

**City of Buenaventura
Toxicity and Chemical Evaluation
February 05 Wet Weather Sampling Event
Santa Clara River Estuary**

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INTRODUCTION

Toxicity tests and chemical analyses were conducted on ambient water samples collected on January 31, 2005 from the Santa Clara River Estuary (SCRE) located near the City of San Buenaventura, CA. This final sampling effort for the project was characterized as a “wet weather” event. Samples for this round of testing were collected just after a storm; the estuary was full of water, and the sand berm was breached. Mr. Chris Stransky and Mr. John Rudolph of Nautilus Environmental, LLC (Nautilus) 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 for all species except for *C. dubia* were initiated on February 1, 2005 at Nautilus’ laboratory located in San Diego, CA. Due to lack of an adequate number of healthy water fleas in the San Diego laboratory, a portion of each sample was sent to the Tacoma laboratory via overnight delivery service; tests were initiated on February 2, 2005. Chemical analyses were performed by Calscience Environmental Laboratories (CEL) located in Garden Grove, CA.

METHODS AND MATERIALS

SAMPLE COLLECTION, TRANSPORT, AND RECEIPT

Ambient water samples were collected from four of the eleven ambient monitoring locations (specifically sites A-2, B-1, B-3, and C-1). 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 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 then removed for test initiation and the remainder of each sample was held at 4°C until required for use.

BIOASSAY PROTOCOLS

Test conditions and Quality Assurance/Quality Control (QA/QC) requirements for each bioassay performed are summarized in Tables 1 through 7. Freshwater tests were conducted for all four sites. However, additional controls prepared to match the salinity of each sample (1.3 ppt for A-2 and B-1, and 0.7 ppt for B-3 and C-1) were tested concurrently in order to evaluate the role of salinity in any observed toxicity.

Table 1. Test Conditions and QA/QC Summary for the Fathead Minnow 7-Day Survival and Growth Test.

Test organism	<i>Pimephales promelas</i>
Test organism source	Aquatic Biosystems, Inc. (Fort Collins, CO)
Test duration	7 days
Test solution renewal	Daily
Feeding	Three times per day
Test initiation date and time	Within 36 hours of sample collection
Test chambers	400-ml disposable plastic cups
Test solution volume	250 ml
Test temperature	25 ± 1 °C
Dilution water	Dilute Mineral Water (8 parts Nanopure, 2 parts Perrier®)
Test concentrations (% sample)	100, and 0 (control)
Number of organisms/chamber	10
Number of replicates	4
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test Protocol	EPA-821-R-02-013
Test acceptability criteria for controls	Means of ≥ 80% survival and ≥ 0.25 mg biomass
Reference toxicant	Copper chloride

Table 2. Test Conditions and QA/QC Summary for the Water Flea 7-Day Survival and Reproduction Test.

Test organism	<i>Ceriodaphnia dubia</i>
Test organism source	In-house cultures
Test duration	7 days
Test solution renewal	Daily
Feeding	Daily
Test initiation date and time	Within 36 hours of sample collection
Test chambers	30-ml disposable plastic cups
Test solution volume	15 ml
Test temperature	25 ± 1 °C
Dilution water	Dilute Mineral Water (8 parts Nanopure, 2 parts Perrier®)
Test concentrations (% sample)	100, and 0 (control)
Number of organisms/chamber	1
Number of replicates	10
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test Protocol	EPA-821-R-02-013
Test acceptability criteria for controls	1) ≥ 80% mean survival; 2) 60% of the surviving females must produce at least 3 broods of offspring; and 3) total reproduction must be ≥ 15 offspring per surviving female.
Reference toxicant	Sodium chloride

Table 3. Test Conditions and QA/QC Summary for the 96-Hour Algal Growth Inhibition Test.

Test organism	<i>Selenastrum capricornutum</i>
Test organism source	In-house cultures
Test duration	96 Hours
Test solution renewal	None
Feeding	Macro- and micro-nutrients added to test solutions prior to test initiation.
Test initiation date and time	Within 36 hours of sample collection
Test chambers	125-ml Erlenmeyer flasks
Test solution volume	50 ml
Test temperature	25 ± 1 °C
Dilution water	Nutrient-enriched deionized water
Test concentrations (% sample)	100 ^a , and 0 (control)
Initial cell density	10,000 cells/ml ± 10%
Number of replicates	5 ^b (one was used only as a surrogate for measuring pH and temperature during the exposure period).
Photoperiod	Continuous light at 400 ± 40 ft-c
Aeration	None
Test Protocol	EPA-821-R-02-013
Test acceptability criteria for controls	Final cell density ≥ 1.0 × 10 ⁶ cells/ml with ≤ 20% variability among test replicates.
Reference toxicant	Copper chloride

^a Prior to test initiation, each sample was inspected under a microscope and found to have heavy debris and 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.

^b An additional flask containing filtered sample not inoculated with algae was also tested as a blank to ensure that there was no interference in measuring chlorophyll-a fluorescence at test termination.

Table 4. Test Conditions and QA/QC Summary for the Pacific Topsmelt 7-Day Survival and Growth Test.

Test organism	<i>Atherinops affinis</i>
Test organism source	Aquatic Biosystems, Inc. (Fort Collins, CO)
Test duration	7 days
Test solution renewal	Daily
Feeding	Two times per day
Test initiation date and time	Within 36 hours of sample collection
Test chambers	1-L plastic tri-pour beakers
Test solution volume	500 ml
Test temperature	20 ± 1 °C
Dilution water	30 ppt artificial seawater
Test concentrations (% sample)	100, 69 ^a , 50, 25, and 0 (control)
Number of organisms/chamber	5
Number of replicates	5
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test Protocol	EPA/600/R-95/136
Test acceptability criteria for controls	Means of ≥ 80% survival and ≥ 0.85 mg biomass
Reference toxicant	Copper chloride

^a For consistency with species requiring brine, a 69 percent dilution of each sample was prepared and tested.

Table 5. Test Conditions and QA/QC Summary for the Opossum Shrimp 7-Day Survival and Growth Test.

Test organism	<i>Americamysis bahia</i>
Test organism source	Aquatic Biosystems, Inc. (Fort Collins, CO)
Test duration	7 days
Test solution renewal	Daily
Feeding	Two times per day
Test initiation date and time	Within 36 hours of sample collection
Test chambers	400-ml plastic tri-pour beakers
Test solution volume	500 ml
Test temperature	25 ± 1 °C
Dilution water	30 ppt artificial seawater
Test concentrations (% sample)	100, 69 ^a , 50, 25, and 0 (control)
Number of organisms/chamber	5
Number of replicates	8
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test Protocol	EPA-821-R-02-014
Test acceptability criteria for controls	Means of ≥ 80% survival and ≥ 0.20 mg biomass
Reference toxicant	Copper chloride

^a For consistency with species requiring brine, a 69 percent dilution of each sample was prepared and tested.

Table 6. Test Conditions and QA/QC Summary for the 48-Hour Bivalve Embryo Development Test.

Test organism	<i>Mytilus galloprovincialis</i>
Test organism source	Carlsbad Aquafarms
Test duration	48 Hours
Test solution renewal	None
Feeding	None
Test initiation date and time	Within 36 hours of elutriate preparation
Test chamber	30-ml glass scintillation vial
Test solution volume	10 ml
Test temperature	15 ± 1 °C
Dilution water	30 ppt laboratory seawater
Test concentrations (% sample)	100, and 0 (control) (w/artificial sea salts) ^a Highest testable concentration, 50, 25, and 0 ^b
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

^a 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 rather than hypersaline brine. 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.

^b Due to the low salinities of 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 for each sample: approximately 71 percent. An additional control composed of hypersaline brine and deionized water was also tested to ensure observed mortality was not due to the addition of hypersaline brine rather than other toxic constituents.

Table 7. Test Conditions and QA/QC Summary for the 48-Hour Giant Kelp Germination and Growth Test.

Test organism	<i>Macrocystis pyrifera</i>
Test organism source	La Jolla Cove, CA (field-collected by Nautilus staff)
Test duration	48 Hours
Test solution renewal	None
Feeding	None
Test initiation date and time	Within 36 hours of elutriate preparation
Test chamber	50-ml glass Petri dishes
Test solution volume	30 ml
Test temperature	15 ± 1 °C
Dilution water	32 ppt laboratory seawater
Test concentrations (% sample)	100, and 0 (control) (w/artificial sea salts) ^a Highest testable concentration, 50, 25, and 0 ^b
Number of organisms/chamber	225,000
Number of replicates	5
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test Protocol	EPA/600/R-95/136
Test acceptability criteria for controls	Mean of ≥ 70% germination and tube length of ≥ 10 µm.
Reference toxicant	Copper chloride

^a 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 rather than hypersaline brine. 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.

^b Due to the low salinities of 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 for each sample: approximately 69 percent. An additional control composed of hypersaline brine and deionized water was also tested to ensure observed mortality was not due to the addition of hypersaline brine rather than other toxic constituents.

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, 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-Kärber, or Linear Interpolation Analyses. The choice of statistical method used was dependent upon specific assumptions met by the data.

CHEMICAL ANALYSES

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

WATER-EFFECT RATIO CALCULATION FOR COPPER

Water-effect ratios (WERs) were calculated for three of the four estuary samples (B-1, B-3, and C-1) using the blue mussel embryo development test. Contamination was observed in the test chambers for sample A-2, thus invalidating the test and any subsequent calculations. The embryo development test using *Mytilus galloprovincialis* 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 criteria for copper in marine waters (see Table 9 for values).

Water samples for the WER analysis were spiked with nominal concentrations of copper of 0, 12, 19, 32, 54, 90, and 150 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. In addition, a standard copper reference toxicant test was also conducted using unpolished seawater. Final nominal concentrations of copper in the reference toxicant test were 0, 2.5, 5.0, 10, 20, and 40 µg/L. A copper reference toxicant

test is performed concurrently with all bivalve embryo tests conducted at Nautilus to evaluate variability in test procedures and sensitivity of organisms over time. All samples spiked with copper were thoroughly mixed for approximately 5 minutes, covered and maintained at the test temperature of 15°C overnight. Samples were spiked with copper on the evening of field sample collection. Subsamples of all test concentrations were collected on the following day (test initiation date) for analytical verification of copper concentrations.

The 48-hour bivalve embryo tests were initiated approximately 48 hours after sample collection. Bivalve tests were performed following the same methods employed for the unspiked estuary samples (Table 6). Measured concentrations of copper were used for all calculations in this report. Total and dissolved copper concentrations were measured in all field-collected samples. Total copper was measured in copper-spiked test concentrations that bracketed dose responses.

RESULTS AND DISCUSSION

Detailed data summaries are 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. All data associated with the WER study are provided in Appendix F. Finally, chain-of-custody information is provided in Appendix G.

FRESHWATER SPECIES

Performing toxicity tests with freshwater organisms on the estuary samples was complicated by the fact that the salinities were higher than freshwater, and could pose variable levels of stress on the test organisms. Consequently, the samples were tested with concurrent salinity controls; to separate salinity effects from other constituents present in the sample, statistical comparisons were made between each full-strength sample and the appropriate salinity control.

Fathead Minnow 7-Day Survival and Growth

Survival in the salinity controls met the test acceptability criterion of 80 percent, with mean values of 85 and 98 percent in the 1.3 and 0.7 ppt controls, respectively. Conversely, survival of fathead minnow larvae was high in all estuary samples, ranging

from 95 to 98 percent (Figure 1), indicating that salinity in the samples was not problematic for the test organisms.

No adverse effects on larval growth were observed. The mean dry biomass of fish exposed to the samples and their corresponding salinity controls ranged from 0.32 to 0.40 mg (Figure 1).

Water Flea 7-Day Survival and Reproduction

Salinity did not affect survival of *Ceriodaphnia*. Mean survival in the 1.0 and 2.2 ppt salinity controls was 90 and 100 percent, respectively. Survival in the estuary samples ranged from 90 to 100 percent (Figure 2), depending upon the site.

With respect to reproduction, no adverse effects were observed for samples A-2, B-1, and C-1, or their corresponding salinity controls. However, sample B-3 did exhibit slightly reduced reproduction (Figure 2). An equal variance t-test determined that this reduction was significant compared to the salinity control.

96-Hour Algal Growth Inhibition

No toxicity was observed in either the salinity controls or the filtered estuary samples. However, cell density in the unfiltered samples was lower than that in the filtered samples, suggesting that particulate material or native algae in the samples interfered with cell growth to some extent (Figure 3).

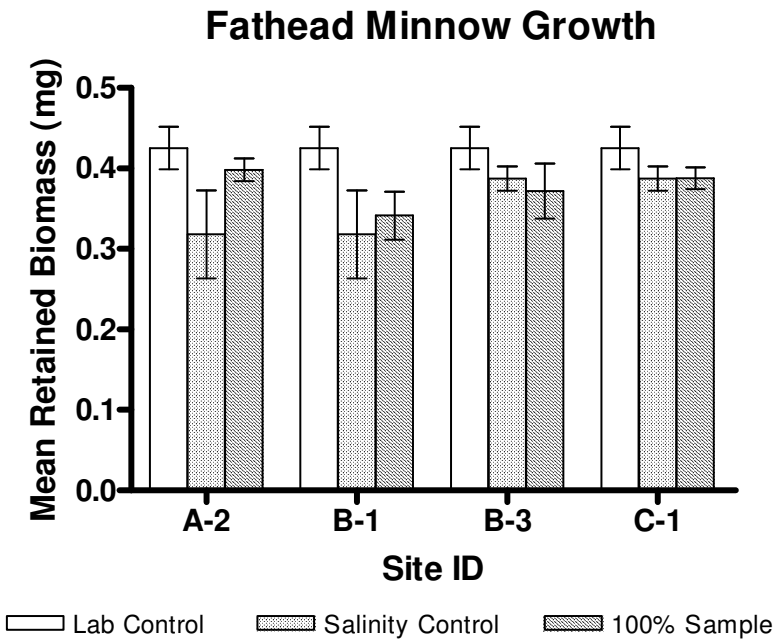
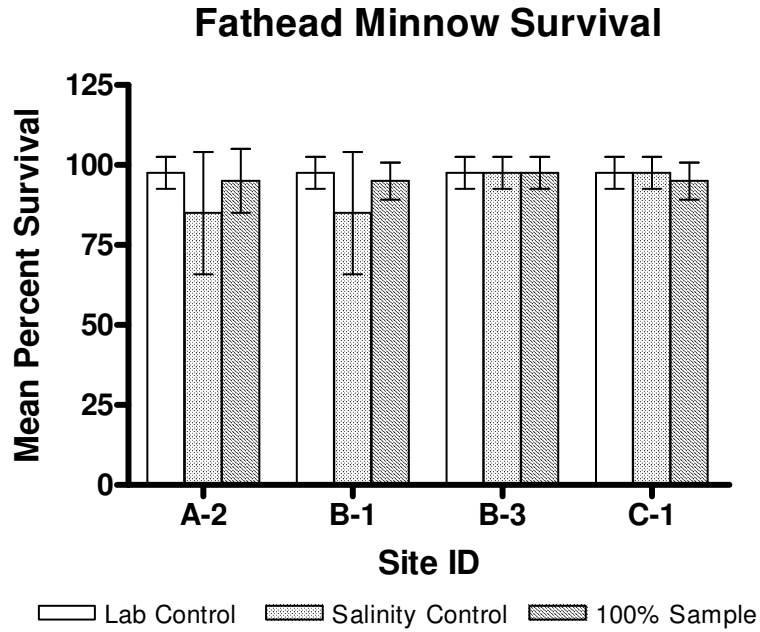


Figure 1. Summary of toxicity test results for fathead minnow 7-day survival and growth. Mean ($\pm 1SD$) values in 100 percent sample are displayed. No statistically significant decreases were observed compared to concurrent salinity controls.

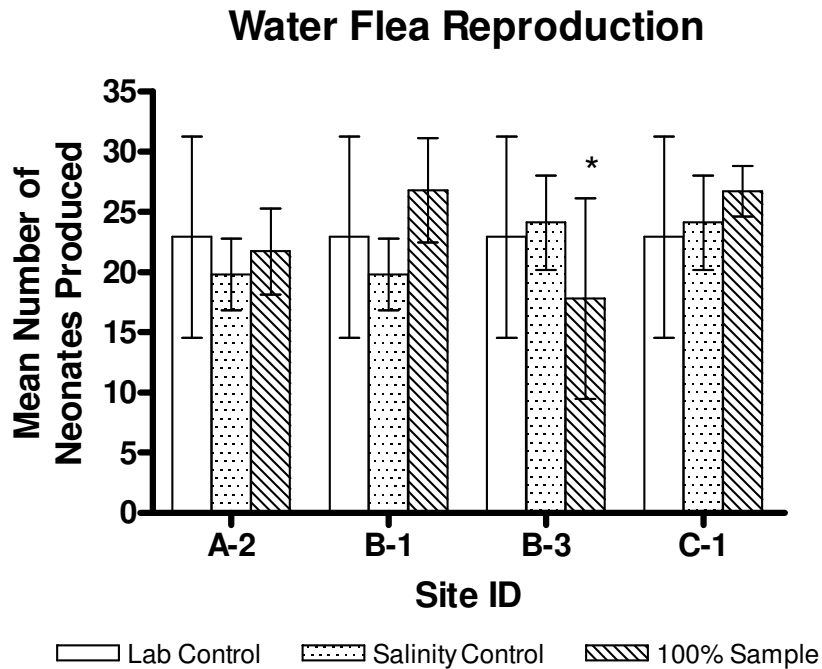
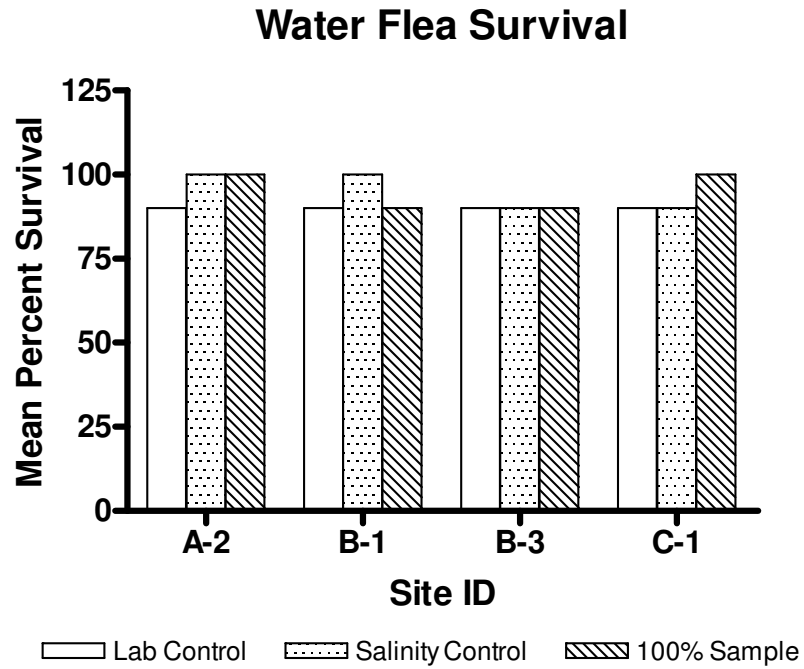


Figure 2. Summary of toxicity test results for water flea 7-day survival and reproduction. Mean ($\pm 1SD$ for reproduction) values in 100 percent sample are displayed. Reproduction in sample B-3 was reduced compared to the salinity control.

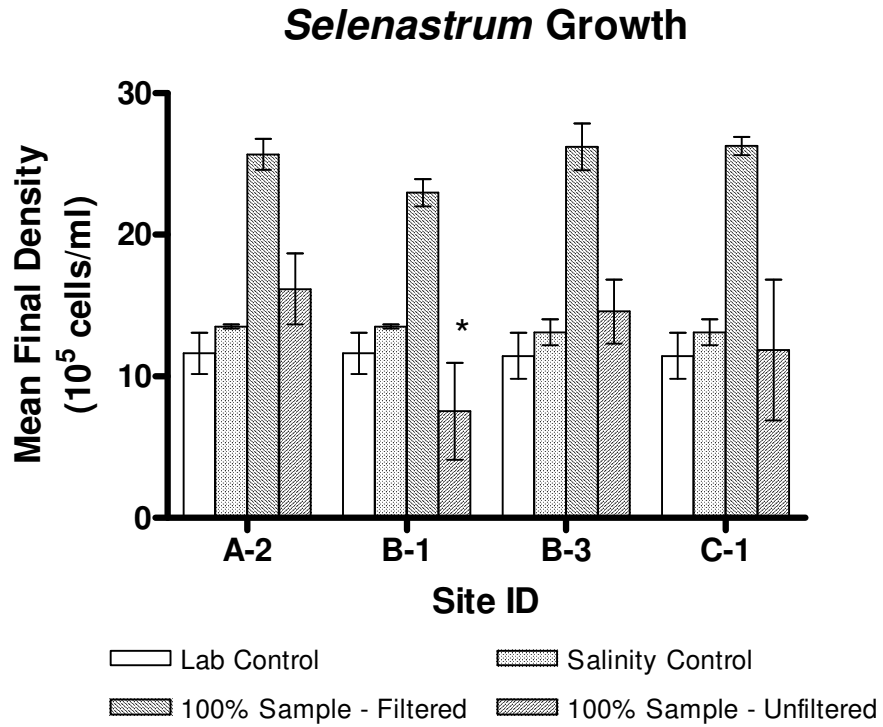


Figure 3. Summary of toxicity test results for algal growth inhibition. Mean ($\pm 1SD$) values in 100 percent sample are displayed. Only unfiltered sample from site B-1 showed a significant decrease in cell density relative to the salinity control.

MARINE SPECIES

Pacific Topsmelt 7-Day Survival and Growth

Survival of topsmelt larvae was high across all test concentrations and samples, ranging from 88 to 100 percent (Figure 4, Appendix Table A-4). No reductions in growth were observed relative to the salt controls. Mean biomass in the undiluted samples ranged from 1.1 to 1.4 mg, compared to 1.2 mg in the salt controls (Figure 4).

Opossum Shrimp 7-Day Survival and Growth

No adverse effects on survival or growth were observed for mysids. Across samples and test concentrations, mean survival ranged from 90 to 100 percent, and mean biomass ranged from 0.20 to 0.26 mg (Figure 5, Appendix Table A-5).

Bivalve Embryo Development

Mussel embryo development was not impacted by exposure to estuary samples. Normal development was high in samples amended with hypersaline brine. Mean normal development ranged from 83 to 91 percent among test concentrations (up to 71 percent sample) and sample sites (Figure 6, Appendix Table A-6). However, the addition of artificial sea salts did impact mussel embryo development; few normal embryos were observed in the salt controls or the samples amended with salts. Therefore, these concentrations and controls were deemed invalid and are not reported here.

48-Hour Giant Kelp Germination and Growth

No significant reductions in giant kelp spore germination or germ tube length were observed (Figure 7). Mean germination ranged from 68 to 88 percent in full-strength samples amended with artificial salts, and those amended with hypersaline brine. Mean tube length ranged from 11 to 15 μm (Figure 7).

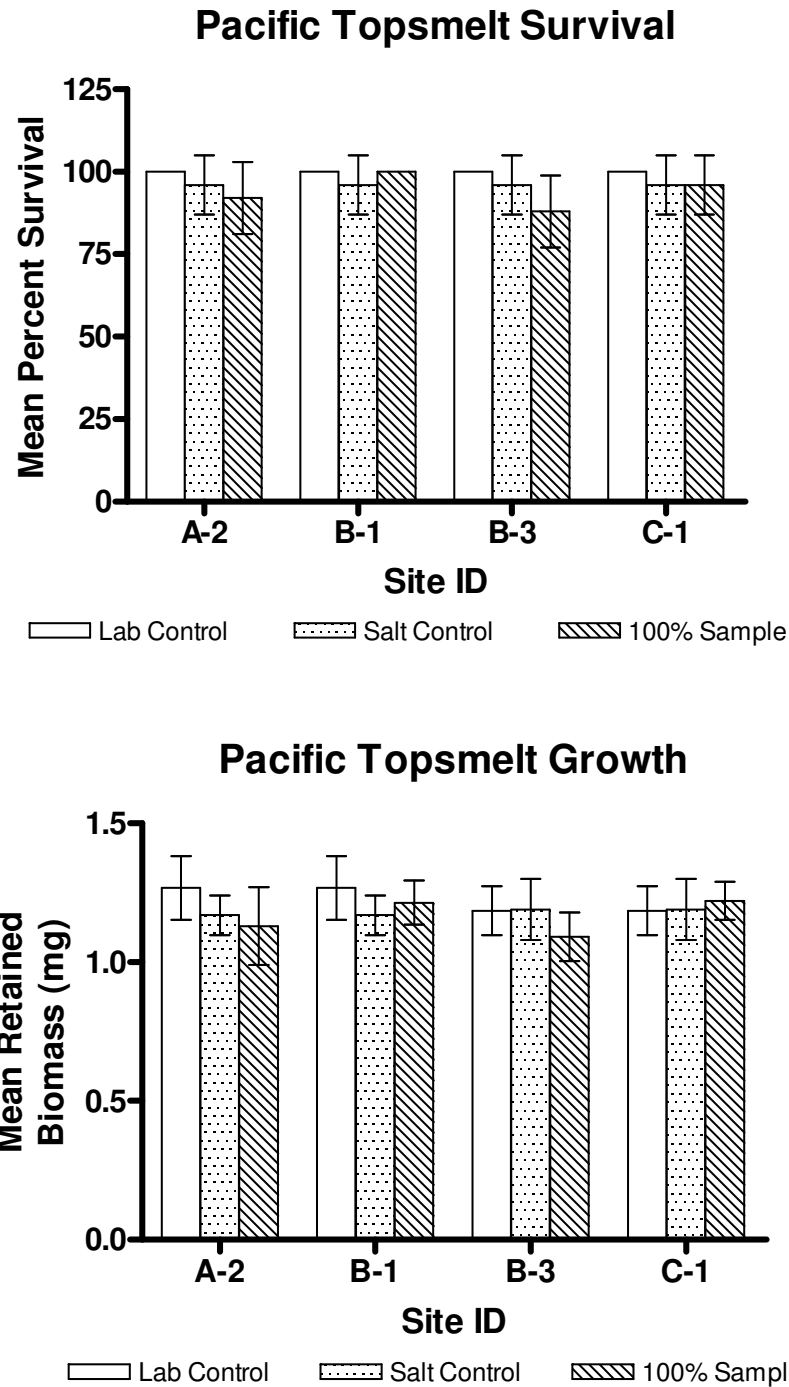


Figure 4. Summary of toxicity test results for Pacific topsmelt 7-day survival and growth. Mean ($\pm 1SD$) values in 100 percent sample are displayed. No reductions in germination or growth were observed relative to the appropriate salt control.

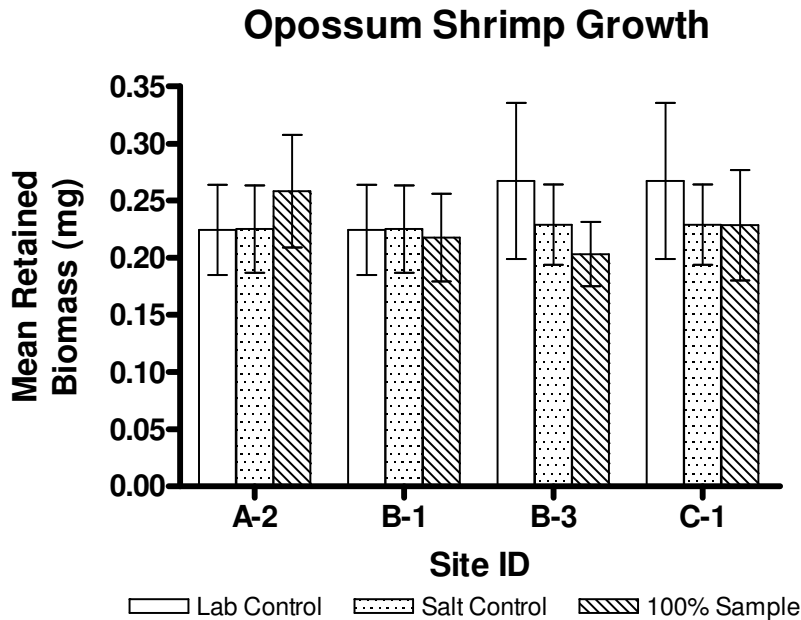
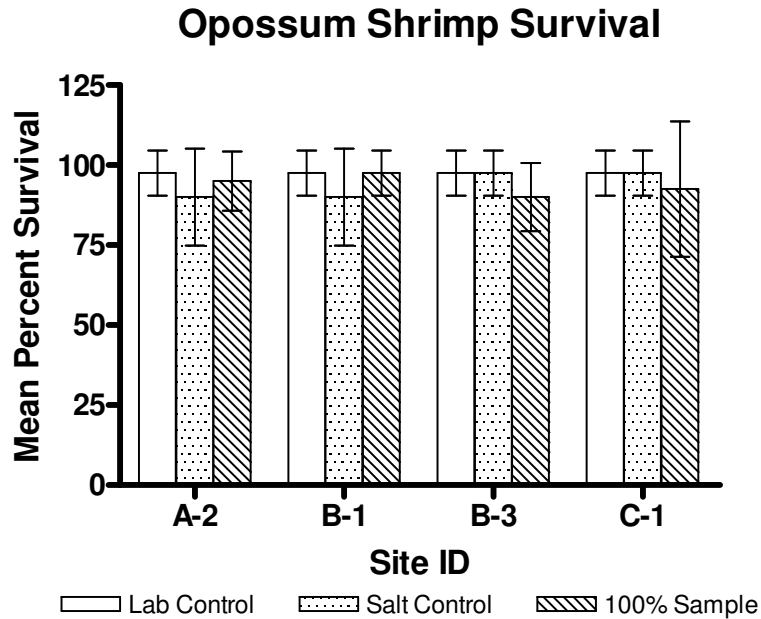


Figure 5. Summary of toxicity test results for opossum shrimp 7-day survival and growth. Mean (± 1 SD) values in 100 percent sample are displayed. No statistically significant decreases in survival or growth were observed compared to concurrent salt controls.

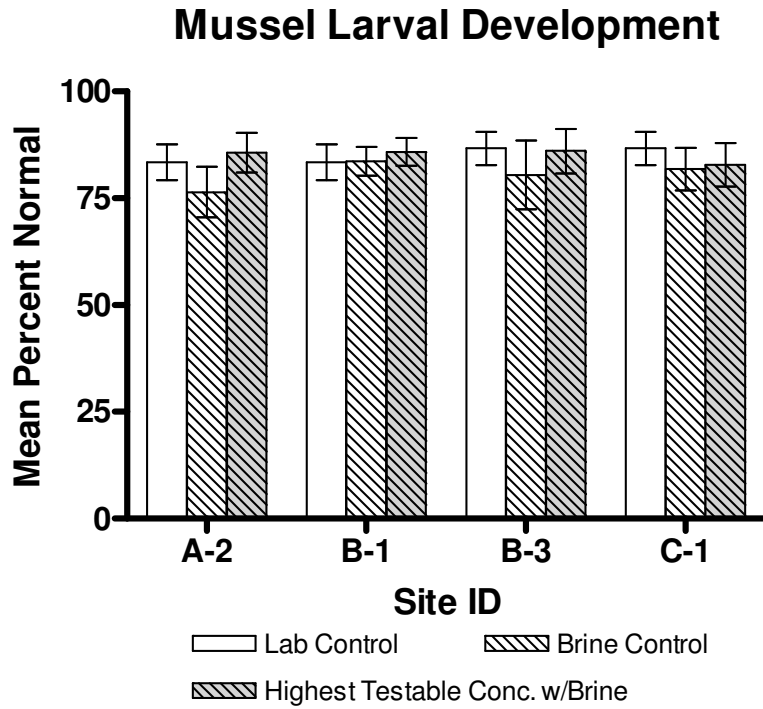
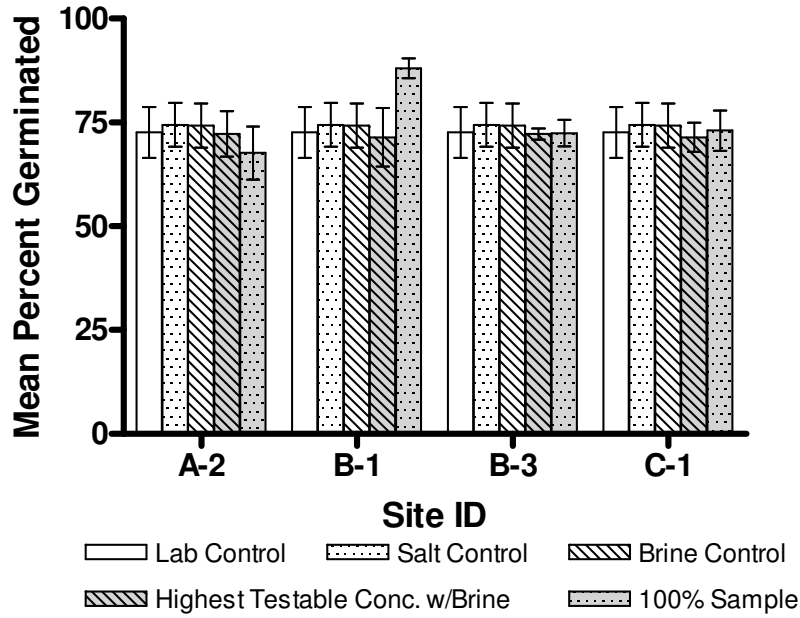


Figure 6. Summary of toxicity test results for bivalve 48-hour embryo development using *Mytilus galloprovincialis*. Mean ($\pm 1SD$) values in the highest testable concentration with brine (71%) are displayed. No statistically significant decreases were observed compared to the appropriate concurrent controls.

Giant Kelp Germination



Giant Kelp Growth

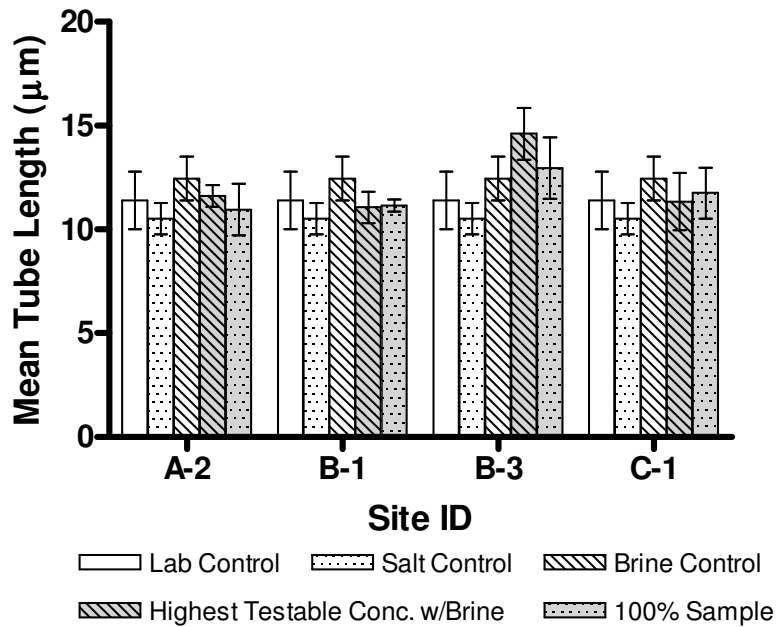


Figure 7. Summary of toxicity test results for giant kelp spore germination and growth. Mean ($\pm 1SD$) values for each site are displayed. No statistically significant decreases in germination or growth were observed compared to appropriate concurrent controls.

AMBIENT WATER ANALYTICAL CHEMISTRY RESULTS

Measured concentrations of various contaminants of concern are shown in Table 8 and associated water quality criteria values are presented in Table 9. Dissolved copper concentrations in samples B-1 and C-1 were above the EPA protective water quality criterion for marine species of 3.1 µg/L. However, this value was determined using the 48-hour bivalve embryo development test, which showed no toxicity in these samples. Moreover, concentrations of nickel, selenium, and zinc were relatively low, and all below their respective water quality guidelines. This suggests that these contaminants were unlikely to be associated with toxicity (Table 9). The detection limit for total cyanide was greater than the criterion values, which are for free cyanide. However, the general lack of toxicity associated with these samples suggests that this constituent was not present at concentrations associated with adverse effects. Measurements for total organic carbon (TOC), dissolved organic carbon (DOC), and total suspended solids (TSS) are included in Table 10.

Table 8. Summary of Total and Dissolved Contaminant Concentrations Measured in Santa Clara River Estuary Samples Collected January 31, 2005

Sample	Form	Concentration (µg/L)				
		Cyanide	Copper	Nickel	Selenium	Zinc
A-2	Dissolved	NM	2.79	6.79	3.81*	10.3*
	Total	< 50	4.49	6.74	3.77	10.2
B-1	Dissolved	NM	4.87	6.10	4.26	21.9
	Total	<50	9.70	6.60	4.48	23.8
B-3	Dissolved	NM	2.77	6.58*	3.40	<5.00
	Total	<50	3.23	6.24	5.94	11.0
C-1	Dissolved	NM	3.39*	6.64*	3.65	<5.00
	Total	<50	3.11	6.30	3.77	11.0

*In these cases, the dissolved metal concentration exceeded the total. However, both sets of results (e.g. total and dissolved metals) met analytical laboratory quality assurance and reporting criteria. In addition, true differences in concentrations are difficult to detect close to the method reporting limit.

NM – Not measured.

Table 9. EPA Water Quality Criteria for the Protection of Aquatic Life ^a as reported in “Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California,” (US EPA 2000).

Sample	Concentration (µg/L)				
	Cyanide ^b	Copper	Nickel	Selenium	Zinc
EPA Marine Acute CMC	1	4.8	74	290	90
EPA Marine Chronic CCC	1	3.1	8.2	71	81
EPA Freshwater Acute CMC ^c	22	13	470	13-186 ^d	120
EPA Freshwater Chronic CCC ^c	5.2	9.0	52	5 total	120

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

^b Values expressed in terms of free cyanide (e.g. µg HCN/L)

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

^d Freshwater CMC depends on ratio of selenite to selenate

CMC - Criterion Maximum Concentration

CCC - Criterion Continuous Concentration

Table 10. Summary of additional analytical chemistry measurements in Santa Clara River Estuary samples collected January 31, 2005

Sample	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Suspended Solids (mg/L)
A-2	5.9	6.5	238
B-1	11.0	9.5	4.0
B-3	4.4	5.7	462
C-1	5.0	5.5	275

WATER-EFFECT RATIO

Copper EC₅₀ values and WER calculations are summarized in Table 11. Detailed WER results are available in Appendix F. Mean normal development was 83 to 86 percent in the unspiked estuary samples, compared to 95 percent in the laboratory control. Total copper EC₅₀ values calculated for estuary samples based on measured copper concentrations ranged from 31.6 to 92.5 µg/L. For comparison, the mean EC₅₀ calculated for polished seawater spiked with copper was 17.9 µg/L. The calculated WER values ranged from 1.77 to 5.17, with a geometric mean of 2.53.

Table 11. Total Copper WER Values for Santa Clara River Estuary Samples Calculated using Scripps Polished Seawater (measured concentrations)^a

Sample	EC ₅₀ (µg/L Total Cu)	Water-Effect Ratio
Site A-2	NR	NR
Site B-1	92.5	5.17
Site B-3	31.6	1.77
Site C-1	31.7	1.77
Polished Scripps Seawater ^a	17.9	NA
Scripps Seawater ^b	4.3	NA

^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 to conduct a standard copper reference toxicant test included here, and in the laboratory reference toxicant control chart.

NR - Not reported, contamination was observed in one or more of the test chambers.

QA/QC

FRESHWATER SPECIES

Laboratory controls met acceptability criteria for fathead minnows and green alga. Mean percent survival for the fathead minnow lab control was 98 percent (> 80 percent criterion); mean dry biomass was 0.43 mg (> 0.25 mg criterion). The lab controls for the green alga test had mean final densities of 11.6 and 11.4 x 10⁵ cells/ml and variability among control replicates of 13 and 14 percent for controls 1 and 2, respectively.

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. The water flea test controls met performance criteria; ten percent mortality was observed in the lab controls for the water flea test (< 20 percent criterion), and mean reproduction was 23 offspring (> 15 offspring minimum). However, the tests were initiated just outside of the 36-hour allowed holding time due to the necessity to send samples to the Tacoma laboratory for testing.

Reference toxicant tests conducted using the fathead minnow, water flea, and green alga met test acceptability criteria, and fell within two standard deviations of laboratory control chart means (Appendix C).

MARINE SPECIES

Laboratory controls met acceptability criteria for three of the four marine species tested: Pacific topsmelt, opossum shrimp, and giant kelp. The bivalve development test resulted in lab controls with mean normal development of 83 to 87 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 the range of values among control replicates included several values exceeding the criterion; 2) no toxicity was observed in the tests; and 3) the percent minimum significant differences (MSDp) between test concentrations and the control were low, indicating the test was sensitive. Topsmelt mean control survival was 100 percent and mean dry biomass ranged from 1.2 to 1.3 mg. Both endpoints exceeded the minimum requirements of 80 percent survival and 0.85 mg biomass, respectively. Mean percent survival for both of the opossum shrimp controls was 98 percent, which also exceeded the minimum requirement of 80 percent. The mean dry biomass ranged from 0.22 to 0.27 mg (> 0.20 mg criterion). Finally, the kelp test control exhibited 73 mean percent germination and 11 μm mean spore length, exceeding the criteria of 70 percent and 10 μm , respectively.

Reference toxicant tests conducted using topsmelt, opossum shrimp, mussel embryo, and giant kelp met test acceptability criteria, and fell within two standard deviations of laboratory control chart means (Appendix C).

LITERATURE CITED

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APPENDIX A
CHRONIC 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 Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Pimephales promelas*

Sample	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control	A	10	100	98	5.0	0.43	0.43	0.03
	B	10	100			0.42		
	C	10	100			0.40		
	D	9	90			0.46		
Salinity Control #1 (1.3 ppt) A-2, B-1	A	10	100	85	19	0.28	0.32	0.05
	B	8	80			0.32		
	C	10	100			0.40		
	D	6	60			0.28		
Salinity Control #2 (0.7 ppt) B-3, C-1	A	10	100	98	5.0	0.40	0.39	0.01
	B	9	90			0.37		
	C	10	100			0.39		
	D	10	100			0.39		
A-2	A	10	100	95	10	0.41	0.40	0.01
	B	8	80			0.40		
	C	10	100			0.38		
	D	10	100			0.41		
B-1	A	10	100	95	5.8	0.30	0.34	0.03
	B	9	90			0.36		
	C	9	90			0.37		
	D	10	100			0.33		
B-3	A	10	100	98	5.0	0.41	0.37	0.03
	B	10	100			0.37		
	C	9	90			0.33		
	D	10	100			0.39		
C-1	A	10	100	95	5.8	0.38	0.39	0.01
	B	9	90			0.38		
	C	9	90			0.38		
	D	10	100			0.41		

C. DUBIA

Appendix A-2. Water Flea 7-Day Survival and Reproduction Test Results

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 2, 2005

Test Species: *Ceriodaphnia dubia*

Sample	Replicate	Percent Survival at 7 Days	Mean Percent Survival at 7 Days	Number of Neonates Produced	Mean Number of Neonates Produced	Standard Deviation
Lab Control	1	100	90	28	23	8.4
	2	100		27		
	3	100		28		
	4	100		27		
	5	100		25		
	6	100		24		
	7	0		0		
	8	100		21		
	9	100		23		
	10	100		26		
Salinity Control #1 (2.2 ppt) A-2, B-1	1	100	100	17	20	3.0
	2	100		19		
	3	100		16		
	4	100		19		
	5	100		20		
	6	100		22		
	7	100		16		
	8	100		22		
	9	100		22		
	10	100		25		
A-2	1	100	100	24	22	3.6
	2	100		27		
	3	100		16		
	4	100		24		
	5	100		26		
	6	100		20		
	7	100		21		
	8	100		22		
	9	100		19		
	10	100		18		
B-1	1	100	90	25	27	4.3
	2	100		31		
	3	100		27		
	4	100		21		
	5	100		31		
	6	100		26		
	7	100		28		
	8	0		24		
	9	100		21		
	10	100		34		

Appendix A-2 (Con'd). Water Flea 7-Day Survival and Reproduction Test Results

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 2, 2005

Test Species: *Ceriodaphnia dubia*

Sample	Replicate	Percent Survival at 7 Days	Mean Percent Survival at 7 Days	Number of Neonates Produced	Mean Number of Neonates Produced	Standard Deviation
Lab Control	1	100	90	28	23	8.4
	2	100		27		
	3	100		28		
	4	100		27		
	5	100		25		
	6	100		24		
	7	0		0		
	8	100		21		
	9	100		23		
	10	100		26		
Salinity Control #2 (1.0 ppt) B-3, C-1	1	100	90	24	24	3.9
	2	100		25		
	3	100		24		
	4	100		28		
	5	100		24		
	6	100		22		
	7	100		30		
	8	100		24		
	9	100		25		
	10	0		15		
B-3	1	100	90	16	18	8.3
	2	100		20		
	3	100		7		
	4	100		24		
	5	100		21		
	6	100		19		
	7	0		0		
	8	100		22		
	9	100		28		
	10	100		21		
C-1	1	100	100	29	27	2.1
	2	100		30		
	3	100		25		
	4	100		26		
	5	100		25		
	6	100		25		
	7	100		29		
	8	100		24		
	9	100		28		
	10	100		26		

Values in bold indicate a significant decrease in survival or growth was observed in that test concentration relative to the appropriate salinity control.

S. CAPRICORNUTUM

Appendix Table A-3. 96-Hour Algal Growth Inhibition Test Results

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

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
Lab Control #1	A	0.100	12.9	11.6 +/- 1.46	12800	11525
	B	0.100	12.8		12700	
	C	0.100	9.9		9800	
	D	0.100	10.9		10800	
Salinity Control #1 (1.3 ppt) A-2, B-1	A	0.100	13.4	13.5 +/- 0.114	13300	13425
	B	0.100	13.7		13600	
	C	0.100	13.5		13400	
	D	0.100	13.5		13400	
A-2 Filtered	A	0.100	26.6	25.7 +/- 1.12	26500	25575
	B	0.100	24.1		24000	
	C	0.100	25.8		25700	
	D	0.100	26.2		26100	
A-2 Unfiltered	A	0.100	12.7	16.2 +/- 2.51	12600	16075
	B	0.100	16		15900	
	C	0.100	18.3		18200	
	D	0.100	17.7		17600	
B-1 Filtered	A	0.100	22.5	22.9 +/- 0.983	22400	22850
	B	0.100	22.4		22300	
	C	0.100	24.4		24300	
	D	0.100	22.5		22400	
B-1 Unfiltered	A	0.100	6.45	7.53 +/- 3.41	6350	7438
	B	0.100	5.15		5050	
	C	0.100	5.95		5850	
	D	0.100	12.6		12500	
Filtered Blank A-2	A	0.100	0.05	NA	-50	NA
Unfiltered Blank A-2	A	0.100	3.60	NA	3500	NA
Filtered Blank B-1	A	0.100	0.21	NA	110	NA
Unfiltered Blank B-1	A	0.100	2.03	NA	1930	NA

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

Values in **bold** indicate a significant decrease in cell density was observed in that test concentration relative to the appropriate salinity control.

Appendix Table A-3 (Con'd). 96-Hour Algal Growth Inhibition Test Results

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

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
Lab Control #2	A	0.100	10.5	11.4 +/- 1.64	10400	11343
	B	0.100	12.4		12300	
	C	0.100	13.2		13100	
	D	0.100	9.67		9570	
Salinity Control #2 (0.7ppt) B-3, C-1	A	0.100	13.2	13.1 +/- 0.946	13100	13000
	B	0.100	14.3		14200	
	C	0.100	12.8		12700	
	D	0.100	12.1		12000	
B-3 Filtered	A	0.100	23.8	26.2 +/- 1.63	23700	26100
	B	0.100	26.6		26500	
	C	0.100	27.3		27200	
	D	0.100	27.1		27000	
B-3 Unfiltered	A	0.100	17.9	14.5 +/- 2.26	17800	14475
	B	0.100	13.3		13200	
	C	0.100	13		12900	
	D	0.100	14.1		14000	
C-1 Filtered	A	0.100	27.2	26.2 +/- 0.668	27100	26150
	B	0.100	25.9		25800	
	C	0.100	26		25900	
	D	0.100	25.9		25800	
C-1 Unfiltered	A	0.100	9.19	11.9 +/- 4.99	9090	11763
	B	0.100	10.7		10600	
	C	0.100	19.2		19100	
	D	0.100	8.36		8260	
Filtered Blank B-3	A	0.100	0.07	NA	-30	NA
Unfiltered Blank B-3	A	0.100	3.31	NA	3210	NA
Filtered Blank C-1	A	0.100	0.04	NA	-60	NA
Unfiltered Blank C-1	A	0.100	2.41	NA	2310	NA

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

MARINE

A. AFFINIS

Appendix Table A-4. Site A-2 Marine Larval Fish 7-Day Survival and Growth Test Results
City of Buenaventura
Santa Clara River Estuary Wet Weather Sampling Event
Test Initiation Date: February 1, 2005
Test Species: *Atherinops affinis*

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control #1	A	5	100	100	0.00	1.4	1.3	0.11
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
Salt Control #1	A	4	80	96	8.9	1.1	1.2	0.07
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
25%	A	5	100	100	0.00	1.1	1.1	0.12
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
50%	A	5	100	100	0.00	1.3	1.2	0.07
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
69%	A	4	80	96	8.9	1.1	1.2	0.10
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
100%	A	4	80	92	11	1.0	1.1	0.14
	B	4	80					
	C	5	100					
	D	5	100					
	E	5	100					

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 Wet Weather Sampling Event
Test Initiation Date: February 1, 2005
Test Species: *Atherinops affinis*

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control #1	A	5	100	100	0.00	1.4	1.3	0.11
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
Salt Control #1	A	4	80	96	8.9	1.1	1.2	0.07
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
25%	A	5	100	100	0.00	1.1	1.2	0.05
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
50%	A	4	80	92	11	1.0	1.0	0.11
	B	5	100					
	C	4	80					
	D	5	100					
	E	5	100					
69%	A	5	100	100	0.00	1.1	1.2	0.05
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
100%	A	5	100	100	0.00	1.20	1.2	0.08
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					

Values in **bold** indicate a significant decrease in survival or growth was observed in that test concentration relative to the salt control.

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 Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Atherinops affinis*

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control #2	A	5	100	100	0.00	1.3	1.2	0.09
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
Salt Control #2	A	5	100	96	8.9	1.3	1.2	0.11
	B	5	100					
	C	4	80					
	D	5	100					
	E	5	100					
25%	A	5	100	96	8.9	1.0	1.1	0.12
	B	5	100					
	C	5	100					
	D	5	100					
	E	4	80					
50%	A	4	80	92	11	1.2	1.2	0.10
	B	4	80					
	C	5	100					
	D	5	100					
	E	5	100					
69%	A	5	100	100	0.00	1.4	1.3	0.07
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
100%	A	5	100	88	11	1.0	1.1	0.09
	B	4	80					
	C	5	100					
	D	4	80					
	E	4	80					

Appendix Table A-4 (Con'd). Site C-1 Marine Larval Fish 7-Day Survival and Growth Test Results
City of Buenaventura
Santa Clara River Estuary Wet Weather Sampling Event
Test Initiation Date: February 1, 2005
Test Species: *Atherinops affinis*

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control #2	A	5	100	100	0.00	1.3	1.2	0.09
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
Salt Control #2	A	5	100	96	8.9	1.3	1.2	0.11
	B	5	100					
	C	4	80					
	D	5	100					
	E	5	100					
25%	A	5	100	100	0.00	1.4	1.3	0.10
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
50%	A	5	100	100	0.00	1.2	1.2	0.05
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
69%	A	5	100	96	8.9	1.2	1.2	0.10
	B	5	100					
	C	5	100					
	D	5	100					
	E	4	80					
100%	A	5	100	96	8.9	1.3	1.2	0.07
	B	5	100					
	C	5	100					
	D	4	80					
	E	5	100					

A. BAHIA

Appendix Table A-5. Site A-2 Opossum Shrimp 7-Day Survival and Growth Test Results
City of Buenaventura
Santa Clara River Estuary Wet Weather Sampling Event
Test Initiation Date: February 1, 2005
Test Species: *Americamysis bahia*

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control #1	A	5	100	98	7.1	0.29	0.22	0.04
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	4	80					
	G	5	100					
	H	5	100					
Salt Control #1	A	5	100	90	15	0.29	0.23	0.04
	B	3	60					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	4	80					
	H	4	80					
25%	A	5	100	98	7.1	0.23	0.24	0.03
	B	4	80					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					
50%	A	5	100	98	7.1	0.29	0.25	0.04
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	4	80					
	G	5	100					
	H	5	100					
69%	A	5	100	98	7.1	0.21	0.22	0.02
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	4	80					
	G	5	100					
	H	5	100					
100%	A	4	80	95	9.3	0.22	0.26	0.05
	B	4	80					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					

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 Wet Weather Sampling Event
Test Initiation Date: February 1, 2005
Test Species: *Americamysis bahia*

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control #1	A	5	100	98	7.1	0.29	0.22	0.04
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	4	80					
	G	5	100					
	H	5	100					
Salt Control #1	A	5	100	90	15	0.29	0.23	0.04
	B	3	60					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	4	80					
	H	4	80					
25%	A	5	100	98	7.1	0.22	0.23	0.03
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	4	80					
	H	5	100					
50%	A	5	100	98	7.1	0.17	0.22	0.03
	B	5	100					
	C	5	100					
	D	4	80					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					
69%	A	5	100	100	0.00	0.21	0.22	0.02
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					
100%	A	4	80	98	7.1	0.18	0.22	0.04
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					

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 Wet Weather Sampling Event
Test Initiation Date: February 1, 2005
Test Species: *Americamysis bahia*

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control #2	A	5	100	98	7.1	0.42	0.27	0.07
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	4	80					
	G	5	100					
	H	5	100					
Salt Control #2	A	5	100	98	7.1	0.24	0.23	0.04
	B	5	100					
	C	4	80					
	D	5	100					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					
25%	A	4	80	95	9.3	0.24	0.22	0.08
	B	5	100					
	C	10	100					
	D	10	100					
	E	5	100					
	F	5	100					
	G	4	80					
	H	5	100					
50%	A	4	80	90	11	0.23	0.24	0.03
	B	5	100					
	C	4	80					
	D	5	100					
	E	4	80					
	F	5	100					
	G	4	80					
	H	5	100					
69%	A	5	100	95	14	0.36	0.24	0.06
	B	5	100					
	C	5	100					
	D	3	60					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					
100%	A	4	80	90	11	0.22	0.20	0.03
	B	4	80					
	C	5	100					
	D	4	80					
	E	5	100					
	F	5	100					
	G	5	100					
	H	4	80					

Appendix Table A-5 (Con'd). Site C-1 Opossum Shrimp 7-Day Survival and Growth Test Results
City of Buenaventura
Santa Clara River Estuary Wet Weather Sampling Event
Test Initiation Date: February 1, 2005
Test Species: *Americamysis bahia*

Concentration	Replicate	No. Alive	Percent Survival	Mean Percent Survival	Standard Deviation	Retained Biomass (mg)	Mean Retained Biomass (mg)	Standard Deviation
Lab Control #2	A	5	100	98	7.1	0.42	0.27	0.07
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	4	80					
	G	5	100					
	H	5	100					
Salt Control #2	A	5	100	98	7.1	0.24	0.23	0.04
	B	5	100					
	C	4	80					
	D	5	100					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					
25%	A	4	80	93	10	0.23	0.22	0.03
	B	5	100					
	C	5	100					
	D	4	80					
	E	5	100					
	F	4	80					
	G	5	100					
	H	5	100					
50%	A	5	100	98	7.1	0.26	0.24	0.03
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	4	80					
	G	5	100					
	H	5	100					
69%	A	5	100	100	0.00	0.21	0.22	0.02
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	5	100					
	H	5	100					
100%	A	5	100	93	21	0.25	0.23	0.05
	B	5	100					
	C	5	100					
	D	5	100					
	E	5	100					
	F	5	100					
	G	5	100					
	H	2	40					

M. GALLOPROVINCIALIS

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

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Mytilus galloprovincialis*

Concentration	Replicate	Percent Normal Development	Mean Percent Normal Development	Standard Deviation
Lab Control #1	A	81	83	4.2
	B	85		
	C	80		
	D	90		
	E	81		
Brine Control	A	74	76	6.0
	B	85		
	C	69		
	D	75		
	E	79		
25%	A	89	91	3.4
	B	94		
	C	92		
	D	95		
	E	87		
50%	A	88	88	3.3
	B	91		
	C	92		
	D	85		
	E	85		
71%^a	A	91	86	4.7
	B	89		
	C	85		
	D	84		
	E	79		

^a This is the highest concentration testable due to the addition of hypersaline brine. The 100 percent concentration was tested with the addition of artificial salts but results are not reported due to poor development in the salted samples and the salt control.

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

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Mytilus galloprovincialis*

Concentration	Replicate	Percent Normal Development	Mean Percent Normal Development	Standard Deviation
Lab Control #1	A	81	83	4.2
	B	85		
	C	80		
	D	90		
	E	81		
Brine Control	A	82	84	3.4
	B	84		
	C	88		
	D	85		
	E	79		
25%	A	93	89	3.2
	B	85		
	C	90		
	D	87		
	E	91		
50%	A	90	92	1.5
	B	91		
	C	92		
	D	91		
	E	94		
71%^a	A	86	86	3.3
	B	90		
	C	87		
	D	81		
	E	85		

^a This is the highest concentration testable due to the addition of hypersaline brine. The 100 percent concentration was tested with the addition of artificial salts but results are not reported due to poor development in the salted samples and in the salt control.

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

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Mytilus galloprovincialis*

Concentration	Replicate	Percent Normal Development	Mean Percent Normal Development	Standard Deviation
Lab Control #2	A	90	87	3.9
	B	87		
	C	89		
	D	80		
	E	87		
Brine Control	A	68	80	8.0
	B	85		
	C	82		
	D	78		
	E	89		
25%	A	92	89	2.5
	B	90		
	C	85		
	D	89		
	E	89		
50%	A	88	87	2.3
	B	84		
	C	88		
	D	90		
	E	86		
71%^a	A	82	86	5.2
	B	84		
	C	86		
	D	95		
	E	83		

^b This is the highest concentration testable due to the addition of hypersaline brine. The 100 percent concentration was tested with the addition of artificial salts but results are not reported due to poor development in the salted samples and in the salt control.

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

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Mytilus galloprovincialis*

Concentration	Replicate	Percent Normal Development	Mean Percent Normal Development	Standard Deviation
Lab Control #2	A	89	87	3.9
	B	90		
	C	80		
	D	87		
	E	87		
Brine Control	A	81	82	5.0
	B	90		
	C	79		
	D	82		
	E	77		
25%	A	89	83	13.4
	B	84		
	C	90		
	D	60		
	E	93		
50%	A	90	87	2.2
	B	87		
	C	88		
	D	88		
	E	84		
71%^a	A	84	83	5.1
	B	84		
	C	75		
	D	82		
	E	89		

^b This is the highest concentration testable due to the addition of hypersaline brine. The 100 percent concentration was tested with the addition of artificial salts but results are not reported due to poor development in the salted samples and in the salt control.

M. PYRIFERA

Appendix Table A-7. Site A-2 48-Hour Kelp Spore Germination and Growth Test Results

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Macrocystis pyrifera*

Concentration ^a	Replicate	Percent Germinated	Mean Percent Germinated	Standard Deviation	Spore Length (µm)	Mean Spore Length (µm)	Standard Deviation
Lab Control	A	68	73	6.1	10	11	1.4
	B	70			11		
	C	67			14		
	D	81			11		
	E	77			11		
Salt Control	A	83	74	5.3	11	11	0.8
	B	73			11		
	C	69			10		
	D	72			10		
	E	75			11		
Brine Control	A	76	74	5.3	13	12	1.1
	B	78			14		
	C	79			12		
	D	72			12		
	E	66			12		
25%	A	60	72	9.5	12	12	0.4
	B	83			11		
	C	79			12		
	D	65			11		
	E	71			12		
50%	A	75	74	7.5	12	12	1.1
	B	77			14		
	C	81			13		
	D	61			12		
	E	74			12		
69%	A	74	72	5.5	12	12	0.5
	B	73			12		
	C	80			12		
	D	68			11		
	E	66			12		
100%	A	62	68	6.4	10	11	1.2
	B	75			10		
	C	62			11		
	D	65			13		
	E	74			11		

^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 statistical comparisons were made between the salt control and 100% sample, and between the brine control and remaining test concentrations.

Appendix Table A-7 (Con'd). Site B-1 48-Hour Kelp Spore Germination and Growth Test Results

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Macrocystis pyrifera*

Concentration ^a	Replicate	Percent Germinated	Mean Percent Germinated	Standard Deviation	Spore Length (µm)	Mean Spore Length (µm)	Standard Deviation
Lab Control	A	68	73	6.1	10	11	1.4
	B	70			11		
	C	67			14		
	D	81			11		
	E	77			11		
Salt Control	A	83	74	5.3	11	11	0.75
	B	73			11		
	C	69			10		
	D	72			10		
	E	75			11		
Brine Control	A	76	74	5.3	13	12	1.1
	B	78			14		
	C	79			12		
	D	72			12		
	E	66			12		
25%	A	79	80	5.7	9.0	11	1.4
	B	86			13		
	C	71			11		
	D	83			11		
	E	82			9.3		
50%	A	88	77	13	12	11	1.3
	B	88			12		
	C	57			11		
	D	77			8.5		
	E	76			11		
69%	A	61	71	7.0	11	11	0.76
	B	80			10		
	C	71			12		
	D	75			11		
	E	70			11		
100%	A	89	88	2.3	11	11	0.29
	B	84			11		
	C	90			11		
	D	88			12		
	E	89			11		

^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 statistical comparisons were made between the salt control and 100% sample, and between the brine control and remaining test concentrations.

Appendix Table A-7 (Con'd). Site B-3 48-Hour Kelp Spore Germination and Growth Test Results

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Macrocystis pyrifera*

Concentration ^a	Replicate	Percent Germinated	Mean Percent Germinated	Standard Deviation	Spore Length (μm)	Mean Spore Length (μm)	Standard Deviation
Lab Control	A	68	73	6.1	10	11	1.4
	B	70			11		
	C	67			14		
	D	81			11		
	E	77			11		
Salt Control	A	83	74	5.3	11	11	0.75
	B	73			11		
	C	69			10		
	D	72			10		
	E	75			11		
Brine Control	A	76	74	5.3	13	12	1.1
	B	78			14		
	C	79			12		
	D	72			12		
	E	66			12		
25%	A	68	76	7.4	12	13	0.86
	B	71			14		
	C	79			14		
	D	75			13		
	E	87			14		
50%	A	70	72	3.6	14	14	1.3
	B	70			12		
	C	77			15		
	D	75			15		
	E	69			13		
69%	A	71	72	1.3	17	15	1.2
	B	73			14		
	C	74			14		
	D	72			14		
	E	71			15		
100%	A	74	72	3.2	15	13	1.5
	B	69			12		
	C	70			14		
	D	77			12		
	E	72			12		

^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 statistical comparisons were made between the salt control and 100% sample, and between the brine control and remaining test concentrations.

Appendix Table A-7 (Con'd). Site C-1 48-Hour Kelp Spore Germination and Growth Test Results

City of Buenaventura

Santa Clara River Estuary Wet Weather Sampling Event

Test Initiation Date: February 1, 2005

Test Species: *Macrocystis pyrifera*

Concentration ^a	Replicate	Percent Germinated	Mean Percent Germinated	Standard Deviation	Spore Length (µm)	Mean Spore Length (µm)	Standard Deviation
Lab Control	A	68	73	6.1	10	11	1.4
	B	70			11		
	C	67			14		
	D	81			11		
	E	77			11		
Salt Control	A	83	74	5.3	11	11	0.75
	B	73			11		
	C	69			10		
	D	72			10		
	E	75			11		
Brine Control	A	76	74	5.3	13	12	1.1
	B	78			14		
	C	79			12		
	D	72			12		
	E	66			12		
25%	A	64	70	5.9	10	10	0.64
	B	72			9.4		
	C	74			10		
	D	63			10		
	E	76			11		
50%	A	90	85	5.3	12	11	1.3
	B	82			11		
	C	77			11		
	D	85			9.4		
	E	89			13		
69%	A	72	71	3.5	12	11	1.4
	B	77			11		
	C	71			11		
	D	68			10		
	E	69			13		
100%	A	77	73	4.8	11	12	1.2
	B	78			10		
	C	67			12		
	D	74			12		
	E	69			13		

^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 statistical comparisons were made between the salt control and 100% sample, and between the brine control and remaining test concentrations.

APPENDIX B
STATISTICAL ANALYSIS SUMMARIES
& RAW BENCH DATASHEETS

FRESHWATER

P. PROMELAS

CETIS Test Summary

Fathead Minnow 7-d Larval Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	11-2737-7126	Test Type:	Growth-Survival (7d)		Duration:	6d 20h			
Start Date:	01 Feb-05 05:00 PM	Protocol:	EPA/821/R-02-013 (2002)		Species:	Pimephales promelas			
Ending Date:	08 Feb-05 01:40 PM	Dil Water:	Diluted Mineral Water (8:2)		Source:	Aquatic Biosystems, CO			
Setup Date:	01 Feb-05 05:00 PM	Brine:	Frozen Seawater (for control)						
Comments:	The sample was slightly saline (1.3 ppt) so a control was added to match the salinity. All analyses were made comparing the sample to the salinity control.								
Sample No:	04-1606-8825	Material:	Estuarine Monitoring Sample		Client:	City of Buenaventura			
Sample Date:	31 Jan-05 03:20 PM	Code:	0502-031		Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	26h	Station:	A-2						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
00-5449-0874	7d Proportion Survived	100	> 100	N/A	26.14%	Equal Variance t			
04-7825-2553	Mean Dry Biomass-mg	100	> 100	N/A	17.20%	Equal Variance t			
Test Acceptability									
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision				
00-5449-0874	7d Proportion Survived	Control Response	0.85000	0.8 - N/A	Passes acceptability criteria				
04-7825-2553	Mean Dry Biomass-mg	Control Response	0.318	0.25 - N/A	Passes acceptability criteria				
04-7825-2553	Mean Dry Biomass-mg	MSDp	0.17205	0.12 - 0.3	Passes acceptability criteria				
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	4	0.97500	0.90000	1.00000	0.02500	0.05000	5.13%	
0	Salt Control	4	0.85000	0.60000	1.00000	0.09574	0.19149	22.53%	
100		4	0.95000	0.80000	1.00000	0.05000	0.10000	10.53%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	4	0.42525	0.39700	0.46000	0.01305	0.02611	6.14%	
0	Salt Control	4	0.31800	0.27800	0.39600	0.02726	0.05452	17.15%	
100		4	0.39825	0.37900	0.41100	0.00704	0.01408	3.54%	
7d Proportion Survived Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Lab Control	1.00000	1.00000	1.00000	0.90000				
0	Salt Control	1.00000	0.80000	1.00000	0.60000				
100		1.00000	0.80000	1.00000	1.00000				
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Lab Control	0.42500	0.41900	0.39700	0.46000				
0	Salt Control	0.28300	0.31500	0.39600	0.27800				
100		0.41100	0.39700	0.37900	0.40600				

CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	12-6853-7174	12-6853-7174	15 Feb-05 2:20 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	26.14%

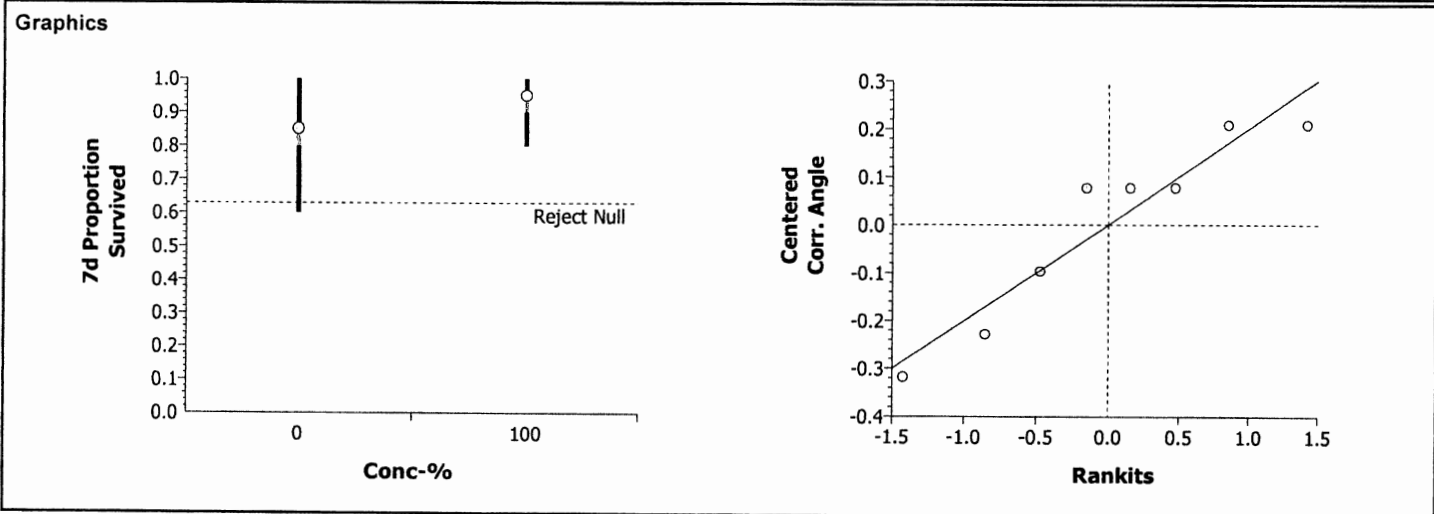
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.85000	0.8 - N/A	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.82602	47.46723	0.41626	Equal Variances
Distribution	Shapiro-Wilk W	0.88773	0.74935	0.21480	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0345765	0.034576	1	0.78	0.41173	Non-Significant Effect
Error	0.2667042	0.044451	6			
Total	0.30128071	0.0790272	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-0.882	1.94318	0.7941	0.28969	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	0.85000	0.60000	1.00000	0.19149	1.20431	0.88608	1.41202	0.25625
100		4	0.95000	0.80000	1.00000	0.10000	1.33580	1.10715	1.41202	0.15243



CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	12-6853-7174	12-6853-7174	15 Feb-05 2:20 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	17.20%

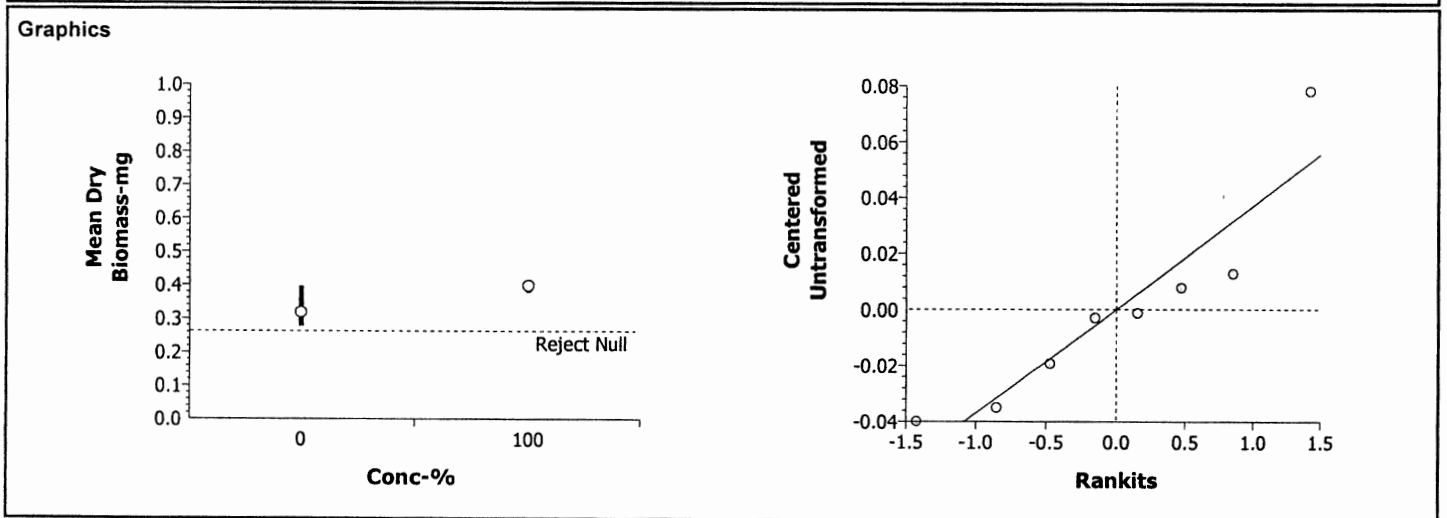
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.318	0.25 - N/A	Passes acceptability criteria
MSDp	0.17205	0.12 - 0.3	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	14.99429	47.46723	0.05207	Equal Variances
Distribution	Shapiro-Wilk W	0.87676	0.74935	0.17218	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0128801	0.012880	1	8.12	0.02917	Significant Effect
Error	0.0095127	0.001585	6			
Total	0.02239287	0.0144656	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-2.8503	1.94318	0.9854	0.05471	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	0.31800	0.27800	0.39600	0.05452				
100		4	0.39825	0.37900	0.41100	0.01408				



Freshwater Chronic Bioassay

Larval Fish Survival & Weights

Test Species: P. promelas

Client Name: City of Buenaventura

Test Date: 2/1/2005

Sample ID: A-2, B-1

Test No.: 0502-031, 032

Conc. (___%___)	Rep.	Test Day								Percent Survival	pan wt. (g)	pan + fish (g)
		0	1	2	3	4	5	6	7			
Lab Cont. #1	a	10	10	10	10	10	10	10	10	100	0.03236	0.03655
	b	10	10	10	10	10	10	10	10	100	0.02899	0.03318
	c	10	10	10	10	10	10	10	10	100	0.02656	0.03053
	d	10	9	9	9	9	9	9	9	90	0.02399	0.02859
Salinity	a	10	10	10	10	10	10	10	10	100	0.02364	0.02587
Control #1	b	10	10	10	9	8	8	8	8	80	0.02474	0.02789
	c	10	10	10	10	10	10	10	10	100	0.02126	0.02522
	d	10	10	9	7	7	7	6	6	60	0.02384	0.02662
	A-2 100%	a	10	10	10	10	10	10	10	100	0.03198	0.03609
	b	10	10	10	10	10	9	8	80	0.02976	0.03373	
	c	10	10	10	10	10	9	9	100	0.02679	0.03058	
	d	10	10	10	10	10	10	10	100	0.02984	0.03390	
B-1 100%	a	10	10	10	10	10	10	10	10	100	0.02750	0.03054
	b	10	10	10	9	9	9	9	9	90	0.02251	0.02615
	c	10	10	10	10	10	9	9	9	90	0.03187	0.03554
	d	10	10	10	10	10	10	10	10	100	0.02550	0.02880
	a											
	b											
	c											
	d											
	a											
	b											
	c											
	d											
Tech Initials		SD	RB	AH	UC	MC	RY	AH	YR			

Feeding Times (day):

	0	1	2	3	4	5	6
—		0830	0830	0815	0710	0700	0915
—		1400	1430	1330	1130	1400	1400
	1730	1600	1540	1530	1430	1900	1530

Comments: _____

Weight Data:
 Date/Time in: 2-8-05/1515
 Date/Time out: 2-10-05/1025
 Oven Temp (°C): 68
 Tech Initials: YR

QC Check: AH 2/15/05
 Final Review: [Signature]

Freshwater Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura
 Sample ID: A-2, B-1
 Test No: 0502-031, 032

Test Species: P. promelas
 Start Date/Time: 2/1/2005 1700
 End Date/Time: 2/8/2005 / 1340

Concentration	Lab Control #1							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.23	8.19	8.02	8.16	8.12	7.94	7.99	
DO (mg/L)	7.7	7.4	7.8	7.6	7.8	7.7	7.6	
Cond. (µmhos/cm)	215	204	215	201	204	203	203	
Temp (°C)	24.4	24.9	25.9	25.0	25.4	24.7	24.7	
Final								
pH		8.10	7.91	7.96	8.10	7.94	7.92	8.11
DO (mg/L)		7.1	6.5	6.1	6.4	6.2	6.3	6.7
Temp (°C)		25.1	25.2	24.8	24.0	24.2	24.3	24.8

Concentration	Salinity Control #1 <u>2.0 (1.3 ppt)</u>							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.17	8.27	7.89	8.14	8.14	8.06	8.01	
DO (mg/L)	7.6	8.1	7.9	7.7	7.9	7.7	7.5	
Cond. (µmhos/cm)	2240	2290	2220	2290	2270	2270	2300	
Temp (°C)	24.8	25.0	25.9	25.0	25.4	25.3	24.8	
Final								
pH		8.07	7.87	7.81	7.83	7.84	7.83	7.83
DO (mg/L)		7.2	6.5	5.9	6.5	6.2	6.3	6.6
Temp (°C)		25.0	25.1	24.2	24.0	24.2	24.3	25.1

Concentration	A-2 100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.21	8.22	8.13	8.01	8.01	8.00	7.97	
DO (mg/L)	8.7	8.9	9.0	9.1	9.3	9.2	9.0	
Cond. (µmhos/cm)	2130	2120	2100	2120	2120	2140	1909	
Temp (°C)	24.7	24.1	25.2	24.8	24.3	25.1	24.4	
Final								
pH		8.46	8.37	8.28	8.29	8.07	8.36	8.27
DO (mg/L)		7.1	6.4	5.5	6.4	6.1	6.3	6.2
Temp (°C)		24.9	25.0	24.2	24.1	24.2	24.2	25.2

Concentration	B-1 100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	7.81	7.85	7.76	7.76	7.92	7.87	7.88	
DO (mg/L)	8.9	9.0	9.1	9.3	9.7	9.5	9.1	
Cond. (µmhos/cm)	2240	2260	2240	2240	2260	2240	2030	
Temp (°C)	24.9	24.1	24.3	24.2	24.1	25.4	24.1	
Final								
pH		8.33	8.16	8.10	8.15	8.07	8.21	8.0
DO (mg/L)		7.0	6.3	5.8	6.3	6.2	6.4	5.8
Temp (°C)		24.7	25.0	24.2	24.0	24.2	24.2	25.1

	0	1	2	3	4	5	6	7
Analysts: Initial:	SD	SD	SD	SH	MC	SD	SD	
Final:		FE	SD	SH	MC	Ry	Rly	SD

Comments: _____

Animal Source/Date Received: ABS / 2-1-05 Animal Age at Initiation: < 48 hours

QC Check: AH 2/15/05 Final Review: [Signature] 2/24/05

CETIS Test Summary

Report Date: 15 Feb-05 2:30 PM

Link: 07-3934-3719/0502-032

Fathead Minnow 7-d Larval Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	11-2737-7126	Test Type:	Growth-Survival (7d)	Duration:	6d 20h				
Start Date:	01 Feb-05 05:00 PM	Protocol:	EPA/821/R-02-013 (2002)	Species:	Pimephales promelas				
Ending Date:	08 Feb-05 01:40 PM	Dil Water:	Diluted Mineral Water (8:2)	Source:	Aquatic Biosystems, CO				
Setup Date:	01 Feb-05 05:00 PM	Brine:	Frozen Seawater (for control)						
Comments:	The sample was slightly saline (1.3 ppt) so a control was added to match the salinity. All analyses were made comparing the sample to the salinity control.								
Sample No:	17-0778-5011	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura				
Sample Date:	31 Jan-05 02:30 PM	Code:	0502-032	Project:					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	27h	Station:	B-1						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
14-1037-6390	7d Proportion Survived	100	> 100	N/A	23.38%	Equal Variance t			
09-0164-7620	Mean Dry Biomass-mg	100	> 100	N/A	19.01%	Equal Variance t			
Test Acceptability									
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision				
14-1037-6390	7d Proportion Survived	Control Response	0.85000	0.8 - N/A	Passes acceptability criteria				
09-0164-7620	Mean Dry Biomass-mg	Control Response	0.318	0.25 - N/A	Passes acceptability criteria				
09-0164-7620	Mean Dry Biomass-mg	MSDp	0.19009	0.12 - 0.3	Passes acceptability criteria				
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	4	0.97500	0.90000	1.00000	0.02500	0.05000	5.13%	
0	Salt Control	4	0.85000	0.60000	1.00000	0.09574	0.19149	22.53%	
100		4	0.95000	0.90000	1.00000	0.02887	0.05774	6.08%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	4	0.42525	0.39700	0.46000	0.01305	0.02611	6.14%	
0	Salt Control	4	0.31800	0.27800	0.39600	0.02726	0.05452	17.15%	
100		4	0.34125	0.30400	0.36700	0.01499	0.02997	8.78%	
7d Proportion Survived Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Lab Control	1.00000	1.00000	1.00000	0.90000				
0	Salt Control	1.00000	0.80000	1.00000	0.60000				
100		1.00000	0.90000	0.90000	1.00000				
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Lab Control	0.42500	0.41900	0.39700	0.46000				
0	Salt Control	0.28300	0.31500	0.39600	0.27800				
100		0.30400	0.36400	0.36700	0.33000				

CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-3934-3719	12-6853-7174	15 Feb-05 2:26 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	23.38%

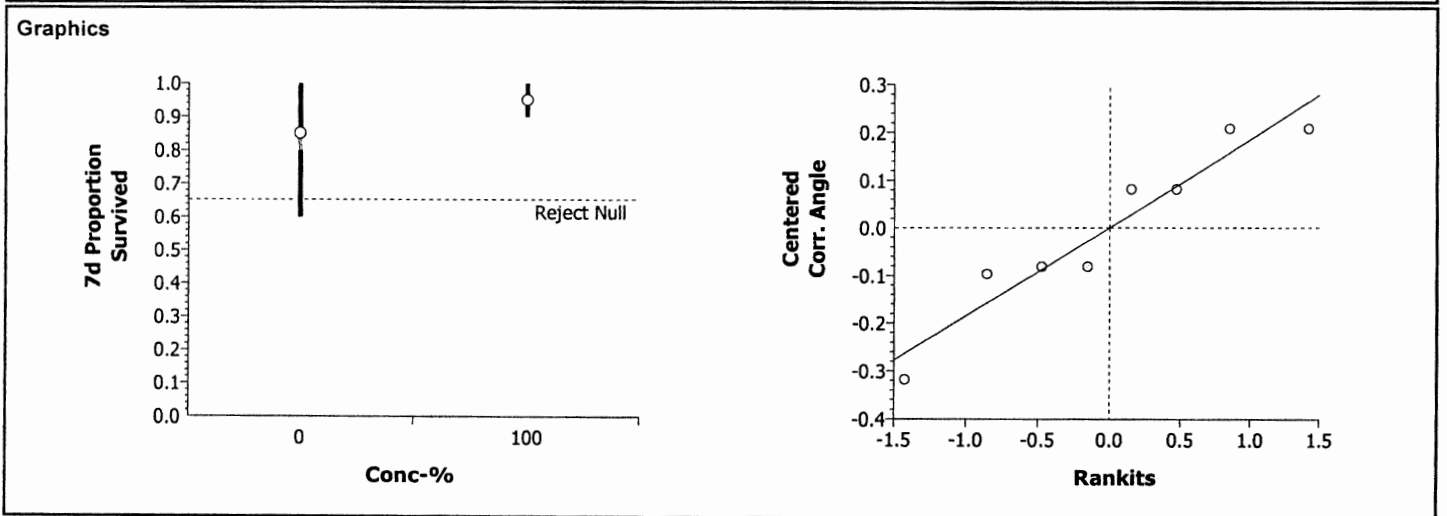
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.85000	0.8 - N/A	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	7.41721	47.46723	0.13397	Equal Variances
Distribution	Shapiro-Wilk W	0.91513	0.74935	0.36644	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0318612	0.031861	1	0.86	0.39078	Non-Significant Effect
Error	0.2235555	0.037259	6			
Total	0.25541663	0.0691204	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-0.9247	1.94318	0.8046	0.26523	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	0.85000	0.60000	1.00000	0.19149	1.20431	0.88608	1.41202	0.25625
100		4	0.95000	0.90000	1.00000	0.05773	1.33053	1.24905	1.41202	0.09409



CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test					Nautilus Environmental (CA)	
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	07-3934-3719	12-6853-7174	15 Feb-05 2:26 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	19.01%

