION

As part of a continued monitoring and characterization effort of the Santa Clara River Estuary (SCRE), a water-effect ratio (WER) was determined for copper using ambient water samples collected on July 20, 2004. The WER was conducted following guidance and procedure published in EPA Method 822-R-01-005 (Streamlined Water-Effect Ratio Procedure for Discharge of Copper). Blue mussel larvae (*Mytilus galloprovincialis*) bioassays were initiated on July 22, 2004 at Nautilus' laboratory located in San Diego, CA. The embryo development test was chosen for this WER due to its sensitivity to copper; toxicity to bivalve larvae is the primary driver for EPA's derivation of water quality criterion for copper in marine waters ($3.1 \mu g/L$, US EPA 2000). Measurements of copper concentrations in support of the WER were performed by Calscience Environmental Laboratories (CEL) located in Garden Grove, CA.

In addition to the WER, ambient water toxicity was evaluated using other freshwater (e.g. alga *Selenastrum capricornutum*, the water flea *Ceriodaphnia dubia*, and the fathead minnow *Pimephales promelas*) and marine organisms (e.g. giant kelp *Macrocystis pyrifera*, the opossum shrimp *Americamysis bahia*, and the Pacific topsmelt *Atherinops affinis*).

METHODS AND MATERIALS

SAMPLE COLLECTION, TRANSPORT, AND PREPARATION

Ambient water samples were collected from four of the eleven ambient monitoring locations (specifically sites A-2, B-1, B-3, and C-2). Sites for water collection were selected based on location within the estuary and water depth (i.e. centrally located sites with enough water to provide an adequate sample volume for testing). Sample collection time, global positioning system (GPS) coordinates, water depth, temperature, dissolved oxygen (DO), salinity, and pH were recorded in a field logbook and is summarized in Appendix E.

All equipment used for water collection was cleaned thoroughly with Alconox soap and rinsed with site water. Collections were performed using a hand pump connected to ½" clear PVC tubing. The end of the tubing was held at mid-depth to collect the water and pumped into 20-L plastic-lined buckets; a total of five buckets were collected at each site.

Nautilus personnel transported all samples to the laboratory where samples were placed in a 4 °C cold room overnight. The following day, the contents of all sample containers from each site were composited and water quality parameters of temperature, DO, conductivity, salinity, pH, total residual chlorine, alkalinity, and hardness were measured and recorded in a logbook. A portion of each composited sample was removed and spiked with nominal copper concentrations of 0, 9.0, 15, 25, 40, 65, and 100 µg/L. For comparison, polished laboratory seawater (PSW) was also spiked with copper on the same day with final concentrations of 0, 1.8, 3.0, 5.0, 8.4, 14, 23, and 39 µg/L. Laboratory seawater was polished by filtration through a Gelman 0.20-µm filter. Spiked samples were placed in a 15 °C temperature-controlled room and allowed to equilibrate overnight. Subsamples of all test concentrations were collected prior to test initiation for analytical verification of copper concentrations.

BIOASSAY PROTOCOLS

Test conditions and Quality Assurance/Quality Control (QA/QC) requirements for the blue mussel embryo development test are summarized in Table 1.

Test organism	Mytilus galloprovincialis
Test organism source	Field Collected by Nautilus Personnel
Test duration	48 Hours
Test solution renewal	None
Feeding	None
Test initiation date and time	Within 24 hours of copper addition to samples
Test chamber	30-ml glass scintillation vial
Test solution volume	10 ml
Test temperature	15 ± 1 ℃
Dilution water	None
Test concentrations $(\mu g/L \text{ copper added to 100\% sample})^a$	0, 9, 15, 25, 40, 65, and 100
Number of organisms/chamber	250-300
Number of replicates	5
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test Protocol	ASTM Designation E 724-98
Test acceptability criteria for controls	≥ 90% normal
Reference toxicant	Copper chloride
Reference toxicant test concentrations (μg/L) Polished Seawater ^b Natural Seawater ^c	0, 1.8, 3.0, 5.0, 8.4, 14, 23, and 39 0, 2.5, 5.0, 10, 20, and 40

Table 1. Test Conditions and QA/QC Summary for the 48-Hour Bivalve Embryo Development Test.

^a In order to determine the WER for full-strength sample, Forty Fathoms[™] sea salt, as opposed to hypersaline brine, was added to each sample in order to raise the salinity to 30 ppt. An additional control, composed of Forty Fathoms[™] sea salt and deionized water, was also tested to ensure observed effects were not due to the addition of artificial salt.

^b The polished seawater copper reference toxicant test was used for calculation of the water-effect ratio for each estuary sample.

^c The copper reference toxicant test using natural seawater is performed concurrently with all bivalve embryo tests conducted at Nautilus to evaluate variability in test procedures and sensitivity of organisms over time.

STATISTICAL ANALYSES

Analysis of ambient water and reference toxicant data was conducted using CETIS[™] Comprehensive Environmental Toxicity Information System and Database Software, Version 1.025B. Statistical differences from the control and No Observed Effect Concentrations (NOEC) were determined for each test using Dunnett's or Steel's Many-One Rank Tests. Median Effect Concentration (EC₅₀) values were determined using Maximum Likelihood Probit Analysis (linear regression). The choice of statistical method used was dependent upon specific assumptions met by the data.

CHEMICAL ANALYSES

Analysis of total copper in selected estuary samples was performed by CEL (Appendix D).

WATER-EFFECT RATIO CALCULATION FOR COPPER

Measured concentrations of copper were used for all calculations in this report. Total copper was measured in copper-spiked test concentrations that bracketed dose responses. The WER was calculated for each site by dividing the EC50 for copper in the sample, by the EC50 for copper in the Scripps polished seawater.

RESULTS AND DISCUSSION

A detailed data summary is contained in Appendix A. Statistical analyses and raw data can be found in Appendix B, and reference toxicant data are located in Appendix C. Analytical chemistry data reports and field collection data can be found in Appendices D, and E, respectively. Finally, chain-of-custody information is provided in Appendix F.

Copper EC₅₀ values and WER calculations are summarized in Table 2. Mean normal development was 84 to 89 percent in the unspiked estuary samples, compared to 87 to 92 percent in the artificial salt controls. Total copper EC₅₀ values calculated for estuary samples based on measured copper concentrations ranged from 83.4 to 90.5 μ g/L. For comparison, the mean EC₅₀ calculated for polished seawater spiked with copper was 12.2 μ g/L. The calculated WER values ranged from 6.84 to 7.42, with a geometric mean of 7.06.

Sample	EC ₅₀ (μg/L Total Cu)	Water-Effect Ratio
Site A-2	83.4	6.84
Site B-1	85.4	7.00
Site B-3	90.5	7.42
Site C-2	85.3	6.99
Polished Scripps Seawater ^a	12.2	NA
Scripps Seawater ^b	8.17	NA

Table 2. Total Copper WER Values for Santa Clara River Estuary Samples Calculated using Scripps Polished Seawater (measured concentrations)

^a Seawater from Scripps (see footnote b) was polished at Nautilus by passing it through a 0.2-µm filter.

^b Seawater from the Scripps Institute of Oceanography was sand filtered on-site prior to collection. This seawater was used used to conduct a standard copper reference toxicant test included here and in the laboratory reference toxicant control chart.

QA/QC

The bivalve development tests conducted on estuary samples resulted in lab controls with mean normal development of 88 to 89 percent, just below the 90 percent criterion. However, the results were deemed acceptable for reporting purposes because: 1) the mean values for normal development were close to the criterion; and 2) the range of values among control replicates included several values exceeding the criterion.

The reference toxicant test conducted met test acceptability criteria, and the EC_{50} fell within two standard deviations of laboratory control chart mean (Appendix C).

LITERATURE CITED

- American Society for Testing and Materials (ASTM), 1999. Standard guide for conducting static acute toxicity tests starting with embryos of four species of saltwater bivalve molluscs. ASTM Designation: E 724-98.
- Tidepool Scientific Software. 2001-2002. Comprehensive Environmental Toxicity Information System (CETIS), version 1.025B.
- U.S. EPA. 2000. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California. Federal Register Volume 65 No. 97, May 2000.
- U.S. EPA, 2001. Streamlined Water-Effect Ratio Procedure for Discharges of Copper. U.S EPA Office of Water, Washington DC. (EPA-822-R-01-005), March 2001.

APPENDIX A TEST RESULT SUMMARY

Appendix Table A-1. Water-Effect Ratio Summary Results City of Buenaventura Santa Clara River Estuary Dry Sampling Event Test Initiation Date: July 22, 2004 Test Species: *Mytilus galloprovincialis*

Site ID	Nominal Spiked Copper (µg/L) [*]	Measured Total Copper (µg/L) ^b	Mean Percent Normal Development ^c	EC₅₀ (µg/L total copper) ^d
	Lab Control	5.61	89 +/- 4.6	······································
	Salt Control	8.68	92 +/- 1.9	
	0 (Unspiked Sample)	3.45	86 +/- 6.5	
	9.0	NM	86 +/- 5.6	
Δ-2	15	NM	77 +/- 1.9	83.4
	25	39.0	83 +/- 7.8	(58.9-122)
	40	54 4	66 +/- 37	
	65	80.2	51 +/- 30	
	100	116	27 +/- 6 8	
	Lab Control	5.61	80 +/- 0.0	
	Lab Control	5.01	09 +/- 4.0	
	O (Upanikad Sample)	0.00	92 +/- 1.9	
	0 (Unspiked Sample)	3.47	00 +/- 3.4	
-	9.0	NM	90 +/- 2.5	85.4
B-1	15	NM	84 +/- 15	(82.7-88.8)
	25	NM	69 +/- 38	(
	40	53.0	87 +/- 4.3	
	65	79.8	64 +/- 10	
	100	115	0.46 +/- 1.0	
	Lab Control	5.61	88 +/- 4.3	
	Salt Control	8.68	87 +/- 4.5	
	0 (Unspiked Sample)	3.67	86 +/- 8.8	
	9.0	NM	86 +/- 4.7	90.5
B-3	15	NM	82 +/- 3.3	90.5 (94.4.05.0)
	25	NM	85 +/- 5.5	(04.4-95.9)
	40	51.9	81 +/- 6.1	
	65	75.1	72 +/- 12	
	100	116	6.8 +/- 3.3	
	Lab Control	5.61	88 +/- 4.3	
	Salt Control	8.68	87 +/- 4.5	
	0 (Unspiked Sample)	3.41	89 +/- 1.7	
	9.0	NM	86 +/- 2.4	
C-2	15	NM	87 +/- 4.3	85.3
• •	25	NM	80 +/- 15	(71.7-94.9)
	40	49.2	86 +/- 4 3	
	65	77 1	58 +/- 3 2	
	100	114	08 1/- 3.2	
	0 (Lab Control)	114 NIM	96 ±/ 2.0	
			00 +/- 2.9	
	1.0	INIVI NIM	87 +1- 2.7	
Laboratory Dallahad	3.0	NM 9,70	90 +/- 2.9	
Laboratory Polished	5.0	8.79	82 +/- /.0	12.2
Seawater (PSW)	8.4	12.6	62 +/- 7.1	
	14	13.0	6.0 +/- 3.7	
	23	24.0	0.40 +/- 0.89	
	39	NM	0.00	
	0 (Lab Control)	NM	91 +/- 2.5	
	2.5	NM	83 +/- 5.9	
Copper Reference	5.0	NM	83 +/- 3.4	8.17
Toxicant Test	10	NM	21 +/- 7.9	(7.52-8.67)
	20	NM	0.00	
	40	NM	0.00	

^a Nominal spiked concentrations do not include the background concentrations of copper in the field samples.

^b Total measured copper includes spiked plus background concentrations of copper in each sample.

^c Values presented for mean percent normal development in unspiked samples are results from the tests initiated on 21 July 2004 for 100% sample amended with artificial sea salts. All values are shown +/- 1 standard deviation.

^d EC₅₀ values were calculated using measured copper concentrations and were based on comparison to the salt control. Development in the unspiked sample was not included in the analysis. The 95% confidence intervals are displayed below each value in parentheses. Values in **bold** indicate a significant decrease in normal development was observed in that test concentration relative to the control.

APPENDIX B STATISTICAL ANALYSIS SUMMARIES & RAW BENCH DATASHEETS

A-2

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CETIS Test Summary

Page 1 of 1 Report Date: 21 Oct-04 11:24 AM Link: 19-4018-7366/0407-061a

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)								
Test No: Start Date: Ending Date: Setup Date:	10-3873-8927 22 Jul-04 05:00 PM 24 Jul-04 03:00 PM 22 Jul-04 05:00 PM		Test Type: Protocol: Dil Water: Brine:	Development ASTM E724-98 (1999) Laboratory Seawater Forty Fathoms			Duration: Species: Source:	46h Mytilis galloprovincialis Field Collected
Sample No: Sample Date: Receive Date: Sample Age: Comments:	13-3403-5050 20 Jul-04 02:50 PM 21 Jul-04 07:45 AM 50h (19.3 °C) Date entered with measur		Material: Code: Source: Station: ed copper valu	Aaterial: Estuarine Monitoring Sample Code: 0407-061a Source: City of Buenaventura Station: WER (A-2) copper values		ample	Client: Project:	City of Buenaventura
Comparison S	Summary							
Analysis	Endpoint T2 Proportion Normal		NOEL < 39	NOEL LOP				Method Steel's Many-One Rank
Deline Feelinget								
Point Estimate Analysis	e Summary Endpoint		% Effe	ct Co	nc-µg/L	95% LCL	95% UCL	Method
13-0300-2359	Proportion Normal		25 50	54. 83.	84115 39790	21.30472 58.86151	72.59219 121.90670	Linear Regression
Proportion Normal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	cv
5.6	Lab Control	5	0.88600	0.85000	0.96000	0.02040	0.04561	5.15%
8.7	Salt Control	5	0.91600	0.89000	0.94000	0.00872	0.01949	2.13%
39		5	0.82567	0.70130	0.90000	0.03467	0.07752	9.39%
54.4		5	0.65910	0.00000	0.88000	0.16609	0.3/140	56.35%
80.2		5	0.50913	0.01000	0.75000	0.13504	0.30197	59.31%
115		5	0.26621	0.20455	0.37000	0.03028	0.06772	25.44%
Proportion No	ormal Detail							
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
5.6	Lab Control	0.86000	0.96000	0.85000	0.86000	0.90000		
8.7	Salt Control	0.91000	0.94000	0.89000	0.93000	0.91000		
39		0.70130	0.83000	0.88000	0.81707	0.90000		
54.4		0.78000	0.00000	0.88000	0.86000	0.77551		
80.2		0.75000	0.64000	0.01000	0.44565	0.70000		
115		0.37000	0.28000	0.27000	0.20455	0.20652		

Page 1 of 1

CETIS Analysis Detail

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)										
Endpoint		An	Analysis Type Sample Link Control Link					Date Analyzed Version		
Proportion Normal			mparison		19-4018-7	19-4018-7366 19-401		21 Oct-04 11:23	AM CETISv1.025	
Method		Alt	H Data	Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-	One Rank	C :	>T Angu	lar (Corrected	1)	<39	39		N/A	37.05%
ANOVA Assu	Imptions									
Attribute	Test		Stati	stic Cr	ritical P	Level	Decisio	n(0.01)		
Variances	nces Bartlett		26.38	3464 13	13.27671 0.00		03 Unequal Variances			
Distribution Shapiro-Wilk W 0.75326 0.88746 0.00001 Non-normal Distribution										
ANOVA Table										
Source	Sum of	Squares	Mean Squ	uare DF	F Statist	ic P Level		Decision(0.05)		
Between	1.74832	3	0.4370809	9 4 5 20	5.35	0.00429		Significant Effect		
Total	3 38359	2	0.5188445	5 20						
Group Comp	arisons		Chatiatia	Critical	Disust	Tine	Dee	i		
Sample	vs Sample		Statistic	17	P Level	1 les	Dec	ision(0.05)		
87	54 4		15	17	<= 0.0500	1	Sigr	ificant Effect		
87	80.2		15	17	<= 0.0500	1	Sigr	ificant Effect		
87	115		15	17	<= 0.0500	1	Sigr	ificant Effect		
0.7	110				- 0.0000		Sigi			
Data Summary		. .	Original Data				Transformed Data			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD 0.01040	Mean	Minimum	Maximum	SD 0.03540
30	Salt Control	5	0.91000	0.09000	0.94000	0.07752	1.27020	7 0 00257	1.32333	0.03040
54.4		5	0.65910	0.00000	0.88000	0.37140	0.02282	0.99207	1.24905	0.09937
80.2		5	0.50913	0.01000	0.75000	0.30197	0.9220	5 0.00002	1.21705	0.49100
115		5	0.26621	0.20455	0.37000	0.06772	0.53979	0.46931	0.65389	0.07579
Graphics										
Graphics										
1.0				÷.,		0.4-		:		
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	8.7 3	39 5	4.4 80.2	115		-2.0	-1.5 -1	.0 -0.5 0.0 0	.5 1.0 1.5	2.0
		Conc	:-μg/L					Rankits		



 Linear Regression:
 Page 1 of 2

 Report Date:
 21 Oct-04 11:24 AM

 Analysis:
 13-0300-2359/0407-061a

Nautilus Environmental (CA)

CETIS Analysis Detail

Bivalve Larval Survival and Development Test

Endpoint Analysis				ysis Type Sample			Link Control Link		lyzed	Version
Proportion	Normal	Lin	ear Regressio	n	19-4018-7366		-4018-7366	21 Oct-04	11:23 AN	A CETISv1.025
Linear Regression Options										
Model Threshold Option			Lower Thres	hold Thi	Threshold Optimized		Reweighted Poo		oups l	Heterogeneity Corr.
Log-Norma	Normal Control Threshold		0.084	Yes	5	Yes	Yes		Ň	Yes
Regression Parameters										
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Statisti	c P Leve	el Dec	ision(0.0	5)
Threshold	0.08262	0.05947	7 -0.04	234	0.20757	1.389	0.2992	26 Not	Significar	nt
Slope	3.70500	1.18787	7 1.20	938	6.20062	3.119	0.0892	25 Not	Significan	nt
Intercept	-2.11788	2.23721	-6.81	808	2.58232	-0.947	0.4437	73 Not	Significar	nt
Regression Summary										
lters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critic	al PLe	vel De	cision(0.0	05)
4	-575.74210	-0.57163	0.26991	0.4537	1 432.0360	00 28.86	930 0.00	000 Sig	nificant H	eterogeneity
Residual Analysis										
Attribute Method			Statis	tic	Critical P Level		Decisi	Decision(0.05)		
Variances	Modified Levene		1.18042		3.05557	0.35899 Equal V		Variances		
Distribution	n Shapiro-Wilk W		0.75472		0.90456	0.00007 Non-nor		rmal Distribution		
Point Estimates										
% Effect	Conc-µg/L	95% LCL	95% U	CL						
25	54.84115	21.30472	72.592	19						
50	83.39790	58.86151	121.90	670						
Data Sumr	nary		Calculated Variat			e(A/B)				
Conc-µg/L	Control Type	Count	Mean	Minimum	n Maximum	SE	SD	А	в	
8.7	Salt Control	5	0.91600	0.89000	0.94000	0.00398	0.01949	458	500	
39		5	0.82567	0.70130	0.90000	0.01582	0.07752	382	459	
54.4		5	0.65910	0.00000	0.88000	0.07581	0.37140	328	498	
80.2		5	0.50913	0.01000	0.75000	0.06164	0.30197	251	492	
115		5	0.26621	0.20455	0.37000	0.01382	0.06772	129	480	