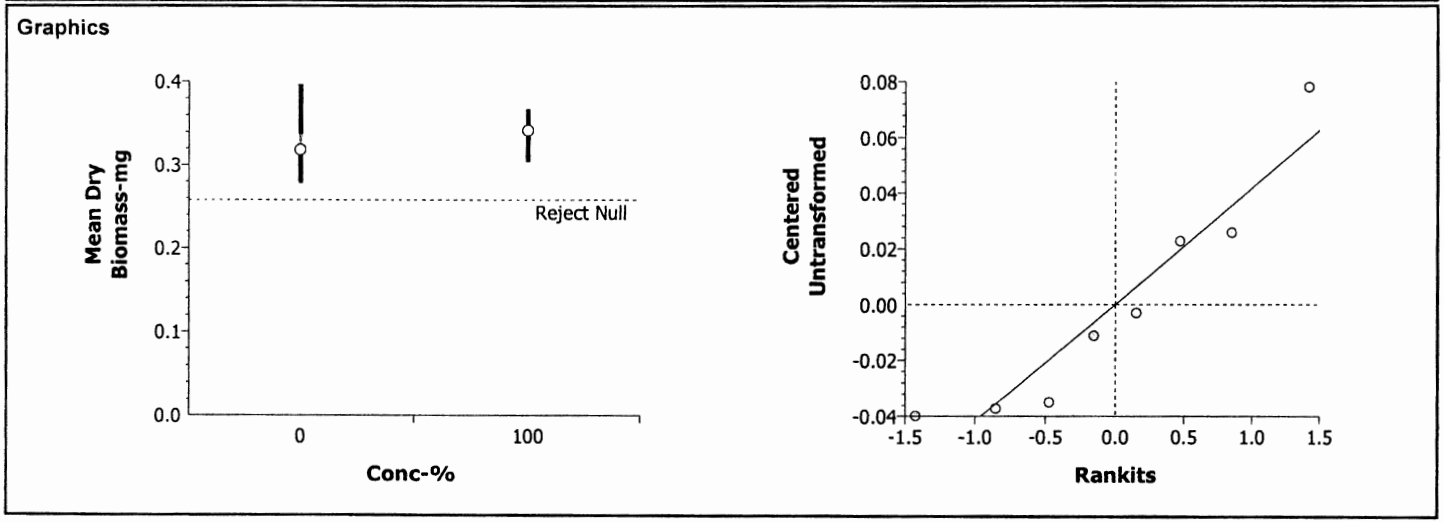
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.318	0.25 - N/A	Passes acceptability criteria
MSDp	0.19009	0.12 - 0.3	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.30940	47.46723	0.35191	Equal Variances
Distribution	Shapiro-Wilk W	0.89372	0.74935	0.24204	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0010811	0.001081	1	0.56	0.48308	Non-Significant Effect
Error	0.0116127	0.001935	6			
Total	0.01269385	0.0030166	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-0.7474	1.94318	0.7585	0.06045	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	0.31800	0.27800	0.39600	0.05452				
100		4	0.34125	0.30400	0.36700	0.02997				



CETIS Test Summary

 Report Date: 15 Feb-05 2:45 PM
 Link: 16-9749-5672/0502-033

Fathead Minnow 7-d Larval Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	06-5114-4566	Test Type:	Growth-Survival (7d)	Duration:	6d 21h				
Start Date:	01 Feb-05 05:00 PM	Protocol:	EPA/821/R-02-013 (2002)	Species:	Pimephales promelas				
Ending Date:	08 Feb-05 02:10 PM	Dil Water:	Diluted Mineral Water (8:2)	Source:	Aquatic Biosystems, CO				
Setup Date:	01 Feb-05 05:00 PM	Brine:	Frozen Seawater (for control)						
Comments:	The sample was slightly saline (0.7 ppt) so a control was added to match the salinity. All analyses were made comparing the sample to the salinity control.								
Sample No:	08-9283-1651	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura				
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-033	Project:					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	29h	Station:	B-3 (for control)						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
04-4501-9617	7d Proportion Survived	100	> 100	N/A	7.07%	Mann-Whitney U			
18-0212-1022	Mean Dry Biomass-mg	100	> 100	N/A	9.37%	Equal Variance t			
Test Acceptability									
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision				
04-4501-9617	7d Proportion Survived	Control Response	0.975	0.8 - N/A	Passes acceptability criteria				
18-0212-1022	Mean Dry Biomass-mg	Control Response	0.38725	0.25 - N/A	Passes acceptability criteria				
18-0212-1022	Mean Dry Biomass-mg	MSDp	0.09373	0.12 - 0.3	Fails acceptability criteria				
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	4	0.97500	0.90000	1.00000	0.02500	0.05000	5.13%	
0	Salt Control	4	0.97500	0.90000	1.00000	0.02500	0.05000	5.13%	
100		4	0.97500	0.90000	1.00000	0.02500	0.05000	5.13%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	4	0.42525	0.39700	0.46000	0.01305	0.02611	6.14%	
0	Salt Control	4	0.38725	0.36700	0.40300	0.00749	0.01497	3.87%	
100		4	0.37200	0.32600	0.40700	0.01711	0.03422	9.20%	
7d Proportion Survived Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Lab Control	1.00000	1.00000	1.00000	0.90000				
0	Salt Control	1.00000	0.90000	1.00000	1.00000				
100		1.00000	1.00000	0.90000	1.00000				
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Lab Control	0.42500	0.41900	0.39700	0.46000				
0	Salt Control	0.40300	0.36700	0.39100	0.38800				
100		0.40700	0.37000	0.32600	0.38500				

CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	16-9749-5672	16-9749-5672	15 Feb-05 2:38 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)		100	>100	1.00	N/A	7.07%

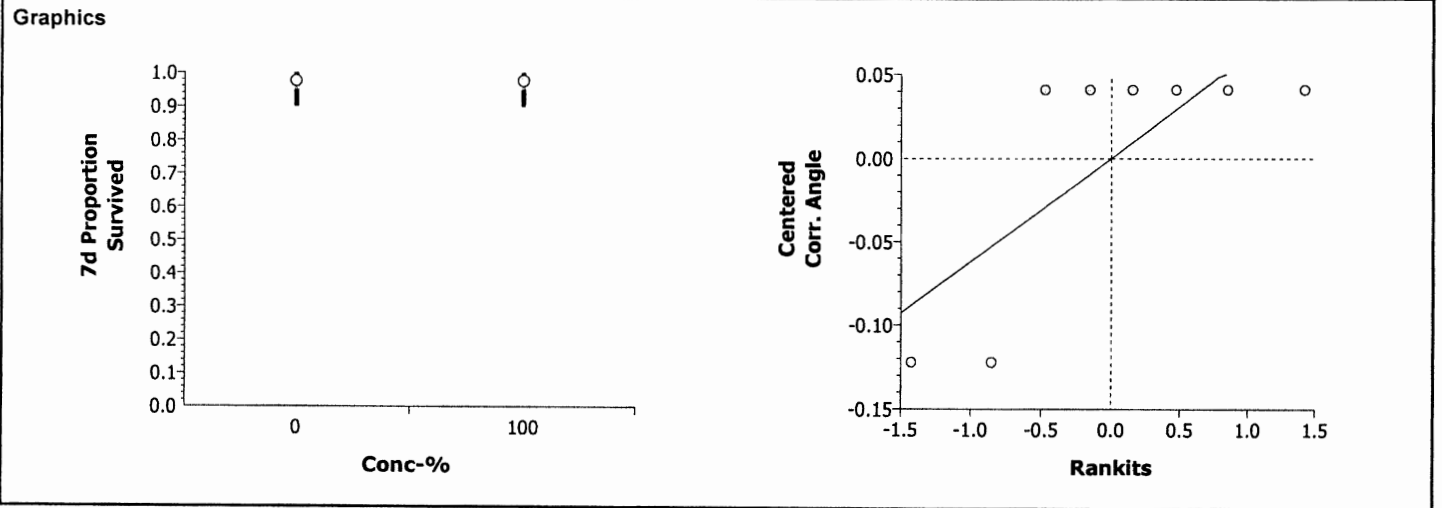
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.975	0.8 - N/A	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.00000	47.46723	1.00000	Equal Variances
Distribution	Shapiro-Wilk W	0.56623	0.74935	0.00002	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0	0	1	0.00	1.00000	Non-Significant Effect
Error	0.039839	0.00664	6			
Total	0.039839	0.0066398	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		100	8		0.4429	2	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	0.97500	0.90000	1.00000	0.05000	1.37127	1.24905	1.41202	0.08149
100		4	0.97500	0.90000	1.00000	0.05000	1.37127	1.24905	1.41202	0.08149



CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test	Nautilus Environmental (CA)
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	16-9749-5672	16-9749-5672	15 Feb-05 2:38 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	9.37%

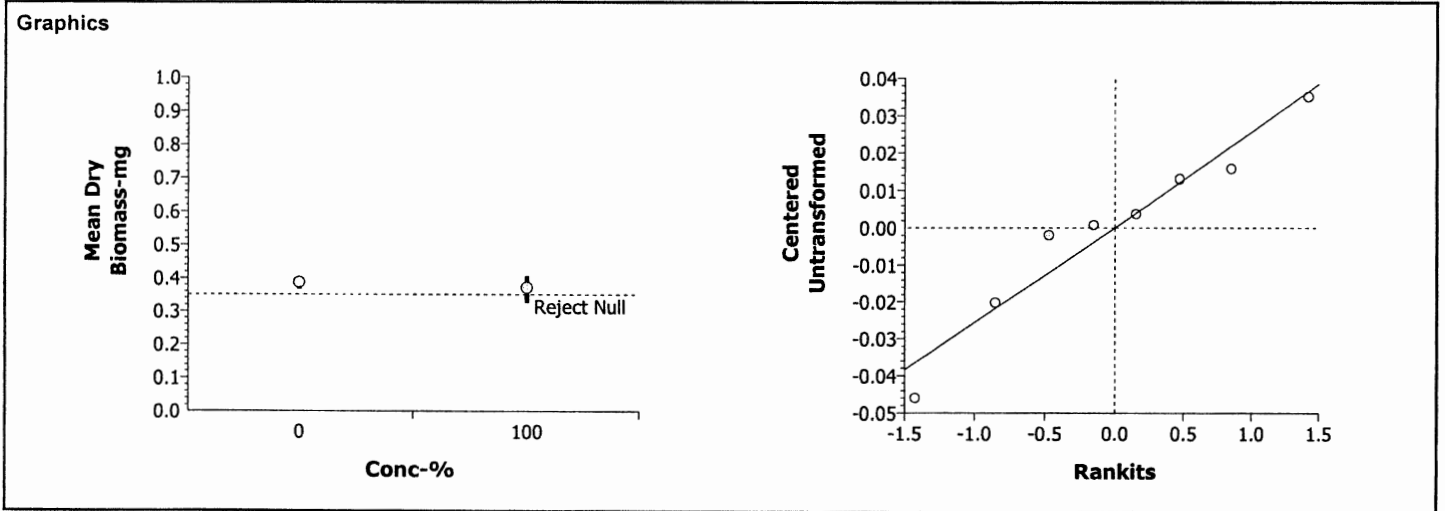
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.38725	0.25 - N/A	Passes acceptability criteria
MSDp	0.09373	0.12 - 0.3	Fails acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	5.22339	47.46723	0.20783	Equal Variances
Distribution	Shapiro-Wilk W	0.95385	0.74935	0.71599	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0004651	0.000465	1	0.67	0.44545	Non-Significant Effect
Error	0.0041868	0.000698	6			
Total	0.00465187	0.0011629	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	0.81643	1.94318	0.2227	0.0363	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	0.38725	0.36700	0.40300	0.01497				
100		4	0.37200	0.32600	0.40700	0.03422				



Freshwater Chronic Bioassay

Larval Fish Survival & Weights

Test Species: P. promelas

Client Name: City of Buenaventura

Test Date: 2/1/2005

Sample ID: B-3, C-1

Test No.: 0502-033, 034

Conc. (%)	Rep.	Test Day								Percent Survival	pan wt. (g)	pan + fish (g)
		0	1	2	3	4	5	6	7			
Lab Cont. #2	a	10										
	b	10										
	c	10										
	d	10										
Salinity	a	10	10	10	10	10	10	10	10	100	0.02460	0.02863
Control #2	b	10	10	9	9	9	9	9	9	90	0.02537	0.02904
	c	10	10	10	10	10	10	10	10	100	0.02648	0.03039
	d	10	10	10	10	10	10	10	10	100	0.02729	0.03117
	B-3 100%	a	10	10	10	10	10	10	10	10	100	0.02858
	b	10	10	10	10	10	10	10	10	100	0.02998	0.03368
	c	10	9	9	9	9	9	9	9	90	0.02333	0.02659
	d	10	10	10	10	10	10	10	10	100	0.02892	0.03277
C-1 100%	a	10	10	10	10	10	10	10	10	100	0.02732	0.03115
	b	10	10	9	9	9	9	9	9	90	0.02478	0.02855
	c	10	10	10	9	9	9	9	9	90	0.02527	0.02910
	d	10	10	10	10	10	10	10	10	100	0.02891	0.03249
	a											
	b											
	c											
	d											
	a											
	b											
	c											
	d											
Tech Initials		SD	Rg	Att	mc	mc	Rg	AH	PR			

Feeding Times (day):

	0	1	2	3	4	5	6
-	0830	0830	0815	0710	1000	0915	
-	1400	1430	1330	1130	1400	1400	
	1730	1600	1545	1530	1430	1900	1550

Weight Data:
 Date/Time in: 2-8-05/1515
 Date/Time out: 2-10-05/1025
 Oven Temp (°C): 62
 Tech Initials: PR

Comments: See A-2, B1 for lab control data

QC Check: AH 2/1/05
 Final Review: PR 2/24/05

Freshwater Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura
 Sample ID: B-3, C-1
 Test No: 0502-033, 034

Test Species: P. promelas
 Start Date/Time: 2/1/2005 1700
 End Date/Time: 2/8/2005 1410

Concentration	Lab Control #2							
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Cond. (µmhos/cm)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Concentration	Salinity Control #2 (0.7 PPT)							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.22	8.27	7.93	8.16	8.17	8.04	8.04	
DO (mg/L)	7.5	8.0	7.9	7.6	7.9	7.7	7.5	
Cond. (µmhos/cm)	1233	1259	1272	1262	1269	1268	1260	
Temp (°C)	24.7	24.1	25.7	25.0	25.4	25.1	24.7	
Final								
pH		8.07	8.296	7.82	8.00	8.02	8.10	7.87
DO (mg/L)		7.1	10.4	5.4	8.8	6.0	6.4	4.5
Temp (°C)		24.9	24.8	24.2	24.0	24.2	24.2	25.2

Concentration	B-3 100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.27	8.27	8.20	8.19	8.19	8.19	8.18	
DO (mg/L)	9.0	9.0	9.0	9.2	9.5	9.4	9.0	
Cond. (µmhos/cm)	1177	1196	1194	1194	1199	1197	1184	
Temp (°C)	24.8	24.1	24.1	24.7	24.3	25.4	24.7	
Final								
pH		8.44	8.32	8.34	8.26	8.21	8.31	8.39
DO (mg/L)		7.0	5.9	6.1	6.0	6.1	6.2	6.8
Temp (°C)		25.1	25.8	24.6	24.4	24.2	24.2	25.2

Concentration	C-1 100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.20	8.23	8.17	8.08	8.10	8.10	8.11	
DO (mg/L)	9.0	9.0	9.0	9.3	9.4	9.5	9.4	
Cond. (µmhos/cm)	1265	1241	1236	1238	1256	1236	1118	
Temp (°C)	25.2	24.1	24.8	24.9	24.5	25.3	24.7	
Final								
pH		8.39	8.32	8.32	8.33	8.19	8.29	8.41
DO (mg/L)		6.9	6.0	6.2	6.5	6.0	6.2	7.0
Temp (°C)		25.1	25.9	24.8	24.7	24.3	24.2	24.4

	0	1	2	3	4	5	6	7
Analysts: Initial:	SD	SD	SD	SH	MC	SD	SD	
Final:		TE	SD	SH	MC	RY	RY	SD

Comments:

Animal Source/Date Received: ABS / 2-1-05

Animal Age at Initiation: < 48 hours

QC Check: AH 2/15/05

Final Review: [Signature] 2/21/05

CETIS Test Summary

Fathead Minnow 7-d Larval Survival and Growth Test **Nautilus Environmental (CA)**

Test No: 06-5114-4566	Test Type: Growth-Survival (7d)	Duration: 6d 21h
Start Date: 01 Feb-05 05:00 PM	Protocol: EPA/821/R-02-013 (2002)	Species: Pimephales promelas
Ending Date: 08 Feb-05 02:10 PM	Dil Water: Diluted Mineral Water (8:2)	Source: Aquatic Biosystems, CO
Setup Date: 01 Feb-05 05:00 PM	Brine: Frozen Seawater (for control)	

Comments: The sample was slightly saline (0.7 ppt) so a control was added to match the salinity. All analyses were made comparing the sample to the salinity control.

Sample No: 11-8835-9330	Material: Estuarine Monitoring Sample	Client: City of Buenaventura
Sample Date: 31 Jan-05 08:45 AM	Code: 0502-034	Project:
Receive Date: 31 Jan-05 10:10 PM	Source: City of Buenaventura	
Sample Age: 32h	Station: C-1	

Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method
13-6457-1721	7d Proportion Survived	100	> 100	N/A	7.61%	Equal Variance t
09-8245-3264	Mean Dry Biomass-mg	100	> 100	N/A	5.11%	Equal Variance t

Test Acceptability					
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision
13-6457-1721	7d Proportion Survived	Control Response	0.975	0.8 - N/A	Passes acceptability criteria
09-8245-3264	Mean Dry Biomass-mg	Control Response	0.38725	0.25 - N/A	Passes acceptability criteria
09-8245-3264	Mean Dry Biomass-mg	MSDp	0.05108	0.12 - 0.3	Fails acceptability criteria

7d Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	0.97500	0.90000	1.00000	0.02500	0.05000	5.13%
0	Salt Control	4	0.97500	0.90000	1.00000	0.02500	0.05000	5.13%
100		4	0.95000	0.90000	1.00000	0.02887	0.05774	6.08%

Mean Dry Biomass-mg Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	0.42525	0.39700	0.46000	0.01305	0.02611	6.14%
0	Salt Control	4	0.38725	0.36700	0.40300	0.00749	0.01497	3.87%
100		4	0.38775	0.37700	0.40800	0.00690	0.01379	3.56%

7d Proportion Survived Detail					
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1.00000	1.00000	1.00000	0.90000
0	Salt Control	1.00000	0.90000	1.00000	1.00000
100		1.00000	0.90000	0.90000	1.00000

Mean Dry Biomass-mg Detail					
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	0.42500	0.41900	0.39700	0.46000
0	Salt Control	0.40300	0.36700	0.39100	0.38800
100		0.38300	0.37700	0.38300	0.40800

CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	11-5192-2119	16-9749-5672	15 Feb-05 2:43 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	7.61%

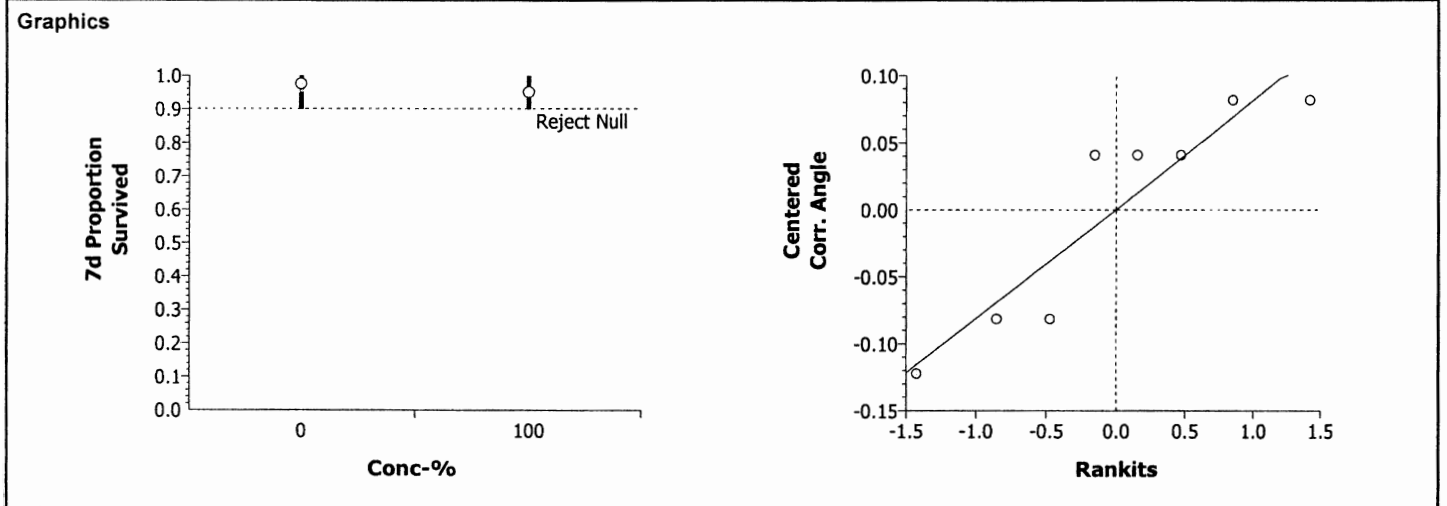
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.975	0.8 - N/A	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.33333	47.46723	0.81873	Equal Variances
Distribution	Shapiro-Wilk W	0.82784	0.74935	0.06156	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0033199	0.00332	1	0.43	0.53696	Non-Significant Effect
Error	0.0464788	0.007746	6			
Total	0.04979875	0.0110664	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	0.65465	1.94318	0.2685	0.12093	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	0.97500	0.90000	1.00000	0.05000	1.37127	1.24905	1.41202	0.08149
100		4	0.95000	0.90000	1.00000	0.05773	1.33053	1.24905	1.41202	0.09409



CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test	Nautilus Environmental (CA)
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	11-5192-2119	16-9749-5672	15 Feb-05 2:43 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	5.11%

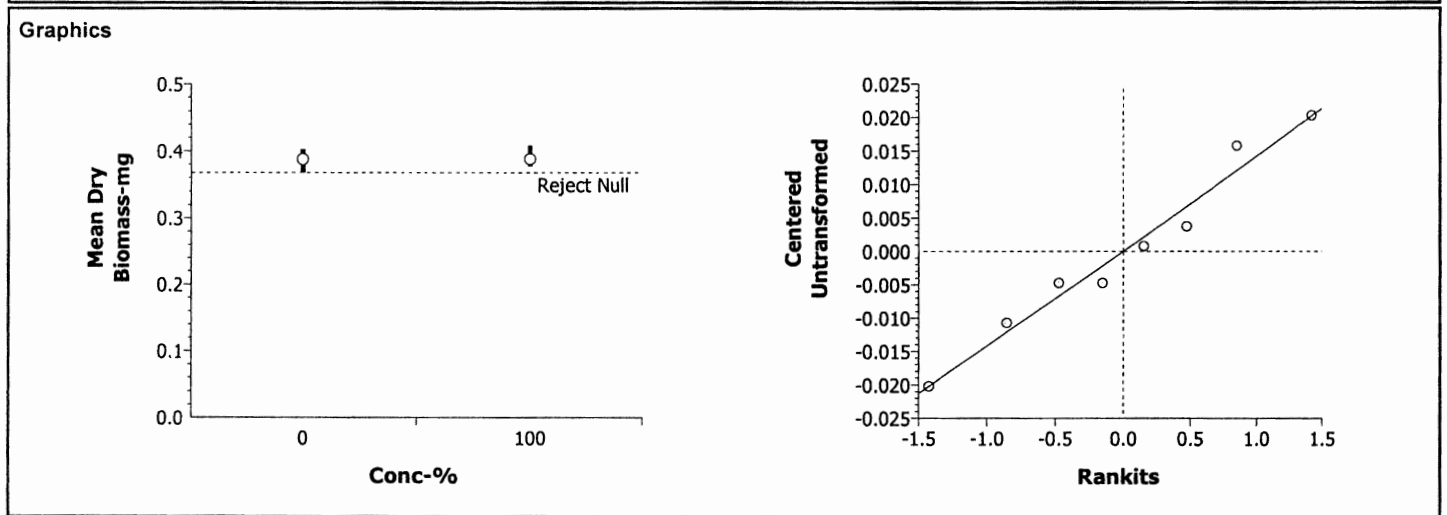
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.38725	0.25 - N/A	Passes acceptability criteria
MSDp	0.05108	0.12 - 0.3	Fails acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.17868	47.46723	0.89569	Equal Variances
Distribution	Shapiro-Wilk W	0.96749	0.74935	0.85801	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	5.001E-07	5.00E-07	1	0.00	0.96242	Non-Significant Effect
Error	0.0012435	0.000207	6			
Total	0.00124401	0.0002078	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-0.0491	1.94318	0.5188	0.01978	Non-Significant Effect

Data Summary										
Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	0.38725	0.36700	0.40300	0.01497				
100		4	0.38775	0.37700	0.40800	0.01379				



C. DUBIA

CETIS Test Summary

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

Test No: 01-1942-5425	Test Type: Reproduction-Survival (7d)	Duration: 6d 23h
Start Date: 02 Feb-05 04:20 PM	Protocol: EPA/821/R-02-013 (2002)	Species: Ceriodaphnia dubia
Ending Date: 09 Feb-05 03:30 PM	Dil Water: Diluted Mineral Water (8:2)	Source: In-House Culture
Setup Date: 02 Feb-05 04:20 PM	Brine: Frozen Seawater	

Comments: The sample was slightly saline (2.2ppt) so a control was added to match the salinity. Analyses were made comparing the sample to the salinity control. Due to a poor Ceriodaphnia culture in San Diego, samples were sent to the northwest lab for testing.

Sample No: 06-6609-1492	Material: Estuarine Monitoring Sample	Client: City of Buenaventura
Sample Date: 31 Jan-05 03:20 PM	Code: 0502-035	Project:
Receive Date: 02 Feb-05 09:40 AM	Source: City of Buenaventura	
Sample Age: 49h	Station: A-2	

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method
15-9259-8070	7d Proportion Survived	100	> 100	N/A	N/A	Fisher's Exact
10-1703-8234	Reproduction	100	> 100	N/A	12.85%	Equal Variance t

Test Acceptability

Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision
15-9259-8070	7d Proportion Survived	Control Response	1	0.8 - N/A	Passes acceptability criteria
10-1703-8234	Reproduction	Control Response	19.8	15 - N/A	Passes acceptability criteria
10-1703-8234	Reproduction	MSDp	0.12848	0.13 - 0.47	Fails acceptability criteria

7d Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%
0	Salt Control	10	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		10	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%

Reproduction Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	10	22.9	0	28	2.6434	8.3593	36.50%
0	Salt Control	10	19.8	16	25	0.9404	2.974	15.02%
100		10	21.7	16	27	1.126	3.5606	16.41%

7d Proportion Survived Detail

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

Reproduction Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	28	27	28	27	25	24	0	21	23	26
0	Salt Control	17	19	16	19	20	22	16	22	22	25
100		24	27	16	24	26	20	21	22	19	18

CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	17-3049-9849	17-3049-9849	15 Feb-05 3:49 PM	CETISv1.025

Method	Alt H	Data Transform	NOEL	LOEL	Toxic Units	ChV	MSDp
Fisher's Exact	C > T	Untransformed	100	>100	1.00	N/A	

Test Acceptability

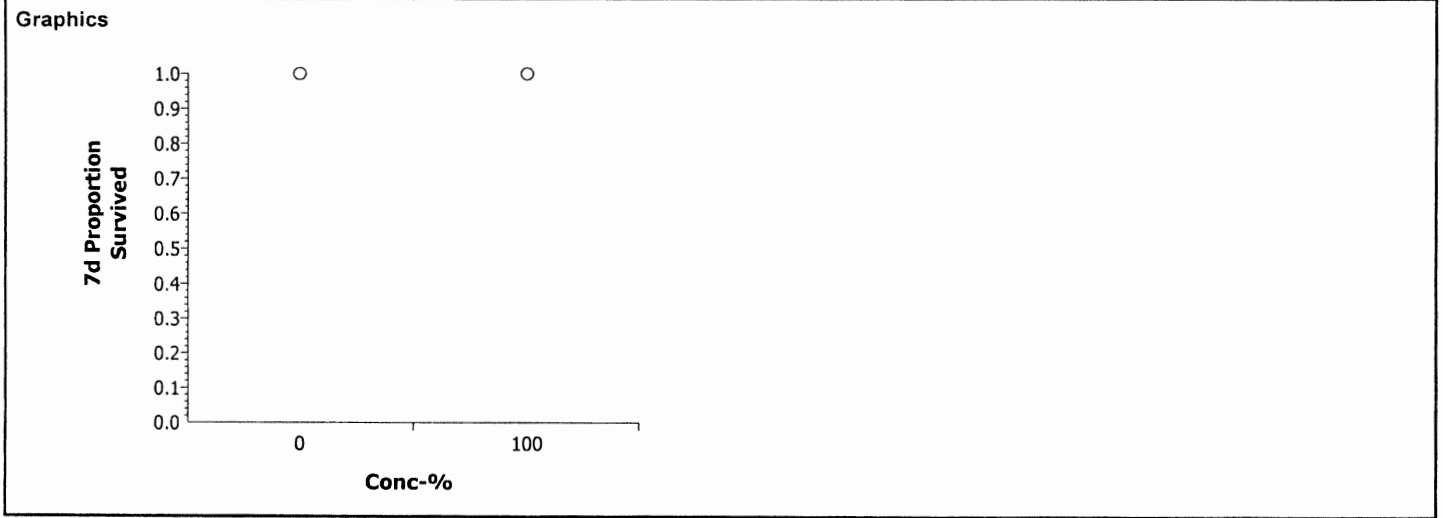
Attribute	Statistic	Acceptable Range	Decision
Control Response	1	0.8 - N/A	Passes acceptability criteria

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	Decision(0.05)
Salt Control		100	1.00000	0.05000	Non-Significant Effect

Data Summary

Conc-%	Control Type	Non-Responders	Responders	Total Observed
0	Salt Control	10	0	10
100		10	0	10



CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test	Nautilus Environmental WA
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Reproduction	Comparison	17-3049-9849	17-3049-9849	24 Feb-05 11:18 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	12.85%

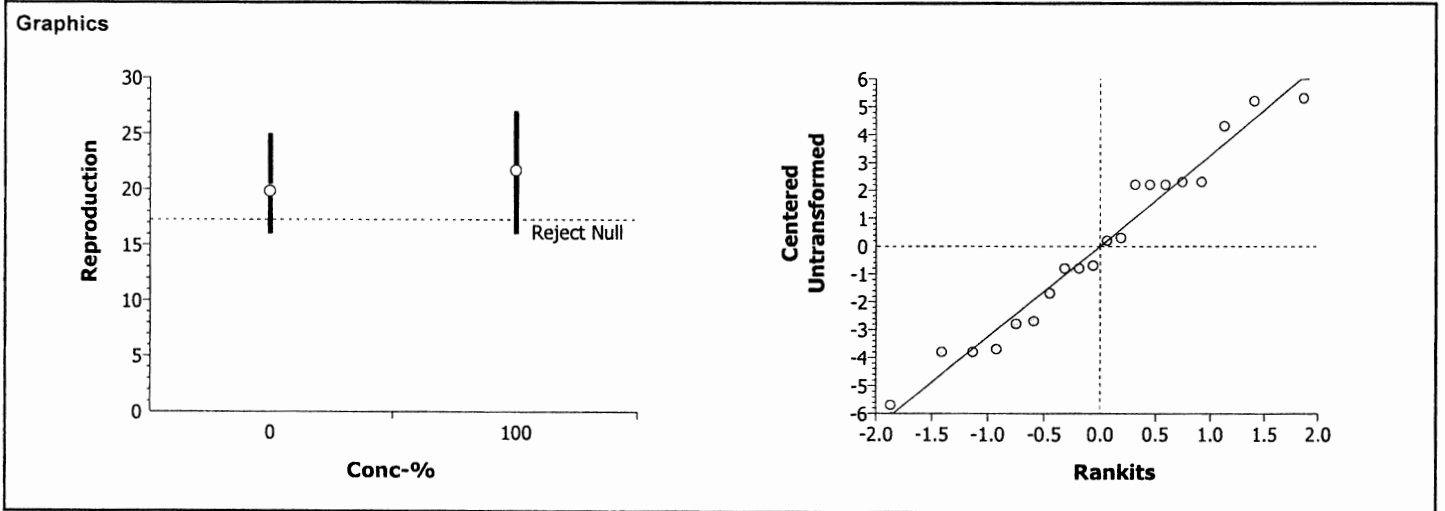
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	19.8	15 - N/A	Passes acceptability criteria
MSDp	0.12848	0.13 - 0.47	Fails acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.43342	6.54109	0.60031	Equal Variances
Distribution	Shapiro-Wilk W	0.95584	0.86826	0.45110	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	18.05	18.05	1	1.68	0.21164	Non-Significant Effect
Error	193.7	10.76111	18			
Total	211.749996	28.811110	19			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-1.2951	1.73406	0.8942	2.54395	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	10	19.8	16	25	2.974				
100		10	21.7	16	27	3.5606				



Ceriodaphnia 7-Day Chronic Survival and Reproduction

Client/Sample ID: Buenaventura A-2, B-1, B-3, C-1 7
Test Number: 0502-05NW 0502-035-0038

Start Date and Time: 2/2/05 1620
Stop Date and Time: 2/9/05 1530

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
Con	1	37	-	-	-	4	9	15	-		28
	2	10	-	-	-	4	9	-	14		27
	3	28	-	-	-	5	8	-	15		28
	4	59	-	-	-	4	11	12	-		27
	5	55	-	-	-	4	10	11	-		25
	6	20	-	-	4	-	7	13	15		24
	7	8	-	-	-	-	X	-	-		0/d
	8	46	-	-	-	3	8	10	-		21
	9	48	-	-	-	5	7	9	-		23
	10	5	-	-	-	6	7	13	-		26
Analyst	AA	RS	AA	AA	AA	CP	AA				
Time	1620	1530	1330	1330	1400	1500	1535	1530			

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
A-2	1	17	-	-	-	4	10	10	-		24
	2	38	-	-	-	6	11	10	-		27
	3	4	-	-	-	4	8	4	8		16
	4	42	-	-	-	5	9	10	-		24
	5	23	-	-	-	4	11	11	-		26
	6	15	-	-	-	3	7	10	-		20
	7	51	-	-	-	5	8	-	8		21
	8	9	-	-	-	4	8	10	-		22
	9	40	-	-	-	5	7	7	-		19
	10	69	-	-	-	4	7	-	7		18

B-3
C-1 con

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
1.0 sal	1	2	-	-	-	5	8	-	11		24
	2	17	-	-	-	4	9	-	12		25
	3	43	-	-	-	4	10	-	10		24
	4	18	-	-	-	4	10	-	14		28
	5	61	-	-	-	4	10	-	10		24
	6	58	-	-	4	-	8	10	11		22
	7	66	-	-	-	5	12	-	13		30
	8	62	-	-	-	4	9	-	11		24
	9	63	-	-	-	3	9	-	13		25
	10	14	-	-	-	5	10	X	-		15/d

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
B-1	1	14	-	-	-	3	10	12	-		25
	2	31	-	-	-	6	11	14	-		31
	3	70	-	-	-	5	8	14	-		27
	4	44	-	-	-	4	11	6	-		21
	5	36	-	-	-	5	11	15	-		31
	6	47	-	-	4	10	-	12	11		26
	7	49	-	-	-	6	10	12	-		28
	8	22	-	-	-	5	10	9	X		24/d
	9	53	-	-	-	5	7	-	9		21
	10	25	-	-	-	6	14	14	-		34

con
A-2
B-3

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
2.2 sal	1	29	-	-	-	4	3	10	-		17
	2	56	-	-	-	4	5	-	9		19
	3	39	-	-	-	4	7	5	-		16
	4	7	-	-	-	3	7	-	9		19
	5	50	-	-	-	4	6	-	10		20
	6	45	-	-	2	4	5	11	13		22
	7	54	-	-	-	3	5	-	8		16
	8	68	-	-	-	4	9	-	9		22
	9	35	-	-	-	4	9	9	-		22
	10	65	-	-	-	5	10	-	10		25

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
B-3	1	41	-	-	-	4	5	-	7		16
	2	12	-	-	-	3	7	-	10		20
	3	27	-	-	-	-	-	7	-		7
	4	3	-	-	-	4	9	-	11		24
	5	34	-	-	-	4	9	8	-		21
	6	32	-	-	5	-	8	6	16		19
	7	60	-	-	-	-	X	-	-		0/d
	8	6	-	-	-	4	8	10	-		22
	9	18	-	-	-	5	10	-	13		25
	10	1	-	-	-	5	7	-	9		21

Comments: X=mortality. Only the first 3 broods are included in reproduction totals.

Review. 2/10/05

Ceriodaphnia Brood Board

Date/Time started: 1/25 9:5 Tech: CP

Day	1	2	3	4	5	6	7	8
Date	1/26	1/27	1/28	1/29		1/31	2/01	2/02
Time	0900	0915	1130	1045		0930	1000	0930

Day	1	2	3	4	5	6	7	8
Date	1/26	1/27	1/28			1/31	2/01	2/02
Time						0930	1000	0930

Cont #	1	2	3	4	5	6	7	8
1	-	-	-	5	8	-	10	13
2	-	-	-	5	9	-	14	X
3	-	-	-	5	7	-	12	14
4	-	-	-	5	10	-	11	15
5	-	-	-	5	10	-	X	-
6	-	-	-	6	9	-	13	14
7	-	-	-	5	9	-	10	15
8	-	-	-	5	10	-	12	11
9	-	-	-	6	8	-	12	13
10	-	-	-	5	8	-	11	15
11	-	-	-	5	8	-	X	-
12	-	-	-	6	10	-	11	10
13	-	-	-	5	8	-	11	12
14	-	-	-	6	8	-	13	15
15	-	-	-	3	6	-	12	12
16	-	-	-	2	-	8	13	-
17	-	-	-	6	8	-	8	12
18	-	-	-	6	9	-	10	10
19	-	-	-	5	9	-	13	12
20	-	-	-	5	10	-	13	7
21	-	-	-	5	9	-	11	12
22	-	-	-	6	9	-	11	14
23	-	-	-	6	10	-	15	13
24	-	-	-	6	10	-	X	-
25	-	-	-	6	9	-	12	12
26	-	-	-	6	11	-	14	15
27	-	-	-	6	11	-	10	14
28	-	-	-	4	10	-	12	13
29	-	-	6	-	11	10	3	10
30	-	-	4	-	9	11	4	8
Tech	CP	AA	AA	AA	AA	CP	CP	CP

Cont #	1	2	3	4	5	6	7	8
31	-	-	5	-	10	15	14	-
32	-	-	4	-	9	10	12	-
33	-	-	4	7	-	8	13	9
34	-	-	3	-	10	14	12	-
35	-	-	4	-	9	17	11	-
36	-	-	-	6	-	11	15	-
37	-	-	4	-	7	11	-	15
38	-	-	-	4	10	11	-	14
39	-	-	4	-	10	14	-	13
40	-	-	-	5	X	-	-	-
41	-	-	-	6	6	-	10	12
42	-	-	-	5	10	-	X	-
43	-	-	-	6	7	-	10	13
44	-	-	-	6	11	-	14	15
45	-	-	-	6	9	-	10	13
46	-	-	-	6	10	-	12	14
47	-	-	-	5	11	-	12	15
48	-	-	-	5	8	-	12	13
49	-	-	6	-	10	11	15	-
50	-	-	5	-	9	14	14	-
51	-	-	5	-	11	14	11	-
52	-	-	6	-	10	11	11	-
53	-	-	-	6	9	-	12	11
54	-	-	-	5	10	-	12	12
55	-	-	-	5	10	-	14	12
56	-	-	-	4	9	-	11	11
57	-	-	-	6	10	-	11	14
58	-	-	-	6	10	-	13	14
59	-	-	-	5	9	-	13	15
60	-	-	-	1	10	-	13	14
Tech	CP	AA	AA	AA	AA	CP	CP	CP

Test Set Up

Test Rep #	Brood Board Cont #
1	4
2	7
3	10
4	14
5	26
6	37
7	44
8	47
9	59
10	60

Client: Buena Ventura
 Start Date: 2/2/05
 Test #: 0602-035 → 038

Nautilus Environmental
 AMEG Earth and Environmental
 Northwest Bioassay Laboratory

Review: *[Signature]* 2/24/05

Nautilus Environmental
Northwest Laboratory

Initial and Final Chemistries
Seven Day Chronic Freshwater Bioassay

Client: Buenaventura
Sample ID: A-2, B-1, B-3, C-1
Test No: 0502-05 AHW
USE SD TEST ID'S 0502-035 → 0387

Start Date & Time: 2/2/05 1620
Stop Date & Time: 2/9/05 1530
Test Species: Ceriodaphnia dubia

Concentration	Days													
	0	1	2	3	4	5	6							
Control 8:2	[Shaded]													
pH	8.09	8.24	8.03	8.13	8-15	8-39	8-19 8-29	8-20 8.14	8.03	8.50	8.12	8-38		
DO (mg/l)	7.7	7.2	7.3	7.6	8-2	7-7	8-8	8-1	8-0	7.8	10.72	7.4	7.7	8-2
Cond. (µmhos-cm)	141	175	180	168	158	171	170	192	171	177	161	202	162	179
Temperature (°C)	24.5	24.6	25.0	25.2	24.9	25.1	24.0	24.3	25.0	25.5	25.0	24.7	25.5	25.0
Concentration	Days													
* con. 1-0 salinity	[Shaded]													
pH	8.03	8.19	8.06	8.14	8-12	8-35	8-17	8-32	8-19	8.14	8.01	8.5	8.05	8-27
DO (mg/l)	8.2	7.3	7.4	7.7	8-0	8-0	8-1	8-3	8-3	8.3	10.8	7.4	8.1	8-3
Cond. (µmhos-cm)	1950	2030	1857	1785	1956	1926	1862	1908	1979	2030	1850	1974	1521	2000
Temperature (°C)	24.5	24.6	25.0	25.2	24.9	25.1	24.0	24.3	25.0	25.5	25.0	24.7	25.5	25.0
Concentration	Days													
* con. 2-2 salinity	[Shaded]													
pH	8.01	8.13	7.97	8.08	8-10	8-27	8-16	8-25	8-15	8.09	8.00	8.49	8.03	8-57
DO (mg/l)	8.4	7.7	7.3	7.3	8-1	8-0	8-0	8-2	8-4	7.3	10.9	7.5	8.3	8-3
Cond. (µmhos-cm)	3840	3780	3500	3760	3990	3890	3880	3960	3960	3980	3830	4110	3980	4060
Temperature (°C)	24.5	24.6	25.0	25.2	24.9	25.1	24.0	24.3	25.0	25.5	25.0	24.7	25.5	25.0
Concentration	Days													
SCORE A-2	[Shaded]													
pH	8.20	8.55	8.24	8.50	8-17	8-67	8-20	8-68	8-25	8.55	8.15	8.71	8.16	8-69
DO (mg/l)	8.7	7.5	7.6	7.9	8-2	7-8	8-7	8-3	8-3	8.0	10.5	8.2	9.8	8-5
Cond. (µmhos-cm)	3810	4140	3880	4000	3940	4030	3780	4020	4140	4170	3660	4190	3990	4200
Temperature (°C)	24.5	24.6	25.0	25.2	24.9	25.1	24.0	24.3	25.0	25.5	25.0	24.7	25.5	25.0
Concentration	Days													
SCORE B-1	[Shaded]													
pH	7.87	8.57	8.02	8.56	7.82	8-70	7.87	8-66	8-03	8.56	7.78	8.74	7.89	8-73
DO (mg/l)	8.7	7.7	7.6	7.5	8-2	8-2	8-8	8-3	8-5	7.1	10.9	7.5	9.4	8-8
Cond. (µmhos-cm)	2020	2160	2080	2090	2070	2100	1953	2080	2130	2160	2250	2180	2040	2180
Temperature (°C)	24.5	24.6	25.0	25.2	24.9	25.1	24.0	24.3	25.0	25.5	25.0	24.7	25.5	25.0
Concentration	Days													
SCORE B-3	[Shaded]													
pH	8.26	8.65	8.28	8.59	8-22	8-64	8-25	8-72	8-31	8.60	8.18	8.77	8.19	8-66
DO (mg/l)	8.7	7.9	7.6	8.0	8-5	8-6	8-8	8-5	8-6	7.4	8.8	7.8	10.3	8-7
Cond. (µmhos-cm)	950	1145	1099	1125	1091	1107	1055	1101	1167	1155	1140	1162	1090	1151
Temperature (°C)	24.5	24.6	25.0	25.2	24.9	25.1	24.0	24.3	25.0	25.5	25.0	24.7	25.5	25.0

* 8.2

	Control	SCORE A2	SCORE B1	SCORE B3	SCORE C1	Analysts:
Hardness*	80	7400	320	332	300	JRW & SA CP Reviewed: 2/24/05
Alkalinity*	68	7400	188	208	208	
Initial Chlorinel		<0.03	<0.03	<0.03	<0.03	
Ammonia I		<1.0	<1.0	<1.0	<1.0	

* mg/L as CaCO3; I mg/L; ND: no chlorine detected

Sample Description: _____
Animal Source: Internal Date Received: NA Date of Hatch: 2/2/05
Comments: _____

* made by adding Nat. Seawater to 8:2

CETIS Test Summary

Report Date: 24 Feb-05 11:20 AM

Link: 04-8187-4866/0502-036

Ceriodaphnia 7-d Survival and Reproduction Test							Nautilus Environmental WA				
Test No:	01-1942-5425	Test Type:	Reproduction-Survival (7d)		Duration:	6d 23h					
Start Date:	02 Feb-05 04:20 PM	Protocol:	EPA/821/R-02-013 (2002)		Species:	Ceriodaphnia dubia					
Ending Date:	09 Feb-05 03:30 PM	Dil Water:	Diluted Mineral Water (8:2)		Source:	In-House Culture					
Setup Date:	02 Feb-05 04:20 PM	Brine:	Frozen Seawater (for control)								
Comments:	The sample was slightly saline (2.2ppt) so a control was added to match the salinity. Analyses were made comparing the sample to the salinity control. Due to a poor Ceriodaphnia culture in San Diego, samples were sent to the northwest lab for testing.										
Sample No:	14-7289-2275	Material:	Estuarine Monitoring Sample			Client:	City of Buenaventura				
Sample Date:	31 Jan-05 02:30 PM	Code:	0502-036			Project:					
Receive Date:	02 Feb-05 09:40 AM	Source:	City of Buenaventura								
Sample Age:	50h	Station:	B-1								
Comparison Summary											
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method					
18-5294-7795	7d Proportion Survived	100	> 100	N/A	N/A	Fisher's Exact					
10-9306-0227	Reproduction	100	> 100	N/A	14.51%	Equal Variance t					
Test Acceptability											
Analysis	Endpoint	Attribute	Statistic	Acceptable Range		Decision					
18-5294-7795	7d Proportion Survived	Control Response	1	0.8 - N/A		Passes acceptability criteria					
10-9306-0227	Reproduction	Control Response	19.8	15 - N/A		Passes acceptability criteria					
10-9306-0227	Reproduction	MSDp	0.14515	0.13 - 0.47		Passes acceptability criteria					
7d Proportion Survived Summary											
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV			
0	Lab Control	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%			
0	Salt Control	10	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%			
100		10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%			
Reproduction Summary											
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV			
0	Lab Control	10	22.9	0	28	2.6434	8.3593	36.50%			
0	Salt Control	10	19.8	16	25	0.9404	2.974	15.02%			
100		10	26.8	21	34	1.3646	4.3153	16.10%			
7d Proportion Survived Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000
0	Salt Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
100		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000
Reproduction Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	28	27	28	27	25	24	0	21	23	26
0	Salt Control	17	19	16	19	20	22	16	22	22	25
100		25	31	27	21	31	26	28	24	21	34

CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test	Nautilus Environmental WA
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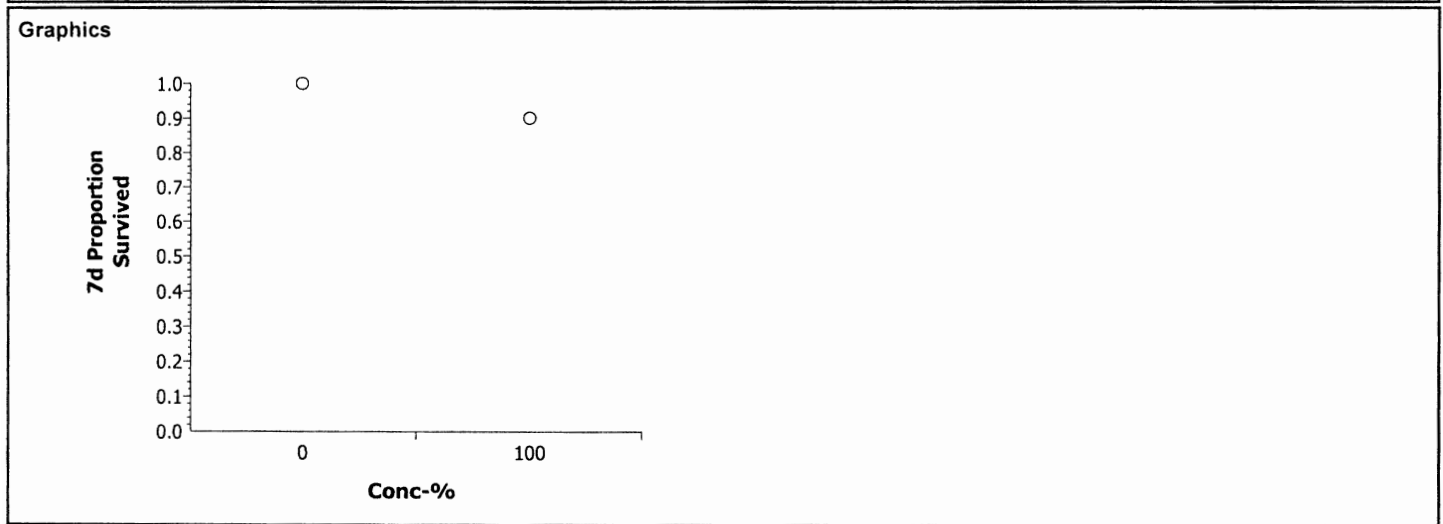
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	04-8187-4866	17-3049-9849	15 Feb-05 4:04 PM	CETISv1.025

Method	Alt H	Data Transform	NOEL	LOEL	Toxic Units	ChV	MSDp
Fisher's Exact	C > T	Untransformed	100	>100	1.00	N/A	

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	1	0.8 - N/A	Passes acceptability criteria

Group Comparisons					
Control	vs	Conc-%	Statistic	Decision(0.05)	
Salt Control		100	0.50000	0.05000	Non-Significant Effect

Data Summary				
Conc-%	Control Type	Non-Responders	Responders	Total Observed
0	Salt Control	10	0	10
100		9	1	10



CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Reproduction	Comparison	04-8187-4866	17-3049-9849	24 Feb-05 11:19 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	14.51%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	19.8	15 - N/A	Passes acceptability criteria
MSDp	0.14515	0.13 - 0.47	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.10553	6.54109	0.28260	Equal Variances
Distribution	Shapiro-Wilk W	0.97438	0.86826	0.81702	Normal Distribution

ANOVA Table

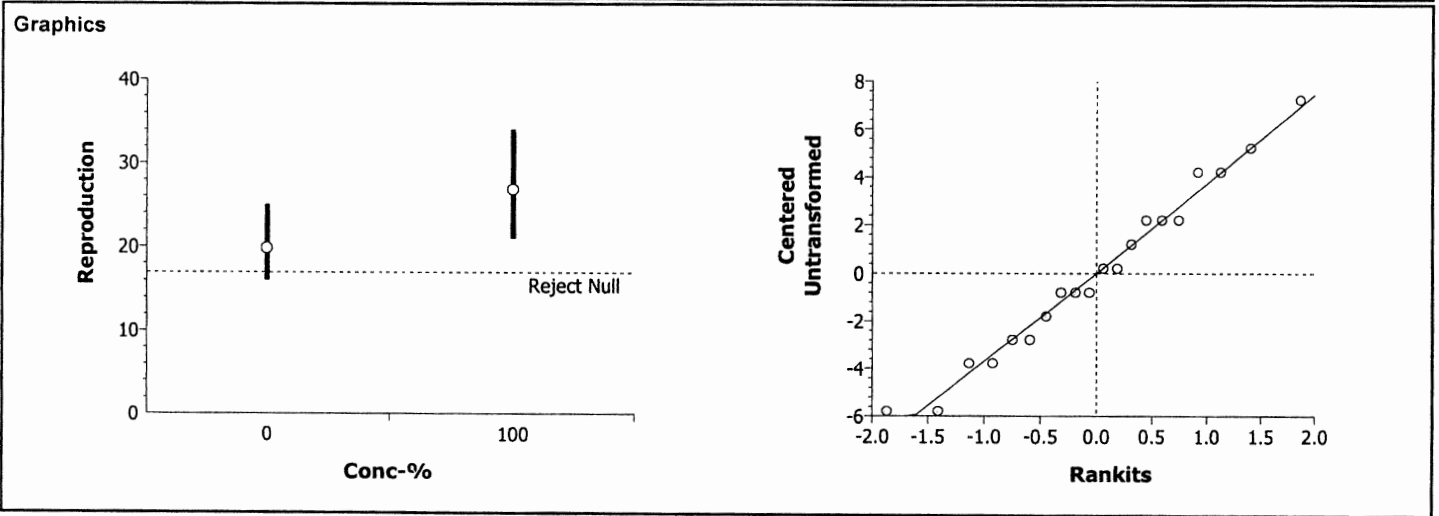
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	245	245	1	17.84	0.00051	Significant Effect
Error	247.2	13.73333	18			
Total	492.199997	258.73333	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-4.2237	1.73406	0.9997	2.87388	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	10	19.8	16	25	2.974				
100		10	26.8	21	34	4.3153				



CETIS Test Summary

Report Date: 16 Feb-05 6:47 PM

Link: 07-9807-2296/0502-037

Ceriodaphnia 7-d Survival and Reproduction Test							Nautilus Environmental WA				
Test No:	04-7816-6381	Test Type:	Reproduction-Survival (7d)	Duration:	6d 23h						
Start Date:	02 Feb-05 04:20 PM	Protocol:	EPA/821/R-02-013 (2002)	Species:	Ceriodaphnia dubia						
Ending Date:	09 Feb-05 03:30 PM	Dil Water:	Diluted Mineral Water (8:2)	Source:	In-House Culture						
Setup Date:	02 Feb-05 04:20 PM	Brine:	Frozen Seawater (for control)								
Comments:	The sample was slightly saline (1.0 ppt) so a control was added to match the salinity. Analyses were made comparing the sample to the salinity control. Due to a poor Ceriodaphnia culture in San Diego, samples were sent to the northwest lab for testing.										
Sample No:	17-0121-7707	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura						
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-037	Project:							
Receive Date:	02 Feb-05 09:40 AM	Source:	City of Buenaventura								
Sample Age:	52h	Station:	B-3								
Comparison Summary											
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method					
08-6669-4799	7d Proportion Survived	100	> 100	N/A	N/A	Fisher's Exact					
18-0621-0988	Reproduction	< 100	100	N/A	20.94%	Equal Variance t					
Point Estimate Summary											
Analysis	Endpoint	% Effect	Conc-%	95% LCL	95% UCL	Method					
15-3333-9481	Reproduction	25	95.63492	53.27103	N/A	Linear Interpolation					
		50	> 100.00000	N/A	N/A						
Test Acceptability											
Analysis	Endpoint	Attribute	Statistic	Acceptable Range		Decision					
08-6669-4799	7d Proportion Survived	Control Response	0.9	0.8 - N/A		Passes acceptability criteria					
15-3333-9481	Reproduction	Control Response	24.1	15 - N/A		Passes acceptability criteria					
18-0621-0988	Reproduction	Control Response	24.1	15 - N/A		Passes acceptability criteria					
18-0621-0988	Reproduction	MSDp	0.20943	0.13 - 0.47		Passes acceptability criteria					
7d Proportion Survived Summary											
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV			
0	Lab Control	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%			
0	Salt Control	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%			
100		10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%			
Reproduction Summary											
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV			
0	Lab Control	10	22.9	0	28	2.6434	8.3593	36.50%			
0	Salt Control	10	24.1	15	30	1.2423	3.9285	16.30%			
100		10	17.8	0	28	2.6323	8.324	46.76%			
7d Proportion Survived Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000
0	Salt Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000
100		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000
Reproduction Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	28	27	28	27	25	24	0	21	23	26
0	Salt Control	24	25	24	28	24	22	30	24	25	15
100		16	20	7	24	21	19	0	22	28	21

CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test	Nautilus Environmental WA
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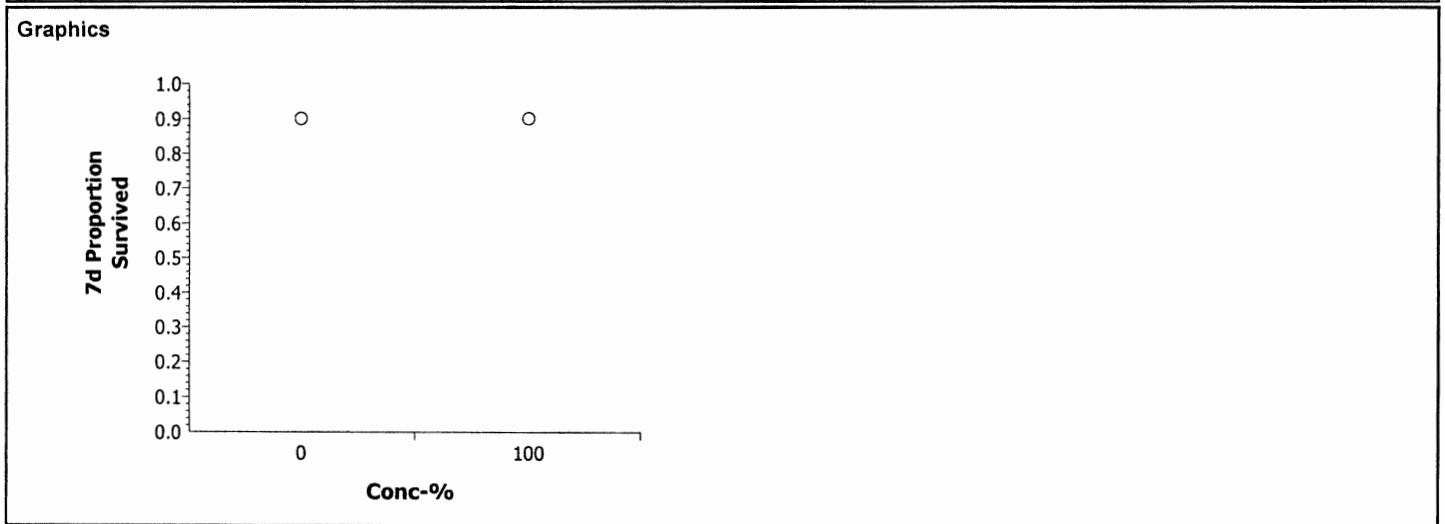
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-9807-2296	07-9807-2296	15 Feb-05 4:10 PM	CETISv1.025

Method	Alt H	Data Transform	NOEL	LOEL	Toxic Units	ChV	MSDp
Fisher's Exact	C > T	Untransformed	100	>100	1.00	N/A	

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.9	0.8 - N/A	Passes acceptability criteria

Group Comparisons				
Control	vs	Conc-%	Statistic	Decision(0.05)
Salt Control		100	0.76316	0.05000 Non-Significant Effect

Data Summary				
Conc-%	Control Type	Non-Responders	Responders	Total Observed
0	Salt Control	9	1	10
100		9	1	10



CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Reproduction	Comparison	07-9807-2296	07-9807-2296	15 Feb-05 4:10 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		<100	100		N/A	20.94%

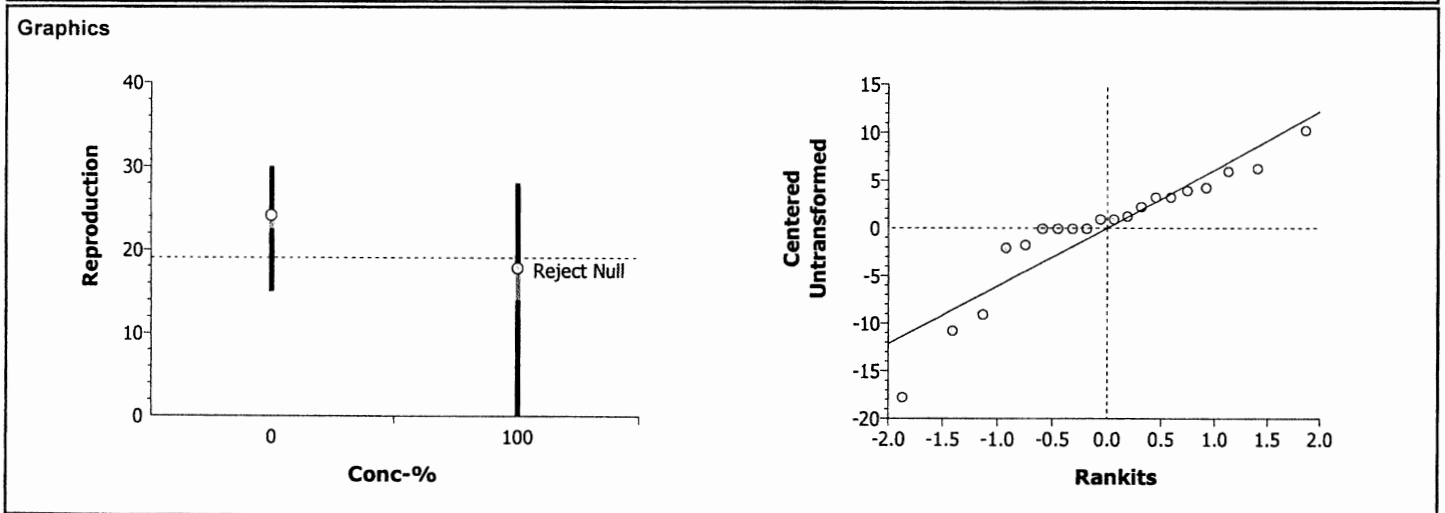
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	24.1	15 - N/A	Passes acceptability criteria
MSDp	0.20943	0.13 - 0.47	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	4.48956	6.54109	0.03555	Equal Variances
Distribution	Shapiro-Wilk W	0.87493	0.86826	0.01342	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	198.45	198.45	1	4.68	0.04412	Significant Effect
Error	762.5	42.36111	18			
Total	960.949997	240.81111	19			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	2.16442	1.73406	0.0221	5.04735	Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	10	24.1	15	30	3.9285				
100		10	17.8	0	28	8.324				



CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test	Nautilus Environmental WA
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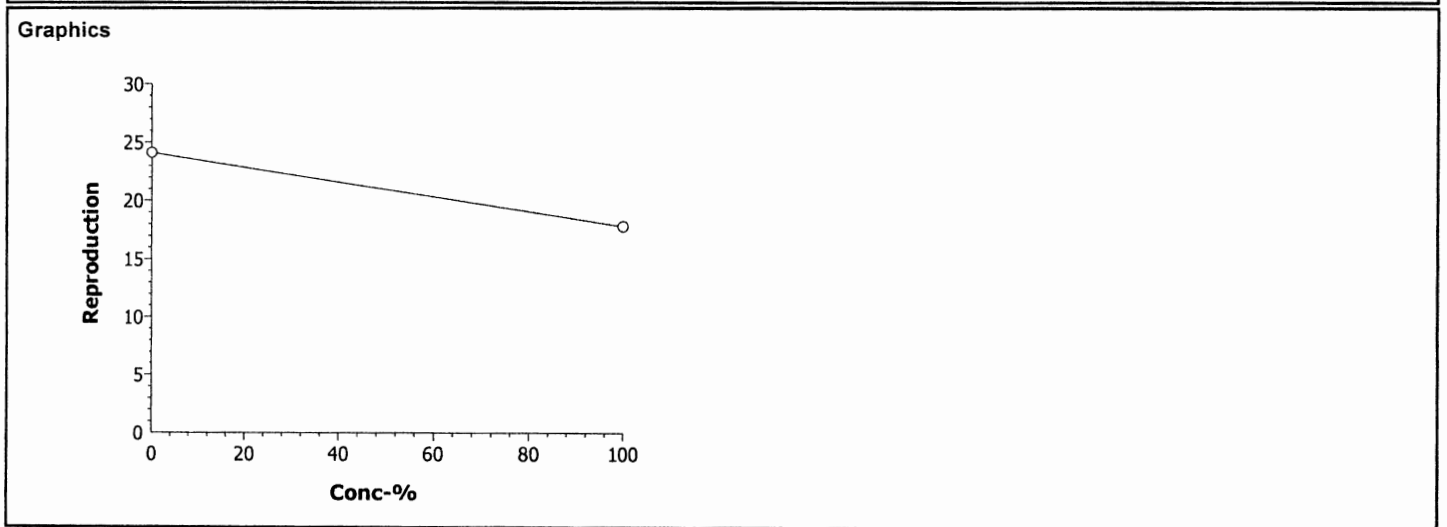
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Reproduction	Linear Interpolation	07-9807-2296	07-9807-2296	15 Feb-05 4:11 PM	CETISv1.025

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Expanded CL	Method
Linear	Linear	2895624	200	Yes	Two-Point Interpolation

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	24.1	15 - N/A	Passes acceptability criteria

Point Estimates			
% Effect	Conc-%	95% LCL	95% UCL
25	95.63492	53.27103	N/A
50	> 100.00000	N/A	N/A

Data Summary		Calculated Variate					
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD
0	Salt Control	10	24.1	15	30	0.80191	3.92853
100		10	17.8	0	28	1.69913	8.32399



CETIS Test Summary

Report Date: 16 Feb-05 6:48 PM

Link: 13-8410-4944/0502-038

Ceriodaphnia 7-d Survival and Reproduction Test							Nautilus Environmental WA				
Test No:	04-7816-6381	Test Type:	Reproduction-Survival (7d)			Duration:	6d 23h				
Start Date:	02 Feb-05 04:20 PM	Protocol:	EPA/821/R-02-013 (2002)			Species:	Ceriodaphnia dubia				
Ending Date:	09 Feb-05 03:30 PM	Dil Water:	Diluted Mineral Water (8:2)			Source:	In-House Culture				
Setup Date:	02 Feb-05 04:20 PM	Brine:	Frozen Seawater (for control)								
Comments:	The sample was slightly saline (1.0 ppt) so a control was added to match the salinity. Analyses were made comparing the sample to the salinity control. Due to a poor Ceriodaphnia culture in San Diego, samples were sent to the northwest lab for testing.										
Sample No:	14-8977-2995	Material:	Estuarine Monitoring Sample			Client:	City of Buenaventura				
Sample Date:	31 Jan-05 08:45 AM	Code:	0502-038			Project:					
Receive Date:	02 Feb-05 09:40 AM	Source:	City of Buenaventura								
Sample Age:	56h	Station:	C-1								
Comparison Summary											
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method					
06-3088-6589	7d Proportion Survived	100	> 100	N/A	N/A	Fisher's Exact					
11-6141-1999	Reproduction	100	> 100	N/A	10.15%	Equal Variance t					
Test Acceptability											
Analysis	Endpoint	Attribute	Statistic	Acceptable Range		Decision					
06-3088-6589	7d Proportion Survived	Control Response	0.9	0.8 - N/A		Passes acceptability criteria					
11-6141-1999	Reproduction	Control Response	24.1	15 - N/A		Passes acceptability criteria					
11-6141-1999	Reproduction	MSDp	0.10147	0.13 - 0.47		Fails acceptability criteria					
7d Proportion Survived Summary											
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV			
0	Lab Control	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%			
0	Salt Control	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%			
100		10	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%			
Reproduction Summary											
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV			
0	Lab Control	10	22.9	0	28	2.6434	8.3593	36.50%			
0	Salt Control	10	24.1	15	30	1.2423	3.9285	16.30%			
100		10	26.7	24	30	0.6675	2.1108	7.91%			
7d Proportion Survived Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000
0	Salt Control	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000
100		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
Reproduction Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	28	27	28	27	25	24	0	21	23	26
0	Salt Control	24	25	24	28	24	22	30	24	25	15
100		29	30	25	26	25	25	29	24	28	26

CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test	Nautilus Environmental WA
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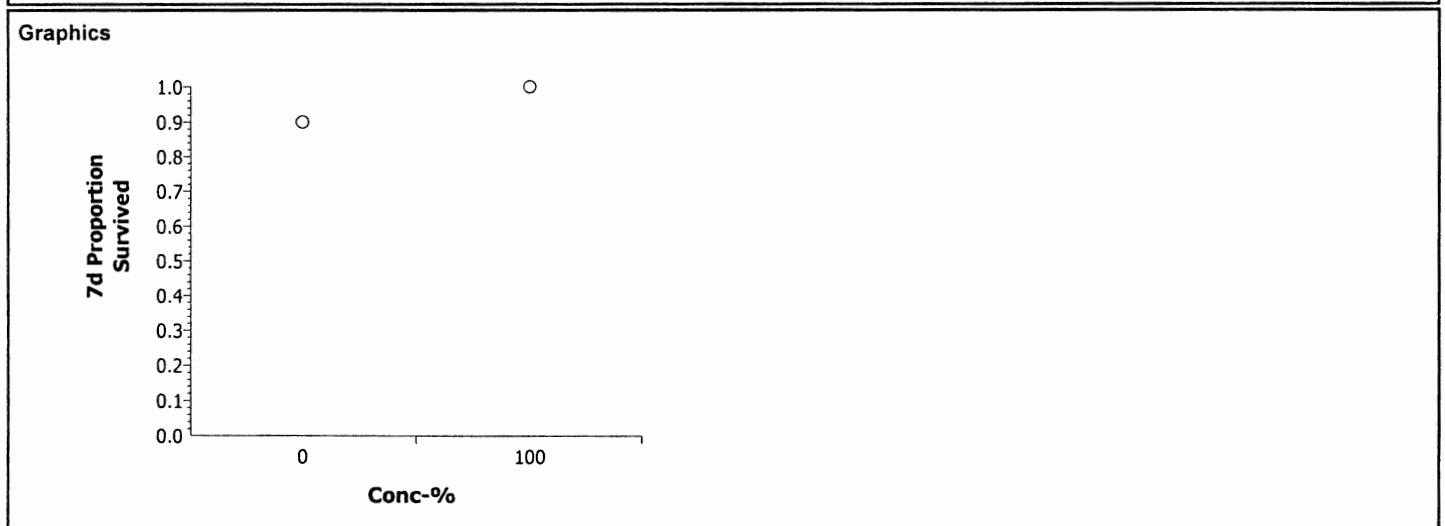
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	13-8410-4944	07-9807-2296	15 Feb-05 4:15 PM	CETISv1.025

Method	Alt H	Data Transform	NOEL	LOEL	Toxic Units	ChV	MSDp
Fisher's Exact	C > T	Untransformed	100	>100	1.00	N/A	

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.9	0.8 - N/A	Passes acceptability criteria

Group Comparisons					
Control	vs	Conc-%	Statistic	Decision(0.05)	
Salt Control		100	1.00000	0.05000	Non-Significant Effect

Data Summary				
Conc-%	Control Type	Non-Responders	Responders	Total Observed
0	Salt Control	9	1	10
100		10	0	10



CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Reproduction	Comparison	13-8410-4944	07-9807-2296	15 Feb-05 4:16 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	10.15%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	24.1	15 - N/A	Passes acceptability criteria
MSDp	0.10147	0.13 - 0.47	Fails acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.46384	6.54109	0.07833	Equal Variances
Distribution	Shapiro-Wilk W	0.91385	0.86826	0.07557	Normal Distribution

ANOVA Table

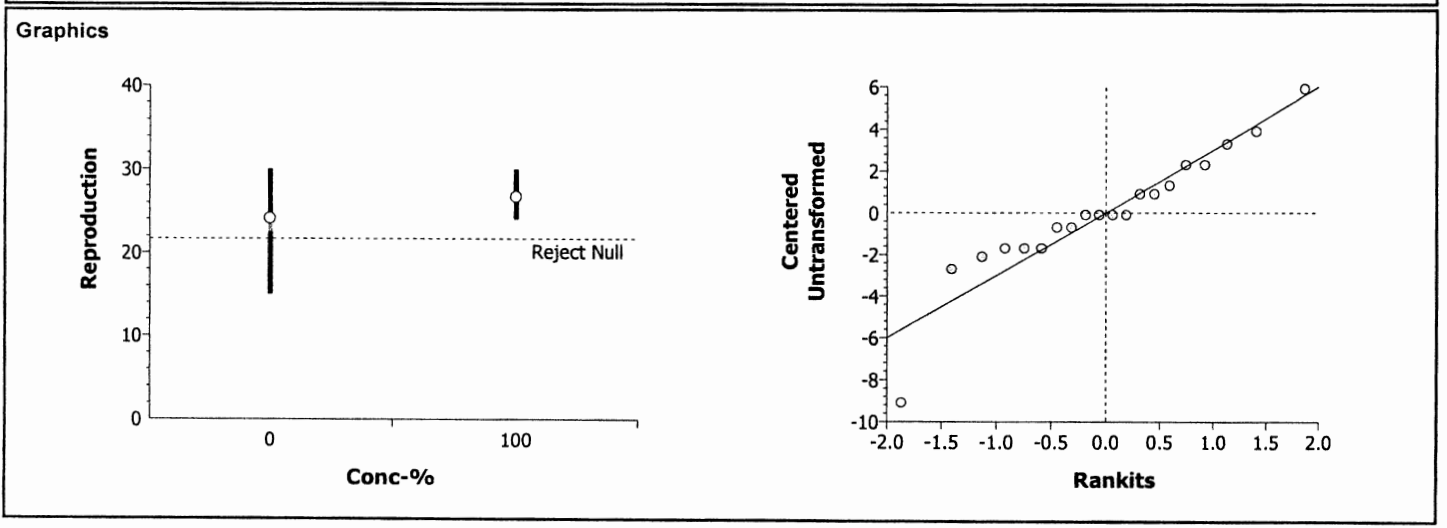
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	33.8	33.8	1	3.40	0.08177	Non-Significant Effect
Error	179	9.944445	18			
Total	212.799999	43.744444	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-1.8436	1.73406	0.9591	2.44552	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	10	24.1	15	30	3.9285				
100		10	26.7	24	30	2.1108				



Ceriodaphnia 7-Day Chronic Survival and Reproduction

Client/Sample ID: Buenaventura / A-2, B-1, B-3, C-1
 Test Number: 0502-05 NW 0502-035-038

Start Date and Time: 2/2/05 1620
 Stop Date and Time: 2/9/05 1530

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
C-1	1	24	-	-	-	5	10	14	-		29
	2	11	-	-	-	5	11	14	-		30
	3	52	-	-	-	5	9	12	-		25
	4	31	-	-	-	4	11	11	-		26
	5	37	-	-	-	4	10	11	-		25
	6	19	-	X	4	-	9	12	16		25
	7	16	-	-	-	5	9	-	15		29
	8	26	-	-	-	4	9	11	-		24
	9	21	-	-	-	2	12	14	-		28
	10	33	-	-	-	3	10	13	-		26
Analyst		MA	-	MA	MA	MA	MA	CP	MA		
Time											

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

Comments: X=mortality. Only the first 3 broods are included in reproduction totals.
 Review: 2/2/05

Nautilus Environmental Northwest Laboratory

Initial and Final Chemistries

Seven Day Chronic Freshwater Bioassay

Client: Buena Ventura
Sample ID: A-2, B-1, B-3, C-1
Test No: 0502-05 NW
USESD Test ID's: 0502-035 to 038

Start Date & Time: 2/2/05 1620
Stop Date & Time: 2/9/05 1530
Test Species: C. dubia

Table with multiple rows for Concentration, pH, DO, Cond., and Temperature across 7 days. Includes a large shaded area in the middle.

Table with columns for Control and rows for Hardness, Alkalinity, Initial Chlorine, and Ammonia.

Analysts:

Reviewed: [Signature] 2/2/05

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Sample Description:
Animal Source: Internal
Date Received: NA
Date of Hatch: 2/2/05
Comments:

S. CAPRICORNUTUM

CETIS Test Summary

Report Date: 24 Feb-05 9:51 AM

Link: 07-5552-6371/0502-039

Selenastrum Growth Test			Nautilus Environmental (CA)					
Test No:	15-8916-2915	Test Type:	Cell Growth	Duration:	94h			
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-013 (2002)	Species:	Selenastrum capricornutum			
Ending Date:	05 Feb-05 02:00 PM	Dil Water:	Nutrient Enriched Water	Source:	In-House Culture			
Setup Date:	01 Feb-05 04:00 PM	Brine:						
Sample No:	06-9815-8290	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 03:20 PM	Code:	0502-039	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	25h	Station:	A-2					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
02-0824-5471	Cell Density	100	> 100	N/A	9.77%	Unequal Variance t		
04-2617-8581		101	> 101	N/A	21.90%	Unequal Variance t		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
02-0824-5471	Cell Density	Control CV	0.00844	N/A - 0.2	Passes acceptability criteria			
04-2617-8581	Cell Density	Control CV	0.00844	N/A - 0.2	Passes acceptability criteria			
02-0824-5471	Cell Density	Control Response	1351000	1000000 - N/A	Passes acceptability criteria			
04-2617-8581	Cell Density	Control Response	1351000	1000000 - N/A	Passes acceptability criteria			
02-0824-5471	Cell Density	MSDp	0.09775	0.091 - 0.29	Passes acceptability criteria			
04-2617-8581	Cell Density	MSDp	0.21896	0.091 - 0.29	Passes acceptability criteria			
Cell Density Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	1.16E+6	9.90E+5	1.29E+6	7.32E+4	1.46E+5	12.59%
0	Salt Control	4	1.35E+6	1.34E+6	1.37E+6	5.70E+3	1.14E+4	0.84%
100		4	2.57E+6	2.41E+6	2.66E+6	5.58E+4	1.12E+5	4.35%
101 100% unfiltered		4	1.62E+6	1.27E+6	1.83E+6	1.26E+5	2.51E+5	15.50%
Cell Density Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	1.29E+6	1.28E+6	9.90E+5	1.09E+6			
0	Salt Control	1.34E+6	1.37E+6	1.35E+6	1.35E+6			
100		2.66E+6	2.41E+6	2.58E+6	2.62E+6			
101 100% unfiltered		1.27E+6	1.60E+6	1.83E+6	1.77E+6			

CETIS Analysis Detail

Selenastrum Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Comparison	07-5552-6371	07-5552-6371	10 Feb-05 11:10 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed		100	>100	1.00	N/A	9.77%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control CV	0.00844	N/A - 0.2	Passes acceptability criteria
Control Response	1351000	1000000 - N/A	Passes acceptability criteria
MSDp	0.09775	0.091 - 0.29	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	95.88461	47.46723	0.00355	Unequal Variances
Distribution	Shapiro-Wilk W	0.83601	0.74935	0.07345	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	2.965E+12	2.96E+12	1	470.76	0.00000	Significant Effect
Error	3.779E+10	6.3E+09	6			
Total	3.0024E+12	2.971E+12	7			

Group Comparisons

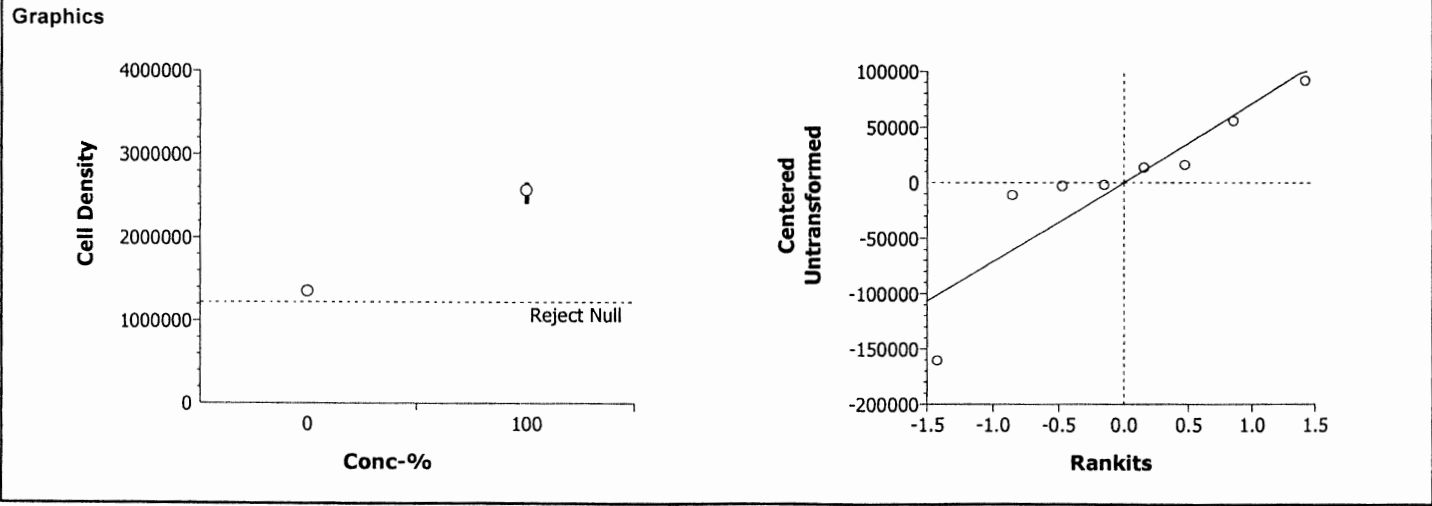
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-21.697	2.35336	0.9999	132056	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	1.35E+6	1.34E+6	1.37E+6	1.14E+4				
100		4	2.57E+6	2.41E+6	2.66E+6	1.12E+5				

Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.34E+6	1.37E+6	1.35E+6	1.35E+6						
100		2.66E+6	2.41E+6	2.58E+6	2.62E+6						



CETIS Analysis Detail

Selenastrum Growth Test	Nautilus Environmental (CA)
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Comparison	07-5552-6371	07-5552-6371	10 Feb-05 11:10 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed		101	>101	0.99	N/A	21.90%

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control CV	0.00844	N/A - 0.2	Passes acceptability criteria
Control Response	1351000	1000000 - N/A	Passes acceptability criteria
MSDp	0.21896	0.091 - 0.29	Passes acceptability criteria

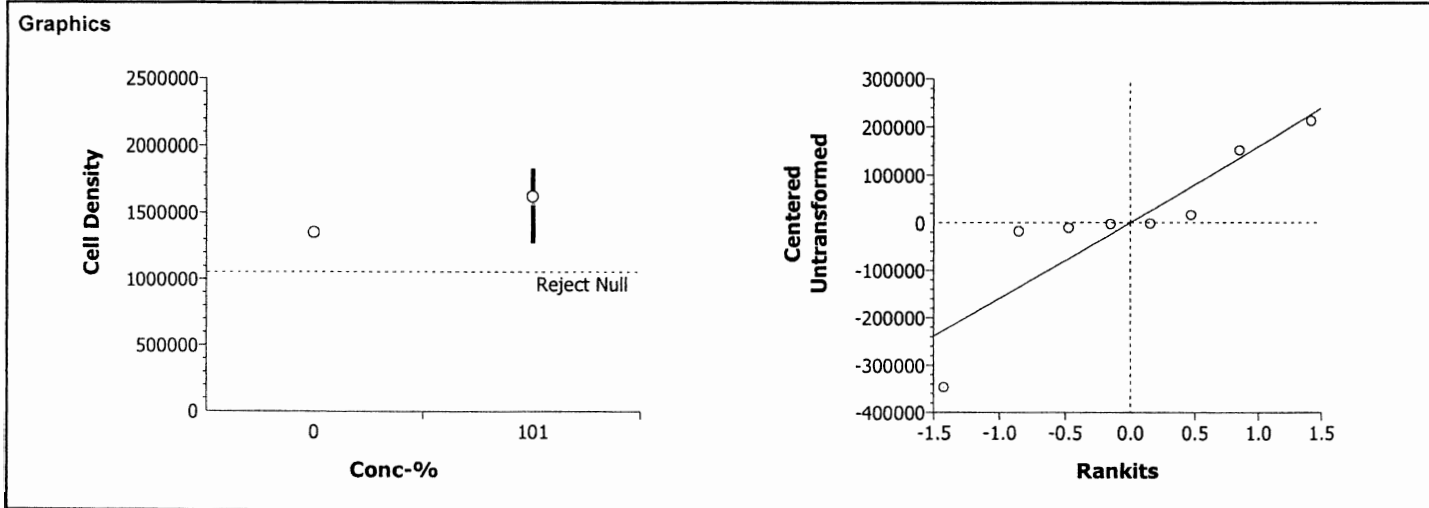
ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	485.14360	47.46723	0.00032	Unequal Variances
Distribution	Shapiro-Wilk W	0.83323	0.74935	0.06917	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	1.447E+11	1.45E+11	1	4.58	0.07614	Non-Significant Effect
Error	1.896E+11	3.16E+10	6			
Total	3.3432E+11	1.763E+11	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		101	-2.1401	2.35336	0.9391	295810	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	1.35E+6	1.34E+6	1.37E+6	1.14E+4				
101 <i>100% unfiltered</i>		4	1.62E+6	1.27E+6	1.83E+6	2.51E+5				

Data Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.34E+6	1.37E+6	1.35E+6	1.35E+6						
101 <i>100% unfiltered</i>		1.27E+6	1.60E+6	1.83E+6	1.77E+6						



CETIS Data Worksheet

Report Date: 01 Feb-05 10:43 AM

Link: 07-5552-6371

Selenastrum Growth Test Nautilus Environmental (CA)

Start Date: 01 Feb-05	Species: Selenastrum capricornutum	Sample Code: 0502-039
Ending Date: 05 Feb-05	Protocol: EPA/821/R-02-013 (2002)	Sample Source: City of Buenaventura
Sample Date: 31 Jan-05	Material: Estuarine Monitoring Sample	Sample Station: A-2

Conc-%	Code	Rep	Pos	Cell Density	Absorbance	Biomass	Chlorophyll a	Notes
0	LC	1	2					
0	LC	2	5					
0	LC	3	1					
0	LC	4	3					
0	SC	1	10					
0	SC	2	6					
0	SC	3	8					
0	SC	4	9					
100		1	12					
100		2	4					
100		3	11					
100		4	7					

LC #1

SC #1

QC AH

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

Test Species: S. capricornutum

Client: City of Buena Ventura

Test Date: 2/1/05

Sample ID: A-2, B1, B-3, C-1

Start/End Times: 16:00/1400

Test No: 0502-039 → 042

Analyst: AH, SA

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	0.00, 2.22	
1		9.90	
2		12.86	
3		10.93	
4		24.08	
5		12.83	
6		13.67	
7		26.24	
8		13.49	
9		13.48	
10		13.40	
11		25.32	
12		26.60	
Cal Check 2 (NEW, Solid, Effluent Blanks)		0.00, 2.21	
15		24.41	
16		22.39	
18		22.46	
20		22.49	
25		14.34	
26		23.78	
27		12.09	
28		27.07	
29		26.56	
30		13.21	
31		27.32	
32		12.37	
Cal Check 3 (NEW, Solid, Effluent Blanks)		0.00, 2.20	

Comments: _____

QC Check: AH 2/1/05

Final Review: [Signature] 2/2/05

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

Test Species: S. capricornutum

Client: City of Buena Ventura

Test Date: 2/1/05

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

Start/End Times: 16:00 / 1400

Test No: 0502-039 → 042

Analyst: 1 sit

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, 2.21	
33		10.48	
34		12.76	
35		9.67	
36		13.20	
37		27.24	
44		25.89	
45		25.85	
46		25.99	
A-2 unfiltered A		16.02	
A-2 " B		18.33	
" " C		17.72	
" " D		12.73	
Cal Check 2 (NEW, Solid, Effluent Blanks)		0.00, 2.21	
B-1 unfiltered A		5.15	
↓ B		6.45	
↓ C		5.95	
↓ D		12.58	
B-3 unfiltered A		13.25	
↓ B		17.85	
↓ C		14.05	
↓ D		12.95	
C-1 unfiltered A		10.73	
↓ B		19.21	
↓ C		8.36	
↓ D		9.19	
Cal Check 3 (NEW, Solid, Effluent Blanks)		0.00, 2.21	

Comments: _____

QC Check: AH 2/1/05

Final Review: [Signature] 2/24/05

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

Test Species: S. capricornutum

Client: City of Buena Vista

Test Date: 2-1-05

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

Start/End Times: 1600/1400

Test No: 0502-039-042

Analyst: Sit

Random Number	Dilution	Cell Density (fluorometric) (cells/ml * 10 ⁶)	Cell Density (microscopic) (cells/ml * 10 ⁶)
Blank	NA		
Cal Check 1 (NEW, Solid, Effluent Blanks)		0.00, 2.22	
A2 filtered blank		0.05	
B1 ↓		0.21	
B3 ↓		0.07	
C1 ↓ ↓		0.04	
A2 unfiltered blank		3.60	
B1 ↓		2.03	
B3 ↓		3.31	
C1 ↓ ↓		2.41	
Cal Check 2 (NEW, Solid, Effluent Blanks)		0.00, 2.21	
Cal Check 3 (NEW, Solid, Effluent Blanks)			

Comments: _____

QC Check: At 2/1/05

Final Review: [Signature] 2/21/05

Freshwater Chronic Bioassay

Algal Growth Inhibition Worksheet

Client : City of Buenaventura, Internal Test Species: S-capricornutum

Sample ID: A-2, B-1, B-3, C-1, CuCl2 Test Date: 2/1/05

Test No: 0502-039 → 042, 050201 SCF Analyst: AH

Source/Date Stock Culture Started: 1/27/05

Stock Cell Density Measurements: 30.43
30.36 Mean: 30.13
30.07
29.91
29.87

(mean no. * 100,000)/(500,000) = x (dilution factor): 6.03

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 ± 10%.

Inoculum Cell Density Confirmation Counts: 1
1 Mean: 1 (10,000)
1

Test Initiation Time: 16:00

Test Termination Time: 14:00

Comments: _____

QC Check: AH 2/1/05 Final Review: [Signature] 2/24/05

Freshwater Chronic Bioassay

Water Quality Measurements
Algal Growth Inhibition

Test Species: S. capricornutum

Client: City of Buenaventura

Test Date: 2/1/05

Sample ID: A-2, B-1

Start/End Times: 2/8:05 / 16:00 / 1400

Test No: 0502-039, 040

Analyst: AH

Concentration (____%)	Initial Readings				Final Readings	
	D.O. (mg/L)	Conductivity (umhos-cm)	Alkalinity (mg/L)	Hardness (mg/L)	D.O. (mg/L)	Conductivity (umhos-cm)
Lab Control #1	7.0	92	11	11	7.1 9.0	93 92
Salt Control #1 1.3 ppt	7.2	2460	15	229	9.2	2420
A-2 100% filtered	7.9	2150	-	-	9.4	1879
B-1 100% filtered	8.1	2290	-	-	9.3	2180
A-2 100% unfiltered	9.4	2200	227	580	9.2 9.1	1903 1519
B-1 100% unfiltered	9.5	2330	185	542	9.4 9.1	2180 977

		0 Hour	24 Hour ^(a)	48 Hour ^(a)	72 Hour ^(a)	96 Hour ^(a)
pH/Temperature (°C):	Lab Control #1	7.27/25.0	7.64/27.8	7.80/27.8	8.12/26.7	7.63/27.0
pH/Temperature (°C):	Salt Cont #1	7.35/25.0	7.50/28.3	7.91/27.9	8.76/27.1	8.65/27.0
pH/Temperature (°C):	A-2 filt	8.25/25.0	8.63/27.9	8.77/27.7	8.55/27.1	9.09/27.0
pH/Temperature (°C):	B-1 filt	8.04/25.0	8.56/27.8	8.73/27.7	8.98/27.3	9.33/27.0
pH/Temperature (°C):	A-2 un.	8.27/25.0	8.63/27.5	8.48/27.3	8.44/26.9	8.67/27.0
pH/Temperature (°C):	B-1 un.	7.97/25.0	8.69/27.6	8.87/27.6	9.04/27.2	9.28/27.0
pH/Temperature (°C):		1/25.0	1	1	1	1

Comments: @temp. out of range ± 25.0°C, added fans and turned room temp down.

QC Check: AH 2/1/05

Final Review: [Signature] 2/24/05

CETIS Test Summary

Report Date: 24 Feb-05 9:52 AM

Link: 13-1105-5896/0502-040

Selenastrum Growth Test			Nautilus Environmental (CA)					
Test No:	15-8916-2915	Test Type:	Cell Growth	Duration:	94h			
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-013 (2002)	Species:	Selenastrum capricornutum			
Ending Date:	05 Feb-05 02:00 PM	Dil Water:	Nutrient Enriched Water	Source:	In-House Culture			
Setup Date:	01 Feb-05 04:00 PM	Brine:						
Sample No:	06-6653-4431	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 02:30 PM	Code:	0502-040	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	26h	Station:	B-1					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
07-6526-3759	Cell Density	< 101	101	N/A	29.69%	Unequal Variance t		
12-6206-7480		100	> 100	N/A	8.62%	Unequal Variance t		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
07-6526-3759	Cell Density	Control CV	0.00844	N/A - 0.2	Passes acceptability criteria			
12-6206-7480	Cell Density	Control CV	0.00844	N/A - 0.2	Passes acceptability criteria			
07-6526-3759	Cell Density	Control Response	1351000	1000000 - N/A	Passes acceptability criteria			
12-6206-7480	Cell Density	Control Response	1351000	1000000 - N/A	Passes acceptability criteria			
07-6526-3759	Cell Density	MSDp	0.29693	0.091 - 0.29	Fails acceptability criteria			
12-6206-7480	Cell Density	MSDp	0.08615	0.091 - 0.29	Fails acceptability criteria			
Cell Density Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	1.16E+6	9.90E+5	1.29E+6	7.32E+4	1.46E+5	12.59%
0	Salt Control	4	1.35E+6	1.34E+6	1.37E+6	5.70E+3	1.14E+4	0.84%
100		4	2.29E+6	2.24E+6	2.44E+6	4.91E+4	9.83E+4	4.28%
100	<i>not 100% unfiltered</i>	4	7.53E+5	5.15E+5	1.26E+6	1.70E+5	3.41E+5	45.24%
Cell Density Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	1.28E+6	9.90E+5	1.29E+6	1.09E+6			
0	Salt Control	1.34E+6	1.37E+6	1.35E+6	1.35E+6			
100		2.25E+6	2.24E+6	2.44E+6	2.25E+6			
100	<i>not 100% unfiltered</i>	6.45E+5	5.15E+5	5.95E+5	1.26E+6			

CETIS Analysis Detail

Selenastrum Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Comparison	13-1105-5896	13-1105-5896	10 Feb-05 11:09 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed		100	>100	1.00	N/A	8.62%

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control CV	0.00844	N/A - 0.2	Passes acceptability criteria
Control Response	1351000	1000000 - N/A	Passes acceptability criteria
MSDp	0.08615	0.091 - 0.29	Fails acceptability criteria

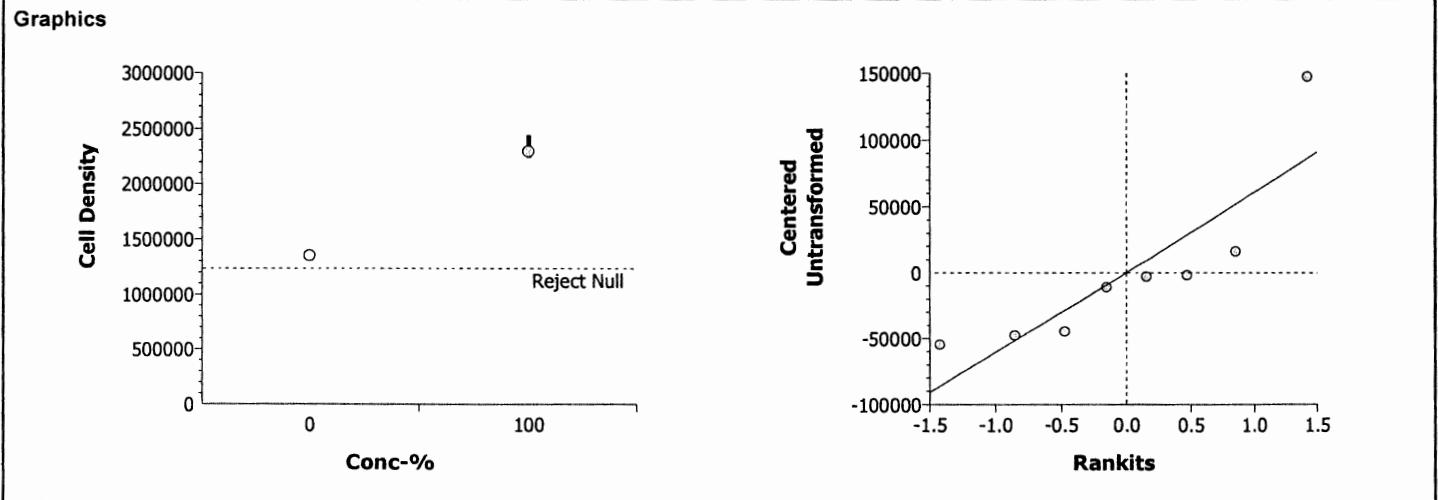
ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	74.26346	47.46723	0.00518	Unequal Variances
Distribution	Shapiro-Wilk W	0.76982	0.74935	0.01647	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	1.778E+12	1.78E+12	1	363.35	0.00000	Significant Effect
Error	2.935E+10	4.89E+09	6			
Total	1.8069E+12	1.782E+12	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-19.062	2.35336	0.9998	116392	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	1.35E+6	1.34E+6	1.37E+6	1.14E+4				
100		4	2.29E+6	2.24E+6	2.44E+6	9.83E+4				

Data Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.34E+6	1.37E+6	1.35E+6	1.35E+6						
100		2.25E+6	2.24E+6	2.44E+6	2.25E+6						



CETIS Analysis Detail

Selenastrum Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Comparison	13-1105-5896	13-1105-5896	10 Feb-05 11:09 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed		<101	101		N/A	29.69%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control CV	0.00844	N/A - 0.2	Passes acceptability criteria
Control Response	1351000	1000000 - N/A	Passes acceptability criteria
MSDp	0.29693	0.091 - 0.29	Fails acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	893.06860	47.46723	0.00013	Unequal Variances
Distribution	Shapiro-Wilk W	0.78675	0.74935	0.02453	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	7.146E+11	7.15E+11	1	12.30	0.01272	Significant Effect
Error	3.487E+11	5.81E+10	6			
Total	1.0633E+12	7.727E+11	7			

Group Comparisons

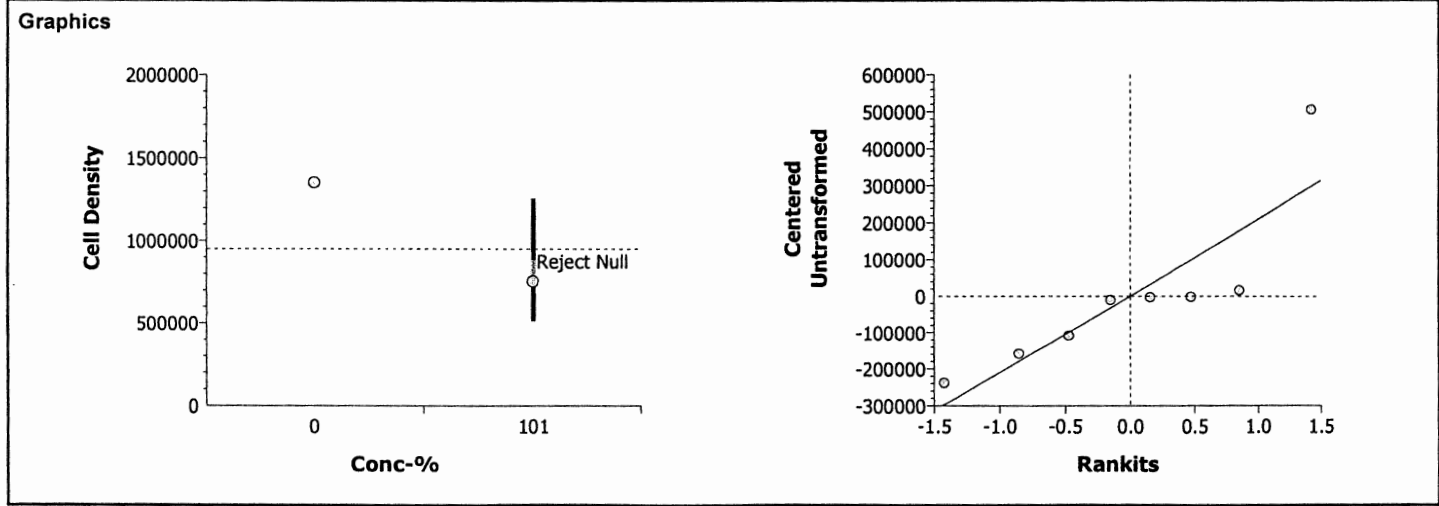
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		101	3.50665	2.35336	0.0196	401159	Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	1.35E+6	1.34E+6	1.37E+6	1.14E+4				
101	100% unfiltered	4	7.53E+5	5.15E+5	1.26E+6	3.41E+5				

Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.34E+6	1.37E+6	1.35E+6	1.35E+6						
101	100% unfiltered	6.45E+5	5.15E+5	5.95E+5	1.26E+6						



CETIS Data Worksheet

Report Date: 01 Feb-05 10:48 AM

Link: 13-1105-5896/0502-040

Selenastrum Growth Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Selenastrum capricornutum Sample Code: 0502-040
 Ending Date: 05 Feb-05 Protocol: EPA/821/R-02-013 (2002) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: B-1

Conc-%	Code	Rep	Pos	Cell Density	Absorbance	Biomass	Chlorophyll a	Notes
0	LC	1	24					
0	LC	2	13					
0	LC	3	21					
0	LC	4	23					
0	SC	1	22					
0	SC	2	14					
0	SC	3	19					
0	SC	4	17					
100		1	20					
100		2	16					
100		3	15					
100		4	18					

Shore
LC#1, SC#1
WA-2

QCAH

Report Date: 24 Feb-05 9:52 AM

Link: 13-4875-1569/0502-041

CETIS Test Summary

Selenastrum Growth Test				Nautilus Environmental (CA)				
Test No:	15-8916-2915	Test Type:	Cell Growth	Duration:	94h	Species:	Selenastrum capricornutum	
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-013 (2002)	Dil Water:	Nutrient Enriched Water	Source:	In-House Culture	
Ending Date:	05 Feb-05 02:00 PM	Brine:						
Setup Date:	01 Feb-05 04:00 PM							
Sample No:	05-4000-1608	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura	Project:		
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-041					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	28h	Station:	B-3					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
03-2370-9554	Cell Density	101	> 101	N/A	18.21%	Equal Variance t		
10-4575-7769		100	> 100	N/A	14.00%	Equal Variance t		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
03-2370-9554	Cell Density	Control CV	0.07221	N/A - 0.2	Passes acceptability criteria			
10-4575-7769	Cell Density	Control CV	0.07221	N/A - 0.2	Passes acceptability criteria			
03-2370-9554	Cell Density	Control Response	1309750	1000000 - N/A	Passes acceptability criteria			
10-4575-7769	Cell Density	Control Response	1309750	1000000 - N/A	Passes acceptability criteria			
03-2370-9554	Cell Density	MSDp	0.18206	0.091 - 0.29	Passes acceptability criteria			
10-4575-7769	Cell Density	MSDp	0.13996	0.091 - 0.29	Passes acceptability criteria			
Cell Density Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	1.14E+6	9.67E+5	1.32E+6	8.19E+4	1.64E+5	14.33%
0	Salt Control	4	1.31E+6	1.21E+6	1.43E+6	4.73E+4	9.46E+4	7.22%
100		4	2.62E+6	2.38E+6	2.73E+6	8.16E+4	1.63E+5	6.24%
100 100% unfiltered		4	1.45E+6	1.30E+6	1.79E+6	1.13E+5	2.26E+5	15.59%
Cell Density Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	1.05E+6	1.24E+6	1.32E+6	9.67E+5			
0	Salt Control	1.32E+6	1.43E+6	1.28E+6	1.21E+6			
100		2.38E+6	2.66E+6	2.73E+6	2.71E+6			
100 100% unfiltered		1.79E+6	1.33E+6	1.30E+6	1.41E+6			

CETIS Analysis Detail

Comparisons: Page 2 of 2
 Report Date: 10 Feb-05 11:18 AM
 Analysis: 10-4575-7769/0502-041

Selenastrum Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Comparison	13-4875-1569	13-4875-1569	10 Feb-05 11:17 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	14.00%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control CV	0.07221	N/A - 0.2	Passes acceptability criteria
Control Response	1309750	1000000 - N/A	Passes acceptability criteria
MSDp	0.13996	0.091 - 0.29	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.97997	47.46723	0.39378	Equal Variances
Distribution	Shapiro-Wilk W	0.90777	0.74935	0.31845	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	3.424E+12	3.42E+12	1	192.39	0.00001	Significant Effect
Error	1.068E+11	1.78E+10	6			
Total	3.5311E+12	3.442E+12	7			

Group Comparisons

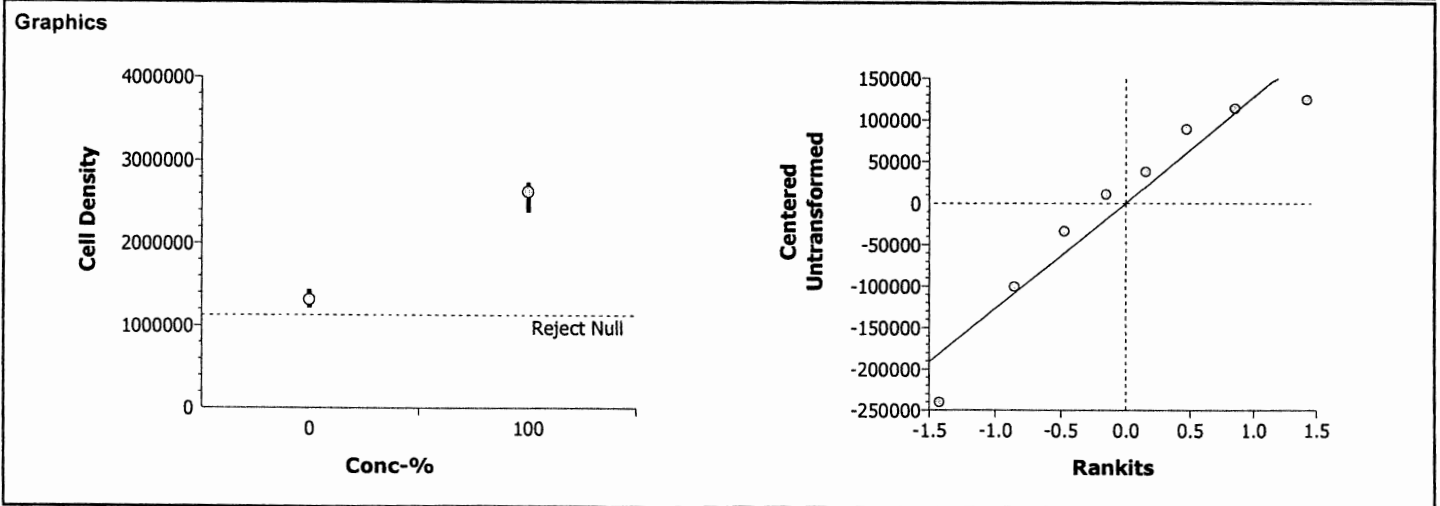
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-13.870	1.94318	1.0000	183314	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	1.31E+6	1.21E+6	1.43E+6	9.46E+4				
100		4	2.62E+6	2.38E+6	2.73E+6	1.63E+5				

Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.32E+6	1.43E+6	1.28E+6	1.21E+6						
100		2.38E+6	2.66E+6	2.73E+6	2.71E+6						



CETIS Analysis Detail

Selenastrum Growth Test					Nautilus Environmental (CA)	
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Comparison	13-4875-1569	13-4875-1569	10 Feb-05 11:18 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		101	>101	0.99	N/A	18.21%

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control CV	0.07221	N/A - 0.2	Passes acceptability criteria
Control Response	1309750	1000000 - N/A	Passes acceptability criteria
MSDp	0.18206	0.091 - 0.29	Passes acceptability criteria

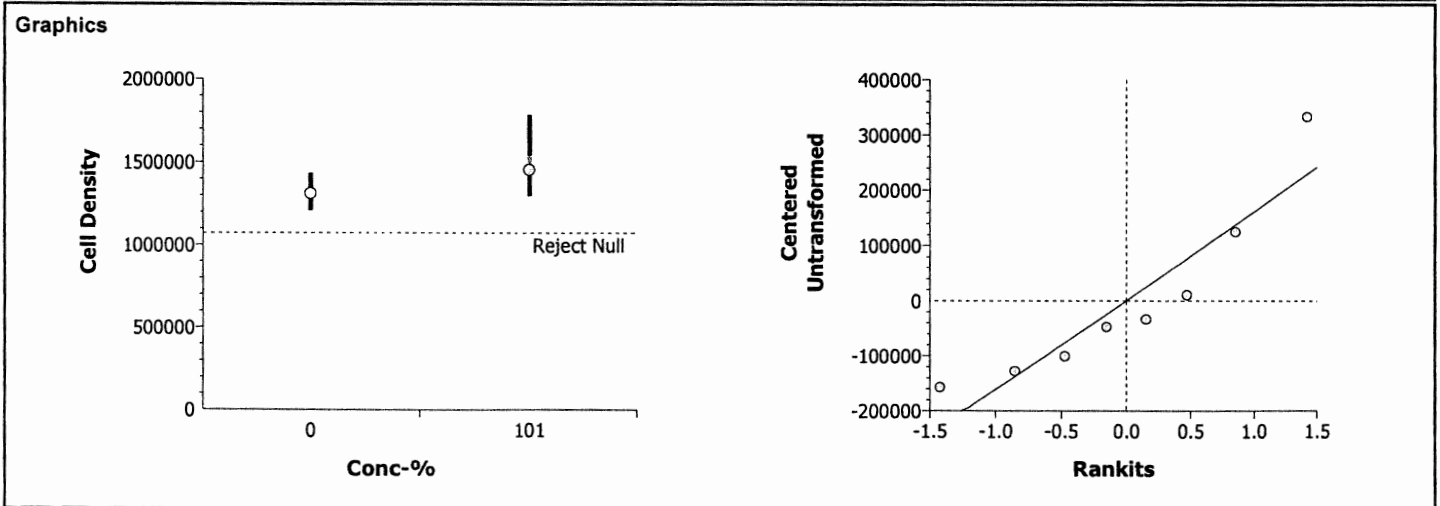
ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	5.73460	47.46723	0.18537	Equal Variances
Distribution	Shapiro-Wilk W	0.86919	0.74935	0.14748	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	4.076E+10	4.08E+10	1	1.35	0.28889	Non-Significant Effect
Error	1.807E+11	3.01E+10	6			
Total	2.2146E+11	7.087E+10	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		101	-1.1633	1.94318	0.8556	238457	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	1.31E+6	1.21E+6	1.43E+6	9.46E+4				
101	100% unfiltered	4	1.45E+6	1.30E+6	1.79E+6	2.26E+5				

Data Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.32E+6	1.43E+6	1.28E+6	1.21E+6						
101	100% unfiltered	1.79E+6	1.33E+6	1.30E+6	1.41E+6						



CETIS Data Worksheet

Report Date: 01 Feb-05 10:46 AM

Link: 13-4875-1569

Selenastrum Growth Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 **Species:** Selenastrum capricornutum **Sample Code:** 0502-041
Ending Date: 05 Feb-05 **Protocol:** EPA/821/R-02-013 (2002) **Sample Source:** City of Buenaventura
Sample Date: 31 Jan-05 **Material:** Estuarine Monitoring Sample **Sample Station:** B-3

Conc-%	Code	Rep	Pos	Cell Density	Absorbance	Biomass	Chlorophyll a	Notes
0	LC	1	33					
0	LC	2	32					
0	LC	3	30					
0	LC	4	35					
0	SC	1	36					
0	SC	2	25					
0	SC	3	34					
0	SC	4	27					
100		1	26					
100		2	29					
100		3	31					
100		4	28					

LC#2
SC#2

QC=AH

Test Species: S. capricornutum

Client : City of Buenaventura

Test Date: 2/1/05

Sample ID: B-3, C-1

Start/End Times: 2/8/05 16:00/14:00

Test No: 0502-041, 042

Analyst: AH

Concentration (<u> </u> %)	Initial Readings				Final Readings	
	D.O. (mg/L)	Conductivity (umhos-cm)	Alkalinity (mg/L)	Hardness (mg/L)	D.O. (mg/L)	Conductivity (umhos-cm)
Lab Control #2	7.1	95	11	11	9.0	93
Salt Control #2 0.7ppt	7.3	1507	17	144	9.2	1519
B-3 100% filtered	7.8	1225	-	-	9.2	2180 977 1514 SH
C-1 100% filtered	8.7	1254 1317 #	-	-	9.4 9.4	1030 977
B-3 100% unfiltered	9.7	1254	213	498	9.1	975
C-1 100% unfiltered	9.8	1325	212	507	9.1	1070

		0 Hour	24 Hour	48 Hour	72 Hour	96 Hour
pH/Temperature (°C):	Lab Control #2	7.72/25.0	7.74/27.1	7.59/27.8	8.31/27.2	7.63/27.0
pH/Temperature (°C):	SC #2	7.50/25.0	7.81/28.0	7.74/27.9	8.93/27.2	8.81/27.0
pH/Temperature (°C):	B-3 filt	8.31/25.0	8.63/28.1	8.75/28.0	8.75/27.4	9.16/27.0
pH/Temperature (°C):	C-1 filt	8.34/25.0	8.63/28.4	8.79/28.1	8.75/27.4	9.13/27.0
pH/Temperature (°C):	B-3 un	8.34/25.0	8.65/28.0	8.57/27.9	8.62/27.2	8.92/27.0
pH/Temperature (°C):	C-1 un	8.30/25.0	8.65/28.5	8.53/27.9	8.56/27.3	8.88/27.0
pH/Temperature (°C):		1	1	1	1	1

Comments: @ Temp. out of range 25.0°C ± 1, added fans + turned room temp down

QC Check: AH 2/10/05

Final Review: [Signature] 2/24/05

CETIS Test Summary

Report Date: 24 Feb-05 9:52 AM

Link: 09-2007-3234/0502-042

Selenastrum Growth Test		Nautilus Environmental (CA)						
Test No:	15-8916-2915	Test Type:	Cell Growth	Duration:	94h			
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-013 (2002)	Species:	Selenastrum capricornutum			
Ending Date:	05 Feb-05 02:00 PM	Dil Water:	Nutrient Enriched Water	Source:	In-House Culture			
Setup Date:	01 Feb-05 04:00 PM	Brine:						
Sample No:	18-2531-6202	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 08:45 AM	Code:	0502-042	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	31h	Station:	C-1					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
03-9845-2945	Cell Density	101	> 101	N/A	37.67%	Equal Variance t		
11-0764-3373		100	> 100	N/A	8.59%	Equal Variance t		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
03-9845-2945	Cell Density	Control CV	0.07221	N/A - 0.2	Passes acceptability criteria			
11-0764-3373	Cell Density	Control CV	0.07221	N/A - 0.2	Passes acceptability criteria			
03-9845-2945	Cell Density	Control Response	1309750	1000000 - N/A	Passes acceptability criteria			
11-0764-3373	Cell Density	Control Response	1309750	1000000 - N/A	Passes acceptability criteria			
03-9845-2945	Cell Density	MSDp	0.3767	0.091 - 0.29	Fails acceptability criteria			
11-0764-3373	Cell Density	MSDp	0.08587	0.091 - 0.29	Fails acceptability criteria			
Cell Density Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	1.14E+6	9.67E+5	1.32E+6	8.19E+4	1.64E+5	14.33%
0	Salt Control	4	1.31E+6	1.21E+6	1.43E+6	4.73E+4	9.46E+4	7.22%
100		4	2.62E+6	2.59E+6	2.72E+6	3.34E+4	6.68E+4	2.54%
100	<i>100% unfiltered</i>	4	1.19E+6	8.36E+5	1.92E+6	2.49E+5	4.99E+5	42.02%
Cell Density Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	1.32E+6	1.24E+6	9.67E+5	1.05E+6			
0	Salt Control	1.28E+6	1.32E+6	1.43E+6	1.21E+6			
100		2.72E+6	2.59E+6	2.60E+6	2.59E+6			
100	<i>100% unfiltered</i>	9.19E+5	1.07E+6	1.92E+6	8.36E+5			

CETIS Analysis Detail

Selenastrum Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Comparison	09-2007-3234	09-2007-3234	10 Feb-05 11:22 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	8.59%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control CV	0.07221	N/A - 0.2	Passes acceptability criteria
Control Response	1309750	1000000 - N/A	Passes acceptability criteria
MSDp	0.08587	0.091 - 0.29	Fails acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.00682	47.46723	0.58177	Equal Variances
Distribution	Shapiro-Wilk W	0.88435	0.74935	0.20071	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	3.456E+12	3.46E+12	1	515.75	0.00000	Significant Effect
Error	4.020E+10	6.70E+09	6			
Total	3.4960E+12	3.463E+12	7			

Group Comparisons

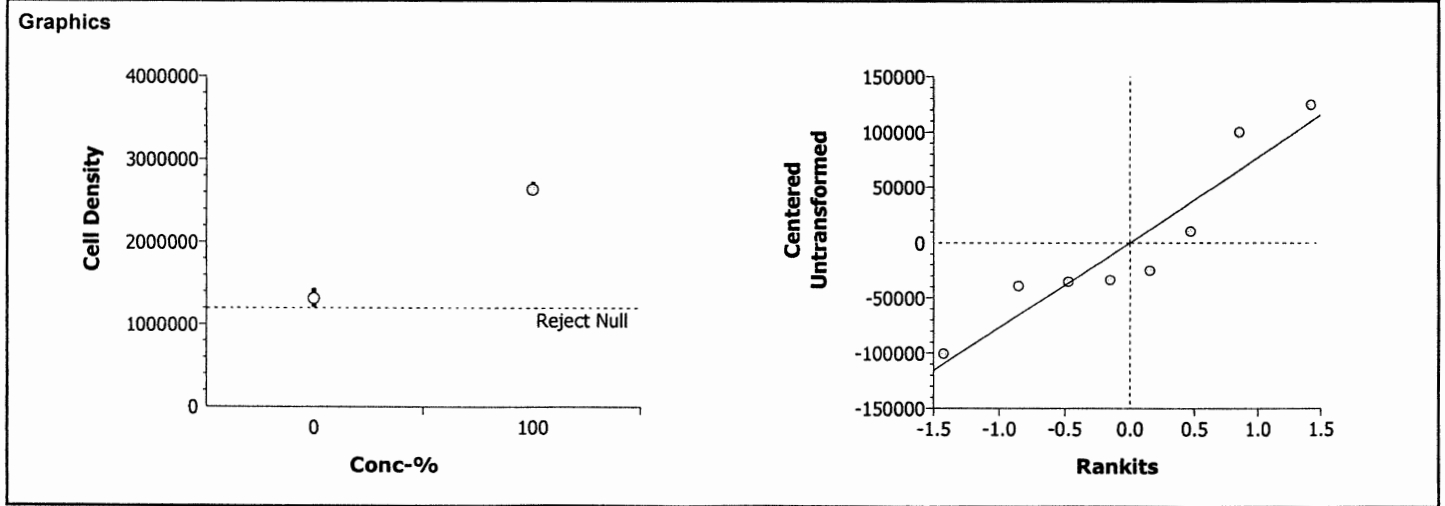
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-22.710	1.94318	1.0000	112475	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	1.31E+6	1.21E+6	1.43E+6	9.46E+4				
100		4	2.62E+6	2.59E+6	2.72E+6	6.68E+4				

Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.28E+6	1.32E+6	1.43E+6	1.21E+6						
100		2.72E+6	2.59E+6	2.60E+6	2.59E+6						



CETIS Analysis Detail

Selenastrum Growth Test						Nautilus Environmental (CA)
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Comparison	09-2007-3234	09-2007-3234	10 Feb-05 11:22 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		101	>101	0.99	N/A	37.67%

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control CV	0.07221	N/A - 0.2	Passes acceptability criteria
Control Response	1309750	1000000 - N/A	Passes acceptability criteria
MSDp	0.3767	0.091 - 0.29	Fails acceptability criteria

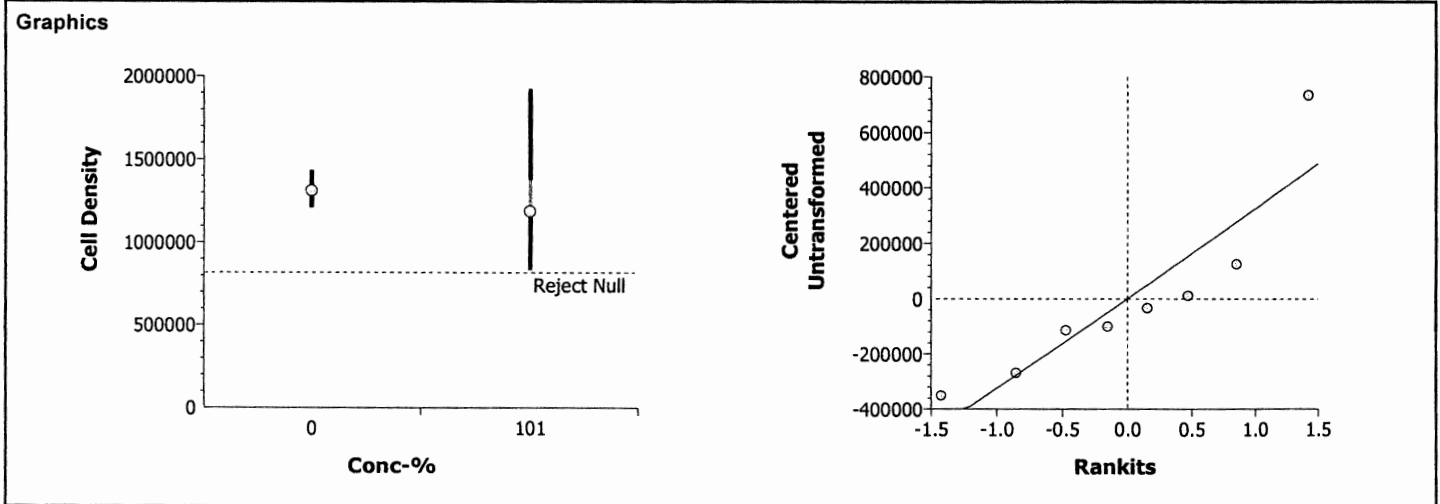
ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	27.83080	47.46723	0.02170	Equal Variances
Distribution	Shapiro-Wilk W	0.84035	0.74935	0.08059	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	3.001E+10	3.00E+10	1	0.23	0.64657	Non-Significant Effect
Error	7.736E+11	1.29E+11	6			
Total	8.0362E+11	1.589E+11	7			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		101	0.48247	1.94318	0.3233	493382	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	4	1.31E+6	1.21E+6	1.43E+6	9.46E+4				
101	100% unfiltered	4	1.19E+6	8.36E+5	1.92E+6	4.99E+5				

Data Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.28E+6	1.32E+6	1.43E+6	1.21E+6						
101	100% unfiltered	9.19E+5	1.07E+6	1.92E+6	8.36E+5						



CETIS Data Worksheet

Report Date: 01 Feb-05 10:51 AM
 Link: 09-2007-3234/0502-042

Selenastrum Growth Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: *Selenastrum capricornutum* Sample Code: 0502-042
 Ending Date: 05 Feb-05 Protocol: EPA/821/R-02-013 (2002) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: C-1

Conc-%	Code	Rep	Pos	Cell Density	Absorbance	Biomass	Chlorophyll a	Notes
0	LC	1	39					
0	LC	2	40					
0	LC	3	47					
0	LC	4	43					
0	SC	1	42					
0	SC	2	48					
0	SC	3	38					
0	SC	4	41					
100		1	37					
100		2	44					
100		3	46					
100		4	45					

*Share
LC, SC #2
w/B-3*

QCAH

MARINE

A. AFFINIS

CETIS Test Summary

Report Date: 24 Feb-05 11:42 AM

Link: 05-7289-1881/0502-015

Pacific Topsmelt 7-d Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	08-1113-5423	Test Type:	Growth-Survival (7d)	Duration:	6d 21h				
Start Date:	01 Feb-05 02:00 PM	Protocol:	EPA/600/R-95/136 (1995)	Species:	Atherinops affinis				
Ending Date:	08 Feb-05 11:20 AM	Dil Water:	Laboratory Seawater	Source:	Aquatic Biosystems, CO				
Setup Date:	01 Feb-05 02:00 PM	Brine:	Forty Fathoms						
Sample No:	09-9033-0917	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura				
Sample Date:	31 Jan-05 03:20 PM	Code:	0502-015	Project:					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	23h	Station:	A-2						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
14-5961-1816	7d Proportion Survived	100	> 100	N/A	11.84%	Steel's Many-One Rank			
12-2235-6839	Mean Dry Biomass-mg	100	> 100	N/A	13.00%	Dunnett's Multiple Comparison			
Test Acceptability									
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision				
14-5961-1816	7d Proportion Survived	Control Response	0.96000	0.8 - N/A	Passes acceptability criteria				
12-2235-6839	Mean Dry Biomass-mg	Control Response	1.1692	0.85 - N/A	Passes acceptability criteria				
14-5961-1816	7d Proportion Survived	MSDp	0.11836	N/A - 0.25	Passes acceptability criteria				
12-2235-6839	Mean Dry Biomass-mg	MSDp	0.12996	N/A - 0.5	Passes acceptability criteria				
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
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	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
69		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 Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	1.26800	1.14200	1.40400	0.05113	0.11432	9.02%	
0	Salt Control	5	1.16920	1.09800	1.28000	0.03215	0.07190	6.15%	
25		5	1.14520	0.99800	1.30000	0.05453	0.12192	10.65%	
50		5	1.20920	1.09400	1.27800	0.03302	0.07385	6.11%	
69		5	1.21040	1.10600	1.31000	0.04409	0.09859	8.15%	
100		5	1.13000	0.93600	1.25200	0.06220	0.13909	12.31%	
7d Proportion Survived Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000			
0	Salt Control	0.80000	1.00000	1.00000	1.00000	1.00000			
25		1.00000	1.00000	1.00000	1.00000	1.00000			
50		1.00000	1.00000	1.00000	1.00000	1.00000			
69		0.80000	1.00000	1.00000	1.00000	1.00000			
100		0.80000	0.80000	1.00000	1.00000	1.00000			
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.40400	1.32800	1.31000	1.15600	1.14200			
0	Salt Control	1.11400	1.18600	1.09800	1.16800	1.28000			
25		1.06200	1.13800	1.22800	0.99800	1.30000			
50		1.27800	1.20400	1.09400	1.27000	1.20000			
69		1.11000	1.22800	1.10600	1.31000	1.29800			
100		1.03000	0.93600	1.21000	1.25200	1.22200			

CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	05-7289-1881	05-7289-1881	15 Feb-05 1:06 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		100	>100	1.00	N/A	11.84%

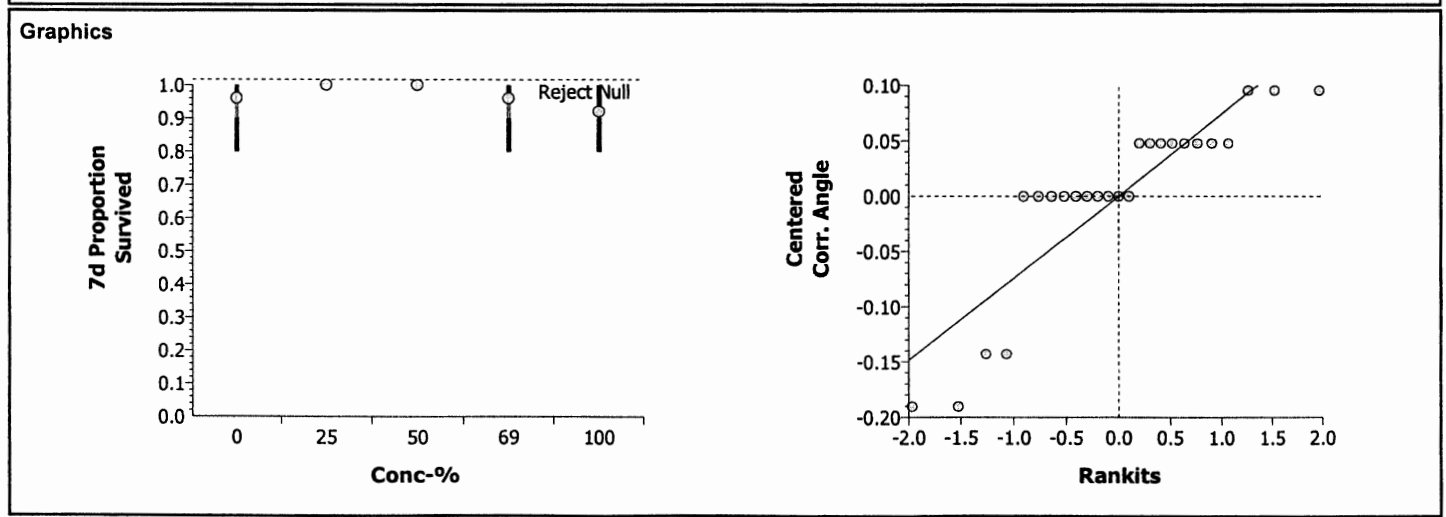
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.96000	0.8 - N/A	Passes acceptability criteria
MSDp	0.11836	N/A - 0.25	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.72000	4.43069	0.18510	Equal Variances
Distribution	Shapiro-Wilk W	0.78117	0.88746	0.00005	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0317564	0.007939	4	1.00	0.43068	Non-Significant Effect
Error	0.1587821	0.007939	20			
Total	0.19053853	0.0158782	24			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		25	30	17	> 0.0500	1	Non-Significant Effect
		50	30	17	> 0.0500	1	Non-Significant Effect
		69	27.5	17	> 0.0500	2	Non-Significant Effect
		100	25	17	> 0.0500	2	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	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	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00020
69		5	0.96000	0.80000	1.00000	0.08944	1.29766	1.10715	1.34528	0.10650
100		5	0.92000	0.80000	1.00000	0.10954	1.25003	1.10715	1.34528	0.13043



CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	05-7289-1881	05-7289-1881	15 Feb-05 1:06 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	13.00%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	1.1692	0.85 - N/A	Passes acceptability criteria
MSDp	0.12996	N/A - 0.5	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	2.45129	13.27671	0.65338	Equal Variances
Distribution	Shapiro-Wilk W	0.95322	0.88746	0.30617	Normal Distribution

ANOVA Table

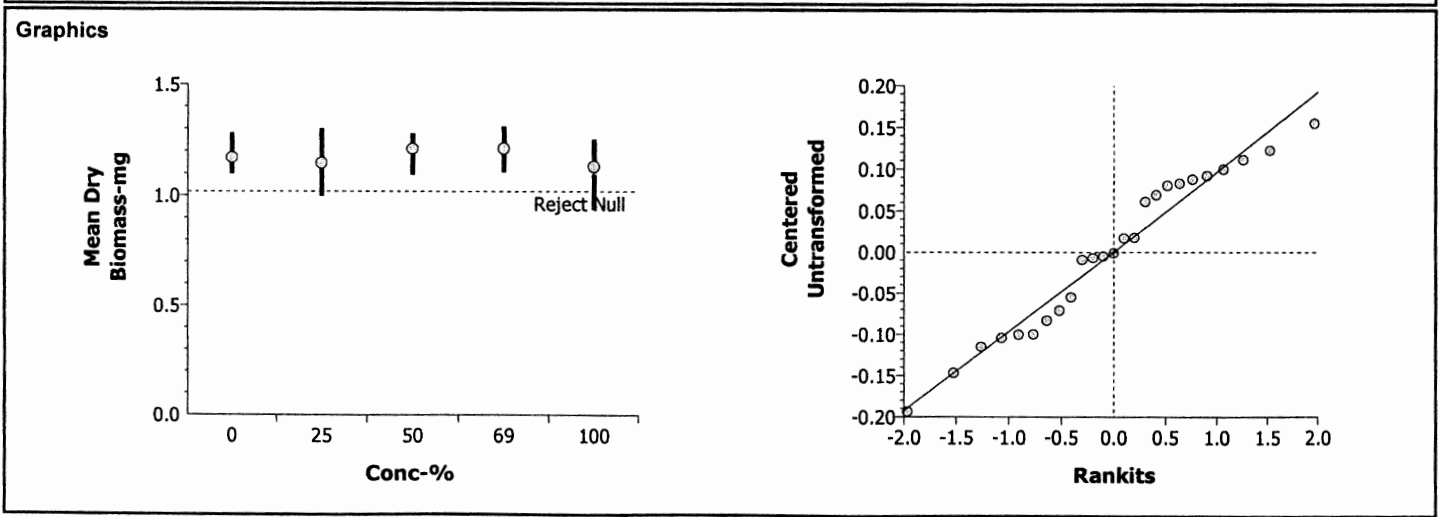
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0267264	0.006682	4	0.61	0.65858	Non-Significant Effect
Error	0.2182172	0.010911	20			
Total	0.24494356	0.0175925	24			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	0.36329	2.3	> 0.0500	0.15195	Non-Significant Effect
		50	-0.6055	2.3	> 0.0500	0.15195	Non-Significant Effect
		69	-0.6236	2.3	> 0.0500	0.15195	Non-Significant Effect
		100	0.59337	2.3	> 0.0500	0.15195	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	1.16920	1.09800	1.28000	0.07190				
25		5	1.14520	0.99800	1.30000	0.12192				
50		5	1.20920	1.09400	1.27800	0.07385				
69		5	1.21040	1.10600	1.31000	0.09859				
100		5	1.13000	0.93600	1.25200	0.13909				



Marine Chronic Bioassay

Larval Fish Survival & Weights

Client Name: City of Buenaventura

Test Species: A. affinis

Sample ID: A-2

Start Date/Time: 2/1/2005 / 1400

Test No.: 0502-015

End Date/Time: 2/8/2005 / 1120
0920
0944

Conc. (μg/L)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + fish (g)
		0	1	2	3	4	5	6	7			
Lab cont. #1	a	5	5	5	5	5	5	5	5	100	0.03403	0.04105
	b	5	5	5	5	5	5	3	5	100	0.03608	0.04272
	c	5	5	5	5	5	5	5	5	100	0.02188	0.03443
	d	5	5	5	5	5	5	5	5	100	0.02987	0.03565
	e	5	5	5	5	5	5	5	5	100	0.02909	0.03480
Salt Cont. #1	a	5	3	4	4	4	4	4	4	80	0.02799	0.03356
	b	5	5	5	5	5	5	5	5	100	0.02531	0.03279
	c	5	5	5	5	5	5	5	5	100	0.02926	0.03475
	d	5	5	5	5	5	5	5	5	100	0.02626	0.03210
	e	5	5	5	5	5	5	5	5	100	0.02451	0.03091
25	a	5	5	5	5	5	5	5	5	100	0.03939	0.04470
	b	5	5	5	5	5	5	5	5	100	0.02980	0.03549
	c	5	5	5	5	5	5	5	5	100	0.02771	0.03385
	d	5	5	5	5	5	5	5	5	100	0.02916	0.03415
	e	5	5	5	5	5	5	5	5	100	0.02468	0.03118
50	a	5	5	5	5	5	5	5	5	100	0.02750	0.03389
	b	5	5	5	5	5	5	5	5	100	0.02710	0.03312
	c	5	5	5	5	5	5	5	5	100	0.02407	0.02954
	d	5	5	5	5	5	5	5	5	100	0.02337	0.02574
	e	5	5	5	5	5	5	5	5	100	0.02481	0.03081
69	a	5	5	4	4	4	4	4	4	80	0.02698	0.03253
	b	5	5	5	5	5	5	5	5	100	0.02437	0.03051
	c	5	5	5	5	5	5	5	5	100	0.02340	0.02893
	d	5	5	5	5	5	5	5	5	100	0.02157	0.02812
	e	5	5	5	5	5	5	5	5	100	0.02385	0.03034
100	a	5	5	4	4	4	4	4	4	80	0.02512	0.03027
	b	5	5	5	4	4	4	4	4	80	0.02367	0.02835
	c	5	5	5	5	5	5	5	5	100	0.02884	0.03489
	d	5	5	5	5	5	5	5	5	100	0.02820	0.03446
	e	5	5	5	5	5	5	5	5	100	0.02466	0.03077
/	a	5										
	b	5										
	c	5										
	d	5										
	e	5										

Tech Initials: FR FR FR SH MC SA SA YR

Feeding Times (day):

	0	1	2	3	4	5	6
—	0830	0830	0815	0710	1600	0915	
1730	1600	1545	1530	1430	1400	1530	

Weight Data:
 Date/Time in: 2-8-05/1120
 Date/Time out: 2-10-05/1315
 Oven Temp (°C): 64.2 ± 0.6 °C
 Tech Initials: FR

Comments: _____

QC Check: AH 2/15/05
 Final Review: [Signature] 2/24/05

Client: City of Buenaventura

Test Species: A. affinis

Sample ID: A-2

Start Date/Time: 2/1/2005 11400

Test No: 0502-015

End Date/Time: 2/8/2005 1120
19:44

Concentration	Lab Control #1							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.00	8.05	7.93	8.04	7.96	8.00	8.05	
DO (mg/L)	8.4	8.2	8.0	8.1	8.0	7.9	8.1	
Salinity (ppt)	30.0	29.7	29.5	30.4	30.7	30.3	30.1	
Temp (°C)	20.0	20.8	20.3	20.6	20.4	20.5	19.6	
Final								
pH		7.83	7.79	7.78	7.68	7.67	7.61	7.48
DO (mg/L)		8.2	6.9	6.5	6.1	5.2	5.1	4.4
Temp (°C)		25.4 20.0	19.4	19.1	19.5	19.5	19.5	19.9

Concentration	50%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.62	8.35	8.32	8.37	8.31	8.35	8.28	
DO (mg/L)	8.0	6.8	6.9	6.8	7.0	6.7	6.2	
Salinity (ppt)	30.5	30.5	29.9	29.1	29.4	31.0	30.9	
Temp (°C)	20.4	20.7	20.7	20.9	20.5	20.8	19.9	
Final								
pH		8.44	8.17	8.18	8.08	8.15	8.14	8.05
DO (mg/L)		6.9	6.3	6.0	5.6	5.8	5.5	5.4
Temp (°C)		25.4 19.8	19.8	19.2	19.5	19.5	19.4	20.0

Concentration	Salt Control #1							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.47	8.33	8.47	8.17	8.21	8.19	8.22	
DO (mg/L)	7.7	6.7	7.6	7.4	7.7	7.7	7.1	
Salinity (ppt)	30.2	29.6	29.4	29.2	29.3	30.6	30.5	
Temp (°C)	20.0	20.4	20.1	20.3	20.4	20.2	20.0	
Final								
pH		8.47	7.92	7.92	7.65	7.62	7.72	7.74
DO (mg/L)		7.5	6.2	6.2	6.0	5.9	5.1	5.4
Temp (°C)		25.2 19.6	19.7	19.1	19.5	19.5	19.4	20.0

Concentration	69%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.55	8.35	8.27	8.35	8.31	8.37	8.30	
DO (mg/L)	8.2	6.9	6.6	6.6	6.7	6.3	6.0	
Salinity (ppt)	30.5	30.6	30.1	29.1	29.5	31.0	31.0	
Temp (°C)	20.5	20.9	20.9	20.8	20.8	20.9	20.0	
Final								
pH		8.42	8.23	8.23	8.16	8.22	8.22	8.09
DO (mg/L)		7.0	6.2	5.8	6.2	5.8	5.6	5.1
Temp (°C)		25.2 19.9	19.7	19.2	19.5	19.5	19.3	19.9

Concentration	25%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.75	8.54	8.39	8.39	8.36	8.29	8.26	
DO (mg/L)	7.9	6.6	7.3	7.1	7.3	7.7	6.8	
Salinity (ppt)	30.5	30.4	29.7	29.2	29.3	30.8	30.5	
Temp (°C)	20.0	20.4	20.3	20.6	20.5	20.5	20.0	
Final								
pH		8.44	8.05	8.01	7.97	7.98	7.96	7.92
DO (mg/L)		7.0	6.5	5.8	5.7	5.5	5.4	6.0
Temp (°C)		25.2 19.8	19.8	19.2	19.5	19.5	19.4	20.0

Concentration	100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.47	8.36	8.23	8.34	8.29	8.39	8.33	
DO (mg/L)	8.8	7.9	6.1	6.2	6.4	6.6	6.0	
Salinity (ppt)	30.5	30.7	30.3	29.0	29.5	29.3	30.6	
Temp (°C)	20.0	20.9	20.9	20.9	20.8	20.9	19.5	
Final								
pH		8.40	8.28	8.25	8.21	8.29	8.31	8.25
DO (mg/L)		7.0	6.1	5.5	6.1	6.0	5.9	5.6
Temp (°C)		25.0 19.9	19.8	19.2	19.5	19.5	19.4	19.7

Animal Source/Date Received: ABS / 1-29-05

Analysts: Initial: SD SD SD SH MC SD SD

Animal Age at Initiation: 13 days

Analysts: Final: 4R SD SH MC SD Rb SD

Comments:

QC Check: At 2/15/05

Final Review: [Signature] 2/24/05

CETIS Test Summary

Report Date: 24 Feb-05 11:47 AM

Link: 09-5145-7631/0502-016

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)

Test No: 08-1113-5423	Test Type: Growth-Survival (7d)	Duration: 6d 21h
Start Date: 01 Feb-05 02:00 PM	Protocol: EPA/600/R-95/136 (1995)	Species: Atherinops affinis
Ending Date: 08 Feb-05 11:20 AM	Dil Water: Laboratory Seawater	Source: Aquatic Biosystems, CO
Setup Date: 01 Feb-05 02:00 PM	Brine: Forty Fathoms	

Sample No: 20-0757-1800	Material: Estuarine Monitoring Sample	Client: City of Buenaventura
Sample Date: 31 Jan-05 02:30 PM	Code: 0502-016	Project:
Receive Date: 31 Jan-05 10:10 PM	Source: City of Buenaventura	
Sample Age: 24h	Station: B-1	

Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method
12-3768-8576	7d Proportion Survived	100	> 100	N/A	10.36%	Steel's Many-One Rank
12-1539-4690	Mean Dry Biomass-mg	100	> 100	N/A	9.59%	Dunnett's Multiple Comparison

Test Acceptability					
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision
12-3768-8576	7d Proportion Survived	Control Response	0.96000	0.8 - N/A	Passes acceptability criteria
12-1539-4690	Mean Dry Biomass-mg	Control Response	1.1692	0.85 - N/A	Passes acceptability criteria
12-3768-8576	7d Proportion Survived	MSDp	0.10358	N/A - 0.25	Passes acceptability criteria
12-1539-4690	Mean Dry Biomass-mg	MSDp	0.09592	N/A - 0.5	Passes acceptability criteria

7d Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
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%
69		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%

Mean Dry Biomass-mg Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	1.26800	1.14200	1.40400	0.05113	0.11432	9.02%
0	Salt Control	5	1.16920	1.09800	1.28000	0.03215	0.07190	6.15%
25		5	1.15960	1.07800	1.20200	0.02316	0.05180	4.47%
50		5	1.03080	0.86400	1.16000	0.05044	0.11279	10.94%
69		5	1.17720	1.10600	1.25000	0.02347	0.05249	4.46%
100		5	1.21400	1.13000	1.34200	0.03576	0.07996	6.59%

7d Proportion Survived Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000
0	Salt Control	0.80000	1.00000	1.00000	1.00000	1.00000
25		1.00000	1.00000	1.00000	1.00000	1.00000
50		0.80000	1.00000	0.80000	1.00000	1.00000
69		1.00000	1.00000	1.00000	1.00000	1.00000
100		1.00000	1.00000	1.00000	1.00000	1.00000

Mean Dry Biomass-mg Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	1.40400	1.32800	1.31000	1.15600	1.14200
0	Salt Control	1.11400	1.18600	1.09800	1.16800	1.28000
25		1.14000	1.20200	1.19800	1.07800	1.18000
50		1.01400	1.10600	0.86400	1.16000	1.01000
69		1.10600	1.15800	1.19400	1.17800	1.25000
100		1.20400	1.17000	1.34200	1.13000	1.22400

CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	09-5145-7631	05-7289-1881	15 Feb-05 1:19 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		100	>100	1.00	N/A	10.36%

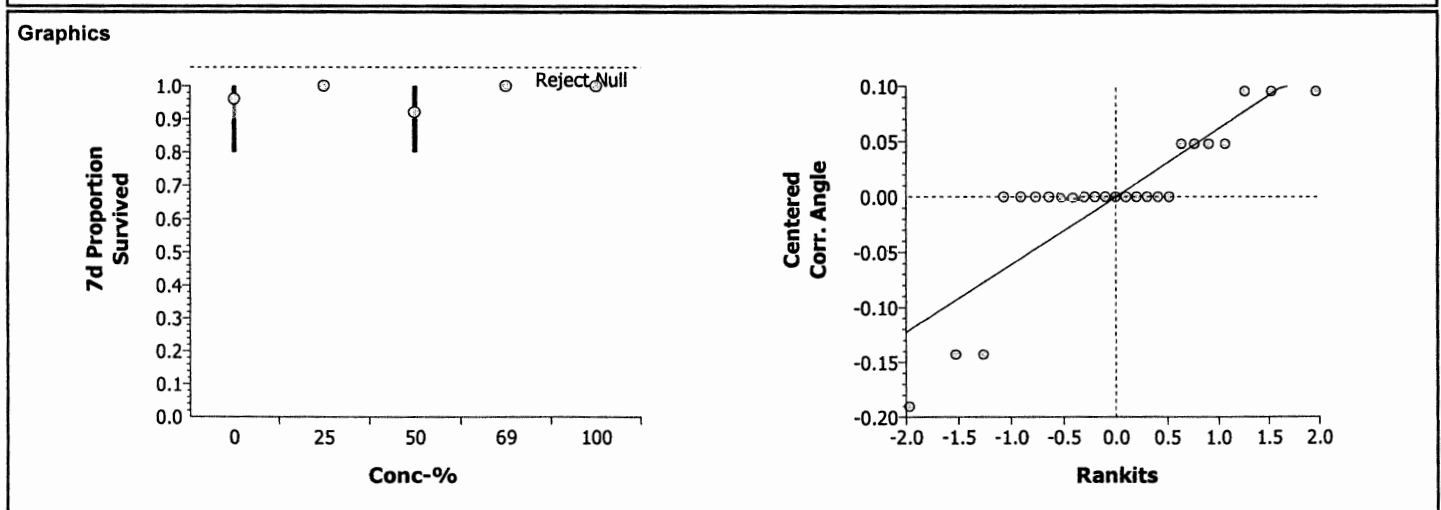
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.96000	0.8 - N/A	Passes acceptability criteria
MSDp	0.10358	N/A - 0.25	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	2.54286	4.43069	0.07160	Equal Variances
Distribution	Shapiro-Wilk W	0.75773	0.88746	0.00002	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0362931	0.009073	4	1.60	0.21322	Non-Significant Effect
Error	0.1134158	0.005671	20			
Total	0.14970886	0.0147441	24			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		25	30	17	> 0.0500	1	Non-Significant Effect
		50	25	17	> 0.0500	2	Non-Significant Effect
		69	30	17	> 0.0500	1	Non-Significant Effect
		100	30	17	> 0.0500	1	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	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
69		5	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00020
100		5	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00020



CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	09-5145-7631	05-7289-1881	15 Feb-05 1:19 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	9.59%

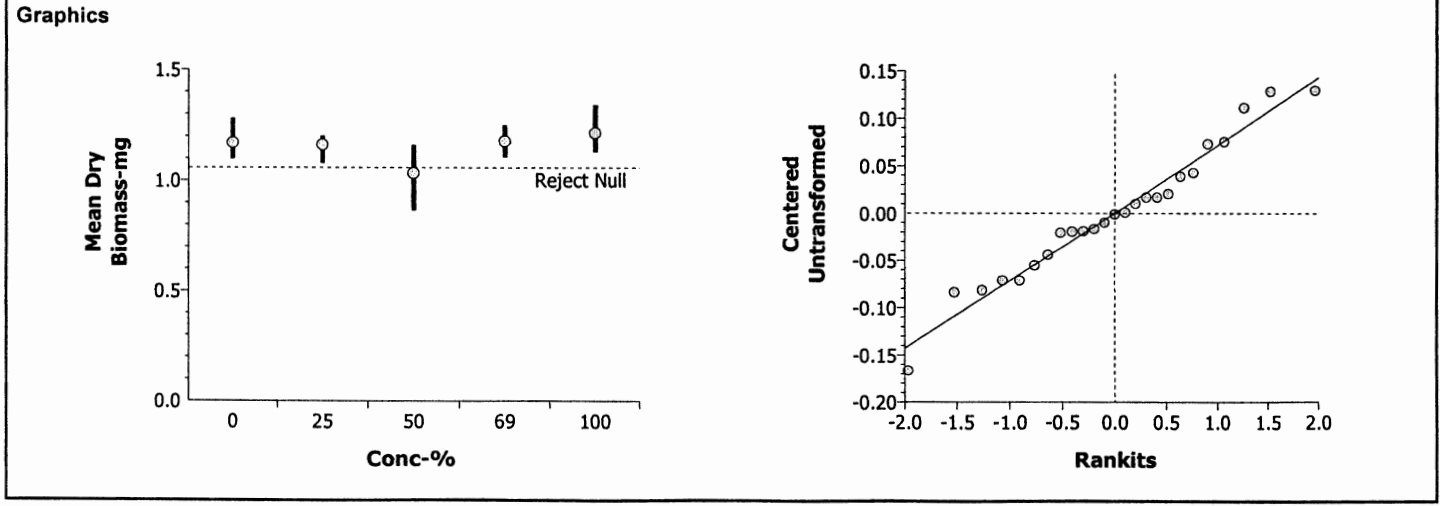
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	1.1692	0.85 - N/A	Passes acceptability criteria
MSDp	0.09592	N/A - 0.5	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	3.16587	13.27671	0.53046	Equal Variances
Distribution	Shapiro-Wilk W	0.97109	0.88746	0.67034	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0975256	0.024381	4	4.10	0.01379	Significant Effect
Error	0.1188896	0.005944	20			
Total	0.21641517	0.0303259	24			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	0.19687	2.3	> 0.0500	0.11215	Non-Significant Effect
		50	2.83824	2.3	<= 0.0500	0.11215	Significant Effect
		69	-0.1641	2.3	> 0.0500	0.11215	Non-Significant Effect
		100	-0.9187	2.3	> 0.0500	0.11215	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	1.16920	1.09800	1.28000	0.07190				
25		5	1.15960	1.07800	1.20200	0.05180				
50		5	1.03080	0.86400	1.16000	0.11279				
69		5	1.17720	1.10600	1.25000	0.05249				
100		5	1.21400	1.13000	1.34200	0.07996				



Marine Chronic Bioassay

Larval Fish Survival & Weights

Client Name: City of Buenaventura

Test Species: A. affinis

Sample ID: B-1

Start Date/Time: 2/1/2005 / 1400

Test No.: 0502-016

End Date/Time: 2/8/2005 / 1120
~~1000~~
~~0900~~

Conc. (μ /L)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + fish (g)
		0	1	2	3	4	5	6	7			
25	a	5	5	5	5	5	5	5	5	100	0.02492	0.03062
	b	5	5	5	5	5	5	5	5	100	0.02633	0.03234
	c	5	5	5	5	5	5	5	5	100	0.02302	0.02901
	d	5	5	5	5	5	5	5	5	100	0.02395	0.02934
	e	5	5	5	5	5	5	5	5	100	0.02686	0.03276
50	a	5	5	4	4	4	4	4	4	80	0.03320	0.03827
	b	5	5	5	5	5	5	5	5	100	0.02324	0.02877
	c	5	5	4	4	4	4	4	4	80	0.03228	0.03660
	d	5	5	5	5	5	5	5	5	100	0.03534	0.04114
	e	5	5	5	5	5	5	5	5	100	0.02671	0.03176
69	a	5	5	5	5	5	5	5	5	100	0.02814	0.03367
	b	5	5	5	5	5	5	5	5	100	0.02195	0.02774
	c	5	5	5	5	5	5	5	5	100	0.02502	0.03099
	d	5	5	5	5	5	5	5	5	100	0.02773	0.03362
	e	5	5	5	5	5	5	5	5	100	0.02337	0.02962
100	a	5	5	5	5	5	5	5	5	100	0.02317	0.02919
	b	5	5	5	5	5	5	5	5	100	0.02498	0.03083
	c	5	5	5	5	5	5	5	5	100	0.02459	0.03130
	d	5	5	5	5	5	5	5	5	100	0.02492	0.03057
	e	5	5	5	5	5	5	5	5	100	0.02379	0.02991
	a											
	b											
	c											
	d											
	e											
	a											
	b											
	c											
	d											
	e											

Tech Initials: PR PR PR SH MC SD SA HAYR

Feeding Times (day):

	0	1	2	3	4	5	6
—		0830	0830	0815	0710	1600	0915
PSD	1600	1745	1530	1430	1900	1530	

Weight Data:
 Date/Time in: 2-8-05/1120
 Date/Time out: 2-10-05/1315
 Oven Temp (°C): 64°
 Tech Initials: HA

Comments: See A-2 for Lab and Salt control data

QC Check: AK 2/15/05
 Final Review: WJA 2/24/05

Client: City of Buenaventura
 Sample ID: B-1
 Test No: 0502-016

Test Species: A. affinis
 Start Date/Time: 2/1/2005 11400
 End Date/Time: 2/8/2005 1120

Concentration	25%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.72	8.55	8.38	8.36	8.34	8.27	8.29	
DO (mg/L)	7.9	6.7	7.2	6.6	7.1	7.6	7.1	
Salinity (ppt)	30.2	30.3	29.5	29.6	29.5	30.3	30.1	
Temp (°C)	20.3	20.9	20.5	20.8	20.6	20.3	19.3	
Final								
pH		8.44	8.05	8.02	7.97	8.97	7.98	8.01
DO (mg/L)		6.9	6.1	5.5	6.0	6.0	6.0	6.0
Temp (°C)		19.9	19.8	19.3	19.6	19.3	19.5	19.9

Concentration	100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.44	8.35	8.22	8.38	8.29	8.35	8.29	
DO (mg/L)	8.5	7.8	5.9	7.0	7.2	6.6	7.1	
Salinity (ppt)	30.2	30.7	29.5	29.3	29.9	31.9	31.3	
Temp (°C)	20.5	20.9	20.9	20.5	20.7	20.8	19.3	
Final								
pH		8.36	8.25	8.21	8.16	8.23	8.23	8.19
DO (mg/L)		6.7	6.1	5.3	5.8	6.6	6.1	6.0
Temp (°C)		19.9	19.5	19.3	19.5	19.5	19.4	19.9

Concentration	50%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.61	8.55	8.32	8.39	8.31	8.31	8.31	
DO (mg/L)	8.1	6.8	6.8	7.0	7.1	7.3	6.1	
Salinity (ppt)	30.2	30.3	29.6	29.4	29.7	31.0	31.1	
Temp (°C)	20.1	20.9	20.9	20.8	20.6	20.3	19.3	
Final								
pH		8.41	8.05	8.11	8.05	8.10	8.09	8.05
DO (mg/L)		6.7	6.4	5.7	6.2	6.0	6.1	6.0
Temp (°C)		19.8	19.8	19.3	19.5	19.4	19.5	20.0

Concentration								
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Salinity (ppt)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Concentration	69%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.55	8.35	8.28	8.38	8.31	8.33	8.31	
DO (mg/L)	8.4	7.1	6.4	6.9	7.0	7.0	6.8	
Salinity (ppt)	30.1	30.5	29.8	29.5	29.7	31.7	31.1	
Temp (°C)	20.0	20.9	20.8	20.8	20.7	20.0	19.3	
Final								
pH		8.39	8.18	8.15	8.10	8.17	8.16	8.16
DO (mg/L)		6.8	6.3	5.8	6.0	6.1	6.2	6.0
Temp (°C)		19.8	19.7	19.4	19.5	19.4	19.5	19.9

Concentration								
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Salinity (ppt)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Animal Source/Date Received: ABS / 1-29-05

Analysts: Initial: SD SH MC SD SD

Animal Age at Initiation: 13 days

Final: RL SD SH MC SD RL SD

Comments: See A-2 for lab and salt controls

QC Check: AH 2/15/05

Final Review: [Signature] 2/24/05

CETIS Test Summary

Report Date: 24 Feb-05 11:54 AM

Link: 09-5088-0808/0502-017

Pacific Topsmelt 7-d Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	02-4775-0258	Test Type:	Growth-Survival (7d)	Duration:	6d 21h				
Start Date:	01 Feb-05 02:00 PM	Protocol:	EPA/600/R-95/136 (1995)	Species:	Atherinops affinis				
Ending Date:	08 Feb-05 11:50 AM	Dil Water:	Laboratory Seawater	Source:	Aquatic Biosystems, CO				
Setup Date:	01 Feb-05 02:00 PM	Brine:	Forty Fathoms						
Sample No:	15-1681-1477	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura				
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-017	Project:					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	26h	Station:	B-3						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
10-4340-2955	7d Proportion Survived	100	> 100	N/A	13.78%	Dunnett's Multiple Comparison			
07-5757-1789	Mean Dry Biomass-mg	100	> 100	N/A	11.93%	Dunnett's Multiple Comparison			
Test Acceptability									
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision				
10-4340-2955	7d Proportion Survived	Control Response	0.96000	0.8 - N/A	Passes acceptability criteria				
07-5757-1789	Mean Dry Biomass-mg	Control Response	1.18960	0.85 - N/A	Passes acceptability criteria				
10-4340-2955	7d Proportion Survived	MSDp	0.13782	N/A - 0.25	Passes acceptability criteria				
07-5757-1789	Mean Dry Biomass-mg	MSDp	0.1193	N/A - 0.5	Passes acceptability criteria				
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
0	Salt Control	5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%	
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%	
69		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
100		5	0.88000	0.80000	1.00000	0.04899	0.10954	12.45%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	1.18480	1.09000	1.27400	0.03931	0.08790	7.42%	
0	Salt Control	5	1.18960	1.01600	1.31600	0.04909	0.10976	9.23%	
25		5	1.07960	0.99400	1.28200	0.05223	0.11679	10.82%	
50		5	1.15760	1.05600	1.29200	0.04286	0.09585	8.28%	
69		5	1.29640	1.17400	1.36200	0.03191	0.07136	5.50%	
100		5	1.09200	0.98200	1.18400	0.03905	0.08732	8.00%	
7d Proportion Survived Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000			
0	Salt Control	1.00000	1.00000	0.80000	1.00000	1.00000			
25		1.00000	1.00000	1.00000	1.00000	0.80000			
50		0.80000	0.80000	1.00000	1.00000	1.00000			
69		1.00000	1.00000	1.00000	1.00000	1.00000			
100		1.00000	0.80000	1.00000	0.80000	0.80000			
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.27400	1.25000	1.09000	1.09200	1.21800			
0	Salt Control	1.31600	1.19800	1.01600	1.18400	1.23400			
25		1.01400	1.07200	1.28200	0.99400	1.03600			
50		1.16600	1.07600	1.19800	1.05600	1.29200			
69		1.36200	1.17400	1.31800	1.31400	1.31400			
100		1.02600	1.18400	1.16600	1.10200	0.98200			

CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	09-5088-0808	09-5088-0808	15 Feb-05 1:34 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		100	>100	1.00	N/A	13.78%

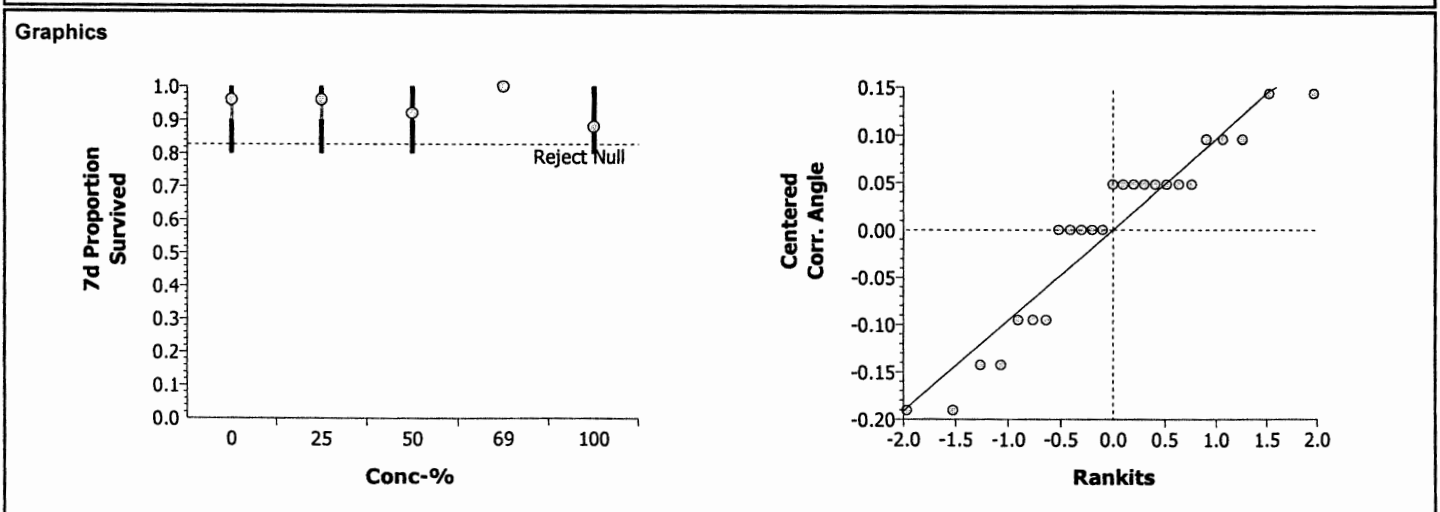
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.96000	0.8 - N/A	Passes acceptability criteria
MSDp	0.13782	N/A - 0.25	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.51429	4.43069	0.23592	Equal Variances
Distribution	Shapiro-Wilk W	0.90106	0.88746	0.02030	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0589762	0.014744	4	1.30	0.30375	Non-Significant Effect
Error	0.2268316	0.011342	20			
Total	0.28580781	0.0260856	24			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	0	2.3	> 0.0500	0.15492	Non-Significant Effect
		50	0.70711	2.3	> 0.0500	0.15492	Non-Significant Effect
		69	-0.7071	2.3	> 0.0500	0.15492	Non-Significant Effect
		100	1.41421	2.3	> 0.0500	0.15492	Non-Significant Effect

Data Summary										
Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	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	0.96000	0.80000	1.00000	0.08944	1.29766	1.10715	1.34528	0.10650
50		5	0.92000	0.80000	1.00000	0.10954	1.25003	1.10715	1.34528	0.13043
69		5	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00020
100		5	0.88000	0.80000	1.00000	0.10954	1.20240	1.10715	1.34528	0.13043



CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	09-5088-0808	09-5088-0808	15 Feb-05 1:35 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	11.93%

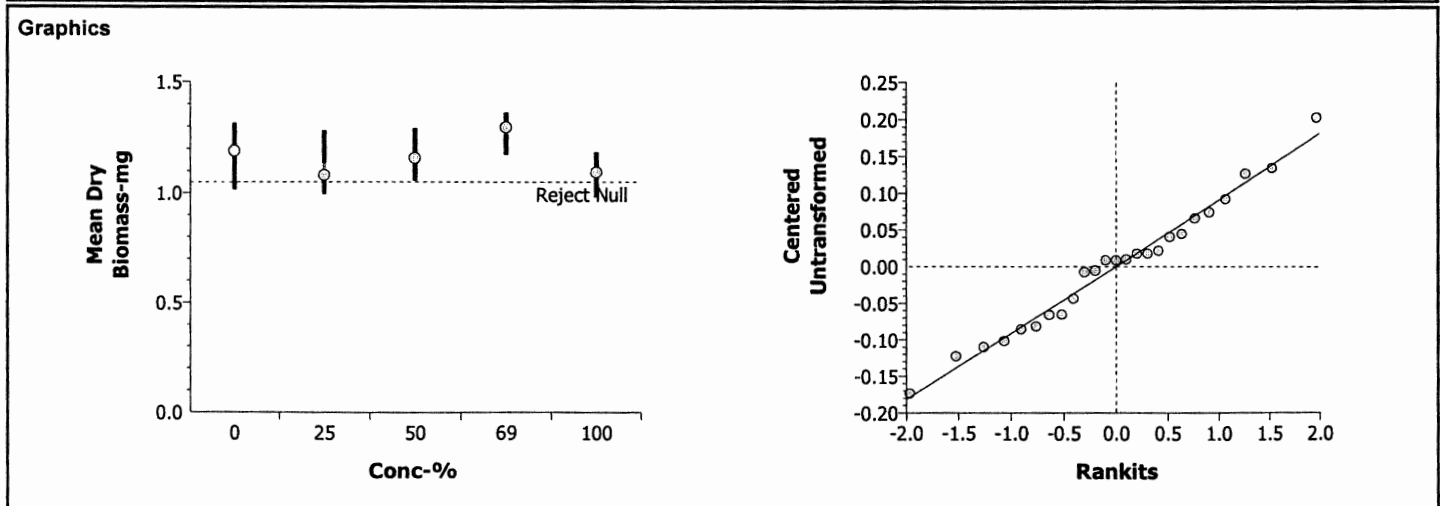
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	1.18960	0.85 - N/A	Passes acceptability criteria
MSDp	0.1193	N/A - 0.5	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	1.04446	13.27671	0.90298	Equal Variances
Distribution	Shapiro-Wilk W	0.98352	0.88746	0.93641	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.1526443	0.038161	4	4.01	0.01511	Significant Effect
Error	0.1903565	0.009518	20			
Total	0.3430008	0.0476789	24			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	1.78277	2.3	> 0.0500	0.14191	Non-Significant Effect
		50	0.51862	2.3	> 0.0500	0.14191	Non-Significant Effect
		69	-1.7309	2.3	> 0.0500	0.14191	Non-Significant Effect
		100	1.58180	2.3	> 0.0500	0.14191	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	1.18960	1.01600	1.31600	0.10976				
25		5	1.07960	0.99400	1.28200	0.11679				
50		5	1.15760	1.05600	1.29200	0.09585				
69		5	1.29640	1.17400	1.36200	0.07136				
100		5	1.09200	0.98200	1.18400	0.08732				



Marine Chronic Bioassay

Larval Fish Survival & Weights

Client Name: City of Buenaventura

Test Species: A. affinis

Sample ID: B-3

Start Date/Time: 2/1/2005 / 1400

Test No.: 0502-017

End Date/Time: 2/8/2005 / 1150
1050
074

Conc. (μ /L)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + fish (g)
		0	1	2	3	4	5	6	7			
Lab Cont. #2	a	5	5	5	5	5	5	5	5	100	0.02828	0.03465
	b	5	5	5	5	5	5	5	5	100	0.0321	0.03746
	c	5	5	5	5	5	5	5	5	100	0.02421	0.02966
	d	5	5	5	5	5	5	5	5	100	0.02682	0.03228
	e	5	5	5	5	5	5	5	5	100	0.03054	0.03663
Soft Cont. #2	a	5	5	5	5	5	5	5	5	100	0.03039	0.03697
	b	5	5	5	5	5	5	5	5	100	0.02832	0.03431
	c	5	5	4	4	4	4	4	4	80	0.02748	0.03256
	d	5	5	5	5	5	5	5	5	100	0.02918	0.03510
	e	5	5	5	5	5	5	5	5	100	0.03361	0.03978
25	a	5	5	5	5	5	5	5	5	100	0.03340	0.03847
	b	5	5	5	5	5	5	5	5	100	0.02803	0.03339
	c	5	5	5	5	5	5	5	5	100	0.03732	0.04373
	d	5	5	5	5	5	5	5	5	100	0.04016	0.04513
	e	5	5	5	5	5	4	4	4	80	0.03024	0.03542
50	a	5	5	4	4	4	4	4	4	80	0.02558	0.03141
	b	5	5	4	4	4	4	4	4	80	0.02591	0.03139
	c	5	5	5	5	5	5	5	5	100	0.02023	0.02622
	d	5	5	5	5	5	5	5	5	100	0.02224	0.02752
	e	5	5	5	5	5	5	5	5	100	0.02237	0.02883
69	a	5	5	5	5	5	5	5	5	100	0.02374	0.03055
	b	5	5	5	5	5	5	5	5	100	0.03065	0.03652
	c	5	5	5	5	5	5	5	5	100	0.02577	0.03236
	d	5	5	5	5	5	5	5	5	100	0.02526	0.03183
	e	5	5	5	5	5	5	5	5	100	0.02921	0.03578
100	a	5	5	5	5	5	5	5	5	100	0.03135	0.03648
	b	5	4	4	4	4	4	4	4	80	0.03454	0.04046
	c	5	5	5	5	5	5	5	5	100	0.02837	0.03420
	d	5	5	5	4	4	4	4	4	80	0.02792	0.03343
	e	5	5	4	4	4	4	4	4	80	0.02265	0.02756
	a	5										
	b	5										
	c	5										
	d	5										
	e	5										
Tech Initials		TR	TR	TR	SH	MC	SH	SH	TR			