Analyst: Att Approval:
CETIS Analysis Detail

 Linear Regression:
 Page 2 of 2

 Report Date:
 21 Oct-04 11:24 AM

 Analysis:
 13-0300-2359/0407-061a





Analyst.Att

 Test Summary:
 Page 1 of 1

 Report Date:
 23 Aug-04 10:08 AM

 Link:
 15-6742-6728/0407-061

Bivalve Larva	I Survival and [Developm	ent Test					AMEC Bioassay SD			
Test:10-3873-8927Test Type:DevelopmentDStart Date:22 Jul-04 05:00 PMProtocol:ASTM E724-98 (1999)SEnd Date:24 Jul-04 03:00 PMDil Water:Laboratory SeawaterSSetup Date:22 Jul-04 05:00 PMBrine:Forty Fathoms						Duration: Species: Source:	46 Hours Mytilis galloprovincialis Carlobad Aquatarms field (olluct AH				
Sample:0Sampled:2Received:2Hold Time:5	01-4344-4927 20 Jul-04 02:50 F 21 Jul-04 07:45 A 50 Hours (19.3 °C	PM NM C)	Material: Code: Source: Station:	Estuarine M 0407-061 City of Bue WER (A-2)	Aonitoring S naventura	ample	Client: Project:	City of Buenaventura			
Comparison Summary											
Analysis 20-4366-2275	Endpoint Proportion Nor	mal	NOEL 9	LOI 15	EL	ChV 11.61895	MSDp 0.34469	Method Steel's Many-One Rank			
Point Estimate Analysis 03-8386-7232	e Summary Endpoint Proportion Nor	mal	% Effe 25 50	ect Cor 41.5 71.4	10-% 51814 43471	95% LCL 11.22233 46.57259	95% UCL 58.65912 115.29440	Method Linear Regression			
Proportion No	ormal Summary	,									
Conc ₂ % Conc	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	CV			
0	Lab Control	5	0.88600	0.85000	0.96000	0.02040	0.04561	5.15%			
0	Salt Control	5	0.91000	0.89000	0.94000	0.00872	0.01949	2.13%			
15		5	0.00449	0.78000	0.92000	0.02466	0.05559	0.43%			
25		5	0.82567	0.42043	0.03000	0.03467	0.07752	9 39%			
40		5	0.65910	0.00000	0.88000	0 16609	0.37140	56.35%			
65		5	0.50913	0.01000	0.75000	0.13504	0.30197	59.31%			
100		5	0.26621	0.20455	0.37000	0.03028	0.06772	25.44%			
Proportion No	ormal Detail										
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Lab Control	0.86000	0.96000	0.85000	0.86000	0.90000					
0	Salt Control	0.91000	0.94000	0.89000	0.93000	0.91000					
9		0.84000	0.89873	0.92000	0.78000	0.88372					
15		0.89000	0.84000	0.84000	0.42045	0.85057					
25		0.70130	0.83000	0.88000	0.81707	0.90000					
40		0.78000	0.00000	0.88000	0.86000	0.77551					
65		0.75000	0.64000	0.01000	0.44565	0.70000					
100		0.37000	0.28000	0.27000	0.20455	0.20652					

Approved By

 Comparisons:
 Page 1 of 1

 Report Date:
 19 Aug-04 10:31 AM

 Analysis:
 20-4366-2275

Bivalve Larval Survival and Development Test A-2 AMEC Bioassay SD											
Endpoint		Ar	alysis Type		Sample L	.ink	Control	Link D	ate Analyzed	Version	
Proportion No	rmal	Co	mparison		15-6742-6728 15-6742-6728 19 Aug-04 10:30 A					AM CETISV	1.024
Method		Al	tH Data	Transform	Z	N	IOEL L	LOEL Toxic Units		ChV	MSDp
Steel's Many-One Rank			> T Angu	lar (Corrected)		9	1	5	11.11	11.61895	34.47%
ANOVA Assu	mptions										
Attribute	Test		Stati	stic Cri	Critical P Leve		vel	Decision	(0.01)		
Variances	Bartlett		32.42	927 16.	81190 0	.000	001	Unequal \	/ariances		
Distribution	Shapiro-Wi	k W	0.773	.997 0.9	1004 0	.000	000	Non-norm	al Distribution		
ANOVA Table											
Source	Sum of S	Squares	Mean Squ	are DF	F Statist	ic	P Level	D	ecision(0.05)		
Between	2.105092	2	0.3508486	6 6	5.32		0.00090	S	ignificant Effect		
Error	1.845265		0.0659023 28								
Total	3.950356	672	0.416751	34							
Group Comp	arisons """A	L									
Control	vs Conc-%		Statistic	Critical	P Level Ties		Ties	Decis	sion(0.05)		
Salt Control	9		19	16	>0.05		1	Non-S	Significant Effect		
	15		15.5	16	<=0.05	3	3	Signif	icant Effect		
	25		16	16	<=0.05	<=0.05 1		Signif	icant Effect		
	40		15	16	<=0.05		1	Signif	icant Effect		
	65		15	16	<=0.05	1	1	Signif	icant Effect		
	100		15	16	<=0.05		1	Signif	icant Effect		
Data Summa	ſŷ			Origi	nal Data				Transfo	rmed Data	
Conc-% Ngh	Control Type	Count	Mean	Minimum	Maximum		SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.91600	0.89000	0.94000	(0.01949	1.27826	1.23273	1.32333	0.03540
9		5	0.86449	0.78000	0.92000	(0.05559	1.19913	1.08259	1.28404	0.07941
15		5	0.76821	0.42045	0.89000	(0.19549	1.08614	0.70551	1.23273	0.21492
25		5	0.82567	0.70130	0.90000	(0.07752	1.14667	0.99257	1.24905	0.09937
40		5	0.65910	0.00000	0.88000	(0.37140	0.92283	0.05002	1.21705	0.49185
65		5	0.50913	0.01000	0.75000	C	0.30197	0.75935	0.10017	1.04720	0.38734
100		5	0.26621	0.20455	0.37000	(0.06772	0.53979	0.46931	0.65389	0.07579

Approved By:

Linear Regression: Page 1 of 1 Report Date: 19 Aug-04 10:31 AM

Analysis:

03-8386-7232

-

Bivalve Larval Survival and Development Test A-2 AMEC Bioassay SD											
Endpoint		An	alysis Type		Sample	Link C	Control L	ink Date	Analyzed	Version	
Proportion N	lormal	Lin	ear Regressio	on	15-6742	-6728 1	5-6742-6	728 19 A	ug-04 10:30 AN	A CETISv1.024	
Linear Regr	ression Options	5									
Model	Threshold	Option	Lower Thres	hold Thre	eshold Optimi	zed R	eweighte	d Pool	ed Groups H	leterogeneity Corr.	
Log-Normal	Control Th	reshold	0.084	Yes		Y	es	No	Y	′es	
Regression	Parameters										
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Statis	stic P	Level	Decision(0.0	5)	
Threshold	0.12687	0.04767	7 0.02	922	0.22453	2.661	0.	05631	Not Significan	t	
Slope	2.86199	0.97092	2 0.87	316	4.85083	2.948	0.	04206	Significant		
Intercept	-0.30587	1.74111	-3.87	238	3.26063	-0.176	0.	86908	Not Significan	t	
Regression Summary											
lters L	.og Likelihood	Mu	Sigma	G Stat	Chi-Sq	Criti	ical	P Level	Decision(0.0)5)	
15 -	-751.40970	-0.10687	0.34941	0.48290	577.2470	0 41.3	3714	0.00000	Significant H	eterogeneity	
Residual Analysis											
Attribute	Method		Statis	stic C	Critical	P Level	D	ecision(0.0)5)		
Variances	Modified	Levene	1.577	54 2	2.52766	0.19869	E	qual Varian	ces		
Distribution	Shapiro-	Wilk W	0.701	12 0	0.92671 0.0		000 Non-norm		Distribution		
Point Estim	ates ANIL										
% Effect	Conc-%	95% LCL	95% L	ICL							
25	41.51814	11.22233	58.659	912							
50	71.43471	46.57259	115.29	9440							
Data Summ	ary			Calc	ulated Variate	e(A/B)					
Conc-	Control Type	Count	Mean	Minimum	Maximum	SE	SD	А	в		
0	Salt Control	5	0.91600	0.89000	0.94000	0.0039	8 0.01	949 4	58 500		
9		5	0.86449	0.78000	0.92000	0.0113	5 0.05	559 40	01 465		
15		5	0.76821	0.42045	0.89000	0.0399	0 0.19	549 36	68 475		
25		5	0.82567	0.70130	0.90000	0.0158	2 0.07	752 38	32 459		
40		5	0.65910	0.00000	0.88000	0.0758	1 0.37	140 32	28 498		
65		5	0.50913	0.01000	0.75000	0.0616	4 0.30	197 2	51 492		
100		5	0.26621	0.20455	0.37000	0.0138	2 0.06	772 12	29 480		

Approved By

CETIS Worksheet

 Data Worksheet:
 Page 1 of 1

 Report Date:
 19 Jul-04 2:33 PM

 Link:
 15-6742-6728/0407-061

AMEC Bioassay SD

Bivalve Larval Survival a	nd De	evelopment Tes	t		AMEC BIOASSAY SD
Start Date: 24 Jul-04		Species:	Mytilis gallop	rovincialis	Sample Code: 0407-061
End Date: 23 Jul-04		Protocol:	ASTM (1993)	1994 1999	Sample Source: City of Buenaventura
Sampled: 20 Jul-04		Material:	Estuarine Mo	nitoring Sample	e Sample Station: WER (A-2)
Conc-	Pos	# Counted	# Normal		Notes
	161	82	67	HC	
and we have a second of the Statistical content with the second second second second second second second second	162	92	41	MC	
	163	98	76	re	
	164	100	37	Nec	
	165	100	15	RG	
	167	100	10	RG	
	168		43	RIC	
	169	100		RIA	
	170	100	6	DF-	
and the same way is the same a second structure of the same second structure of the same second structure of the	171	100	78	RG	
	172	100	άĊ	RG	
	173	/00	કર્ય	RG	
	174	100	94	mi	
	175	100	89	me	
	176	100	31	MC	
	178	100	QY	KY	
	179	BL	76	Rla	
	180		- BE	RIA	
	181	100	85	HL	
	182	100	64	R4	
	183	100	64	R4	
	184	100	୫୧	'RG	
	185	100	27	MC	
	186	100	90	MC	
	188	106	36	MC	
	189	NUL DA 76	25.04	Serg	
and the second	190	10170 17 10 20 17	26	K9	
	191	Kg 19 10	54	Ria	
	192	92	19	HC	
a a second a second secon	193	100	92	R6	
	194	ちて	18	Lic	
	195	100	a 1	hc	
	196	100	<u>у</u> с	K4	
	19/	00 An	51	RG	
and the second se	190	100	810	Ru	
	200	100	RA	ille	
Mes No	0			<u>~~</u>	CC dute puter or - 14
Sins A. Jana	X	p-1 Wil	n Shan	てししゃ	SC. Make enjoy or - ATT

CETIS Worksheet

Report Dat Link:

Data Worksheet:

te:	19 Jul-04 2:33 PM
	15-6742-6728/0407-061

Page 1 of 1

Bivalve Lar	al Sur	vival a	and De	evelopment Tes	t		AMEC Bioassay SD
Start Date:	24 Jul	-04		Species:	Mytilis galloprovincialis	Sample Code:	0407-061
End Date: 2	23 Jul	-04		Protocol:	ASTM (1993) 1994	Sample Source:	City of Buenaventura
Sampled:	20 Jul	-04		Material:	Estuarine Monitoring Sam	ple Sample Station:	WER (A-2)
Conc-	Code	Rep	Pos	# Counted	# Normal	Note	25
1910-	0 LC	1	199	100	86		
	0 LC	2	178	1000	496		
	0 LC	3	181	IDO	85		
	0 LC	4	187	1	86		
	0 LC	5	186		90		
	0 SC	1	195		91		
	0 SC	2	174		94		
	0 SC	3	175		89		
	0 SC	4	167		93		
	0 SC	5	176	<u>v</u>	91		
	9	1	188				
	9	2	189				
	9	3	193				
	9	4	171				
	9	5	179				
1	5	1	184				
1	5	2	173				
1	5	3	183				
1	5	4	197				
1	5	5	198				
2	5	1	191	ウフ	54		
2	5	2	168	100	83		
2	5	3	200	100	¥ X		
2	5	4	101	82	61		
2	0	5	190	100	90		
4	0 		170	100	8		
4	n	2	180	$\frac{1}{100}$	0		
4	0	4	177	100	88		
4	0	5	163	100	80		
6	5	1	165	100	25		
6	5	2	182				
6	5	- 3	169	100	1		
6	5	4	162	9.2	H I		
6	5	5	172		70		
10	0	1	164	làs	27		
10	0	2	190	100	36		
10	0	3	185		20		
10	0	4	194	88	18		
10	0	5	192	92-	19		

Sites A-2 and B-1 will shave LC + SC

QC:SH

Analyst: 5H

Reviewed By: AH 8-12-

Bivalve Development Bioassay Worksheet

Client: <u>City of Buenaventurn</u> Test No.: <u>0407-061-7065,0407121799</u> Vt E Test Species: <u>M. salloprovincialis</u> Tech Initials: <u>JR</u>	Start Date/Time: End Date/Time: Date Received:	7/22/04 17:00 7/24/04 15:00 7/22/04
Sample Type: WER		
Test Chamber Type and Sample Volume: <u>JOm 1 She</u>	11 Vials;	<u>10m1</u>
Spawn Initiation Time:		
Male Female Number of Spawners:		
Spawn Condition: Fair to Poor		
Fertilization Time: 1530		
Egg Stock Density Calculation:		
Eggs Counted (x): 7 11 13 18 10 13 6 12 Mean 8.2 13.2 Overall Mean: Mean: $10.7 \times 42 = 449.7 \text{ eggs/ml}$	10.7	
Initial Stock - $\frac{449.7_{eggs/ml}}{400 eggs/ml} = \frac{1.12}{1.12}$	ctor	
Percent Division Upon Inoculation: 30		
Time of Inoculation:00		
Comments:	AMEC Bioassay Labo 5550 Morehouse Driv	oratory e. Suite B
Reviewed/ Date: AH 8-12:04	San Diego, CA 92121 (858) 458-9044	

Marine Chronic Bioassay

Water Quality Measurements

Raw Datasheet

Client:	City of Bueraventura
Sample ID:	WER A-2, B-1
Test No.:	0407-061,062

Test Species: <u>M. galbprovincialis</u> Start/End Dates: <u>7-7:04 / 7-33-04</u> Start/End Times: <u>170</u> <u>1500</u>^{4/7}

Concentration	Te	Temperature			Salinity			olved Oxy	/gen	рН		
of Lan		(°C)		(ppt)				(mg/L)		(pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	15.1	14.4	14.5	30.0	30.2	30.2	8.9	9.0	9.2	8104	7.91	7.95
Salt Control	15.1	14.4	14.5	30,0	30.2	30.4	8.0	8.9	9.2	8.35	8.21	8,15
A-2 9149/L	15.3	14.2	14.5	30.0	30.3	30.5	9.0	8.0	8.7	8.88	8.70	8.59
A.2 15	15.4	14.2	14.4	30.2	30.6	30.7	9.1	8.0	8.7	8.89	8.70	8,60
A.2 25	15.4	14.2	14.3	30.3	30.6	30.7	9.1	8.6	8.7	8.90	8.71	8.60
A-2 40	15.4	14.1	14.3	30.2	30.5	30.7	9.2	8.0	5.7	8.90	8.71	8.60
A-2 65	15.3	14.0	14.3	30.2	30.5	30.6	9.3	8.1	8.6	8.90	8.71	8.59
A-3 100	15.5	14.0	142	30.1	30.4	30.6	9.4	8.0	8.5	8.90	8.71	8.59
B-1 9	15.4	14.7	14.5	30,0	30.1	30.2	9.2	8.3	۹.0	8.23	8.29	8.32
B-1 15	15.2	14.4	14.4	30.1	30.1	30.5	9.2	8.4	9.1	8.23	8.28	8.32
B-1 25	15.4	14.4	14.4	30.1	30.3	30.5	9.3	8.4	9.1	8.23	8.29	8.32
B-1 40	15.4	14.4	14.4	30.0	30.2	30.5	9.3	8.5	9.1	8.24	8.29	8.32
B.1 65	15.11	14.1	14.3	30.0	30.2	20.5	9,3	8.6	9.1	8.24	8.29	8.32
B-1 100	15.4	14.0	14.2	29.9	30.1	30.4	9.3	8.7	9.1	8.23	8.29	8.35

Technician Initials:

24 48 0 M ue SH

Animal Source/Date Received:

Mission Bay 7 122/04

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr., Suite B San Diego, CA 92121 B-1

CETIS Test Summary

Page 1 of 1 Report Date: 21 Oct-04 11:14 AM Link: 12-1341-7417/0407-062a

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)												
Test No: Start Date: Ending Date: Setup Date:	10-3873-8927 22 Jul-04 05:00 24 Jul-04 03:00 22 Jul-04 05:00) PM) PM) PM	Test Type: Protocol: Dil Water: Brine:	Developme ASTM E72 Laboratory Forty Fatho	ent 24-98 (1999) Seawater oms		Duration: Species: Source:	46h Mytilis galloprovincialis Field Collected				
Sample No: Sample Date: Receive Date: Sample Age:	03-2295-1435 20 Jul-04 01:40 21 Jul-04 07:49 51h (18.4 °C)	D PM 5 AM	Material: Code: Source: Station:	Estuarine M 0407-062a City of Bue WER (B-1)	Monitoring Si naventura	ample	Client: Project:	City of Buenaventura				
Comments: Data entered with measured copper values												
Comparison S Analysis	Comparison Summary Analysis Endpoint		NOEL	LO	EL	ChV	MSDp	Method				
07-8260-1802	Proportion Nor	mal	53	79.8 65.034		6.74%	Dunnett's Multiple Comparison					
Point Estimate Summary												
Analysis	s Endpoint		% Effe	ct Co	nc-µg/L	95% LCL	95% UCL	Method				
07-3648-8776	Proportion Nor	mal	25 50	79.01229 85.41254		75.87711 82.74161	81.57116 88.84130	Linear Regression				
Proportion No	ormal Summary											
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximu	m SE	SD	cv				
5.6	Lab Control	5	0.88600	0.85000	0.96000	0.02040	0.04561	5.15%				
8.7	Salt Control	5	0.91600	0.89000	0.94000	0.00872	0.01949	2.13%				
53		5	0.86800	0.83000	0.94000	0.01934	0.04324	4.98%				
79.8		5	0.64400	0.49000	0.76000	0.04589	0.10262	15.93%				
115		5	0.00460	0.00000	0.02299	0.00460	0.01028	223.61				
Proportion No	ormal Detail											
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
5.6	Lab Control	0.86000	0.96000	0.85000	0.86000	0.90000						
8.7	Salt Control	0.91000	0.94000	0.89000	0.93000	0.91000						
53		0.86000	0.87000	0.94000	0.83000	0.84000						
79.8		0.62000	0.76000	0.71000	0.49000	0.64000						
115		0.00000	0.02299	0.00000	0.00000	0.00000						

CETIS Analysis Detail

Comparisons: Page 1 of 1 Report Date: 21 Oct-04 11:14 AM

07-8260-1802/0407-062a

Analysis: **Bivalve Larval Survival and Development Test** Nautilus Environmental (CA) Endpoint Analysis Type Sample Link Control Link Date Analyzed Version 12-1341-7417 12-1341-7417 Proportion Normal Comparison 21 Oct-04 11:13 AM CETISv1.025 Method Alt H Data Transform z NOEL LOEL **Toxic Units** ChV MSDp Dunnett's Multiple Comparison C > T Angular (Corrected) 53 65.034 79.8 1.89 6.74% **ANOVA Assumptions** Attribute Statistic Critical Test P Level Decision(0.01) Variances Bartlett 5.16940 11.34487 0.15981 Equal Variances Distribution Shapiro-Wilk W 0.91082 0.86826 0.06605 Normal Distribution **ANOVA Table** Sum of Squares DF F Statistic Source Mean Square P Level Decision(0.05) Between 4.589399 1.5298 3 309.71 0.00000 Significant Effect Error 0.079032 0.0049395 16 4.66843086 1.5347391 19 Total **Group Comparisons** Statistic MSD Decision(0.05) Sample Sample Critical P Level vs 8.7 53 1.68122 2.23 > 0.0500 0.09912 Non-Significant Effect 2.23 8.7 79.8 7.74391 <= 0.0500 0.09912 Significant Effect 8.7 115 27.1244 2.23 <= 0.0500 0.09912 Significant Effect Data Summary **Original Data** Transformed Data Conc-µg/L **Control Type** Count Mean Minimum Maximum SD Mean Minimum Maximum SD 8.7 Salt Control 5 0.91600 0.89000 0.94000 0.01949 1.27826 1.23273 1.32333 0.03540 5 53 0.86800 0.83000 0.94000 0.04324 1.20353 1.14581 1.32333 0.07055 5 79.8 0.49000 0.93404 0.64400 0.76000 0.10262 0.77540 1.05882 0.10744 5 115 0.00460 0.00000 0.02299 0.01028 0.07258 0.05002 0.15221 0.04455 Graphics 1.0 0.15 9 ୍ 0 0.9 **Proportion Normal** 0.10 Reject Null 0.8 Centered Corr. Angle 0.05 0.7 0.6 000000000 0.00 0.5 00 -0.05 0.4 0.3 -0.10 0.2 -0.15 0.1 0.0 -0.20 8.7 53 79.8 -2.0 -1.5 -1.0 -0.5 0.0 0.5 115 1.0 1.5 2.0 Conc-µg/L Rankits



Linear Regression: Page 1 of 2

Report Date: Analysis: 07

21 Oct-04 11:14 AM

07-3648-8776/0407-062a

Nautilus Environmental (CA)

CETIS Analysis Detail

Bivalve Larval Survival and	Development Test
-----------------------------	------------------

Endpoint	Analysis Type				Sample	Link	Contro	l Link	Date Analy	zed	Version	
Proportion N	Normal	Lin	ear Regression	า	12-1341	-7417	12-134	1-7417	21 Oct-04 1	1:13 AM	CETISv1.025	
Linear Reg	ression Options											
Model	Threshold	Option	Lower Thres	hold Th	reshold Optimi	ptimized Reweigh		hted Pooled Groups		ups He	Heterogeneity Corr.	
Log-Normal	Control Th	reshold	0.084	Yes	Yes		Yes		No	Ye	25	
Regression	n Parameters											
Parameter	eter Estimate Std Er		or 95% LCL		95% UCL	t Stat	istic	P Level	Decis	ion(0.05)		
Threshold	0.10799	0.01732	2 0.070)57	0.14540	6.236		0.10123	3 Not Si	ignificant		
Slope	19.93939	2.83307	7 13.81	892	26.05987	7.038		0.08985	5 Not Si	ignificant		
Intercept	-33.51337	5.42566	6 -45.2	3481	-21.79194	-6.177		0.10218	3 Not Si	ignificant		
Regression Summary												
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Cr	itical	P Lev	el Deci	sion(0.05)	
8	-327.26000	-1.68076	0.05015	0.0942	40.45851	22	36203	0.000	35 Signi	ficant Het	erogeneity	
Residual A	nalysis											
Attribute	Method		Statis	tic	Critical P Le		evel Decision		on(0.05)			
Variances	Modified	Levene	1.763	28	3.58743	0.21212	12 Equal Vari		ariances			
Distribution	Shapiro-\	Wilk W	0.876	25	0.88071	0.04274	4 Non-normal E		rmal Distribut	ion		
Point Estin	nates											
% Effect	Conc-µg/L	95% LCL	95% U	CL								
25	79.01229	75.87711	81.571	16								
50	85.41254	82.74161	88.841	30								
Data Sumn	nary			Cal	culated Variate	e(A/B)			_			
Conc-µg/L	Control Type	Count	Mean	Minimum	n Maximum	SE	S	D	Α	в		
8.7	Salt Control	5	0.91600	0.89000	0.94000	0.003	98 0	.01949	458	500		
53		5	0.86800	0.83000	0.94000	0.008	83 0	.04324	434	500		
79.8		5	0.64400	0.49000	0.76000	0.020	95 0	.10262	322	500		
115		5	0.00460	0.00000	0.02299	0.002	10 0	.01028	2	449		

Analyst: At Approval:





 Test Summary:
 Page 1 of 1

 Report Date:
 23 Aug-04 10:00 AM

 Link:
 06-2836-6117/0407-062

AMEC Bioassay SD **Bivalve Larval Survival and Development Test** Duration: 46 Hours Test: 10-3873-8927 Test Type: Development Mytilis galloprovincialis Start Date: 22 Jul-04 05:00 PM Protocol: ASTM E724-98 (1999) Species: XCarlsbad Aquatarms Field collected End Date: 24 Jul-04 03:00 PM Dil Water: Laboratory Seawater Source: Setup Date: 22 Jul-04 05:00 PM Brine: Forty Fathoms City of Buenaventura Sample: 03-6446-9006 Material: Estuarine Monitoring Sample Client: Sampled: 20 Jul-04 01:40 PM Code: 0407-062 Project: Received: 21 Jul-04 07:45 AM Source: City of Buenaventura Hold Time: 51 Hours (18.4 °C) Station: WER (B-1) **Comparison Summary** Analysis Endpoint NOEL LOEL ChV MSDp Method 40 65 50.99020 0.25045 Steel's Many-One Rank 16-2969-9876 Proportion Normal **Point Estimate Summary** Method Analysis Endpoint % Effect Conc 95% LCL 95% UCL 05-8513-2623 Proportion Normal 50 59.7222 57.79022 61.71891 Trimmed Spearman-Karber **Proportion Normal Summary** Conc-y/M H Control Type Reps Mean SD cv Minimum Maximum SE 0 Lab Control 5 0.88600 0.85000 0.96000 0.02040 0.04561 5.15% 0 Salt Control 5 0.91600 0.89000 0.94000 0.00872 0.01949 2.13% 9 5 0.89800 0.88000 0.94000 0.01114 0.02490 2.77% 15 5 0.84000 0.58000 0.94000 0.06595 0.14748 17.56% 25 5 0.69000 0.02000 0.88000 0.16772 0.37503 54.35% 40 5 0.86800 0.83000 0.94000 0.01934 4.98% 0.04324 65 5 0.64400 0.49000 0.76000 0.04589 0.10262 15.93% 100 223.61 5 0.00460 0.00000 0.02299 0.00460 0.01028 **Proportion Normal Detail** Conc-Rep 1 Rep 2 Rep 3 Rep 4 Rep 5 Lab Control 0 0.86000 0.96000 0.85000 0.86000 0.90000 0 Salt Control 0.94000 0.91000 0.89000 0.93000 0.91000 9 0.89000 0.88000 0.94000 0.90000 0.88000 15 0.94000 0.58000 0.90000 0.91000 0.87000 25 0.83000 0.87000 0.88000 0.02000 0.85000 40 0.86000 0.87000 0.94000 0.83000 0 84000 65 0.62000 0.76000 0.71000 0.49000 0.64000 100 0.00000 0.02299 0.00000 0.00000 0.00000

Comparisons:Page 1 of 1Report Date:23 Aug-04 10:00 AM

16-2969-9876

Analysis:

Bivalve Larva	I Survival and D	evelop	ment Test							AMEC	Bioassay SD
Endpoint		An	alysis Type		Sample	Li	nk Contro	l Link	Date Analyzed	Versior	
Proportion No	mal	Co	mparison		06-2836	-61	17 06-283	6-6117	23 Aug-04 9:59	AM CETISV	1.024
Method		Ait	H Data	Transform	Z		NOEL I	OEL	Toxic Units	ChV	MSDp
Steel's Many-	One Rank	C :	>T Angu	lar (Corrected	1)		40 6	55	2.50	50.99020	25.04%
ANOVA Assu	mptions										
Attribute	Test		Stati	stic Cr	itical	ΡI	Level	Decisio	n(0.01)		
Variances	Bartlett		40.63	3643 16	.81190	0.0	00000	Unequal	Variances		
Distribution	Shapiro-Wil	k W	0.699	970 0.9	91004	0.0	00000	Non-nor	mal Distribution		
ANOVA Table	;										
Source	Sum of S	Squares	Mean Squ	are DF	F Statis	stic	c P Level		Decision(0.05)		
Between	5.382684		0.897114	6	23.02		0.00000		Significant Effec	t	
Error	1.091374		0.0389776	6 28							
Total	6.474057	44	0.9360916	34							
Group Comp	arisons	1									
Control	vs Conc-	Alle	Statistic	Critical	P Level		Ties	Dec	ision(0.05)		
Salt Control	9		21	16	>0.05		4	Non	-Significant Effe	ct	
	15		22.5	16	>0.05		2	Non	-Significant Effe	ct	
	25		15	16	<=0.05		1	Sign	ificant Effect		
	40		19.5	16	>0.05		2	Non	-Significant Effe	ct	
	65		15	16	<=0.05		1	Sign	nificant Effect		
	100		15	16	<=0.05		1	Sigr	ificant Effect		
Data Summa	ry			Orig	jinal Data				Transf	ormed Data	
Conc-	Control Type	Count	Mean	Minimum	Maximu	m	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.91600	0.89000	0.94000		0.01949	1.27826	5 1.23273	1.32333	0.03540
9		5	0.89800	0.88000	0.94000		0.02490	1.24784	1.21705	1.32333	0.04423
15		5	0.84000	0.58000	0.94000		0.14748	1.18123	0.86574	1.32333	0.18163
25		5	0.69000	0.02000	0.88000		0.37503	0.97596	6 0.14190	1.21705	0.46706
40		5	0.86800	0.83000	0.94000		0.04324	1.20353	3 1.14581	1.32333	0.07055
65		5	0.64400	0.49000	0.76000		0.10262	0.93404	0.77540	1.05882	0.10744
100		5	0.00460	0.00000	0.02299		0.01028	0.07258	0.05002	0.15221	0.04455

Approved By a fle

 Spearman-Karber:
 Page 1 of 1

 Report Date:
 23 Aug-04 10:00 AM

 Analysis:
 05-8513-2623

Bivalve Larval Survival and Development Test AMEC Bioassay SD											
Endpoint		An	alysis Type		Sample	Link Co	ntrol Link	Date An	alyzed	Version	
Proportion I	Normal	Tri	mmed Spear	ed Spearman-Karber 06-2836-6117 06-28			-2836-6117	23 Aug-(04 10:00 AM	CETISv1.024	
Spearman-Karber Options Point Estimates											
Threshold	Option Lower	Thresho	ld Trim L	evel Mu	Sigi	na	EC50/LC50		95% LCL	95% UCL	
Control Thr	eshold 0.084		1.97%	1.97% 1.776136 0.0		714098	1098 59.72227		57.79022	61.71891	
Data Sumn	nary			Calcu	lated Variate	(A/B)					
Conc-	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	в		
0	Salt Control	5	0.91600	0.89000	0.94000	0.00398	0.01949	458	500		
9		5	0.89800	0.88000	0.94000	0.00508	0.02490	449	500		
15		5	0.84000	0.58000	0.94000	0.03010	0.14748	420	500		
25		5	0.69000	0.02000	0.88000	0.07655	0.37503	345	500		
40		5	0.86800	0.83000	0.94000	0.00883	0.04324	434	500		
65		5	0.64400	0.49000	0.76000	0.02095	0.10262	322	500		
100		5	0.00460	0 00000	0 02299	0.00210	0.01028	2	449		



Bivalve Larval Survival an	d Dev	velopment Tes	t							AMEC I	Bioassay SE
Start Date: 221 Jul-04		Species:	Mytilis gall	oprovincialis			Sample	e Code:	0407-062		
Jul-04, وجبار End Date: مجبار		Protocol:	ASTM (19	33) 1999.			Sample	City of Buenaver	ntura		
Sampled: Clark Jul-04		Material:	Estuarine	Monitoring Sar	nple		Sample	e Station:	WER (B-1)		
Conc	os	# Counted	# Normal		R	2- CD	unt.	Note	S		
2	201	93	82	NB	1	100	84	$S\lambda$			
2	202	111	92	12		102	86	50			1
2	203	84	0	MC	1	•					
2	204	104	94	2		100	87	50			
2	205	85	74	2		100	87	_			
2	206	87	2	uc							
2	207	104	79	NR		100	83	50			
2	208	108	66	ß		100	76	SD			
2	209	86	O	uc			-				
2	210	102	93	18		100	90	SD			
2	211	100	85	RS		106	85	1			
2	212	115	46	12		100	88	17			
2	213	81	36	rs		100	38	ne			
2	214	116	54	12		106	62	He			
2	215	92	0	HC			1				
2	216	102	42	02		100	71	MC			
2	217	72	Ż	ß		100	2	Me			
2	218	103	86	RS		100	83	inc			
2	219	98	84	ß		100	94	m			
2	220	46	42	RS		100	49	MC			
2	221	100	90	MC							
2	222	100	83	ue		,					
2	223	100	88	ue							
2	224	100	94	ue							
2	225	100	94	LIC							
2	226	100	91	uc							
2	227	100	89	ne		t					
2	228	100	0	MC		1					
2	229	SOI	64	ue							
2	230	VOD	87	Me							
Sites A-2 and	B	-1 will	Shaw	e kc.	4 <	sc	1	$\circ a$	ta entry	90	eff-

Reviewed By: 8-2-04

Data Worksheet:

Report Date:

Link:

Page 1 of 1

06-2836-6117

19 Jul-04 2:35 PM

								Data Worksheet	: Page 1 of 1
CETI	C 111	Inrl	cch	oot				Report Date:	19 Jul-04 2:35 PM
			191	EEL				Link:	06-2836-6117
Bivalve La	rval Sur	vival	and D	evelopment Tes	t	,			AMEC Bioassay SD
Start Date:	net Jul	-04		Species:	Mytilis gallopre	ovincialis	Sample Code:	0407-062	
End Date:	1428 Jul	-04		Protocol:	ASTML(1993)	999	Sample Source:	City of Buenaven	tura
Sampled:	20 Jul	-04		Material:	Estuarine Mor	nitoring Sample	Sample Station:	WER (B-1)	
Conc-1/01	Code	Rep	Pos	# Counted	# Normal		Note	S	
JAN 1	9	1	227						
	9	2	223						
	9	3	225						
	9	4	221						
	9	5	222						
	15	1	224						
	15	2	213						
	15	3	210						
	15	4	226			and Mapping and an Apple results are an an an array when			
	15	5	230						
	25	1	205						
	25	2	207						
	25	3	212						
	25	4	217						
	25	5	211						
	40	1	202	100	86				
	40	2	204	100	87				
	40	3	219	100	94				
	40	4	218	100	83				And in the local division of the local divis
	40	5	201	100	84				
	65	1	214	100	62				
	65	2	208	100	76				
	65	3	216	100	7'				
	65	4	220	100	49				
	65	5	229	100	64				
1	100	1	209	86	0				
1	00	2	206	87	2				
1	100	3	228	100	0				
	100	4	215	92	0				
1	100	5	203	84	0				

Sites A. 2 and B-1 will share LC+SC

QC:SH



B-3

CETIS Test Summary

Page 1 of 1 Report Date: 21 Oct-04 11:16 AM Link: 04-3401-7925/0410-063a

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)										
Test No: Start Date: Ending Date: Setup Date:	10-3873-8927 22 Jul-04 05:0 24 Jul-04 03:0 22 Jul-04 05:0	0 PM 0 PM 0 PM	Test Type: Protocol: Dil Water: Brine:	Developr ASTM E Laborato Forty Fat	ment 724-98 (1999) ory Seawater thoms		46h Mytilis galloprovincialis Field Collected			
Sample No: Sample Date: Receive Date Sample Age: Comments:	11-4911-3396 20 Jul-04 10:4 : 21 Jul-04 07:4 54h (18.2 °C) Data entered w	0 AM 5 AM /ith measur	Material: Code: Source: Station: red copper val	Aaterial: Estuarine Monitoring Sample >ode: 0410-063a >ource: City of Buenaventura >station: WER (B-3) copper values.				City of Buenaventura		
Comparison	Summary									
Analysis 13-1131-6345	-1131-6345 Proportion Normal		NOEL 51.9	LOEL 75.1		ChV 62.431	MSDp 10.90%	Method Dunnett's Multiple Comparison		
Point Estimate Summary										
Analysis	alysis Endpoint		% Effe	ct C	Conc-µg/L	95% LCL	95% UCL	Method		
00-8347-8297	Proportion Nor	mal	25 50	80.31321 90.52885		72.77174 84.36038	85.94550 95.86558	Linear Regression		
Proportion No	ormal Summary									
Conc-µg/L	Control Type	Reps	Mean	Minimur	m Maximur	n SE	SD	cv		
5.6	Lab Control	5	0.87800	0.82000	0.93000	0.01934	0.04324	4.93%		
8.7	Salt Control	5	0.87000	0.83000	0.94000	0.02025	0.04528	5.20%		
51.9		5	0.80800	0.73000	0.90000	0.02746	0.06140	7.60%		
75.1		5	0.71800	0.53000	0.83000	0.05417	0.12112	16.87%		
116		5	0.06800	0.03000	0.12000	0.01463	0.03271	48.10%		
Proportion No	ormal Detail									
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5				
5.6	Lab Control	0.82000	0.86000	0.93000	0.91000	0.87000				
8.7	Salt Control	0.85000	0.94000	0.84000	0.83000	0.89000				
51.9		0.79000	0.73000	0.80000	0.90000	0.82000				
75.1	0.82000 0.83000 0.53000 0.71000 0		0.70000							
116	0.06000 0.12000 0.07000 0.03000 0.06000		0.06000							