Feeding Times (day):

	0	1	2	3	4	5	6
—	0830	0830	0815	0710	1000	0915	
1730	1600	1545	1530	1430	1900	1530	

Weight Data:
 Date/Time in: 2-8-05/1150
 Date/Time out: 2-10-05/1315
 Oven Temp (°C): 64°
 Tech Initials: MA

Comments: _____

QC Check: MA 2/8/05
 Final Review: MA 2/8/05

Client: City of Buenaventura

Test Species: A. affinis

Sample ID: B-3

Start Date/Time: 2/1/2005 1/1400

Test No: DS02-017

End Date/Time: 2/8/2005 1150

Concentration		Lab Control #2							
Day	0	1	2	3	4	5	6	7	
Initial									
pH	8.06	8.05	7.93	8.04	7.96	8.06	8.05		SD
DO (mg/L)	8.4	8.2	8.0	8.1	8.0	7.9	8.8		
Salinity (ppt)	30.0	29.7	29.5	30.4	30.7	30.3	30.0		
Temp (°C)	20.0	20.9	20.3	20.6	20.4	20.5	19.6		
Final									
pH		7.90	7.82	7.81	7.74	7.72	7.75	7.70	
DO (mg/L)		7.4	6.4	6.5	6.0	5.4	5.5	5.5	
Temp (°C)		25.4	19.7	19.2	19.5	19.4	19.4	20.0	

Concentration		50%							
Day	0	1	2	3	4	5	6	7	
Initial									
pH	8.64	8.38	8.35	8.45	8.47	8.57	8.35		
DO (mg/L)	8.1	6.9	6.9	7.1	7.4	7.0	6.3		
Salinity (ppt)	30.3	30.7	30.1	29.2	30.1	30.4	30.3		
Temp (°C)	20.3	20.9	20.9	20.9	20.7	20.7	20.1		
Final									
pH		8.47	8.21	8.17	8.13	8.13	8.11	8.03	
DO (mg/L)		7.1	6.3	5.2	5.9	6.4	5.5	4.8	
Temp (°C)		25.4	19.8	19.4	19.6	19.4	19.4	20.1	

Concentration		Salt Control #2							
Day	0	1	2	3	4	5	6	7	
Initial									
pH	8.97	8.53	8.47	8.17	8.21	8.19	8.22		
DO (mg/L)	7.7	6.7	7.6	7.4	7.7	7.7	7.1		
Salinity (ppt)	30.2	29.6	29.4	29.2	29.3	30.6	30.5		
Temp (°C)	20.0	20.4	20.1	20.3	20.4	20.2	20.0		
Final									
pH		8.49	7.94	7.94	7.69	7.70	7.75	7.88	
DO (mg/L)		7.2	6.1	6.0	6.0	5.8	5.5	5.9	
Temp (°C)		25.4	19.7	19.2	19.5	19.3	19.4	20.1	

Concentration		69%							
Day	0	1	2	3	4	5	6	7	
Initial									
pH	8.60	8.39	8.31	8.45	8.50	8.41	8.38		
DO (mg/L)	8.3	7.3	6.6	6.9	7.0	6.7	6.2		
Salinity (ppt)	30.2	30.2	30.3	29.1	30.1	30.6	30.1		
Temp (°C)	20.1	20.9	20.9	20.9	20.7	20.9	20.2		
Final									
pH		8.45	8.25	8.22	8.18	8.21	8.21	8.11	
DO (mg/L)		6.9	6.3	5.4	6.0	6.2	5.7	5.3	
Temp (°C)		25.4	19.5	19.4	19.5	19.4	19.5	20.1	

Concentration		25%							
Day	0	1	2	3	4	5	6	7	
Initial									
pH	8.76	8.35	8.41	8.44	8.39	8.29	8.31		
DO (mg/L)	7.9	6.6	7.3	7.2	7.4	7.4	6.8		
Salinity (ppt)	30.2	30.5	29.7	29.3	30.2	30.3	30.0		
Temp (°C)	20.1	20.9	20.5	20.4	20.5	20.4	20.0		
Final									
pH		8.50	8.12	8.14	8.04	7.98	7.97	7.86	
DO (mg/L)		7.2	6.2	5.7	6.1	6.2	5.5	4.9	
Temp (°C)		25.4	19.8	19.3	19.5	19.3	19.5	20.0	

Concentration		100%							
Day	0	1	2	3	4	5	6	7	
Initial									
pH	8.53	8.40	8.26	8.45	8.52	8.45	8.41		
DO (mg/L)	9.0	7.9	6.1	6.8	7.1	6.1	5.6		
Salinity (ppt)	30.3	30.7	30.9	29.0	30.1	30.9	30.5		
Temp (°C)	19.5	20.9	20.9	20.9	20.9	21.6	20.3		
Final									
pH		8.44	8.31	8.25	8.25	8.31	8.33	8.23	
DO (mg/L)		6.9	5.9	5.3	5.8	6.2	5.6	5.6	
Temp (°C)		25.4	19.7	19.4	19.5	19.4	19.4	20.1	

Animal Source/Date Received: ABS / 1-29-05

Analysts:	Initial:	0	1	2	3	4	5	6	7
		SD	SD	SD	SH	UC	SD	SD	
	Final:		SD	SD	SH	UC	SD	SH	SD

Animal Age at Initiation: 13 days

Comments: _____

QC Check: Att 2/15/05

Final Review: [Signature] 2/24/05

CETIS Test Summary

Report Date: 24 Feb-05 11:57 AM

Link: 15-7773-9986/0502-018

Pacific Topsmelt 7-d Survival and Growth Test						Nautilus Environmental (CA)			
Test No:	02-4775-0258	Test Type:	Growth-Survival (7d)	Duration:	6d 21h	Species:	Atherinops affinis	Source:	Aquatic Biosystems, CO
Start Date:	01 Feb-05 02:00 PM	Protocol:	EPA/600/R-95/136 (1995)	Dil Water:	Laboratory Seawater	Brine:	Forty Fathoms	Client:	City of Buenaventura
Ending Date:	08 Feb-05 11:50 AM	Code:	0502-018	Project:		Station:	C-1		
Setup Date:	01 Feb-05 02:00 PM	Material:	Estuarine Monitoring Sample						
Sample No:	10-4021-8448	Source:	City of Buenaventura						
Sample Date:	31 Jan-05 08:45 AM								
Receive Date:	31 Jan-05 10:10 PM								
Sample Age:	29h								
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
01-2547-0302	7d Proportion Survived	100	> 100	N/A	11.12%	Steel's Many-One Rank			
10-0734-0324	Mean Dry Biomass-mg	100	> 100	N/A	11.00%	Dunnett's Multiple Comparison			
Test Acceptability									
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision				
01-2547-0302	7d Proportion Survived	Control Response	0.96000	0.8 - N/A	Passes acceptability criteria				
10-0734-0324	Mean Dry Biomass-mg	Control Response	1.18960	0.85 - N/A	Passes acceptability criteria				
01-2547-0302	7d Proportion Survived	MSDp	0.11120	N/A - 0.25	Passes acceptability criteria				
10-0734-0324	Mean Dry Biomass-mg	MSDp	0.10998	N/A - 0.5	Passes acceptability criteria				
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
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	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
69		5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%	
100		5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	1.18480	1.09000	1.27400	0.03931	0.08790	7.42%	
0	Salt Control	5	1.18960	1.01600	1.31600	0.04909	0.10976	9.23%	
25		5	1.27440	1.16000	1.43200	0.04583	0.10248	8.04%	
50		5	1.19640	1.12800	1.25600	0.02085	0.04661	3.90%	
69		5	1.19480	1.02200	1.29800	0.04686	0.10479	8.77%	
100		5	1.22040	1.10200	1.27800	0.03079	0.06885	5.64%	
7d Proportion Survived Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000			
0	Salt Control	1.00000	1.00000	0.80000	1.00000	1.00000			
25		1.00000	1.00000	1.00000	1.00000	1.00000			
50		1.00000	1.00000	1.00000	1.00000	1.00000			
69		1.00000	1.00000	1.00000	1.00000	0.80000			
100		1.00000	1.00000	1.00000	0.80000	1.00000			
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	1.27400	1.25000	1.09000	1.09200	1.21800			
0	Salt Control	1.31600	1.19800	1.01600	1.18400	1.23400			
25		1.43200	1.28600	1.28200	1.21200	1.16000			
50		1.19400	1.21600	1.12800	1.18800	1.25600			
69		1.24800	1.18800	1.29800	1.21800	1.02200			
100		1.25400	1.22600	1.24200	1.10200	1.27800			

2/21/05

CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	15-7773-9986	09-5088-0808	15 Feb-05 1:44 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		100	>100	1.00	N/A	11.12%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.96000	0.8 - N/A	Passes acceptability criteria
MSDp	0.11120	N/A - 0.25	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	0.86667	4.43069	0.50091	Equal Variances
Distribution	Shapiro-Wilk W	0.60369	0.88746	0.00000	Non-normal Distribution

ANOVA Table

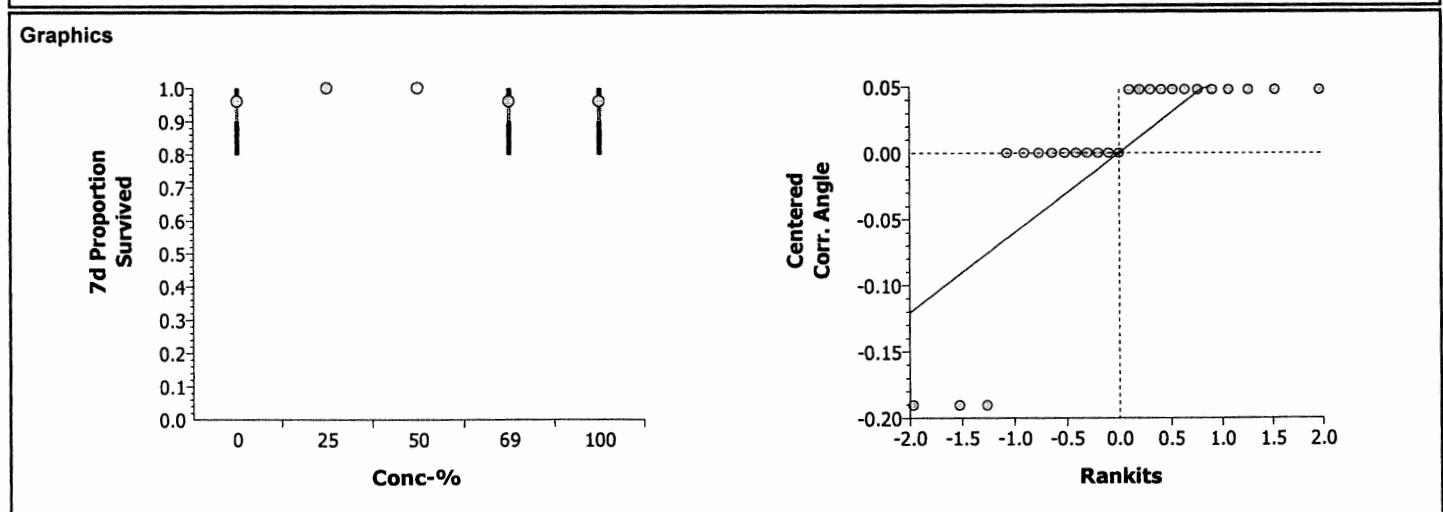
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0136099	0.003402	4	0.50	0.73604	Non-Significant Effect
Error	0.136099	0.006805	20			
Total	0.14970885	0.0102074	24			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		25	30	17	> 0.0500	1	Non-Significant Effect
		50	30	17	> 0.0500	1	Non-Significant Effect
		69	27.5	17	> 0.0500	2	Non-Significant Effect
		100	27.5	17	> 0.0500	2	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	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	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00020
69		5	0.96000	0.80000	1.00000	0.08944	1.29766	1.10715	1.34528	0.10650
100		5	0.96000	0.80000	1.00000	0.08944	1.29766	1.10715	1.34528	0.10650



CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	15-7773-9986	09-5088-0808	15 Feb-05 1:44 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	11.00%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	1.18960	0.85 - N/A	Passes acceptability criteria
MSDp	0.10998	N/A - 0.5	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	3.21309	13.27671	0.52282	Equal Variances
Distribution	Shapiro-Wilk W	0.93615	0.88746	0.12850	Normal Distribution

ANOVA Table

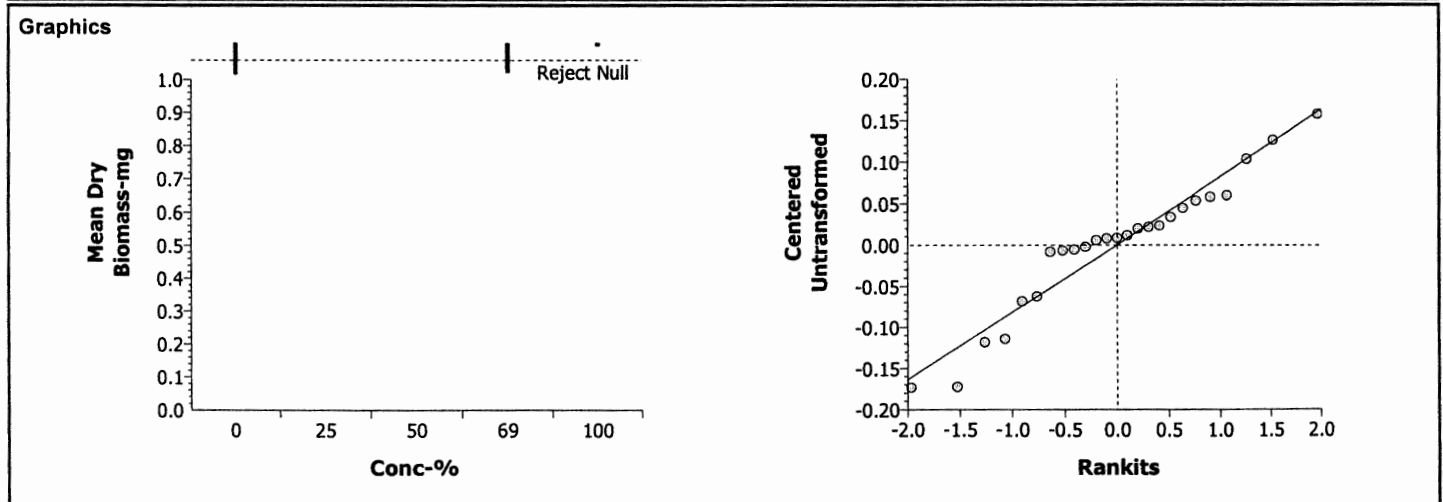
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0247831	0.006196	4	0.77	0.55981	Non-Significant Effect
Error	0.1617776	0.008089	20			
Total	0.18656065	0.0142846	24			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	-1.4908	2.3	> 0.0500	0.13083	Non-Significant Effect
		50	-0.1195	2.3	> 0.0500	0.13083	Non-Significant Effect
		69	-0.0914	2.3	> 0.0500	0.13083	Non-Significant Effect
		100	-0.5415	2.3	> 0.0500	0.13083	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	1.18960	1.01600	1.31600	0.10976				
25		5	1.27440	1.16000	1.43200	0.10248				
50		5	1.19640	1.12800	1.25600	0.04661				
69		5	1.19480	1.02200	1.29800	0.10479				
100		5	1.22040	1.10200	1.27800	0.06885				



Marine Chronic Bioassay

Larval Fish Survival & Weights

Client Name: City of Buenaventura

Test Species: A. affinis

Sample ID: C-1

Start Date/Time: 2/1/2005 / 1400

Test No.: 0502-018

End Date/Time: 2/8/2005 / 1150
~~1125~~
~~0744~~

Conc. (%)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + fish (g)
		0	1	2	3	4	5	6	7			
25	a	5	5	5	5	5	5	5	5	100	0.02992	0.03708
	b	5	5	5	5	5	5	5	5	100	0.02946	0.03589
	c	5	5	5	5	5	5	5	5	100	0.02974	0.03615
	d	5	5	5	5	5	5	5	5	100	0.02888	0.03494
	e	5	5	5	5	5	5	5	5	100	0.02527	0.03107
50	a	5	5	5	5	5	5	5	5	100	0.02841	0.03438
	b	5	5	5	5	5	5	5	5	100	0.02437	0.03045
	c	5	5	5	5	5	5	5	5	100	0.02396	0.02960
	d	5	5	5	5	5	5	5	5	100	0.02642	0.03236
	e	5	5	5	5	5	5	5	5	100	0.02755	0.03383
69	a	5	5	5	5	5	5	5	5	100	0.02570	0.03194
	b	5	5	5	5	5	5	5	5	100	0.03580	0.04174
	c	5	5	5	5	5	5	5	5	100	0.03318	0.03967
	d	5	5	5	5	5	5	5	5	100	0.02626	0.03235
	e	5	5	4	4	4	4	4	4	80	0.02674	0.03185
100	a	5	5	5	5	5	5	5	5	100	0.02800	0.03427
	b	5	5	5	5	5	5	5	5	100	0.03444	0.04057
	c	5	5	5	5	5	5	5	5	100	0.02990	0.03361
	d	5	5	5	4	4	4	4	4	80	0.02817	0.03368
	e	5	5	5	5	5	5	5	5	100	0.02764	0.03403
	a											
	b											
	c											
	d											
	e											
	a											
	b											
	c											
	d											
	e											

Tech Initials: PR PR PR SH UC SD SD YR

Feeding Times (day):

	0	1	2	3	4	5	6
—		0830	0830	0815	0710	1000	0915
1730	1600	1545	1530	1430	1900	1530	

Weight Data:
 Date/Time in: 2-8-05/1150
 Date/Time out: 2-10-05/1100
 Oven Temp (°C): 68°
 Tech Initials: PR

Comments: See B-3 for lab and salt control data

QC Check: AK 2/15/05
 Final Review: [Signature] 2/24/05

Client: City of Buenaventura

Test Species: A. affinis

Sample ID: C-1

Start Date/Time: 2/1/2005 1/1400

Test No: 0502-018

End Date/Time: 2/8/2005 1150
~~1125~~

Concentration		25%						
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.74	8.35	8.41	8.41	8.44	8.31	8.30	
DO (mg/L)	7.8	6.7	7.2	7.1	7.4	7.5	7.0	
Salinity (ppt)	30.2	29.9	29.8	29.2	30.4	30.4	30.5	
Temp (°C)	20.2	20.9	20.3	20.6	20.9	20.6	19.8	
Final								
pH		8.39	8.05	8.01	7.92	7.95	7.93	7.85
DO (mg/L)		6.9	6.1	5.3	5.6	5.9	5.2	4.7
Temp (°C)		20.0 19.9	19.6	19.3	19.7	19.4	19.5	20.0

Concentration		100%						
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.50	8.39	8.28	8.38	8.48	8.44	8.34	
DO (mg/L)	8.9	7.9	6.3	6.6	6.8	6.9	6.7	
Salinity (ppt)	30.4	30.9	30.9	29.1	30.1	30.8	30.6	
Temp (°C)	19.2	20.9	20.9	20.8	20.7	20.9	19.9	
Final								
pH		8.42	8.31	8.26	8.20	8.17	8.22	8.09
DO (mg/L)		7.1	6.3	5.9	5.9	4.9	4.9	4.2
Temp (°C)		20.0 19.7	19.6	19.2	19.4	19.3	19.5	19.9

Concentration		50%						
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.65	8.36	8.36	8.38	8.46	8.38	8.33	
DO (mg/L)	8.2	6.9	6.9	6.9	7.0	7.3	7.0	
Salinity (ppt)	30.2	30.3	30.4	29.2	30.4	30.9	30.0	
Temp (°C)	20.0	20.5	20.9	20.9	20.7	20.9	19.8	
Final								
pH		8.44	8.20	8.15	8.05	8.05	8.05	7.97
DO (mg/L)		7.1	6.9	5.5	6.1	5.8	4.9	5.1
Temp (°C)		20.0 19.8	19.6	19.3	19.5	19.4	19.4	20.0

Concentration								
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Salinity (ppt)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Concentration		69%						
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.58	8.37	8.34	8.38	8.47	8.41	8.33	
DO (mg/L)	8.4	7.2	6.8	6.8	7.0	6.9	6.8	
Salinity (ppt)	30.3	30.6	30.7	29.3	30.1	31.3	30.0	
Temp (°C)	19.9	20.9	20.9	20.9	20.7	20.9	19.9	
Final								
pH		8.42	8.25	8.23	8.14	8.01	8.14	7.97
DO (mg/L)		7.0	6.4	5.8	5.8	4.8	5.2	3.2
Temp (°C)		20.0 19.7	19.4	19.3	19.5	19.4	19.5	19.8

Concentration								
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Salinity (ppt)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Animal Source/Date Received: ABS / 1-29-05

Analysts: Initial:

SD	SP	SD	SH	MC	SD	SD	
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Animal Age at Initiation: 13 days

Final:

	RE	SD	SH	MC	SD	RG	SD
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Comments: See B-3 for lab and salt control data

QC Check: AH 2/15/05

Final Review: [Signature] 2/21/05

A. BAHIA

CETIS Test Summary

Report Date: 24 Feb-05 12:55 PM

Link: 16-1911-1762/0502-019

Mysid 7-d Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	11-7062-8689	Test Type:	Growth-Survival (7d)	Duration:	7d 1h		Species:	Americamysis bahia	
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-014 (2002)	Source:	Aquatic Biosystems, CO				
Ending Date:	08 Feb-05 05:00 PM	Dil Water:	Artificial Saltwater						
Setup Date:	01 Feb-05 04:00 PM	Brine:	Forty Fathoms						
Sample No:	04-1856-7943	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura				
Sample Date:	31 Jan-05 03:20 PM	Code:	0502-019	Project:					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	25h	Station:	A-2						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
09-1570-9388	7d Proportion Survived	100	> 100	N/A	11.61%	Steel's Many-One Rank			
01-5564-4480	Mean Dry Biomass-mg	100	> 100	N/A	18.43%	Dunnnett's Multiple Comparison			
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
0	Salt Control	8	0.90000	0.60000	1.00000	0.05345	0.15119	16.80%	
25		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
50		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
69		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
100		8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	8	0.22450	0.18200	0.29400	0.01392	0.03936	17.53%	
0	Salt Control	8	0.22525	0.17200	0.28800	0.01346	0.03807	16.90%	
25		8	0.24375	0.21000	0.32200	0.01213	0.03432	14.08%	
50		8	0.25400	0.19000	0.30000	0.01317	0.03725	14.66%	
69		8	0.22400	0.20200	0.25800	0.00746	0.02111	9.42%	
100		8	0.25825	0.21200	0.36800	0.01739	0.04918	19.04%	
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	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000
0	Salt Control	1.00000	0.60000	1.00000	1.00000	1.00000	1.00000	0.80000	0.80000
25		1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
50		1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000
69		1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000
100		0.80000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Lab Control	0.29400	0.25400	0.18400	0.22000	0.25200	0.19600	0.21400	0.18200
0	Salt Control	0.28800	0.18000	0.23800	0.21800	0.22800	0.25800	0.22000	0.17200
25		0.22600	0.21000	0.25400	0.23600	0.24600	0.22800	0.22800	0.32200
50		0.28600	0.28000	0.25600	0.30000	0.25800	0.19000	0.21200	0.25000
69		0.21000	0.25800	0.25600	0.21200	0.21800	0.20200	0.21600	0.22000
100		0.22200	0.21200	0.24200	0.28200	0.23600	0.36800	0.24800	0.25600

CETIS Analysis Detail

Mysid 7-d Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	16-1911-1762	16-1911-1762	24 Feb-05 12:55 PM	CETISv1.025

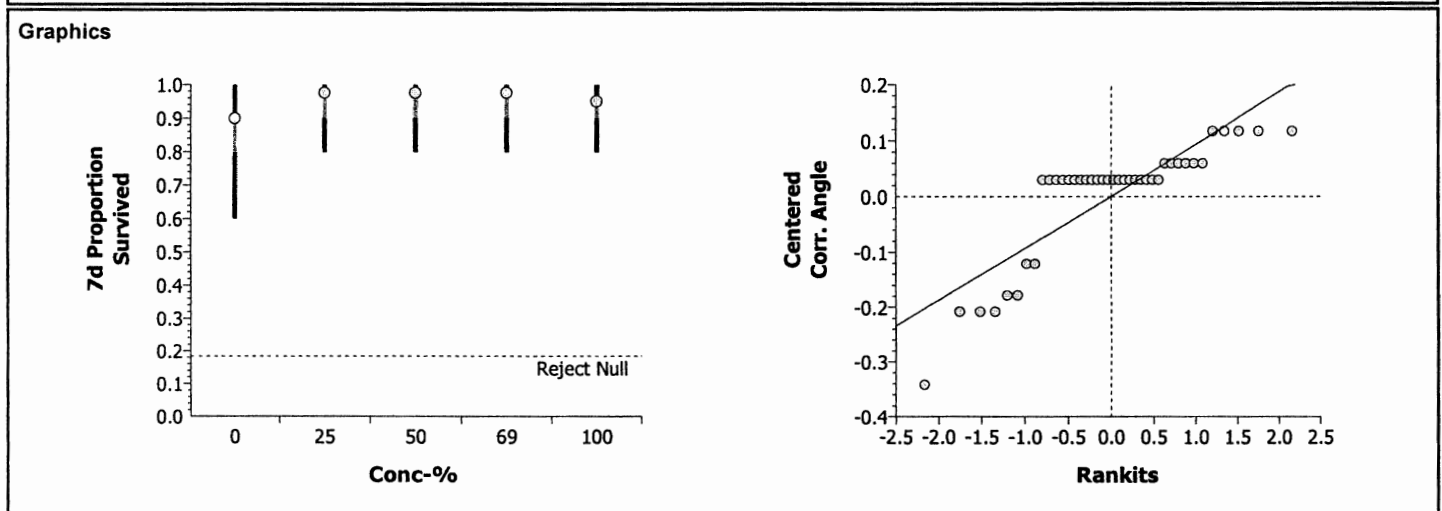
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		100	>100	1.00	N/A	11.61%

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	6.35147	13.27671	0.17439	Equal Variances
Distribution	Shapiro-Wilk W	0.73532	0.91882	0.00000	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0459961	0.011499	4	0.90	0.47633	Non-Significant Effect
Error	0.4488168	0.012823	35			
Total	0.49481291	0.0243224	39			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		25	76.5	47	> 0.0500	2	Non-Significant Effect
		50	76.5	47	> 0.0500	2	Non-Significant Effect
		69	76.5	47	> 0.0500	2	Non-Significant Effect
		100	73	47	> 0.0500	2	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	8	0.90000	0.60000	1.00000	0.15119	1.22835	0.88608	1.34528	0.17521
25		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
50		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
69		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
100		8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023



CETIS Analysis Detail

Mysid 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	16-1911-1762	16-1911-1762	24 Feb-05 12:55 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	18.43%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	4.35598	13.27671	0.35997	Equal Variances
Distribution	Shapiro-Wilk W	0.94373	0.91882	0.06695	Normal Distribution

ANOVA Table

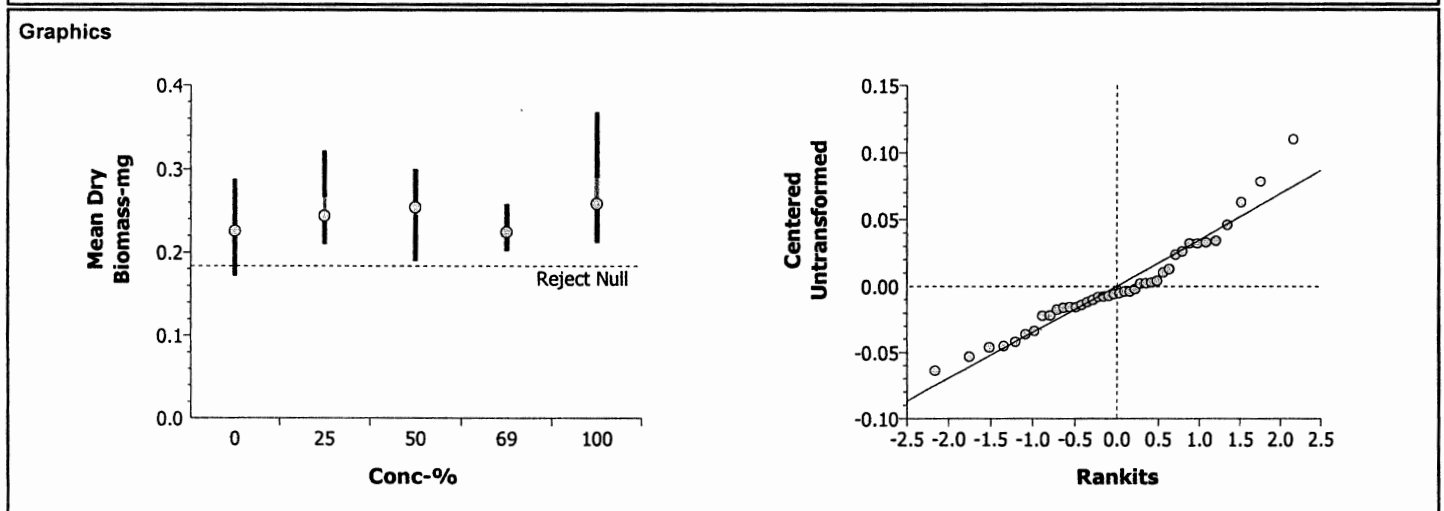
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0080894	0.002022	4	1.47	0.23223	Non-Significant Effect
Error	0.0481505	0.001376	35			
Total	0.05623988	0.0033981	39			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	-0.9976	2.23857	> 0.0500	0.04152	Non-Significant Effect
		50	-1.5503	2.23857	> 0.0500	0.04152	Non-Significant Effect
		69	0.06739	2.23857	> 0.0500	0.04152	Non-Significant Effect
		100	-1.7794	2.23857	> 0.0500	0.04152	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	8	0.22525	0.17200	0.28800	0.03807				
25		8	0.24375	0.21000	0.32200	0.03432				
50		8	0.25400	0.19000	0.30000	0.03725				
69		8	0.22400	0.20200	0.25800	0.02111				
100		8	0.25825	0.21200	0.36800	0.04918				



Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name: City of Buenaventura

Test Species: A. bahia

Sample ID: A-2

Start Date/Time: 2/1/2005 / 1600

Test No.: 0502-019

End Date/Time: 2/8/2005 / 1530 1700

Conc. (%)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + mysid (g)
		0	1	2	3	4	5	6	7			
Lab Control #1	a	5	5	5	5	5	5	5	5	100	0.03757	0.03904
	b	5	5	5	5	5	5	5	5	100	0.04018	0.04145
	c	5	5	5	5	5	5	5	5	100	0.03780	0.03872
	d	5	5	5	5	5	5	5	5	100	0.03888	0.03998
	e	5	5	5	5	5	5	5	5	100	0.03818	0.03944
	f	5	5	5	5	5	4	4	4	80	0.03873	0.03971
	g	5	5	5	5	5	5	5	5	100	0.03689	0.03796
	h	5	5	5	5	5	5	5	5	100	0.04144	0.04235
Salt Control #1	a	5	5	5	5	5	5	5	5	100	0.03838	0.03982
	b	5	5	5	3	3	3	3	3	60	0.04504	0.04594
	c	5	5	5	5	5	5	5	5	100	0.03984	0.04103
	d	5	5	5	5	5	5	5	5	100	0.03809	0.03918
	e	5	5	5	5	5	5	5	5	100	0.03682	0.03796
	f	5	5	5	5	5	5	5	5	100	0.03232	0.03361
	g	5	5	5	5	5	5	4	4	80	0.03513	0.03623
	h	5	5	5	4	4	4	4	4	80	0.04100	0.04186
25%	a	5	5	5	5	5	5	5	5	100	0.03953	0.04066
	b	5	4	4	4	4	4	4	4	80	0.04001	0.04106
	c	5	5	5	5	5	5	5	5	100	0.03798	0.03925
	d	5	5	5	5	5	5	5	5	100	0.03800	0.03918
	e	5	5	5	5	5	5	5	5	100	0.03932	0.04055
	f	5	5	5	5	5	5	5	5	100	0.03795	0.03909
	g	5	5	5	5	5	5	5	5	100	0.03655	0.03769
	h	5	5	5	5	5	5	5	5	100	0.04003	0.04169
50%	a	5	5	5	5	5	5	5	5	100	0.03921	0.04064
	b	5	5	5	5	5	5	5	5	100	0.03760	0.03900
	c	5	5	5	5	5	5	5	5	100	0.03749	0.03877
	d	5	5	5	5	5	5	5	5	100	0.03513	0.03663
	e	5	5	5	5	5	5	5	5	100	0.03857	0.03986
	f	5	5	5	5	5	5	4	4	80	0.04287	0.04382
	g	5	5	5	5	5	5	5	5	100	0.04029	0.04135
	h	5	5	5	5	5	5	5	5	100	0.03832	0.03957
Tech Initials		SH	RL	SS	ML	SH	RL	AT	VR			

Feeding Times (day):

	0	1	2	3	4	5	6
—	0830	0830	0815	0710	1000	0915	
	1730	1600	1745	1530	1430	1900	1530

Weight Data:

Date/Time in: 2.8.05 / 1700
 Date/Time out: 2/15/05 1320
 Oven Temp (°C): 67
 Tech Initials: SM

Comments:

QC Check: AT 2/16/05
 Final Review: AT 2/28/05

Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name: City of Buenaventura

Test Species: A. bahia

Sample ID: A-2

Start Date/Time: 2/1/2005 / 1600

Test No.: 0502-019

End Date/Time: 2/8/2005 / 1605-1700

Conc. (%)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + mysid (g)	
		0	1	2	3	4	5	6	7				
69%	a	5	5	5	5	5	5	5	5	5	100	0.03842	0.03947
	b	5	5	5	5	5	5	5	5	5	100	0.03751	0.03880
	c	5	5	5	5	5	5	5	5	5	100	0.03656	0.03784
	d	5	5	5	5	5	5	5	5	5	100	0.03525	0.03631
	e	5	5	5	5	5	5	5	5	5	100	0.03869	0.03978
	f	5	5	5	4	4	4	4	4	4	80	0.03699	0.03800
	g	5	5	5	5	5	5	5	5	5	100	0.03912	0.04020
	h	5	5	5	5	5	5	5	5	5	100	0.03560	0.03670
100%	a	5	5	4	4	4	4	4	4	4	80	0.03527	0.03638
	b	5	5	5	4	4	4	4	4	4	80	0.03410	0.03522
	c	5	5	5	5	5	5	5	5	5	100	0.03190	0.03311
	d	5	5	5	5	5	5	5	5	5	100	0.03808	0.03949
	e	5	5	5	5	5	5	5	5	5	100	0.04069	0.04187
	f	5	5	5	5	5	5	5	5	5	100	0.03778	0.03962
	g	5	5	5	5	5	5	5	5	5	100	0.03880	0.04004
	h	5	5	5	5	5	5	5	5	5	100	0.03768	0.03896
	a												
	b												
	c												
	d												
	e												
	f												
	g												
	h												

Tech Initials: SH/RG SP MC SH RG AH GR

Feeding Times (day):

	0	1	2	3	4	5	6
—	0930	0830	0815	0710	1000	6915	
1730	1600	1545	1530	1430	1900	1530	

Weight Data:
 Date/Time in: 2-8-05 / 1700
 Date/Time out: 2/15/05 1320
 Oven Temp (°C): 67
 Tech Initials: SM

Comments: _____

QC Check: AH 2/16/05
 Final Review: AH 2/28/05

Client: City of Buenaventura

Test Species: A. bahia

Sample ID: A-2

Start Date/Time: 2/1/2005 / 1600

Test No: 0502-019

End Date/Time: 2/8/2005 / 1700

Concentration	Lab Control #1							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.06	8.65	7.95	8.04	7.96	8.00	8.05	
DO (mg/L)	8.4	8.2	8.8	8.1	8.6	7.9	8.1	
Salinity (ppt)	30.0	29.7	29.5	30.4	30.7	30.3	30.1	
Temp (°C)	25.0	25.0	25.7	24.5	24.2	25.5	25.0	
Final								
pH		7.95	7.85	7.80	7.68	7.79	7.88	7.07
DO (mg/L)		8.1	5.9	5.2	5.4	5.4	5.5	5.7
Temp (°C)		24.9	25.5	24.6	24.5	24.6	24.6	25.3

Concentration	50%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.62	8.35	8.17	8.37	8.3	8.35	8.29	
DO (mg/L)	8.0	6.8	7.5	6.8	7.0	6.7	6.2	
Salinity (ppt)	30.5	30.5	30.0	29.1	29.4	31.0	30.9	
Temp (°C)	25.0	25.0	25.2	24.5	24.2	25.0	25.0	
Final								
pH		8.32	8.22	8.15	8.08	8.10	8.24	8.18
DO (mg/L)		7.7	5.0	5.2	5.4	5.2	6.0	5.7
Temp (°C)		25.3	25.7	24.7	24.6	24.7	24.5	25.5

Concentration	Salt Control #1							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.47	8.33	8.13	8.17	8.21	8.19	8.22	
DO (mg/L)	7.7	6.7	7.1	7.4	7.1	7.7	7.1	
Salinity (ppt)	30.2	29.6	29.7	29.2	29.3	30.6	30.5	
Temp (°C)	25.0	25.0	24.7	24.5	24.2	25.2	25.0	
Final								
pH		8.17	8.04	8.00	7.92	7.97	8.02	7.97
DO (mg/L)		7.8	5.7	5.1	5.3	5.7	5.9	5.5
Temp (°C)		25.2	25.6	24.7	24.5	24.6	24.7	25.2

Concentration	69%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.55	8.35	8.18	8.35	8.31	8.37	8.30	
DO (mg/L)	8.2	6.9	7.4	6.6	6.7	6.3	6.0	
Salinity (ppt)	30.5	30.4	30.0	29.1	29.5	31.0	31.0	
Temp (°C)	25.0	25.0	25.1	24.5	24.2	25.1	25.0	
Final								
pH		8.35	8.27	8.22	8.12	8.11	8.32	8.25
DO (mg/L)		7.8	5.7	5.4	5.3	5.1	5.7	5.7
Temp (°C)		25.3	25.7	24.7	24.7	24.7	24.7	25.4

Concentration	25%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.75	8.34	8.16	8.39	8.30	8.29	8.26	
DO (mg/L)	7.9	6.6	7.6	7.1	7.3	7.7	6.8	
Salinity (ppt)	30.5	30.4	29.8	29.2	29.3	30.8	30.5	
Temp (°C)	25.0	25.0	25.5	24.5	24.2	25.0	25.0	
Final								
pH		8.26	8.13	8.07	7.99	8.03	8.13	8.06
DO (mg/L)		7.5	5.6	5.0	5.4	5.1	5.6	5.4
Temp (°C)		25.3	25.7	24.8	24.7	24.7	24.6	25.7

Concentration	100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.47	8.36	8.18	8.34	8.29	8.39	8.33	
DO (mg/L)	8.8	7.4	7.7	6.2	6.4	5.0	4.0	
Salinity (ppt)	30.5	30.7	30.2	29.0	29.5	31.5	30.6	
Temp (°C)	20.0	25.0	25.6	24.5	24.2	25.0	25.0	
Final								
pH		8.38	8.33	8.26	8.21	8.25	8.37	8.28
DO (mg/L)		7.6	5.7	5.0	5.1	5.2	5.6	5.2
Temp (°C)		25.1	25.6	24.7	24.6	24.7	24.6	25.5

Animal Source/Date Received: ABS 2/1/05

Analysts:	Initial:	0	1	2	3	4	5	6	7
		SD	SD	SD	SH	me	SD	SD	
	Final:		GR	SD	SH	me	RG	RG	SD

Animal Age at Initiation: 7 days

Comments: ⓐ Temperature below minimum of 24°C.

QC Check: SM 2/16/05

Final Review: ATH 2/28/05

CETIS Test Summary

Report Date: 24 Feb-05 1:07 PM

Link: 13-8535-5322/0502-020

Mysid 7-d Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	11-7062-8689	Test Type:	Growth-Survival (7d)	Duration:	7d 1h				
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Americamysis bahia				
Ending Date:	08 Feb-05 05:00 PM	Dil Water:	Artificial Saltwater	Source:	Aquatic Biosystems, CO				
Setup Date:	01 Feb-05 04:00 PM	Brine:	Forty Fathoms						
Sample No:	11-5540-6558	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura				
Sample Date:	31 Jan-05 02:30 PM	Code:	0502-020	Project:					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	26h	Station:	B-1						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
10-8027-0523	7d Proportion Survived	100	> 100	N/A	10.48%	Steel's Many-One Rank			
02-6089-0179	Mean Dry Biomass-mg	100	> 100	N/A	15.51%	Dunnett's Multiple Comparison			
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
0	Salt Control	8	0.90000	0.60000	1.00000	0.05345	0.15119	16.80%	
25		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
50		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
69		8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
100		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	8	0.22450	0.18200	0.29400	0.01392	0.03936	17.53%	
0	Salt Control	8	0.22525	0.17200	0.28800	0.01346	0.03807	16.90%	
25		8	0.22900	0.20200	0.29000	0.00961	0.02719	11.87%	
50		8	0.21950	0.17400	0.24800	0.00941	0.02661	12.12%	
69		8	0.22325	0.20400	0.27000	0.00781	0.02209	9.89%	
100		8	0.21775	0.17000	0.28400	0.01365	0.03860	17.72%	
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	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000
0	Salt Control	1.00000	0.60000	1.00000	1.00000	1.00000	1.00000	0.80000	0.80000
25		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000
50		1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000
69		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
100		0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Lab Control	0.29400	0.25400	0.18400	0.22000	0.25200	0.19600	0.21400	0.18200
0	Salt Control	0.28800	0.18000	0.23800	0.21800	0.22800	0.25800	0.22000	0.17200
25		0.22200	0.21600	0.23200	0.20800	0.29000	0.23600	0.20200	0.22600
50		0.17400	0.22400	0.24600	0.18800	0.22200	0.21600	0.23800	0.24800
69		0.20600	0.23200	0.21800	0.20400	0.27000	0.23200	0.22000	0.20400
100		0.18200	0.21200	0.25800	0.17000	0.21400	0.19200	0.23000	0.28400

CETIS Analysis Detail

Mysid 7-d Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	13-8535-5322	16-1911-1762	24 Feb-05 1:06 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		100	>100	1.00	N/A	10.48%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.50587	3.90824	0.22168	Equal Variances
Distribution	Shapiro-Wilk W	0.72048	0.91882	0.00000	Non-normal Distribution

ANOVA Table

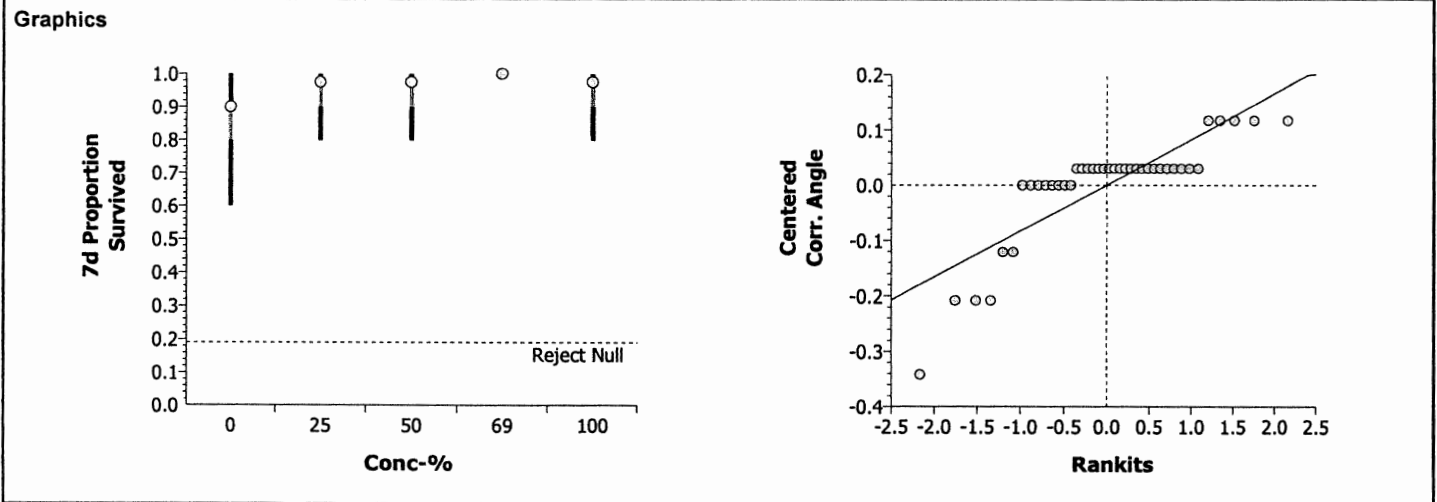
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0626021	0.015651	4	1.51	0.22168	Non-Significant Effect
Error	0.363755	0.010393	35			
Total	0.42635711	0.0260435	39			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		25	76.5	47	> 0.0500	2	Non-Significant Effect
		50	76.5	47	> 0.0500	2	Non-Significant Effect
		69	80	47	> 0.0500	2	Non-Significant Effect
		100	76.5	47	> 0.0500	2	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	8	0.90000	0.60000	1.00000	0.15119	1.22835	0.88608	1.34528	0.17521
25		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
50		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
69		8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
100		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419



CETIS Analysis Detail

Mysid 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	13-8535-5322	16-1911-1762	24 Feb-05 1:06 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	15.51%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	3.09665	13.27671	0.54178	Equal Variances
Distribution	Shapiro-Wilk W	0.95805	0.91882	0.19710	Normal Distribution

ANOVA Table

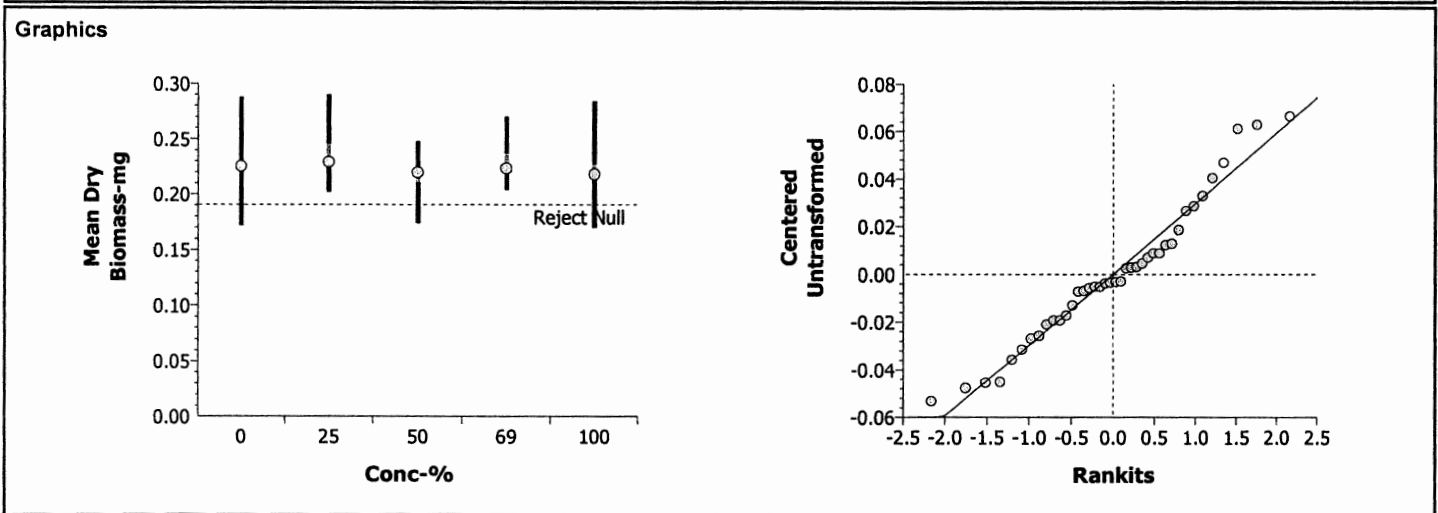
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0006474	0.000162	4	0.17	0.95421	Non-Significant Effect
Error	0.0341202	0.000975	35			
Total	0.03476761	0.0011367	39			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	-0.2402	2.23857	> 0.0500	0.03495	Non-Significant Effect
		50	0.36830	2.23857	> 0.0500	0.03495	Non-Significant Effect
		69	0.12810	2.23857	> 0.0500	0.03495	Non-Significant Effect
		100	0.48041	2.23857	> 0.0500	0.03495	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	8	0.22525	0.17200	0.28800	0.03807				
25		8	0.22900	0.20200	0.29000	0.02719				
50		8	0.21950	0.17400	0.24800	0.02661				
69		8	0.22325	0.20400	0.27000	0.02209				
100		8	0.21775	0.17000	0.28400	0.03860				



Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name: City of Buenaventura

Test Species: A. bahia

Sample ID: B-1

Start Date/Time: 2/1/2005 / 1600

Test No.: 0502-020

End Date/Time: 2/8/2005 / ²⁰¹1700

Conc. (%)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + mysid (g)
		0	1	2	3	4	5	6	7			
25	a	5	5	5	5	5	5	5	5	100	0.03675	0.03786
	b	5	5	5	5	5	5	5	5	100	0.03707	0.03815
	c	5	5	5	5	5	5	5	5	100	0.03581	0.03697
	d	5	5	5	5	5	5	5	5	100	0.04216	0.04320
	e	5	5	5	5	5	5	5	5	100	0.04115	0.04260
	f	5	5	5	5	5	5	5	5	100	0.03600	0.03718
	g	5	4	4	4	4	4	4	4	80	0.03668	0.03719
	h	5	5	5	5	5	5	5	5	100	0.03126	0.03239
50	a	5	5	5	5	5	5	5	5	100	0.03122	0.03209
	b	5	5	5	5	5	5	5	5	100	0.03172	0.03284
	c	5	5	5	5	5	5	5	5	100	0.03093	0.03216
	d	5	5	5	5	5	4	4	4	80	0.03039	0.03133
	e	5	5	5	5	5	5	5	5	100	0.03043	0.03154
	f	5	5	5	5	5	5	5	5	100	0.03028	0.03136
	g	5	5	5	5	5	5	5	5	100	0.02947	0.03066
	h	5	5	5	5	5	5	5	5	100	0.03100	0.03224
69%	a	5	5	5	5	5	5	5	5	100	0.02967	0.03070
	b	5	5	5	5	5	5	5	5	100	0.03408	0.03524
	c	5	5	5	5	5	5	5	5	100	0.02934	0.03043
	d	5	5	5	5	5	5	5	5	100	0.02927	0.03029
	e	5	5	5	5	5	5	5	5	100	0.03069	0.03204
	f	5	5	5	5	5	5	5	5	100	0.03462	0.0378 ³⁵
	g	5	5	5	5	5	5	5	5	100	0.03445	0.03555
	h	5	5	5	5	5	5	5	5	100	0.03371	0.03473
100	a	5	5	4	4	4	4	4	4	80	0.03367	0.03458
	b	5	5	5	5	5	5	5	5	100	0.03198	0.03304
	c	5	5	5	5	5	5	5	5	100	0.03347	0.03476
	d	5	5	5	5	5	5	5	5	100	0.03203	0.03288
	e	5	5	5	5	5	5	5	5	100	0.03278	0.03385
	f	5	5	5	5	5	5	5	5	100	0.03160	0.03262
	g	5	5	5	5	5	5	5	5	100	0.03649	0.03764
	h	5	5	5	5	5	5	5	5	100	0.03381	0.03523
Tech Initials		SM/AL	RG	SD	ML	SP	RG	AL	AL			

Feeding Times (day):

	0	1	2	3	4	5	6
-		0830	0830	0815	0710	1000	0915
	1730	1600	1545	1530	1430	1900	1530

Weight Data:
 Date/Time in: 2-8-05/1700
 Date/Time out: 2/15/05 1320
 Oven Temp (°C): 67
 Tech Initials: SM

Comments: _____

QC Check: AL 2/16/05
 Final Review: AL 2/22/05

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura

Test Species: A. bahia

Sample ID: B-1

Start Date/Time: 2/1/2005 1100

Test No: 0502-020

End Date/Time: 2/8/2005/1700

Concentration	25%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.72	8.77	8.16	8.36	8.34	8.29	8.29	
DO (mg/L)	7.9	6.7	7.0	6.6	7.1	7.6	7.1	
Salinity (ppt)	30.2	30.3	29.7	29.6	29.5	30.3	30.1	
Temp (°C)	25.3	25.0	24.5	24.5	24.2	25.0	25.0	
Final								
pH		8.25	8.12	8.08	8.02	8.11	8.05	8.06
DO (mg/L)		7.5	5.3	5.0	5.4	5.4	5.3	5.3
Temp (°C)		25.2	25.7	24.7	24.3	24.3	24.5	25.5

Concentration	100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.44	8.35	8.22	8.38	8.29	8.35	8.29	
DO (mg/L)	8.5	7.8	5.9	7.0	7.2	6.4	7.1	
Salinity (ppt)	30.2	30.7	29.5	29.3	29.9	31.9	31.8	
Temp (°C)	25.0	25.0	25.0	24.5	24.2	25.0	25.0	
Final								
pH		8.35	8.28	8.28	8.19	8.26	8.34	8.28
DO (mg/L)		7.6	5.3	5.1	5.1	5.0	5.6	5.0
Temp (°C)		25.3	25.6	24.7	24.3	24.3	24.6	25.7

Concentration	50%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.01	8.35	8.16	8.37	8.31	8.31	8.31	
DO (mg/L)	8.1	6.8	7.5	7.0	7.1	7.3	6.1	
Salinity (ppt)	30.2	30.3	29.7	29.4	29.7	31.0	31.1	
Temp (°C)	25.0	25.0	24.7	24.5	24.2	25.0	25.0	
Final								
pH		8.30	8.17	8.12	8.08	8.17	8.19	8.13
DO (mg/L)		7.4	5.3	5.0	5.3	5.6	5.4	5.1
Temp (°C)		25.3	25.6	24.8	24.4	24.3	24.5	25.5

Concentration								
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Salinity (ppt)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Concentration	69%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.55	8.35	8.28	8.38	8.31	8.33	8.31	
DO (mg/L)	8.4	7.1	6.9	6.9	7.0	7.0	6.8	
Salinity (ppt)	30.1	30.5	29.8	29.5	29.7	31.7	31.1	
Temp (°C)	25.0	25.0	24.8	24.5	24.2	25.0	25.0	
Final								
pH		8.33	8.24	8.23	8.14	8.23	8.25	8.19
DO (mg/L)		7.6	5.3	5.0	5.1	5.4	5.6	5.2
Temp (°C)		25.5	25.6	24.7	24.3	24.2	24.6	25.7

Concentration								
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Salinity (ppt)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Animal Source/Date Received: ABS 2/1/05

Analysts:	Initial:	0	1	2	3	4	5	6	7
		SD	SD	SD	SH	MC	SD	SD	
	Final:		YR	SD	SH	MC	RG	RG	SD

Animal Age at Initiation: 7 days

Comments: See A-2 for lab and salt control data.

QC Check: SM 2/16/05

Final Review: [Signature] 2/24/05

CETIS Test Summary

Report Date: 24 Feb-05 3:13 PM

Link: 06-6762-0296/0502-021

Mysid 7-d Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	00-8578-6125	Test Type:	Growth-Survival (7d)	Duration:	7d 1h				
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Americamysis bahia				
Ending Date:	08 Feb-05 05:00 PM	Dil Water:	Artificial Saltwater	Source:	Aquatic Biosystems, CO				
Setup Date:	01 Feb-05 04:00 PM	Brine:	Forty Fathoms						
Sample No:	13-2325-9246	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura				
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-021	Project:					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	28h	Station:	B-3						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
05-1376-5500	7d Proportion Survived	100	> 100	N/A	12.84%	Steel's Many-One Rank			
04-9615-0856	Mean Dry Biomass-mg	100	> 100	N/A	24.39%	Dunnett's Multiple Comparison			
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
0	Salt Control	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
25		8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%	
50		8	0.90000	0.80000	1.00000	0.03780	0.10690	11.88%	
69		8	0.95000	0.60000	1.00000	0.05000	0.14142	14.89%	
100		8	0.90000	0.80000	1.00000	0.03780	0.10690	11.88%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	8	0.26725	0.18600	0.41600	0.02417	0.06836	25.58%	
0	Salt Control	8	0.22900	0.18800	0.29400	0.01242	0.03513	15.34%	
25		8	0.21912	0.04600	0.31000	0.02802	0.07926	36.17%	
50		8	0.24075	0.19400	0.27600	0.00938	0.02653	11.02%	
69		8	0.23900	0.15400	0.35600	0.02073	0.05862	24.53%	
100		8	0.20325	0.14200	0.22800	0.00996	0.02818	13.87%	
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	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000
0	Salt Control	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000
25		0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000
50		0.80000	1.00000	0.80000	1.00000	0.80000	1.00000	0.80000	1.00000
69		1.00000	1.00000	1.00000	0.60000	1.00000	1.00000	1.00000	1.00000
100		0.80000	0.80000	1.00000	0.80000	1.00000	1.00000	1.00000	0.80000
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Lab Control	0.41600	0.28200	0.27200	0.26000	0.24200	0.18600	0.26800	0.21200
0	Salt Control	0.24000	0.29400	0.18800	0.20200	0.22000	0.21200	0.26400	0.21200
25		0.23800	0.31000	0.19800	0.22100	0.28600	0.21400	0.04600	0.24000
50		0.23400	0.26200	0.23800	0.26600	0.27600	0.23200	0.22400	0.19400
69		0.35600	0.27200	0.21800	0.15400	0.22600	0.25600	0.21400	0.21600
100		0.22200	0.19600	0.21600	0.18800	0.22800	0.21400	0.22000	0.14200

CETIS Analysis Detail

Mysid 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	06-6762-0296	06-6762-0296	24 Feb-05 3:13 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		100	>100	1.00	N/A	12.84%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	2.68648	13.27671	0.61158	Equal Variances
Distribution	Shapiro-Wilk W	0.82533	0.91882	0.00001	Non-normal Distribution

ANOVA Table

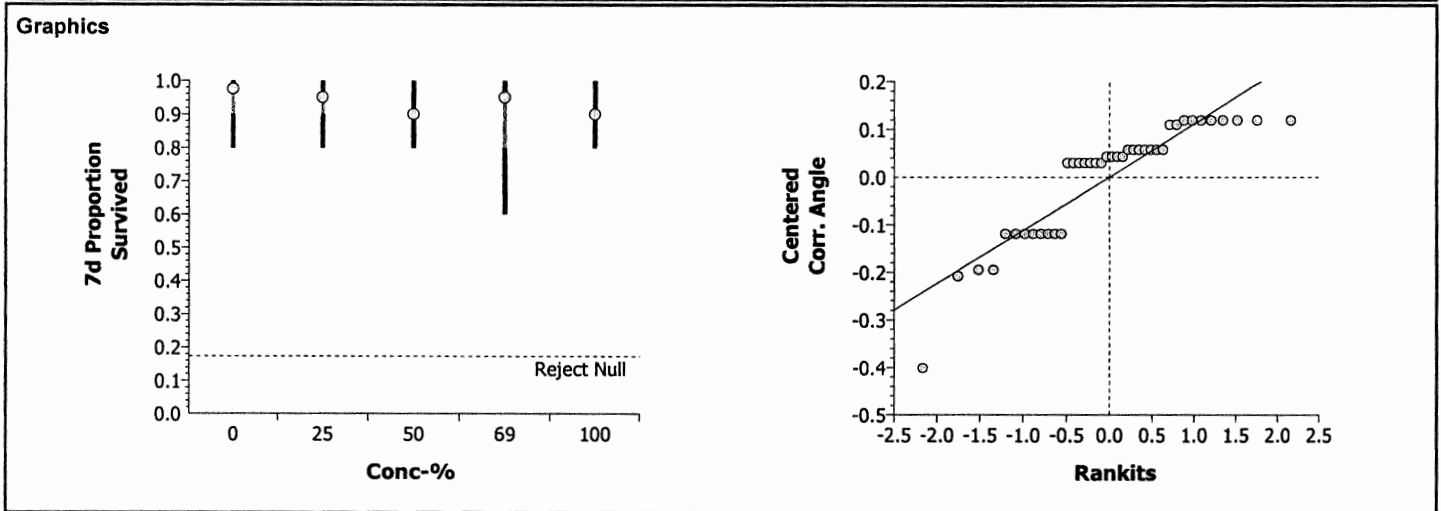
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0581106	0.014528	4	0.89	0.47773	Non-Significant Effect
Error	0.5685955	0.016246	35			
Total	0.62670613	0.0307732	39			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		25	71	47	> 0.0500	3	Non-Significant Effect
		50	56	47	> 0.0500	2	Non-Significant Effect
		69	67.5	47	> 0.0500	1	Non-Significant Effect
		100	56	47	> 0.0500	2	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
25		8	0.95000	0.80000	1.00000	0.09258	1.30243	1.10715	1.41202	0.12400
50		8	0.90000	0.80000	1.00000	0.10690	1.22622	1.10715	1.34528	0.12729
69		8	0.95000	0.60000	1.00000	0.14142	1.28788	0.88608	1.34528	0.16235
100		8	0.90000	0.80000	1.00000	0.10690	1.22622	1.10715	1.34528	0.12729



CETIS Analysis Detail

Mysid 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	06-6762-0296	06-6762-0296	24 Feb-05 3:13 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	24.39%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	12.31975	13.27671	0.01513	Equal Variances
Distribution	Shapiro-Wilk W	0.91940	0.91882	0.01045	Normal Distribution

ANOVA Table

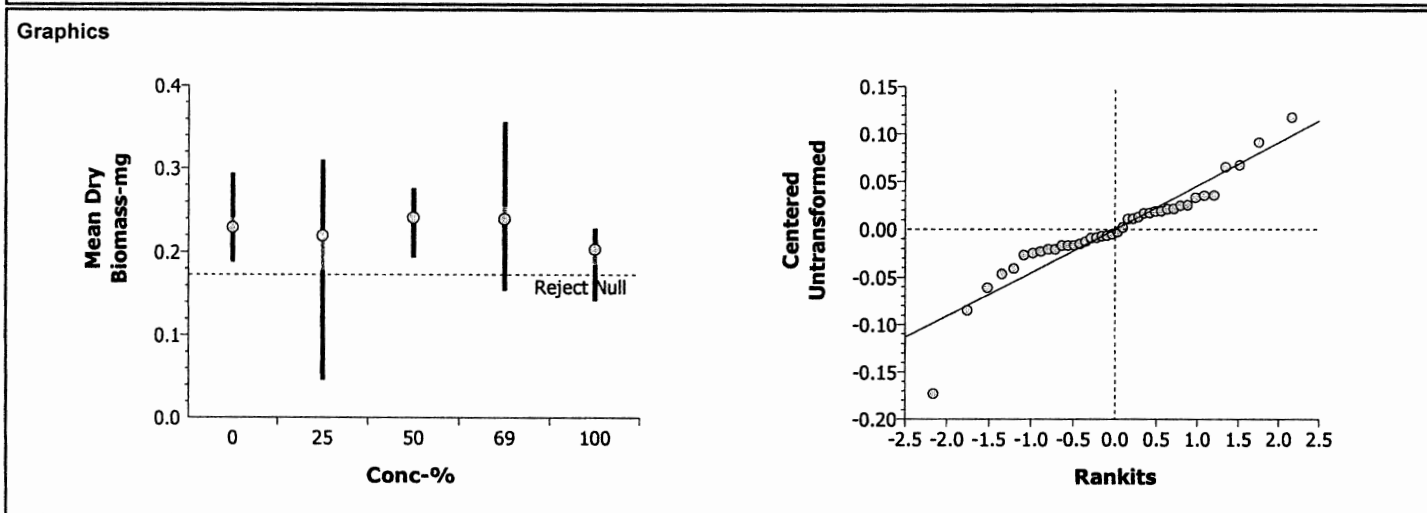
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0076811	0.001920	4	0.77	0.55134	Non-Significant Effect
Error	0.0871539	0.002490	35			
Total	0.094835	0.0044104	39			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	0.39578	2.23857	> 0.0500	0.05585	Non-Significant Effect
		50	-0.4709	2.23857	> 0.0500	0.05585	Non-Significant Effect
		69	-0.4008	2.23857	> 0.0500	0.05585	Non-Significant Effect
		100	1.03204	2.23857	> 0.0500	0.05585	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	8	0.22900	0.18800	0.29400	0.03513				
25		8	0.21912	0.04600	0.31000	0.07926				
50		8	0.24075	0.19400	0.27600	0.02653				
69		8	0.23900	0.15400	0.35600	0.05862				
100		8	0.20325	0.14200	0.22800	0.02818				



Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name: City of Buenaventura

Test Species: A. bahia

Sample ID: B-3

Start Date/Time: 2/1/2005 / 1600

Test No.: 0502-021

End Date/Time: 2/8/2005 / 1630^{AM} 1700

Conc. (%)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + mysid (g)	(mg)
		0	1	2	3	4	5	6	7				
Lab Control #2	a	5	5	5	5	5	5	5	5	100	0.03188	0.03346	↓
	b	5	5	5	5	5	5	5	5	100	0.03164	0.03305	
	c	5	5	5	5	5	5	5	5	100	0.03905	0.04041	
	d	5	5	5	5	5	5	5	5	100	0.04003	0.04133	
	e	5	5	5	5	5	5	5	5	100	0.03912	0.04033	
	f	5	5	5	5	5	4	4	4	80	0.03906	0.03999	
	g	5	5	5	5	5	5	5	5	100	0.03752	0.03886	
	h	5	5	5	5	5	5	5	5	100	0.03978	0.04084	
Salt Control #2	a	5	5	5	5	5	5	5	5	100	0.03740	0.03860	
	b	5	5	5	5	5	5	5	5	100	0.03870	0.04017	
	c	5	5	5	5	5	5	4	4	80	0.03882	0.03976	
	d	5	5	5	5	5	5	5	5	100	0.04438	0.04539	
	e	5	5	5	5	5	5	5	5	100	0.04104	0.04214	
	f	5	5	5	5	5	5	5	5	100	0.03785	0.03891	
	g	5	5	5	5	5	5	5	5	100	0.03742	0.03874	
	h	5	5	5	5	5	5	5	5	100	0.03492	0.03598	
25	a	5	5	4	4	4	4	4	4	80	0.03493	0.03448	36.1
	b	5	5	5	5	5	5	5	5	100	0.03589	0.03334	37.4
	c	8/10	10	10	10	10	10	10	10	100	0.03517	0.03824	37.1
	d	8/10	10	10	10	10	10	10	10	100	0.03456	0.03393	36
	e	5	5	5	5	5	5	5	5	100	0.03421	0.03260	35
	f	5	5	5	5	5	5	5	5	100	0.03452	0.03428	35
	g	5	5	5	4	4	4	4	4	80	0.03434	0.03692	35.4
	h	5	5	5	4	5	5	5	5	100	0.03481	0.04055	36.0
50	a	5	5	5	5	5	5	5	4	80	0.03831	0.04076	39.1
	b	5	5	5	5	5	5	5	5	100	0.03646	0.03919	37.7
	c	5	5	5	5	5	5	5	4	80	0.03446	0.03860	35.6
	d	5	5	5	5	5	5	5	5	100	0.03612	0.04118	38
	e	5	5	5	5	5	5	5	4	80	0.03311	0.04072	34
	f	5	5	5	5	5	5	5	5	100	0.03705	0.04019	35
	g	5	5	5	5	5	5	4	4	80	0.03529	0.03911	36.1
	h	5	5	5	5	5	5	5	5	100	0.03498	0.04673	35.7
Tech Initials		SH/ML	RG	SD	ML	SH	RG	AH	ML/SD				

Feeding Times (day):

	0	1	2	3	4	5	6
→	0630	0830	0815	0710	1000	0915	
←	1730	1600	1545	1530	1430	1900	1530

Weight Data:
 Date/Time in: 2-8-05/1700
 Date/Time out: 2/15/05 1320
 Oven Temp (°C): 67
 Tech Initials: SH

Comments: ⓐ Reps c and d in 25% concentration accidentally initiated with 10 animals instead of 5.

QC Check: AH 2/16/05
 Final Review: SH 2/24/05

Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name: City of Buenaventura

Test Species: A. bahia

Sample ID: B-3

Start Date/Time: 2/1/2005 / 1600

Test No.: 0502-021

End Date/Time: 2/8/2005 / 1430^{DM} - 1700

Conc. (./.)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + mysid (g)	(ma ↓3 36.0 34.7 35.4 34.1 SM3
		0	1	2	3	4	5	6	7				
69%	a	5	5	5	5	5	5	5	5	100	0.03512	0.04248	
	b	5	5	5	5	5	5	5	5	100	0.03465	0.03995	
	c	5	5	5	5	5	5	5	5	100	0.03361	0.04282	
	d	5	5	5	4	4	4	3	3	60	0.03463	0.04378	
	e	5	5	5	5	5	5	5	5	100	0.03301	0.04501	
	f	5	5	5	5	5	5	5	5	100	0.03761	0.04657	
	g	5	5	5	5	5	5	5	5	100	0.03696	0.03803	
	h	5	5	5	5	5	5	5	5	100	0.02990	0.03098	
100%	a	5	5	5	4	4	4	4	4	80	0.03526	0.03637	
	b	5	4	4	4	4	4	4	4	80	0.03119	0.03217	
	c	5	5	5	5	5	5	5	5	100	0.03334	0.03442	
	d	5	5	5	5	5	5	4	4	80	0.03399	0.03493	
	e	5	5	5	5	5	5	5	5	100	0.03356	0.03464	
	f	5	5	5	5	5	5	5	5	100	0.03188	0.03295	
	g	5	5	5	5	5	5	5	5	100	0.03321	0.03431	
	h	5	5	5	5	5	5	4	4	80	0.03266	0.03331	
	a												
	b												
	c												
	d												
	e												
	f												
	g												
	h												

Tech Initials: SM/RL Rg SD WC SH Rg AH SS

Feeding Times (day):

	0	1	2	3	4	5	6
—		0830	0830	0815	0710	1006	0915
	1730	1600	1445	1530	1430	1906	1530

Comments: Too cloudy for accurate counts (completed renewal before doing counts)

Weight Data:
 Date/Time in: 2-8-05 1700
 Date/Time out: 2/15/05 1320
 Oven Temp (°C): 67
 Tech Initials: SM

QC Check: SM 2/16/05
 Final Review: SM 2/24/05

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura

Test Species: A. bahia

Sample ID: B-3

Start Date/Time: 2/1/2005 1100

Test No: 0502-021

End Date/Time: 2/8/2005 1700

Concentration		Lab Control #2								
Day		0	1	2	3	4	5	6	7	
Initial										
pH		8.06	8.05	7.93	8.04	7.96	8.02	8.05		
DO (mg/L)		8.4	8.2	8.0	8.1	8.0	7.9	8.1		
Salinity (ppt)		30.0	29.7	29.5	30.4	30.7	30.3	30.0		
Temp (°C)		25.0	25.0	25.0	24.5	24.2	25.0	24.7	25.0	
Final										
pH			7.89	7.89	7.86	7.81	7.93	7.90	7.89	
DO (mg/L)			7.8	5.45	5.1	5.7	5.7	5.7	5.8	
Temp (°C)			25.2	25.9	24.9	24.5	24.6	24.7	25.4	

Concentration		50%								
Day		0	1	2	3	4	5	6	7	
Initial										
pH		8.124	8.38	8.19	8.45	8.47	8.37	8.35		
DO (mg/L)		8.1	6.9	7.5	7.1	7.4	7.0	6.5		
Salinity (ppt)		30.3	30.7	30.2	29.2	30.1	30.4	30.3		
Temp (°C)		25.0	25.0	25.5	24.5	24.2	25.0	25.0		
Final										
pH			8.35	8.23	8.16	8.13	8.17	8.25	8.19	
DO (mg/L)			7.1	6.4	5.2	5.4	5.1	6.0	5.1	
Temp (°C)			25.2	25.9	24.9	24.4	24.5	24.8	25.8	

Concentration		Salt Control #2								
Day		0	1	2	3	4	5	6	7	
Initial										
pH		8.97	8.33	8.47	8.17	8.21	8.19	8.22		
DO (mg/L)		7.7	6.7	7.6	7.4	7.7	7.7	7.1		
Salinity (ppt)		30.2	29.6	29.4	29.2	29.3	30.6	30.5		
Temp (°C)		25.0	25.0	25.0	24.5	24.2	25.0	25.0	25.0	
Final										
pH			8.17	7.94	7.91	7.93	7.94	8.02	7.94	
DO (mg/L)			7.6	5.5	5.0	5.6	5.7	5.8	5.2	
Temp (°C)			25.1	25.9	25.0	24.3	24.6	24.8	25.8	

Concentration		69%								
Day		0	1	2	3	4	5	6	7	
Initial										
pH		8.100	8.39	8.21	8.45	8.50	8.41	8.38		
DO (mg/L)		8.3	7.3	7.4	6.9	7.0	6.7	6.2		
Salinity (ppt)		30.2	30.2	30.7	29.1	30.1	30.6	30.1		
Temp (°C)		25.0	25.0	25.2	24.5	24.2	25.0	25.0		
Final										
pH			8.37	8.29	8.20	8.18	8.19	8.27	8.25	
DO (mg/L)			7.3	5.6	5.1	5.4	5.2	5.5	5.5	
Temp (°C)			25.2	25.9	24.8	24.5	24.4	24.7	25.7	

Concentration		25%								
Day		0	1	2	3	4	5	6	7	
Initial										
pH		8.76	8.35	8.17	8.44	8.39	8.29	8.31		
DO (mg/L)		7.9	6.6	7.7	7.2	7.4	7.4	6.8		
Salinity (ppt)		30.2	30.5	30.0	29.3	30.2	30.3	30.0		
Temp (°C)		25.0	25.0	25.5	24.5	24.2	25.0	25.0		
Final										
pH			8.29	8.15	8.06	8.04	8.11	8.13	8.09	
DO (mg/L)			7.4	6.2	5.1	5.4	5.1	5.7	6.2	
Temp (°C)			25.1	25.9	24.9	24.4	24.5	24.8	25.9	

Concentration		100%								
Day		0	1	2	3	4	5	6	7	
Initial										
pH		8.53	8.46	8.26	8.45	8.52	8.45	8.41		
DO (mg/L)		9.0	7.9	6.1	6.8	7.1	6.1	5.6		
Salinity (ppt)		30.3	30.7	30.9	29.0	30.1	30.9	30.5		
Temp (°C)		25.0	25.0	25.0	24.5	24.2	25.0	25.0		
Final										
pH			8.41	8.33	8.23	8.25	8.27	8.37	8.27	
DO (mg/L)			7.5	5.6	4.7	5.4	5.2	5.5	5.4	
Temp (°C)			25.1	25.9	24.9	24.5	24.4	24.8	25.3	

Animal Source/Date Received: ABS 2/1/05

Analysts:	Initial:	0	1	2	3	4	5	6	7
		SD	SD	SD	SA	MC	SP	SD	
	Final:		MC	SD	SA	MC	RG	RG	SD

Animal Age at Initiation: 7 days

Comments:

QC Check: SM 2/16/05

Final Review: [Signature] 2/24/05

CETIS Test Summary

Report Date: 24 Feb-05 3:24 PM

Link: 03-8102-5010/0502-022

Mysid 7-d Survival and Growth Test							Nautilus Environmental (CA)		
Test No:	00-8578-6125	Test Type:	Growth-Survival (7d)	Duration:	7d 1h				
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Americamysis bahia				
Ending Date:	08 Feb-05 05:00 PM	Dil Water:	Artificial Saltwater	Source:	Aquatic Biosystems, CO				
Setup Date:	01 Feb-05 04:00 PM	Brine:	Forty Fathoms						
Sample No:	08-0113-2659	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura				
Sample Date:	31 Jan-05 08:45 AM	Code:	0502-022	Project:					
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	31h	Station:	C-1						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
06-3506-8900	7d Proportion Survived	100	> 100	N/A	13.01%	Steel's Many-One Rank			
10-3420-1731	Mean Dry Biomass-mg	100	> 100	N/A	16.70%	Dunnett's Multiple Comparison			
7d Proportion Survived Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
0	Salt Control	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
25		8	0.92500	0.80000	1.00000	0.03660	0.10351	11.19%	
50		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%	
69		8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%	
100		8	0.92500	0.40000	1.00000	0.07500	0.21213	22.93%	
Mean Dry Biomass-mg Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	8	0.26725	0.18600	0.41600	0.02417	0.06836	25.58%	
0	Salt Control	8	0.22900	0.18800	0.29400	0.01242	0.03513	15.34%	
25		8	0.21600	0.17400	0.26000	0.00896	0.02534	11.73%	
50		8	0.23875	0.19600	0.28200	0.01154	0.03265	13.68%	
69		8	0.21950	0.19600	0.25600	0.00832	0.02354	10.72%	
100		8	0.22850	0.12800	0.29200	0.01710	0.04835	21.16%	
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	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000
0	Salt Control	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000
25		0.80000	1.00000	1.00000	0.80000	1.00000	0.80000	1.00000	1.00000
50		1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000
69		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	0.40000
Mean Dry Biomass-mg Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Lab Control	0.41600	0.28200	0.27200	0.26000	0.24200	0.18600	0.26800	0.21200
0	Salt Control	0.24000	0.29400	0.18800	0.20200	0.22000	0.21200	0.26400	0.21200
25		0.22800	0.21800	0.26000	0.17400	0.20600	0.21000	0.20000	0.23200
50		0.25800	0.19600	0.23600	0.20600	0.28200	0.20800	0.25000	0.27400
69		0.21400	0.24400	0.20400	0.19600	0.20400	0.19800	0.25600	0.24000
100		0.25000	0.20400	0.21800	0.25400	0.29200	0.23400	0.24800	0.12800

CETIS Analysis Detail

Mysid 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	03-8102-5010	06-6762-0296	24 Feb-05 3:24 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		100	>100	1.00	N/A	13.01%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	0.69777	3.90824	0.59866	Equal Variances
Distribution	Shapiro-Wilk W	0.64003	0.91882	0.00000	Non-normal Distribution

ANOVA Table

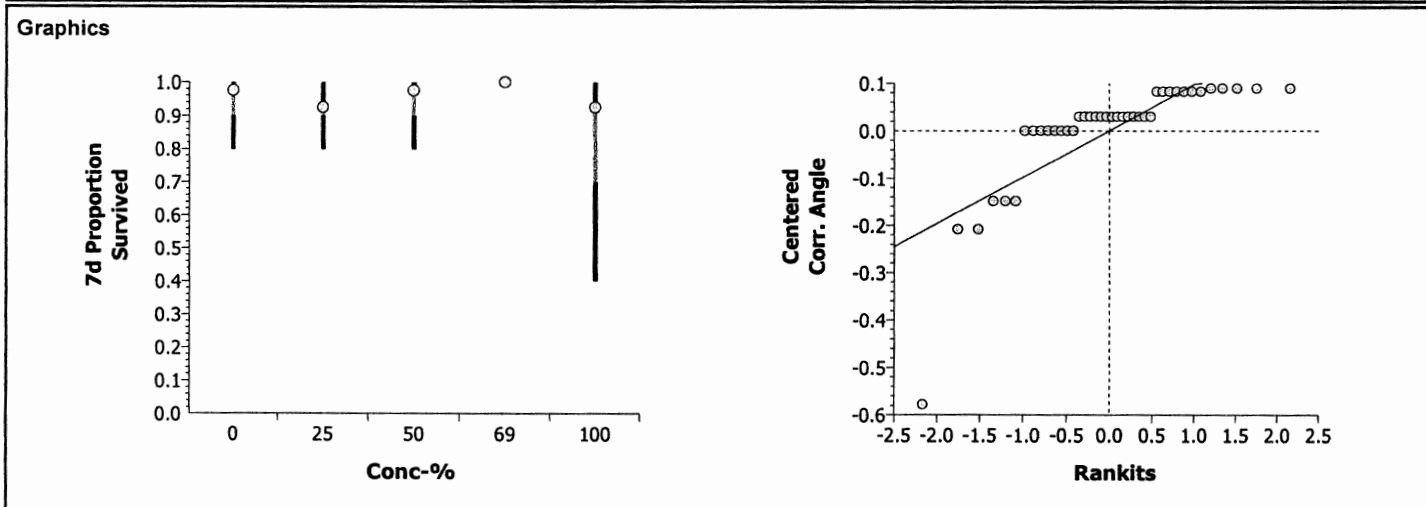
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0468397	0.01171	4	0.70	0.59866	Non-Significant Effect
Error	0.5873675	0.016782	35			
Total	0.6342072	0.0284918	39			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		25	60	47	> 0.0500	2	Non-Significant Effect
		50	68	47	> 0.0500	2	Non-Significant Effect
		69	72	47	> 0.0500	1	Non-Significant Effect
		100	67.5	47	> 0.0500	1	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
25		8	0.92500	0.80000	1.00000	0.10351	1.25598	1.10715	1.34528	0.12325
50		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
69		8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
100		8	0.92500	0.40000	1.00000	0.21213	1.26271	0.68472	1.34528	0.23354



CETIS Analysis Detail

Mysid 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-8102-5010	06-6762-0296	24 Feb-05 3:24 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	16.70%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	4.51198	13.27671	0.34113	Equal Variances
Distribution	Shapiro-Wilk W	0.97158	0.91882	0.49634	Normal Distribution

ANOVA Table

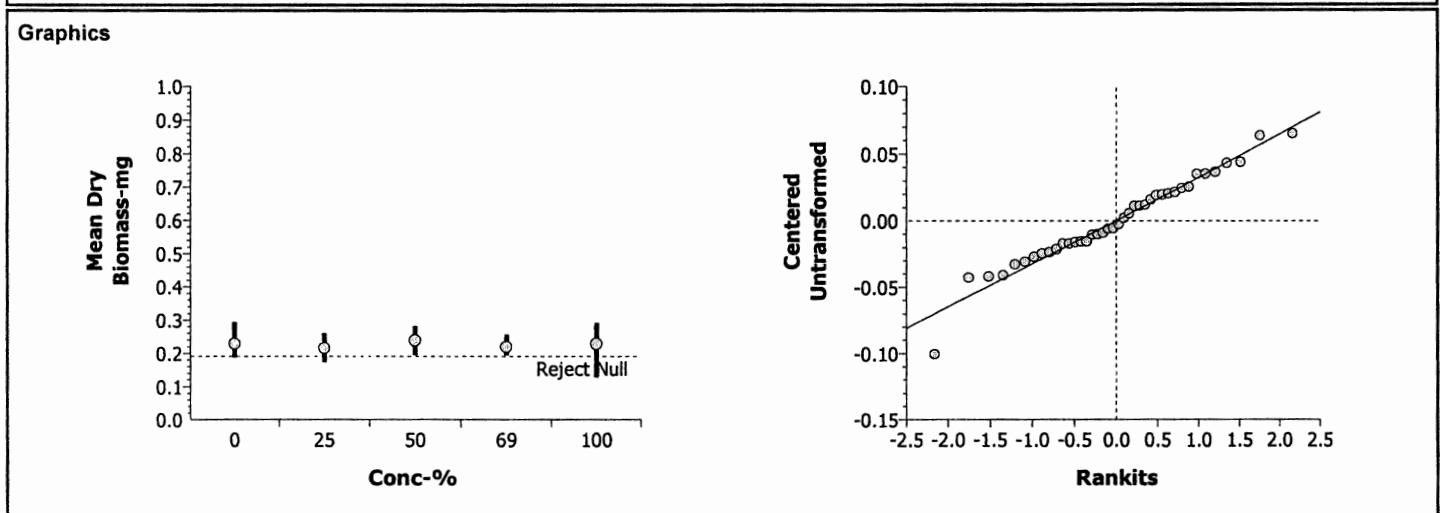
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0025556	0.000639	4	0.55	0.70202	Non-Significant Effect
Error	0.0408437	0.001167	35			
Total	0.04339932	0.0018059	39			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		25	0.76110	2.23857	> 0.0500	0.03824	Non-Significant Effect
		50	-0.5708	2.23857	> 0.0500	0.03824	Non-Significant Effect
		69	0.55619	2.23857	> 0.0500	0.03824	Non-Significant Effect
		100	0.02926	2.23857	> 0.0500	0.03824	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	8	0.22900	0.18800	0.29400	0.03513				
25		8	0.21600	0.17400	0.26000	0.02534				
50		8	0.23875	0.19600	0.28200	0.03265				
69		8	0.21950	0.19600	0.25600	0.02354				
100		8	0.22850	0.12800	0.29200	0.04835				



Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name: City of Buenaventura

Test Species: A. bahia

Sample ID: C-1

Start Date/Time: 2/1/2005 / 1600

Test No.: 0502-022

End Date/Time: 2/8/2005 / 1620

Conc. (%/-)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + mysid (g)
		0	1	2	3	4	5	6	7			
25	a	5	5	4	4	4	4	4	4	80	0.03334	0.03448
	b	5	5	5	5	5	5	5	5	100	0.03225	0.03334
	c	5	5	5	5	5	5	5	5	100	0.03694	0.03829
	d	5	5	5	5	5	4	4	4	80	0.03256	0.03343
	e	5	5	5	5	5	5	5	5	100	0.03257	0.03360
	f	5	5	4	4	4	4	4	4	80	0.03323	0.03428
	g	5	5	5	5	5	5	5	5	100	0.03592	0.03692
	h	5	5	5	5	5	5	5	5	100	0.03939	0.04055
50	a	5	5	5	5	5	5	5	5	100	0.03947	0.04076
	b	5	5	5	5	5	5	5	5	100	0.03821	0.03919
	c	5	5	5	5	5	5	5	5	100	0.03742	0.03860
	d	5	5	5	5	5	5	5	5	100	0.04015	0.04118
	e	5	5	5	5	5	5	5	5	100	0.03931	0.04072
	f	5	5	5	5	5	5	4	4	80	0.03915	0.04019
	g	5	5	5	5	5	5	5	5	100	0.03786	0.03911
	h	5	5	5	5	5	5	5	5	100	0.04536	0.04673
69%	a	5	5	5	5	5	5	5	5	100	0.04141	0.04248
	b	5	5	5	5	5	5	5	5	100	0.03873	0.03995
	c	5	5	5	5	5	5	5	5	100	0.04180	0.04282
	d	5	5	5	5	5	5	5	5	100	0.04280	0.04378
	e	5	5	5	5	5	5	5	5	100	0.04399	0.04501
	f	5	5	5	5	5	5	5	5	100	0.04552	0.04651
	g	5	5	5	5	5	5	5	5	100	0.04306	0.04439
	h	5	5	5	5	5	5	5	5	100	0.04367	0.04487
100	a	5	5	5	5	5	5	5	5	100	0.04440	0.04565
	b	5	5	5	5	5	5	5	5	100	0.04414	0.04516
	c	5	5	5	5	5	5	5	5	100	0.056409	0.04518
	d	5	5	5	5	5	5	5	5	100	0.04548	0.04675
	e	5	5	5	5	5	5	5	5	100	0.05069	0.05215
	f	5	5	5	5	5	5	5	5	100	0.05054	0.05171
	g	5	5	5	5	5	5	5	5	100	0.04339	0.04463
	h	5	5	5	3	3	3	3	2	40	0.04997	0.05061
Tech Initials		SH/RE	RG	SD	MC	SH	RG	AH	ME			

Feeding Times (day):

	0	1	2	3	4	5	6
—		0430	0830	0815	0710	1000	0915
	1730	1600	1445	1530	1430	1900	1530

Weight Data:
 Date/Time in: 2/8/05 1620
 Date/Time out: 2/15/05 1320
 Oven Temp (°C): 67
 Tech Initials: SM

Comments: See B-3 for lab and salt control

QC Check: AH 2/16/05
 Final Review: SM 2/24/05

Client: City of Buenaventura
 Sample ID: C-1
 Test No: 0502-022

Test Species: A. bahia
 Start Date/Time: 2/1/2005 / 11000
 End Date/Time: 2/8/2005 / 1700^{DM}-1620

Concentration	25%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.74	8.35	8.18	8.41	8.44	8.31	8.30	
DO (mg/L)	7.8	6.7	7.7	7.1	7.4	7.5	7.0	
Salinity (ppt)	30.2	29.9	30.1	29.2	30.4	30.4	30.5	
Temp (°C)	25.0	25.0	25.7	24.5	24.9	25.0	25.0	
Final								
pH		8.27	8.13	8.07	8.02	8.06	8.15	8.09
DO (mg/L)		7.4	5.5	4.9	4.5	5.2	5.2	5.4
Temp (°C)		25.2	25.8	24.8	24.3	24.2	24.5	25.8

Concentration	100%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.50	8.39	8.23	8.38	8.48	8.44	8.34	
DO (mg/L)	8.9	7.9	7.5	6.6	6.8	6.9	6.7	
Salinity (ppt)	30.4	30.9	31.5	29.1	30.1	31.0	30.6	
Temp (°C)	25.0	25.0	25.8	24.5	24.2	25.0	25.0	
Final								
pH		8.39	8.32	8.26	8.22	8.24	8.35	8.30
DO (mg/L)		7.8	5.3	4.8	5.5	5.1	5.4	5.4
Temp (°C)		25.0	25.9	24.8	24.4	24.1	24.5	25.8

Concentration	50%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.163	8.36	8.20	8.38	8.46	8.38	8.33	
DO (mg/L)	8.2	6.9	7.6	6.9	7.0	7.3	7.0	
Salinity (ppt)	30.2	30.3	30.4	29.2	30.4	30.9	30.0	
Temp (°C)	25.0	25.0	25.6	24.5	24.2	25.0	25.0	
Final								
pH		8.33	8.22	8.15	8.11	8.15	8.24	8.18
DO (mg/L)		7.3	5.9	4.8	5.3	5.1	5.3	5.5
Temp (°C)		25.1	25.9	24.8	24.3	24.3	24.5	25.7

Concentration								
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Salinity (ppt)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Concentration	69%							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.58	8.37	8.22	8.38	8.47	8.41	8.35	
DO (mg/L)	8.4	7.2	7.4	6.8	7.0	6.9	6.8	
Salinity (ppt)	30.3	30.6	30.9	29.3	30.1	31.3	30.0	
Temp (°C)	25.0	25.0	25.4	24.5	24.2	25.0	25.0	
Final								
pH		8.34	8.26	8.21	8.18	8.17	8.31	8.24
DO (mg/L)		7.5	6.2	4.8	5.4	5.2	5.5	5.4
Temp (°C)		25.1	25.9	24.8	24.4	24.3	24.5	25.8

Concentration								
Day	0	1	2	3	4	5	6	7
Initial								
pH								
DO (mg/L)								
Salinity (ppt)								
Temp (°C)								
Final								
pH								
DO (mg/L)								
Temp (°C)								

Animal Source/Date Received: ABS 2/1/05

Animal Age at Initiation: 7 days

Comments: See B-3 for lab and salt control data.

QC Check: SM 2/16/05

Analysts:	Initial:	0	1	2	3	4	5	6	7
		SD	SD	SD	SH	MC	SD	SD	
	Final:		RE	SD	SH	MC	RE	RE	SD

Final Review: [Signature] 2/24/05

M. GALLOPROVINCIALIS

CETIS Test Summary

Report Date: 28 Feb-05 9:55 AM

Link: 14-8546-3756/0502-027

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)		
Test No:	16-0870-9544	Test Type:	Development	Duration:	47h	Species:	Mytilus galloprovincialis	
Start Date:	01 Feb-05 04:45 PM	Protocol:	ASTM E724-98 (1999)	Source:	Carlsbad Aquafarms			
Ending Date:	03 Feb-05 03:45 PM	Dil Water:	Scripps Seawater	Brine:	Frozen Seawater			
Setup Date:	01 Feb-05 04:45 PM	Comments: The 100 percent concentration was prepared by the addition of artificial salts, all other concentrations were made by adding hypersaline brine.						
Sample No:	10-7764-7639	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 03:20 PM	Code:	0502-027	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	25h	Station:	A-2					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
07-5510-9096	Proportion Normal	100	> 100	N/A	96.72%	Equal Variance t		
13-5387-4314		71	> 71	N/A	10.06%	Dunnett's Multiple Comparison		
Proportion Normal Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	0.76400	0.69000	0.85000	0.02676	0.05983	7.83%
0	Lab Control	5	0.83400	0.80000	0.90000	0.01860	0.04159	4.99%
0	Salt Control	5	0.30600	0.00000	0.71000	0.14780	0.33050	108.01
25		5	0.91400	0.87000	0.95000	0.01503	0.03362	3.68%
50		5	0.88200	0.85000	0.92000	0.01463	0.03271	3.71%
71		5	0.85600	0.79000	0.91000	0.02088	0.04669	5.45%
100		5	0.61600	0.46000	0.81000	0.06860	0.15339	24.90%
Proportion Normal Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Brine Control	0.74000	0.85000	0.69000	0.75000	0.79000		
0	Lab Control	0.81000	0.85000	0.80000	0.90000	0.81000		
0	Salt Control	0.59000	0.23000	0.00000	0.00000	0.71000		
25		0.89000	0.94000	0.92000	0.95000	0.87000		
50		0.88000	0.91000	0.92000	0.85000	0.85000		
71		0.91000	0.89000	0.85000	0.84000	0.79000		
100		0.47000	0.62000	0.81000	0.72000	0.46000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	14-8546-3756	14-8546-3756	28 Feb-05 9:49 AM	CETISv1.025

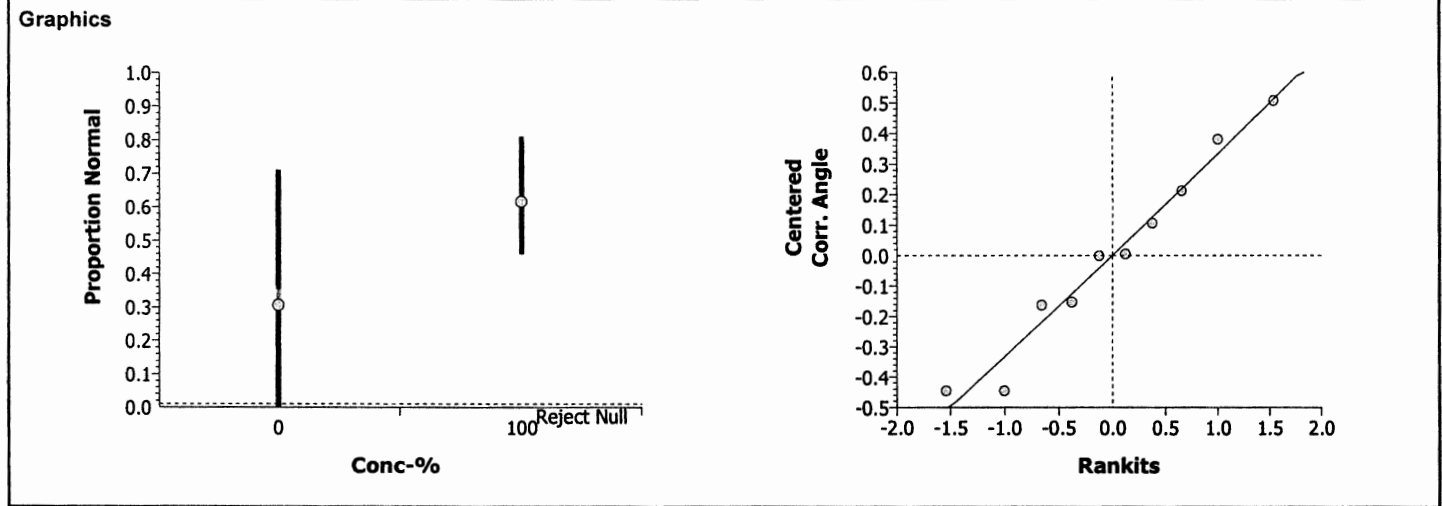
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	96.72%

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	7.55518	23.15450	0.07559	Equal Variances
Distribution	Shapiro-Wilk W	0.95714	0.78055	0.72507	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.4252051	0.425205	1	3.76	0.08836	Non-Significant Effect
Error	0.9039483	0.112994	8			
Total	1.32915336	0.5381986	9			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-1.9399	1.85955	0.9558	0.39533	Non-Significant Effect

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.30600	0.00000	0.71000	0.33050	0.49565	0.05002	1.00212	0.44673
100		5	0.61600	0.46000	0.81000	0.15339	0.90806	0.74536	1.11977	0.16253



CETIS Analysis Detail

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	14-8546-3756	14-8546-3756	28 Feb-05 9:50 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnnett's Multiple Comparison	C > T	Angular (Corrected)		71	>71	1.41	N/A	10.06%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	0.45067	11.34487	0.92959	Equal Variances
Distribution	Shapiro-Wilk W	0.96351	0.86826	0.59480	Normal Distribution

ANOVA Table

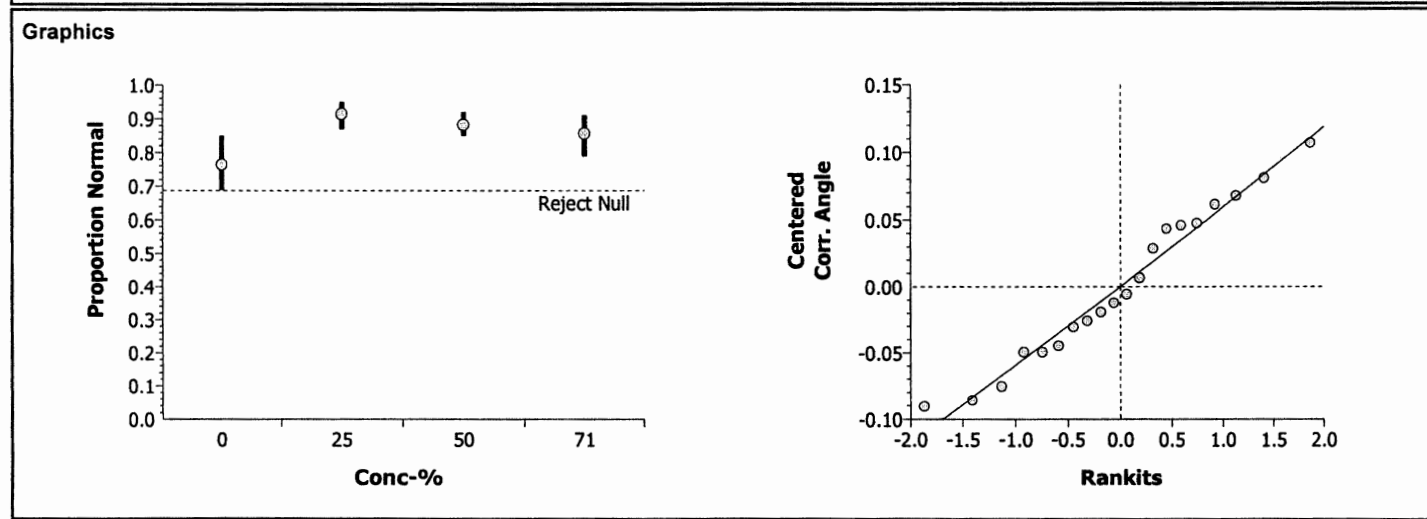
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.1202274	0.040076	3	10.06	0.00058	Significant Effect
Error	0.0637653	0.003985	16			
Total	0.18399278	0.0440611	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	-5.2909	2.23	> 0.0500	0.08904	Non-Significant Effect
		50	-3.9188	2.23	> 0.0500	0.08904	Non-Significant Effect
		71	-2.9799	2.23	> 0.0500	0.08904	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Brine Control	5	0.76400	0.69000	0.85000	0.05983	1.06622	0.98030	1.17310	0.07230
25		5	0.91400	0.87000	0.95000	0.03362	1.27746	1.20193	1.34528	0.06011
50		5	0.88200	0.85000	0.92000	0.03271	1.22268	1.17310	1.28404	0.05148
71		5	0.85600	0.79000	0.91000	0.04669	1.18519	1.09476	1.26610	0.06671



Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura
 Sample ID: A-2
 Test No.: 0502-027

Test Species: M. galloprovincialis
 Start Date/Time: 2/1/2005 16:45
 End Date/Time: 2:30 1545

Concentration ____ % ____	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control #1	30.0 33.6	29.5	29.6	14.0	15.5	15.2	8.6	8.3	7.9	8.21	7.77	7.90
Salt Control #1	30.0	30.1	30.0	14.0	14.9	15.1	7.2	7.9	7.9	8.06	7.85	7.92
Brine Control	30.3	30.1	30.3	14.0	15.0	15.2	7.9	8.0	7.9	8.16	7.81	7.93
25	30.7	32.0	32.7	14.0	14.9	15.2	8.6	8.4	8.0	8.10	7.98	8.03
50	29.6	31.3	31.2	14.0	15.0	15.0	8.6	7.8	7.8	8.06	8.09	8.20
70.8	30.8	31.9	31.4	14.0	14.8	15.1	8.6	8.0	8.0	8.04	8.16	8.32
100	30.1	30.7	30.2	14.0	14.7	15.1	8.9	8.3 8.4	8.1	8.52	8.37	8.37

Technician Initials:

0	24	48
MC	RE	RG

Animal Source/Date Received: Mission Bay
field collected 1/28/05

Comments: 0 hrs: _____
 24 hrs: _____
 48 hrs: _____

QC Check: 93/100 at 2/1/05 Final Review: [Signature] 2/28/05

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC

Sample ID: Site A-2

Test Date: 2/1/2005

Test No: 0502-027

Test Type: Bivalve Development

Salinity of Effluent 1.1

Salinity of Brine 100.2

Target Salinity 30

Test Dilution Volume 150

	<u>Effluent</u>	<u>Brine Control</u>
Salinity Adjustment Factor: (TS - SE)/(SB - TS) =	<u>0.41</u>	<u>0.43</u>
TS = target salinity		
SE = salinity of effluent		
SB = salinity of brine		

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	150
25.0	37.5	0.41	15.4	150
50.0	75	0.41	30.9	150
70.8	106	0.41	43.7	150

DI Volume

Brine Control	102	0.43	43.7	150
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Total Brine Volume Required (ml): **133.8**

Marine Chronic Bioassay

Bivalve Development Worksheet

Client: City of Buena Vista, Internal Start Date/Time: 2/1/05 1645
 Test No.: 0502-027, 0030, 050201 mg rt End Date/Time: 2/3/05 1545
 Test Species: M. galloprovincialis Technician Initials: mc
 Animal Source: Carlsbad Aquafarms/Mission Bay
 Date Received: 1/28/05

Test Chambers: Shell vials Sample Volume: 10ml

First Gamete Release Time: 1145

Spawn Information		
Sex	Number	Condition
Male	16	Good
Female	7	Good

Egg Fertilization Time: 1440

Embryo Stock Density Calculation:

Number Counted: 12 15
25 16
16 38
22 19
18 22

Mean: 20.3

Mean ~~18.6~~ ^{20.3} X 42 = 853 embryos/ml

Initial Density: 853 = 2.13 (dilution factor) $1/1.13 = 100/113$
 Desired Final Density: 400

Prepare the embryo stock according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Percent Division Upon Inoculation: 90 Time Zero Counts: / 48-h QC: 93/100

Inoculation Time: 1645

Comments: _____

QC Check: AH 2/10/05

Final Review: [Signature] 2/28/05

CETIS Data Worksheet

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502 -027
 Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: A-2

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
			31	100	85	uc
			32	100	25 59	SD UC
			33	100	72	uc
			34	100	95	uc
			35	100	85	uc
			36	100	81	uc
			37	100	77 71	SD UC
			38	100	92	uc
			39	100	23	SD UC
			40	100	87	uc
			41	100	91	uc
			42	100	79	uc
			43	100	85	uc
			44	100	94	uc
			45	100	92	uc
			46		89	uc
			47		89	uc
			48		90	
			49		47	
			50		81	
			51		91	
			52		46	
			53		75	
			54		79	AH
			55		85	
			56		74 84	
			57		74	
			58		62	heavy debris
			59		81	"
			60		80	
			61		85	
			62	100	0	SD
			63		0	SD
			64		88	AH
			65		69	AH

CETIS Data Worksheet

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502-027
 Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: A-2

Conc.-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	B	1	57	100	74	
0	B	2	35		85	
0	B	3	65		69	
0	B	4	53		75	
0	B	5	42		79	
0	LC	1	50		81	
0	LC	2	31		85	
0	LC	3	60		80	
0	LC	4	48		80	
0	LC	5	36		88	
0	SC	1	32		58	
0	SC	2	39		59	
0	SC	3	63		23	
0	SC	4	62		00	
0	SC	5	37		00	
25		1	46		99	
25		2	44		99	
25		3	45		94	
25		4	34		99	
25		5	40		97	
50		1	64	88		
50		2	51	88		
50		3	38	99		
50		4	55	99		
50		5	43	99		
85		1	41	99		
65	AH	2	47	99		
65		3	61	99		
65		4	56	99		
65		5	54	94		
100		1	49	79		
100		2	58	77		
100		3	59	62		
100		4	33	82		
100		5	52	72		
				46		

CETIS Test Summary

Report Date: 28 Feb-05 10:02 AM

Link: 06-0849-1893/0502-028

Bivalve Larval Survival and Development Test				Nautilus Environmental (CA)				
Test No:	16-0870-9544	Test Type:	Development	Duration:	47h			
Start Date:	01 Feb-05 04:45 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis			
Ending Date:	03 Feb-05 03:45 PM	Dil Water:	Scripps Seawater	Source:	Carlsbad Aquafarms			
Setup Date:	01 Feb-05 04:45 PM	Brine:	Frozen Seawater					
Comments:	The 100 percent concentration was prepared by the addition of artificial salts, all other concentrations were made by adding hypersaline brine.							
Sample No:	09-3000-5498	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 02:30 PM	Code:	0502-028	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	26h	Station:	B-1					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
07-0274-5421	Proportion Normal	100	> 100	N/A	96.59%	Equal Variance t		
00-7972-5090		71	> 71	N/A	5.64%	Dunnett's Multiple Comparison		
Proportion Normal Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	0.83600	0.79000	0.88000	0.01503	0.03362	4.02%
0	Lab Control	5	0.83400	0.80000	0.90000	0.01860	0.04159	4.99%
0	Salt Control	5	0.30600	0.00000	0.71000	0.14780	0.33050	108.01
25		5	0.89200	0.85000	0.93000	0.01428	0.03194	3.58%
50		5	0.91600	0.90000	0.94000	0.00678	0.01517	1.66%
71		5	0.85800	0.81000	0.90000	0.01463	0.03271	3.81%
100		5	0.13000	0.03000	0.30000	0.04743	0.10607	81.59%
Proportion Normal Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Brine Control	0.82000	0.84000	0.88000	0.85000	0.79000		
0	Lab Control	0.81000	0.81000	0.80000	0.85000	0.90000		
0	Salt Control	0.00000	0.71000	0.00000	0.23000	0.59000		
25		0.93000	0.85000	0.90000	0.87000	0.91000		
50		0.90000	0.91000	0.92000	0.91000	0.94000		
71		0.86000	0.90000	0.87000	0.81000	0.85000		
100		0.30000	0.09000	0.07000	0.16000	0.03000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test	Nautilus Environmental (CA)
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	06-0849-1893	06-0849-1893	28 Feb-05 10:01 AM	CETISv1.025

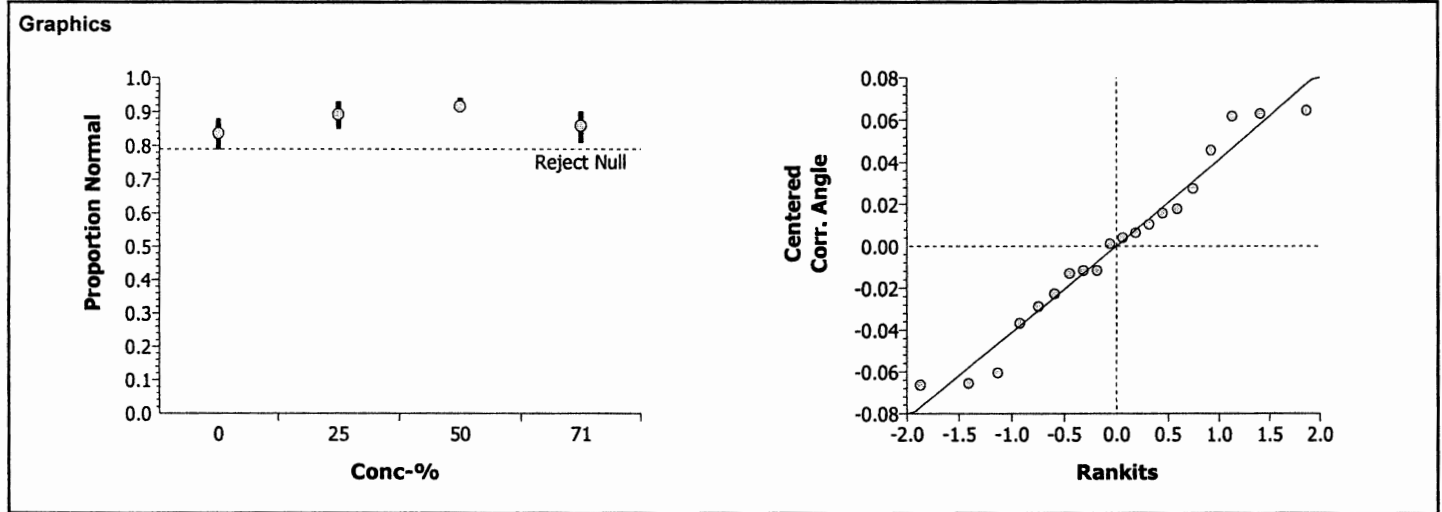
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		71	>71	1.41	N/A	5.64%

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	1.31282	11.34487	0.72609	Equal Variances
Distribution	Shapiro-Wilk W	0.95338	0.86826	0.41034	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0443801	0.014793	3	7.64	0.00217	Significant Effect
Error	0.0309717	0.001936	16			
Total	0.07535172	0.0167291	19			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	-2.9927	2.23	> 0.0500	0.06205	Non-Significant Effect
		50	-4.3972	2.23	> 0.0500	0.06205	Non-Significant Effect
		71	-1.1091	2.23	> 0.0500	0.06205	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	0.83600	0.79000	0.88000	0.03362	1.15537	1.09476	1.21705	0.04562
25		5	0.89200	0.85000	0.93000	0.03194	1.23864	1.17310	1.30303	0.05160
50		5	0.91600	0.90000	0.94000	0.01517	1.27772	1.24905	1.32333	0.02834
71		5	0.85800	0.81000	0.90000	0.03271	1.18623	1.11977	1.24905	0.04686



CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	06-0849-1893	06-0849-1893	28 Feb-05 10:01 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	96.59%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	8.29382	23.15450	0.06448	Equal Variances
Distribution	Shapiro-Wilk W	0.95551	0.78055	0.70504	Normal Distribution

ANOVA Table

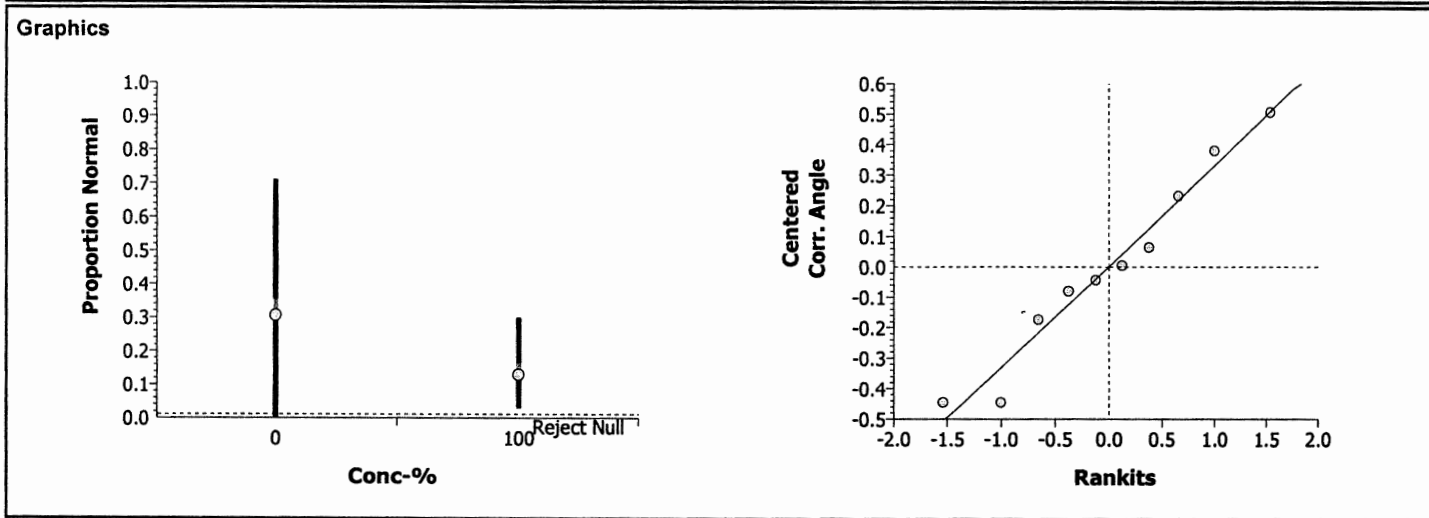
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0548397	0.05484	1	0.49	0.50359	Non-Significant Effect
Error	0.8945383	0.111817	8			
Total	0.94937793	0.1666569	9			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	0.70031	1.85955	0.2518	0.39327	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.30600	0.00000	0.71000	0.33050	0.49565	0.05002	1.00212	0.44673
100		5	0.13000	0.03000	0.30000	0.10607	0.34754	0.17408	0.57964	0.15512



CETIS Data Worksheet

Report Date: 31 Jan-05 2:08 PM
Link: 06-0849-1893

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502-028
Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: B-1

Conc.-%	Code	Rep	Pos	# Counted	# Normal	Notes
			66	-	-	
			67	100	81	SD
			68	100	90	AA
			69	100	92 96	SD
			70	100	92	SD
			71	100	85	AA
			72	100	85	SD
			73	100	85 88	↓
			74	-	-	
			75	-	-	
			76	100	93	AA
			77	100	77	SD
			78	100	91	SD
			79	100	-	
			80	-	-	
			81	100	59 84	SD JR
			82	↓	77 82	↓ JR
			83	↓	75 85	↓ SD
			84	-	-	
			85	100	87	SD
			86	100	91	AA
			87	-	-	
			88	100	30	SD
			89	100	90	SD
			90	-	-	
			91	↓	90 77	↓
			92	-	-	
			93	100	66	SD
			94	↓	87 86	↓
			95	-	-	
			96	100	94	
			97	100	88 85	SD
			98	100	88 79	SD
			99	-	-	
			100	100	NR 97 3	SD

84 JR
82

Share LC and SC w/ A-2

LC SC
85/100 59/100
81/100 71/100
90/100 23/100
81/100 0/100
80/100 0/100

CETIS Data Worksheet

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502-028
 Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: B-1

Conc.-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	B	1	82	100	84 82	JR
0	B	2	81	100	84	JR
0	B	3	73			
0	B	4	97			
0	B	5	98			
0	LC	1	79			
0	LC	2	92			
0	LC	3	99			
0	LC	4	74			
0	LC	5	80			
0	SC	1	95			
0	SC	2	88			
0	SC	3	87			
0	SC	4	84			
0	SC	5	66			
25		1	76	100	93	AT
25		2	71	100	85	AT
25		3	89	100	90	SD
25		4	90	100	87	SD
25		5	91	100	91	SD
50		1	68	100	90	AT
50		2	86	100	91	AT
50		3	70	100	92	SD
50		4	78	100	91	SD
50		5	96	100	96	SD
65		1	94	100	86	SD
65		2	69	100	90	SD
65		3	85	100	87	SD
65		4	67	↓	81	↓
65		5	83	↓	85	↓
100		1	88	100	30	SD
100		2	72	100	9	↓
100		3	77	↓	7	↓
100		4	93	↓	16	↓
100		5	100	↓	3	JR

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura
 Sample ID: B-1
 Test No.: 0502-028

Test Species: M. galloprovincialis
 Start Date/Time: 2/1/2005 1645
 End Date/Time: 2.3.05 1545

Concentration ____%____	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Brine Control	30.1	30.0	30.2	14.0	15.3	15.2	7.6	8.0	7.9	8.16	7.91	7.94
25	30.5	30.4	30.7	14.0	15.1	15.1	8.7	8.1	7.7	8.05	8.00	8.03
50	30.6	30.7	30.9	14.0	15.0	15.2	8.8	8.0	7.9	7.97	8.06	8.05
75	30.9	30.4	30.7	14.6	14.9	15.2	8.7	8.0	7.9	7.91	8.11	8.20
100	29.8	29.9	29.3	14.0	15.0	15.2	8.8	8.4	8.1	8.50	8.42	8.51

Technician Initials:

0	24	48
ML	RL	RL

Animal Source/Date Received: Mission Bay field collected 1/28/05

Comments: 0 hrs: See A-2 for Lab and Salt control data
 24 hrs: _____
 48 hrs: _____

QC Check: AS/10 AH 2/10/05 Final Review: [Signature] 2/28/05

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC

Sample ID: Site B-1

Test Date: 2/1/2005

Test No: 0502-028

Test Type: Bivalve Development

Salinity of Effluent 1.3

Salinity of Brine 100.2

Target Salinity 30

Test Dilution Volume 150

	<u>Effluent</u>	<u>Brine Control</u>
Salinity Adjustment Factor: (TS - SE)/(SB - TS) =	<u>0.41</u>	<u>0.43</u>

TS = target salinity
SE = salinity of effluent
SB = salinity of brine

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	150
25.0	37.5	0.41	15.3	150
50.0	75	0.41	30.7	150
71.0	106	0.41	43.5	150

DI Volume

Brine Control	102	0.43	43.5	150
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Total Brine Volume Required (ml): **133.1**

CETIS Test Summary

Report Date: 28 Feb-05 10:05 AM

Link: 12-5295-7283/0502-029

Bivalve Larval Survival and Development Test				Nautilus Environmental (CA)				
Test No:	16-0870-9544	Test Type:	Development	Duration:	47h			
Start Date:	01 Feb-05 04:45 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis			
Ending Date:	03 Feb-05 03:45 PM	Dil Water:	Scripps Seawater	Source:	Carlsbad Aquafarms			
Setup Date:	01 Feb-05 04:45 PM	Brine:	Frozen Seawater					
Comments:	The 100 percent concentration was prepared by the addition of artificial salts, all other concentrations were made by adding hypersaline brine.							
Sample No:	16-0445-8447	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-029	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	29h	Station:	B-3					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
04-6960-7781	Proportion Normal	100	> 100	N/A	36.52%	Unequal Variance t		
03-2801-2674		71	> 71	N/A	9.94%	Dunnett's Multiple Comparison		
Proportion Normal Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	0.80400	0.68000	0.89000	0.03586	0.08019	9.97%
0	Lab Control	5	0.86600	0.80000	0.90000	0.01749	0.03912	4.52%
0	Salt Control	5	0.44400	0.18000	0.60000	0.07132	0.15947	35.92%
25		5	0.89000	0.85000	0.92000	0.01140	0.02550	2.86%
50		5	0.87200	0.84000	0.90000	0.01020	0.02280	2.62%
71		5	0.86000	0.82000	0.95000	0.02345	0.05244	6.10%
100		5	0.89800	0.89000	0.92000	0.00583	0.01304	1.45%
Proportion Normal Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Brine Control	0.68000	0.85000	0.82000	0.78000	0.89000		
0	Lab Control	0.90000	0.87000	0.89000	0.80000	0.87000		
0	Salt Control	0.43000	0.18000	0.51000	0.60000	0.50000		
25		0.92000	0.90000	0.85000	0.89000	0.89000		
50		0.88000	0.84000	0.88000	0.90000	0.86000		
71		0.82000	0.84000	0.86000	0.95000	0.83000		
100		0.89000	0.90000	0.92000	0.89000	0.89000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	12-5295-7283	12-5295-7283	28 Feb-05 10:04 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		71	>71	1.41	N/A	9.94%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	5.60521	11.34487	0.13248	Equal Variances
Distribution	Shapiro-Wilk W	0.95672	0.86826	0.46629	Normal Distribution

ANOVA Table

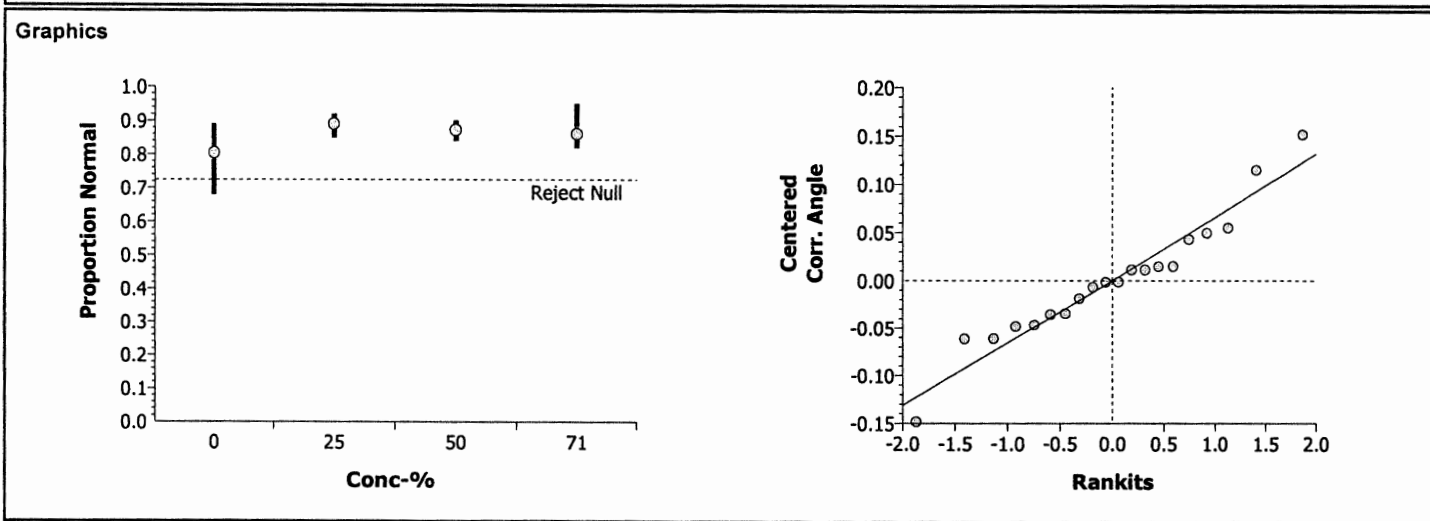
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0369421	0.012314	3	2.43	0.10278	Non-Significant Effect
Error	0.0810055	0.005063	16			
Total	0.11794766	0.0173769	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	-2.5823	2.23	> 0.0500	0.10035	Non-Significant Effect
		50	-1.9516	2.23	> 0.0500	0.10035	Non-Significant Effect
		71	-1.6876	2.23	> 0.0500	0.10035	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Brine Control	5	0.80400	0.68000	0.89000	0.08019	1.11812	0.96953	1.23273	0.09964
25		5	0.89000	0.85000	0.92000	0.02549	1.23433	1.17310	1.28404	0.04013
50		5	0.87200	0.84000	0.90000	0.02280	1.20595	1.15928	1.24905	0.03402
71		5	0.86000	0.82000	0.95000	0.05244	1.19406	1.13265	1.34528	0.08692



CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	12-5295-7283	12-5295-7283	28 Feb-05 10:04 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	36.52%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	58.92915	23.15450	0.00165	Unequal Variances
Distribution	Shapiro-Wilk W	0.79664	0.78055	0.01545	Normal Distribution

ANOVA Table

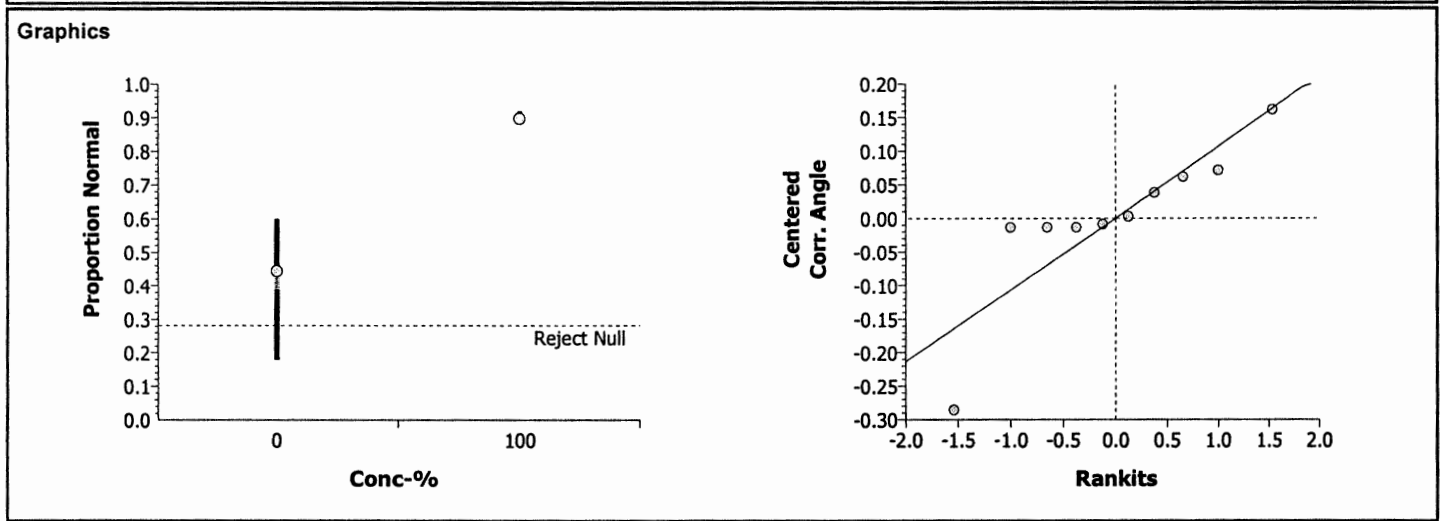
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.6817781	0.681778	1	45.87	0.00014	Significant Effect
Error	0.1189095	0.014864	8			
Total	0.80068760	0.6966418	9			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-6.7726	2.13185	0.9988	0.16438	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.44400	0.18000	0.60000	0.15947	0.72404	0.43815	0.88608	0.17097
100		5	0.89800	0.89000	0.92000	0.01304	1.24626	1.23273	1.28404	0.02227



CETIS Data Worksheet

Report Date: 31 Jan-05 2:10 PM

Link: 12-5295-7283

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Start Date: 01 Feb-05	Species: Mytilus galloprovincialis	Sample Code: 0502-029
Ending Date: 03 Feb-05	Protocol: ASTM E724-98 (1999)	Sample Source: City of Buenaventura
Sample Date: 31 Jan-05	Material: Estuarine Monitoring Sample	Sample Station: B-3

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
			101	100	88	AA
			102	100	76 50	SD
			103	100	92	
			104	100	75 85	
			105		88	
			106	↓	89	
			107	100	78 51	
			108	↓	89 70 77	↓ AA
			109	100	92	AA
			110	100	90	
			111	100	83	
			112	100	84	
			113	100	87 78 76	AA
			114	100	89	SD
			115	100	89	
			116	100	90	
			117	100	89	↓
			118	100	95	SD
			119	100	80 43	SD
			120	100	80 5	SD
			121	100	80 18	SD
			122	↓	70 90	AA
			123	100	89	AA
			124	100	80 80	AA
			125	100	78 87	AA
			126	100	84	AA
			127	100	80	AA
			128	100	86	SD
			129	100	80	SD
			130	100	78	SD
			131	100	89	SD
			132	100	80	SD
			133	100	86	SD
			134	100	80	AA
			135	100	90	SD

CETIS Data Worksheet

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date: 01 Feb-05 Species: *Mytilus galloprovincialis* Sample Code: 0502-029
 Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: B-3

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	B	1	127	100	68	NA
0	B	2	104	100	85	SD
0	B	3	129	100	82	SD
0	B	4	130	100	78	SD
0	B	5	131	100	89	SD
0	LC	1	122	100	70 / 90	SD / NA
0	LC	2	125	100	78 / 87	SD / NA
0	LC	3	108	106	77 / 89	SD / NA
0	LC	4	124	100	29 / 80	SD / NA
0	LC	5	113	106	76 / 87	SD / NA
0	SC	1	119	100	43	SD
0	SC	2	121	100	91	SD
0	SC	3	107	100	51	SD
0	SC	4	132	100	60	SD
0	SC	5	102	100	50	SD
25		1	109	100	92	NA
25		2	110	100	90	NA
25		3	120	100	85	SD
25		4	106	100	89	SD
25		5	114	100	89	SD
50		1	101	100	88	NA
50		2	126	100	84	SD
50		3	105	100	88	SD
50		4	135	100	90	SD
50		5	128	100	86	SD
65		1	134	100	82	NA
65		2	112	100	84	SD
65		3	133	100	86	SD
65		4	118	100	95	SD
65		5	111	100	83	SD
100		1	123	100	89	NA
100		2	116	100	90	SD
100		3	103	100	92	SD
100		4	117	100	89	SD
100		5	115	100	89	SD

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura
 Sample ID: B-3
 Test No.: 0502-029

Test Species: M. galloprovincialis
 Start Date/Time: 2/1/2005 1645
 End Date/Time: 2.3.05 1545

Concentration ____%	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control #2	29.8	29.2	29.2	14.0	15.5	15.1	8.4	8.0	7.9	8.22	7.99	7.95
Salt Control #2	29.7	29.3	29.4	14.0	15.3	15.2	7.4	7.7	7.9	8.06	7.94	7.94
Brine Control	30.3	30.6	31.0	14.0	14.7	15.1	7.8	7.7	7.8	8.14	7.90	7.99
25	30.5	30.7	30.1	14.0	15.0	15.0	8.6	7.7	7.9	8.10	8.10	8.10
50	29.5	30.3	30.4	14.0	14.9	15.1	8.9	7.9	7.9	8.08	8.17	8.18
70.6	29.4	30.5	30.6	14.0	14.9	15.1	9.0	7.9	8.0	8.06	8.23	8.25
100	30.0	29.3	29.7	14.0	14.8	15.1	9.0	7.9	8.1	8.58	8.48	8.47

Technician Initials:

0	24	48
MC	RE	RG

Animal Source/Date Received: Mission Bay Field collected 1/28/05

Comments: 0 hrs: _____
 24 hrs: _____
 48 hrs: _____

QC Check: AH 2/10/05 Final Review: AH 2/28/05

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC

Sample ID: Site B-3, C-1

Test Date: 2/1/2005

Test No: 0502-029,030

Test Type: Bivalve Development

Salinity of Effluent 0.7

Salinity of Brine 100.2

Target Salinity 30

Test Dilution Volume 150

	<u>Effluent</u>	<u>Brine Control</u>
Salinity Adjustment Factor:		
(TS - SE)/(SB - TS) =	<u>0.42</u>	<u>0.43</u>
TS = target salinity		
SE = salinity of effluent		
SB = salinity of brine		

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	150
25.0	37.5	0.42	15.7	150
50.0	75	0.42	31.3	150
70.6	106	0.42	44.2	150

DI Volume

Brine Control	103	0.43	44.2	150
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Total Brine Volume Required (ml): **135.3**

CETIS Test Summary

Report Date: 28 Feb-05 10:06 AM

Link: 03-2227-1595/0502-030

Bivalve Larval Survival and Development Test				Nautilus Environmental (CA)				
Test No:	16-0870-9544	Test Type:	Development	Duration:	47h			
Start Date:	01 Feb-05 04:45 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis			
Ending Date:	03 Feb-05 03:45 PM	Dil Water:	Scripps Seawater	Source:	Carlsbad Aquafarms			
Setup Date:	01 Feb-05 04:45 PM	Brine:	Frozen Seawater					
Comments:	The 100 percent concentration was prepared by the addition of artificial salts, all other concentrations were made by adding hypersaline brine.							
Sample No:	09-0791-7830	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 08:45 AM	Code:	0502-030	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	32h	Station:	C-1					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
18-5884-7087	Proportion Normal	100	> 100	N/A	34.36%	Equal Variance t		
02-6940-5382		71	> 71	N/A	13.77%	Dunnett's Multiple Comparison		
Proportion Normal Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	0.81800	0.77000	0.90000	0.02223	0.04970	6.08%
0	Lab Control	5	0.86600	0.80000	0.90000	0.01749	0.03912	4.52%
0	Salt Control	5	0.44400	0.18000	0.60000	0.07132	0.15947	35.92%
25		5	0.83200	0.60000	0.93000	0.05978	0.13368	16.07%
50		5	0.87400	0.84000	0.90000	0.00980	0.02191	2.51%
71		5	0.82800	0.75000	0.89000	0.02267	0.05070	6.12%
100		5	0.81400	0.74000	0.88000	0.02441	0.05459	6.71%
Proportion Normal Detail								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Brine Control	0.81000	0.90000	0.79000	0.82000	0.77000		
0	Lab Control	0.89000	0.90000	0.80000	0.87000	0.87000		
0	Salt Control	0.43000	0.50000	0.18000	0.51000	0.60000		
25		0.89000	0.84000	0.90000	0.60000	0.93000		
50		0.90000	0.87000	0.88000	0.88000	0.84000		
71		0.84000	0.84000	0.75000	0.82000	0.89000		
100		0.83000	0.78000	0.84000	0.88000	0.74000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	03-2227-1595	03-2227-1595	28 Feb-05 10:06 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		71	>71	1.41	N/A	13.77%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	9.15487	11.34487	0.02730	Equal Variances
Distribution	Shapiro-Wilk W	0.87630	0.86826	0.01426	Normal Distribution

ANOVA Table

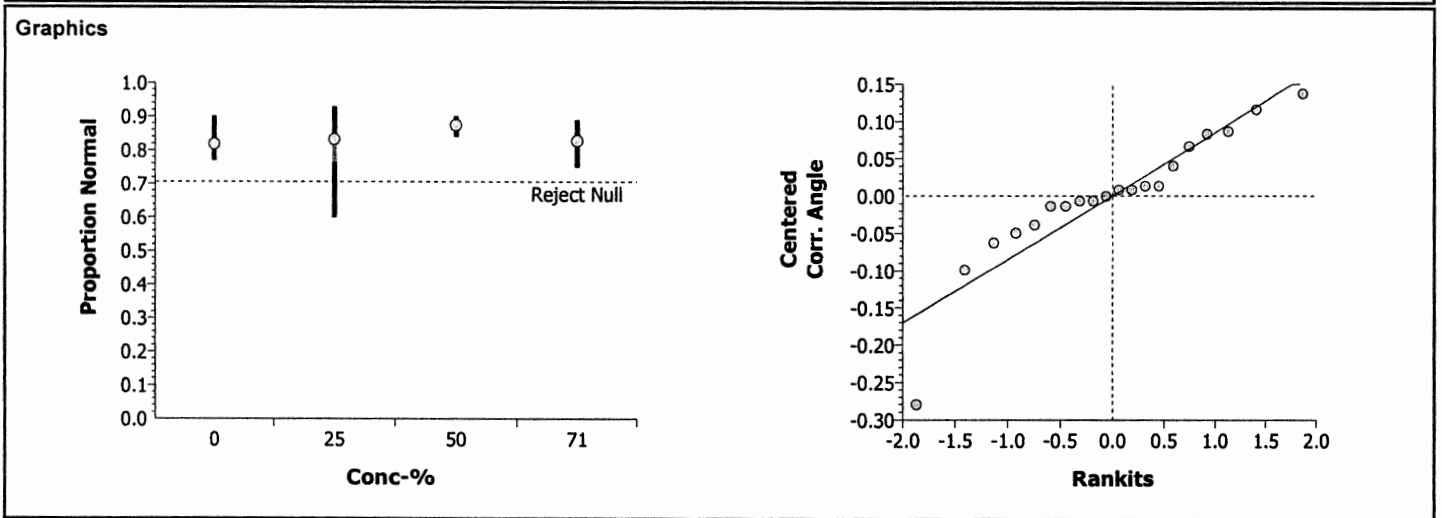
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.016357	0.005452	3	0.58	0.63463	Non-Significant Effect
Error	0.1495949	0.00935	16			
Total	0.16595185	0.0148020	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	-0.5341	2.23	> 0.0500	0.13637	Non-Significant Effect
		50	-1.2347	2.23	> 0.0500	0.13637	Non-Significant Effect
		71	-0.2103	2.23	> 0.0500	0.13637	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Brine Control	5	0.81800	0.77000	0.90000	0.04970	1.13337	1.07062	1.24905	0.06891
25		5	0.83200	0.60000	0.93000	0.13368	1.16603	0.88608	1.30303	0.16472
50		5	0.87400	0.84000	0.90000	0.02191	1.20887	1.15928	1.24905	0.03262
71		5	0.82800	0.75000	0.89000	0.05070	1.14623	1.04720	1.23273	0.06674



CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	03-2227-1595	03-2227-1595	28 Feb-05 10:06 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	34.36%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	5.90449	23.15450	0.11371	Equal Variances
Distribution	Shapiro-Wilk W	0.90053	0.78055	0.21520	Normal Distribution

ANOVA Table

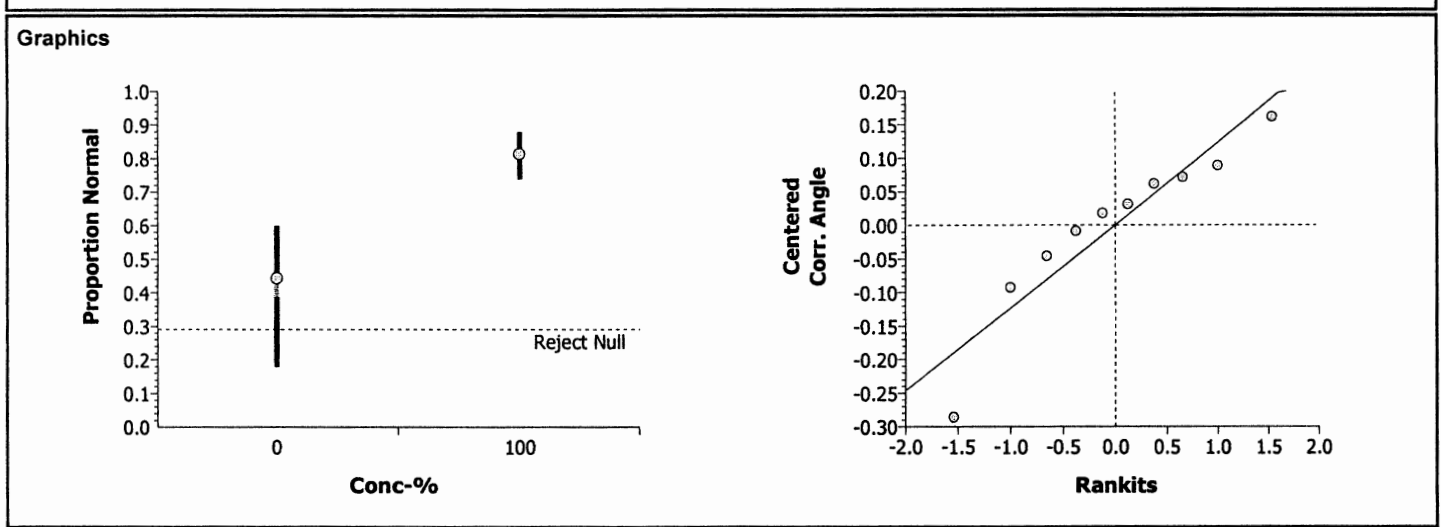
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.4081482	0.408148	1	23.88	0.00121	Significant Effect
Error	0.1367281	0.017091	8			
Total	0.54487625	0.4252392	9			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-4.8868	1.85955	0.9994	0.15375	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.44400	0.18000	0.60000	0.15947	0.72404	0.43815	0.88608	0.17097
100		5	0.81400	0.74000	0.88000	0.05459	1.12809	1.03573	1.21705	0.07036



CETIS Data Worksheet

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502-030
 Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: C-1

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
			136	100	84	AH
			137	-	-	
			138	100	93	
			139	-	87	
			140	-	81	
			141	-	82	
			142	-	88	
			143	-	84	
			144	-	79	
			145	-	90	
			146	-	89	
			147	-	88	
			148	-	-	
			149	-	75	
			150	-	82	
			151	-	77	
			152	-	78	
			153	-	74	
			154	-	-	
			155	-	-	
			156	-	83	
			157	-	88	
			158	-	-	
			159	-	-	
			160	-	84	
			161	-	-	
			162	-	-	
			163	-	84	
			164	-	90	
			165	-	90	
			166	-	89	
			167	-	-	
			168	-	84	
			169	-	90	
			170	-	-	

Share SC and LC w/ B3.

LC
 89/100
 87/100
 90/100
 80/100
 87/100

SC
 50/100
 51/100
 43/100
 18/100
 60/100

CETIS Data Worksheet

Report Date: 31 Jan-05 2:13 PM
 Link: 03-2227-1595/0501-030

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502-030
 Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: C-1

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	B	1	140			
0	B	2	170			
0	B	3	145			
0	B	4	151			
0	B	5	152			
0	LC	1	141			
0	LC	2	156			
0	LC	3	159			
0	LC	4	155			
0	LC	5	168			
0	SC	1	160			
0	SC	2	137			
0	SC	3	162			
0	SC	4	149			
0	SC	5	163			
25		1	167			
25		2	136			
25		3	165			
25		4	166			
25		5	138			
50		1	146			
50		2	139			
50		3	148			
50		4	158			
50		5	161			
65		1	144			
65		2	169			
65		3	150			
65		4	142			
65		5	147			
100		1	157			
100		2	153			
100		3	164			
100		4	143			
100		5	154			

LC#2
 SC#2
~~LC#1
 LC#2
 LC#3
 LC#4
 LC#5
 SC#1
 SC#2
 SC#3
 SC#4
 SC#5~~

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura
 Sample ID: C-1
 Test No.: 0502-030

Test Species: M. galloprovincialis
 Start Date/Time: 2/1/2005 1645
 End Date/Time: 2.3.05 1545

Concentration ____%____	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Brine Control	30.6	30.7	30.1	14.0	14.9	15.1	7.8	8.0	8.0	8.13	7.88	7.94
25	31.0	30.9	31.1	14.0	15.2	15.0	8.6	7.8	7.9	8.09	8.10	8.12
50	30.1	31.0	31.2	14.0	15.0	15.1	8.6	7.9	7.9	8.05	8.17	8.15
70.6	30.3	30.7	30.7	14.0	14.9	15.1	8.9	7.9	7.9	8.01	8.23	8.27
100	30.1	30.4	30.4	14.0	14.9	15.2	8.9	8.0	7.9	8.54	8.45	8.49

Technician Initials:

0	24	48
ML	JR	RG

Animal Source/Date Received: Mission Bay field collected 1/28/05

Comments: 0 hrs: See B-3 for lab and salt control data
 24 hrs: _____
 48 hrs: _____

QC Check: AH 2/10/05 Final Review: [Signature] 2/28/05

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC

Sample ID: Site B-3, C-1

Test Date: 2/1/2005

Test No: 0502-029,030

Test Type: Bivalve Development

Salinity of Effluent 0.7

Salinity of Brine 100.2

Target Salinity 30

Test Dilution Volume 150

	<u>Effluent</u>	<u>Brine Control</u>
Salinity Adjustment Factor: (TS - SE)/(SB - TS) =	<u>0.42</u>	<u>0.43</u>

TS = target salinity
SE = salinity of effluent
SB = salinity of brine

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	150
25.0	37.5	0.42	15.7	150
50.0	75	0.42	31.3	150
70.6	106	0.42	44.2	150

DI Volume

Brine Control	103	0.43	44.2	150
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Total Brine Volume Required (ml): **135.3**

M. PYRIFERA

CETIS Test Summary

Report Date: 24 Feb-05 3:37 PM

Link: 03-2798-4268/0502-023

Macrocyctis Germination and Germ Tube Growth Test				Nautilus Environmental (CA)				
Test No:	11-8620-2502	Test Type:	Growth-Germination	Duration:	44h			
Start Date:	01 Feb-05 03:30 PM	Protocol:	EPA/600/R-95/136 (1995)	Species:	Macrocyctis pyrifera			
Ending Date:	03 Feb-05 12:00 PM	Dil Water:	Laboratory Seawater	Source:	Field Collected			
Setup Date:	01 Feb-05 03:30 PM	Brine:	Frozen Seawater					
Comments:	The 100 % concentration was prepared by adding artificial salts. All other concentrations were made by adding hypersaline brine.							
Sample No:	12-5467-9320	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 03:20 PM	Code:	0502-023	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	24h	Station:	A-2					
Comments:	Control data shared with B-3.							
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
15-4740-2362	Mean Length	100	> 100	N/A	11.49%	Equal Variance t		
06-8149-9079		69	> 69	N/A	9.61%	Dunnett's Multiple Comparison		
13-4664-9869	Proportion Germinated	100	> 100	N/A	9.26%	Equal Variance t		
12-3785-0173		69	> 69	N/A	13.93%	Dunnett's Multiple Comparison		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
06-8149-9079	Mean Length	Control Response	12.45	10 - N/A	Passes acceptability criteria			
15-4740-2362	Mean Length	Control Response	10.5	10 - N/A	Passes acceptability criteria			
12-3785-0173	Proportion Germinated	Control Response	0.74200	0.7 - N/A	Passes acceptability criteria			
13-4664-9869	Proportion Germinated	Control Response	0.74400	0.7 - N/A	Passes acceptability criteria			
06-8149-9079	Mean Length	MSDp	0.09614	N/A - 0.2	Passes acceptability criteria			
15-4740-2362	Mean Length	MSDp	0.11494	N/A - 0.2	Passes acceptability criteria			
12-3785-0173	Proportion Germinated	MSDp	0.13928	N/A - 0.2	Passes acceptability criteria			
13-4664-9869	Proportion Germinated	MSDp	0.09257	N/A - 0.2	Passes acceptability criteria			
Mean Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	12.45	11.5	14.25	0.477	1.0665	8.57%
0	Lab Control	5	11.4	10.25	13.75	0.6205	1.3874	12.17%
0	Salt Control	5	10.5	9.75	11.25	0.3354	0.75	7.14%
25		5	11.6	11.25	12.25	0.1871	0.4183	3.61%
50		5	12.35	11.5	14.25	0.5099	1.1402	9.23%
69		5	11.6	10.75	12	0.2318	0.5184	4.47%
100		5	10.95	9.75	13	0.5557	1.2425	11.35%
Proportion Germinated Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	0.74200	0.66000	0.79000	0.02375	0.05310	7.16%
0	Lab Control	5	0.72600	0.67000	0.81000	0.02731	0.06107	8.41%
0	Salt Control	5	0.74400	0.69000	0.83000	0.02358	0.05273	7.09%
25		5	0.71600	0.60000	0.83000	0.04261	0.09529	13.31%
50		5	0.73600	0.61000	0.81000	0.03370	0.07537	10.24%
69		5	0.72200	0.66000	0.80000	0.02458	0.05495	7.61%
100		5	0.67600	0.62000	0.75000	0.02874	0.06427	9.51%

Report Date: 24 Feb-05 3:37 PM

Link: 03-2798-4268/0502-023

CETIS Test Summary

Mean Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	12.5	14.25	12	12	11.5
0	Lab Control	10.25	11.25	13.75	11.25	10.5
0	Salt Control	10.5	11.25	9.75	9.75	11.25
25		11.75	11.25	12.25	11.25	11.5
50		11.5	14.25	12.5	11.5	12
69		11.5	12	12	10.75	11.75
100		10.25	9.75	10.75	13	11

Proportion Germinated Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	0.76000	0.78000	0.79000	0.72000	0.66000
0	Lab Control	0.68000	0.70000	0.67000	0.81000	0.77000
0	Salt Control	0.83000	0.73000	0.69000	0.72000	0.75000
25		0.60000	0.83000	0.79000	0.65000	0.71000
50		0.75000	0.77000	0.81000	0.61000	0.74000
69		0.74000	0.73000	0.80000	0.68000	0.66000
100		0.62000	0.75000	0.62000	0.65000	0.74000

CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Comparison	03-2798-4268	06-8754-7222	24 Feb-05 3:37 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		69	>69	1.45	N/A	13.93%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74200	0.7 - N/A	Passes acceptability criteria
MSDp	0.13928	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	1.68677	11.34487	0.63988	Equal Variances
Distribution	Shapiro-Wilk W	0.97470	0.86826	0.82318	Normal Distribution

ANOVA Table

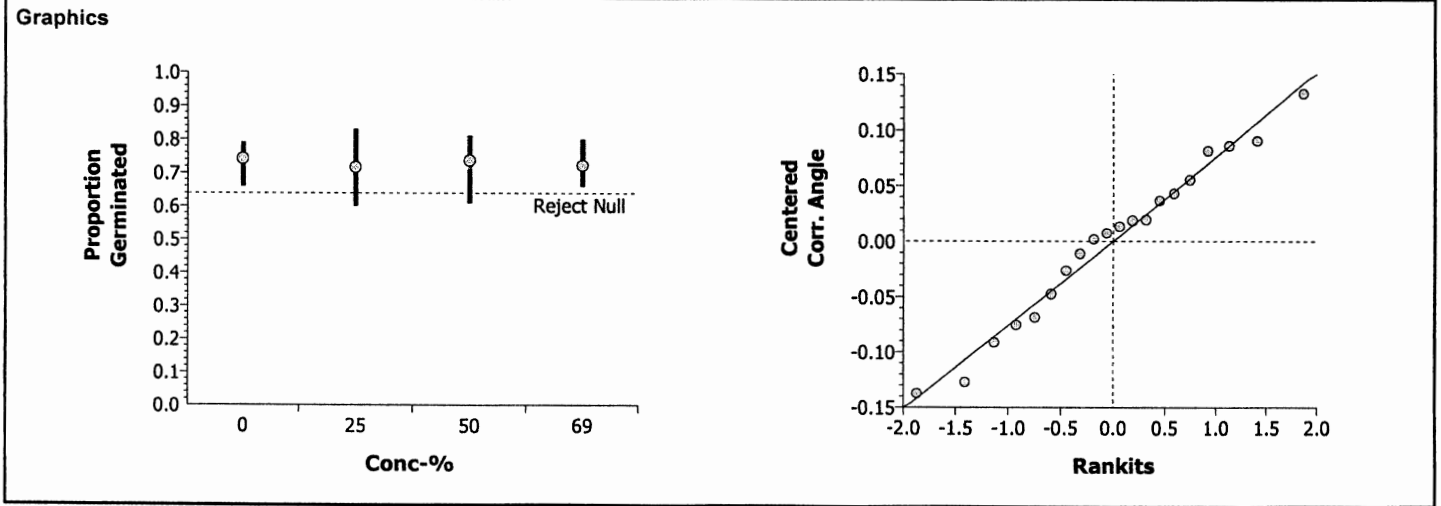
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0024387	0.000813	3	0.13	0.94380	Non-Significant Effect
Error	0.1038581	0.006491	16			
Total	0.10629684	0.0073040	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	0.51467	2.23	> 0.0500	0.11363	Non-Significant Effect
		50	0.10999	2.23	> 0.0500	0.11363	Non-Significant Effect
		69	0.44185	2.23	> 0.0500	0.11363	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Brine Control	5	0.74200	0.66000	0.79000	0.05310	1.03953	0.94826	1.09476	0.05979
25		5	0.71600	0.60000	0.83000	0.09529	1.01330	0.88608	1.14581	0.10749
50		5	0.73600	0.61000	0.81000	0.07537	1.03392	0.89631	1.11977	0.08342
69		5	0.72200	0.66000	0.80000	0.05495	1.01701	0.94826	1.10715	0.06227



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Comparison	03-2798-4268	06-8754-7222	24 Feb-05 3:37 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		69	>69	1.45	N/A	9.61%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	12.45	10 - N/A	Passes acceptability criteria
MSDp	0.09614	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	4.90312	11.34487	0.17903	Equal Variances
Distribution	Shapiro-Wilk W	0.87297	0.86826	0.01231	Normal Distribution

ANOVA Table

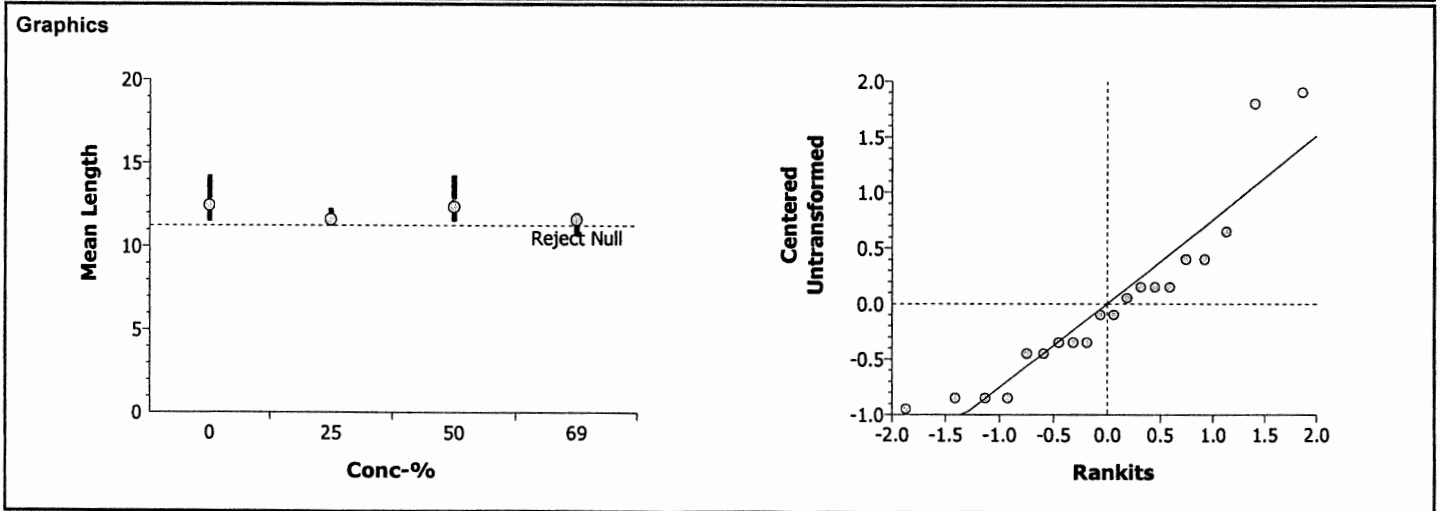
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	3.225	1.075	3	1.49	0.25450	Non-Significant Effect
Error	11.525	0.720313	16			
Total	14.7499995	1.7953125	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	1.58354	2.23	> 0.0500	1.19700	Non-Significant Effect
		50	0.1863	2.23	> 0.0500	1.19700	Non-Significant Effect
		69	1.58354	2.23	> 0.0500	1.19700	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Brine Control	5	12.45	11.5	14.25	1.0665				
25		5	11.6	11.25	12.25	0.4183				
50		5	12.35	11.5	14.25	1.1402				
69		5	11.6	10.75	12	0.5184				



CETIS Analysis Detail

Macrocyctis Germination and Germ Tube Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Comparison	03-2798-4268	06-8754-7222	24 Feb-05 3:36 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	9.26%

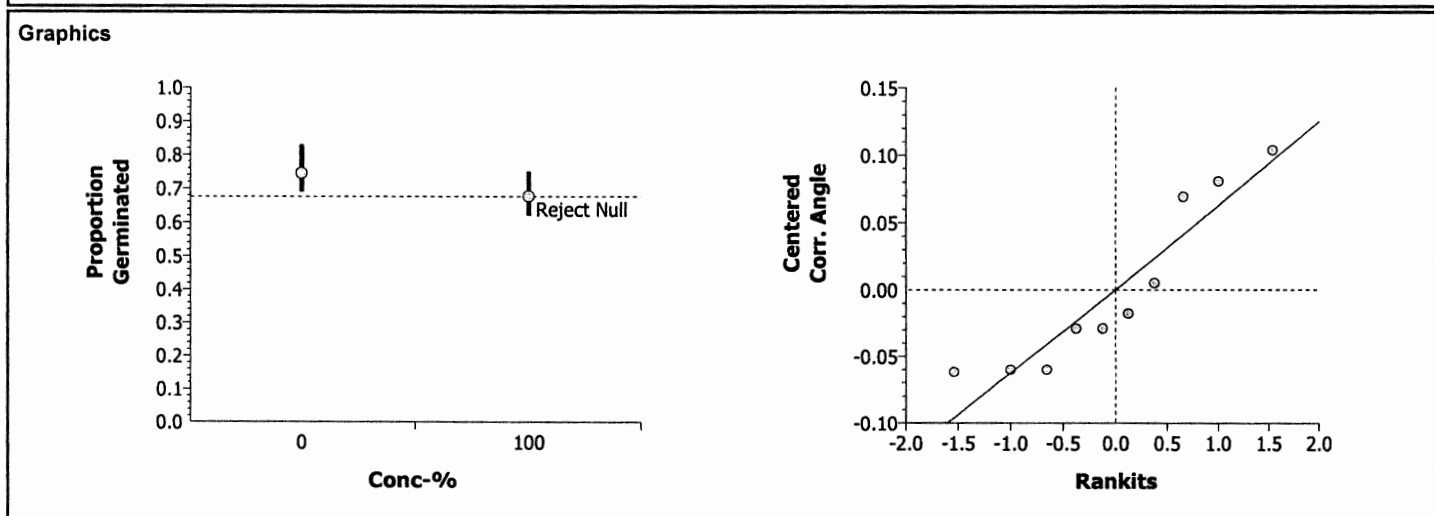
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74400	0.7 - N/A	Passes acceptability criteria
MSDp	0.09257	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.22614	23.15450	0.84815	Equal Variances
Distribution	Shapiro-Wilk W	0.85883	0.78055	0.07738	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0142178	0.014218	1	3.24	0.10936	Non-Significant Effect
Error	0.0350610	0.004383	8			
Total	0.04927884	0.0186004	9			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	1.80115	1.85955	0.0547	0.07786	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.74400	0.69000	0.83000	0.05273	1.04218	0.98030	1.14581	0.06275
100		5	0.67600	0.62000	0.75000	0.06427	0.96677	0.90658	1.04720	0.06948



CETIS Analysis Detail

Macrocyctis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Comparison	03-2798-4268	06-8754-7222	24 Feb-05 3:36 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	11.49%

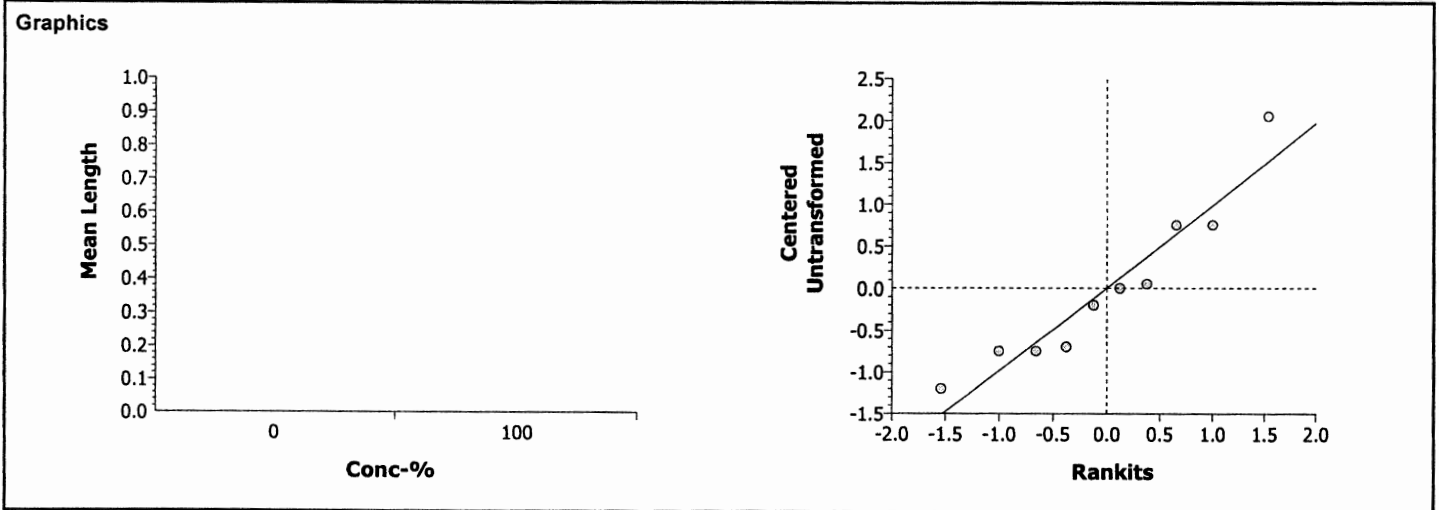
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	10.5	10 - N/A	Passes acceptability criteria
MSDp	0.11494	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.74444	23.15450	0.35174	Equal Variances
Distribution	Shapiro-Wilk W	0.91716	0.78055	0.31762	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.50625	0.50625	1	0.48	0.50773	Non-Significant Effect
Error	8.425	1.053125	8			
Total	8.93125021	1.5593750	9			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-0.6933	1.85955	0.7461	1.20692	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	10.5	9.75	11.25	0.75				
100		5	10.95	9.75	13	1.2425				



Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 1-Feb-05

Species: *Macrocystis pyrifera*

Test ID: 0502-023

End Date: 3-Feb-05

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

Sample Source: City of Buenaventura

Sampled: 31-Jan-05

Sample Station: A-2

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)										Calibration Factor	Mean Tube Length (µm)
LC 36	100	80	7	7	7	3	3	4	5	4	7	6	2.5	13.25
37	100	66	6	5	6	4	4	5	6	3	4	4	2.5	11.75
SC 38	100	71	2	6	2	5	3	4	4	3	4	3	2.5	9
39	100	61	5	5	5	6	4	4	5	3	4	5	2.5	11.5
40	100	62	3	4	4	4	3	6	4	5	4	4	2.5	10.25
LC 41	100	67	7	4	4	3	4	4	4	6	4	5	2.5	11.25
42	100	73	4	6	6	4	5	4	4	5	5	5	2.5	12
SC 43	100	64	4	4	4	5	5	4	5	6	5	5	2.5	11.75
LC 44	100	70	3	3	4	5	6	2	3	3	7	4	2.5	10
LC 45	100	81	5	5	3	7	4	5	3	6	5	5	2.5	12
LC 46	100	73	5	4	4	4	4	4	5	4	4	3	2.5	10.25
47	100	66	3	3	4	5	3	5	5	5	3	3	2.5	9.75
48	100	83	4	5	5	4	6	6	4	4	4	3	2.5	11.25
49	100	77	7	5	5	6	4	7	6	6	4	7	2.5	14.25
50	100	75	5	4	4	4	3	4	3	4	4	4	2.5	9.75
51	100	60	7	6	3	5	5	5	4	4	5	3	2.5	11.75
52	100	74	6	4	4	4	5	7	3	6	4	5	2.5	12
53	100	65	3	5	7	6	3	3	4	5	5	4	2.5	11.25
54	100	64	6	5	5	4	5	3	4	4	4	4	2.5	11
55	100	71	3	5	6	4	6	5	3	6	4	4	2.5	11.5
56	100	68	7	3	3	3	5	4	4	5	4	5	2.5	10.75
57	100	74	5	5	4	6	5	4	4	3	4	4	2.5	11
58	100	80	5	5	3	4	5	4	5	5	7	5	2.5	12
SC 59	100	77	5	5	5	4	5	3	5	5	3	3	2.5	10.75
60	100	81	7	6	3	6	3	3	6	6	4	6	2.5	12.5
61	100	65	5	5	6	4	7	6	5	4	5	5	2.5	13
SC 62	100	76	6	5	3	3	3	5	5	4	3	4	2.5	10.25
63	100	62	4	6	4	4	4	4	3	5	5	4	2.5	10.75
64	100	71	4	4	4	4	4	3	3	5	4	4	2.5	9.75
65	100	75	5	5	7	4	5	5	5	4	3	3	2.5	11.5
66	100	79	4	6	6	4	5	7	3	6	4	4	2.5	12.25
67	100	74	3	5	5	3	4	5	5	6	5	5	2.5	11.5
68	100	83	3	4	4	4	5	4	3	3	4	5	2.5	9.75
SC 69	100	72	4	3	5	3	4	4	6	4	3	4	2.5	10
70	100	75	3	4	3	3	4	4	3	3	4	4	2.5	8.75

QC Check: AH 2/7/05

Final review: [Signature] 2/24/05
 actual data changed w/ R-2 in CETIS

Analyst: MC

Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 1-Feb-05

Species: *Macrocystis pyrifera*

Test ID: 0502-023

End Date: 3-Feb-05

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

Sample Source: City of Buenaventura

Sampled: 31-Jan-05

Sample Station: A-2

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)										Calibration Factor	Mean Tube Length (µm)
36	100	100	6	5	6	4	4	5	6	3	4	4	2.5	#DIV/0!
37	100	80	7	7	7	3	3	4	5	4	7	6		#DIV/0!
38	100	71	2	6	2	5	3	4	4	3	4	3		#DIV/0!
39	100	61	5	5	5	6	4	4	5	3	4	5		#DIV/0!
40	100	62	3	4	4	4	3	6	4	5	4	4		#DIV/0!
41	100	67	7	4	4	3	4	4	4	6	4	5		#DIV/0!
42	100	73	4	6	6	4	5	4	4	5	5	5		#DIV/0!
43	100	64	4	4	4	5	5	4	5	6	5	5		#DIV/0!
44	100	76	3	3	4	5	6	2	3	3	7	4		#DIV/0!
45	100	81	5	5	3	7	4	5	3	6	5	5		#DIV/0!
46	100	73	5	4	4	4	4	4	5	4	4	3		#DIV/0!
47	100	66	3	3	4	5	3	5	5	5	3	3		#DIV/0!
48	100	83	4	5	3	4	6	6	4	4	3	4		#DIV/0!
49	100	77	7	5	5	6	4	7	6	6	4	7		#DIV/0!
50	100	75	5	4	4	4	3	4	3	4	4	4		#DIV/0!
51	100	60	7	6	3	5	5	5	4	4	5	3		#DIV/0!
52	100	74	6	4	4	4	5	7	3	6	4	5		#DIV/0!
53	100	65	3	5	7	6	3	3	4	5	5	4		#DIV/0!
54	100	64	6	5	5	4	5	3	4	4	4	4		#DIV/0!
55	100	71	3	5	6	4	6	5	3	6	4	4		#DIV/0!
56	100	68	7	3	3	3	5	4	4	5	4	5		#DIV/0!
57	100	74	5	5	4	6	5	4	4	3	4	4		#DIV/0!
58	100	80	5	5	3	4	5	4	5	5	7	5		#DIV/0!
59	100	77	5	5	5	4	5	3	5	5	3	3		#DIV/0!
60	100	81	7	6	3	6	3	3	6	6	4	6		#DIV/0!
61	100	65	5	5	6	4	7	6	5	4	5	5		#DIV/0!
62	100	76	6	5	3	3	3	5	5	4	3	4		#DIV/0!
63	100	62	4	6	4	4	4	4	3	5	5	4		#DIV/0!
64	100	71	4	4	4	4	4	3	3	5	4	4		#DIV/0!
65	100	75	5	5	7	4	5	5	5	4	3	3		#DIV/0!
66	100	79	4	6	6	4	5	7	3	6	4	4		#DIV/0!
67	100	74	3	5	5	3	4	5	5	6	5	5		#DIV/0!
68	100	83	3	4	4	4	5	4	3	3	4	5		#DIV/0!
69	100	72	4	3	5	3	4	4	6	4	3	4		#DIV/0!
70	100	75	3	4	3	3	4	4	3	3	4	4		#DIV/0!