Comparisons: Page 1 of 1 Report Date: 21 Oct-04 11:16 AM Analysis: 13-1131-6345/0410-063a

CETIS Analysis Detail

Endpoint	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)													
Lindpoint			An	alysis Type		Sam	Sample Link Control Link				k Date Analyzed Version			
Proportion No	ormal		Co	mparison		04-3	401-79	925	04-340	1-7925	325 21 Oct-04 11:16 AM CETISv1.02			.025
Method			Al	tH Data	Transform		z	NOE	L	LOEL	Toxic Units	ChV		MSDp
Dunnett's Mu	ultiple C	omparison	C	>T Angu	lar (Correcte	ed)		51.9		75.1	1.93	62.431		10.90%
ANOVA Ass	umptic	ons												
Attribute		Test		Stati	stic (Critical	Р	Level		Decisio	on(0.01)			
Variances		Bartlett		2.487	······································	1.34487	0.	47761		Equal V	/ariances			
Distribution		Shapiro-Wi	lk W	0.928	323 (0.86826	0.	14265		Normal	Distribution			
ANOVA Tab	le													
Source		Sum of	Squares	Mean Squ	are DF	FS	tatisti	c F	^o Level		Decision(0.05)			
Between		2.845392	2	0.9484642	3	111	.48	C	0.00000		Significant Effe	ct		
Error		0.136123	36	0.0085077	16									
Total		2.981516	508	0.9569719	19									
Group Com	pariso	ns												
Sample	vs	Sample		Statistic	Critical	P Leve	el	MSE	כ	De	cision(0.05)			
8.7		51.9		1.46134	2.23	> 0.0500)	0.13	009	No	n-Significant Effe	ect		
8.7		75.1		3.24704	2.23	<= 0.0500)	0.13	009	Sig	nificant Effect			
8.7		116		16.2634	2.23	<= 0.0500)	0.13	009	Sig	nificant Effect			
Data Summa	ary			Original Data							Trans	sformed [Data	
Conc-µg/L	Con	trol Type	Count	Mean	Minimu	m Maxii	num	SD		Mean	Minimur	n Maxi	mum	SD
8.7	Salt	Control	5	0.87000	0.83000	0.940	00	0.04	528	1.2068	1.14581	1.323	333	0.07309
51.9			5	0.80800	0.73000	0.900	00	0.06	0140	1.1216	0 1.02440	1.249	905	0.08176
/5.1			5	0.71800	0.03000	0.830	00	0.12	271	0.2581	0 0 17408	1.145	271 271	0.13309
110			5	0.06600	0.03000	0.120	00	0.03	2/1	0.2301	0 0.17408	0.550	5/4	0.00420
Graphics														
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2 0	.7		•	1	Reject Null			ingl	0.00		-	000		
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0 tion								ວຶ ອັ	-0.05					
portion 0 0	.5								1					
Proportion 0 0	.5								-0.10	0				
Proportion 0 0 0 0	.5								-0.10 -0.15	0	~			
Proportion	.5 .4 .3 .2								-0.10 -0.15 -0.20	0	~			
Proportion	.5 .4 .3 .2				4				-0.10 -0.15 -0.20	0	~			
Proportion		8.7	51.9	75.1	4 116	-			-0.10 -0.15 -0.20 -0.25 -2	© .0 -1.5	-1.0 -0.5 0.0	0.5 1.0	1.5	2.0



CETIS Analysis Detail

Linear Regression: Page 1 of 2

Report Date:

21 Oct-04 11:16 AM

		Clair						Analysis	: (0-8347-8297/0410-063a
Bivalve La	rval Survival and	Developm	ent Test						Nautilu	s Environmental (CA)
Endpoint		An	alysis Type		Sample	Link Co	ntrol Link	Date Analy	zed	Version
Proportion N	Normal	Lin	ear Regression		04-3401	-7925 04-3	3401-7925	21 Oct-04 1	1:16 AM	CETISv1.025
Linear Reg	ression Options									
Model	Threshold	Option	Lower Thresh	old Three	shold Optimi	zed Rev	veighted	Pooled Grou	ups Het	terogeneity Corr.
Log-Normal	Control Thr	reshold	0.13	Yes		Yes		No	Yes	3
Regression	n Parameters									
Parameter	Estimate	Std Err	or 95% L	CL 9	5% UCL	t Statistic	P Leve	el Decis	ion(0.05)	
Threshold	0.16028	0.02389	0.108	67 0	.21189	6.709	0.0942	20 Not Si	ignificant	
Slope	12.97095	1.56828	9.582	38 1	6.35902	8.271	0.0766	50 Not Si	ignificant	
Intercept	-20.38139	3.11643	3 -27.11	403 -	13.64875	-6.540	0.0965	59 Not Si	ignificant	
Regression	n Summary									
lters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critica	l PLe	vel Deci	sion(0.05)	
5	-311.55800	-1.57131	0.07710	0.06823	53.92818	22.362	03 0.00	000 Signi	ficant Hete	erogeneity
Residual A	nalysis						· · · · · · · · · · · · · · · · · · ·			
Attribute	Method		Statist	ic Ci	ritical	P Level	Decisi	ion(0.05)		
Variances	Modified	Levene	5.3155	7 3.	58743	0.01652	Unequ	al Variances		
Distribution	Shapiro-V	Wilk W	0.9107	7 0.	88071	0.14244	Norma	I Distribution		
Point Estin	nates									
% Effect	Conc-µg/L	95% LCL	95% UC	L						
25	80.31321	72.77174	85.9455	50						
50	90.52885	84.36038	95.8655	58						
Data Sumn	nary			Calcu	lated Variat	e(A/B)				
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	А	в	
8.7	Salt Control	5	0.87000	0.83000	0.94000	0.00924	0.04528	435	500	
51.9		5	0.80800	0.73000	0.90000	0.01253	0.06140	404	500	
75.1		5	0.71800	0.53000	0.83000	0.02472	0.12112	359	500	
116		5	0.06800	0.03000	0.12000	0.00668	0.03271	34	500	





Analyst: Att

 Test Summary:
 Page 1 of 1

 Report Date:
 23 Aug-04 10:10 AM

 Link:
 20-4972-3352/0407-063

Bivalve Larva	Bivalve Larval Survival and Development Test AMEC Bioassay SD										
Test: 10-3873-8927 Start Date: 22 Jul-04 05:00 PM End Date: 24 Jul-04 03:00 PM Setup Date: 22 Jul-04 05:00 PM			Test Type: Protocol: Dil Water: Brine:	Developme ASTM E72 Laboratory Forty Fathe	ent 4-98 (1999) Seawater oms		Duration: Species: Source:	46 Hours Mytilis galloprovincialis Garlspad Aquafam s Held Collected			
Sample: 06-3770-9493 Sampled: 20 Jul-04 10:40 AM Received: 21 Jul-04 07:45 AM Hold Time: 54 Hours (18.2 °C)			Material: Code: Source: Station:	Iterial: Estuarine Monitoring Sample ode: 0407-063 ource: City of Buenaventura ation: WER (B-3)			Client: Project:	City of Buenaventura			
Comparison Summary											
08-0736-8131	Proportion Nor	mal	40	65		50.99020	0.10798	Dunnett's Multiple Comparison			
Point Estima Analysis 07-5906-3447	te Summary Endpoint Proportion Nor	mal	% Effe 25 50	ect Co 69. 78.	nc-%M9 ^{1/2} 39398 14755	95% LCL 65.15742 74.60044	95% UCL 72.86250 81.42194	Method Linear Regression			
Proportion N	ormal Summary	,									
Conc-	Control Type	Reps	Mean	Minimum	Maximu	n SE	SD	CV			
0	Lab Control	5	0.87800	0.82000	0.93000	0.01934	0.04324	4.93%			
0	Salt Control	5	0.87000	0.83000	0.94000	0.02025	0.04528	5.20%			
9		5	0.85847	0.80233	0.92000	0.02123	0.04747	5.53%			
15		5	0.82200	0.78000	0.87000	0.01463	0.03271	3.98%			
25		5	0.84933	0.78667	0.92000	0.02471	0.05525	6.50%			
40		5	0.80800	0.73000	0.90000	0.02746	0.06140	7.60%			
65		5	0.71800	0.53000	0.83000	0.05417	0.12112	16.87%			
100		5	0.06800	0.03000	0.12000	0.01463	0.03271	48.10%			
Proportion N	ormal Detail										
Conc-24	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Lab Control	0.82000	0.86000	0.93000	0.91000	0.87000					
0	Salt Control	0.85000	0.94000	0.84000	0.83000	0.89000					
9		0.88000	0.80233	0.92000	0.82000	0.87000					
15		0.83000	0.87000	0.82000	0.78000	0.81000					
25		0.78667	0.84000	0.92000	0.81000	0.89000					
40		0.79000	0.73000	0.80000	0.90000	0.82000					
65		0.82000	0.83000	0.53000	0.71000	0.70000					
100		0.06000	0.12000	0.07000	0.03000	0.06000					

Approved By

Page 1 of 1 Comparisons: Report Date:

19 Aug-04 10:47 AM 08-0736-8131

	Report								Analysis:		08-0736-8131
Bivalve Larva	al Survival and [Develop	ment Test	8-3						AMEC E	Bioassay SD
Endpoint		Ar	alysis Type		Sample I	_ink	Control	Link	Date Analyzed	Version	
Proportion No	rmal	Co	mparison 20-4972-3352 20-4972-3352					2-3352	19 Aug-04 10:47	AM CETISV	1.024
Method		Al	tH Data	Transform	Z	N	DEL L	.OEL	Toxic Units	ChV	MSDp
Dunnett's Mul	tiple Comparison	C	> T Angu	lar (Corrected))	40	6	5	2.50	50.99020	10.80%
ANOVA Assi	Imptions										
Attribute	Test		Statis	stic Crit	tical F	P Lev	rel	Decisio	n(0.01)		
Variances	Bartlett		5.131	73 16.8	81190 0).527	03	Equal Va	ariances		
Distribution	tribution Shapiro-Wilk W			244 0.9	1004 0	0.175	78	Normal (Distribution		
ANOVA Tabl	e										
Source	Sum of	Squares	Mean Squ	are DF	F Statis	tic	P Level		Decision(0.05)		
Between	3.462545	5	0.5770908	6	85.64		0.00000		Significant Effect		
Error	0.188689	94	0.0067389	28							
Total	3.651234	105	0.5838297	34							
Group Comp	arisons	a12									
Control	vs Conc-%	ų.	Statistic	Critical	P Level	N	ISD	Dec	ision(0.05)		
Salt Control	9		0.3409441	2.408571	>0.05	0	1250502	Non	-Significant Effec	t	
	15		1.35402	2.408571	>0.05	0	1250502	Non	-Significant Effec	t	
	25		0.5691272	2.408571	>0.05	0	1250502	Non	-Significant Effec	t	
	40		1.641965	2.408571	>0.05	0	1250502	Non	-Significant Effec	t	
	65		3.648373	2.408571	<=0.05	0	1250502	Sign	ificant Effect		
	100		18.27362	2.408571	<=0.05	0	1250502	Sign	ificant Effect		
Data Summa	ry			Origi	nal Data				Transfo	ormed Data	
Conc-Sual	Control Type	Count	Mean	Minimum	Maximum	n S	D	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.87000	0.83000	0.94000	0	.04528	1.20685	5 1.14581	1.32333	0.07309
9		5	0.85847	0.80233	0.92000	0	.04747	1.18915	5 1.11006	1.28404	0.06963
15		5	0.82200	0.78000	0.87000	0	.03271	1.13655	5 1.08259	1.20193	0.04350
25		5	0.84933	0.78667	0.92000	0	.05525	1.17730	1.09068	1.28404	0.08000
40		5	0.80800	0.73000	0.90000	0	.06140	1.12160	1.02440	1.24905	0.08176
65		5	0.71800	0.53000	0.83000	0	12112	1.01743	0.81542	1.14581	0.13369
100		5	0.06800	0.03000	0.12000	0	.03271	0.25810	0.17408	0.35374	0.06428

Approved BCCHA \$21

Linear Regression: Page 1 of 1 19 Aug-04 10:47 AM Report Date: Analysis:

07-5906-3447

Bivalve La	rval Survival and	d Developr	nent Test	5-3							AMEC Bioassay SD
Endpoint		An	alysis Type		Sample	Link	Contro	l Link	Date Ana	lyzed	Version
Proportion I	Normal	Lin	ear Regressio	n	20-4972	-3352	20-497	2-3352	19 Aug-04	10:47 A	AM CETISv1.024
Linear Reg	ression Options	;									
Model	Threshold	Option	Lower Thres	hold Th	reshold Optim	ized	Reweig	ghted	Pooled Gr	oups	Heterogeneity Corr.
Log-Normal	I Control Th	reshold	0.13	Ye	S		Yes		No		Yes
Regression	n Parameters										
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Sta	tistic	P Leve	Dec	ision(0.	05)
Threshold	0.15763	0.01190	0.13	325	0.18201	13.24	6	0.0001	9 Sigr	ificant	
Slope	13.07313	1.2070	1 10.60	0069	15.54558	10.83	1	0.0004	1 Sigr	ificant	
Intercept	-19.74633	2.3204	1 -24.4	9947	-14.99320	-8.510)	0.0010	5 Sigr	ificant	
Regression	n Summary										
Iters	Log Likelihood	Mu	Sigma	G Stat	t Chi-Sq	Cr	itical	P Lev	vel De	cision(0	.05)
7	-263.01960	-1.51045	0.07649	0.0357	77 73.41887	7 41	.33714	0.000	01 Sig	nificant I	Heterogeneity
Residual A	nalysis										
Attribute	Method		Statis	tic	Critical	P Leve		Decisio	on(0.05)		
Variances	Modified	Levene	8.274	80	2.52766	0.0000	3	Unequa	al Variance	5	
Distribution	Shapiro-V	Wilk W	0.699	83	0.92671	0.0000)	Non-no	ormal Distrib	oution	
Point Estin	nates ()										
% Effect	Conc-	95% LCL	95% U	CL							
25	69.39398	65.15742	72.862	50							
50	78.14755	74.60044	81.421	94							
Data Sumn	nary			Cal	culated Variate	e(A/B)					in fan de serve de sonse appendisense man sedemente and e se
Conc-	Control Type	Count	Mean	Minimur	n Maximum	SE	S	SD	- A	в	
0	Salt Control	5	0.87000	0.83000	0.94000	0.00	924 0	.04528	435	500	
9		5	0.85847	0.80233	0.92000	0.00	969 0	.04747	418	486	
15		5	0.82200	0.78000	0.87000	0.00	668 0	.03271	411	500	
25		5	0.84933	0.78667	0.92000	0.01	128 0	.05525	405	475	
40		5	0.80800	0.73000	0.90000	0.01	253 0	.06140	404	500	
65		5	0.71800	0.53000	0.83000	0.024	172 0	.12112	359	500	
100		5	0.06800	0.03000	0.12000	0.00	668 0	0.03271	34	500	

Approved By

 Data Worksheet:
 Page 1 of 1

 Report Date:
 19 Jul-04 2:38 PM

 Link:
 20-4972-3352

AMEC Bioassay SD

Bivaive Larvai Survival and De	evelopment les	t		
Start Date: 221 Jul-04	Species:	Mytilis gallo	provincialis	Sample Code: 0407-063
End Date: 2+23 Jul-04	Protocol:	ASTM (199 3	3) 199 4	Sample Source: City of Buenaventura
Sampled: 20 Jul-04	Material:	Estuarine M	onitoring Sample	Sample Station: WER (B-3)
Conc-	# Counted	# Normal		Notes
231	100	53	RG	
232	/00	92	1.67	
233	100	ठम	MC	
234	100	10	KG	
235	100	80	Pla	
237	100	00	RG RI	
238	15	21	DI	
239		100	24	
240	(°, C	109	RG	
241	10000	89	MC	
242	100	79	SH	
243	100	83	SH	
244	100	81	SH	
245	100	91	MC	
246	im	ଟ୍ଟ	stt	
247	100	93	MC	
248	100	83	SH	
249	100	82	St	
250	100	83	MC	
251	ìœí	89	SH	
252	<u>)00</u>	87	Sh	
253	10D	·†	MC	
254	100	84	SH	
200	:00	82	511	
250	100	¥5)	uc	
257	100	40	Stt	
259	100	S1	AC	
260	100	12		
261	100	94	He.	
262	ŝ	92	SH	
263	100	81	SH	
264	100	6	MC	
265	1DD	23	SD	
266	iou	87		
267	100	-/1	Ú	
268	100	6	йc	
269	100	82	SD	
270	100	82	uc	

sites B3 and C-2 will share LC+SC. data entry QC=Att

Analyst: <u>Rh. M.</u>, Reviewed By: <u>AHE</u>12-C SD, SH

CETIS V	Vor	ksh	eet			Report Date: Link:	19 Jul-04 2:38 PM 20-4972-3352
Bivalve Larval Su	urvival	and De	evelopment Tes	it			AMEC Bioassay SD
Start Date: 224 J	ul-04		Species:	Mytilis galloprovincialis	Sample Code:	0407-063	
End Date: 1423 Jul-04			Protocol:	ASTM (1993) -199 4	Sample Source:	City of Buenaven	itura
Sampled: 20 J	ul-04		Material:	Estuarine Monitoring Sample	Sample Station:	WER (B-3)	
Conc-	le Rep	Pos	# Counted	# Normal	Note	s	
NO LC	1	270	100	82			
0 LC	2	259		86			
0 LC	; 3	247		93			
	; 4	245		41			
0 10	5	258		87			
0 50	; 1	256		85			
0 50	2	261		94			
0 50	3	233		84			
	, 4 , 5	200		68			
0 50	1	241	V	-84			
9	2	240					
9	2	240					
9	4	232					
9	5	266					AND THE REAL PROPERTY OF T
15	1	243					
15	2	252					
15	3	269					
15	4	238					
15	5	263					
25	1	237					
25	2	254					
25	3	262					
25	4	244					
25	5	251					
40	1	242	1002	79			
40	2	265		73			
40	3	236		80			
40	4	257		90			
40	5	249		82			
65	1	255		82			
65	2	248		83			
65	3	231		53			
65	4	267	1	71			
65	5	234		70			
100	1	264		6			
100	2	260		12			
100	3	253		7			
100	4	235		3			
100	5	268	V	4			
sites B-	3 a	nd	C-2 W	ill share LC+	Sc.		

QC:SH

Data Worksheet:

Page 1 of 1

Marine Chronic Bioassay

Water Quality Measurements

Raw Datasheet



Test Species: <u>M. galloprovincialis</u> Start/End Dates: <u>7-32-04</u>04 Start/End Times: <u>1700</u> 1500

Concent	ration	Ter	nperatur	e	Salinity			Dissolved Oxygen			pH (pH upits)		
Avall	Cu		(°C)		(ppt)				(mg/L)				
100110		0	24	48	C	24	48	0	24	48	0	24	48
Isla Cuph	_1 7		14.3	14 6	30.0	29.9	30.1	8.9	8.7	9.1	8.04	799	7.92
Lae WITI		10.1	14.2	14 (30.0	302	30.4	8.0	8.6	9.1	8:35	8.15	8.13
Salt Cont	7016	NI	19.2	111 -	799	200	30.0	9.1	8.3	8.9	8.80	8.67	8,59
B-3 (9	2,21	14.4	19.7	798	2-1.7	26.1	9.3	8.3	8.9	8.81	8.66	8.59
B.3 1	5	15.5	14.4	19.1	2010	29.0	30.1	9.3	\$ 2	89	8.83	8.68	\$ 59
B:3 2	5	15.4	14.3	14.6	29,6	27.0	30.1	9.4	0.0	59	8.84	81.9	8.60
B3 4	0	15.6	14.3	146	2915	24.6	30.0	65	0.) a 2	0.1	8.83	8.69	\$159
B.3 6	,5	15.7	14.4	14.5	29,5	29.8	29.9	GF	0,1)	C 4	884	81.9	8,60
B.3 1	00	15.8	14.5	14.6	25.4	297	29.8	7,5	8.5	0.0	0101	9119	9.42
r-2	9	15.4	14.3	146	30.1	30.3	30.4	8.8	8.4	8.8	8,64	5.40	0.42
1-2	16	N-4	14.3	14.7	30.2	30.5	30.5	8.8	83	8.9	8.62	8.48	8,42
1.2	26	IFU	14.3	14.6	30.2	30.5	30.5	9.0	8.3	8.8	8.65	8.49	8.43
02	110	Irr	iil. 3	146	30.1	30.4	30,5	9.0	8.3	8.8	8.64	8.49	8.43
	40	ITT	14.4	146	70.1	30.4	30.4	9.2	8.3	8.8	8,64	8.49	8,43
6.6	1-0	10.5		14 1	200	31).3	30.3	9,3	8.3	8.8	8.64	8.49	8.43
10-2	100	15.5	14.4	1-1-0	130.0			1					

	0	24 48
Technician Initial	ls: ar	the SH
Animal Source/D	Date Received:	Mission Buy 7/22/04
Comments:	0 hrs:	
	24 hrs:	
	48 hrs:	
QC Check:	AH 8-12-04	Final Review:

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr., Suite B San Diego, CA 92121

C-2

CETIS Test Summary

Page 1 of 1 Report Date: 21 Oct-04 8:52 AM Link: 05-9101-4703/0407-064a

Bivalve Larva	Bivalve Larval Survival and Development Test Nautilus Environmental (CA									
Test No: Start Date: Ending Date: Setup Date:	10-3873-8927 22 Jul-04 05:00 24 Jul-04 03:00 22 Jul-04 05:00) PM) PM) PM	Test Type: Protocol: Dil Water: Brine:	Development ASTM E724-98 (1999) Laboratory Seawater Forty Fathoms			Duration: Species: Source:	46h Mytilis galloprovincialis Field Collected		
Sample No: Sample Date: Receive Date: Sample Age: Comments:	09-5211-2850 22 Jul-04 05:00 24 Jul-04 03:00 N/A (18.5 °C) Data entered w) PM) PM ith measur	Material: Code: Source: Station: red values fror	Estuarine M 0407-064a City of Buer WER (C-2) n CalScience	lonitoring Sa naventura	imple	Client: Project:	City of Buenaventura		
Comparison S Analysis	Summary Endpoint NOEL LOEL ChV				ChV	MSDp	Method			
03-1582-5287 14-3317-8484	Proportion Nor	rmal 49.2 49.2		77.161.59077.161.590		61.590 61.590	28.49% 27.82%	Steel's Many-One Rank Steel's Many-One Rank		
Proportion No	ormal Summary									
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	CV		
5.61	Lab Control	5	0.87800	0.82000	0.93000	0.01934	0.04324	4.93%		
8.68	Salt Control	5	0.87000	0.83000	0.94000	0.02025	0.04528	5.20%		
49.2		5	0.85600	0.80000	0.92000	0.01939	0.04336	5.07%		
77.1		5	0.57600	0.01000	0.75000	0.14232	0.31825	55.25%		
114		5	0.09800	0.07000	0.13000	0.01158	0.02588	26.41%		
Proportion No	ormal Detail									
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5				
5.61	Lab Control	0.82000	0.86000	0.93000	0.91000	0.87000				
8.68	Salt Control	0.85000	0.94000	0.84000	0.83000	0.89000				
49.2		0.92000	0.84000	0.86000	0.80000	0.86000				
77.1		0.66000	0.01000	0.73000	0.73000	0.75000				
114		0.09000	0.12000	0.13000	0.08000	0.07000				

Analyst: <u>Att</u> Approval:

CETIS Test Summary

Page 1 of 1 Report Date: 21 Oct-04 8:57 AM Link: 05-9101-4703/0407-064a

Bivalve Larva	ivalve Larval Survival and Development Test Nautilus Environmental									
Test No: Start Date: Ending Date: Setup Date:	10-3873-8927 22 Jul-04 05:00 24 Jul-04 03:00 22 Jul-04 05:00) PM) PM) PM	Test Type: Protocol: Dil Water: Brine:	Development ASTM E724-98 (1999) Laboratory Seawater Forty Fathoms			Duration: Species: Source:	46h Mytilis galloprovincialis Field Collected		
Sample No: Sample Date: Receive Date: Sample Age: Comments:	09-5211-2850 22 Jul-04 05:00 24 Jul-04 03:00 N/A (18.5 °C) Data entered w) PM) PM ith measur	Material: Code: Source: Station: red values from	Estuarine M 0407-064a City of Bue WER (C-2)	Aonitoring Sa naventura) e	mple	Client: Project:	City of Buenaventura		
Point Estimat	nt Estimate Summary									
Analysis	Endpoint % Effe		% Effe	ct Co	nc-µg/L	95% LCL	95% UCL	Method		
11-7178-5784	Proportion Normal		25	72.52674		52.96722	82.15459	Linear Regression		
			50	85.	27448	71.72765	94.87134			
Proportion No	ormal Summary									
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv		
5.61	Lab Control	5	0.87800	0.82000	0.93000	0.01934	0.04324	4.93%		
8.68	Salt Control	5	0.87000	0.83000	0.94000	0.02025	0.04528	5.20%		
49.2		5	0.85600	0.80000	0.92000	0.01939	0.04336	5.07%		
77.1		5	0.57600	0.01000	0.75000	0.14232	0.31825	55.25%		
114		5	0.09800	0.07000	0.13000	0.01158	0.02588	26.41%		
Proportion No	ormal Detail									
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5				
5.61	Lab Control	0.82000	0.86000	0.93000	0.91000	0.87000				
8.68	Salt Control	0.85000	0.94000	0.84000	0.83000	0.89000				
49.2		0.92000	0.84000	0.86000	0.80000	0.86000				
77.1		0.66000	0.01000	0.73000	0.73000	0.75000				
114		0.09000	0.12000	0.13000	0.08000	0.07000				



CETIS Analysis Detail

 Comparisons:
 Page 1 of 2

 Report Date:
 21 Oct-04 8:52 AM

 Analysis:
 03-1582-5287/0407-064a

Bivalve La	arval Sur	vival and D	Developn	nent Test					N	autilus Enviro	nmental (CA)
Endpoint			An	alysis Type		Sample L	.ink Cont	rol Link	Date Analyzed	Version	
Proportion	Normal		Co	mparison		05-9101-4	4703 05-91	01-4703	21 Oct-04 8:50 A	AM CETISV	1.025
Method			Alt	H Data	Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Ma	ny-One R	lank	C :	> T Angu	lar (Correcte	d)	49.2	77.1	2.03	61.590	28.49%
ANOVA A	ssumptio	ons									
Attribute		Test		Stati	stic C	ritical F	P Level	Decisio	on(0.01)		
Variances		Bartlett		23.00	484 1	1.34487 (0.00004	Unequa	I Variances		
Distribution	n	Shapiro-Wi	ilk W	0.679	03 0	.86826 0	0.00000	Non-no	rmal Distribution		
ANOVA T	able										
Source		Sum of	Squares	Mean Squ	are DF	F Statis	tic P Leve	el	Decision(0.05)		
Between		2.600446	6	0.8668153	3	19.40	0.0000	01	Significant Effec	t	
Error		0.71482	52	0.0446766	16						
Total		3.315270	096	0.9114918	19	national and the state of the s					
Group Co	mpariso	ns									
Sample	VS	Sample		Statistic	Critical	P Level	Ties	De	cision(0.05)		
8.68		49.2		26.5	17	> 0.0500	2	No	n-Significant Effec	ot	
8.68		77.1		15	17	<= 0.0500	1	Sig	nificant Effect		
8.68		114		15	17	<= 0.0500	0	Sig	nificant Effect		
Data Sum	mary				Ori	iginal Data		_	Transf	formed Data	
Conc-µg/l	L Con	ntrol Type	Count	Mean	Minimun	n Maximum	SD	Mean	Minimum	Maximum	SD
8.68	Salt	Control	5	0.87000	0.83000	0.94000	0.04528	1.2068	5 1.14581	1.32333	0.07309
49.2			5	0.85600	0.80000	0.92000	0.04336	1.1850	1.10715	1.28404	0.06431
77.1			5	0.57600	0.01000	0.75000	0.31825	0.8288	0.10017	1.04720	0.40908
114			5	0.09800	0.07000	0.13000	0.02588	0.3163	6 0.26776	0.36886	0.04338
Graphics											
	1.0-						0.4-				
	0.9-	1					0.1			_	/
nal	0.8	Ŷ	Ŷ				0.2-			8 0	Q
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2	0.6						An An E	c c	000000000		
Ĭ	0.5						5 -0.2-				
odo	0.4						0.9				
Pre	0.3-						-0.4				
	0.2										
	0.1			1	4		-0.6-				
1	· · · ·							10			
	0.0				T	7	-0.8		i	T T T	
	0.0	8.68	49.2	77.1	114	-1	-0.8- -2	2.0 -1.5 -	1.0 -0.5 0.0 (0.5 1.0 1.5	2.0



Linear Regression: Page 1 of 2 Report Date: 21 Oct-04 8:57 AM

11-7178-5784/0407-064a

Nautilus Environmental (CA)

Analysis:

CETIS Analysis Detail

Bivalve Larval Survival and Development Test

Endpoint	dpoint Analysis Type				Sample Link Control Li			Date Anal	Version	
Proportion N	Normal	LIN	ear Regression	1	05-9101-4703 05-9101-4703 2			21 Oct-04	8:56 AM	CETISV1.025
Linear Reg	Linear Regression Options									
Model	Threshold Option Lower Th			nold Thr	eshold Optimi	zed Rev	weighted	ited Pooled Groups Heterogeneity Corr.		
Log-Normal	Control Thr	eshold	0.13	Yes	5	Yes		No	Y	/es
Regressior	Parameters									
Parameter	Estimate	Std Err	or 95% I	LCL	95% UCL	t Statistic	c P Lev	/el Deci	sion(0.05	5)
Threshold	0.13205	0.04260	0.040	01	0.22408	3.100	0.198	68 Not	Significant	t
Slope	9.59159	2.33131	4.555	11	14.62808	4.114	0.151	79 Not \$	Significant	t
Intercept	-13.51963	4.57069	-23.3	9401	-3.64526	-2.958	0.207	55 Not	Significan	t
Regression	n Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critica	al PL	evel Dec	ision(0.0	5)
3	-267.15200	-1.40953	0.10426	0.2757	2 175.0555	22.362	203 0.00	0000 Sigi	nificant He	eterogeneity
Residual A	nalysis									
Attribute	Method		Statis	tic	Critical	P Level	Decis	sion(0.05)		
Variances	Modified	Levene	1.0125	55	3.58743	0.42393 Equal Va		I Variances		
Distribution	Shapiro-V	Vilk W	0.6582	21	0.88071 0.00		001 Non-norma		ution	
Point Estin	nates									
% Effect	Conc-µg/L	95% LCL	95% U	CL						
25	72.52674	52.96722	82.154	59						
50	85.27448	71.72765	94.871	34						
Data Sumn	nary			Cal	culated Variat	e(A/B)				
Conc-µg/L	Control Type	Count	Mean	Minimum	n Maximum	SE	SD	Α	в	
8.68	Salt Control	5	0.87000	0.83000	0.94000	0.00924	0.04528	435	500	
49.2		5	0.85600	0.80000	0.92000	0.00885	0.04336	428	500	
77.1		5	0.57600	0.01000	0.75000	0.06496	0.31825	288	500	
114		5	0.09800	0.07000	0.13000	0.00528	0.02588	49	500	

Analyst: <u>Att</u> Approval: &

CETIS Analysis Detail





Analyst: AH

CETIS™ v1.025B

000-089-125-2

 Test Summary:
 Page 1 of 1

 Report Date:
 23 Aug-04 10:10 AM

 Link:
 03-3239-1095/0407-064

AMEC Bioassay SD

Divalve Laiva	i Survivai anu L	evelopin	entrest					
Test: 1 Start Date: 2 End Date: 2 Setup Date: 2	0-3873-8927 22 Jul-04 05:00 F 24 Jul-04 03:00 F 22 Jul-04 05:00 F	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Developm ASTM E72 Laboratory Forty Fath	ent 24-98 (1999) ⁄ Seawater oms		Duration: Species: Source:	46 Hours Mytilis galloprovincialis Carlsharl Aquatarms AH Field Collected
Sample: 02-2229-8424 Sampled: 20 Jul-04 09:35 AM Received: 21 Jul-04 07:45 AM Hold Time: 55 Hours (18.5 °C)			Material: Code: Source: Station:	Estuarine Monitoring Sample 0407-064 City of Buenaventura WER (C-2)			Client: Project:	City of Buenaventura
Comparison Summary								
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
13-8993-6609	Proportion Nor	mal	40	65		50.99020	0.25353	Steel's Many-One Rank
Point Estimat	e Summary							
Analysis	Endpoint		% Effe	ct Co	nc-%	95% LCL	95% UCL	Method
05-8197-3207	Proportion Nor	mal	25	61	.64165	50.12504	68.61827	Linear Regression
			50	73	.31651	64.97266	80.20047	
Proportion No	ormal Summary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	cv
0	Lab Control	5	0.87800	0.82000	0.93000	0.01934	0.04324	4.93%
0	Salt Control	5	0.87000	0.83000	0.94000	0.02025	0.04528	5.20%
9		5	0.85800	0.83000	0.89000	0.01068	0.02387	2.78%
15		5	0.86800	0.81000	0.92000	0.01934	0.04324	4.98%
25		5	0.80000	0.54000	0.90000	0.06656	0.14883	18.60%
40		5	0.85600	0.80000	0.92000	0.01939	0.04336	5.07%
65		5	0.57600	0.01000	0.75000	0.14232	0.31825	55.25%
100		5	0.09800	0.07000	0.13000	0.01158	0.02588	26.41%
Proportion No	ormal Detail							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	0.91000	0.93000	0.87000	0.86000	0.82000		
0	Salt Control	0.84000	0.89000	0.83000	0.85000	0.94000		
9		0.83000	0.87000	0.89000	0.84000	0.86000		
15		0.86000	0.90000	0.92000	0.81000	0.85000		
25		0.85000	0.54000	0.89000	0.90000	0.82000		
40		0.92000	0.84000	0.86000	0.80000	0.86000		
65		0.66000	0.01000	0.73000	0.73000	0.75000		
100		0.09000	0.12000	0.13000	0.08000	0.07000		
Page 1 of 1 Comparisons: Report Date: 19 Aug-04 11:10 AM Analysis:

13-8993-6609

Bivalve Larva	al Survival an	d Develo	oment Test	(-2					AMEC E	Bioassay SD
Endpoint		A	nalysis Type		Sample L	ink Co	ntrol Link	Date Analyzed	Version	
Proportion No	rmal	C	omparison		03-3239-1	1095 03-	8 AM CETISV	1.024		
Method		A	It H Data	Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-	One Rank	С	>T Angu	ular (Corrected))	40	65	2.50	50.99020	25.35%
ANOVA Assu	Imptions									
Attribute	Test		Stat	istic Cri	tical P	Level	Decis	ion(0.01)		
Variances	Bartlett		36.8	3924 16.	81190 0	.00000	Unequ	al Variances		
Distribution	Shapiro-	Wilk W	0.71	981 0.9	1004 0	.00000	Non-n	ormal Distribution		
ANOVA Table	9									
Source	Sum	of Square	s Mean Sq	uare DF	F Statist	tic PL	evel	Decision(0.05)		
Between	3.319	016	0.553169	3 6	18.11	0.00	0000	Significant Effe	ct	
Error	0.855	4191	0.030550	7 28						
Total	4.174	43484	0.583719	9 34						
Group Comp	arisons									
Control	vs Conc-	%	Statistic	Critical	P Level	Ties	D	ecision(0.05)		
Salt Control	9		26.5	16	>0.05	3	N	on-Significant Effe	ect	
	15		28.5	16	>0.05	1	N	on-Significant Effe	ect	
	25		25	16	>0.05	2	N	on-Significant Effe	ect	
	40		26.5	16	>0.05	2	N	on-Significant Effe	ect	
	65		15	16	<=0.05	1	S	gnificant Effect		
	100		15	16	<=0.05	0	S	gnificant Effect		
Data Summa	ry			Origi	nal Data			Trans	formed Data	
Conc-%	Control Typ	e Coun	t Mean	Minimum	Maximum	SD	Mear	n Minimum	Maximum	SD
0	Salt Control	5	0.87000	0.83000	0.94000	0.0452	3 1.206	85 1.14581	1.32333	0.07309
9		5	0.85800	0.83000	0.89000	0.0238	7 1.185	641 1.14581	1.23273	0.03452
15		5	0.86800	0.81000	0.92000	0.04324	4 1.202	1.11977	1.28404	0.06472
25		5	0.80000	0.54000	0.90000	0.1488	3 1 1 2 2	0.82544	1.24905	0.17253
40		5	0.85600	0.80000	0.92000	0.04336	5 1.185	01 1.10715	1.28404	0.06431
65		5	0.57600	0.01000	0.75000	0.3182	5 0.828	0.10017	1.04720	0.40908
100		5	0.09800	0.07000	0.13000	0.02588	8 0.316	0.26776	0.36886	0.04338

Linear Regression: Page 1 of 1 19 Aug-04 11.10 AM Report Date: Analysis:

Version

CETISv1.024

Heterogeneity Corr.