QC Check: AH 2/3/05

Final review: AH 2/7/05

Analyst: MC

CETIS Data Worksheet

Report Date: 31 Jan-05 2:27 PM
 Link: 03-2798-4268/0502-023

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: *Macrocystis pyrifera* Sample Code: 0502-023
 Ending Date: 03 Feb-05 Protocol: EPA/600/R-95/136 (1995) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: A-2

Conc.-%	Code	Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor	Notes
0	B	1	70	100			1	
0	B	2	54	100			1	
0	B	3	64	100			1	
0	B	4	68	100			1	
0	B	5	47	100			1	
0	LC	1	45	100			1	
0	LC	2	44	100			1	
0	LC	3	36	100			1	
0	LC	4	41	100			1	
0	LC	5	46	100			1	
0	SC	1	38	100			1	
0	SC	2	43	100			1	
0	SC	3	62	100			1	
0	SC	4	69	100			1	
0	SC	5	59	100			1	
25		1	51	100			1	
25		2	48	100			1	
25		3	66	100			1	
25		4	53	100			1	
25		5	55	100			1	
50		1	65	100			1	
50		2	49	100			1	
50		3	60	100			1	
50		4	39	100			1	
50		5	52	100			1	
65		1	67	100			1	
65		2	42	100			1	
65		3	58	100			1	
65		4	56	100			1	
65		5	37	100			1	
100		1	40	100			1	
100		2	50	100			1	
100		3	63	100			1	
100		4	61	100			1	
100		5	57	100			1	

LC#1
 shall w/B-3
 SC#1

Marine Chronic Bioassay

Kelp Spore Germination & Growth Worksheet

Client: City of Buena Ventura, Internal
Test No.: 0502-023-7026, 050201 mprt
Tech. Initials: RG

Start Date/Time: 2-1-05 1 1530
End Date/Time: 2-3-05 1 200
Test Species: Macrocystis pyrifera

Date Collected: 2/1/05
Kelp Collector: Dave Gutoff
Collection Location: La Jolla Cove
Conditions (weather, etc.): Sunny, moderate to strong swell - 4' sets 3-4' vis.
Dilution Water Source (Client I: _____): scripps pier
Dilution Water Source (Client II: _____): _____
Dilution Water Source (Client III: _____): _____
Dilution Water Source (Reference Toxicant): _____

Time of Initial Rinsing and Dessication: 10:15 (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers: 14:15 (keep kelp from each collecting bag separated)
Conditions of Zoospore Density and Motility (beaker 1): Density Low motility good
Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed): 15:15

Density Counts (target = 90): 14 17 13 23 19 Mean: 17.6
Mean 17.6 * 10,000 = 176,000 spores per ml (Density of Spore Release)

Calculate the volume of spore stock to add to each test container:

$(225,000 \text{ spores/container}) / (\text{density of spore release}) = \underline{1.28} \text{ ml stock/container}$

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 new spore stock of 900,000 cells/ml and add 0.25 ml:

Density of spore release _____ * $\frac{0.25 \text{ ml}}{1 \text{ container}}$ = _____ spores = _____ (x)
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 volume added should not exceed 0.5 ml. (This volume exceeds the EPA and MBP required volume of no greater than 1% of the total test solution volume. However, it may sometimes be necessary to exceed the 0.3 ml requirement in order to achieve the desired spore density.)

If the density of spore release is < 450,000 spores/ml, check the density of the spores in the second release beaker.

Time of Inoculation: 1530 Amount inoculated: .5 ml 24-hour germination check: 0470

Comments: _____

QC Check: AH 2/3/05 Final Review: AH 2/10/05

Marine Chronic Bioassay

Water Quality Measurements

Client : City of Buenaventura

Test Species: Macrocystis pyrifera

Sample ID: A-2

Start Date/Time: 2/1/2005 1 1530

Test No: 0502-023

End Date/Time: 2/3/2005 1 1200

Analyst: RG

Test Type: Kelp Spore Germination and Growth

Concentration (<u> </u> %)	Initial Readings				Final Readings			
	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)
Lab Control #1	8.2	8.05	31.9	14.0	7.2	7.99	31.4	14.2
Salt Control #1	7.6	8.20	31.9	14.0	7.2	7.93	31.5	14.2
Brine Control	7.8	8.18	31.7	14.0	7.3	7.96	30.9	14.2
25	8.3	8.05	32.3	14.0	7.1	8.14	32.4	14.2
50	8.4	8.02	32.6	14.0	7.2	8.24	32.8	14.2
68.8	8.5	8.01	32.5	14.0	7.2	8.30	32.4	14.2
100	8.4	8.49	32.0	14.0	7.2	8.36	31.8	14.2

Comments: _____

QC Check: AH 2/3/05

Final Review: [Signature] 2/24/05

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC/RG

Sample ID: Site A-2

Test Date: 2/1/2005

Test No: 0502-023

Test Type: Kelp spore germination and Growth

Salinity of Effluent 1.1

Salinity of Brine 100.2

Target Salinity 32

Test Dilution Volume 150

	<u>Effluent</u>	<u>Brine Control</u>
Salinity Adjustment Factor: (TS - SE)/(SB - TS) =	<u>0.45</u>	<u>0.47</u>

TS = target salinity
SE = salinity of effluent
SB = salinity of brine

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	150
25.0	37.5	0.45	17.0	150
50.0	75	0.45	34.0	150
68.8	103	0.45	46.8	150

DI Volume

Brine Control	100	0.47	46.8	150
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Total Brine Volume Required (ml): **144.5**

CETIS Test Summary

Report Date: 24 Feb-05 3:39 PM

Link: 13-7798-2771/0502-024

Macrocystis Germination and Germ Tube Growth Test						Nautilus Environmental (CA)		
Test No:	11-8620-2502	Test Type:	Growth-Germination	Duration:	44h	Species:	Macrocystis pyrifera	
Start Date:	01 Feb-05 03:30 PM	Protocol:	EPA/600/R-95/136 (1995)	Source:	Field Collected			
Ending Date:	03 Feb-05 12:00 PM	Dil Water:	Laboratory Seawater					
Setup Date:	01 Feb-05 03:30 PM	Brine:	Frozen Seawater					
Comments:	The 100 % concentration was prepared by adding artificial salts. All other concentrations were made by adding hypersaline brine.							
Sample No:	08-4215-6469	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 02:30 PM	Code:	0502-024	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	25h	Station:	B-1					
Comments:	Control data shared with B-3.							
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
18-7313-7334	Mean Length	100	> 100	N/A	6.35%	Equal Variance t		
05-3796-1273		69	> 69	N/A	13.20%	Dunnett's Multiple Comparison		
12-9363-1556	Proportion Germinated	100	> 100	N/A	6.98%	Equal Variance t		
04-7873-5942		69	> 69	N/A	16.70%	Dunnett's Multiple Comparison		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
05-3796-1273	Mean Length	Control Response	12.45	10 - N/A	Passes acceptability criteria			
18-7313-7334	Mean Length	Control Response	10.5	10 - N/A	Passes acceptability criteria			
04-7873-5942	Proportion Germinated	Control Response	0.74200	0.7 - N/A	Passes acceptability criteria			
12-9363-1556	Proportion Germinated	Control Response	0.74400	0.7 - N/A	Passes acceptability criteria			
05-3796-1273	Mean Length	MSDp	0.13200	N/A - 0.2	Passes acceptability criteria			
18-7313-7334	Mean Length	MSDp	0.06355	N/A - 0.2	Passes acceptability criteria			
04-7873-5942	Proportion Germinated	MSDp	0.16702	N/A - 0.2	Passes acceptability criteria			
12-9363-1556	Proportion Germinated	MSDp	0.06984	N/A - 0.2	Passes acceptability criteria			
Mean Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	12.45	11.5	14.25	0.477	1.0665	8.57%
0	Lab Control	5	11.4	10.25	13.75	0.6205	1.3874	12.17%
0	Salt Control	5	10.5	9.75	11.25	0.3354	0.75	7.14%
25		5	10.55	9	12.5	0.6442	1.4405	13.65%
50		5	10.6	8.5	11.75	0.5734	1.2821	12.10%
69		5	11.05	10.25	12.25	0.3391	0.7583	6.86%
100		5	11.15	10.75	11.5	0.1275	0.2850	2.56%
Proportion Germinated Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	0.74200	0.66000	0.79000	0.02375	0.05310	7.16%
0	Lab Control	5	0.72600	0.67000	0.81000	0.02731	0.06107	8.41%
0	Salt Control	5	0.74400	0.69000	0.83000	0.02358	0.05273	7.09%
25		5	0.80200	0.71000	0.86000	0.02557	0.05718	7.13%
50		5	0.77200	0.57000	0.88000	0.05669	0.12677	16.42%
69		5	0.71400	0.61000	0.80000	0.03140	0.07021	9.83%
100		5	0.88000	0.84000	0.90000	0.01049	0.02345	2.67%

CETIS Test Summary

Report Date: 24 Feb-05 3:39 PM

Link: 13-7798-2771/0502-024

Mean Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	12.5	14.25	12	12	11.5
0	Lab Control	10.25	11.25	13.75	11.25	10.5
0	Salt Control	10.5	11.25	9.75	9.75	11.25
25		9	12.5	11	11	9.25
50		11.75	11.5	10.75	8.5	10.5
69		11.25	10.25	12.25	10.75	10.75
100		10.75	11.25	11	11.5	11.25
Proportion Germinated Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	0.76000	0.78000	0.79000	0.72000	0.66000
0	Lab Control	0.68000	0.70000	0.67000	0.81000	0.77000
0	Salt Control	0.83000	0.73000	0.69000	0.72000	0.75000
25		0.79000	0.86000	0.71000	0.83000	0.82000
50		0.88000	0.88000	0.57000	0.77000	0.76000
69		0.61000	0.80000	0.71000	0.75000	0.70000
100		0.89000	0.84000	0.90000	0.88000	0.89000

CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Comparison	13-7798-2771	06-8754-7222	24 Feb-05 3:38 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		69	>69	1.45	N/A	16.70%

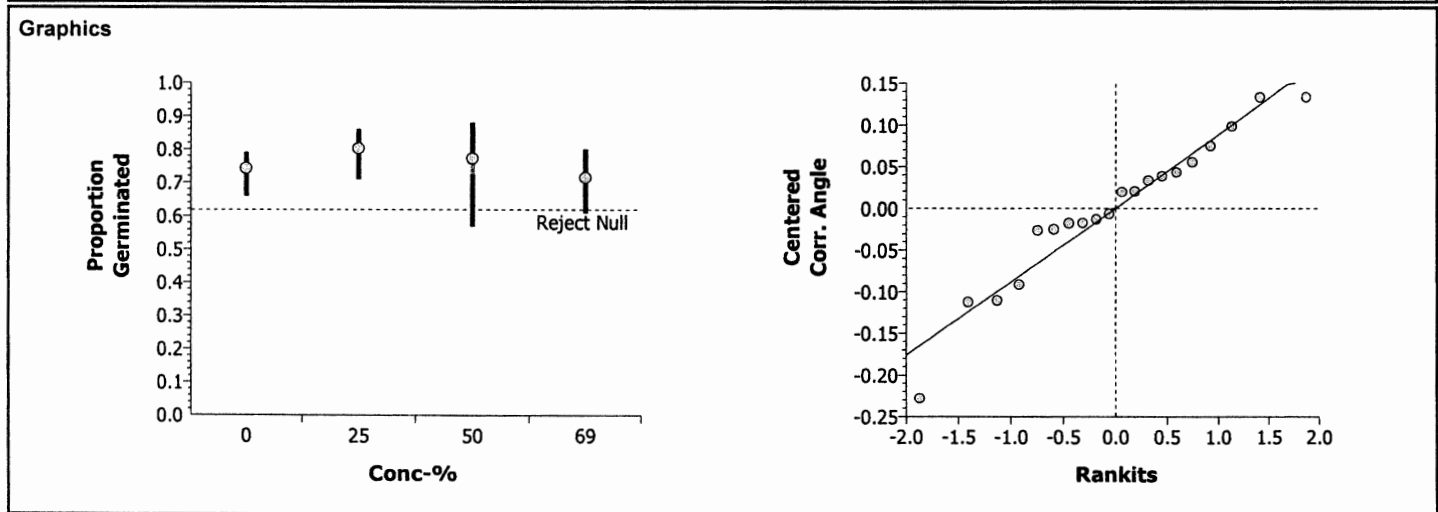
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74200	0.7 - N/A	Passes acceptability criteria
MSDp	0.16702	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	3.98081	11.34487	0.26354	Equal Variances
Distribution	Shapiro-Wilk W	0.94537	0.86826	0.29709	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0318191	0.010606	3	1.16	0.35605	Non-Significant Effect
Error	0.1464397	0.009152	16			
Total	0.17825887	0.0197589	19			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	-1.2065	2.23	> 0.0500	0.13493	Non-Significant Effect
		50	-0.7323	2.23	> 0.0500	0.13493	Non-Significant Effect
		69	0.50808	2.23	> 0.0500	0.13493	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	0.74200	0.66000	0.79000	0.05310	1.03953	0.94826	1.09476	0.05979
25		5	0.80200	0.71000	0.86000	0.05718	1.11253	1.00212	1.18730	0.07001
50		5	0.77200	0.57000	0.88000	0.12677	1.08384	0.85563	1.21705	0.14864
69		5	0.71400	0.61000	0.80000	0.07021	1.00879	0.89631	1.10715	0.07771



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Comparison	13-7798-2771	06-8754-7222	24 Feb-05 3:38 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		69	>69	1.45	N/A	13.20%

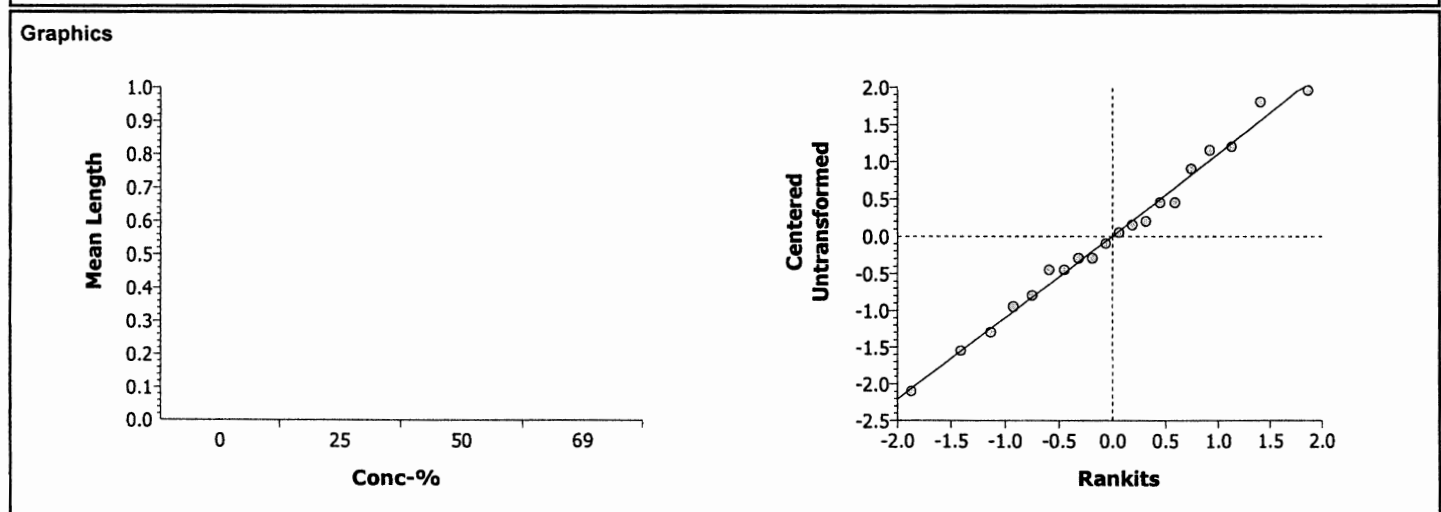
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	12.45	10 - N/A	Passes acceptability criteria
MSDp	0.13200	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	1.52553	11.34487	0.67639	Equal Variances
Distribution	Shapiro-Wilk W	0.98527	0.86826	0.97303	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	11.80937	3.936458	3	2.90	0.06728	Non-Significant Effect
Error	21.725	1.357813	16			
Total	33.5343752	5.2942709	19			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	2.57812	2.23	<= 0.0500	1.64344	Significant Effect
		50	2.51028	2.23	<= 0.0500	1.64344	Significant Effect
		69	1.89967	2.23	> 0.0500	1.64344	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	12.45	11.5	14.25	1.0665				
25		5	10.55	9	12.5	1.4405				
50		5	10.6	8.5	11.75	1.2821				
69		5	11.05	10.25	12.25	0.7583				



CETIS Analysis Detail

Macrocyctis Germination and Germ Tube Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Comparison	13-7798-2771	06-8754-7222	24 Feb-05 3:39 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	6.98%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74400	0.7 - N/A	Passes acceptability criteria
MSDp	0.06984	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.24957	23.15450	0.28012	Equal Variances
Distribution	Shapiro-Wilk W	0.92537	0.78055	0.38249	Normal Distribution

ANOVA Table

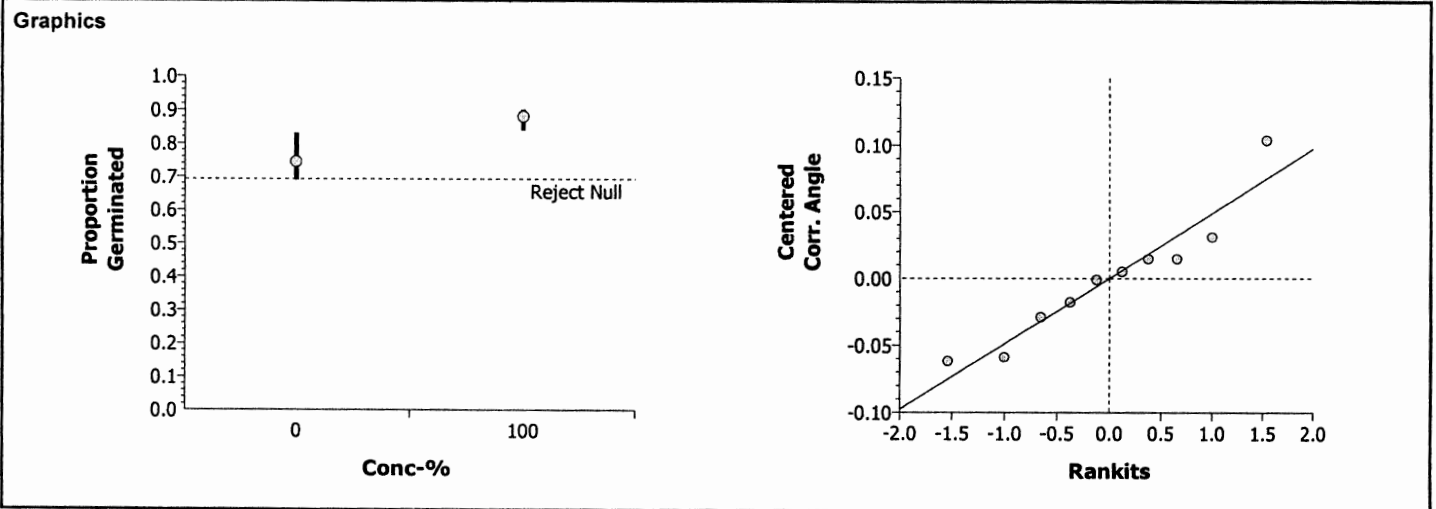
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0774308	0.077431	1	30.08	0.00058	Significant Effect
Error	0.0205964	0.002575	8			
Total	0.09802715	0.0800053	9			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-5.4841	1.85955	0.9997	0.05967	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.74400	0.69000	0.83000	0.05273	1.04218	0.98030	1.14581	0.06275
100		5	0.88000	0.84000	0.90000	0.02345	1.21817	1.15928	1.24905	0.03481



CETIS Analysis Detail

Macrocyctis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Comparison	13-7798-2771	06-8754-7222	24 Feb-05 3:39 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	6.35%

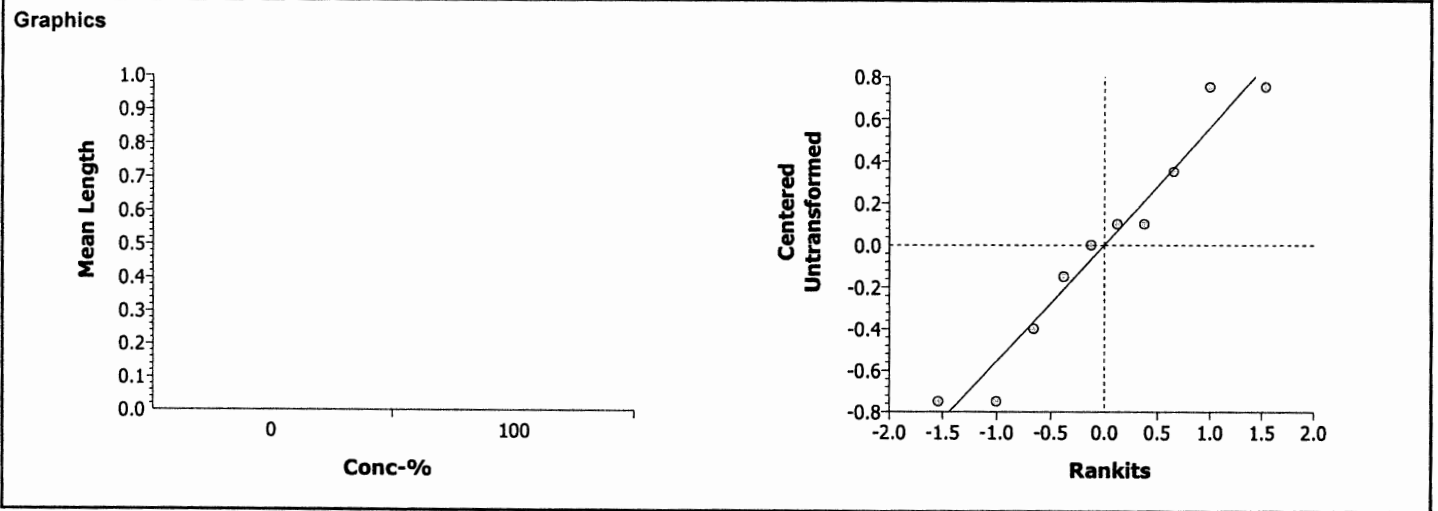
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	10.5	10 - N/A	Passes acceptability criteria
MSDp	0.06355	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	6.92308	23.15450	0.08754	Equal Variances
Distribution	Shapiro-Wilk W	0.93261	0.78055	0.44826	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	1.05625	1.05625	1	3.28	0.10764	Non-Significant Effect
Error	2.575	0.321875	8			
Total	3.63125002	1.378125	9			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-1.8115	1.85955	0.9462	0.66724	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	10.5	9.75	11.25	0.75				
100		5	11.15	10.75	11.5	0.2850				



Macrocystis Germination and Germ Tube Growth Test

Start Date: 1-Feb-05
 End Date: 3-Feb-05
 Sampled: 31-Jan-05

Species: *Macrocystis pyrifera*
 Protocol: EPA/600/R-95/136 (1995 West Coast Manual)

Test ID: 0502-024

Sample Source: City of Buenaventura
 Sample Station: B-1

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)											Calibration Factor	Mean Tube Length (µm)
71	100	65	5	4	4	5	4	3	2	4	3	5	2.5	9.75	
72	100	88	3	5	3	6	3	5	6	5	6	5	2.5	11.75	
73	100	--													
74	100	82	3	2	3	4	2	5	5	4	7	2	2.5	9.25	
75	100	88	6	5	5	3	4	4	6	5	3	5	2.5	11.5	
76	100	--													
77	100	--													
78	100	75	4	4	4	6	5	5	4	4	4	3	2.5	10.75	
79	100	83	4	4	4	5	4	4	5	4	5	5	2.5	11	
80	100	90	5	4	6	5	3	4	4	5	5	3	2.5	11.25	
81	100	89	5	5	4	4	4	5	5	4	4	5	2.5	11.25	
82	100	61	5	5	3	4	3	6	4	4	6	5	2.5	11.25	
83	100	--													
84	100	--													
85	100	--													
86	100	71	6	4	5	3	4	6	6	4	4	4	2.5	11.5	
87	100	88	5	5	4	5	5	5	5	4	4	4	2.5	11.5	
88	100	--													
89	100	57	3	3	3	4	4	3	6	6	6	5	2.5	10.75	
90	100	89	4	4	4	3	3	6	5	5	4	5	2.5	10.75	
91	100	86	5	4	5	4	5	5	5	5	6	6	2.5	12.5	
92	100	--													
93	100	58	4	3	4	6	4	4	3	5	3	5	2.5	10.25	
94	100	64	4	4	4	3	3	4	5	5	5	4	2.5	10.25	
95	100	70	5	4	5	4	4	6	5	4	3	3	2.5	10.75	
96	100	71	5	6	5	3	4	3	4	6	4	4	2.5	11	
97	100	--													
98	100	76	4	3	4	3	6	4	6	4	4	4	2.5	10.5	
99	100	71	5	6	5	5	4	5	5	4	5	5	2.5	12.25	
100	100	80	4	4	6	2	5	4	3	5	3	5	2.5	10.25	
101	100	77	5	3	3	4	4	4	2	2	3	4	2.5	8.5	
102	100	79	3	3	4	3	4	3	5	4	4	3	2.5	9	
103	100	--													
104	100	84	4	4	5	4	5	4	5	4	5	5	2.5	11.25	
105	100	81	4	4	3	3	4	4	3	4	6	5	2.5	10	

QC Check: All 2/7/05

Final review: [Signature] 2/21/05
 control data shared w/B-3

Analyst: MC

Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 1-Feb-05

Species: *Macrocystis pyrifera*

Test ID: 0502-024

End Date: 3-Feb-05

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

Sample Source: City of Buenaventura

Sampled: 31-Jan-05

Sample Station: B-1

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)										Calibration Factor	Mean Tube Length (µm)
71	100	65	5	4	4	5	4	3	2	4	3	5	2.5	#DIV/0!
72	100	88	3	5	3	6	3	5	6	5	6	5		#DIV/0!
73	100	--												#DIV/0!
74	100	82	3	2	3	4	2	5	5	4	7	2		#DIV/0!
75	100	88	6	5	5	3	4	4	6	5	3	5		#DIV/0!
76	100	--												#DIV/0!
77	100	--												#DIV/0!
78	100	75	4	4	4	6	5	5	4	4	4	3		#DIV/0!
79	100	83	4	4	4	5	4	4	5	4	5	5		#DIV/0!
80	100	90	5	4	6	5	3	4	4	5	5	3		#DIV/0!
81	100	89	5	5	4	4	4	5	5	4	4	5		#DIV/0!
82	100	61	5	5	3	4	3	6	4	4	6	5		#DIV/0!
83	100	--												#DIV/0!
84	100	--												#DIV/0!
85	100	--												#DIV/0!
86	100	71	6	4	5	3	4	6	6	4	4	4		#DIV/0!
87	100	88	5	5	4	5	5	5	5	4	4	4		#DIV/0!
88	100	--												#DIV/0!
89	100	57	3	3	3	4	4	3	6	6	6	5		#DIV/0!
90	100	89	4	4	4	3	3	6	5	5	4	5		#DIV/0!
91	100	86	5	4	5	4	5	5	5	5	6	6		#DIV/0!
92	100	--												#DIV/0!
93	100	58	4	3	4	6	4	4	3	5	3	5		#DIV/0!
94	100	64	4	4	4	3	3	4	5	5	5	4		#DIV/0!
95	100	70	5	4	5	4	4	6	5	4	3	3		#DIV/0!
96	100	71	5	6	5	3	4	3	4	6	4	4		#DIV/0!
97	100	--												#DIV/0!
98	100	76	4	3	4	3	6	4	6	4	4	4		#DIV/0!
99	100	71	5	6	5	5	4	5	5	4	5	5		#DIV/0!
100	100	80	4	4	6	2	5	4	3	5	3	5		#DIV/0!
101	100	77	5	3	3	4	4	4	2	2	3	4		#DIV/0!
102	100	79	3	3	4	3	4	3	5	4	4	3		#DIV/0!
103	100	--												#DIV/0!
104	100	84	4	4	5	4	5	4	5	4	5	5		#DIV/0!
105	100	81	4	4	3	3	4	4	3	4	6	5		#DIV/0!

QC Check: At 2/3/05

Final review: AH 2/7/05

Analyst: MC

Marine Chronic Bioassay

Kelp Spore Germination & Growth Worksheet

Client: City of Buena Ventura, Internal
Test No. 0502-023-7026, 050201 mprt
Tech. Initials: RG

Start Date/Time: 2-1-05 / 1530
End Date/Time: 2-3-05 / 1200
Test Species: Macrocystis pyrifera

Date Collected: 2/1/05
Kelp Collector: Dave Gutoff
Collection Location: La Jolla Cove
Conditions (weather, etc.): Sunny, moderate to strong swell - 4' sets 3-4' vis.
Dilution Water Source (Client I): _____: scripps pier
Dilution Water Source (Client II): _____: _____
Dilution Water Source (Client III): _____: _____
Dilution Water Source (Reference Toxicant): _____: _____

Time of Initial Rinsing and Dessication: 10:15 (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers: 1415 (keep kelp from each collecting bag separated)
Conditions of Zoospore Density and Motility (beaker 1): Density Low motility good
Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed): 1515

Density Counts (target = 90): 14 17 13 23 19 Mean: 17.6
Mean 17.6 * 10,000 = 176,000 spores per ml (Density of Spore Release)

Calculate the volume of spore stock to add to each test container:

$(225,000 \text{ spores/container}) / (\text{density of spore release}) = \underline{1.28} \text{ ml stock/container}$

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 new spore stock of 900,000 cells/ml and add 0.25 ml:

Density of spore release _____ * $\frac{0.25 \text{ ml}}{1 \text{ container}}$ = _____ spores = _____ (x)
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 volume added should not exceed 0.5 ml. (This volume exceeds the EPA and MBP required volume of no greater than 1% of the total test solution volume. However, it may sometimes be necessary to exceed the 0.3 ml requirement in order to achieve the desired spore density.)

If the density of spore release is < 450,000 spores/ml, check the density of the spores in the second release beaker.

Time of Inoculation: 1530 Amount inoculated: .5 ml 24-hour germination check: 84%

Comments: _____

QC Check: AH 2/3/05 Final Review: AH 2/10/05

CETIS Data Worksheet

Report Date: 31 Jan-05 2:29 PM
 Link: 13-7798-2771

Macrocyctis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Macrocyctis pyrifera Sample Code: 0502-024
 Ending Date: 03 Feb-05 Protocol: EPA/600/R-95/136 (1995) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: B-1

Conc-%	Code	Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor	Notes
0	B	1	86	100			1	
0	B	2	93	100			1	
0	B	3	94	100			1	
0	B	4	71	100			1	
0	B	5	105	100			1	
0	LC	1	84	100			1	
0	LC	2	76	100			1	
0	LC	3	103	100			1	
0	LC	4	97	100			1	
0	LC	5	77	100			1	
0	SC	1	73	100			1	
0	SC	2	88	100			1	
0	SC	3	85	100			1	
0	SC	4	92	100			1	
0	SC	5	83	100			1	
25		1	102	100			1	
25		2	91	100			1	
25		3	96	100			1	
25		4	79	100			1	
25		5	74	100			1	
50		1	72	100			1	
50		2	75	100			1	
50		3	89	100			1	
50		4	101	100			1	
50		5	98	100			1	
65		1	82	100			1	
65		2	100	100			1	
65		3	99	100			1	
65		4	78	100			1	
65		5	95	100			1	
100		1	90	100			1	
100		2	104	100			1	
100		3	80	100			1	
100		4	87	100			1	
100		5	81	100			1	

LC#1
 Share
 w/ B-3
 SC#1

Marine Chronic Bioassay

Water Quality Measurements

Client : City of Buenaventura

Test Species: Macrocystis pyrifera

Sample ID: B-1

Start Date/Time: 2/1/2005 1 15 30

Test No: 0502-024

End Date/Time: 2/3/2005 1 12 00

Analyst: RG

Test Type: Kelp Spore Germination and Growth

Concentration (____%)	Initial Readings				Final Readings			
	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)
Brine Control	7.8	8.14	32.2	14.0	7.2	8.01	31.5	14.2
25	8.4	8.00	32.4	14.0	7.2	8.11	32.4	14.2
50	8.5	7.91	32.6	14.0	7.2	8.20	32.6	14.2
69.0	8.4	7.90	32.7	14.0	7.2	8.22	32.9	14.2
100	8.5	8.48	31.9	14.0	7.2	8.33	32.0	14.2

Comments: See ~~B-2~~ B-3 for lab and salt control data

QC Check: AH 2/3/05

Final Review: [Signature] 2/2/05

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC RG

Sample ID: Site B-1

Test Date: 2/1/2005

Test No: 0502-024

Test Type: Kelp spore germination and Growth

Salinity of Effluent 1.3

Salinity of Brine 100.2

Target Salinity 32

Test Dilution Volume 150

	<u>Effluent</u>	<u>Brine Control</u>
Salinity Adjustment Factor: (TS - SE)/(SB - TS) =	<u>0.45</u>	<u>0.47</u>

TS = target salinity
SE = salinity of effluent
SB = salinity of brine

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	150
25.0	37.5	0.45	16.9	150
50.0	75	0.45	33.8	150
69.0	103	0.45	46.6	150

DI Volume

Brine Control	99	0.47	46.6	150
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Total Brine Volume Required (ml): **143.8**

Report Date: 24 Feb-05 3:43 PM

Link: 06-8754-7222/0502-025

CETIS Test Summary

Macrocystis Germination and Germ Tube Growth Test						Nautilus Environmental (CA)		
Test No:	11-8620-2502	Test Type:	Growth-Germination	Duration:	44h	Species:	Macrocystis pyrifera	
Start Date:	01 Feb-05 03:30 PM	Protocol:	EPA/600/R-95/136 (1995)	Dil Water:	Laboratory Seawater	Source:	Field Collected	
Ending Date:	03 Feb-05 12:00 PM	Brine:	Frozen Seawater					
Setup Date:	01 Feb-05 03:30 PM							
Comments:	The 100 % concentration was prepared by adding artificial salts. All other concentrations were made by adding hypersaline brine.							
Sample No:	04-5385-2456	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-025	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	27h	Station:	B-3					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
03-4401-2511	Mean Length	100	> 100	N/A	13.16%	Equal Variance t		
04-8976-9731		69	> 69	N/A	12.95%	Dunnett's Multiple Comparison		
06-3062-2675	Proportion Germinated	100	> 100	N/A	7.06%	Equal Variance t		
04-3468-8614		69	> 69	N/A	9.92%	Dunnett's Multiple Comparison		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
03-4401-2511	Mean Length	Control Response	10.5	10 - N/A	Passes acceptability criteria			
04-8976-9731	Mean Length	Control Response	12.45	10 - N/A	Passes acceptability criteria			
04-3468-8614	Proportion Germinated	Control Response	0.74200	0.7 - N/A	Passes acceptability criteria			
06-3062-2675	Proportion Germinated	Control Response	0.74400	0.7 - N/A	Passes acceptability criteria			
03-4401-2511	Mean Length	MSDp	0.13164	N/A - 0.2	Passes acceptability criteria			
04-8976-9731	Mean Length	MSDp	0.12947	N/A - 0.2	Passes acceptability criteria			
04-3468-8614	Proportion Germinated	MSDp	0.09923	N/A - 0.2	Passes acceptability criteria			
06-3062-2675	Proportion Germinated	MSDp	0.07056	N/A - 0.2	Passes acceptability criteria			
Mean Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	12.45	11.5	14.25	0.477	1.0665	8.57%
0	Lab Control	5	11.4	10.25	13.75	0.6205	1.3874	12.17%
0	Salt Control	5	10.5	9.75	11.25	0.3354	0.75	7.14%
25		5	13.4	12	14.25	0.3841	0.8588	6.41%
50		5	13.65	12	15	0.6	1.3416	9.83%
69		5	14.6	13.75	16.75	0.5568	1.245	8.53%
100		5	12.95	11.5	15	0.6633	1.4832	11.45%
Proportion Germinated Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	0.74200	0.66000	0.79000	0.02375	0.05310	7.16%
0	Lab Control	5	0.72600	0.67000	0.81000	0.02731	0.06107	8.41%
0	Salt Control	5	0.74400	0.69000	0.83000	0.02358	0.05273	7.09%
25		5	0.76000	0.68000	0.87000	0.03317	0.07416	9.76%
50		5	0.72200	0.69000	0.77000	0.01594	0.03564	4.94%
69		5	0.72200	0.71000	0.74000	0.00583	0.01304	1.81%
100		5	0.72400	0.69000	0.77000	0.01435	0.03209	4.43%

CETIS Test Summary

Mean Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	12.5	14.25	12	12	11.5
0	Lab Control	10.25	11.25	13.75	11.25	10.5
0	Salt Control	10.5	11.25	9.75	9.75	11.25
25		12	13.75	13.75	13.25	14.25
50		14	12	15	14.75	12.5
69		16.75	14.25	13.75	13.75	14.5
100		15	11.5	14	12	12.25

Proportion Germinated Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	0.76000	0.78000	0.79000	0.72000	0.66000
0	Lab Control	0.68000	0.70000	0.67000	0.81000	0.77000
0	Salt Control	0.83000	0.73000	0.69000	0.72000	0.75000
25		0.68000	0.71000	0.79000	0.75000	0.87000
50		0.70000	0.70000	0.77000	0.75000	0.69000
69		0.71000	0.73000	0.74000	0.72000	0.71000
100		0.74000	0.69000	0.70000	0.77000	0.72000

CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Comparison	06-8754-7222	06-8754-7222	24 Feb-05 3:42 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		69	>69	1.45	N/A	9.92%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74200	0.7 - N/A	Passes acceptability criteria
MSDp	0.09923	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	9.39662	11.34487	0.02446	Equal Variances
Distribution	Shapiro-Wilk W	0.95636	0.86826	0.46009	Normal Distribution

ANOVA Table

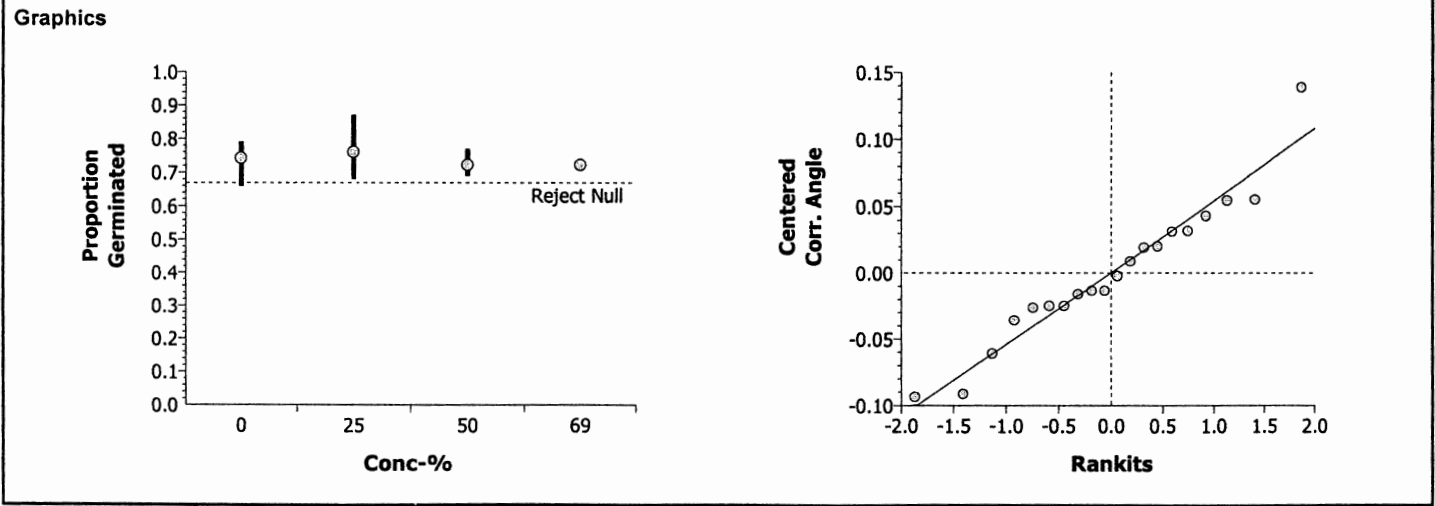
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0076994	0.002566	3	0.75	0.53719	Non-Significant Effect
Error	0.0546206	0.003414	16			
Total	0.0623202	0.0059803	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	-0.6382	2.23	> 0.0500	0.08240	Non-Significant Effect
		50	0.6344	2.23	> 0.0500	0.08240	Non-Significant Effect
		69	0.64989	2.23	> 0.0500	0.08240	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Brine Control	5	0.74200	0.66000	0.79000	0.05310	1.03953	0.94826	1.09476	0.05979
25		5	0.76000	0.68000	0.87000	0.07416	1.06311	0.96953	1.20193	0.09083
50		5	0.72200	0.69000	0.77000	0.03564	1.01608	0.98030	1.07062	0.04020
69		5	0.72200	0.71000	0.74000	0.01304	1.01551	1.00212	1.03573	0.01459



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Comparison	06-8754-7222	06-8754-7222	24 Feb-05 3:43 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		69	>69	1.45	N/A	12.95%

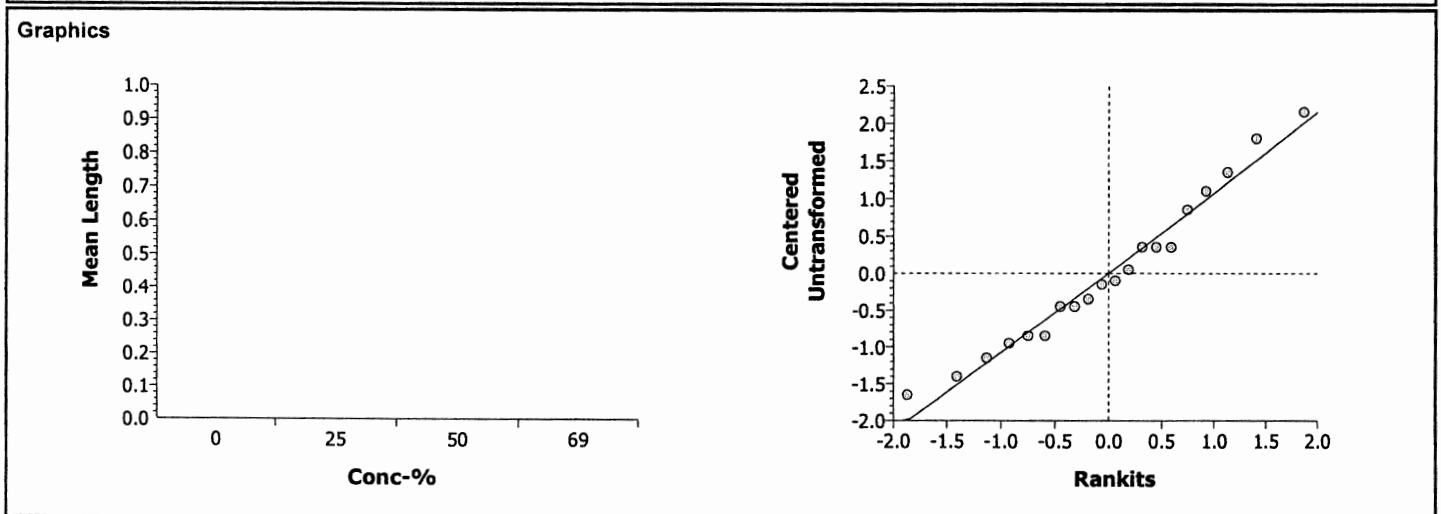
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	12.45	10 - N/A	Passes acceptability criteria
MSDp	0.12947	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	0.79066	11.34487	0.85170	Equal Variances
Distribution	Shapiro-Wilk W	0.96774	0.86826	0.68174	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	11.7125	3.904167	3	2.99	0.06215	Non-Significant Effect
Error	20.9	1.30625	16			
Total	32.6124992	5.2104167	19			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	-1.3143	2.23	> 0.0500	1.61194	Non-Significant Effect
		50	-1.6601	2.23	> 0.0500	1.61194	Non-Significant Effect
		69	-2.9744	2.23	> 0.0500	1.61194	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	12.45	11.5	14.25	1.0665				
25		5	13.4	12	14.25	0.8588				
50		5	13.65	12	15	1.3416				
69		5	14.6	13.75	16.75	1.245				



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Comparison	06-8754-7222	06-8754-7222	24 Feb-05 3:43 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	7.06%

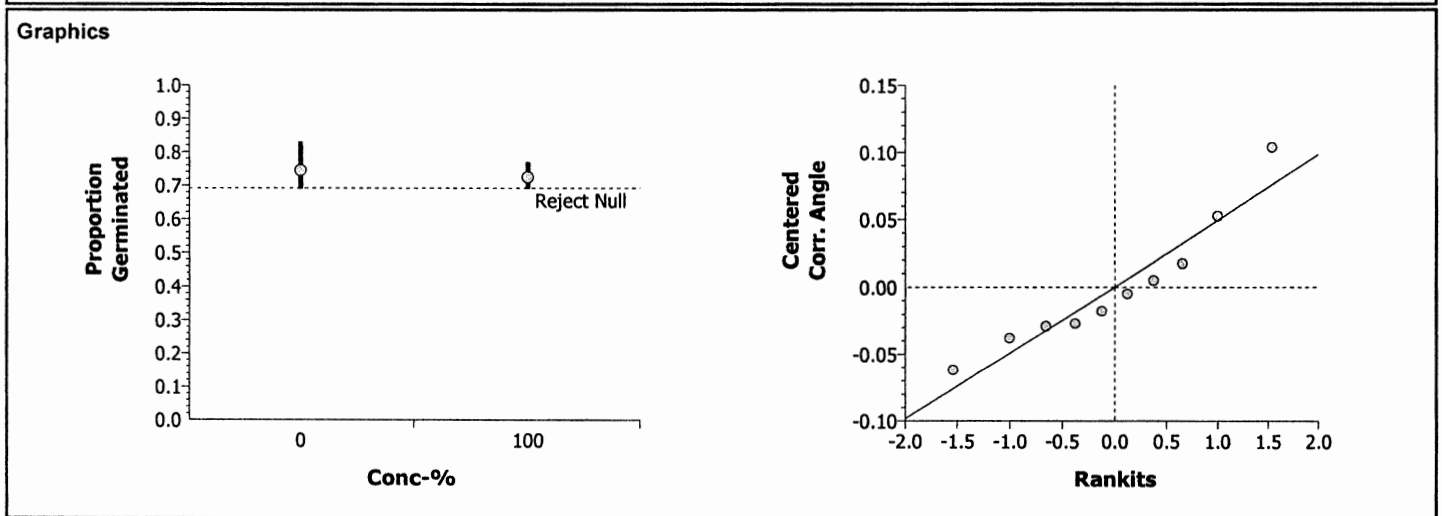
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74400	0.7 - N/A	Passes acceptability criteria
MSDp	0.07056	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.00125	23.15450	0.31232	Equal Variances
Distribution	Shapiro-Wilk W	0.92153	0.78055	0.35084	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0014377	0.001438	1	0.55	0.48039	Non-Significant Effect
Error	0.0209974	0.002625	8			
Total	0.02243507	0.0040623	9			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	0.7401	1.85955	0.2402	0.06025	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.74400	0.69000	0.83000	0.05273	1.04218	0.98030	1.14581	0.06275
100		5	0.72400	0.69000	0.77000	0.03209	1.01820	0.98030	1.07062	0.03622



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Comparison	06-8754-7222	06-8754-7222	24 Feb-05 3:43 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	13.16%

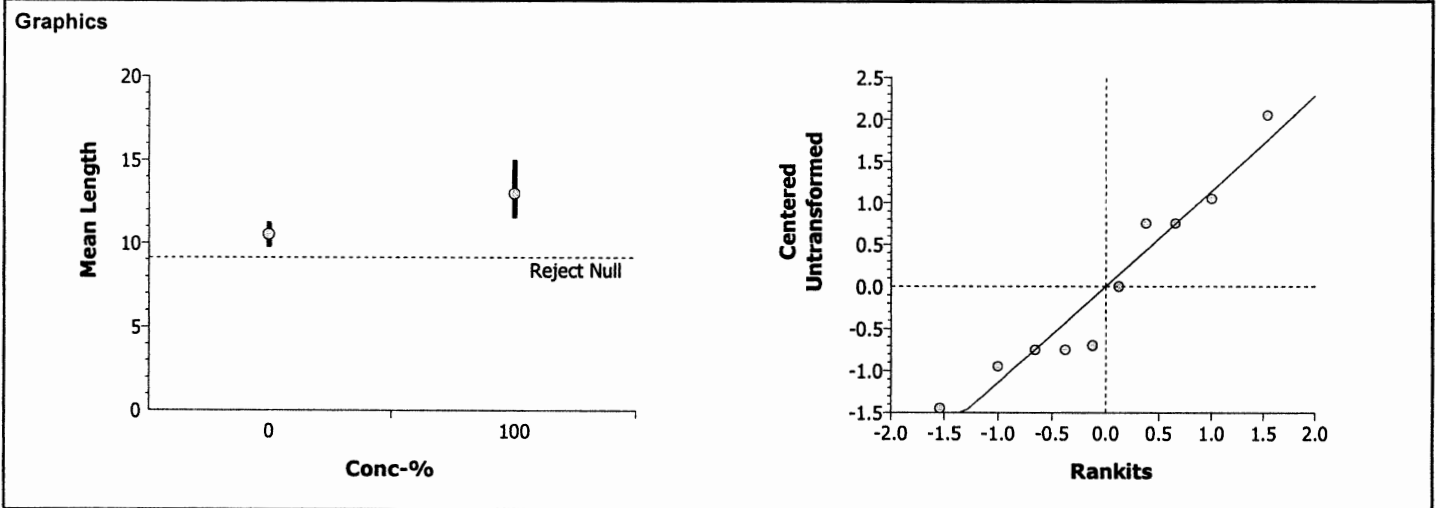
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	10.5	10 - N/A	Passes acceptability criteria
MSDp	0.13164	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	3.91111	23.15450	0.21500	Equal Variances
Distribution	Shapiro-Wilk W	0.92642	0.78055	0.39154	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	15.00625	15.00625	1	10.86	0.01092	Significant Effect
Error	11.05	1.38125	8			
Total	26.0562506	16.387500	9			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-3.2961	1.85955	0.9945	1.38221	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	10.5	9.75	11.25	0.75				
100		5	12.95	11.5	15	1.4832				



Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 1-Feb-05

Species: *Macrocystis pyrifera*

Test ID: 0502-025

End Date: 3-Feb-05

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

Sample Source: City of Buenaventura

Sampled: 31-Jan-05

Sample Station: B-3

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)										Calibration Factor	Mean Tube Length (µm)
106	100	87	6	6	6	7	4	5	6	7	5	5	2.5	14.25
SC 107	100	83	3	3	4	6	5	5	5	4	4	3	2.5	10.5
SC 108	100	75	4	4	4	4	6	5	5	4	5	4	2.5	11.25
109	100	71	5	6	6	6	6	4	5	6	7	7	2.5	14.5
110	100	74	5	5	5	4	4	7	6	7	6	6	2.5	13.75
111	100	77	6	4	4	5	5	4	5	5	5	5	2.5	12
112	100	76	4	6	6	5	4	5	5	6	4	5	2.5	12.5
113	100	78	5	6	7	6	5	7	7	4	5	5	2.5	14.25
114	100	70	3	6	5	5	4	2	6	6	7	4	2.5	12
115	100	71	7	8	8	5	6	6	7	8	7	5	2.5	16.75
116	100	72	6	7	4	6	6	5	5	6	5	5	2.5	13.75
117	100	70	5	5	7	7	6	4	5	4	6	7	2.5	14
LC 118	100	70	5	5	5	5	5	4	5	4	3	4	2.5	11.25
119	100	73	6	8	8	5	5	4	5	4	5	7	2.5	14.25
120	100	69	4	6	5	5	4	5	5	6	4	6	2.5	12.5
121	100	79	5	6	5	5	5	5	4	4	4	5	2.5	12
122	100	72	5	5	5	6	4	6	4	4	6	4	2.5	12.25
123	100	68	6	6	4	4	5	5	5	5	4	4	2.5	12
124	100	74	5	6	8	6	6	5	7	5	7	5	2.5	15
125	100	70	4	4	6	6	6	6	5	6	7	5	2.5	14
SC 126	100	73	4	6	4	4	5	4	5	5	4	4	2.5	11.25
127	100	71	5	6	7	2	4	6	6	7	6	6	2.5	13.75
LC 128	100	67	7	6	7	6	6	4	4	4	4	7	2.5	13.75
129	100	75	5	7	5	5	5	5	6	7	7	7	2.5	14.75
130	100	79	7	5	4	9	4	4	5	4	6	7	2.5	13.75
131	100	66	6	6	4	4	4	4	3	5	4	6	2.5	11.5
LC 132	100	68	5	4	4	5	4	3	4	3	5	4	2.5	10.25
LC 133	100	81	4	4	4	3	5	5	4	6	5	5	2.5	11.25
134	100	75	6	5	5	6	5	5	6	4	5	6	2.5	13.25
135	100	72	5	4	5	4	7	5	5	5	4	4	2.5	12
SC 136	100	69	5	4	3	3	4	3	5	5	4	3	2.5	9.75
SC 137	100	72	4	4	3	2	5	4	4	4	4	5	2.5	9.75
LC 138	100	77	4	4	4	4	5	6	4	3	4	4	2.5	10.5
139	100	69	6	6	5	5	5	4	3	4	4	4	2.5	11.5
140	100	77	8	6	7	7	7	5	4	5	6	5	2.5	15

QC Check: AH 2/7/05

Final review: [Signature] 2/24/05
 control data shared with other sites

Analyst: SH

Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 1-Feb-05

Species: *Macrocystis pyrifera*

Test ID: 0502-025

End Date: 3-Feb-05

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

Sample Source: City of Buenaventura

Sampled: 31-Jan-05

Sample Station: B-3

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)										Calibration Factor	Mean Tube Length (µm)
106	100	87	6	6	6	7	4	5	6	7	5	5	2.5	#DIV/0!
107	100	83	6	6	5	6	5	5	5	4	4	2		#DIV/0!
108	100	75	5	4	5	4	6	5	5	4	5	4		#DIV/0!
109	100	71	5	6	6	6	6	5	5	6	7	7		#DIV/0!
110	100	74	5	5	5	5	5	7	6	7	6	6		#DIV/0!
111	100	77	6	5	5	5	5	5	5	5	5	5		#DIV/0!
112	100	76	5	6	6	5	5	5	5	6	5	5		#DIV/0!
113	100	78	5	6	7	6	7	7	7	5	5	5		#DIV/0!
114	100	70	6	6	5	5	4	2	6	6	7	5		#DIV/0!
115	100	71	7	8	8	5	6	6	7	8	7	5		#DIV/0!
116	100	72	5	5	5	6	6	5	5	6	5	5		#DIV/0!
117	100	70	5	5	7	7	6	5	5	5	6	7		#DIV/0!
118	100	70	5	5	5	5	5	5	5	5	5	4		#DIV/0!
119	100	73	6	8	8	5	5	5	5	5	5	7		#DIV/0!
120	100	69	5	6	5	5	5	5	5	6	5	6		#DIV/0!
121	100	79	5	6	5	5	5	5	5	5	5	5		#DIV/0!
122	100	72	5	5	5	6	5	6	5	5	6	4		#DIV/0!
123	100	68	6	6	5	5	5	5	5	5	4	4		#DIV/0!
124	100	74	6	6	8	6	6	5	7	5	7	5		#DIV/0!
125	100	70	5	5	6	6	6	6	6	5	6	7		#DIV/0!
126	100	73	5	6	4	5	5	5	5	5	5	4		#DIV/0!
127	100	71	5	6	7	6	5	6	6	7	6	6		#DIV/0!
128	100	67	7	6	7	6	6	5	5	5	4	7		#DIV/0!
129	100	75	5	7	5	5	5	5	6	7	7	7		#DIV/0!
130	100	79	7	5	5	9	5	5	5	5	6	7		#DIV/0!
131	100	66	6	6	5	5	5	5	8	5	5	6		#DIV/0!
132	100	68	5	5	5	5	5	5	4	8	5	5		#DIV/0!
133	100	81	5	5	5	8	5	5	5	5	5	6		#DIV/0!
134	100	81	5	5	5	8	5	5	5	5	5	6		#DIV/0!
135	100	72	6	5	5	6	5	5	6	5	5	5		#DIV/0!
136	100	69	5	4	8	8	5	8	5	5	5	2		#DIV/0!
137	100	72	5	5	8	8	5	5	5	4	4	5		#DIV/0!
138	100	77	4	5	5	5	5	6	5	8	4	4		#DIV/0!
139	100	69	6	6	5	5	5	4	8	5	4	4		#DIV/0!
140	100	77	8	6	7	7	7	5	5	5	6	5	γ	#DIV/0!

QC Check: AH 2/3/05

Final review: AH 2/7/05

Analyst: SH

CETIS Data Worksheet

Report Date: 31 Jan-05 2:30 PM
 Link: 06-8754-7222/0502-025

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: *Macrocystis pyrifera* Sample Code: 0502-025
 Ending Date: 03 Feb-05 Protocol: EPA/600/R-95/136 (1995) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: B-3

Conc-%	Code	Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor	Notes
0	B	1	112	100			1	
0	B	2	113	100			1	
0	B	3	121	100			1	
0	B	4	135	100			1	
0	B	5	131	100			1	
0	LC	1	132	100			1	
0	LC	2	118	100			1	
0	LC	3	128	100			1	
0	LC	4	133	100			1	
0	LC	5	138	100			1	
0	SC	1	107	100			1	
0	SC	2	126	100			1	
0	SC	3	136	100			1	
0	SC	4	137	100			1	
0	SC	5	108	100			1	
25		1	123	100			1	
25		2	127	100			1	
25		3	130	100			1	
25		4	134	100			1	
25		5	106	100			1	
50		1	125	100			1	
50		2	114	100			1	
50		3	140	100			1	
50		4	129	100			1	
50		5	120	100			1	
65		1	115	100			1	
65		2	119	100			1	
65		3	110	100			1	
65		4	116	100			1	
65		5	109	100			1	
100		1	124	100			1	
100		2	139	100			1	
100		3	117	100			1	
100		4	111	100			1	
100		5	122	100			1	

Marine Chronic Bioassay

Water Quality Measurements

Client : City of Buenaventura

Test Species: Macrocystis pyrifera

Sample ID: B-3

Start Date/Time: 2/1/2005 1 1530

Test No: 0502-025

End Date/Time: 2/3/2005 1 1200

Analyst: RG

Test Type: Kelp Spore Germination and Growth

Concentration (____%)	Initial Readings				Final Readings			
	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)
Lab Control #2	8.2	8.05	31.9	14.0	7.3	7.98	31.2	14.2
Salt Control #2	7.4	8.20	31.9	14.0	7.3	8.00	31.8	14.2
Brine Control	7.8	8.17	32.4	14.0	7.3	7.98	31.7	14.2
25	7.9	8.08	32.5	14.0	7.2	8.06	31.6	14.2
50	8.1	8.05	32.4	14.0	7.2	8.21	32.3	14.2
68.5	8.3	8.03	32.7	14.0	7.2	8.30	32.4	14.2
100	8.5	8.55	31.9	14.0	7.3	8.35	31.6	14.2

Comments: _____

QC Check: AA 2/3/05

Final Review: [Signature] 2/24/05

Marine Chronic Bioassay

Kelp Spore Germination & Growth Worksheet

Client: City of Buena Ventura, Internal
Test No.: 0502-023-7026, 050201mpt
Tech. Initials: RG

Start Date/Time: 2-1-05 / 1530
End Date/Time: 2-3-05 / 1200
Test Species: Macrocystis pyrifera

Date Collected: 2/1/05
Kelp Collector: Dave Gutoff
Collection Location: La Jolla Cove
Conditions (weather, etc.): Sunny, moderate to strong swell - 4' sets 3-4' vis.
Dilution Water Source (Client I): _____: scripps pier
Dilution Water Source (Client II): _____: _____
Dilution Water Source (Client III): _____: _____
Dilution Water Source (Reference Toxicant): _____: _____

Time of Initial Rinsing and Dessication: 10:15 (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers: 14:15 (keep kelp from each collecting bag separated)
Conditions of Zoospore Density and Motility (beaker 1): Density Low motility good
Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed): 15:15

Density Counts (target = 90): 14 17 13 23 19 Mean: 17.6
Mean 17.6 * 10,000 = 176,000 spores per ml (Density of Spore Release)

Calculate the volume of spore stock to add to each test container:
(225,000 spores/container)/(density of spore release) = 1.28 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 new spore stock of 900,000 cells/ml and add 0.25 ml:

Density of spore release _____ * $\frac{0.25 \text{ ml}}{1 \text{ container}}$ = _____ spores = _____ (x)
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 volume added should not exceed 0.5 ml. (This volume exceeds the EPA and MBP required volume of no greater than 1% of the total test solution volume. However, it may sometimes be necessary to exceed the 0.3 ml requirement in order to achieve the desired spore density.

If the density of spore release is < 450,000 spores/ml, check the density of the spores in the second release beaker.

Time of Inoculation: 1530 Amount inoculated: .5 ml 24-hour germination check: 84%

Comments: _____

QC Check: AH 2/3/05 Final Review: AH 2/10/05

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC ~~AG~~

Sample ID: Site B-3, C-1

Test Date: 2/1/2005

Test No: 0502-025,026

Test Type: Kelp spore germination and Growth

Salinity of Effluent 0.7

Salinity of Brine 100.2

Target Salinity 32

Test Dilution Volume 150

Salinity Adjustment Factor:

$(TS - SE)/(SB - TS) =$

	<u>Effluent</u>	<u>Brine Control</u>
	<u>0.46</u>	<u>0.47</u>

TS = target salinity

SE = salinity of effluent

SB = salinity of brine

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	150
25.0	37.5	0.46	17.2	150
50.0	75	0.46	34.4	150
68.5	103	0.46	47.2	150

DI Volume

Brine Control	101	0.47	47.2	150
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Total Brine Volume Required (ml): **146.0**

CETIS Test Summary

Report Date: 24 Feb-05 3:44 PM

Link: 14-4317-2771/0502-026

Macrocystis Germination and Germ Tube Growth Test							Nautilus Environmental (CA)	
Test No:	11-8620-2502	Test Type:	Growth-Germination	Duration:	44h			
Start Date:	01 Feb-05 03:30 PM	Protocol:	EPA/600/R-95/136 (1995)	Species:	Macrocystis pyrifera			
Ending Date:	03 Feb-05 12:00 PM	Dil Water:	Laboratory Seawater	Source:	Field Collected			
Setup Date:	01 Feb-05 03:30 PM	Brine:	Frozen Seawater					
Comments:	The 100 % concentration was prepared by adding artificial salts. All other concentrations were made by adding hypersaline brine.							
Sample No:	15-3828-5475	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 08:45 AM	Code:	0502-026	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	31h	Station:	C-1					
Comments:	Control data shared with B-3.							
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
07-8225-9297	Mean Length	100	> 100	N/A	11.38%	Equal Variance t		
09-1077-2870		69	> 69	N/A	12.98%	Dunnett's Multiple Comparison		
09-0502-3916	Proportion Germinated	100	> 100	N/A	8.16%	Equal Variance t		
10-4925-2663		69	> 69	N/A	10.30%	Dunnett's Multiple Comparison		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range		Decision		
07-8225-9297	Mean Length	Control Response	10.5	10 - N/A		Passes acceptability criteria		
09-1077-2870	Mean Length	Control Response	12.45	10 - N/A		Passes acceptability criteria		
09-0502-3916	Proportion Germinated	Control Response	0.74400	0.7 - N/A		Passes acceptability criteria		
10-4925-2663	Proportion Germinated	Control Response	0.74200	0.7 - N/A		Passes acceptability criteria		
07-8225-9297	Mean Length	MSDp	0.11376	N/A - 0.2		Passes acceptability criteria		
09-1077-2870	Mean Length	MSDp	0.12975	N/A - 0.2		Passes acceptability criteria		
09-0502-3916	Proportion Germinated	MSDp	0.08161	N/A - 0.2		Passes acceptability criteria		
10-4925-2663	Proportion Germinated	MSDp	0.103	N/A - 0.2		Passes acceptability criteria		
Mean Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	12.45	11.5	14.25	0.477	1.0665	8.57%
0	Lab Control	5	11.4	10.25	13.75	0.6205	1.3874	12.17%
0	Salt Control	5	10.5	9.75	11.25	0.3354	0.75	7.14%
25		5	10.14	9.36	10.920	0.2848	0.6369	6.28%
50		5	11.44	9.36	12.74	0.5986	1.3384	11.70%
69		5	11.336	9.62	13	0.6186	1.3831	12.20%
100		5	11.752	10.140	13.260	0.5479	1.2250	10.42%
Proportion Germinated Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Brine Control	5	0.74200	0.66000	0.79000	0.02375	0.05310	7.16%
0	Lab Control	5	0.72600	0.67000	0.81000	0.02731	0.06107	8.41%
0	Salt Control	5	0.74400	0.69000	0.83000	0.02358	0.05273	7.09%
25		5	0.69800	0.63000	0.76000	0.02653	0.05933	8.50%
50		5	0.84600	0.77000	0.90000	0.02379	0.05320	6.29%
69		5	0.71400	0.68000	0.77000	0.01568	0.03507	4.91%
100		5	0.73000	0.67000	0.78000	0.02168	0.04848	6.64%

CETIS Test Summary

Report Date: 24 Feb-05 3:44 PM

Link: 14-4317-2771/0502-026

Mean Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	12.5	14.25	12	12	11.5
0	Lab Control	10.25	11.25	13.75	11.25	10.5
0	Salt Control	10.5	11.25	9.75	9.75	11.25
25		9.62	9.36	10.4	10.4	10.920
50		12.48	11.180	11.44	9.36	12.74
69		12.48	10.66	10.920	9.62	13
100		10.920	10.140	12.220	12.220	13.260
Proportion Germinated Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Control	0.76000	0.78000	0.79000	0.72000	0.66000
0	Lab Control	0.68000	0.70000	0.67000	0.81000	0.77000
0	Salt Control	0.83000	0.73000	0.69000	0.72000	0.75000
25		0.64000	0.72000	0.74000	0.63000	0.76000
50		0.90000	0.82000	0.77000	0.85000	0.89000
69		0.72000	0.77000	0.71000	0.68000	0.69000
100		0.77000	0.78000	0.67000	0.74000	0.69000

CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Comparison	14-4317-2771	06-8754-7222	24 Feb-05 3:44 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		69	>69	1.45	N/A	10.30%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74200	0.7 - N/A	Passes acceptability criteria
MSDp	0.103	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	1.34889	11.34487	0.71756	Equal Variances
Distribution	Shapiro-Wilk W	0.94524	0.86826	0.29544	Normal Distribution

ANOVA Table

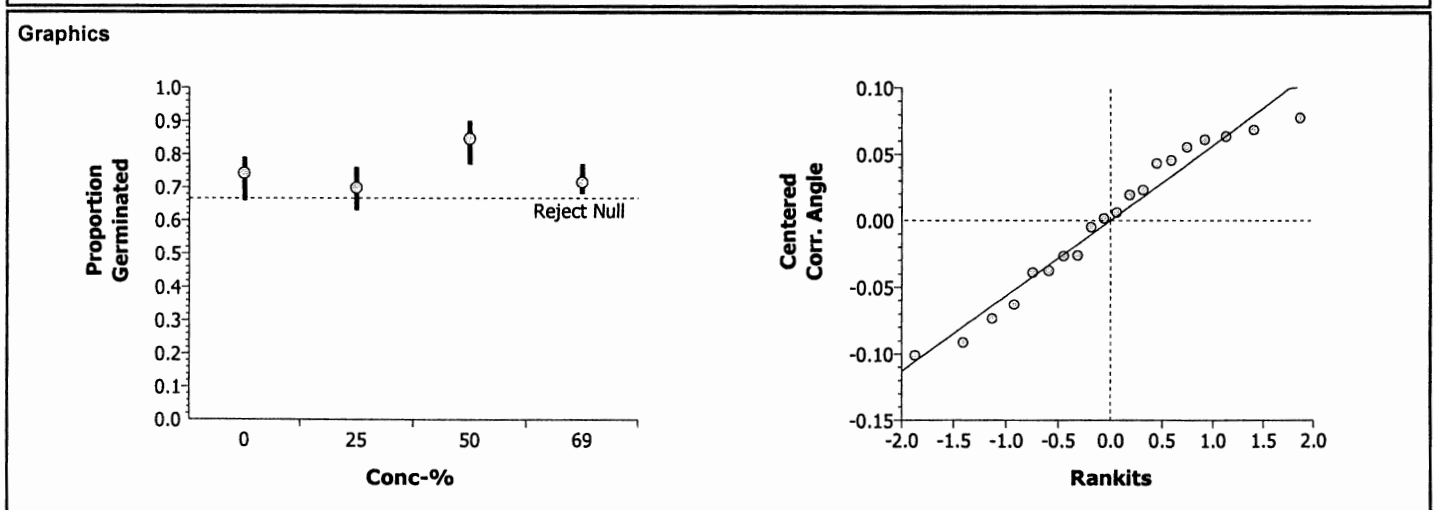
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.1013662	0.033789	3	9.22	0.00089	Significant Effect
Error	0.0586174	0.003664	16			
Total	0.15998356	0.0374523	19			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	1.2836	2.23	> 0.0500	0.08537	Non-Significant Effect
		50	-3.4508	2.23	> 0.0500	0.08537	Non-Significant Effect
		69	0.84572	2.23	> 0.0500	0.08537	Non-Significant Effect

Data Summary

Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Brine Control	5	0.74200	0.66000	0.79000	0.05310	1.03953	0.94826	1.09476	0.05979
25		5	0.69800	0.63000	0.76000	0.05933	0.99039	0.91691	1.05882	0.06450
50		5	0.84600	0.77000	0.90000	0.05320	1.17163	1.07062	1.24905	0.07323
69		5	0.71400	0.68000	0.77000	0.03507	1.00715	0.96953	1.07062	0.03945



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Comparison	14-4317-2771	06-8754-7222	24 Feb-05 3:44 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		69	>69	1.45	N/A	12.98%

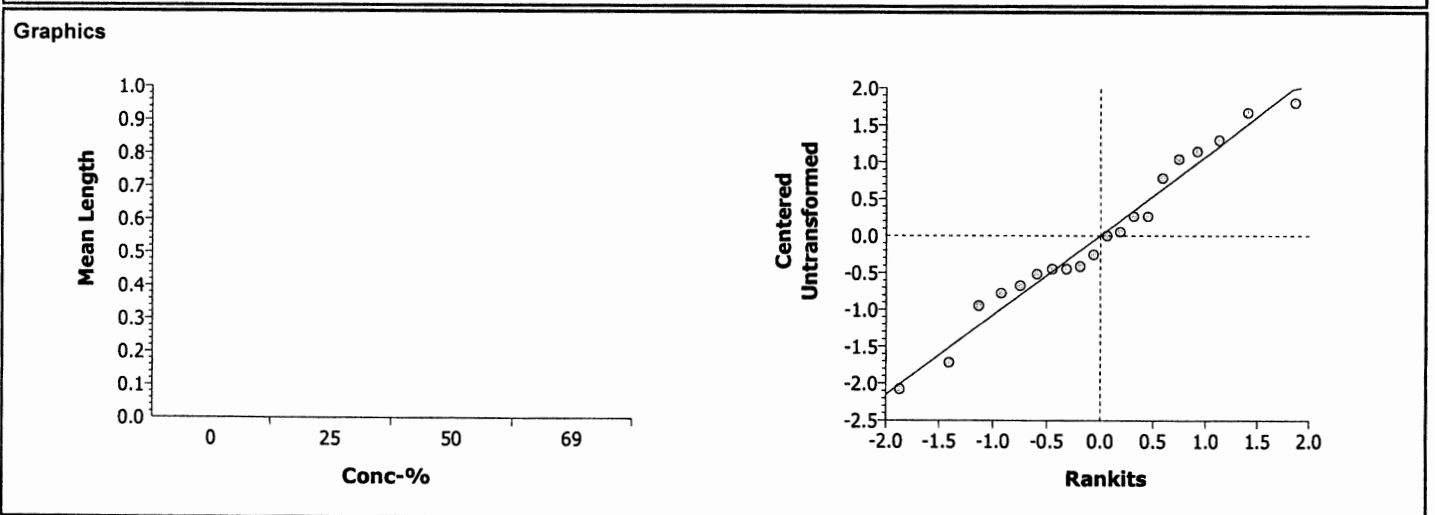
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	12.45	10 - N/A	Passes acceptability criteria
MSDp	0.12975	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	2.27405	11.34487	0.51751	Equal Variances
Distribution	Shapiro-Wilk W	0.96852	0.86826	0.69796	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	13.41054	4.470179	3	3.41	0.04330	Significant Effect
Error	20.99032	1.311895	16			
Total	34.4008579	5.7820741	19			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	3.18884	2.23	<= 0.0500	1.61542	Significant Effect
		50	1.39425	2.23	> 0.0500	1.61542	Non-Significant Effect
		69	1.53782	2.23	> 0.0500	1.61542	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	12.45	11.5	14.25	1.0665				
25		5	10.14	9.36	10.92	0.6369				
50		5	11.44	9.36	12.74	1.3384				
69		5	11.336	9.62	13	1.3831				



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Comparison	14-4317-2771	06-8754-7222	24 Feb-05 3:44 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	8.16%

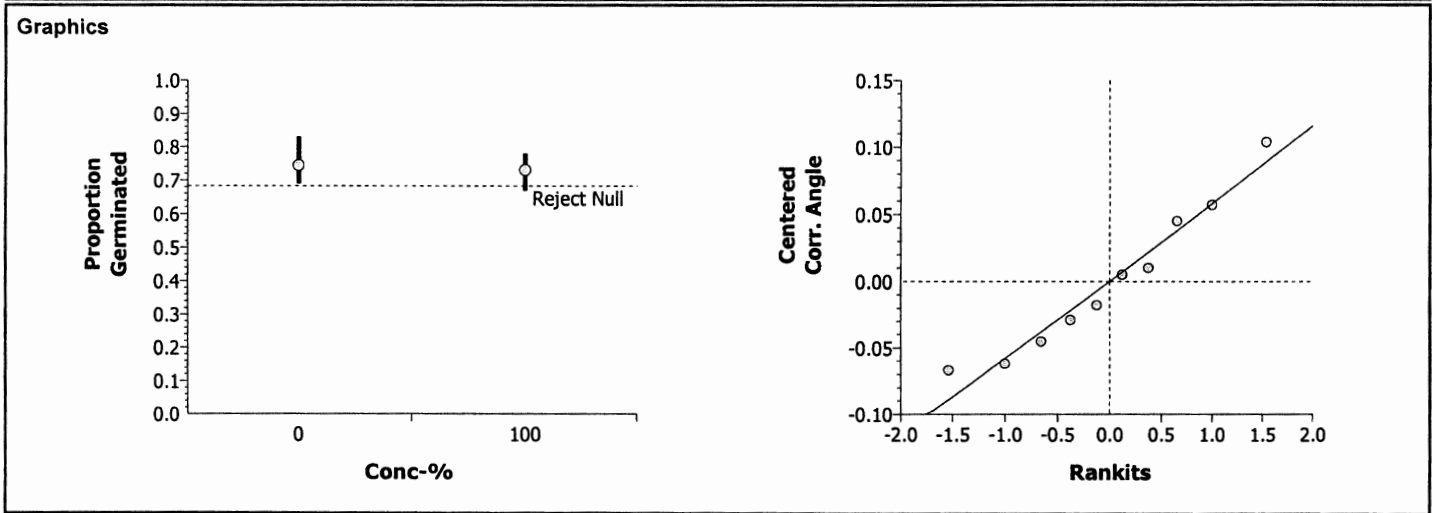
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74400	0.7 - N/A	Passes acceptability criteria
MSDp	0.08161	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.32527	23.15450	0.79154	Equal Variances
Distribution	Shapiro-Wilk W	0.94893	0.78055	0.62543	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0006857	0.000686	1	0.20	0.66773	Non-Significant Effect
Error	0.0276338	0.003454	8			
Total	0.02831954	0.00414	9			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	0.44555	1.85955	0.3339	0.06912	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.74400	0.69000	0.83000	0.05273	1.04218	0.98030	1.14581	0.06275
100		5	0.73000	0.67000	0.78000	0.04848	1.02562	0.95886	1.08259	0.05451



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Comparison	14-4317-2771	06-8754-7222	24 Feb-05 3:44 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	11.38%

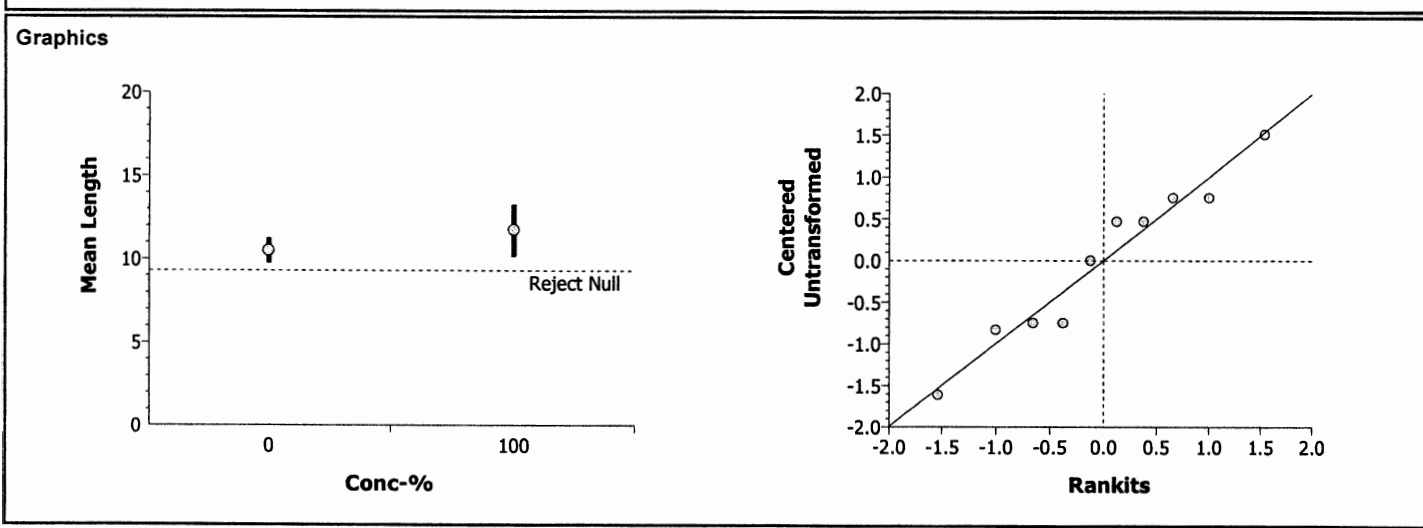
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	10.5	10 - N/A	Passes acceptability criteria
MSDp	0.11376	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.66795	23.15450	0.36491	Equal Variances
Distribution	Shapiro-Wilk W	0.95005	0.78055	0.63871	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	3.918761	3.918761	1	3.80	0.08712	Non-Significant Effect
Error	8.25288	1.03161	8			
Total	12.1716416	4.9503715	9			

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Salt Control		100	-1.9490	1.85955	0.9564	1.19453	Non-Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	10.5	9.75	11.25	0.75				
100		5	11.752	10.14	13.26	1.2250				



Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 1-Feb-05

Species: *Macrocystis pyrifera*

Test ID: 0502-026

End Date: 3-Feb-05

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

Sample Source: City of Buenaventura

Sampled: 31-Jan-05

Sample Station: C-1

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)											Calibration Factor	Mean Tube Length (µm)
141	100	68	5	4	5	5	3	5	2	3	3	2	2.6	9.62	
142	100	76	4	3	4	4	6	4	4	4	6	3	2.6	10.92	
143	100	--													
144	100	82	5	6	5	3	3	5	4	4	5	3	2.6	11.18	
145	100	75	5	4	3	4	4	6	4	4	3	4	2.6	10.66	
146	100	74	4	4	5	5	4	4	6	6	5	4	2.6	12.22	
147	100	77	5	4	3	5	5	3	5	6	5	3	2.6	11.44	
148	100	--													
149	100	74	2	5	6	3	4	4	4	2	5	4	2.6	10.14	
150	100	77	3	3	4	7	4	3	2	6	4	5	2.6	10.66	
151	100	69	8	5	4	4	5	5	3	4	8	5	2.6	13.26	
152	100	66	4	6	3	5	4	4	4	5	6	4	2.6	11.7	
153	100	78	3	4	4	3	4	4	3	6	3	5	2.6	10.14	
154	100	71	5	4	4	3	4	5	7	3	3	4	2.6	10.92	
155	100	74	4	4	4	3	3	4	4	3	6	5	2.6	10.4	
156	100	--													
157	100	--													
158	100	--													
159	100	--													
160	100	--													
161	100	67	3	5	3	5	7	5	3	6	5	5	2.6	12.22	
162	100	85	2	5	5	5	6	2	3	2	2	4	2.6	9.36	
163	100	72	3	5	4	4	3	3	2	4	4	4	2.6	9.36	
164	100	63	3	3	4	4	5	5	4	3	4	5	2.6	10.4	
165	100	64	3	4	3	5	5	3	4	5	2	3	2.6	9.62	
166	100	90	5	5	5	4	4	3	4	8	5	5	2.6	12.48	
167	100	--													
168	100	76	5	5	4	7	5	7	6	6	7	3	2.6	14.3	
169	100	89	5	4	5	5	6	5	4	5	6	4	2.6	12.74	
170	100	69	5	5	6	4	5	5	5	4	5	6	2.6	13	
171	100	77	4	5	5	4	5	4	3	3	4	5	2.6	10.92	
172	100	72	5	4	4	4	3	7	6	5	6	4	2.6	12.48	
173	100	--													
174	100	--													
175	100	81	7	4	3	4	2	5	2	3	2	4	2.6	9.36	

*Lined out replicates are lots and salt controls, share w/ site B-3.

QC Check: AL 2/7/05

Final review: [Signature] 2/24/05

Analyst: AH

Macrocyctis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 1-Feb-05

Species: *Macrocyctis pyrifera*

Test ID: 0502-026

End Date: 3-Feb-05

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

Sample Source: City of Buenaventura

Sampled: 31-Jan-05

Sample Station: C-1

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)										Calibration Factor	Mean Tube Length (µm)
141	100	68	5	4	5	5	3	5	2	3	3	2	2.6	#DIV/0!
142	100	76	4	3	4	4	6	4	4	4	6	3		#DIV/0!
143	100	--												#DIV/0!
144	100	82	5	6	5	3	3	5	4	4	5	3		#DIV/0!
145	100	75	5	4	3	4	4	6	4	4	3	4		#DIV/0!
146	100	74	4	4	5	5	4	4	6	6	5	4		#DIV/0!
147	100	77	5	4	3	5	5	3	5	6	5	3		#DIV/0!
148	100	--												#DIV/0!
149	100	74	2	5	6	3	4	4	4	2	5	4		#DIV/0!
150	100	77	3	3	4	7	4	3	2	6	4	5		#DIV/0!
151	100	69	8	5	4	4	5	5	3	4	8	5		#DIV/0!
152	100	66	4	6	3	5	4	4	4	5	6	4		#DIV/0!
153	100	78	3	4	4	3	4	4	3	6	3	5		#DIV/0!
154	100	71	5	4	4	3	4	5	7	3	3	4		#DIV/0!
155	100	74	4	4	4	3	3	4	4	3	6	5		#DIV/0!
156	100	--												#DIV/0!
157	100	--												#DIV/0!
158	100	--											#DIV/0!	
159	100	--											#DIV/0!	
160	100	--											#DIV/0!	
161	100	67	3	5	3	5	7	5	3	6	5	5	#DIV/0!	
162	100	85 85-AH	2	5	5	5	6	2	3	2	2	4	#DIV/0!	
163	100	72	3	5	4	4	3	3	2	4	4	4	#DIV/0!	
164	100	63	3	3	4	4	5	5	4	2	4	5	#DIV/0!	
165	100	64	3	4	3	5	5	3	4	5	2	3	#DIV/0!	
166	100	90	5	5	5	4	4	3	4	8	5	5	#DIV/0!	
167	100	--											#DIV/0!	
168	100	76	5	5	4	7	5	7	6	6	7	3	#DIV/0!	
169	100	89	5	4	5	5	4	5	4	5	6	4	#DIV/0!	
170	100	69	5	5	6	4	5	5	5	4	5	6	#DIV/0!	
171	100	77	4	5	5	4	5	4	5	3	4	5	#DIV/0!	
172	100	72	5	4	4	4	3	7	6	5	6	4	#DIV/0!	
173	100	--	7										#DIV/0!	
174	100	--											#DIV/0!	
175	100	81	7	4	3	4	8	5	2	3	2	4	#DIV/0!	

QC Check: AH 2/3/05

Final review: AH 2/7/05

Analyst: AH

CETIS Data Worksheet

Report Date: 31 Jan-05 2:31 PM

Link: 14-4317-2771

Macrocyctis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 01 Feb-05 Species: Macrocyctis pyrifera Sample Code: 0502-026
 Ending Date: 03 Feb-05 Protocol: EPA/600/R-95/136 (1995) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 Material: Estuarine Monitoring Sample Sample Station: C-1

Conc-%	Code	Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor	Notes
0	B	1	175	100			1	
0	B	2	152	100			1	
0	B	3	149	100			1	
0	B	4	168	100			1	
0	B	5	145	100			1	
0	LC	1	173	100			1	
0	LC	2	156	100			1	
0	LC	3	157	100			1	
0	LC	4	160	100			1	
0	LC	5	159	100			1	
0	SC	1	167	100			1	
0	SC	2	143	100			1	
0	SC	3	148	100			1	
0	SC	4	168	100			1	
0	SC	5	174	100			1	
25		1	165	100			1	
25		2	163	100			1	
25		3	155	100			1	
25		4	164	100			1	
25		5	142	100			1	
50		1	166	100			1	
50		2	144	100			1	
50		3	147	100			1	
50		4	162	100			1	
50		5	169	100			1	
65		1	172	100			1	
65		2	150	100			1	
65		3	154	100			1	
65		4	141	100			1	
65		5	170	100			1	
100		1	171	100			1	
100		2	153	100			1	
100		3	161	100			1	
100		4	146	100			1	
100		5	151	100			1	

LC#2
Share w/B-3
SC#2

Marine Chronic Bioassay

Kelp Spore Germination & Growth Worksheet

Client: City of Buena Ventura, Internal
Test No.: 0502-023-7026, 050201mpt
Tech. Initials: RG

Start Date/Time: 2-1-05 1 1530
End Date/Time: 2-3-05 1 200
Test Species: Macrocystis pyrifera

Date Collected: 2/1/05
Kelp Collector: Dave Gutoff
Collection Location: La Jolla Cove
Conditions (weather, etc.): Sunny, moderate to strong swell - 4' sets 3-4' vis.
Dilution Water Source (Client I: _____): scripps pier
Dilution Water Source (Client II: _____): _____
Dilution Water Source (Client III: _____): _____
Dilution Water Source (Reference Toxicant): _____

Time of Initial Rinsing and Dessication: 10:15 (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers: 14:15 (keep kelp from each collecting bag separated)
Conditions of Zoospore Density and Motility (beaker 1): Density Low motility good
Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed): 15:15

Density Counts (target = 90): 14 17 13 23 19 Mean: 17.6
Mean 17.6 * 10,000 = 176,000 spores per ml (Density of Spore Release)

Calculate the volume of spore stock to add to each test container:
(225,000 spores/container)/(density of spore release) = 1.28 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 new spore stock of 900,000 cells/ml and add 0.25 ml:

Density of spore release _____ * $\frac{0.25 \text{ ml}}{1 \text{ container}}$ = $\frac{\text{_____ spores}}{225,000 \text{ spores}}$ = _____ (x)

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 volume added should not exceed 0.5 ml. (This volume exceeds the EPA and MBP required volume of no greater than 1% of the total test solution volume. However, it may sometimes be necessary to exceed the 0.3 ml requirement in order to achieve the desired spore density.

If the density of spore release is < 450,000 spores/ml, check the density of the spores in the second release beaker.

Time of Inoculation: 1530 Amount inoculated: .5 ml 24-hour germination check: 84%

Comments: _____

QC Check: AH 2/3/05 Final Review: AH 2/10/05

Marine Chronic Bioassay

Water Quality Measurements

Client : City of Buenaventura

Test Species: Macrocystis pyrifera

Sample ID: C-1

Start Date/Time: 2/1/2005 1 1530

Test No: 0502-026

End Date/Time: 2/3/2005 1 1200

Analyst: RG

Test Type: Kelp Spore Germination and Growth

Concentration (____%)	Initial Readings				Final Readings			
	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)
Brine Control	7.7	8.19	32.7	14.0	7.3	8.01	32.6	14.2
25	8.3	8.02	32.6	14.0	7.2	8.11	32.3	14.2
50	8.6	8.03	32.9	14.0	7.2	8.21	32.5	14.2
68.5	8.8	8.00	32.9	14.0	7.2	8.28	33.3	14.2
100	8.7	8.53	32.1	14.0	7.2	8.34	32.3	14.2

Comments: See B-3 for lab and salt control data

QC Check: AH 2/3/05

Final Review: [Signature] 2/2/05

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC ~~AG~~

Sample ID: Site B-3, C-1

Test Date: 2/1/2005

Test No: 0502-025,026

Test Type: Kelp spore germination and Growth

Salinity of Effluent 0.7

Salinity of Brine 100.2

Target Salinity 32

Test Dilution Volume 150

	<u>Effluent</u>	<u>Brine Control</u>
Salinity Adjustment Factor: (TS - SE)/(SB - TS) =	<u>0.46</u>	<u>0.47</u>

TS = target salinity
SE = salinity of effluent
SB = salinity of brine

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	150
25.0	37.5	0.46	17.2	150
50.0	75	0.46	34.4	150
68.5	103	0.46	47.2	150

DI Volume

Brine Control	101	0.47	47.2	150
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Total Brine Volume Required (ml): **146.0**

APPENDIX C
REFERENCE TOXICANT DATA

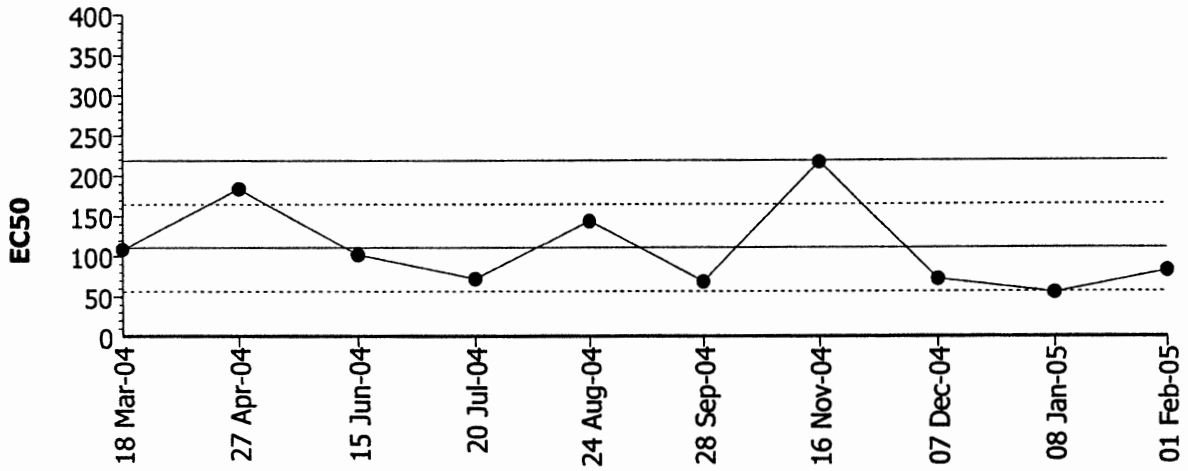
FRESHWATER

P. PROMELAS

CETIS QC Chart

Fathead Minnow 7-d Larval Survival and Growth Test **Nautilus Environmental (CA)**

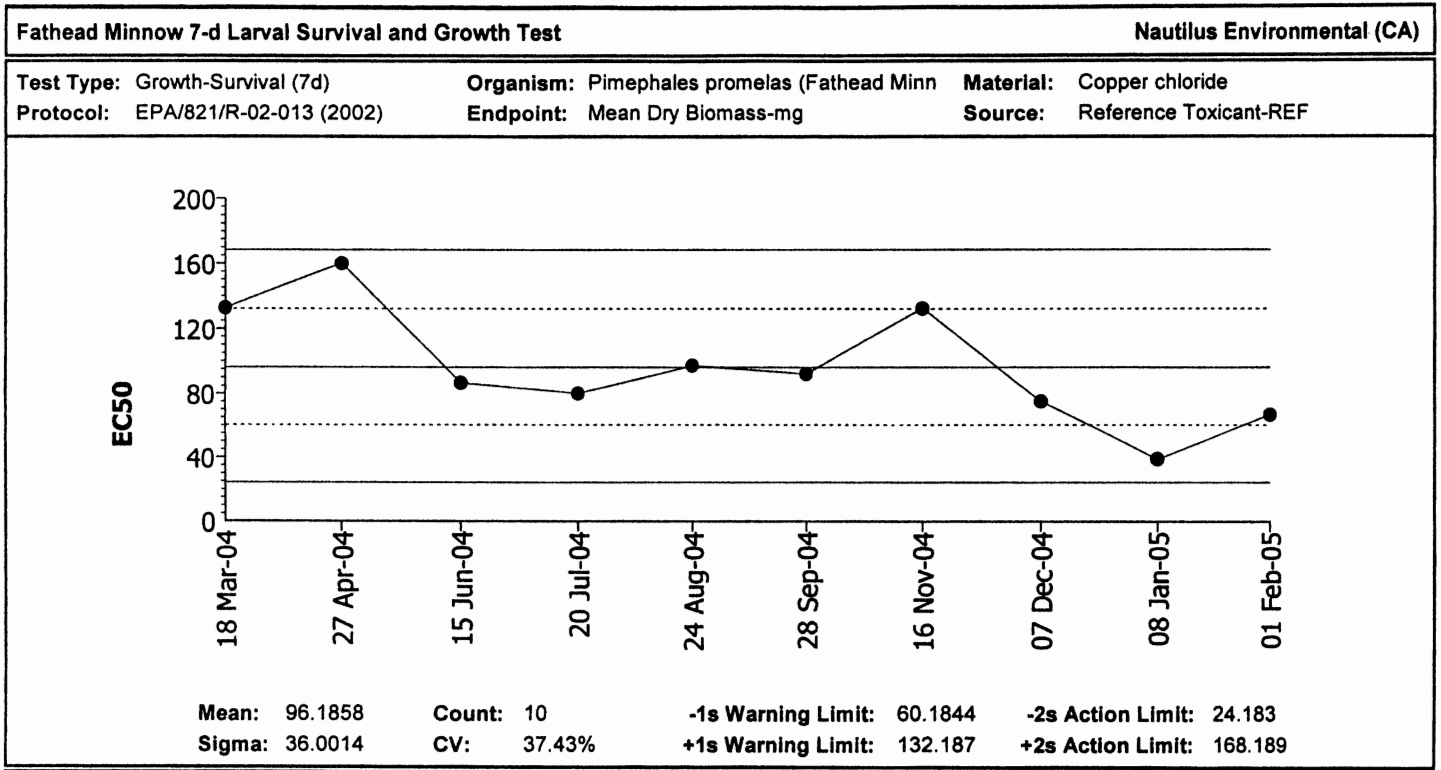
Test Type: Growth-Survival (7d) **Organism:** Pimephales promelas (Fathead Minn) **Material:** Copper chloride
Protocol: EPA/821/R-02-013 (2002) **Endpoint:** 7d Proportion Survived **Source:** Reference Toxicant-REF



Mean: 110.579 **Count:** 10 **-1s Warning Limit:** 56.3015 **-2s Action Limit:** 2.02418
Sigma: 54.2773 **CV:** 49.08% **+1s Warning Limit:** 164.856 **+2s Action Limit:** 219.134

Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2004	Mar	18	108.5512	-2.02765	-0.03736			05-8082-2348	08-0436-3472
2		Apr	27	183.8360	73.25715	1.34968	(+)		03-9136-6658	06-6076-5220
3		Jun	15	101.8321	-8.74675	-0.16115			00-2134-2076	01-2963-1882
4		Jul	20	72.11743	-38.4614	-0.70861			08-2514-0200	05-8061-6470
5		Aug	24	143.8333	33.25445	0.61268			15-7815-6846	04-9679-3585
6		Sep	28	68.53082	-42.0480	-0.77469			03-8928-6184	02-1910-3411
7		Nov	16	217.3135	106.7346	1.96647	(+)		09-0979-5566	18-1400-5982
8		Dec	7	71.87216	-38.7066	-0.71313			07-3388-2322	18-3373-7390
9	2005	Jan	8	55.57915	-54.9997	-1.01331	(-)		07-9360-7488	03-7371-9480
10		Feb	1	82.32289	-28.2559	-0.52058			11-4099-7607	14-2687-2529

CETIS QC Chart



Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2004	Mar	18	132.7899	36.60415	1.01674	(+)		05-8082-2348	04-7627-8237
2		Apr	27	159.8496	63.66385	1.76837	(+)		03-9136-6658	14-8015-1634
3		Jun	15	86.60516	-9.58059	-0.26612			00-2134-2076	12-6915-4979
4		Jul	20	80.07227	-16.1134	-0.44758			08-2514-0200	05-3092-7277
5		Aug	24	97.27808	1.09233	0.03034			15-7815-6846	05-2512-8271
6		Sep	28	92.20737	-3.97838	-0.11051			03-8928-6184	00-5649-0096
7		Nov	16	132.3718	36.18595	1.00513	(+)		09-0979-5566	09-2004-0757
8		Dec	7	74.96952	-21.2162	-0.58932			07-3388-2322	06-9312-4157
9	2005	Jan	8	38.90785	-57.2779	-1.59099	(-)		07-9360-7488	06-3481-8399
10		Feb	1	66.80593	-29.3798	-0.81607			11-4099-7607	06-7554-9464

CETIS Test Summary

Report Date: 15 Feb-05 2:05 PM
 Link: 11-4099-7607/050201pprt

Fathead Minnow 7-d Larval Survival and Growth Test **Nautilus Environmental (CA)**

Test No: 04-6411-6053	Test Type: Growth-Survival (7d)	Duration: 6d 21h
Start Date: 01 Feb-05 05:00 PM	Protocol: EPA/821/R-02-013 (2002)	Species: Pimephales promelas
Ending Date: 08 Feb-05 02:50 PM	Dil Water: Diluted Mineral Water (8:2)	Source: Aquatic Biosystems, CO
Setup Date: 01 Feb-05 05:00 PM	Brine: Not Applicable	

Sample No: 01-2281-1947	Material: Copper chloride	Client: Internal
Sample Date: 01 Feb-05	Code: 050201pprt	Project:
Receive Date: 01 Feb-05	Source: Reference Toxicant	
Sample Age: 17h	Station:	

Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method
07-8119-7997	7d Proportion Survived	< 15	15	N/A	11.59%	Dunnett's Multiple Comparison
10-6359-2704	Mean Dry Biomass-mg	15	30	21.213	21.43%	Dunnett's Multiple Comparison

Point Estimate Summary						
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method
14-2687-2529	7d Proportion Survived	25	28.72981	13.54850	44.06039	Linear Regression
		50	82.32289	55.84048	121.17940	
06-7554-9464	Mean Dry Biomass-mg	25	33.56589	1.95336	48.93977	Linear Interpolation
		50	66.80593	36.71645	104.00750	

Test Acceptability					
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision
07-8119-7997	7d Proportion Survived	Control Response	0.95000	0.8 - N/A	Passes acceptability criteria
14-2687-2529	7d Proportion Survived	Control Response	0.95000	0.8 - N/A	Passes acceptability criteria
06-7554-9464	Mean Dry Biomass-mg	Control Response	0.379	0.25 - N/A	Passes acceptability criteria
10-6359-2704	Mean Dry Biomass-mg	Control Response	0.379	0.25 - N/A	Passes acceptability criteria
10-6359-2704	Mean Dry Biomass-mg	MSDp	0.21430	0.12 - 0.3	Passes acceptability criteria

7d Proportion Survived Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	0.95000	0.80000	1.00000	0.05000	0.10000	10.53%
15		4	0.82500	0.80000	0.90000	0.02500	0.05000	6.06%
30		4	0.71667	0.60000	0.80000	0.05000	0.10000	13.95%
60		4	0.52500	0.40000	0.70000	0.06292	0.12583	23.97%
120		4	0.37500	0.30000	0.40000	0.02500	0.05000	13.33%
240		4	0.25000	0.20000	0.30000	0.02887	0.05774	23.09%

Mean Dry Biomass-mg Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	0.37900	0.35100	0.41300	0.01417	0.02833	7.48%
15		4	0.31175	0.25900	0.36400	0.02745	0.05490	17.61%
30		4	0.29575	0.23700	0.34700	0.02343	0.04686	15.84%
60		4	0.19900	0.11000	0.27000	0.03952	0.07904	39.72%
120		4	0.11525	0.07300	0.13800	0.01441	0.02883	25.01%
240		4	0.06350	0.04300	0.09300	0.01162	0.02323	36.58%

Report Date: 15 Feb-05 2:05 PM

Link: 11-4099-7607/050201pprt

CETIS Test Summary

7d Proportion Survived Detail					
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1.00000	1.00000	0.80000	1.00000
15		0.80000	0.80000	0.80000	0.90000
30		0.66667	0.60000	0.80000	0.80000
60		0.50000	0.40000	0.70000	0.50000
120		0.40000	0.40000	0.40000	0.30000
240		0.20000	0.20000	0.30000	0.30000

Mean Dry Biomass-mg Detail					
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	0.36100	0.41300	0.35100	0.39100
15		0.35400	0.27000	0.25900	0.36400
30		0.31500	0.23700	0.28400	0.34700
60		0.26100	0.11000	0.27000	0.15500
120		0.12500	0.12500	0.13800	0.07300
240		0.09300	0.04300	0.07100	0.04700

CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test				Nautilus Environmental (CA)	
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	11-4099-7607	11-4099-7607	15 Feb-05 2:04 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		<15	15		N/A	11.59%

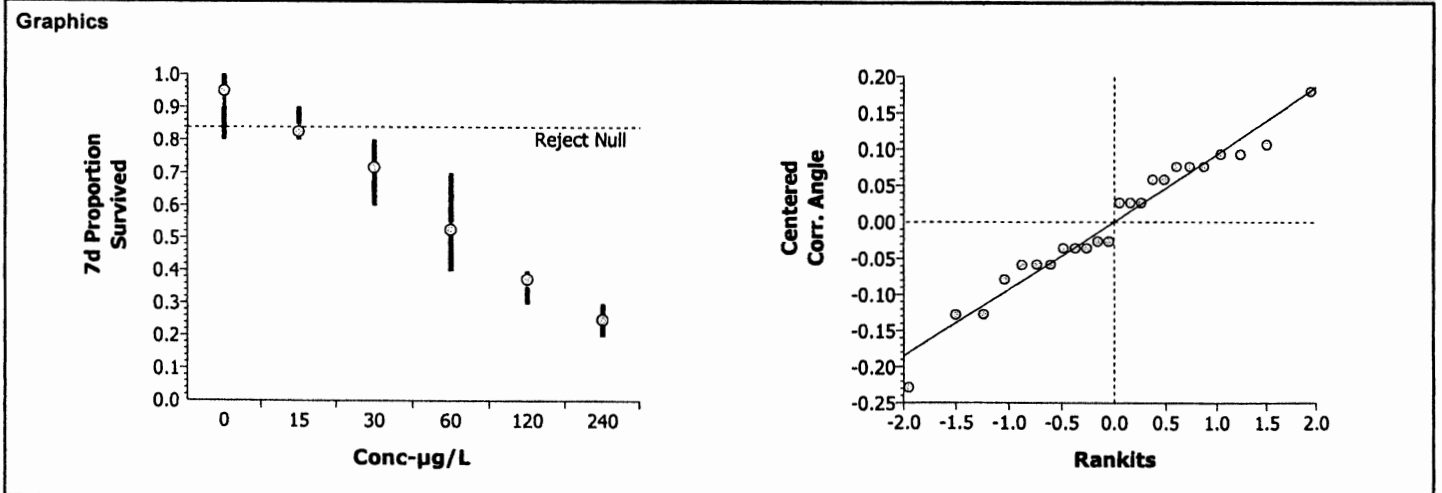
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.95000	0.8 - N/A	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	4.36785	15.08628	0.49776	Equal Variances
Distribution	Shapiro-Wilk W	0.96706	0.88421	0.59112	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	1.879556	0.375911	5	34.98	0.00000	Significant Effect
Error	0.1934183	0.010745	18			
Total	2.07297474	0.3866568	23			

Group Comparisons							
Control	vs	Conc-µg/L	Statistic	Critical	P Level	MSD	Decision(0.05)
Lab Control		15	2.63546	2.41	<= 0.0500	0.17665	Significant Effect
		30	4.39129	2.41	<= 0.0500	0.17665	Significant Effect
		60	7.1506	2.41	<= 0.0500	0.17665	Significant Effect
		120	9.24093	2.41	<= 0.0500	0.17665	Significant Effect
		240	11.1073	2.41	<= 0.0500	0.17665	Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	4	0.95000	0.80000	1.00000	0.10000	1.33580	1.10715	1.41202	0.15243
15		4	0.82500	0.80000	0.90000	0.05000	1.14262	1.10715	1.24905	0.07095
30		4	0.71667	0.60000	0.80000	0.10000	1.01392	0.88608	1.10715	0.11130
60		4	0.52500	0.40000	0.70000	0.12583	0.81167	0.68472	0.99116	0.12873
120		4	0.37500	0.30000	0.40000	0.05000	0.65845	0.57964	0.68472	0.05254
240		4	0.25000	0.20000	0.30000	0.05774	0.52164	0.46365	0.57964	0.06697



CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test					Nautilus Environmental (CA)	
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Linear Regression	11-4099-7607	11-4099-7607	15 Feb-05 2:05 PM	CETISv1.025

Linear Regression Options						
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.
Log-Normal	Control Threshold	0.05	Yes	Yes	No	No

Regression Parameters							
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)
Threshold	0.04885	0.03383	-0.01745	0.11515	1.444	0.24446	Not Significant
Slope	1.47530	0.27433	0.93761	2.01299	5.378	0.01259	Significant
Intercept	2.17403	0.52182	1.15126	3.19680	4.166	0.02516	Significant

Regression Summary								
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)
3	-58.69785	1.47362	0.67783	0.13283	4.93751	28.86930	0.99895	Non-Significant Heterogeneity

Residual Analysis					
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)
Variances	Modified Levene	0.54386	2.95825	0.74040	Equal Variances
Distribution	Shapiro-Wilk W	0.95510	0.90456	0.43843	Normal Distribution

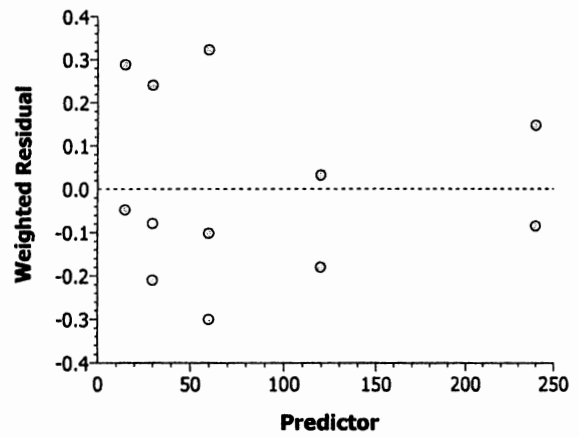
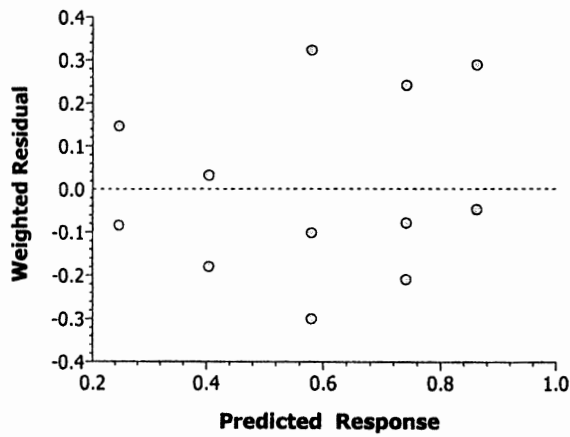
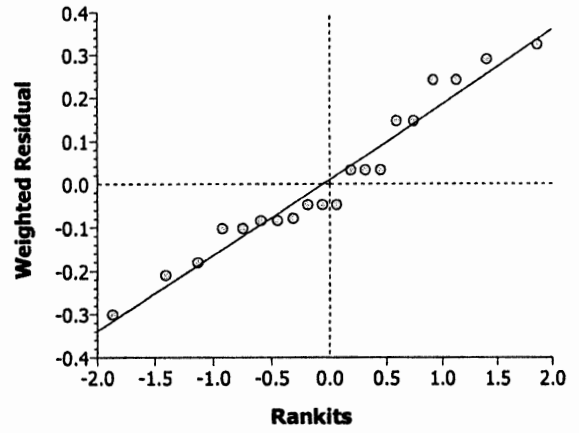
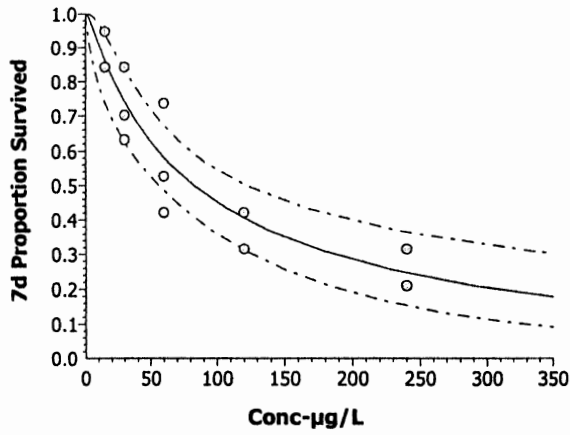
Test Acceptability				
Attribute	Statistic	Acceptable Range	Decision	
Control Response	0.95000	0.8 - N/A	Passes acceptability criteria	

Point Estimates			
% Effect	Conc-µg/L	95% LCL	95% UCL
25	28.72981	13.54850	44.06039
50	82.32289	55.84048	121.17940

Data Summary		Calculated Variate(A/B)							
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Control	4	0.95000	0.80000	1.00000	0.02041	0.10000	38	40
15		4	0.82500	0.80000	0.90000	0.01021	0.05000	33	40
30		4	0.71667	0.60000	0.80000	0.02041	0.10000	26	36
60		4	0.52500	0.40000	0.70000	0.02569	0.12583	21	40
120		4	0.37500	0.30000	0.40000	0.01021	0.05000	15	40
240		4	0.25000	0.20000	0.30000	0.01179	0.05774	10	40

CETIS Analysis Detail

Graphics



CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	11-4099-7607	11-4099-7607	15 Feb-05 2:05 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		15	30	6.67	21.213	21.43%

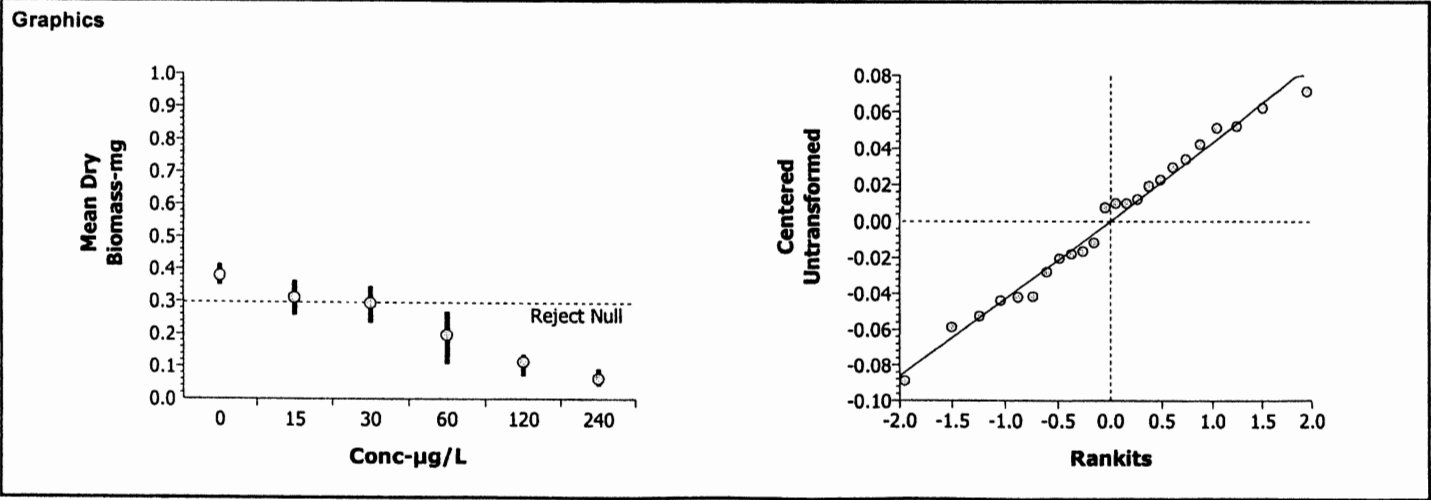
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.379	0.25 - N/A	Passes acceptability criteria
MSDp	0.21430	0.12 - 0.3	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	5.90391	15.08628	0.31568	Equal Variances
Distribution	Shapiro-Wilk W	0.97663	0.88421	0.81405	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.3000663	0.060013	5	26.42	0.00000	Significant Effect
Error	0.0408893	0.002272	18			
Total	0.34095559	0.0622849	23			

Group Comparisons							
Control	vs	Conc-µg/L	Statistic	Critical	P Level	MSD	Decision(0.05)
Lab Control		15	1.99544	2.41	> 0.0500	0.08122	Non-Significant Effect
		30	2.47019	2.41	<= 0.0500	0.08122	Significant Effect
		60	5.34096	2.41	<= 0.0500	0.08122	Significant Effect
		120	7.82599	2.41	<= 0.0500	0.08122	Significant Effect
		240	9.36151	2.41	<= 0.0500	0.08122	Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	4	0.37900	0.35100	0.41300	0.02833				
15		4	0.31175	0.25900	0.36400	0.05490				
30		4	0.29575	0.23700	0.34700	0.04686				
60		4	0.19900	0.11000	0.27000	0.07904				
120		4	0.11525	0.07300	0.13800	0.02883				
240		4	0.06350	0.04300	0.09300	0.02323				



CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Linear Interpolation	11-4099-7607	11-4099-7607	15 Feb-05 2:05 PM	CETISv1.025

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Expanded CL	Method
Linear	Linear	5795186	200	Yes	Two-Point Interpolation

Test Acceptability

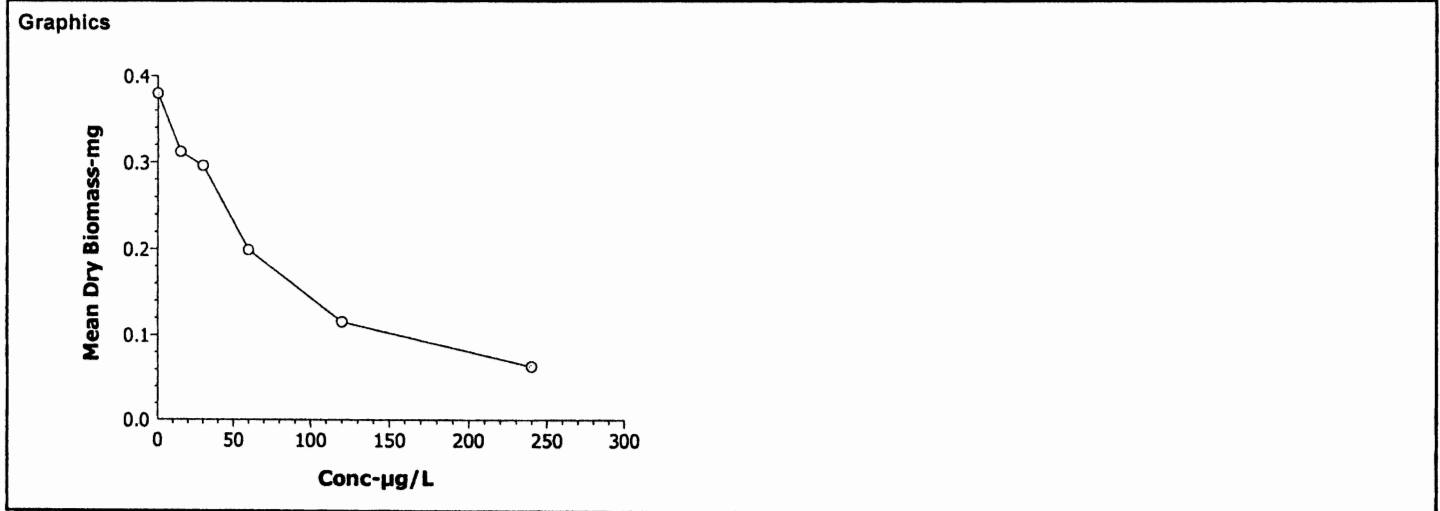
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.379	0.25 - N/A	Passes acceptability criteria

Point Estimates

% Effect	Conc-µg/L	95% LCL	95% UCL
25	33.56589	1.95336	48.93977
50	66.80593	36.71645	104.00750

Data Summary

Conc-µg/L	Control Type	Count	Calculated Variate				
			Mean	Minimum	Maximum	SE	SD
0	Lab Control	4	0.37900	0.35100	0.41300	0.00578	0.02833
15		4	0.31175	0.25900	0.36400	0.01121	0.05490
30		4	0.29575	0.23700	0.34700	0.00956	0.04686
60		4	0.19900	0.11000	0.27000	0.01613	0.07904
120		4	0.11525	0.07300	0.13800	0.00588	0.02883
240		4	0.06350	0.04300	0.09300	0.00474	0.02323



Freshwater Chronic Bioassay

Larval Fish Survival & Weights

Test Species: P. promelas

Client Name: Internal

Test Date: 2/1/2005

Sample ID: CuCl₂

Test No.: 050201pprt

Conc. (µg/L)	Rep.	Test Day								Percent Survival	pan wt. (g)	pan + fish (g)
		0	1	2	3	4	5	6	7			
Lab	a	10	10	10	10	10	10	10	10	100	0.02842	0.03203
Control	b	10	10	10	10	10	10	10	10	100	0.02416	0.02829
	c	10	10	9	9	8	8	8	8	80	0.02696	0.03047
	d	10	10	10	10	10	10	10	10	100	0.02552	0.02943
	15	a	10	10	9	9	8	8	8	8	80	0.02499
15	b	10	10	9	9	9	9	8	8	80	0.02336	0.02606
	c	10	10	9	9	9	9	8	8	80	0.02112	0.02371
	d	10	10	10	10	10	10	9	9	90	0.02271	0.02635
	30	a	10	10	6	6	4	4	4	4	40	0.02200
30	b	10	10	10	8	7	7	6	6	60	0.02364	0.02601
	c	10	9	8	8	8	8	8	8	80	0.02409	0.02693
	d	10	9	9	9	8	8	8	8	80	0.02762	0.03049
	60	a	10	9	9	6	6	5	5	5	50	0.02302
60	b	10	10	7	6	5	5	4	4	40	0.02794	0.02904
	c	10	10	8	8	7	7	7	7	70	0.03112	0.03382
	d	10	9	6	5	5	5	5	5	50	0.02653	0.02808
	120	a	10	10	9	8	7	5	4	4	40	0.02901
120	b	10	9	8	6	4	4	4	4	40	0.02473	0.02598
	c	10	10	9	6	6	4	4	4	40	0.03093	0.03231
	d	10	7	7	6	3	3	3	3	30	0.02177	0.02250
	240	a	10	7	4	4	3	2	2	2	20	0.02351
240	b	10	8	4	2	2	2	2	2	20	0.02592	0.02635
	c	10	8	7	4	4	3	3	3	30	0.02688	0.02759
	d	10	10	7	6	5	4	3	3	30	0.02934	0.02981
		a										
	b											
	c											
	d											
Tech Initials		SD	RG	SD	MC	MC	RG	AH	TR			

Feeding Times (day):

	0	1	2	3	4	5	6
-		0730	0830	0815	0710	1000	0915
-		1400	1430	1330	1130	1400	1400
1730		1600	1545	1530	1430	1400	1530

Weight Data:
 Date/Time in: 2-8-05/1515
 Date/Time out: 2-10-05/1025
 Oven Temp (°C): 48
 Tech Initials: TR

Comments: cup spilled - 4 LIP, use 6th original^{number of} fish in analysis. QC Check: AH 2/15/05
 Final Review: TR 3/1/05

Freshwater Chronic Bioassay

Client: Internal

Sample ID: CuCl₂

Test No: 050201pprt

Test Species: P. promelas

Start Date/Time: 2/1/2005 1700

End Date/Time: 2/8/2005 / 1450

Concentration	Lab Control							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.19	8.05	8.14	8.17	8.11	8.07	8.15	
DO (mg/L)	7.4	7.6	7.4	7.6	7.7	7.7	7.7	
Cond. (µmhos/cm)	209	207	209	203	207	208	191	
Temp (°C)	25.3	25.2	24.9	25.6	25.6	25.8	25.5	
Final								
pH		(A)	8.03	7.97	8.02	7.99	7.98	8.00
DO (mg/L)		(A)	6.8	6.3	6.0	6.2	6.0	6.6
Temp (°C)			25.6	24.6	24.7	24.5	24.5	25.3

Concentration	15 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.19	8.15	8.22	8.19	8.11	8.13	8.10	
DO (mg/L)	7.4	7.7	7.8	7.5	7.7	7.6	7.5	
Cond. (µmhos/cm)	202	201	200	200	207	207	190	
Temp (°C)	25.0	25.2	25.8	25.8	25.6	25.9	25.5	
Final								
pH		(A)	8.05	8.03	7.93	7.97	7.98	8.04
DO (mg/L)		(A)	7.0	6.7	6.3	6.1	6.5	7.2
Temp (°C)			25.6	24.6	24.7	24.6	24.6	25.8

Concentration	30 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.20	8.20	8.23	8.17	8.09	8.17	8.12	
DO (mg/L)	7.4	7.6	7.9	7.6	7.8	7.7	7.5	
Cond. (µmhos/cm)	202	200	200	200	206	205	190	
Temp (°C)	25.0	25.1	25.6	25.7	25.6	25.6	25.5	
Final								
pH		(A)	8.05	8.03	7.91	7.92	8.00	8.00
DO (mg/L)		(A)	7.0	6.8	6.7	6.1	6.7	7.2
Temp (°C)			25.6	24.8	24.7	24.7	24.6	25.7

Concentration	60 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.20	8.20	7.94	8.17	8.09	8.14	8.09	
DO (mg/L)	7.7	7.6	7.8	7.6	7.8	7.7	7.4	
Cond. (µmhos/cm)	202	200	199	199	204	203	189	
Temp (°C)	25.5	25.5	25.7	25.6	25.5	25.6	25.7	
Final								
pH		(A)	8.05	8.03	7.91	7.96	7.96	7.95
DO (mg/L)		(A)	7.0	6.9	6.9	6.4	6.5	6.9
Temp (°C)			25.6	24.8	24.7	24.8	24.7	25.6

Concentration	120 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.18	8.19	7.93	8.16	8.07	8.12	8.08	
DO (mg/L)	7.4	7.5	7.8	7.6	7.8	7.7	7.4	
Cond. (µmhos/cm)	200	198.5	199	198	204	201	188	
Temp (°C)	25.4	25.5	25.8	25.6	25.5	25.5	25.2	
Final								
pH		(A)	8.04	8.01	7.86	7.90	7.96	7.96
DO (mg/L)		(A)	7.1	6.8	6.4	6.2	6.6	7.0
Temp (°C)			25.7	24.8	24.7	24.7	24.6	25.5

Concentration	240 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.16	8.18	7.92	8.15	8.07	8.09	8.05	
DO (mg/L)	7.4	7.7	7.8	7.6	7.8	7.7	7.5	
Cond. (µmhos/cm)	198	197	196	195	202	200	186	
Temp (°C)	25.4	25.2	25.7	25.5	25.5	25.4	25.0	
Final								
pH		(A)	8.07	8.02	7.88	7.90	7.95	7.97
DO (mg/L)		(A)	7.2	6.9	6.7	6.3	6.4	7.0
Temp (°C)			25.7	24.8	24.7	24.4	24.7	25.3

Analysts:	Initial:	0	1	2	3	4	5	6	7
		SD	FR	SD	SH	MC	SD	SD	
	Final:		-	SD	SH	MC	R4	R4	SD

Animal Source/Date Received: ABS / 2-1-05

Animal Age at Initiation: < 48 hours

Comments: (A) water changed before final readings.

QC Check: At 2/15/05

Final Review: [Signature] 3/3/05

C. DUBIA

CETIS Test Summary

Ceriodaphnia 7-d Survival and Reproduction Test						Nautilus Environmental WA		
Test No:	06-9968-6418	Test Type:	Reproduction-Survival (7d)	Duration:	6d 23h	Species:	Ceriodaphnia dubia	
Start Date:	01 Feb-05 11:15 AM	Protocol:	EPA/821/R-02-013 (2002)	Source:	In-House Culture	Dil Water:	Diluted Mineral Water (8:2)	
Ending Date:	08 Feb-05 10:45 AM	Brine:						
Setup Date:	01 Feb-05 12:00 AM							
Sample No:	02-7537-3725	Material:	Sodium chloride	Client:	Reference Toxicant Test	Project:		
Sample Date:	01 Feb-05	Code:	RT020105CD					
Receive Date:	01 Feb-05	Source:	Reference Toxicant					
Sample Age:	N/A	Station:						
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
07-3637-8553	7d Proportion Survived	1	2	1.414	N/A	Fisher's Exact		
10-9702-9484	Reproduction	1	2	1.414	22.47%	Bonferroni Adj Wilcoxon Rank Sum		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-gm/L	95% LCL	95% UCL	Method		
17-1082-8154	7d Proportion Survived	50	1.51280	1.28441	1.78181	Trimmed Spearman-Kärber		
09-1188-2215	Reproduction	25	1.06498	0.44336	1.23009	Linear Interpolation		
		50	1.39652	1.13545	1.52398			
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
07-3637-8553	7d Proportion Survived	Control Response	0.8	0.8 - N/A	Passes acceptability criteria			
17-1082-8154	7d Proportion Survived	Control Response	0.8	0.8 - N/A	Passes acceptability criteria			
09-1188-2215	Reproduction	Control Response	26.7	15 - N/A	Passes acceptability criteria			
10-9702-9484	Reproduction	Control Response	26.7	15 - N/A	Passes acceptability criteria			
10-9702-9484	Reproduction	MSDp	0.22472	0.13 - 0.47	Passes acceptability criteria			
7d Proportion Survived Summary								
Conc-gm/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	10	0.80000	0.00000	1.00000	0.13333	0.42164	52.70%
0.25		10	0.80000	0.00000	1.00000	0.13333	0.42164	52.70%
0.5		10	0.80000	0.00000	1.00000	0.13333	0.42164	52.70%
1		10	0.77778	0.00000	1.00000	0.14699	0.44096	56.69%
2		10	0.10000	0.00000	1.00000	0.10000	0.31623	316.23
4		10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Reproduction Summary								
Conc-gm/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	10	26.7	10	34	2.5519	8.0698	30.22%
0.25		10	24.7	15	30	1.6401	5.1865	21.00%
0.5		10	23.3	13	30	1.7388	5.4985	23.60%
1		10	21.333	9	29	2.4381	7.3144	34.29%
2		10	1.2	0	12	1.2	3.7947	316.23
4		10	0	0	0	0	0	0.00%

CETIS Test Summary

Report Date: 15 Feb-05 4:45 PM

Link: 00-2473-8252/RT020105CD

7d Proportion Survived Detail											
Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000
0.25		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	0.00000
0.5		1.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	0.00000	1.00000	1.00000
1		1.00000	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	N/A	0.00000
2		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000
4		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Reproduction Detail											
Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	27	32	31	14	30	34	29	28	10	32
0.25		21	17	30	27	26	27	15	28	27	29
0.5		25	24	23	27	30	13	26	14	25	26
1		20	28	26	25	29	9	10	21	N/A	24
2		0	0	0	0	0	0	0	0	12	0
4		0	0	0	0	0	0	0	0	0	0

CETIS Analysis Detail

Comparisons: Page 1 of 1
 Report Date: 15 Feb-05 4:45 PM
 Analysis: 07-3637-8553/RT020105CD

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

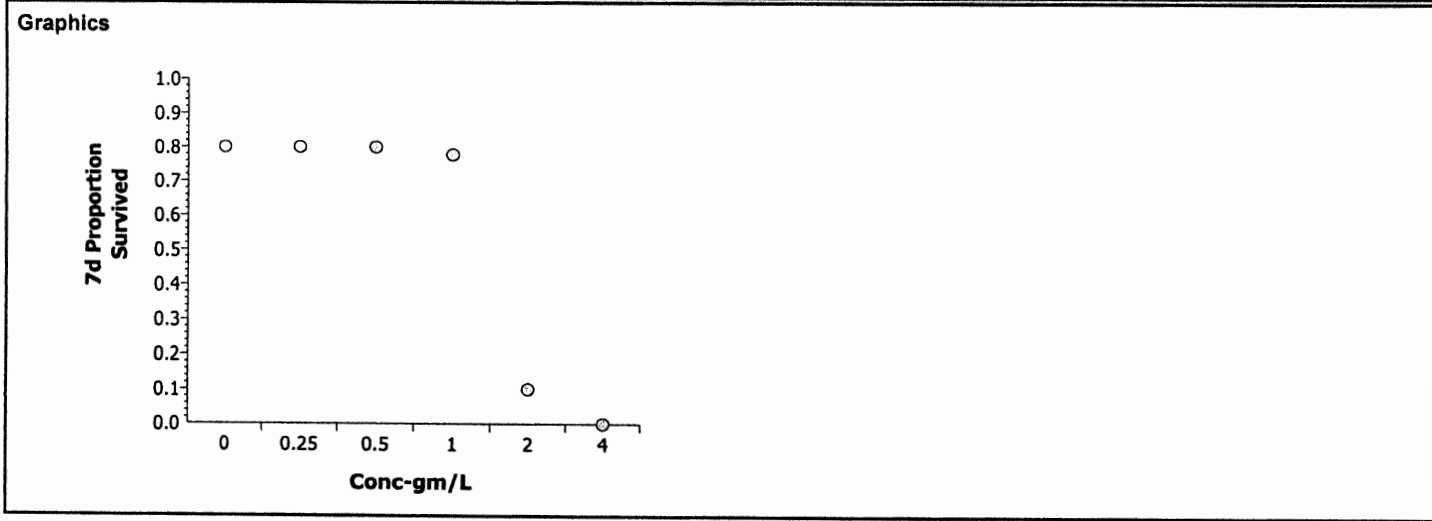
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	00-2473-8252	00-2473-8252	15 Feb-05 4:45 PM	CETISv1.025

Method	Alt H	Data Transform	NOEL	LOEL	Toxic Units	ChV	MSDp
Fisher's Exact	C > T	Untransformed	1	2	100.00	1.414	

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.8	0.8 - N/A	Passes acceptability criteria

Group Comparisons					
Control	vs	Conc-gm/L	Statistic	Critical	Decision(0.05)
Dilution Water		0.25	0.70898	0.05000	Non-Significant Effect
		0.5	0.70898	0.05000	Non-Significant Effect
		1	0.66718	0.05000	Non-Significant Effect
		2	0.00274	0.05000	Significant Effect
		4	0.00036	0.05000	Significant Effect

Data Summary				
Conc-gm/L	Control Type	Non-Responders	Responders	Total Observed
0	Dilution Water	8	2	10
0.25		8	2	10
0.5		8	2	10
1		7	2	9
2		1	9	10
4		0	10	10



CETIS Analysis Detail

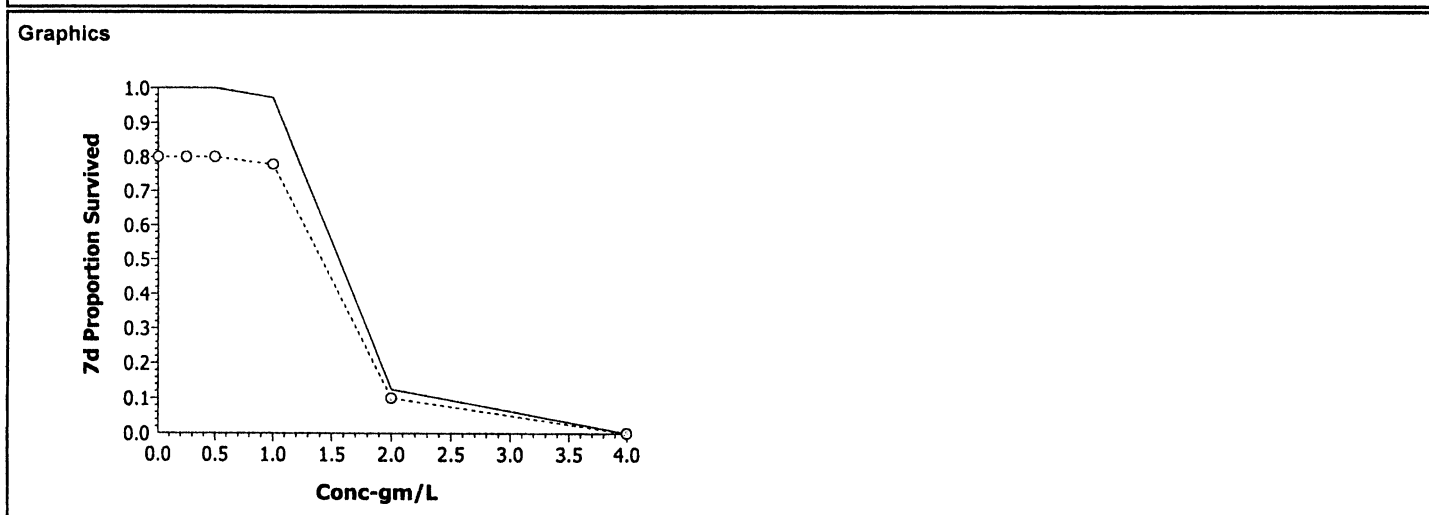
Ceriodaphnia 7-d Survival and Reproduction Test					Nautilus Environmental WA	
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Trimmed Spearman-Kärber	00-2473-8252	00-2473-8252	15 Feb-05 4:45 PM	CETISv1.025

Spearman-Kärber Options					Point Estimates		
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL
Control Threshold	0.2	0.00%	0.1797818	0.03553963	1.51280	1.28441	1.78181

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.8	0.8 - N/A	Passes acceptability criteria

Data Summary		Calculated Variate(A/B)							
Conc-gm/	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Dilution Water	10	0.80000	0.00000	1.00000	0.08607	0.42164	8	10
0.25		10	0.80000	0.00000	1.00000	0.08607	0.42164	8	10
0.5		10	0.80000	0.00000	1.00000	0.08607	0.42164	8	10
1		9	0.77778	0.00000	1.00000	0.09001	0.44096	7	9
2		10	0.10000	0.00000	1.00000	0.06455	0.31623	1	10
4		10	0.00000	0.00000	0.00000	0.00000	0.00000	0	10



CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Reproduction	Comparison	00-2473-8252	00-2473-8252	15 Feb-05 4:45 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Bonferroni Adj Wilcoxon Rank Su	C > T	Untransformed		1	2	100.00	1.414	22.47%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	26.7	15 - N/A	Passes acceptability criteria
MSDp	0.22472	0.13 - 0.47	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	2.45512	3.38414	0.04495	Equal Variances
Distribution	Kolmogorov-Smirnov D	0.24899	0.13416	0.00000	Non-normal Distribution

ANOVA Table

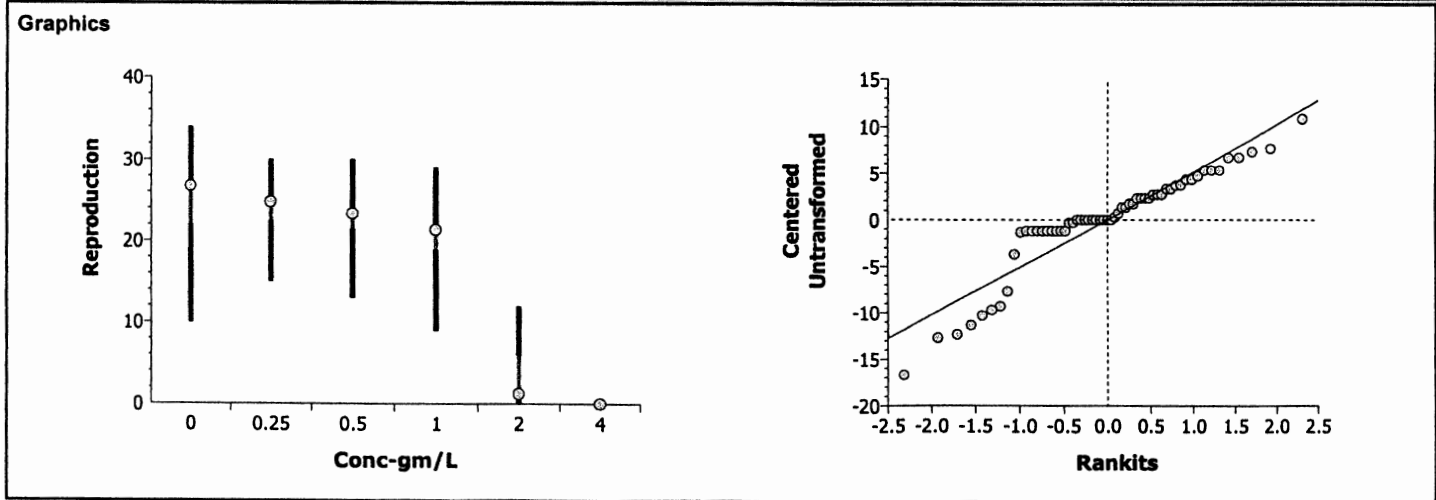
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	7440.27	1488.054	5	47.57	0.00000	Significant Effect
Error	1657.9	31.28113	53			
Total	9098.16956	1519.3351	58			

Group Comparisons

Control	vs	Conc-gm/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Dilution Water		0.25	84		0.0615	5	Non-Significant Effect
		0.5	77.5		0.0177	6	Non-Significant Effect
		1	63.5		0.0140	4	Non-Significant Effect
		2	56		0.0000	2	Significant Effect
		4	55		0.0000	2	Significant Effect

Data Summary

Conc-gm/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Water	10	26.7	10	34	8.0698				
0.25		10	24.7	15	30	5.1865				
0.5		10	23.3	13	30	5.4985				
1		9	21.333	9	29	7.3144				
2		10	1.2	0	12	3.7947				
4		10	0	0	0	0				



CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Reproduction	Linear Interpolation	00-2473-8252	00-2473-8252	15 Feb-05 4:45 PM	CETISv1.025

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Expanded CL	Method
Linear	Linear	7747400	200	Yes	Two-Point Interpolation

Test Acceptability

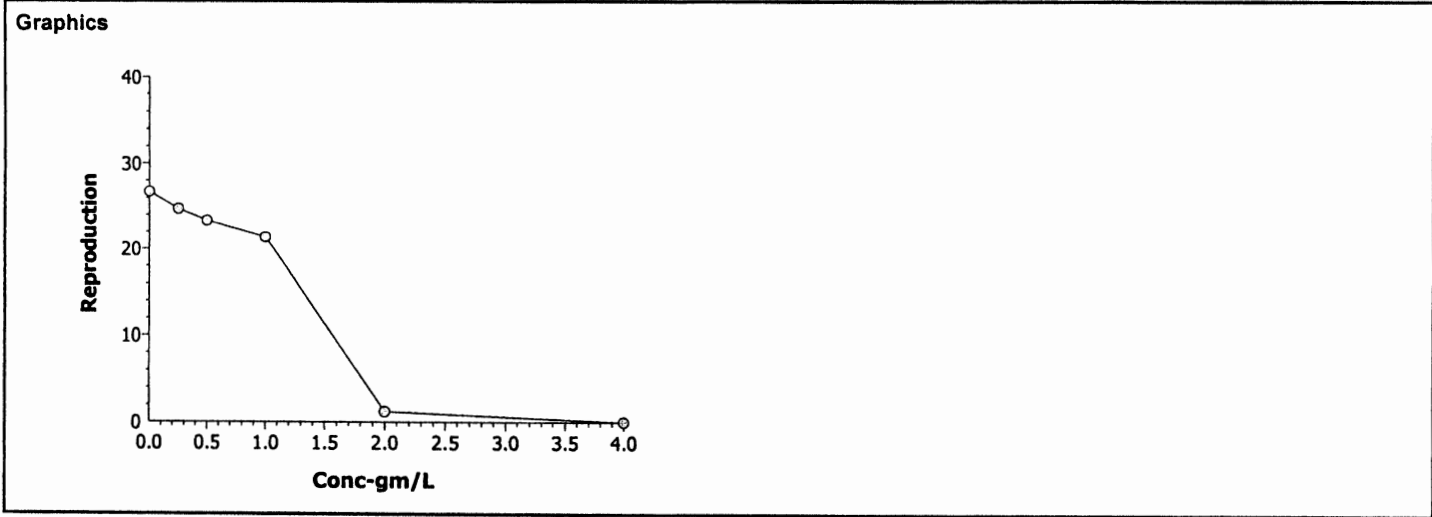
Attribute	Statistic	Acceptable Range	Decision
Control Response	26.7	15 - N/A	Passes acceptability criteria

Point Estimates

% Effect	Conc-gm/L	95% LCL	95% UCL
25	1.06498	0.44336	1.23009
50	1.39652	1.13545	1.52398

Data Summary

Conc-gm/	Control Type	Count	Calculated Variate				
			Mean	Minimum	Maximum	SE	SD
0	Dilution Water	10	26.7	10	34	1.64725	8.06983
0.25		10	24.7	15	30	1.05869	5.18652
0.5		10	23.3	13	30	1.12237	5.49848
1		9	21.333333	9	29	1.49304	7.31437
2		10	1.2	0	12	0.7746	3.79473
4		10	0	0	0	0	0



Ceriodaphnia 7-Day Chronic Survival and Reproduction

Client/Sample ID: Ref Tox 4g/L NaCl
 Test Number: RT020105CD

Start Date and Time: 1 Feb 05 1115
 Stop Date and Time: 8 Feb 05 1045

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
			1	2	3	4	5	6	7		
CON	1	40	-	-	4	-	10	13	14	27	
	2	6	-	-	-	6	11	15	-	32	
	3	45	-	-	5	-	11	15	15	31	
	4	3	-	-	-	4	10	X	-	14/d	
	5	2	-	-	6	-	8	15	-	30	
	6	59	-	-	6	-	9	19	16	34	
	7	48	-	-	5	-	10	14	15	29	
	8	60	-	-	-	4	9	15	-	28	
	9	i	-	-	-	-	10	X	-	10/d	
	10	19	-	-	5	-	8	19	15	32	
Analyst	CP	AM	RS	AM	AM	AM	CP				
Time	1115	1240	1345	1100	1340	1330	1445	1045			

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
			1	2	3	4	5	6	7		
1.00	1	55	-	-	3	-	8	9	11	20	
	2	23	-	-	-	4	11	13	-	28	
	3	34	-	-	-	5	8	13	-	26	
	4	43	-	-	5	-	6	14	10	25	
	5	16	-	-	5	-	8	16	-	29	
	6	24	-	-	-	3	4	2	X	9/d	
	7	30	-	-	-	-	10	X	-	10	
	8	57	-	-	-	5	7	9	-	21	
	9	53	-	Δ	-	-	-	-	-	4/d	
	10	11	-	-	4	8	-	13	X	24/d	

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
			1	2	3	4	5	6	7		
0.25	1	37	-	-	4	-	7	10	13	21	
	2	7	-	-	-	6	7	4	-	17	
	3	49	-	-	6	-	10	14	14	30	
	4	17	-	-	4	-	10	13	13	27	
	5	44	-	-	3	-	9	14	14	26	
	6	51	-	-	6	-	9	12	15	27	
	7	36	-	-	6	-	9	-	X	15/d	
	8	29	-	-	-	6	9	13	-	28	
	9	42	-	-	5	-	9	13	15	27	
	10	10	-	-	6	7	-	10	X	29/d	

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
			1	2	3	4	5	6	7		
2.00	1	20	X	-	-	-	-	-	-	0/d	
	2	32	-	X	-	-	-	-	-		
	3	56	-	X	-	-	-	-	-		
	4	38	-	X	-	-	-	-	-		
	5	50	-	X	-	-	-	-	-		
	6	58	-	X	-	-	-	-	-		
	7	26	-	X	-	-	-	-	-		
	8	5	-	X	-	-	-	-	-		
	9	28	-	-	-	2	-	3	7	12	
	10	25	-	-	-	X	-	-	-	0/d	

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
			1	2	3	4	5	6	7		
0.50	1	35	-	-	-	4	9	12	-	25	
	2	47	-	-	-	5	8	11	-	24	
	3	18	-	-	-	4	6	13	-	23	
	4	21	-	-	6	-	6	15	11	27	
	5	41	-	-	6	11	-	13	14	30	
	6	31	-	-	-	6	7/X	-	-	13/d	
	7	46	-	-	6	-	9	11	9	26	
	8	4	-	-	-	5	9	X	-	14/d	
	9	8	-	-	5	-	8	12	-	25	
	10	39	-	-	4	8	-	14	16	26	

Conc.	Rep	Cont	Daily Reproduction							Day 6 Total	Day 7 Total
			1	2	3	4	5	6	7		
4.00	1	27	X	-	-	-	-	-	-	0/d	
	2	9	-	X	-	-	-	-	-		
	3	15	X	-	-	-	-	-	-		
	4	52	X	-	-	-	-	-	-		
	5	13	X	-	-	-	-	-	-		
	6	54	X	-	-	-	-	-	-		
	7	22	X	-	-	-	-	-	-		
	8	14	X	-	-	-	-	-	-		
	9	12	X	-	-	-	-	-	-		
	10	33	X	-	-	-	-	-	-		

Comments: X=mortality Δ - cup spilled.

D. ... 2/21/05

**Nautilus Environmental
Random Number Sheet**

Client: Reference Toxicant
Test No.: RT020105CD

Species: *Ceriodaphnia dubia*
Start date: 02/01/2005

Conc. (g/l)	Rep	Container	Conc.	Rep	Container
0	1	40	1.00	1	55
	2	6		2	23
	3	45		3	34
	4	3		4	43
	5	2		5	16
	6	59		6	24
	7	48		7	30
	8	60		8	57
	9	1		9	59
	10	19		10	11
0.25	1	37	2.00	1	20
	2	7		2	32
	3	49		3	56
	4	17		4	38
	5	44		5	50
	6	51		6	58
	7	36		7	26
	8	29		8	5
	9	42		9	28
	10	10		10	25
0.50	1	35	4.00	1	27
	2	47		2	9
	3	18		3	15
	4	21		4	52
	5	41		5	13
	6	31		6	54
	7	46		7	22
	8	4		8	14
	9	8		9	12
	10	39		10	33

Ceriodaphnia Brood Board

Date/Time started: 1/25 9:15 Tech: CP

Day	1	2	3	4	5	6	7	8
Date	1/26	1/27	1/28	1/29		1/31	2/01	
Time	0900	0915	1130	1045		0530	1000	

Day	1	2	3	4	5	6	7	8
Date	1/26	1/27	1/28			1/31	2/01	
Time						0930		

Cont #	1	2	3	4	5	6	7	8
1	-	-	-	5	8	-	10	
2	-	-	-	5	9	-	14	
3	-	-	-	5	7	-	12	
4	-	-	-	5	10	-	11	
5	-	-	-	5	10	-	X	-
6	-	-	-	6	9	-	13	
7	-	-	-	5	9	-	10	
8	-	-	-	5	10	-	12	
9	-	-	-	6	8	-	12	
10	-	-	-	5	8	-	11	
11	-	-	-	5	8	-	X	
12	-	-	-	6	10	-	11	
13	-	-	-	5	8	-	11	
14	-	-	-	6	8	-	13	
15	-	-	-	3	6	-	12	
16	-	-	-	2	-	8	13	
17	-	-	-	6	8	-	8	
18	-	-	-	6	9	-	10	
19	-	-	-	5	9	-	13	
20	-	-	-	5	10	-	13	
21	-	-	-	5	9	-	11	
22	-	-	-	6	9	-	11	
23	-	-	-	6	10	-	15	
24	-	-	-	6	10	-	X	-
25	-	-	-	6	9	-	12	
26	-	-	-	6	11	-	14	
27	-	-	-	6	11	-	10	
28	-	-	-	4	10	-	12	
29	-	-	6	-	11	10	3	
30	-	-	4	-	9	11	4	
Tech	CP	NA	NA	NA	NA	CP	CP	

Cont #	1	2	3	4	5	6	7	8
31	-	-	5	-	10	15	14	
32	-	-	4	-	9	10	12	
33	-	-	4	7	-	8	13	
34	-	-	3	-	10	14	12	
35	-	-	4	-	9	17	11	
36	-	-	-	6	-	11	15	
37	-	-	4	-	7	11	-	
38	-	-	-	4	10	11	-	
39	-	-	4	-	10	14	-	
40	-	-	-	5	X	-	-	
41	-	-	-	6	6	-	10	
42	-	-	-	5	10	-	X	-
43	-	-	-	6	7	-	10	
44	-	-	-	6	11	-	14	
45	-	-	-	6	9	-	10	
46	-	-	-	6	10	-	12	
47	-	-	-	5	11	-	12	
48	-	-	-	5	8	-	12	
49	-	-	6	-	10	11	15	
50	-	-	5	-	9	14	14	
51	-	-	5	-	11	14	11	
52	-	-	6	-	10	11	11	
53	-	-	-	6	9	-	12	
54	-	-	-	5	10	-	12	
55	-	-	-	5	10	-	14	
56	-	-	-	4	9	-	11	
57	-	-	-	6	10	-	11	
58	-	-	-	6	10	-	13	
59	-	-	-	5	9	-	13	
60	-	-	-	1	10	-	13	
Tech	CP	NA	NA	NA	NA	CP	CP	

Test Set Up

Test Rep #	Brood Board Cont #
1	2
2	3
3	6
4	8
5	9
6	14
7	15
8	16
9	19
10	20

Client: Ref Tox
 Start Date: 2/1/05
 Test #: RT020105-BCD

AMEC Earth and Environmental
 Northwest Bioassay Laboratory

Review: [Signature] 3/3/05

Nautilus Environmental
Northwest Laboratory

Client: Ref Tox
Sample ID: 4.0 mg/L NaCl
Test No: RT090105 CD

Initial and Final Chemistries

Seven Day Chronic Freshwater Bioassay
Start Date & Time: 1 Feb 05 1115
Stop Date & Time: 8 Feb 05 1045
Test Species: Ceriodaphnia dubia

Concentration	Days													
	0	1	2	3	4	5	6							
CON														
pH	7.84	8.18	7.98	8.14	8.05	8.49	8.15	8.52	8.19	8.29	8.20	8.44	7.98	7.87
DO (mg/l)	16.45	8.0	8.2	7.1	8.7	8.3	8.2	7.9	8.8	8.1	8.0	7.3	10.4	7.6
Cond. (µmhos-cm)	830	197	161	187	160	185	158	175	170	181	171	180	164	198
Temperature (°C)	24.0	24.7	24.5	24.5	25.0	25.2	24.0	25.1	24.5	24.3	25.0	25.5	25.0	25.0
0.25														
pH	7.84	8.20	8.01	8.17	8.08	8.65	8.08	8.53	8.25	8.28	8.21	8.51	8.01	7.96
DO (mg/l)	8.4	8.2	8.2	7.2	8.7	8.6	8.0	8.3	8.5	8.2	7.9	7.3	10.4	7.1
Cond. (µmhos-cm)	619	655	639	688	616	624	612	644	635	667	649	658	682	672
Temperature (°C)	24.0	24.7	24.5	24.5	25.0	25.2	24.0	25.1	24.5	24.3	25.0	25.5	25.0	25.0
0.5														
pH	7.97	8.20	8.01	8.17	8.04	8.67	8.14	8.55	8.25	8.29	8.18	8.49	8.00	7.97
DO (mg/l)	8.4	8.9	8.2	7.2	8.8	8.6	8.1	8.1	8.5	8.2	8.1	7.6	10.7	7.7
Cond. (µmhos-cm)	1064	1134	1108	1195	1074	1163	1060	1107	1095	1134	1114	1123	1084	1170
Temperature (°C)	24.0	24.7	24.5	24.5	25.0	25.2	24.0	25.1	24.5	24.3	25.0	25.5	25.0	25.0
1.0														
pH	7.89	8.21	8.02	8.14	8.05	8.67	8.16	8.57	8.24	8.28	8.18	8.51	8.01	7.98
DO (mg/l)	8.4	8.2	8.2	7.2	8.8	8.7	8.1	7.9	8.6	8.2	8.1	7.5	10.6	6.9
Cond. (µmhos-cm)	1838	2050	2010	2150	1962	2120	1929	2030	1976	2060	2030	2060	1991	2260
Temperature (°C)	24.0	24.7	24.5	24.5	25.0	25.2	24.0	25.1	24.5	24.3	25.0	25.5	25.0	25.0
2.0														
pH	7.92	8.20	8.01	8.11	8.04	8.68	8.13	8.44	8.20	8.26	8.17	8.52	8.01	7.93
DO (mg/l)	8.4	8.3	8.2	7.2	8.8	7.6	8.2	7.6	8.5	8.1	8.1	7.3	10.5	7.4
Cond. (µmhos-cm)	3170	3924	3750	4040	3700	3880	3630	3590	3740	3770	3850	3870	3750	4040
Temperature (°C)	24.0	24.7	24.5	24.5	25.0	25.2	24.0	25.1	24.5	24.3	25.0	25.5	25.0	25.0
4.0														
pH	7.93	8.15	7.99	8.00	8.01									
DO (mg/l)	8.4	8.2	8.2	7.6	8.8									
Cond. (µmhos-cm)	7000	7380	7140	4140	6990									
Temperature (°C)	24.0	24.7	24.5	24.5	25.0									

	Control			
Hardness*	76			
Alkalinity*	52			
Initial Chlorinel				
Ammonia I				

* mg/L as CaCO₃; I mg/L; ND: no chlorine detected

Analysts: AW, SM, CP
Reviewed: CP 3/3/05

Sample Description:

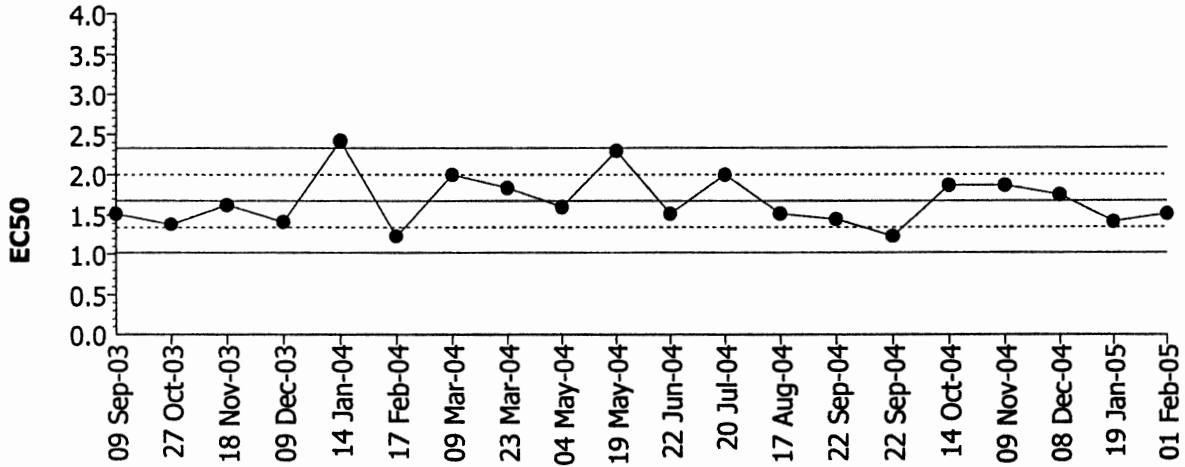
Animal Source: internal Date Received: NA Date of Hatch: _____
Comments: at pH just below 7.90 minimum

CETIS QC Chart

Report Date: 03 Mar-05 2:42 PM

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental WA**

Test Type: Reproduction-Survival (7d) **Organism:** Ceriodaphnia dubia (Water Flea) **Material:** Sodium chloride
Protocol: EPA/821/R-02-013 (2002) **Endpoint:** 7d Proportion Survived **Source:** Reference Toxicant-REF

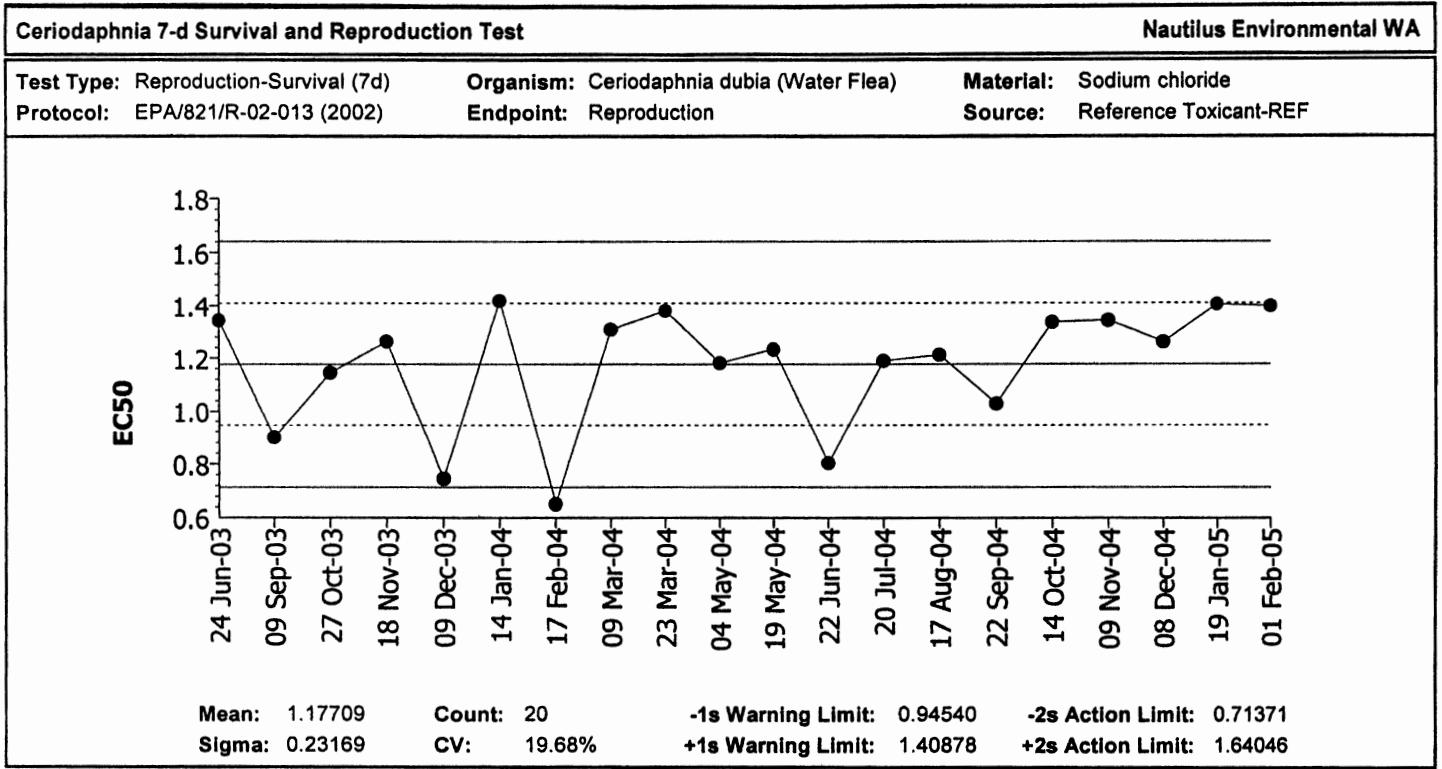


Mean: 1.67231 **Count:** 20 **-1s Warning Limit:** 1.34434 **-2s Action Limit:** 1.01637
Sigma: 0.32797 **CV:** 19.61% **+1s Warning Limit:** 2.00028 **+2s Action Limit:** 2.32825

Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2003	Sep	9	1.51572	-0.15659	-0.47746			00-6136-1598	05-1482-3192
2		Oct	27	1.38391	-0.28840	-0.87934			18-0932-7378	03-3047-8748
3		Nov	18	1.62450	-0.04780	-0.14576			03-5407-6023	05-3301-4959
4		Dec	9	1.41421	-0.25810	-0.78695			01-8264-8807	12-0766-6501
5	2004	Jan	14	2.42465	0.75234	2.29393	(+)	(+)	15-0706-6186	10-3219-8334
6		Feb	17	1.23114	-0.44117	-1.34514	(-)		18-2767-2929	16-0815-0050
7		Mar	9	2.00000	0.32769	0.99914			09-8808-4976	01-5756-7630
8			23	1.83590	0.16359	0.49880			04-9273-7063	10-7955-7013
9		May	4	1.60055	-0.07176	-0.21879			03-2043-5142	09-8389-8031
10			19	2.29740	0.62509	1.90592	(+)		04-7035-2052	09-1547-8716
11		Jun	22	1.51572	-0.15659	-0.47746			15-1252-8901	08-0144-4767
12		Jul	20	2.00000	0.32769	0.99914			10-9033-5177	03-0495-9966
13		Aug	17	1.51572	-0.15659	-0.47746			09-7046-1382	04-1108-7570
14		Sep	22	1.44444	-0.22787	-0.69477			07-8969-2765	13-1290-5283
15			22	1.23114	-0.44117	-1.34514	(-)		07-8969-2765	11-8936-2271
16		Oct	14	1.86607	0.19376	0.59077			08-1686-4525	11-6597-8504
17		Nov	9	1.86607	0.19376	0.59077			04-4715-4856	10-0932-9599
18		Dec	8	1.75203	0.07972	0.24307			13-5597-8021	14-4852-5809
19	2005	Jan	19	1.41421	-0.25810	-0.78695			04-2741-2580	06-9744-8778
20		Feb	1	1.51280	-0.15951	-0.48635			00-2473-8252	17-1082-8154

CETIS QC Chart

Report Date: 03 Mar-05 2:43 PM



Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2003	Jun	24	1.34277	0.16568	0.71510			11-0891-8605	07-2904-0003
2		Sep	9	0.89911	-0.27798	-1.19981	(-)		00-6136-1598	15-9257-5869
3		Oct	27	1.14541	-0.03167	-0.13671			18-0932-7378	06-0093-3628
4		Nov	18	1.26273	0.08564	0.36963			03-5407-6023	08-5781-7875
5		Dec	9	0.74557	-0.43152	-1.86250	(-)		01-8264-8807	05-9483-7053
6	2004	Jan	14	1.41817	0.24108	1.04055	(+)		15-0706-6186	20-4037-9633
7		Feb	17	0.65114	-0.52595	-2.27010	(-)	(-)	18-2767-2929	10-9082-3374
8		Mar	9	1.30882	0.13174	0.56859			09-8808-4976	10-0987-2627
9			23	1.38071	0.20362	0.87887			04-9273-7063	11-4937-0930
10		May	4	1.18217	0.00508	0.02194			03-2043-5142	15-3903-2441
11			19	1.23289	0.05581	0.24087			04-7035-2052	14-9432-5455
12		Jun	22	0.80263	-0.37446	-1.61622	(-)		15-1252-8901	12-8014-3172
13		Jul	20	1.18898	0.01189	0.05131			10-9033-5177	08-9252-5395
14		Aug	17	1.21229	0.03520	0.15194			09-7046-1382	02-8503-6721
15		Sep	22	1.02717	-0.14991	-0.64706			07-8969-2765	02-8587-6832
16		Oct	14	1.33641	0.15932	0.68764			08-1686-4525	18-6882-5029
17		Nov	9	1.34271	0.16562	0.71484			04-4715-4856	10-6702-5887
18		Dec	8	1.26064	0.08355	0.36061			13-5597-8021	10-6602-7350
19	2005	Jan	19	1.40493	0.22784	0.98340			04-2741-2580	08-8737-9669
20		Feb	1	1.39652	0.21943	0.94712			00-2473-8252	09-1188-2215

S. CAPRICORNUTUM

Report Date: 24 Feb-05 9:51 AM

Link: 08-6576-8297/050201scrt

CETIS Test Summary

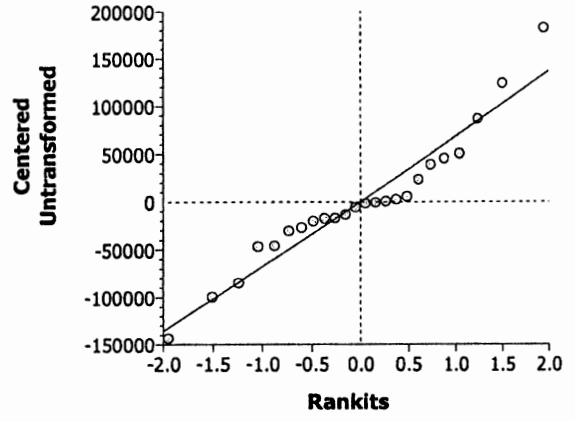
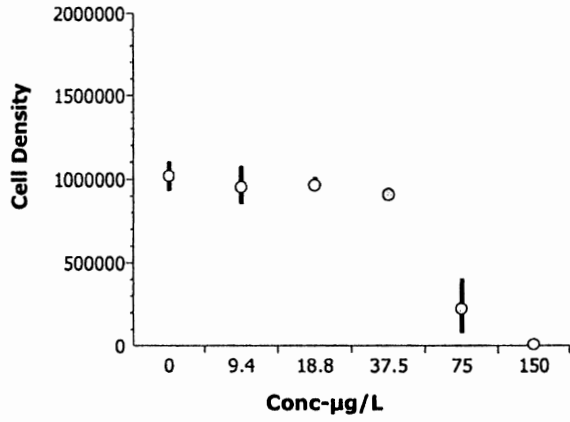
Selenastrum Growth Test				Nautilus Environmental (CA)				
Test No:	15-8916-2915	Test Type:	Cell Growth	Duration:	94h			
Start Date:	01 Feb-05 04:00 PM	Protocol:	EPA/821/R-02-013 (2002)	Species:	Selenastrum capricornutum			
Ending Date:	05 Feb-05 02:00 PM	Dil Water:	Nutrient Enriched Water	Source:	In-House Culture			
Setup Date:	01 Feb-05 04:00 PM	Brine:						
Sample No:	09-8009-8239	Material:	Copper chloride	Client:	Internal			
Sample Date:	01 Feb-05	Code:	050201scrt	Project:				
Receive Date:	01 Feb-05	Source:	Reference Toxicant					
Sample Age:	16h	Station:						
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
13-2261-1015	Cell Density	37.5	75	53.033	12.90%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
04-4949-2996	Cell Density	25	45.40844	40.36261	50.85952	Linear Interpolation		
		50	59.37500	53.92220	67.09946			
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
04-4949-2996	Cell Density	Control CV	0.07761	N/A - 0.2	Passes acceptability criteria			
13-2261-1015	Cell Density	Control CV	0.07761	N/A - 0.2	Passes acceptability criteria			
04-4949-2996	Cell Density	Control Response	1019000	1000000 - N/A	Passes acceptability criteria			
13-2261-1015	Cell Density	Control Response	1019000	1000000 - N/A	Passes acceptability criteria			
13-2261-1015	Cell Density	MSDp	0.12899	0.091 - 0.29	Passes acceptability criteria			
Cell Density Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	4	1.02E+6	9.34E+5	1.11E+6	3.95E+4	7.91E+4	7.76%
9.4		4	9.54E+5	8.54E+5	1.08E+6	4.82E+4	9.64E+4	10.11%
18.8		4	9.65E+5	9.38E+5	1.02E+6	1.72E+4	3.44E+4	3.57%
37.5		4	9.09E+5	8.78E+5	9.47E+5	1.48E+4	2.96E+4	3.26%
75		4	2.25E+5	8.10E+4	4.06E+5	6.72E+4	1.34E+5	59.91%
150		4	6.75E+3	5.00E+3	9.00E+3	8.54E+2	1.71E+3	25.30%
Cell Density Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	1.06E+6	9.73E+5	1.11E+6	9.34E+5			
9.4		9.77E+5	9.07E+5	8.54E+5	1.08E+6			
18.8		9.38E+5	9.48E+5	1.02E+6	9.59E+5			
37.5		9.14E+5	8.95E+5	8.78E+5	9.47E+5			
75		2.04E+5	2.07E+5	4.06E+5	8.10E+4			
150		6.00E+3	5.00E+3	9.00E+3	7.00E+3			