Yes

Decision(0.05)

Significant

Significant

Significant

05-8197-3207

AMEC Bioassay SD

Bivalve Larval Survival and Development Test C-2 Endpoint Analysis Type Sample Link Control Link Date Analyzed 19 Aug-04 10:58 AM Proportion Normal 03-3239-1095 03-3239-1095 Linear Regression Linear Regression Options Threshold Option Model Lower Threshold Threshold Optimized Reweighted **Pooled Groups** 0.13 Yes Log-Normal Control Threshold Yes No **Regression Parameters** Parameter Estimate Std Error 95% LCL 95% UCL t Statistic P Level 0.14834 Threshold 0.02247 0 10232 0.19436 6.603 0.00273 Slope 8.95410 1.77531 5.31754 12.59065 5.044 0.00726 Intercept -11.70120 3.36867 -18.60161 -4.80078 -3.474 0.02550 **Regression Summary**

Iters Log Likelihood Mu Sigma G Stat Chi-Sq Critical P Level Decision(0.05) -219.85520 -1.306800.11168 0.16494 265.48960 41.33714 0.00000 Significant Heterogeneity 7 **Residual Analysis** Attribute Method Statistic Critical P Level Decision(0.05) Variances Modified Levene 1.41847 2.52766 0.25024 Equal Variances Shapiro-Wilk W Distribution 0.50980 0.92671 0.00000 Non-normal Distribution Point Estimates % Effect Conc-% 95% LCL 95% UCL 25 61.64165 50.12504 68.61827 50 73.31651 64.97266 80.20047 Data Summary Calculated Variate(A/B) Conc-% Control Type Count Mean Minimum Maximum SE SD Α в 0 Salt Control 5 0.87000 0.83000 0.94000 0.00924 0.04528 435 500 9 5 0.85800 0.83000 0.89000 0.00487 0.02387 429 500 15 5 0.86800 0.81000 0.92000 0.00883 0.04324 434 500 25 5 0.80000 0.54000 0.90000 0.03038 0.14883 400 500

0.92000

0.75000

0.13000

0.00885

0.06496

0.00528

0.04336

0.31825

0.02588

428

288

49

500

500

500

40

65

100

5

5

5

0.85600

0.57600

0.09800

0.80000

0.01000

0.07000

Bivalve Lar	val Survival a	and De	velopment Tes	t			AMEC Bioassay SD
Start Date:7	224 Jul-04		Species:	Mytilis ga	lloprovincialis	Sample Code:	0407-064
End Date: 2	#2 3 Jul-04		Protocol:	ASTM -(19)93) -199 4	Sample Source:	City of Buenaventura
Sampled:	20 Jul-04		Material:	Estuarine Monitoring Sample		Sample Station:	WER (C-2)
Conc-%	Code Rep	Pos	# Counted	# Normal		Note	5
		271	100	25	\mathcal{D}		
		272		28			
		273		196			
		274		73			
		275		03			
		276		3C			
		277		RZ			
faired 1 1		278	\odot			a de su de la companya de la company	100000
		279	IOD	7	HC		······································
		280	100				
		281	100	34	27		
		282	100	92	SH		
		283	100	13	uc		
		284	100	89	SH		
		285	100	85	SH		
		286	100	9			
		287	100	84	SA		
		288	100	81	0H		
		209	106	81	DA		· · · · ·
		290	100	42	SH	a and a lot 7. We have been as a second of the second second second second second second second second second s	
		291	100	40	SH		
		202	100	0	nc nc		
		200	100	0			
		294	100	86	SI		
		296	100	34	Sh		
		297	100	89	<u> </u>	,	
		298	100	65	SH		
		299	ŝ	86	SH		
		300	100	54	20		
L				-21			

sites B. Zand C- 2 will share Land SC data entry QC=AH

CETIS Worksheet

Analyst: SD, MC, SH Reviewed By: AH 8-12-C

Data Worksheet:

Report Date:

Link:

Page 1 of 1

19 Jul-04 2:40 PM 03-3239-1095

CETIS	SW	or	ksh	eet			Report Date:	19 Jul-04 2:39 PM
Bivalve La	yal Sur	vival	and De	evelopment Tes	t			AMEC Bioassay SD
Start Date;	-124 Jul-	04		Species:	Mytilis galloprovincialis	Sample Code:	0407-064	
End Date:	123 Jul-	04		Protocol:	ASTM (1993) 1994	Sample Source:	City of Buenaver	ntura
Sampled:	20 Jul-	04		Material:	Estuarine Monitoring Sample	Sample Station:	WER (C-2)	
Conc-%	Code	Rep	Pos	# Counted	# Normal	Note	S	
	9	1	277	100	83			
	9	2	289	1	87			
	9	3	296		89			
	9	4	287	1	84			
	9	5	281		86			
	15	1	276		86			
	15	2	291		90			
	15	3	282		92			
	15	4	288		81			
	15	5	285		85			
	25	1	297		85			
	25	2	300	1	54			
	25	3	284		89			
	25	4	299		90			
	25	5	272		82			And a second
	40	1	290	1	92			
· ·	40	2	295		84			
· ·	40	3	298	1	86			
	40	4	275		80			
	40	5	294		86			and the state of t
	65	1	273		66			
	65	2	278	1	Į.			
	65	3	280		73			
	65	4	274		73			
	65	5	271		75			
10	00	1	286		9			
11	00	2	292		12			
10	00	3	283		13			
10	00	4	293		8			
10	00	5	279	مل	7			

Sites B3 and C-2 will share LC +SC

QCISH

Data Worksheet:

Page 1 of 1

APPENDIX C REFERENCE TOXICANT DATA

POLISHED SEAWATER

CETIS Test Summary

Page 1 of 1 Report Date: 21 Oct-04 11:58 AM

Link:

07-8602-7552/0407-065a

Bivalve Larva	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)									
Test No: Start Date: Ending Date: Setup Date:	08-1535-5748 22 Jul-04 05:00 24 Jul-04 03:00 22 Jul-04 05:00	08-1535-5748 Test Type 22 Jul-04 05:00 PM Protocol: 24 Jul-04 03:00 PM Dil Water 22 Jul-04 05:00 PM Brine: 07-3040-6887 Material:		Developme ASTM E72 Laboratory Not Applic	ent 24-98 (1999) Seawater able		Duration: Species: Source:	46h Mytilis galloprovincialis Field Collected		
Sample No: Sample Date: Receive Date: Sample Age: Comments:	07-3040-6887 22 Jul-04 05:00 22 Jul-04 05:00 N/A Data entered w	040-6887 Material: II-04 05:00 PM Code: II-04 05:00 PM Source: Station:		Copper chloride 0407-065a Reference Toxicant Polished Sea Water			Client: Project:	Internal		
Comparison Summary										
Analysis	Endpoint Proportion Norr	mal	NOEL 8.8	LC 12)EL .6	ChV 10.530	MSDp 9.59%	Method Dunnett's Multiple Comparison		
Point Estimate	Point Estimate Summary									
Analysis	Endpoint		% Effe	ct Co	onc-µg/L	95% LCL	95% UCL	Method		
03-6063-3038	Proportion Nor	nal	25 50	10 12	.78552 .20004	N/A N/A	N/A N/A	Linear Regression		
Proportion No	ormal Summary									
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	cv		
5.6	Lab Control	5	0.86200	0.83000	0.90000	0.01281	0.02864	3.32%		
8.8		5	0.81600	0.73000	0.90000	0.03124	0.06986	8.56%		
12.6		5	0.62400	0.55000	0.73000	0.03187	0.07127	11.42%		
13		5	0.06000	0.00000	0.10000	0.01643	0.03674	61.24%		
24		5	0.00400	0.00000	0.02000	0.00400	0.00894	223.61		
Proportion No	ormal Detail									
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5				
5.6	Lab Control	0.84000	0.83000	0.88000	0.86000	0.90000				
8.8		0.73000	0.90000	0.81000	0.87000	0.77000				
12.6		0.55000	0.73000	0.65000	0.62000	0.57000				
13		0.00000	0.07000	0.07000	0.10000	0.06000				
24		0.00000	0.00000	0.00000	0.00000	0.02000				

 Comparisons:
 Page 1 of 1

 Report Date:
 21 Oct-04 11:58 AM

 Analysis:
 14-7348-0399/0407-065a

CETIS Analysis Detail

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)											
Endpoint		Ar	alysis Type		Sample	Link	Contro	Link	Date Analyzed	Version	
Proportion No	rmal	Co	omparison		07-8602-	7552	07-860	2-7552	21 Oct-04 11:57	AM CETISV	.025
Method		Al	t H Data	Transform	Z	NO	EL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Mul	tiple Comparison	C	> T Angu	lar (Correct	ed)	8.8		12.6	11.36	10.530	9.59%
ANOVA Assu	mptions										
Attribute	Test		Stati	stic	Critical	P Leve	1	Decisio	n(0.01)		
Variances	Bartlett	/112 \ \ \	4.926)69)23	13.27671	0.2949) 	Equal V	ariances Distribution		
Distribution	Shapiro-w		0.970		0.00740	0.04920	5	Normal	Distribution		
ANOVA Table	5										
Source	Sum of	Squares	Mean Squ	iare D	F F Statis	tic	P Level		Decision(0.05)		
Between	5.46492	2	1.36623	4 20	239.14		0.00000		Significant Effect		
Total	5.57918	3146	1.371943	24	, 1						
Group Comp	arisons										
Sample	vs Sample		Statistic	Critical	P Level	MS	D	Dec	cision(0.05)		
5.6	8.8		1.22469	2.3	> 0.0500	0.1	0995	Nor	-Significant Effec	t	
5.6	12.6		5.85160	2.3	<= 0.0500	0.1	0995	Sig	nificant Effect		
5.6	13		20.0975	2.3	<= 0.0500	0.1	0995	Sig	nificant Effect		
5.6	24		23.498	2.3	<= 0.0500	0.1	0995	Sig	nificant Effect		
Data Summa	ry		•••••	0	riginal Data				Transfe	ormed Data	
Conc-µg/L	Control Type	Count	Mean	Minimu	m Maximun	n SD)	Mean	Minimum	Maximum	SD
5.6	Lab Control	5	0.86200	0.83000	0.90000	0.0	2864	1.1917	0 1.14581	1.24905	0.04215
8.8		5	0.81600	0.73000	0.90000	0.0	6986	1.1331	5 1.02440	1.24905	0.09230
12.6		5	0.62400	0.55000	0.73000	0.0	7127	0.9119	7 0.83548	1.02440	0.07476
13		5	0.06000	0.00000	0.10000	0.0	0804	0.2309	5 0.05002	0.32175	0.10484
24		5	0.00400	0.00000	0.02000	0.0	0094	0.0004	0.03002	0.14190	. 0.04109
Graphics											
1.0	Ē						0.15		:		/
e.0 g		I					0.10-			0.2	ିର
	}	f		Reject Nul	i.	문 역	0.05-			0.0.0	
Z 0.7			¢.			tere Ang	0.00		_000	Ø [®]	
it 0.5			1			Cent.	0.00		00000000000		
d 0.4						υŪ	-0.05		0,99		
ئ 0.3	3-						-0.10	ő			
0.2	2-						0.15				
0.1			\$				-0.15-	3			
0.0). 5.6 8	3.8	12.6 13	 24	1		-0.20 ⁻¹ -2	.0 -1.5	-1.0 -0.5 0.0 0	.5 1.0 1.5	2.0
			55								
		Con	c-µg/L						Rankits		



Analyst: Att

Linear Regression: Page 1 of 2

Report Date: 21 Oct-04 11:58 AM Analysis:

Nautilus Environmental (CA)

03-6063-3038/0407-065a

CETIS Analysis Detail

Bivalve La	rval Surviva	al and Dev	elopment]	Fest
Divalve Lu			cropincia	

Endpoint		An	alysis Type		Sample Link Control Link			Date Analy	zed	Version
Proportion N	lormal	Line	ear Regressio	n	07-8602-7552 07-8602-7552 21 Oct-04 11:58			1:58 AM	CETISv1.025	
Linear Reg	ression Options									
Model	Threshold	Option	Lower Thres	hold Thr	eshold Optimi	ized Rew	eighted	Pooled Grou	ups Het	terogeneity Corr.
Log-Normal	Control Th	reshold	0.138	Yes		Yes		No	Yes	6
Regression	n Parameters									
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Statistic	P Level	Decis	sion(0.05)	
Threshold	0.14130	0.09650	-0.06	5143	0.34404	1.464	0.28069	Not S	ignificant	
Slope	12.60246	11.1326	-10.7	'8640	35.99133	1.132	0.37508	Not S	ignificant	
Intercept	-8.69083	12.2736	51 -34.4	7674	17.09508	-0.708	0.55229	Not S	ignificant	
Regression	n Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	l P Lev	el Deci	sion(0.05)	
6	-369.41260	-0.68961	0.07935	3.4443	5 747.1390	00 28.8693	30 0.000	00 Signi	ificant Hete	erogeneity
Residual A	nalysis									
Attribute	Method		Statis	stic	Critical	P Level	Decisio	on(0.05)		
Variances	Modified	Levene	1.003	38	3.05557	0.43638	Equal V	ariances		
Distribution	Shapiro-\	Wilk W	0.734	60	0.90456	0.00003	Non-noi	rmal Distribut	tion	
Point Estin	nates									
% Effect	Conc-µg/L	95% LCL	95% U	CL						
25	10.78552	N/A	N/A							
50	12.20004	N/A	N/A							
Data Sumn	nary			Cal	culated Variat	e(A/B)		_		
Conc-µg/L	Control Type	Count	Mean	Minimum	n Maximum	SE	SD	Α	в	
5.6	Lab Control	5	0.86200	0.83000	0.90000	0.00585	0.02864	431	500	
8.8		5	0.81600	0.73000	0.90000	0.01426	0.06986	408	500	
12.6		5	0.62400	0.55000	0.73000	0.01455	0.07127	312	500	
13		5	0.06000	0.00000	0.10000	0.00750	0.03674	30	500	
24		5	0.00400	0.00000	0.02000	0.00183	0.00894	2	500	





Analyst: Att

 Test Summary:
 Page 1 of 1

 Report Date:
 23 Aug-04 10:13 AM

 Link:
 03-9819-1062/0407-065

Bivalve Larva	Bivalve Larval Survival and Development Test AMEC Bioassay SD								
Test: 08-1535-5748 Start Date: 22 Jul-04 05:00 PM End Date: 24 Jul-04 03:00 PM Setup Date: 22 Jul-04 05:00 PM			Test Type: Protocol: Dil Water: Brine:	Developm ASTM E72 Laboratory Not Applic	ent 24-98 (1999) ⁄ Seawater able		Duration: Species: Source:	46 Hours Mytilis galloprovincialis - Carlsbad Aquafam AH Field Collected	
Sample: Sampled: Received: Hold Time:	09-6819-3015 22 Jul-04 05:00 F 22 Jul-04 05:00 F N/A	PM PM	Material: Code: Source: Station:	Copper ch 0407-065 Reference Polished S	loride Toxicant Sea Water		Client: Project:	Internal	
Comparison	Comparison Summary								
Analysis	Endpoint		NOEL	LC	EL	ChV	MSDp	Method	
06-4207-8533	Proportion Nor	mal	5	8.4		6.48074	0.09384	Dunnett's Multiple Comparison	
Point Estimate Summary									
Analysis	Endpoint		% Effe	ect Co	onc-µg/L	95% LCL	95% UCL	Method	
07-0289-3444	Proportion Nor	mal	25 50	8.0 9.6)58964)76855	7.29823 9.04547	8.66549 10.26220	Linear Regression	
Proportion N	ormal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	cv	
0	Lab Control	5	0.86200	0.83000	0.90000	0.01281	0.02864	3.32%	
1.8		5	0.87200	0.83000	0.90000	0.01200	0.02683	3.08%	
3		5	0.89800	0.86000	0.94000	0.01281	0.02864	3.19%	
5		5	0.81600	0.73000	0.90000	0.03124	0.06986	8.56%	
8.4		5	0.62400	0.55000	0.73000	0.03187	0.07127	11.42%	
14		5	0.06000	0.00000	0.10000	0.01643	0.03674	61.24%	
23		5	0.00400	0.00000	0.02000	0.00400	0.00894	223.61	
39		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%	
Proportion N	ormal Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	0.84000	0.83000	0.88000	0.86000	0.90000			
1.8		0.89000	0.83000	0.87000	0.87000	0.90000			
3		0.89000	0.90000	0.90000	0.86000	0.94000			
5		0.73000	0.90000	0.81000	0.87000	0.77000			
84		0.55000	0.73000	0.65000	0.62000	0.57000			
14		0.00000	0.07000	0.07000	0.10000	0.06000			
23		0.00000	0.00000	0.00000	0.00000	0.02000			
39		0.00000	0.00000	0.00000	0.00000	0.00000			

Approved By

Comparisons:Page 1 of 1Report Date:19 Aug-04 11:09 AM

Analysis:

06-4207-8533

Bivalve Larva	Bivalve Larval Survival and Development Test AMEC Bioassay SD													
Endpoint			Ai	nalysis Type		Sar	nple L	ink	Contro	l Link	Date Analyzed		Version	
Proportion No	ormal		Co	omparison		03-	9819-1	062	03-9819	9-1062	19 Aug-04 11:04	4 AM	CETISv1	.024
Method			AI	t H Data	Transform		z	NO	EL L	OEL	Toxic Units	ChV	'	MSDp
Dunnett's Mul	ltiple (Comparison	С	>T Angu	lar (Correct	ed)		5	8	3.4	20.00	6.48	074	9.38%
ANOVA Assu	umpti	ons												
Attribute		Test		Statis	stic (Critical	Р	Leve	el	Decision	n(0.01)			
Variances		Bartlett		7.640	02	18.47531	0.	3654	10	Equal Va	ariances			
Distribution		Shapiro-Will	< W	0.974	10 (0.91882	0.	5753	30	Normal (Distribution			
ANOVA Table														
Source		Sum of S	quares	s Mean Squ	are Di	= F\$	Statisti	с	P Level		Decision(0.05)			
Between		9.915489		1.416498	7	29	7.97		0.00000		Significant Effect	ct		
Error		0.152121	2	0.0047538	32	2								
Total		10.06761	04	1.4212522	39)								
Group Comparisons														
Control	vs	Conc-µg/l	-	Statistic	Critical	P Le	vel	M	SD	Dec	ision(0.05)			
Lab Control		1.8		-0.3346494	2.4425	>0.05	5	0.	1065086	Non	-Significant Effe	ct		
		3		-1.297812	2.4425	>0.05	5	0.	1065086	Non	-Significant Effe	ct		
		5		1.342582	2.4425	>0.05	5	0.	1065086	Non	-Significant Effe	ct		
		8.4		6.41491	2.4425	<=0.()5	0.	1065086	Sign	ificant Effect			
		14		22.0322	2.4425	<=0.0)5	0.	1065086	Sign	ificant Effect			
		23		25.76003	2.4425	<=0.0	05	0.1	1065086	Sign	ificant Effect			
		39		25.08728	2.4425	<=0.0)5	0.	1065086	Sign	ificant Effect			
Data Summa	ry				01	riginal Da	ta				Transf	orme	d Data	
Conc-µg/L	Con	trol Type	Count	Mean	Minimu	m Max	imum	S	D	Mean	Minimum	Ma	aximum	SD
0	Lab	Control	5	0.86200	0.83000	0.90	000	0.0	02864	1.19170	1.14581	1.2	4905	0.04215
1.8			5	0.87200	0.83000	0.90	000	0.0	02683	1.20629	1.14581	1.2	24905	0.03944
3			5	0.89800	0.86000	0.94	000	0.0	02864	1.24829	1.18730	1.3	32333	0.04897
5			5	0 81600	0.73000	0.90	000	0.0	06986	1.13315	1.02440	1.2	4905	0.09230
84			5	0.62400	0.55000	0.73	000	0.0	07127	0.91197	0.83548	1.0	2440	0.07476
14			5	0.06000	0.00000	0.10	000	0.0	03674	0.23095	0.05002	0.3	32175	0.10484
23			5	0.00400	0.00000	0.02	000	0.0	00894	0.06840	0.05002	0.1	4190	0.04109
39			5	0.00000	0.00000	0.00	000	0.0	00000	0.09773	0.05002	0.2	2551	0.07423



Page 1 of 1 Linear Regression:
 Report Date:
 19 Aug-04 11:09 AM

 Analysis:
 07-0289-3444

Bivalve La	Bivalve Larval Survival and Development Test AMEC Bioassay SD										
Endpoint		An	alysis Type		Sample	Link	Contro	l Link	Date Anal	zed	Version
Proportion N	Normal	Lin	ear Regressio	on	03-9819	-1062	03-9819	9-1062	19 Aug-04	11:04 AM	CETISv1.024
Linear Reg	ression Options	;									
Model	Threshold	Option	Lower Thres	hold Thre	shold Optim	ized	Reweig	hted	Pooled Gro	oups He	eterogeneity Corr.
Log-Normal	Control Th	reshold	0.138	Yes		```	res		No	Ye	es
Regression Parameters											
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Stati	istic	P Leve	l Deci	sion(0.05)
Threshold	0.13470	0.0145	B 0.10	503	0.16437	9.236		0.0002	5 Signi	ficant	
Slope	8.48895	0.8998	3 6.65	B24	10.31966	9.434		0.0002	3 Signi	ficant	
Intercept	-3.36785	0.9228	9 -5.24	548	-1.49022	-3.649		0.0147	6 Signi	ficant	
Regressior	n Summary										
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Cri	tical	P Lev	vel Dec	ision(0.0	5)
11	-42.37252	-0.39673	0.11780	0.04651	114.1573	30 47.	39989	0.000	00 Sigr	ificant He	terogeneity
Residual A	Residual Analysis										
Attribute	Method		Statis	stic C	Critical	P Level		Decisi	on(0.05)		
Variances	Modified	Levene	1.363	81 2	.37321	0.26044		Equal \	/ariances		
Distribution	Shapiro-V	Nilk W	0.598	57 0	.93382	0.00000		Non-no	rmal Distrib	ution	
Point Estin	nates										
% Effect	Conc-µg/L	95% LCL	95% L	ICL							
25	8.058964	7.29823	8.6654	19							
50	9.676855	9.04547	10.262	20							
Data Sumn	nary			Calc	ulated Variate	e(A/B)			_		
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	S	D	Α	в	
0	Lab Control	5	0.86200	0.83000	0.90000	0.005	85 0	.02864	431	500	
1.8		5	0.87200	0.83000	0.90000	0.005	48 0	.02683	436	500	
3		5	0.89800	0.86000	0.94000	0.005	85 0.	.02864	449	500	
5		5	0.81600	0.73000	0.90000	0.014	26 0	.06986	408	500	
8.4		5	0.62400	0.55000	0.73000	0.014	55 0	.07127	312	500	
14		5	0.06000	0.00000	0.10000	0.007	50 0	.03674	30	500	
23		5	0.00400	0.00000	0.02000	0.001	83 0	.00894	2	500	
39		5	0.00000	0.00000	0.00000	0.000	00 0	.00000	0	289	



CETIS Worksheet

 Data Worksheet:
 Page 1 of 1

 Report Date:
 19 Jul-04 11:50 AM

 Link:
 03-9819-1062/0407-065

Bivalve Larval Survival and Development Test

AMEC Bioassay SD

AP			
Start Date 2221 Jul-04	Species:	Mytilis galloprovincialis	Sample Code: 0407-065
End Date:24-23 Jul-04	Protocol:	ASTM (1993) , MTH	Sample Source: Reference Toxicant
Sampled: 2227 Jul-04	Material:	Copper chloride	Sample Station: Polished Sea Water
Conc-µg/L Code Rep Pos	# Counted	# Normal	RL-FRAD Notes
1	100	2 40	
2	106	О ИС	
3	100	55	
4	100	89	
5	100	8te	
6	100	83	
7	100	0	
8		90	
9		0	4
10	1	94 1	Counted Pormal
11	ې	OR	2 0 30
12	110	32 09	100 13
13	131	19 18	100 62
15	108	89 00	
16	101		
17			op as in
18	100	SU JA JA	50
19	<i>G</i> L	65 08	<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>
20	100	41 18	
21	100	D Rh	92-0
22	100	90 Rim	100 22
23	100	87 RG	the
24	99	82 18	100 (3)
25	157	3 B	1 57
26	116	ŏ &	T
27	105	0 18	U Las U
28	171	0 18	(a) 73 mc
29	55	0 12	69 0 1
30	14	35 PS	100 90
31	97	0 18	100 6
32	86	0 12	106 0
33	136	78 13	100 86
34	104	37 18	106 87
35	ND	0 18	100 0
36	109	57 ps	100 88
37	Ó	0 18	25 0
38	130	63 18	100 90
39	69	0 12	40 0
40	103	<u> 74 18 </u>	100 89 1

data entry oc=AH

CETIS	Worksheet
Bivalve Larva	Survival and Development Test

Data Worksheet: Page 1 of 1 19 Jul-04 11:50 AM Report Date: Link: 03-9819-1062/0407-065

Bivalve Larv	al Sur	vival	and De	evelopment Tes	t		AMEC Bioassay SD
Start Date:2	21 Jul	-04		Species:	Mytilis galloprovincialis	Sample Code:	0407-065
End Date:24	23 Jul	-04		Protocol:	ASTM (1993) 1994	Sample Source:	Reference Toxicant
Sampled: 22	21 Jul	-04		Material:	Copper chloride	Sample Station:	Polished Sea Water
Conculal	Code	Ren	Pos	# Counted	# Normal	Note	8
00000-		1	19	+ 0001111EU	671		
0		2	18	190	87		
0	LC	3	36		80		
0	LC	4	33	-	86		
0	LC	5	38		80		
1.8		1	4	.	10		
1.8		2	6				
1.8		3	23				
18		4	34				
18		5	30				
3		1	40				
3		2	22				
3		3	15				
3		4	5				
- 3		5	10				
5		1	12	100	73		
5		2	8	1	90		
5		3	24		81		
5		4	20		87		
5		5	14		77		
8.4		1	3		55		
8.4		2	28		73		
8.4		3	12		65		
0.4		4	13		62		
0.4		1	25		5		
14			26		0		
14		3	16		1		
14		4	17	1	10		
14		5	31		10		
23		1	32		0		
23		2	2	1	0		
23		3	21		0		
23		4	35		Õ		
23		5	1		2		
2 39		1	37	V			
39		2	39				
39		3	29				
39		Δ	٩				



39

5

11

Reviewed By: AH 8-12-01

Analyst:_SH____

Marine Chronic Bioassay

Raw Datasheet

Client: <u>City of Buenaventura</u> Sample ID: <u>Polished sea water</u> Test No.: 0407-065

Test Species: <u>M. galloprovinciali</u>s Start/End Dates: <u>7-32-04</u> /7-33104 Start/End Times: <u>1700</u> 1500

Concentration	Те	Temperature			Salinity	,	Dissolved Oxygen			pH			
of lopper		(°C)			(ppt)			(mg/L)			(pH units)		
- mg I	0	24	48	JR O	24	48	0	24	48	0	24	48	
lab control	15.4	14.4	14.6	23.930.	1 30.0	29.9	9,1	8.7	9.0	7.87	791	2.91	
1.8	153	14.4	14.7	34.5 29,	8 30.2	30.3	9.2	8.7	9.1	7.89	791	7.99	
3	15.3	14.4	14.7	34.5 30,	0 30.2	30-3	5.2	8.7	9.1	7.88	7.91	7.93	
5	15.3	14.5	14.7	34,530.	0 30.2	30,4	9,2	8.7	9.2	7.85	7.90	7.98	
84	154	14.6	14.7	34,530.0	30.2	30.4	9.2	8.6	9.3	7.87	7.91	7.93	
14	15,5	14.6	14.7	34.330.	1 30.3	30.3	9.2	8.7	9.3	7.87	7.9	7:93	
23	15.6	14.6	14.7	34.230	1 30.2	30.3	9.2	8-7	9.3	7.86	7.91	7.93	
39	15.6	14.7	147	34730	.2 30.2	30.2	9.2	8.6	9.3	7.84	7.90	7,99	
											l		

Technician Initials:

24 48 0 SH TR me

Animal Source/Date Received:

Mission Bay 7/22/04

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr., Suite B San Diego, CA 92121 NATURAL SEAWATER

Test Summary: Page 1 of 1 Report Date: 23 Aug-04 11:38 AM Link: 10-6041-7464/040722mgrt

AMEC Bioassay SD

Bivalve Larval Survival and Development Test AMEC Bioassay SD									
Test: Start Date: End Date: Setup Date:	10-0748-9302 22 Jul-04 05:00 P 24 Jul-04 03:00 P 22 Jul-04 05:00 P	PM PM PM	Test Type: Protocol: Dil Water: Brine:	Developme ASTM E724 Laboratory Not Applica	nt 4-98 (1999) Seawater ble		Duration: Species: Source:	46 Hours Mytilis galloprovincialis Field Collected	
Sample: 06-7117-4213 Sampled: 22 Jul-04 05:00 PM Received: 22 Jul-04 05:00 PM Hold Time: N/A		M M	Material: Code: Source: Station:	Copper chloride Client: 040722mgrt Project: Reference Toxicant		Internal			
Comparison Summary Analysis Endpoint 14-6839-7916 Proportion Normal			NOEL 2.5	LOI 5	ĒL	ChV 3.53553	MSD p 0.06057	Method Steel's Many-One Rank	
Point Estima Analysis 12-5495-9475	te Summary Endpoint Proportion Nor	mal	% Effe 25 50	ect Cor 6.74 8.17	nc-µg/L 46125 70764	95% LCL 5.88542 7.52133	95% UCL 7.36043 8.66711	Method Linear Regression	
Proportion N	ormal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	cv	
0 2 5 5 10 20 40	Lab Control	5 5 5 5 5 5 5	0.90600 0.83400 0.82800 0.21000 0.00000 0.00000	0.87000 0.75000 0.78000 0.14000 0.00000 0.00000	0.93000 0.89000 0.86000 0.31000 0.00000 0.00000	0.01122 0.02619 0.01530 0.03536 0.00000 0.00000	0.02510 0.05857 0.03421 0.07906 0.00000 0.00000	2.77% 7.02% 4.13% 37.65% 0.00% 0.00%	
Proportion N	ormal Detail								
Conc-μg/L 0 2.5 5 10 20 40	Control Type Lab Control	Rep 1 0.92000 0.80000 0.78000 0.14000 0.00000 0.00000	Rep 2 0.87000 0.89000 0.81000 0.17000 0.00000 0.00000	Rep 3 0.89000 0.88000 0.86000 0.28000 0.00000 0.00000	Rep 4 0.93000 0.85000 0.86000 0.15000 0.00000 0.00000	Rep 5 0.92000 0.75000 0.83000 0.31000 0.00000 0.00000			

Method

Attribute

Source

Between

Control

Error

Total

Comparisons: Page 1 of 1 19 Aug-04 11:26 AM Report Date: Analysis: 14-6839-7916

Bivalve Larval Survival and Development Test AMEC Bioassay SD Endpoint Analysis Type Sample Link **Control Link Date Analyzed** Version Proportion Normal Comparison 10-6041-7464 10-6041-7464 19 Aug-04 11:25 AM CETISv1.024 Alt H Data Transform z NOEL LOEL **Toxic Units** ChV MSDp Steel's Many-One Rank C > T Angular (Corrected) 2.5 5 40.00 3.53553 6.06% **ANOVA Assumptions** Test Statistic Critical P Level Decision(0.01) Variances Bartlett 32.12762 15.08628 0.00001 **Unequal Variances** Distribution Shapiro-Wilk W 0.98513 0.89981 0.94662 Normal Distribution ANOVA Table Sum of Squares Mean Square DF F Statistic P Level Decision(0.05) 7.794126 1.558825 5 482.17 0.00000 Significant Effect 0.07759104 0.003233 24 7.87171707 1.5620581 29 **Group Comparisons** vs Conc-µg/L Statistic Critical P Level Decision(0.05) Ties Lab Control 2.5 17.5 16 >0.05 2 Non-Significant Effect 5 15 16 <=0.05 2 Significant Effect 10 15 16 <=0.05 1 Significant Effect

				10	0.00	•	olgrinic	and Encou		
	20	1	15	16	<=0.05	2	Signific	ant Effect		
	40	1	15	16	<=0.05	2	Signific	ant Effect		
Data Summary				Origi	nal Data		Transformed Data			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	5	0.90600	0.87000	0.93000	0.02510	1.26116	1.20193	1.30303	0.04218
25		5	0.83400	0.75000	0.89000	0.05857	1.15545	1.04720	1.23273	0.07767
5		5	0.82800	0.78000	0.86000	0.03420	1.14455	1.08259	1.18730	0.04503
10		5	0.21000	0.14000	0.31000	0.07906	0.47086	0.38350	0.59050	0.09608
20		5	0.00000	0.00000	0.00000	0.00000	0.05074	0.05002	0.05363	0.00161
40		5	0.00000	0.00000	0.00000	0.00000	0.09593	0.07077	0.11204	0.01801

Linear Regression: Page 1 of 1 19 Aug-04 11:26 AM Report Date: Analysis:

12-5495-9475

Bivalve Larval Survival and Development Test

Endpoint		An	alysis Type		Sample	Link Con	trol Link	Date Analyz	zed Version
Proportion 1	Normal	Line	ear Regressio	n	10-6041	7464 10-6	6041-7464	19 Aug-04 1	1:26 AM CETISv1.024
Linear Reg	ression Options	;							
Model	Threshold	Option	Lower Thres	hold Thre	shold Optimi	zed Rew	eighted	Pooled Grou	ups Heterogeneity Corr.
Log-Normal	Control Th	reshold	0.094	Yes		Yes		No	Yes
Regressior	Parameters								
Parameter	Estimate	Std Err	or 95%	LCL 9	5% UCL	t Statistic	P Leve	l Decis	ion(0.05)
Threshold	0.13143	0.01367	7 0.10	316 0	.15970	9.618	0.0023	9 Signifi	icant
Slope	8.10604	0.97868	6.08	149 1	0.13060	8.283	0.0036	9 Signifi	icant
Intercept	-2.39484	0.96156	5 -4.38	- 399	0.40570	-2.491	0.0884	4 Not Si	ignificant
Regression	n Summary								
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Lev	vel Decis	sion(0.05)
8	-398.41990	-0.29544	0.12336	0.06238	39.20660	35.1724	47 0.038	87 Signi	ficant Heterogeneity
Residual Analysis									
Attribute	Method		Statis	stic C	ritical	P Level	Decisio	on(0.05)	
Variances	Modified	Levene	8.038	15 2.	74006	0.00032	Unequa	al Variances	
Distribution	Shapiro-	Wilk W	0.775	19 0.	91820	0.00004	Non-no	rmal Distribut	tion
Point Estin	nates								
% Effect	Conc-µg/L	95% LCL	95% L	ICL					
25	6.746125	5.88542	7.3604	13					
50	8.170764	7.52133	8.6671	1					
Data Sumn	nary			Calcu	lated Variate	e(A/B)			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	Α	в
0	Lab Control	5	0.90600	0.87000	0.93000	0.00512	0.02510	453	500
2.5		5	0.83400	0.75000	0.89000	0.01195	0.05857	417	500
5		5	0.82800	0.78000	0.86000	0.00698	0.03420	414	500
10		5	0.21000	0.14000	0.31000	0.01614	0.07906	105	500
20		5	0 00000	0.00000	0.00000	0.00000	0.00000	0	487
40		5	0.00000	0.00000	0.00000	0.0000	0.00000	0	150

AMEC Bioassay SD

Data Worksheet: Page 1 of 1 22 Jul-04 11:07 AM Report Date: 10-6041-7464/040722mgrt Link:

JETIS Worksheet

AMEC Bioassay SD

Bivalve Lan	/al Sur	vival a	and De	evelopment Tes	t					AMEC Bioassay SD
Start Date:	22 Jul	-04		Species:	Mytilis gallo	orovincialis		Sample Code:	040722mgrt	
End Date:	24 Jul	-04		Protocol:	ASTM (199	¥1999		Sample Source:	Reference Toxic	ant
Sampled:	22 Jul	-04		Material:	Copper chlo	ride		Sample Station:		
Conc-µg/L	Code	Rep	Pos	# Counted	# Normal		Co wattoo	Norm Note	S	
	0 LC	1	14	.100176	1 27	125	100	87		
	0 LC	2	4	73			100	87		
	0 LC	3	17	103		12-	100	89		
	0 LC	4	12	95	74	-125	100	93		
	0 LC	5	21	10-7	85	25	100	92		
2.	5	1	5	109-	27	28-	100	80		
2.	5	2	11	75-	<u> </u>	- RS	100	89		
2	5	3	27	100	88	a pa televerandel na kara bel-deratema en de	a da a a a a fan a fa a fa a fa a fa a f			
2.	5	4	18	100	85			un annunga ang a ma antara kalong tina panangan ang a tina dikan tina kalong tina kalong tina kalong tina kalon	annan destration of an array of the destration to a sub-	
2	5	. 5	28	100	75				ad die Fageneilinger die der Fahr Wies Licht & Die Minderschlund beiden zum	
	5	1	29	100	78					
	5	2	23	100	81					
	5	3	30	100	86					
	5	4	24	100	86		10 18-18 18-18 18-18 18-18-18-18-18-18-18-18-18-18-18-18-18-1			ana nan manimir - alikunani an 1, alikula mina katan alik digira ika petata na 18.11 ya damat
	5	5	25	100	83					
1	0	1	16	100	14					
1	0	2	3	100	17					
1	0	3	6	100	28					
1	0	4	1	100	15					
	0	5	26	100	-31					
2	0	1	/	100	Ð					
2	0	2	2	100	0					
2	0	3	19	87	0					
2	0	4	22	100	0					
2	0	5	20	100	0					
4	0		13	50	0					
4	0	2	15	20	0					
4	0	3	8	35	0					
4	0	4	9	25	0		B si Banda an Anna an Anna an Anna an Anna an Anna an Anna Anna Anna			
4	0	5	10	<u> </u>	0					

Analyst: AH Reviewed By: AH 8-12 0

CETIS Worksheet

Data Worksheet: Page 1 of 1 22 Jul-04 11:07 AM Report Date: 10-6041-7464/040722mgrt Link:

AMEC Bioassay SD

Bivalve Larval Survival and Development Test

Start Date:	22 Jul-04		Species	Mytilis galle	provincialis		Sam	nle Code:	040722mart
End Date:	22 Jul-04		Brotocol:	ASTM (100	21 1999		Sam	nie Source	a Reference Toxicant
End Date:	24 Jul-04		Motoriol:	Connor obl	St 64		Sam	ple Source	
Sampled:	22 Jui-04		waterial:	Copper chi	onde		Sam	pie Statio	1.
Conc-µg/L	Code Rep	Pos	# Counted	# Normai			Re-	read No	tes
		1	176	27	(B)		100	15	uc
		2	73	C	(B)		100	0	
		3	103	υ	NS.		100	17	
		4	95	74	NB		100	87	
		5	107	85	NS	1	100	80	1
		6	109	27	18		i 00	28	RG
		7	75	0	12		100	0	1
		8	56	0	ß		35	<u>D</u>	
		9	47	0	Ø		25	D	
August a 1.5.		10	28	0	<u>k</u>		20	0	
		11	76	71			100	ØY	
		12	120	109			100	93	
		13	37	0	63		50	0	
		14	46	<u> </u>	<u> </u>		100	42	
		15	17	0	NS-		10	U	
		17	105	4	KA	1	1001	19	V
		18	100	25	uc ye				
		19	100	0.5	1				
		20	5+						
		20	100	0					
		22	ico	~~~					
		23		81					
		24	100	84					
		25		83					
		26	ice	21					
		27	100	88					
		28		75					
		29	in	'79					
		30	(RU)	20					
						1		~	
					de	ita e	ntr	100	=AH
							\mathcal{C}]	



			Bivalve La	arval Survi	val and Develo	pment Test-Propor	tion Normal
Start Date:	07/22/2004		Test ID:	040722mg	rt	Sample ID:	REF-Ref Toxicant
End Date:	07/24/2004		Lab ID:	AEESD-AN	MEC Bioassay S	SD Sample Type:	CUCL-Copper chloride
Sample Date:			Protocol:	ASTM 199	9	Test Species:	MG-Mytilis galloprovincialis
Comments:							
Conc-ug/L	1	2	3	4	5		
L-Lab Control	0.9200	0.8700	0.8900	0.9300	0.9200		
2.5	0.8000	0.8900	0.8800	0.8500	0.7500		
5	0.7800	0.8100	0.8600	0.8600	0.8300		
10	0.1400	0.1700	0.2800	0.1500	0.3100		
20	0.0000	0.0000	0.0000	0.0000	0.0000		
40	0.0000	0.0000	0.0000	0.0000	0.0000		

		_	Tra	ansform:	Arcsin So	quare Roo	ot	Rank	1-Tailed	Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
L-Lab Control	0.9060	1.0000	1.2612	1.2019	1.3030	3.344	5			47	500
2.5	0.8340	0.9205	1.1554	1.0472	1.2327	6.722	5	17.50	16.00	83	500
*5	0.8280	0.9139	1.1446	1.0826	1.1873	3.934	5	15.00	16.00	86	500
*10	0.2100	0.2318	0.4709	0.3835	0.5905	20.406	5	15.00	16.00	395	500
*20	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	5	15.00	16.00	500	500
*40	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	5	15.00	16.00	500	500

Auxiliary Tests					Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates norm	nal distribu	ition (p >	0.01)		0.96477	0.9	0.08223	0.2438
Equality of variance cannot be cor	nfirmed							
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	ΤU				
Steel's Many-One Rank Test	2.5	5	3.53553					



Bivalve Development Bioassay Worksheet

Client: <u>City of Brenaventura</u> Start Test No.: <u>0407-061 > 066, 0407</u> 22 mgyt End I Test Species: <u>M. salloprov.ncialis</u> Date Tech Initials: <u>IR</u>	Date/Time: <u>7/22/04</u> 17:00 Date/Time: <u>7/24/04 15:</u> 00 Received: <u>7/22/04</u>
Sample Type:	
Test Chamber Type and Sample Volume: <u>30m1 She11 [</u>	Vials; 10ml
Spawn Initiation Time:	
Male Female Number of Spawners:	
Spawn Condition: Fair to Poor	
Fertilization Time: 1530	
Egg Stock Density Calculation:	
Eggs Counted (x): 7 11 13 18 10 13 6 12 5 12 Mean <u>8.2</u> 13.2 Overall Mean: 1(Mean: 10.7 x 42 = <u>449.7</u> eggs/ml	2.7
Initial Stock - $\frac{449.7_{eggs/ml}}{100}$ = $\frac{1.12}{1.12}$	
Percent Division Upon Inoculation: <u>30</u>	
Time of Inoculation: 1700	
Comments: AME 5550 San Reviewed/ Date:	C Bioassay Laboratory) Morehouse Drive, Suite B Diego, CA 92121) 458-9044

Marine Chronic Bioassay

Water Quality Measurements

Raw Datasheet



Test Species:	N. gallor	mincialis
Start/End Dates:	7.22.01	7 24 rel
Start/End Times:	1700	1500

Concentration	Te	mperatu	re		Salinity	1	Disso	olved Ox	ygen		pН	
IAL		(°C)			(ppt)			(mg/L)			(pH units	5)
~	0	24	48	Q	24	48	<u> </u>	24	48	Q	24	_{cu} 48
LC	Æ	14.6	14.8		34.5	34,3	B	8.8	9.1	\otimes	793	# 2,98
2.5		14.4	15.0	1 34.4	1.000	34.3		૪.૪	9.2		7.97	7.96
5		14.3	14.7	1 6	34.5	34.5		3.8	9.3		7.97	7.97
10		14.4	14.6		34.5	34.5		8.5	9.3		7.977	2,97
20		14.4	14.7		34.4	34.0		8.9	9.3		7.97	7.97
40	1	14.4	14.6	4	34.5	૩૧.૯	1	8.9	9.3		7.97	727

Technician Initials	0 24 48	
Animal Source/Da	te Received: 110000 Bary 7.22.04	
Comments:	0 hrs: 24 hrs: 48 hrs:	
QC Check:	AH 812-04 Final Review: Afr \$20/04	

AMEC Earth and Environmental Bioassay Laboratory 5550 Morehouse Dr., Suite B San Diego, CA 92121 APPENDIX D ANALYTICAL CHEMISTRY DATA





September 22, 2004

Revised Report

Chris Stransky Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121

Subject: Calscience Work Order No.: Client Reference:

04-09-0244 Buenaventura July 04 WER

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 09/03/04 and analyzed in accordance with the attached chain-of-custody. This report has been revised in order to replace data for sample Polished SW-14. The original concentration reported for this sample was determined to be incorrect, and has been replaced.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The original report of any subcontracted analysis is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Calscience Environmental Laboratories, Inc. Robert Stearns Project Manager







09/03/04

Page 1 of 4

Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121

Date Received: Work Order No: 04-09-0244 Preparation: EPA 3010A Total Method: EPA 6010B

Project: Buenaventura July 04 WER

Client Sample Number			Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
SCRE-A-2-25	en en leiterte er en leiterte er en state er en er		04-09-0244-1	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	<u>Result</u>	RL	DF	Qual	<u>Units</u>			
Copper	39.0	5.0	1		ug/L			
SCRE-A-2-40	. 2965.673		04-09-0244-2	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	Units			
Copper	54.4	5.0	1		ug/L			
SCRE-A-2-65			04 09 0244 3	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	Units			
Copper	80.2	5.0	1		ug/L			
SCRE-A-2-100		ing in the second s	04-09-0244-4	09/02/04	Aqueous	07/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	116	5	1		ug/L			
SCRE-B-2-LC		<u> (1888)</u>	04-09-0244-5	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	5.61	5.00	1		ug/L			
SCRE-B-1-SC			04-09-0244-6	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	Units			
Copper	8.68	5.00	1		ug/L			

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121

Work Order No: Preparation: Method:

Date Received:

04-09-0244 EPA 3010A Total EPA 6010B

09/03/04

Page 2 of 4

Project: Buenaventura July 04 WER

Client Sample Number			Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
SCRE-B-1-0(unspiked)			04-09-0244-7	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	<u>Result</u>	RL	DF	Qual	<u>Units</u>			
Copper	6.15	5.00	1		ug/L			
SCRE-B-1-40		Maria	04-09-0244-8	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	53.0	5.0	1		ug/L			
SCRE-B-1-65	an a		04-09-0244-9	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	79.8	5.0	1		ug/L			
SCRE-B-1-100			04-09-0244-10	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	115	5	1		ug/L			
SCRE-B-3-40			04-09-0244-11	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	<u>Result</u>	RL	DF	Qual	<u>Units</u>			
Copper	51.9	5.0	1		ug/L			
SCRE-B-3-65			04-09-0244-12	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	Units			
Copper	75.1	5.0	1		ug/L			

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121

Work Order No: Preparation: Method:

Date Received:

04-09-0244 EPA 3010A Total EPA 6010B

09/03/04

Page 3 of 4

Project: Buenaventura July 04 WER

Client Sample Number			Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
SCRE-B-3-100			04-09-0244-13	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	<u>Result</u>	<u>RL</u>	DF	Qual	<u>Units</u>			
Copper	116	5	1		ug/L			
SCRE-C-2-40			04-09-0244-14	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	49.2	5.0	1		ug/L			
SCRE-C-2-65			04-09-0244-15	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	Units			
Copper	77.1	5.0	1		ug/L			
SCRE-C-2-100			04-09-0244-16	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	114	5	1		ug/L			
Polished SW-5.0	р		04-09-0244-17	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	8.79	5.00	1		ug/L			
Polished SW-8.4			04-09-0244-18	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	12.6	5.0	1		ug/L			

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received:09/03/04Work Order No:04-09-0244Preparation:EPA 3010A TotalMethod:EPA 6010B

Project: Buenaventura July 04 WER

Client Sample Number			Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Polished SW-14			04-09-0244-19	09/02/04	Aqueous	09/03/04	09/21/04	040903L11
Parameter	Result	RL	DF	Qual	<u>Units</u>			
Copper	13.0	10.0	2		ug/L			
Polished SW-23			04-09-0244-20	09/02/04	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	Units			
Copper	24.0	5.0	1		ug/L			
Method Blank	1		097-01-003-4,143	3 N/A	Aqueous	09/03/04	09/07/04	040903L11
Parameter	Result	RL	DF	Qual	Units			
Copper	ND	5.00	1		ug/L			

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Nautilus Environmental	Date Received:
5550 Morehouse Drive, Suite 150	Work Order No:
San Diego, CA 92121	Preparation:
-	Method:

09/03/04 04-09-0244 EPA 3010A Total EPA 6010B

Project Buenaventura July 04 WER

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Polished SW-23	Aqueous	ICP 3300	09/03/04	09/07/04	040903P11
Parameter	MS %REC	MSD %REC	%REC CL	RPD RPD C	Qualifiers
Copper	112	112	80-120	0 0-20	

RPD - Relative Percent Difference , CL - Control Limit





Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: N/A 04-09-0244 EPA 3010A Total EPA 6010B

Project: Buenaventura July 04 WER

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed		LCS/LCSD Bate Number	:h
097-01-003-4,143	Aqueous	ICP 3300	09/03/04	09/07/04		040903L11	
Parameter	LCS %R	EC LCSD	<u>%REC %F</u>	RECCL	RPD	RPD CL	Qualifiers
Copper	100	99	٤	30-120	0	0-20	

RPD - Relative Percent Difference , CL - Control Limit





Glossary of Terms and Qualifiers



Work Order Number: 04-09-0244

Qualifier	Definition
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
В	Analyte was present in the associated method blank.
С	Analyte presence was not confirmed on primary column.
D	The analyte concentration was reported from analysis of the diluted sample.
E	Concentration exceeds the calibration range.
н	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
х	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.





WORK ORDER #:

04.07.0288

Cooler _/_ of _/__

SAMPLE RECEIPT FORM

Ame _____ CLIENT:

DATE:_____

.

CALSCIENCE COURIER: Chilled, cooler with temperature blank provided. Chilled, cooler without temperature blank. Chilled and placed in cooler with wet ice. Ambient and placed in cooler with wet ice. Ambient temperature. C Temperature blank.	LABORATORY (Other than Calscience Courier): ° C Temperature blank ° C IR thermometer Ambient temperature. Initial:
CUSTODY SEAL INTACT:	\sim
Sample(s): Cooler: No (Not Intact)	: Not Applicable (N/A): Initial:
SAMPLE CONDITION:	
Chain-Of-Custody document(s) received with samples Sample container label(s) consistent with custody papers	Yes No N/A
Correct containers for analyses requested Proper preservation noted on sample label(s) VOA vial(s) free of headspace Tedlar bag(s) free of condensation	

APPENDIX E FIELD COLLECTION DATA
Appendix Table E-1. Field Sample Collection Summary

City of Beunaventura

Santa Clara River Estuary Dry Weather Sampling Event

Site	Collection Time ^a	Latitude 34°…	Longitude 119°…	Water Sample Depth (m)
A-2	1450	13.882	15.843	1.7
B-1	1340	14.094	15.793	1.3
B-3	1040	14.031	15.646	1.6
C-2	0935	14.052	15.392	1.0

Sample Collection Date: July 20, 2004

^a Start of collection time at each site location

Appendix Table E-2. Field Water Quality Measurements

City of Buenaventura

Santa Clara River Estuary Dry Weather Sampling Event

Sample Collection Date: July 20, 2004

Sample		Temperature (°C)	Salinity (ppt)	Conductivity (umhos/cm)	pH (units)	DO (mg/L)
	Surface	26.6	3.0	5620	9.77	>20
A-2	Middle	26.6	3.0	5660	9.75	>20
	Bottom	26.1	7.7	14570		
	Surface	25.9	1.3	2500	7.69	5.0
B-1	Middle	25.1	1.3	2570	9.04	4.0
	Bottom	27.0	4.7	8890		
	Surface	25.4	2.8	5250	9.52	>20
B-3	Middle	25.4	2.9	5320	9.54	>20
	Bottom	25.8	9.5	9340		
	Surface	25.3	2.9	5460	9.53	>20
C-2	Middle	25.2	2.9	5440	9.4	>20
	Bottom	25.1	2.9	5340		

Note: Due to limitations of cord length on the pH and DO meters, sites do not have readings for the bottom depth.

APPENDIX F CHAIN-OF-CUSTODY FORMS

Chain of Custody

amec Earth & Environmental, Inc. AMEC San Diego Bioassay Laboratory 5550 Morehouse Drive, Suite B San Diego, CA 92121 Phone: 858-458-9044 FAX 858-587-3961

Date 1	20-04	Page		of
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Sample Collection by:	VIS St	Tanst	if different)	ANALYSIS REQUIRED																
Company Ity Company Company Address Address Address City State Zip Contact Contact Contact Phone No. Kaven Waln 805-677-4128 Dan Pfeiffe -4131							State Zip	affinis chrone	barria clarini	DYFT Pra Chronic	alloporincialis	Tomelas chronic	lubra chronic	apricorntam						
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER O	F	COMMENTS	Ř	Ă	M.	M.9	D. 0	C. 0	S.						
A-2	7/2010	14:50	H10	5gal bucket	1 5			X	X	X	X	X	χ	X						
B-1	1	13 40		/	5			1		Í			1							
B·3		10.40			5															
(-3		09.35	\checkmark	V	5			V	V	V	V	V	V	V						
							*													
	ION		SAM	PLE RECE	IPT	6	RELINQUISHED BY	RELINQUISHED BY												
CLIENT TOTAL NO. OF CONTAINER					6	40	(Signature)		(Time)	e) (Signature) (Time)										
P.O. NO. CHAIN OF CUSTODY SEALS						M V	(Printed Name) (Date) (Printed Name)								(Date)					
SHIPPED VIA: Collected & transported						1 V	(Company)	(Company)												
SPECIAL INSTRUCTIONS/COMMENTS:						RECEIVED BY	RECEIVED BY (LABORATORY)													
Freshwater	r tes	ts -1	007. 5	samp)le		(Signature)	(Signature) (Signature)												
only w	salt	cun	trof	H			(Printed Name)	(Date)	(Printed Name) ALL - 1535 -> 1528 (Date)											
Salinity of sample 21							(Company)		AMEC Bioassay Lab Log-in No.											

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02/01/99 Revision

CALSCIENCE ENVIRONMENTAL LABORATORIES, INC. 7440 LINCOLN WAY GARDEN GROVE, CA 92841-1432																1	CH. Date	AIN	12	F C 04 2-	:US	TO	DY	RE 3 2		ID
TEL: (714) 895-5494 • FAX: (714) 894-7501 LABORATORY CLIENT: NAUTILUS ENVIRONMENTAl (FORMERLY AMECL) ADDRESS: GGGO Morehouse Dr. Suite 150 CITY San Diego STATE 92721 TEL: 58-175-5541 588-587-3961 EMAIL PRUHLUSENVIR								Page of CLIENT PROJECT NAME / NUMBER: BUENWEN TVA JULY OF WER PROJECT CONTACT: CMMS STRANSKY SAMPLER(S): (SIGNATURE) DOMMENTAL COM									26]							
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SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)								(0)	MTBE (8021B)	CARBONS (8021B)	(8260B)	s (8270C)	(8081A)	(8082)	DBCP (504.1) or (8011)	F22 METALS (6010B)	S METALS (6020)	(8310)	(TO-14A) or (TO-15)	TGNMO (25.1)	GASES (25.1) or (D1946	al upper				
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11	SCRE. B-3-40		9/2/04	12:22	SW																	X	$\left - \right $			
12	8-3-67			12:27		+		+																		
14	G-2-40			13:07			1																			
15	C-2-165			13:10																						
19	V C-2-100			13:13				ļ														\square				
17	Polished SW-5.	0		13:32				ļ																		
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