CETIS Analysis Detail

Selenastrum Growth Test						Nautilus Environmental (CA)					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version					
Cell Density	Comparison		08-6576-8297	08-6576-8297	10 Feb-05 10:53 AM	CETISv1.025					
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp			
Steel's Many-One Rank	C > T	Untransformed		37.5	75	2.67	53.033	12.90%			
Test Acceptability											
Attribute	Statistic	Acceptable Range	Decision								
Control CV	0.07761	N/A - 0.2	Passes acceptability criteria								
Control Response	1019000	1000000 - N/A	Passes acceptability criteria								
MSDp	0.12899	0.091 - 0.29	Passes acceptability criteria								
ANOVA Assumptions											
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)						
Variances	Bartlett	25.34433	15.08628	0.00012	Unequal Variances						
Distribution	Shapiro-Wilk W	0.94531	0.88421	0.22122	Normal Distribution						
ANOVA Table											
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)					
Between	3.936E+12	7.87E+11	5	132.34	0.00000	Significant Effect					
Error	1.071E+11	5.95E+09	18								
Total	4.0432E+12	7.932E+11	23								
Group Comparisons											
Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)				
Lab Control		9.4	15	10	> 0.0500	0	Non-Significant Effect				
		18.8	15	10	> 0.0500	0	Non-Significant Effect				
		37.5	11	10	> 0.0500	0	Non-Significant Effect				
		75	10	10	<= 0.0500	0	Significant Effect				
		150	10	10	<= 0.0500	0	Significant Effect				
Data Summary											
Data Summary			Original Data				Transformed Data				
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD	
0	Lab Control	4	1.02E+6	9.34E+5	1.11E+6	7.91E+4					
9.4		4	9.54E+5	8.54E+5	1.08E+6	9.64E+4					
18.8		4	9.65E+5	9.38E+5	1.02E+6	3.44E+4					
37.5		4	9.09E+5	8.78E+5	9.47E+5	2.96E+4					
75		4	2.25E+5	8.10E+4	4.06E+5	1.34E+5					
150		4	6.75E+3	5.00E+3	9.00E+3	1.71E+3					
Data Detail											
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	1.06E+6	9.73E+5	1.11E+6	9.34E+5						
9.4		9.77E+5	9.07E+5	8.54E+5	1.08E+6						
18.8		9.38E+5	9.48E+5	1.02E+6	9.59E+5						
37.5		9.14E+5	8.95E+5	8.78E+5	9.47E+5						
75		2.04E+5	2.07E+5	4.06E+5	8.10E+4						
150		6.00E+3	5.00E+3	9.00E+3	7.00E+3						

CETIS Analysis Detail

Graphics



CETIS Analysis Detail

Selenastrum Growth Test					Nautilus Environmental (CA)	
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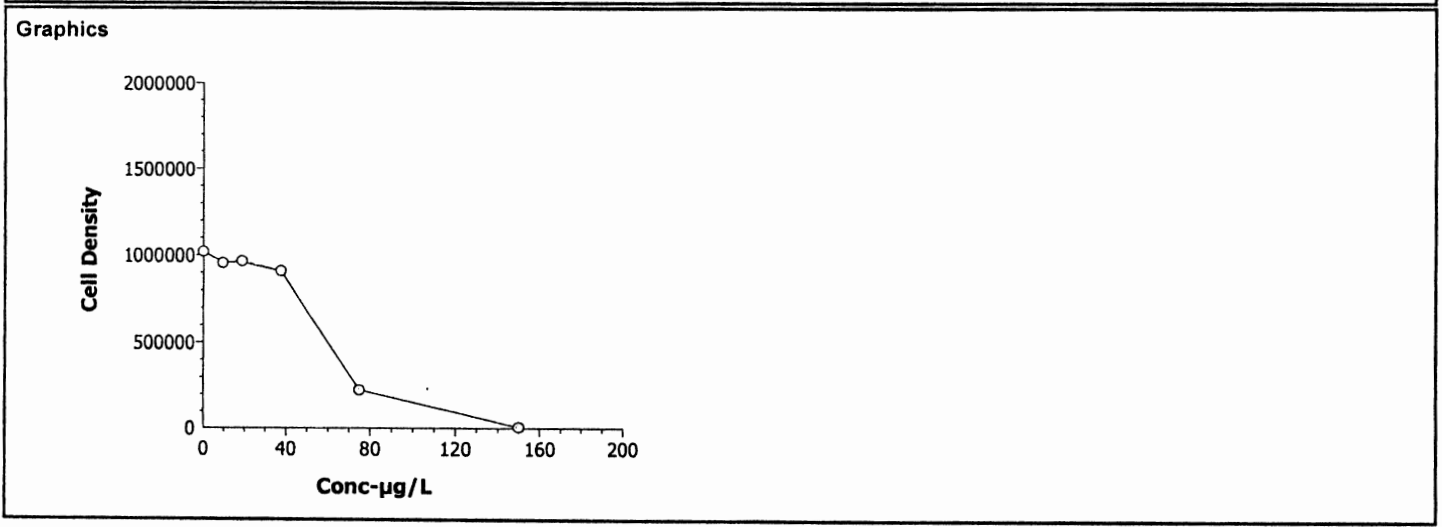
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Cell Density	Linear Interpolation	08-6576-8297	08-6576-8297	10 Feb-05 10:53 AM	CETISv1.025

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Expanded CL	Method
Linear	Linear	453527	200	Yes	Two-Point Interpolation

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control CV	0.07761	N/A - 0.2	Passes acceptability criteria
Control Response	1019000	1000000 - N/A	Passes acceptability criteria

Point Estimates			
% Effect	Conc-µg/L	95% LCL	95% UCL
25	45.40844	40.36261	50.85952
50	59.37500	53.92220	67.09946

Data Summary		Calculated Variate					
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD
0	Lab Control	4	1.02E+6	9.34E+5	1.11E+6	1.61E+4	7.91E+4
9.4		4	9.54E+5	8.54E+5	1.08E+6	1.97E+4	9.64E+4
18.8		4	9.65E+5	9.38E+5	1.02E+6	7.03E+3	3.44E+4
37.5		4	9.09E+5	8.78E+5	9.47E+5	6.04E+3	2.96E+4
75		4	2.25E+5	8.10E+4	4.06E+5	2.75E+4	1.34E+5
150		4	6.75E+3	5.00E+3	9.00E+3	3.49E+2	1.71E+3



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

Client: Internal

Sample ID: CuCl2

Test No: 050701 scrt

Test Species: *S. capricornutum*

Test Date: 2/1/05

Start/End Times: 16:00 / 14:00

Analyst: SH

Random Number	Dilution	Cell Density (fluorometric) (cells/ml * 10 ⁶)	Cell Density (microscopic) (cells/ml * 10 ⁶)
Blank	NA		
Cal Check 1 (NEW, Solid, Effluent Blanks)		0.00, 2.20	
49		9.81	
50		9.38	
51		9.14	
52		9.73	
53		10.15	
54		9.47	
55		8.54	
56		8.78	
57		0.06	
58		10.77	
59		2.04	
60		2.07	
Cal Check 2 (NEW, Solid, Effluent Blanks)		0.00, 2.20	
61		4.06	
62		9.07	
63		11.05	
64		9.59	
65		8.95	
66		9.34	
67		0.09	
68		0.07	
69		9.48	
70		9.77	
71		10.64	
72		0.05	
Cal Check 3 (NEW, Solid, Effluent Blanks)		0.00, 2.20	

Comments: _____

QC Check: AH 2/1/05

Final Review: [Signature] 2/24/05

CETIS Data Worksheet

Selenastrum Growth Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Selenastrum capricornutum Sample Code: 050201sct
 Ending Date: 05 Feb-05 Protocol: EPA/821/R-02-013 (2002) Sample Source: Reference Toxicant
 Sample Date: 01 Feb-05 Material: Copper chloride Sample Station:

Conc-µg/L	Code	Rep	Pos	Cell Density	Absorbance	Biomass	Chlorophyll a	Notes
0	LC	1	71					
0	LC	2	52					
0	LC	3	63					
0	LC	4	66					
9.4		1	70					
9.4		2	62					
9.4		3	55					
9.4		4	58					
18.8		1	50					
18.8		2	69					
18.8		3	53					
18.8		4	64					
37.5		1	54					
37.5		2	51					
37.5		3	65					
37.5		4	56					
75		1	59					
75		2	60					
75		3	61					
75		4	49					
150		1	57					
150		2	72					
150		3	67					
150		4	68					

RC=AH

Test Species: S. capricornutum

Client : Internal

Test Date: 2/1/05

Sample ID: CuCl₂

Start/End Times: 2/1/05 16:00/1400

Test No: 050201scrt

Analyst: AH

Concentration (<u>µg/L</u>)	Initial Readings				Final Readings	
	D.O. (mg/L)	Conductivity (µmhos-cm)	Alkalinity (mg/L)	Hardness (mg/L)	D.O. (mg/L)	Conductivity (µmhos-cm)
Lab Control	7.4	90	11	11	8.7	85
9.4	7.2	90	-	-	8.6	86
18.8	7.4	90	13	12	8.5	92
37.5	7.6	90	-	-	8.7	88
75	7.5	89	-	-	8.4	89
150	7.6	89	12	12	8.3	91

		0 Hour	24 Hour ^(a)	48 Hour ^(a)	72 Hour ^(a)	96 Hour ^(a)
pH/Temperature (°C):	Lab Control	7.87/25.0	7.94/27.9	7.09/27.3	8.27/27.5	8.32/27.0
pH/Temperature (°C):	9.4	7.85/25.0	7.78/29.0	7.79/27.3	8.55/27.8	8.18/27.0
pH/Temperature (°C):	18.8	7.74/25.0	7.65/29.0	7.88/27.6	8.60/27.9	8.16/27.0
pH/Temperature (°C):	37.5	7.70/25.0	7.61/29.5	7.83/29.5	8.64/28.1	8.12/27.0
pH/Temperature (°C):	75	7.62/25.0	7.57/29.5	7.52/27.7	8.20/28.3	7.74/27.0
pH/Temperature (°C):	150	7.57/25.0	7.47/29.9	7.40/27.7	7.93/28.4	7.61/27.0
pH/Temperature (°C):		1	1	1	1	1

Comments: @ Temp of ~~20~~ out of range 25 °C ± 1, added fans + turned room temp. down

QC Check: AH 2/1/05

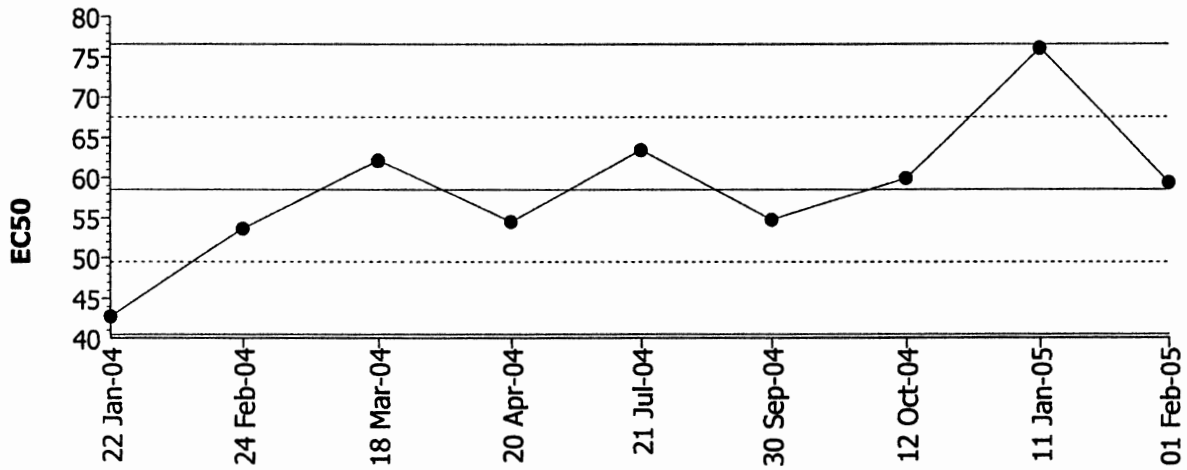
Final Review: [Signature] 2/1/05

CETIS QC Chart

Selenastrum Growth Test

Nautilus Environmental (CA)

Test Type: Cell Growth Organism: *Selenastrum capricornutum* (Green) Material: Copper chloride
 Protocol: EPA/821/R-02-013 (2002) Endpoint: Cell Density Source: Reference Toxicant-REF



Mean: 58.5367 Count: 9 -1s Warning Limit: 49.5025 -2s Action Limit: 40.4682
 Sigma: 9.03423 CV: 15.43% +1s Warning Limit: 67.5709 +2s Action Limit: 76.6051

Quality Control Data

Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2004	Jan	22	42.73970	-15.7969	-1.74857	(-)		11-0163-8710	00-9833-6682
2		Feb	24	53.64418	-4.89251	-0.54155			04-7456-4480	03-1936-6791
3		Mar	18	62.14433	3.60764	0.39933			10-8280-0048	02-4366-4555
4		Apr	20	54.53867	-3.99802	-0.44254			13-9906-5381	04-2100-3790
5		Jul	21	63.48700	4.95031	0.54795			11-5976-2294	11-4134-4405
6		Sep	30	54.81242	-3.72427	-0.41224			02-9946-5891	05-0028-9347
7		Oct	12	59.96410	1.42741	0.15800			16-3769-9394	08-6000-6671
8	2005	Jan	11	76.12479	17.58810	1.94683	(+)		12-8683-6258	03-5591-8833
9		Feb	1	59.37500	0.83831	0.09279			08-6576-8297	04-4949-2996

MARINE

A. AFFINIS

CETIS Test Summary

Report Date: 15 Feb-05 12:49 PM

Link: 07-9201-8053/050201aart

Pacific Topsmelt 7-d Survival and Growth Test						Nautilus Environmental (CA)		
Test No:	12-5261-5370	Test Type:	Growth-Survival (7d)	Duration:	6d 21h	Species:	Atherinops affinis	
Start Date:	01 Feb-05 03:30 PM	Protocol:	EPA/600/R-95/136 (1995)	Source:	Aquatic Biosystems, CO			
Ending Date:	08 Feb-05 01:05 PM	Dil Water:	Laboratory Seawater					
Setup Date:	01 Feb-05 03:30 PM	Brine:	Not Applicable					
Sample No:	08-6882-2880	Material:	Copper chloride	Client:	Internal			
Sample Date:	01 Feb-05	Code:	050201aart	Project:				
Receive Date:	01 Feb-05	Source:	Reference Toxicant					
Sample Age:	16h	Station:						
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
12-6994-1462	7d Proportion Survived	100	200	141.421	14.21%	Steel's Many-One Rank		
10-4427-5019	Mean Dry Biomass-mg	100	200	141.421	13.96%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
04-4294-9245	7d Proportion Survived	25	115.62750	88.50483	135.22030	Linear Regression		
		50	144.26220	121.01210	168.58500			
07-2772-8128	Mean Dry Biomass-mg	25	113.62980	92.85388	127.54740	Linear Interpolation		
		50	149.92170	136.53470	161.13150			
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
04-4294-9245	7d Proportion Survived	Control Response	0.92000	0.8 - N/A	Passes acceptability criteria			
12-6994-1462	7d Proportion Survived	Control Response	0.92000	0.8 - N/A	Passes acceptability criteria			
07-2772-8128	Mean Dry Biomass-mg	Control Response	1.26560	0.85 - N/A	Passes acceptability criteria			
10-4427-5019	Mean Dry Biomass-mg	Control Response	1.26560	0.85 - N/A	Passes acceptability criteria			
12-6994-1462	7d Proportion Survived	MSDp	0.14209	N/A - 0.25	Passes acceptability criteria			
10-4427-5019	Mean Dry Biomass-mg	MSDp	0.13962	N/A - 0.5	Passes acceptability criteria			
7d Proportion Survived Summary								
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	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
50		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		5	0.84000	0.60000	1.00000	0.07483	0.16733	19.92%
200		5	0.16000	0.00000	0.20000	0.04000	0.08944	55.90%
400		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Mean Dry Biomass-mg Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	1.26560	1.05600	1.44800	0.08127	0.18172	14.36%
25		5	1.33000	1.18400	1.40800	0.04115	0.09202	6.92%
50		5	1.24640	1.09000	1.36200	0.04812	0.10760	8.63%
100		5	1.09520	0.91600	1.24400	0.05837	0.13052	11.92%
200		5	0.20120	0.00000	0.31000	0.05289	0.11826	58.78%
400		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

Report Date: 15 Feb-05 12:49 PM

Link: 07-9201-8053/050201aart

CETIS Test Summary

7d Proportion Survived Detail						
Conc- μ /L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	1.00000	1.00000	0.80000	1.00000	0.80000
25		1.00000	1.00000	1.00000	1.00000	1.00000
50		1.00000	1.00000	1.00000	1.00000	1.00000
100		1.00000	0.80000	1.00000	0.80000	0.60000
200		0.20000	0.00000	0.20000	0.20000	0.20000
400		0.00000	0.00000	0.00000	0.00000	0.00000

Mean Dry Biomass-mg Detail						
Conc- μ /L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	1.44800	1.34400	1.08600	1.39400	1.05600
25		1.40800	1.40800	1.31200	1.18400	1.33800
50		1.27800	1.19000	1.09000	1.36200	1.31200
100		1.19200	1.09600	1.24400	1.02800	0.91600
200		0.21600	0.00000	0.31000	0.25400	0.22600
400		0.00000	0.00000	0.00000	0.00000	0.00000

CETIS Analysis Detail

Comparisons: Page 2 of 2
 Report Date: 15 Feb-05 12:49 PM
 Analysis: 12-6994-1462/050201aart

Pacific Topsmelt 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	07-9201-8053	07-9201-8053	15 Feb-05 12:47 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		100	200	1.00	141.421	14.21%

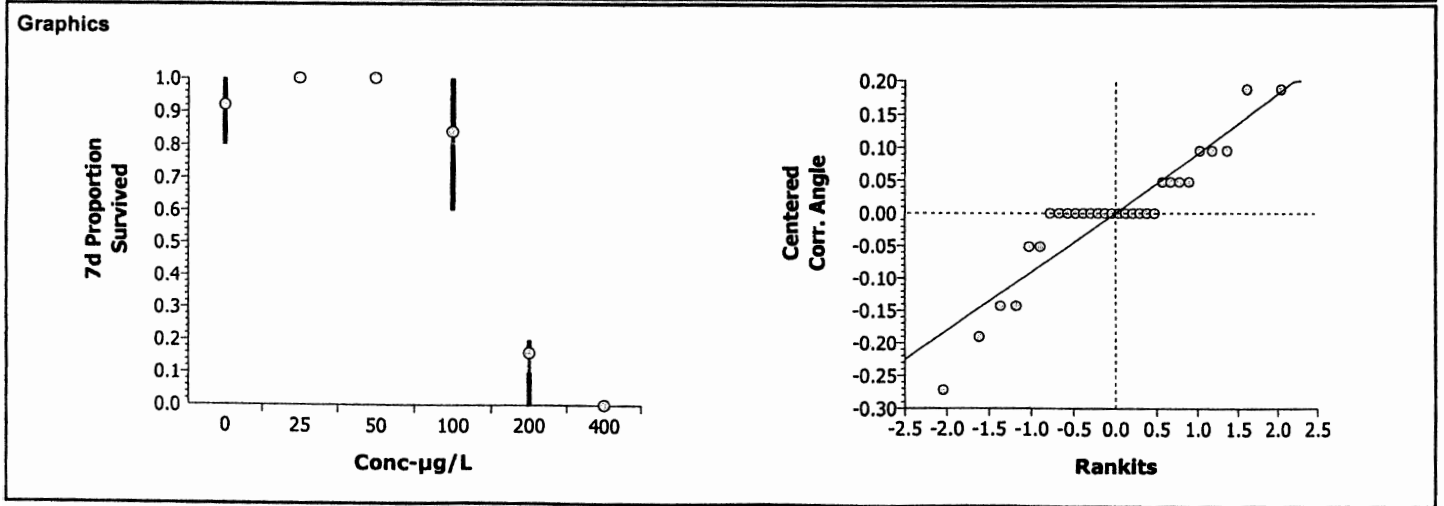
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.92000	0.8 - N/A	Passes acceptability criteria
MSDp	0.14209	N/A - 0.25	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	4.32209	3.89507	0.00604	Unequal Variances
Distribution	Shapiro-Wilk W	0.86912	0.89981	0.00168	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	6.278004	1.255601	5	114.72	0.00000	Significant Effect
Error	0.2626792	0.010945	24			
Total	6.54068285	1.2665457	29			

Group Comparisons							
Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Control		25	32.5	16	> 0.0500	2	Non-Significant Effect
		50	32.5	16	> 0.0500	2	Non-Significant Effect
		100	24	16	> 0.0500	2	Non-Significant Effect
		200	15	16	<= 0.0500	3	Significant Effect
		400	15	16	<= 0.0500	3	Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	5	0.92000	0.80000	1.00000	0.10954	1.25003	1.10715	1.34528	0.13043
25		5	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00020
50		5	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00020
100		5	0.84000	0.60000	1.00000	0.16733	1.15819	0.88608	1.34528	0.19317
200		5	0.16000	0.00000	0.20000	0.08944	0.41602	0.22551	0.46365	0.10650
400		5	0.00000	0.00000	0.00000	0.00000	0.22551	0.22551	0.22551	0.00003



CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test	Nautilus Environmental (CA)
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Linear Regression	07-9201-8053	07-9201-8053	15 Feb-05 12:48 PM	CETISv1.025

Linear Regression Options						
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.
Log-Normal	Control Threshold	0.08	Yes	Yes	No	No

Regression Parameters							
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)
Threshold	0.02690	0.01885	-0.01004	0.06383	1.427	0.24881	Not Significant
Slope	7.01924	1.47803	4.12230	9.91619	4.749	0.01771	Significant
Intercept	-10.15562	3.22383	-16.47433	-3.83691	-3.150	0.05126	Not Significant

Regression Summary								
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)
6	6.20144	-1.44683	0.14247	0.17033	6.91682	35.17247	0.99950	Non-Significant Heterogeneity

Residual Analysis						
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)	
Variances	Modified Levene	2.19698	2.74006	0.09740	Equal Variances	
Distribution	Shapiro-Wilk W	0.81497	0.91820	0.00026	Non-normal Distribution	

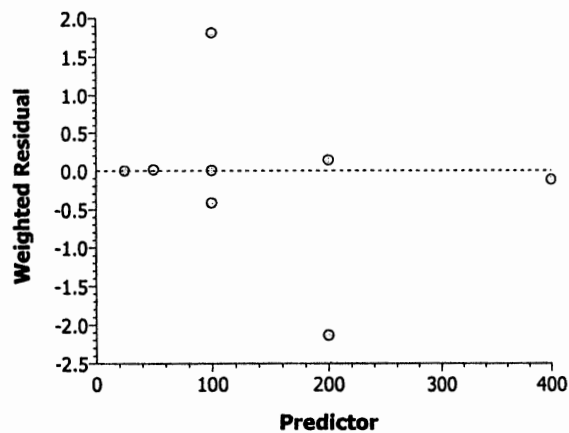
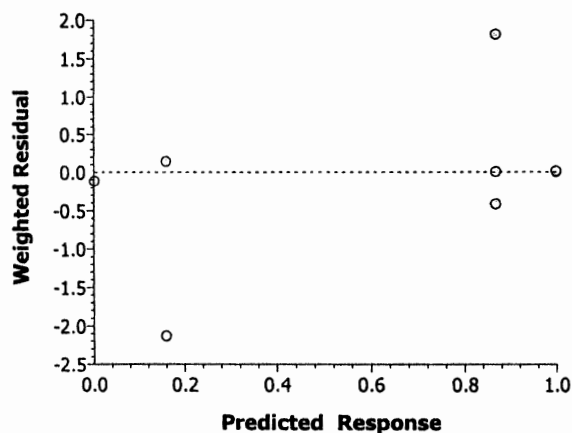
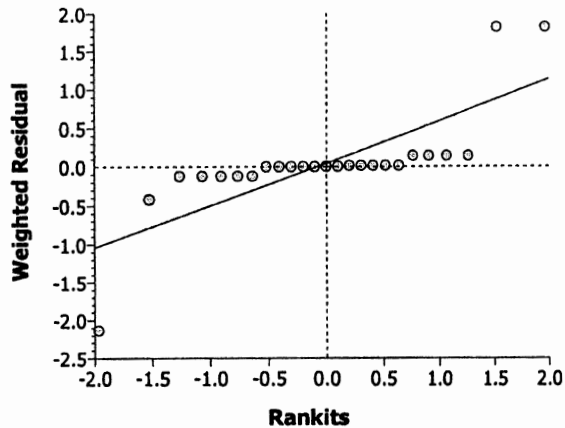
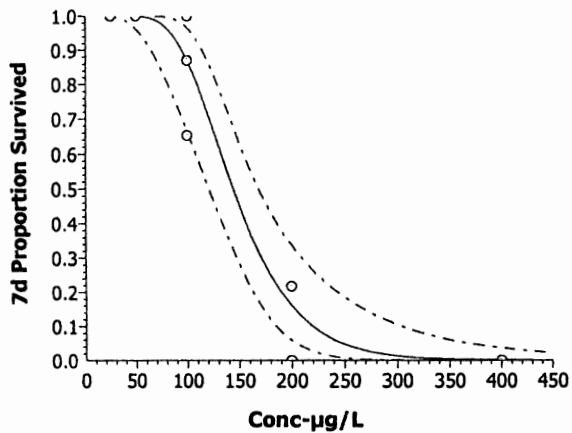
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.92000	0.8 - N/A	Passes acceptability criteria

Point Estimates			
% Effect	Conc-µg/L	95% LCL	95% UCL
25	115.62750	88.50483	135.22030
50	144.26220	121.01210	168.58500

Data Summary		Calculated Variate(A/B)							
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Control	5	0.92000	0.80000	1.00000	0.02236	0.10954	23	25
25		5	1.00000	1.00000	1.00000	0.00000	0.00000	25	25
50		5	1.00000	1.00000	1.00000	0.00000	0.00000	25	25
100		5	0.84000	0.60000	1.00000	0.03416	0.16733	21	25
200		5	0.16000	0.00000	0.20000	0.01826	0.08944	4	25
400		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	25

CETIS Analysis Detail

Graphics



CETIS Analysis Detail

Comparisons: Page 1 of 2
 Report Date: 15 Feb-05 12:49 PM
 Analysis: 10-4427-5019/050201aart

Pacific Topsmelt 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version			
Mean Dry Biomass-mg	Comparison	07-9201-8053	07-9201-8053	15 Feb-05 12:49 PM	CETISv1.025			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Untransformed		100	200	1.00	141.421	13.96%

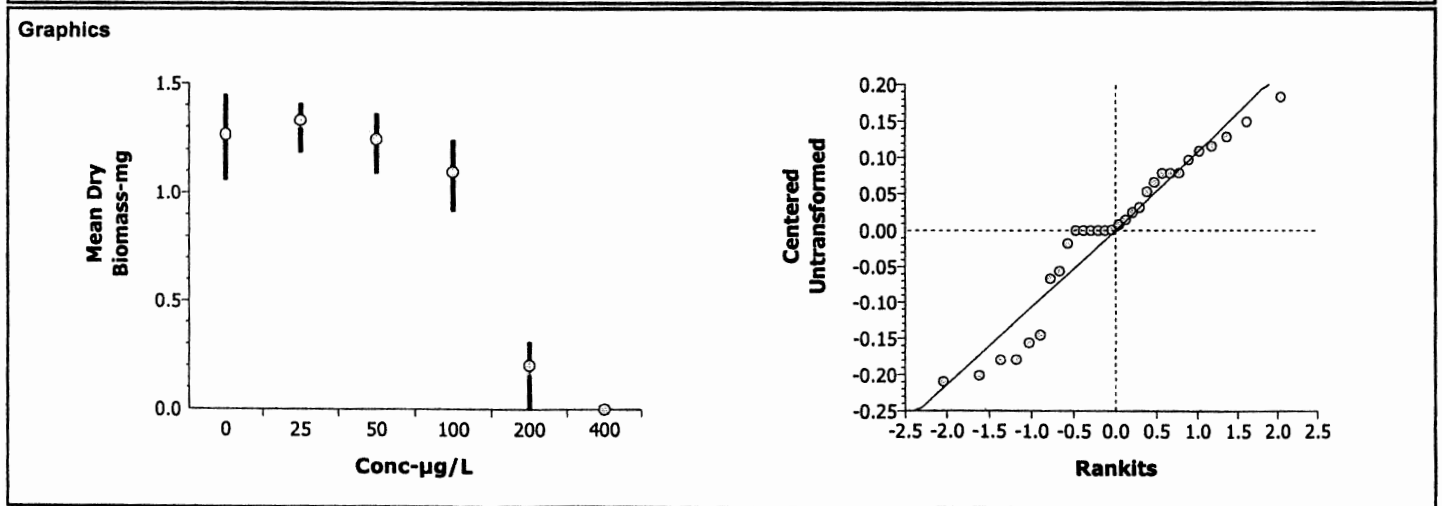
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	1.26560	0.85 - N/A	Passes acceptability criteria
MSDp	0.13962	N/A - 0.5	Passes acceptability criteria

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	5.31920	3.89507	0.00199	Unequal Variances
Distribution	Shapiro-Wilk W	0.92633	0.89981	0.04887	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	8.817875	1.763575	5	125.84	0.00000	Significant Effect
Error	0.3363523	0.014015	24			
Total	9.1542272	1.7775898	29			

Group Comparisons							
Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Control		25	29	16	> 0.0500	0	Non-Significant Effect
		50	26	16	> 0.0500	0	Non-Significant Effect
		100	21	16	> 0.0500	0	Non-Significant Effect
		200	15	16	<= 0.0500	0	Significant Effect
		400	15	16	<= 0.0500	1	Significant Effect

Data Summary			Original Data				Transformed Data			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	5	1.26560	1.05600	1.44800	0.18172				
25		5	1.33000	1.18400	1.40800	0.09202				
50		5	1.24640	1.09000	1.36200	0.10760				
100		5	1.09520	0.91600	1.24400	0.13052				
200		5	0.20120	0.00000	0.31000	0.11826				
400		5	0.00000	0.00000	0.00000	0.00000				



CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Linear Interpolation	07-9201-8053	07-9201-8053	15 Feb-05 12:49 PM	CETISv1.025

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Expanded CL	Method
Linear	Linear	5334240	200	Yes	Two-Point Interpolation

Test Acceptability

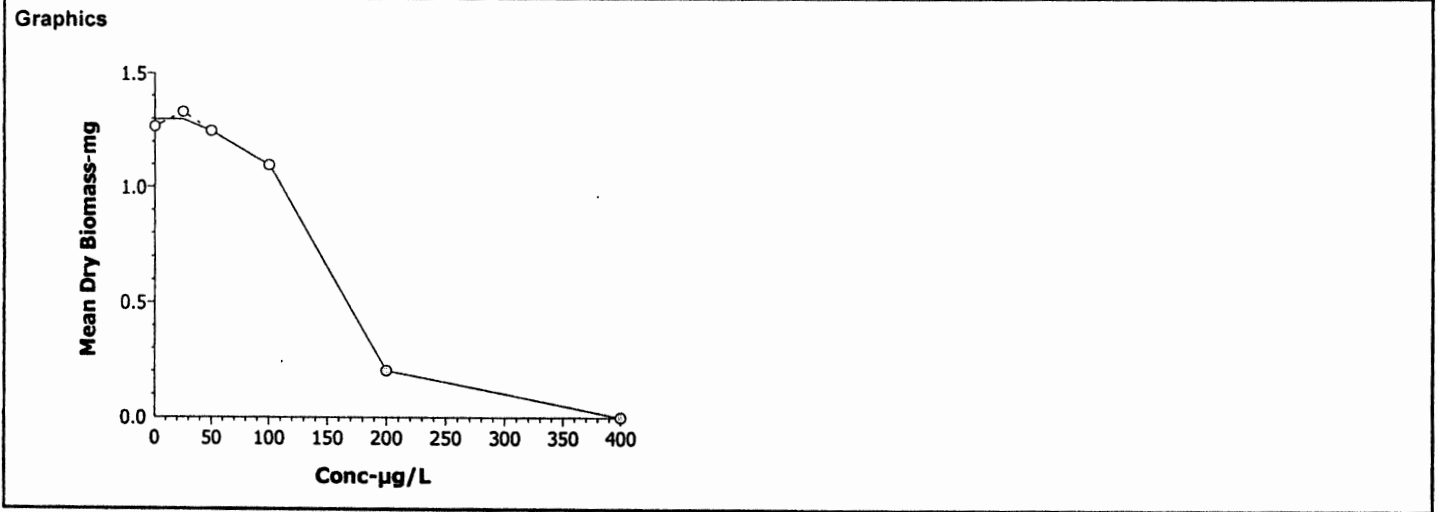
Attribute	Statistic	Acceptable Range	Decision
Control Response	1.26560	0.85 - N/A	Passes acceptability criteria

Point Estimates

% Effect	Conc-µg/L	95% LCL	95% UCL
25	113.62980	92.85388	127.54740
50	149.92170	136.53470	161.13150

Data Summary

Conc-µg/L	Control Type	Count	Calculated Variate				
			Mean	Minimum	Maximum	SE	SD
0	Lab Control	5	1.26560	1.05600	1.44800	0.03709	0.18172
25		5	1.33000	1.18400	1.40800	0.01878	0.09202
50		5	1.24640	1.09000	1.36200	0.02196	0.10760
100		5	1.09520	0.91600	1.24400	0.02664	0.13052
200		5	0.20120	0.00000	0.31000	0.02414	0.11826
400		5	0.00000	0.00000	0.00000	0.00000	0.00000



Marine Chronic Bioassay

Larval Fish Survival & Weights

Client Name: Internal

Test Species: A. affinis

Sample ID: CuCl₂

Start Date/Time: 2/1/2005 | 1530

Test No.: 050201aart

End Date/Time: 2/8/2005 | 1305

Conc. (<u>µg/L</u>)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + fish (g)
		0	1	2	3	4	5	6	7			
Lab Control	a	5	5	5	5	5	5	5	5	100	0.03226	0.03930
	b	5	5	5	5	5	5	5	5	100	0.02504	0.03176
	c	5	5	5	5	5	5	4	4	80	0.02207	0.02750
	d	5	5	5	5	5	5	5	5	100	0.02752	0.03449
	e	5	4	4	4	4	4	4	4	80	0.02663	0.03191
25	a	5	5	5	5	5	5	5	5	100	0.02340	0.03044
	b	5	5	5	5	5	5	5	5	100	0.02724	0.03428
	c	5	5	5	5	5	5	5	5	100	0.02435	0.03091
	d	5	5	5	5	5	5	5	5	100	0.02332	0.02924
	e	5	5	5	5	5	5	5	5	100	0.02697	0.03366
50	a	5	5	5	5	5	5	5	5	100	0.02600	0.03239
	b	5	5	5	5	5	5	5	5	100	0.02965	0.03560
	c	5	5	5	5	5	5	5	5	100	0.02908	0.03453
	d	5	5	5	5	5	5	5	5	100	0.03143	0.03824
	e	5	5	5	5	5	5	5	5	100	0.02867	0.03523
100	a	5	5	5	5	5	5	5	5	100	0.02786	0.03382
	b	5	5	4	4	4	4	4	4	80	0.03203	0.03751
	c	5	5	5	5	5	5	5	5	80	0.03184	0.03806
	d	5	5	5	5	4	4	4	4	80	0.02845	0.03359
	e	5	5	4	4	4	3	3	3	60	0.02785	0.03243
200	a	5	5	4	4	3	2	1	1	20	0.03215	0.03323
	b	5	3	3	3	2	2	1	1	0	0.0	
	c	5	3	2	2	1	1	1	1	20	0.02340	0.02495
	d	5	3	3	3	3	1	1	1	20	0.02893	0.03020
	e	5	3	2	2	2	1	1	1	20	0.02647	0.02760
400	a	5	0	0	-	-	-	-	-	0	0.0	
	b	5	0	0	-	-	-	-	-	0	0.0	
	c	5	0	0	-	-	-	-	-	0	0.0	
	d	5	1	1	1	1	0	1	1	0	0.0	
	e	5	0	0	-	-	-	-	-	0	0.0	
	a											
	b											
	c											
	d											
	e											
Tech Initials		YR	YR	YR	SH	MC	SD	SD	YR			

Feeding Times (day):

	0	1	2	3	4	5	6
	-	0830	0830	0815	0710	1002	0915
	1730	1600	1545	1530	1430	1900	1530

Weight Data:
 Date/Time in: 2-8-05 / 1330
 Date/Time out: 2-10-05 / 1100
 Oven Temp (°C): 68°
 Tech Initials: YR

Comments: _____

QC Check: 4/2/15/05
 Final Review: [Signature] 3/3/05

Marine Chronic Bioassay

Water Quality Measurements

Client: Internal
 Sample ID: CuCl₂
 Test No: 050201aart

Test Species: A. affinis
 Start Date/Time: 2/1/2005 11530
 End Date/Time: 2/8/2005 1305

Concentration	Lab Control							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.0	8.02	8.01	8.02	8.00	8.08	8.06	
DO (mg/L)	8.1	8.1	7.9	8.3	7.4	7.5	8.0	
Salinity (ppt)	30.0	29.5	29.4	30.9	30.6	29.8	29.5	
Temp (°C)	19.8	20.2	20.9	20.8	20.7	20.0	20.1	
Final								
pH		7.90	7.85	7.86	7.74	7.64	7.70	7.57
DO (mg/L)		7.4	6.7	6.7	6.6	6.1	6.2	6.6
Temp (°C)		20.0	19.4	19.5	19.9	19.9	19.7	20.0

Concentration	100 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.00	8.06	8.01	8.04	7.99	8.06	8.05	
DO (mg/L)	8.1	8.2	7.9	8.0	7.5	7.7	8.0	
Salinity (ppt)	29.8	29.6	29.1	30.5	30.4	30.0	29.3	
Temp (°C)	19.7	20.2	20.5	20.5	20.6	20.7	20.0	
Final								
pH		7.96	7.89	7.90	7.83	7.88	7.79	7.65
DO (mg/L)		7.7	6.9	6.9	7.2	6.9	6.3	7.0
Temp (°C)		19.9	20.0	19.7	19.9	19.8	19.6	20.0

Concentration	25 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.01	8.06	8.01	8.03	7.98	8.06	8.06	
DO (mg/L)	8.1	8.0	7.9	8.0	7.5	7.6	8.1	
Salinity (ppt)	29.9	29.5	29.3	30.9	30.6	30.6	29.5	
Temp (°C)	19.8	20.3	20.8	20.7	20.7	20.9	20.1	
Final								
pH		7.95	7.98	7.91	7.80	7.78	7.74	7.64
DO (mg/L)		7.6	6.7	6.9	6.8	6.3	6.1	6.6
Temp (°C)		20.1	19.8	19.5	19.8	19.8	19.6	20.0

Concentration	200 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.00	8.06	8.00	8.04	7.99	8.05	8.05	
DO (mg/L)	8.1	8.2	7.9	7.9	7.5	7.8	8.0	
Salinity (ppt)	29.5	29.5	28.9	30.2	30.2	29.6	29.0	
Temp (°C)	19.7	20.0	20.7	20.5	20.6	20.7	20.0	
Final								
pH		7.97	7.99	7.89	7.84	7.90	7.82	7.79
DO (mg/L)		7.8	7.0	6.9	7.2	6.9	6.4	6.8
Temp (°C)		19.9	19.9	19.7	20.0	19.8	19.6	20.1

Concentration	50 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.01	8.06	8.01	8.03	7.98	8.06	8.06	
DO (mg/L)	8.1	8.3	7.9	8.0	7.5	7.7	8.0	
Salinity (ppt)	29.9	29.5	29.3	30.5	30.6	30.1	29.4	
Temp (°C)	19.7	20.0	20.8	20.6	20.6	20.7	20.1	
Final								
pH		7.96	7.88	7.90	7.81	7.83	7.77	7.64
DO (mg/L)		7.7	6.9	7.0	6.9	7.0	6.4	6.9
Temp (°C)		20.0	19.9	19.5	19.9	19.8	19.6	20.0

Concentration	400 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	7.99	7.99	7.99	8.04	7.99	8.05		
DO (mg/L)	8.1	8.0	7.9	7.9	7.4	7.7		
Salinity (ppt)	29.8	29.9	29.2	29.4	29.6	29.0		
Temp (°C)	19.7	20.1	20.6	20.5	20.6	20.7		
Final								
pH		7.97	7.92	7.94	7.86	7.94		
DO (mg/L)		7.9	7.2	7.2	7.4	7.2		
Temp (°C)		19.9	20.1	19.8	19.9	19.9		

Animal Source/Date Received: ABS / 1-29-05

Animal Age at Initiation: 13 days

Comments: _____

QC Check: AH 2/15/05

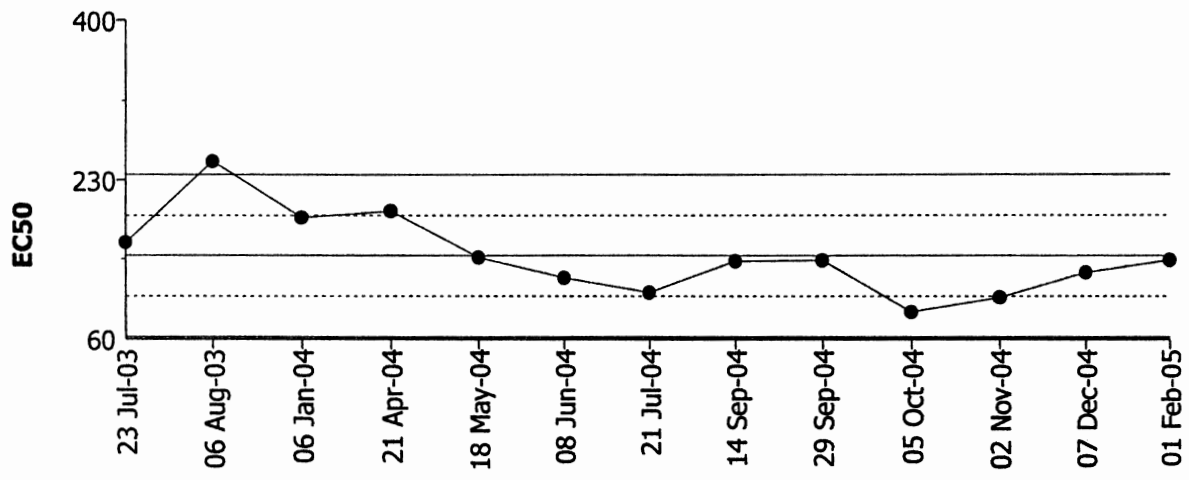
Analysts:	Initial:	0	1	2	3	4	5	6	7
		SD	PR	SD	SH	uc	SD	SD	
	Final:		PR	SD	SH	uc	SD	NY	SD

Final Review: [Signature] 3/2/05

CETIS QC Chart

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)

Test Type: Growth-Survival (7d) Organism: Atherinops affinis (Topsmelt) Material: Copper chloride
 Protocol: EPA/600/R-95/136 (1995) Endpoint: 7d Proportion Survived Source: Reference Toxicant-REF



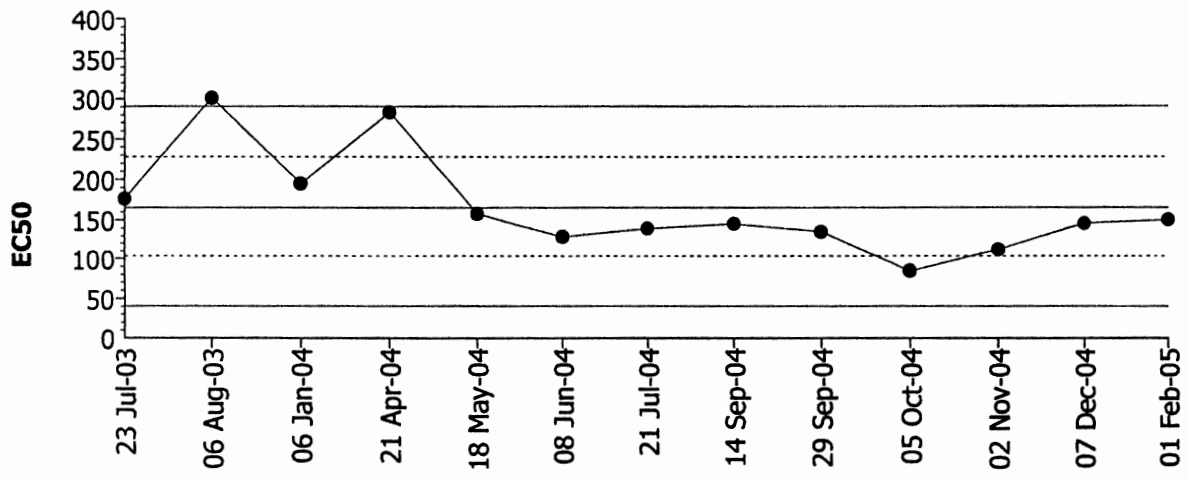
Mean: 149.050 Count: 13 -1s Warning Limit: 105.739 -2s Action Limit: 62.4277
 Sigma: 43.3111 CV: 29.06% +1s Warning Limit: 192.361 +2s Action Limit: 235.672

Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2003	Jul	23	163.1473	14.09729	0.32549			09-0554-1172	04-1119-2100
2		Aug	6	249.7610	100.7109	2.32529	(+)	(+)	13-7576-8964	20-3813-6001
3	2004	Jan	6	190.1277	41.07769	0.94843			10-1484-1987	04-0574-5118
4		Apr	21	197.3097	48.25959	1.11425	(+)		03-1486-7707	07-9780-7840
5		May	18	146.8543	-2.19571	-0.05070			10-9306-1961	08-4701-7250
6		Jun	8	125.3745	-23.6755	-0.54664			14-6414-5672	04-2034-0224
7		Jul	21	109.5876	-39.4624	-0.91114			19-1876-8605	08-1811-3849
8		Sep	14	143.1498	-5.90031	-0.13623			13-7296-2622	10-6485-6945
9			29	143.9629	-5.08711	-0.11745			15-3863-7123	14-8520-4306
10		Oct	5	88.80834	-60.2416	-1.39090	(-)		11-1407-8821	06-7843-0825
11		Nov	2	104.5083	-44.5417	-1.02841	(-)		16-3417-5142	02-8084-9109
12		Dec	7	130.7965	-18.2535	-0.42145			04-9716-3072	03-4852-2064
13	2005	Feb	1	144.2622	-4.78781	-0.11054			07-9201-8053	04-4294-9245

CETIS QC Chart

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)

Test Type: Growth-Survival (7d) Organism: Atherinops affinis (Topsmelt) Material: Copper chloride
 Protocol: EPA/600/R-95/136 (1995) Endpoint: Mean Dry Biomass-mg Source: Reference Toxicant-REF



Mean: 165.619 Count: 13 -1s Warning Limit: 103.108 -2s Action Limit: 40.5975
 Sigma: 62.5107 CV: 37.74% +1s Warning Limit: 228.13 +2s Action Limit: 290.640

Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2003	Jul	23	176.2014	10.58255	0.16929			09-0554-1172	12-0555-8701
2		Aug	6	301.3205	135.7016	2.17085	(+)	(+)	13-7576-8964	04-6424-0992
3	2004	Jan	6	194.8224	29.20355	0.46718			10-1484-1987	03-3477-2263
4		Apr	21	283.5708	117.9519	1.88691	(+)		03-1486-7707	13-3930-4373
5		May	18	157.6347	-7.98415	-0.12772			10-9306-1961	14-6538-5718
6		Jun	8	128.4834	-37.1354	-0.59407			14-6414-5672	11-2803-5281
7		Jul	21	139.1653	-26.4535	-0.42318			19-1876-8605	03-5892-6202
8		Sep	14	145.1567	-20.4621	-0.32734			13-7296-2622	07-4867-1382
9			29	134.7706	-30.8482	-0.49349			15-3863-7123	12-4723-9363
10		Oct	5	84.70332	-80.9155	-1.29443	(-)		11-1407-8821	12-0261-7814
11		Nov	2	111.9411	-53.6777	-0.85870			16-3417-5142	00-4164-1263
12		Dec	7	145.3532	-20.2656	-0.32419			04-9716-3072	16-4511-7210
13	2005	Feb	1	149.9217	-15.6971	-0.25111			07-9201-8053	07-2772-8128

A. BAHIA

Report Date: 03 Mar-05 3:04 PM

Link: 04-7135-6208/050201myrt

CETIS Test Summary

Mysid 7-d Survival and Growth Test						Nautilus Environmental (CA)		
Test No:	14-7450-3755	Test Type:	Growth-Survival (7d)	Duration:	6d 23h	Species:	Americamysis bahia	
Start Date:	01 Feb-05 04:45 PM	Protocol:	EPA/821/R-02-014 (2002)	Dil Water:	Laboratory Seawater	Source:	Aquatic Biosystems, CO	
Ending Date:	08 Feb-05 04:20 PM	Brine:	Not Applicable					
Setup Date:	01 Feb-05 04:45 PM							
Sample No:	06-1335-7410	Material:	Copper chloride	Client:	Internal			
Sample Date:	01 Feb-05	Code:	050201myrt	Project:				
Receive Date:	01 Feb-05	Source:	Reference Toxicant					
Sample Age:	17h	Station:						
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
08-9515-7927	7d Proportion Survived	150	300	212.132	17.27%	Steel's Many-One Rank		
09-1570-6602	Mean Dry Biomass-mg	150	300	212.132	18.77%	Dunnett's Multiple Comparison		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
10-4148-5562	7d Proportion Survived	25	197.00960	153.77180	225.86510	Linear Regression		
		50	241.45370	206.41580	272.30040			
11-9854-0277	Mean Dry Biomass-mg	5	80.51926	18.49014	103.96650	Linear Interpolation		
		10	106.10910	36.98027	144.66720			
		15	131.69890	61.01170	158.41030			
		20	153.19320	70.79610	169.13250			
		25	164.40420	119.83630	179.76320			
		40	198.03700	175.86640	212.94820			
50	220.45890	200.79630	236.25960					
7d Proportion Survived Summary								
Conc-µg/L	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%
37.5		8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
75		8	0.95000	0.60000	1.00000	0.05000	0.14142	14.89%
150		8	0.90000	0.60000	1.00000	0.05345	0.15119	16.80%
300		8	0.23750	0.00000	0.80000	0.09989	0.28253	118.96
600		8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Mean Dry Biomass-mg Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	8	0.23725	0.18200	0.29400	0.01356	0.03837	16.17%
37.5		8	0.24725	0.17600	0.29600	0.01527	0.04320	17.47%
75		8	0.23275	0.11800	0.28000	0.01770	0.05005	21.50%
150		8	0.19725	0.15000	0.24400	0.01172	0.03314	16.80%
300		8	0.03519	0.00000	0.12000	0.01584	0.04482	127.36
600		8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

Report Date: 03 Mar-05 3:04 PM

Link: 04-7135-6208/050201myrt

CETIS Test Summary

7d 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	0.80000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000
37.5		1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000
75		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.60000	1.00000
150		1.00000	1.00000	1.00000	1.00000	0.60000	1.00000	0.80000	0.80000
300		0.50000	0.00000	0.20000	0.20000	0.20000	0.80000	0.00000	0.00000
600		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Mean Dry Biomass-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	0.27000	0.20000	0.26600	0.24600	0.29400	0.21400	0.22600	0.18200
37.5		0.28600	0.27800	0.20000	0.17600	0.23800	0.23200	0.29600	0.27200
75		0.26400	0.21400	0.28000	0.25000	0.24400	0.24200	0.11800	0.25000
150		0.23600	0.24400	0.19000	0.21000	0.16400	0.20600	0.15000	0.17800
300		0.08750	0.00000	0.03200	0.02200	0.02000	0.12000	0.00000	0.00000
600		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

CETIS Analysis Detail

Mysid 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	04-7135-6208	04-7135-6208	16 Feb-05 6:35 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		150	300	0.67	212.132	17.27%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	2.17247	3.48823	0.07539	Equal Variances
Distribution	Shapiro-Wilk W	0.85501	0.92871	0.00002	Non-normal Distribution

ANOVA Table

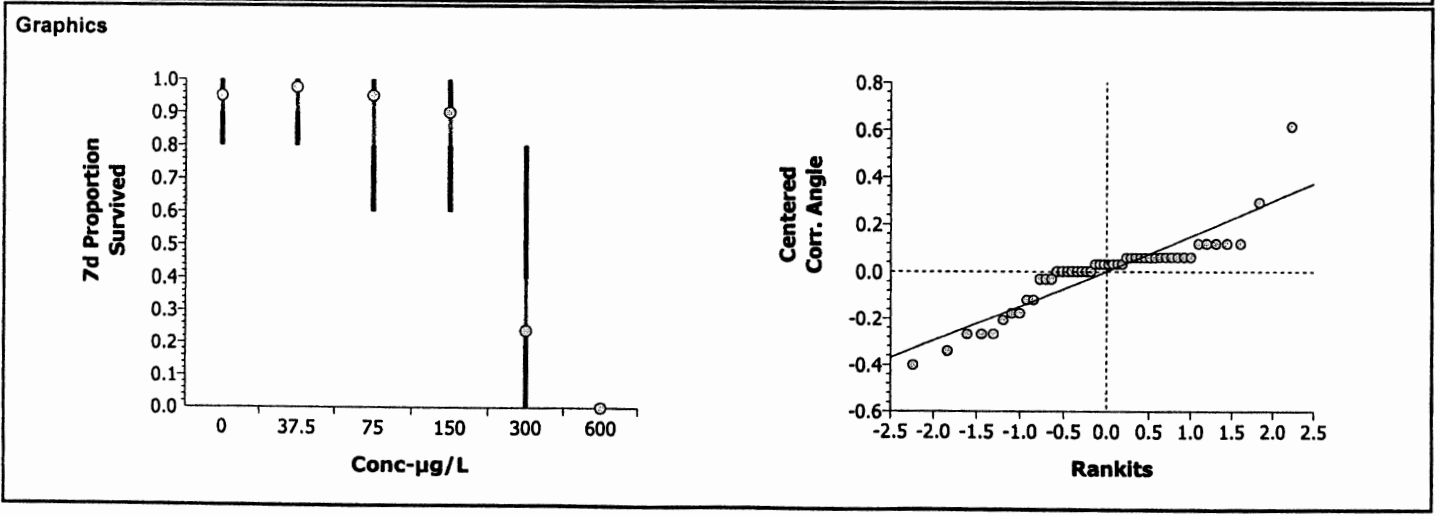
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	9.333599	1.86672	5	64.58	0.00000	Significant Effect
Error	1.213964	0.028904	42			
Total	10.5475634	1.8956236	47			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Control		37.5	72	46	> 0.0500	2	Non-Significant Effect
		75	71	46	> 0.0500	2	Non-Significant Effect
		150	63	46	> 0.0500	2	Non-Significant Effect
		300	37	46	<= 0.0500	4	Significant Effect
		600	36	46	<= 0.0500	3	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023
37.5		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
75		8	0.95000	0.60000	1.00000	0.14142	1.28788	0.88608	1.34528	0.16235
150		8	0.90000	0.60000	1.00000	0.15119	1.22835	0.88608	1.34528	0.17521
300		8	0.23750	0.00000	0.80000	0.28253	0.49500	0.22551	1.10715	0.31165
600		8	0.00000	0.00000	0.00000	0.00000	0.22551	0.22551	0.22551	0.00003



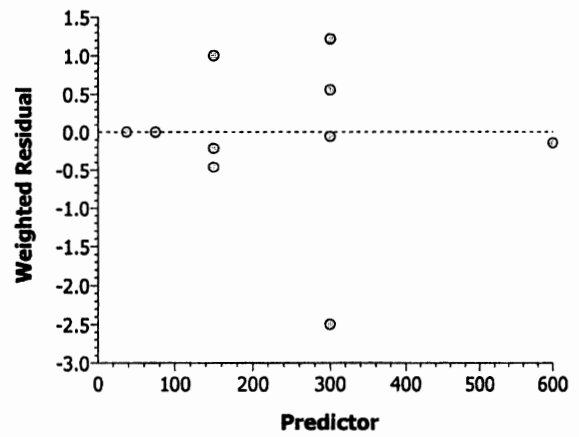
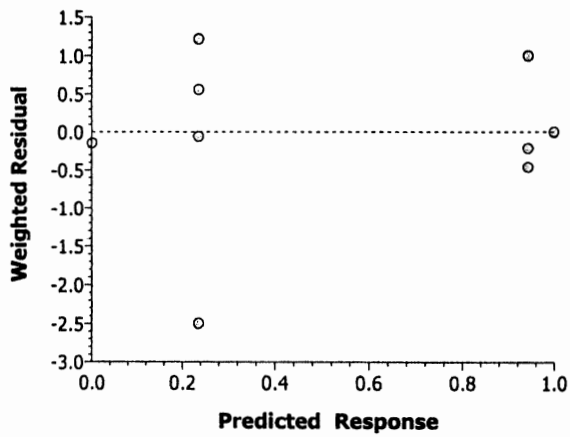
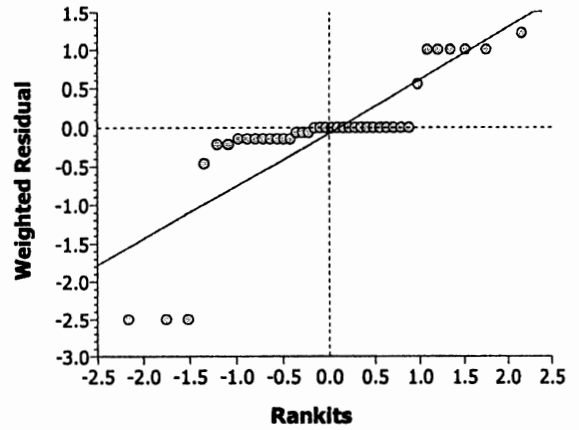
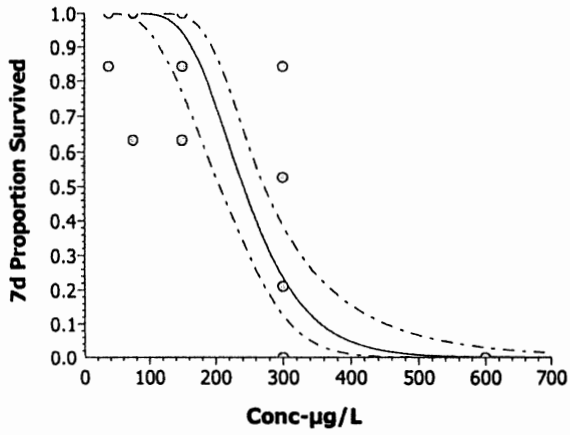
CETIS Analysis Detail

Linear Regression: Page 1 of 2
 Report Date: 03 Mar-05 3:04 PM
 Analysis: 10-4148-5562/050201myrt

Mysid 7-d Survival and Growth Test						Nautilus Environmental (CA)			
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
7d Proportion Survived	Linear Regression	04-7135-6208	04-7135-6208	16 Feb-05 6:35 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.05	Yes	Yes	No	No			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.04203	0.01827	0.00622	0.07784	2.301	0.10492	Not Significant		
Slope	7.63460	1.53277	4.63037	10.63884	4.981	0.01555	Significant		
Intercept	-13.19199	3.71186	-20.46724	-5.91674	-3.554	0.03798	Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
10	-2.68931	-1.72792	0.13098	0.15484	46.83710	53.38354	0.15399	Non-Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	4.47802	2.49362	0.00305	Unequal Variances				
Distribution	Shapiro-Wilk W	0.80903	0.93992	0.00000	Non-normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	197.00960	153.77180	225.86510						
50	241.45370	206.41580	272.30040						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Control	8	0.95000	0.80000	1.00000	0.01890	0.09258	38	40
37.5		8	0.97500	0.80000	1.00000	0.01443	0.07071	39	40
75		8	0.95000	0.60000	1.00000	0.02887	0.14142	38	40
150		8	0.90000	0.60000	1.00000	0.03086	0.15119	36	40
300		8	0.23750	0.00000	0.80000	0.05767	0.28253	9	39
600		8	0.00000	0.00000	0.00000	0.00000	0.00000	0	40

CETIS Analysis Detail

Graphics



CETIS Analysis Detail

Mysid 7-d Survival and Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	04-7135-6208	04-7135-6208	03 Mar-05 3:03 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		150	300	0.67	212.132	18.77%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.93324	3.48823	0.10903	Equal Variances
Distribution	Shapiro-Wilk W	0.98202	0.92871	0.79530	Normal Distribution

ANOVA Table

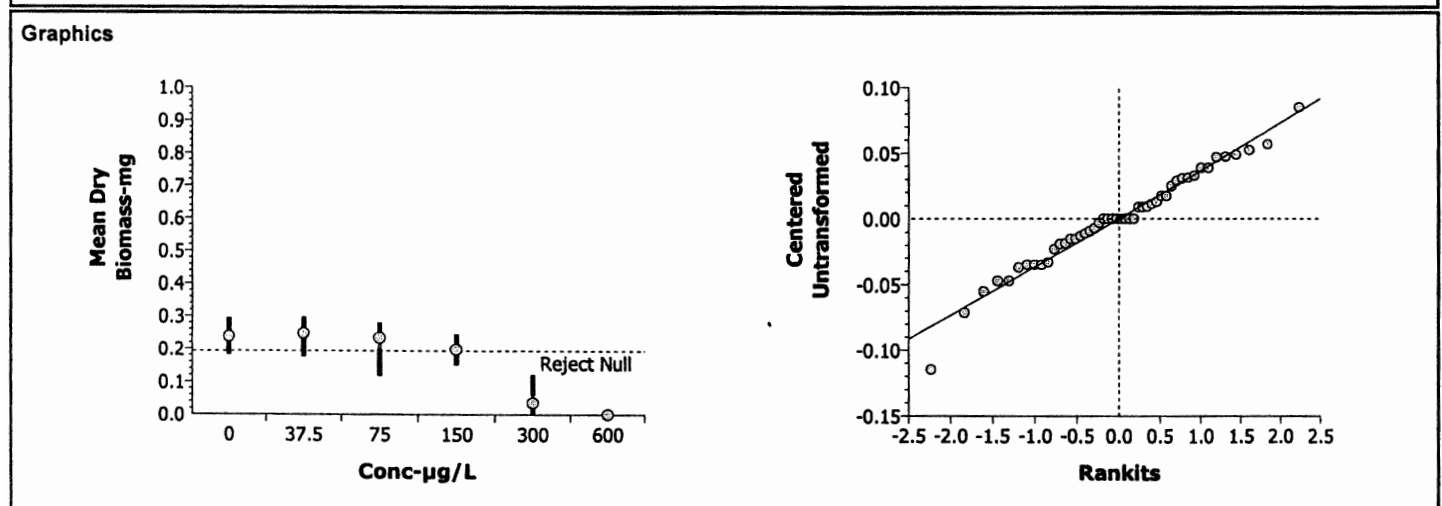
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.4913656	0.098273	5	65.88	0.00000	Significant Effect
Error	0.0626491	0.001492	42			
Total	0.55401473	0.0997648	47			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	MSD	Decision(0.05)
Lab Control		37.5	-0.5179	2.30571	> 0.0500	0.04453	Non-Significant Effect
		75	0.23303	2.30571	> 0.0500	0.04453	Non-Significant Effect
		150	2.07136	2.30571	> 0.0500	0.04453	Non-Significant Effect
		300	10.4636	2.30571	<= 0.0500	0.04453	Significant Effect
		600	12.2858	2.30571	<= 0.0500	0.04453	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	8	0.23725	0.18200	0.29400	0.03837				
37.5		8	0.24725	0.17600	0.29600	0.04320				
75		8	0.23275	0.11800	0.28000	0.05005				
150		8	0.19725	0.15000	0.24400	0.03314				
300		8	0.03519	0.00000	0.12000	0.04482				
600		8	0.00000	0.00000	0.00000	0.00000				



CETIS Analysis Detail

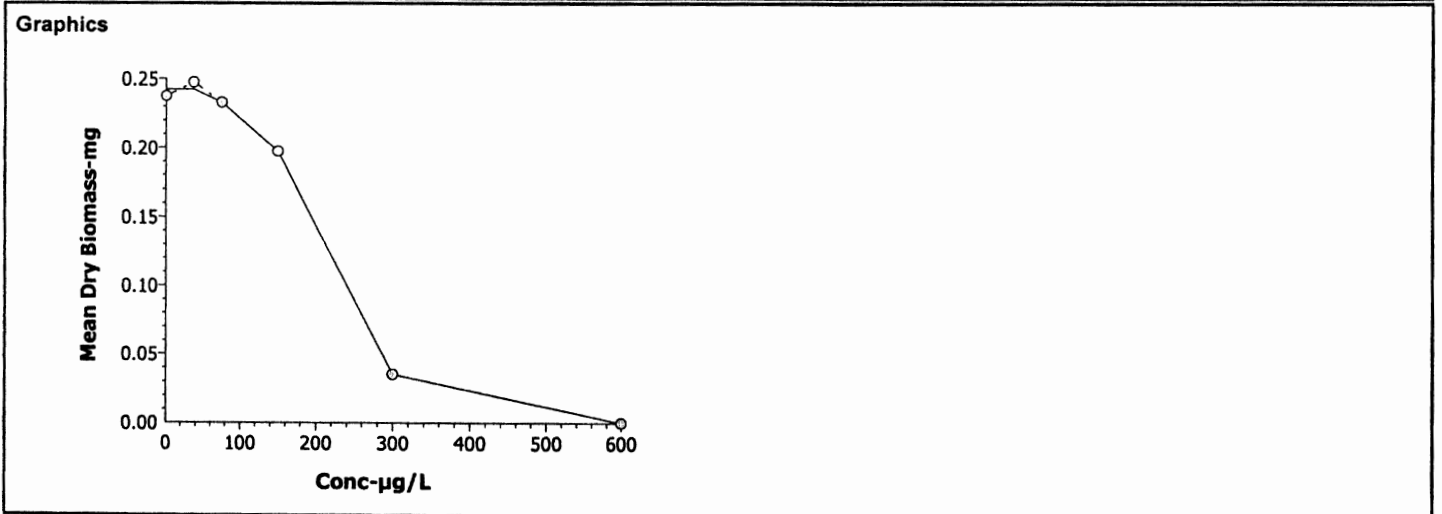
Mysid 7-d Survival and Growth Test					Nautilus Environmental (CA)	
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Linear Interpolation	04-7135-6208	04-7135-6208	03 Mar-05 3:04 PM	CETISv1.025

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Expanded CL	Method
Linear	Linear	7055475	200	Yes	Two-Point Interpolation

Point Estimates			
% Effect	Conc-µg/L	95% LCL	95% UCL
5	80.51926	18.49014	103.96650
10	106.10910	36.98027	144.66720
15	131.69890	61.01170	158.41030
20	153.19320	70.79610	169.13250
25	164.40420	119.83630	179.76320
40	198.03700	175.86640	212.94820
50	220.45890	200.79630	236.25960

Data Summary		Calculated Variate					
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD
0	Lab Control	8	0.23725	0.18200	0.29400	0.00783	0.03837
37.5		8	0.24725	0.17600	0.29600	0.00882	0.04320
75		8	0.23275	0.11800	0.28000	0.01022	0.05005
150		8	0.19725	0.15000	0.24400	0.00676	0.03314
300		8	0.03519	0.00000	0.12000	0.00915	0.04482
600		8	0.00000	0.00000	0.00000	0.00000	0.00000



Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name: Internal

Test Species: A. bahia

Sample ID: CuCl₂

Start Date/Time: 2/1/2005 / 1645

Test No.: 050201myrt

End Date/Time: 2/8/2005 / 1620

Conc. (<u>µg/L</u>)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + mysid (g)
		0	1	2	3	4	5	6	7			
Lab Control	a	5	5	5	5	5	5	5	5	100	0.02706	0.02841
	b	5	5	5	4	4	4	4	4	80	0.02346	0.02446
	c	5	5	5	5	5	5	5	5	100	0.02438	0.02571
	d	5	5	5	5	5	5	5	5	100	0.03119	0.03242
	e	5	5	5	5	5	4	4	4	80	0.02525	0.02672
	f	5	5	5	5	5	5	5	5	100	0.02503	0.02610
	g	5	5	5	5	5	5	5	5	100	0.02030	0.02143
	h	5	5	5	5	5	5	5	5	100	0.01742	0.01833
37.5	a	5	5	5	5	5	5	5	5	100	0.01997	0.02140
	b	5	5	5	5	5	5	5	5	100	0.02121	0.02260
	c	5	5	5	5	5	5	5	5	100	0.02101	0.02201
	d	5	5	5	5	5	4	4	4	80	0.02039	0.02127
	e	5	5	5	5	5	3	5	5	100	0.01758	0.01877
	f	5	5	5	5	5	5	5	5	100	0.02200	0.02316
	g	5	5	5	5	5	5	5	5	100	0.02355	0.02503
	h	5	5	5	5	5	5	5	5	100	0.02299	0.02435
75	a	5	5	5	5	5	5	5	5	100	0.02350	0.02482
	b	5	5	5	5	5	5	5	5	100	0.02279	0.02386
	c	5	5	5	5	5	5	5	5	100	0.02086	0.02226
	d	5	5	5	5	5	5	5	5	100	0.02527	0.02652
	e	5	5	5	5	5	5	5	5	100	0.02130	0.02252
	f	5	5	5	5	5	5	5	5	100	0.02280	0.02401
	g	5	5	5	5	5	4	3	3	60	0.02187	0.02246
	h	5	5	5	5	5	5	5	5	100	0.01991	0.02116
150	a	5	5	5	5	5	5	5	5	100	0.02293	0.02411
	b	5	5	5	5	5	5	5	5	100	0.02490	0.02612
	c	5	5	5	5	5	5	5	5	100	0.02616	0.02711
	d	5	5	5	5	5	5	5	5	100	0.02452	0.02557
	e	5	5	4	4	4	4	3	3	60	0.02560	0.02642
	f	5	5	5	5	5	5	5	5	100	0.02192	0.02295
	g	5	5	4	4	4	4	4	4	80	0.02377	0.02452
	h	5	5	4	4	4	4	4	4	80	0.02079	0.02163
Tech Initials		RE/SH	RL	QR	MC	SH	RL	AH	MC			

Feeding Times (day):

0	1	2	3	4	5	6
-	0930	0870	0815	0710	1000	0915
0730	1600	1545	1530	1430	1900	1530

Weight Data:
 Date/Time in: 2/8/05 1620
 Date/Time out: 2/15/05 1320
 Oven Temp (°C): 67
 Tech Initials: SM

Comments: _____

QC Check: SM 2/16/05
 Final Review: SM 2/16/05

Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name: Internal

Test Species: A. bahia

Sample ID: CuCl₂

Start Date/Time: 2/1/2005 / 1645

Test No.: 050201myrt

End Date/Time: 2/8/2005 / 1620

Conc. (<u>μg/L</u>)	Rep.	Survival on Test Day:								Percent Survival	pan wt. (g)	pan + mysid (g)
		0	1	2	3	4	5	6	7			
300	a	5	4	4	4	3	3	3	2 [Ⓐ]	50	0.02377	0.02412
	b	5	3	2	2	2	1	1	0	0	0.02054	-
	c	5	2	1	1	1	1	1	1	20	0.02853	0.02869
	d	5	3	3	2	2	1	1	1	20	0.02812	0.02823
	e	5	3	2	1	1	1	1	1	20	0.02771	0.02781
	f	5	4	4	4	4	4 [Ⓐ]	4	4	80	0.02431	0.02491
	g	5	3	0	-	-	-	-	-	0	-	-
	h	5	4	1	1	1	1	0	-	0	-	-
600	a	5	0									
	b	5										
	c	5										
	d	5										
	e	5										
	f	5										
	g	5										
	h	5										
	a											
	b											
	c											
	d											
	e											
	f											
	g											
	h											

ALL DEAD

Tech Initials: RS/SH Rg y/L uc SH Rg AH MC

Feeding Times (day):

0	1	2	3	4	5	6
-	0630	0630	0815	0710	1000	0915
1730	1600	1545	1530	1430	1900	1530

Weight Data:
 Date/Time in: 2/8/05 1620
 Date/Time out: 2/15/05 1320
 Oven Temp (°C): 67
 Tech Initials: SM

Comments: Ⓐ one lost in progress, use 4 as original number of animals

QC Check: AH 2/16/05
 Final Review: SM 3/2/05

Marine Chronic Bioassay

Water Quality Measurements

Client: Internal
 Sample ID: CuCl₂
 Test No: 050201myrt

Test Species: A. bahia
 Start Date/Time: 2/1/2005 / 11:45
 End Date/Time: 2/8/2005 / 16:20

Concentration	Lab Control							
Day	0	1	2	3	4	5	6	7
Initial								
pH	7.99	7.96	7.93	8.01	7.99	8.00	8.00	
DO (mg/L)	8.1	7.3	8.2	7.2	7.3	6.7	8.2	
Salinity (ppt)	30.7	30.4	30.3	29.0	30.3	31.5	30.7	
Temp (°C)	24.6	25.8	25.3	24.4	24.4	24.5	24.0	
Final								
pH		7.97	7.98	7.88	7.63	7.71	7.90	7.91
DO (mg/L)		8.1	6.1	5.7	5.4	5.2	5.4	5.5
Temp (°C)		25.0	25.3	24.8	24.5	24.7	24.6	25.4

Concentration	150 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.01	7.99	7.96	8.02	8.00	8.00	8.00	
DO (mg/L)	7.5	7.5	8.0	7.1	7.2	6.7	8.0	
Salinity (ppt)	29.9	30.2	29.8	28.7	29.6	31.1	30.3	
Temp (°C)	24.9	25.2	25.4	24.6	24.6	25.0	24.9	
Final								
pH		8.02	7.97	7.95	7.82	7.79	7.90	7.87
DO (mg/L)		8.3	6.1	5.6	5.7	5.4	5.7	5.5
Temp (°C)		25.1	25.7	24.8	24.5	24.4	24.7	25.7

Concentration	37.5 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.01	7.98	7.95	8.02	7.99	8.00	8.00	
DO (mg/L)	8.0	7.2	7.9	7.1	7.3	6.7	8.0	
Salinity (ppt)	30.4	30.5	30.2	29.0	30.3	31.5	30.7	
Temp (°C)	24.6	25.4	25.4	24.7	24.7	24.8	24.0	
Final								
pH		8.02	7.98	7.88	7.76	7.74	7.90	7.87
DO (mg/L)		8.3	6.1	5.8	5.5	5.3	5.5	5.4
Temp (°C)		25.1	25.4	24.8	24.5	24.5	24.7	25.7

Concentration	300 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.01	7.99	7.94	8.01	8.00	8.00	7.99	
DO (mg/L)	7.4	7.5	7.9	7.2	7.2	6.6	8.0	
Salinity (ppt)	29.3	28.8	27.4	28.8	29.3	30.7	29.9	
Temp (°C)	24.7	25.3	25.0	25.4	24.6	25.3	24.0	
Final								
pH		7.99	7.98	7.93	7.81	7.90	7.94	7.89
DO (mg/L)		8.2	6.3	6.8	5.7	5.9	5.6	5.8
Temp (°C)		25.2	25.5	24.8	24.7	24.6	24.8	25.6

Concentration	75 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.01	7.99	7.95	8.02	8.00	8.00	7.99	
DO (mg/L)	7.3	7.4	8.0	7.1	7.3	6.7	8.0	
Salinity (ppt)	30.2	30.4	30.2	29.1	30.2	31.5	30.7	
Temp (°C)	25.0	25.3	25.2	24.4	24.6	24.9	24.3	
Final								
pH		8.02	7.96	7.85	7.78	7.75	7.90	7.88
DO (mg/L)		8.2	5.9	5.6	5.5	5.2	5.6	5.6
Temp (°C)		25.1	25.6	24.8	24.6	24.5	24.9	25.7

Concentration	600 µg/L							
Day	0	1	2	3	4	5	6	7
Initial								
pH	8.00	7.99						
DO (mg/L)	7.4	7.7						
Salinity (ppt)	28.4	28.8						
Temp (°C)	24.7	24.8						
Final								
pH		7.99						
DO (mg/L)		8.3						
Temp (°C)		25.2						

Animal Source/Date Received: ABS 2/1/05
 Animal Age at Initiation: 7 days
 Comments: _____
 QC Check: AH 2/16/05

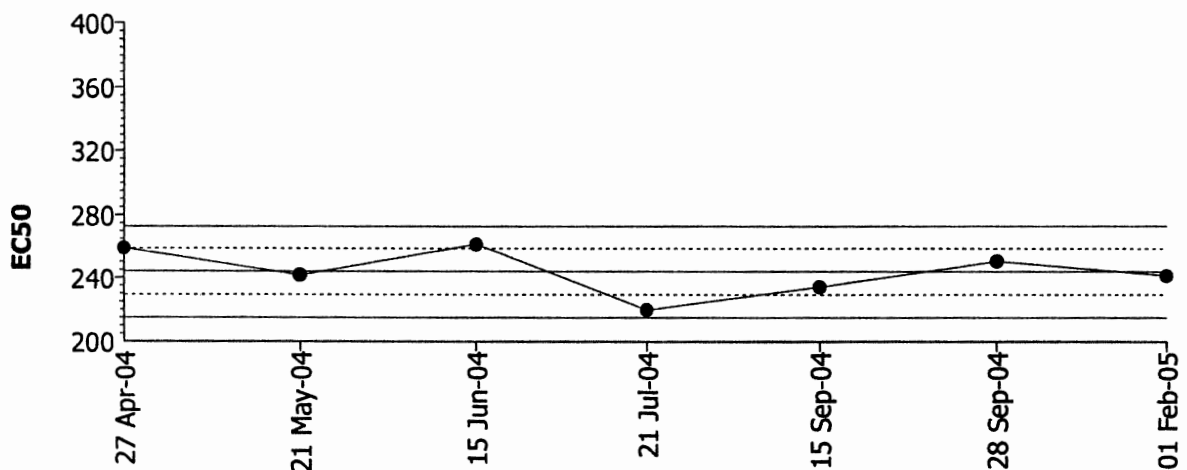
Analysts:	Initial:	0	1	2	3	4	5	6	7
		SD	SD	SD	SH	uc	SD	SD	
	Final:		re	SD	SH	uc	re	re	SD

Final Review: [Signature] 3/3/05

CETIS QC Chart

Mysid 7-d Survival and Growth Test Nautilus Environmental (CA)

Test Type: Growth-Survival (7d) Organism: Americamysis bahia (Opossum Shri) Material: Copper chloride
 Protocol: EPA/821/R-02-014 (2002) Endpoint: 7d Proportion Survived Source: Reference Toxicant-REF



Mean: 243.993 Count: 7 -1s Warning Limit: 229.562 -2s Action Limit: 215.131
 Sigma: 14.4313 CV: 5.91% +1s Warning Limit: 258.425 +2s Action Limit: 272.856

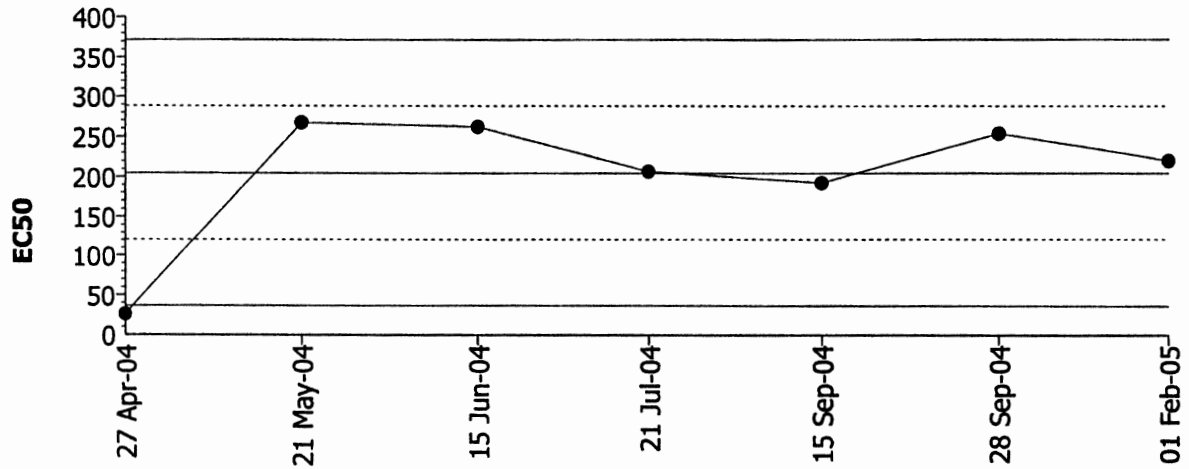
Quality Control Data

Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2004	Apr	27	258.7923	14.79902	1.02548	(+)		03-7850-2349	01-9432-2314
2		May	21	241.8510	-2.14228	-0.14845			11-7321-0330	06-7525-6476
3		Jun	15	261.2044	17.21112	1.19262	(+)		02-7646-0236	12-2674-5191
4		Jul	21	219.7444	-24.2488	-1.68030	(-)		02-9063-5042	15-2505-0324
5		Sep	15	234.3742	-9.61908	-0.66654			04-2249-8254	04-6742-8783
6			28	250.5329	6.53962	0.45315			11-6774-0355	20-1758-8435
7	2005	Feb	1	241.4537	-2.53958	-0.17598			04-7135-6208	10-4148-5562

CETIS QC Chart

Mysid 7-d Survival and Growth Test **Nautilus Environmental (CA)**

Test Type: Growth-Survival (7d) **Organism:** Americamysis bahia (Opossum Shri) **Material:** Copper chloride
Protocol: EPA/821/R-02-014 (2002) **Endpoint:** Mean Dry Biomass-mg **Source:** Reference Toxicant-REF



Mean: 204.469 **Count:** 7 **-1s Warning Limit:** 120.609 **-2s Action Limit:** 36.7480
Sigma: 83.8604 **CV:** 41.01% **+1s Warning Limit:** 288.329 **+2s Action Limit:** 372.19

Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2004	Apr	27	25.88019	-178.588	-2.12959	(-)	(-)	03-7850-2349	05-0447-3306
2		May	21	267.5858	63.11691	0.75264			11-7321-0330	16-9221-6570
3		Jun	15	262.7812	58.31231	0.69535			02-7646-0236	04-5152-7583
4		Jul	21	207.2085	2.73961	0.03267			02-9063-5042	08-4138-5769
5		Sep	15	192.7336	-11.7352	-0.13994			04-2249-8254	18-8727-9291
6			28	254.6341	50.16521	0.59820			11-6774-0355	08-7200-7496
7	2005	Feb	1	220.4589	15.99001	0.19067			04-7135-6208	11-9854-0277

M. GALLOPROVINCIALIS

Report Date: 27 Feb-05 6:49 PM

Link: 09-1499-2257/050201mgt

CETIS Test Summary

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)	
Test No:	09-9798-9542	Test Type:	Development	Duration:	47h			
Start Date:	01 Feb-05 04:45 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis			
Ending Date:	03 Feb-05 03:45 PM	Dil Water:	Scripps Seawater	Source:	Field Collected			
Setup Date:	01 Feb-05 04:45 PM	Brine:	Not Applicable					
Sample No:	10-0116-5675	Material:	Copper chloride	Client:	Internal			
Sample Date:	01 Feb-05	Code:	050201mgt	Project:				
Receive Date:	01 Feb-05	Source:	Reference Toxicant					
Sample Age:	17h	Station:						
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
06-9318-4816	Proportion Normal	< 2.5	2.5	N/A	9.72%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
05-3428-2661	Proportion Normal	25	2.72162	2.41572	2.97945	Linear Regression		
		50	3.43444	3.15690	3.69568			
Proportion Normal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	0.89000	0.79000	0.94000	0.02702	0.06042	6.79%
2.5		5	0.72800	0.63000	0.82000	0.03308	0.07396	10.16%
5		5	0.12600	0.02000	0.32000	0.05231	0.11696	92.83%
10		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
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 Normal Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	0.94000	0.88000	0.91000	0.93000	0.79000		
2.5		0.76000	0.75000	0.68000	0.82000	0.63000		
5		0.32000	0.14000	0.06000	0.02000	0.09000		
10		0.00000	0.00000	0.00000	0.00000	0.00000		
20		0.00000	0.00000	0.00000	0.00000	0.00000		
40		0.00000	0.00000	0.00000	0.00000	0.00000		

CETIS Analysis Detail

Comparisons: Page 1 of 1
 Report Date: 27 Feb-05 6:49 PM
 Analysis: 06-9318-4816/050201mgrt

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	09-1499-2257	09-1499-2257	27 Feb-05 6:49 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		<2.5	2.5		N/A	9.72%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	7.74608	3.89507	0.00019	Unequal Variances
Distribution	Shapiro-Wilk W	0.84072	0.89981	0.00034	Non-normal Distribution

ANOVA Table

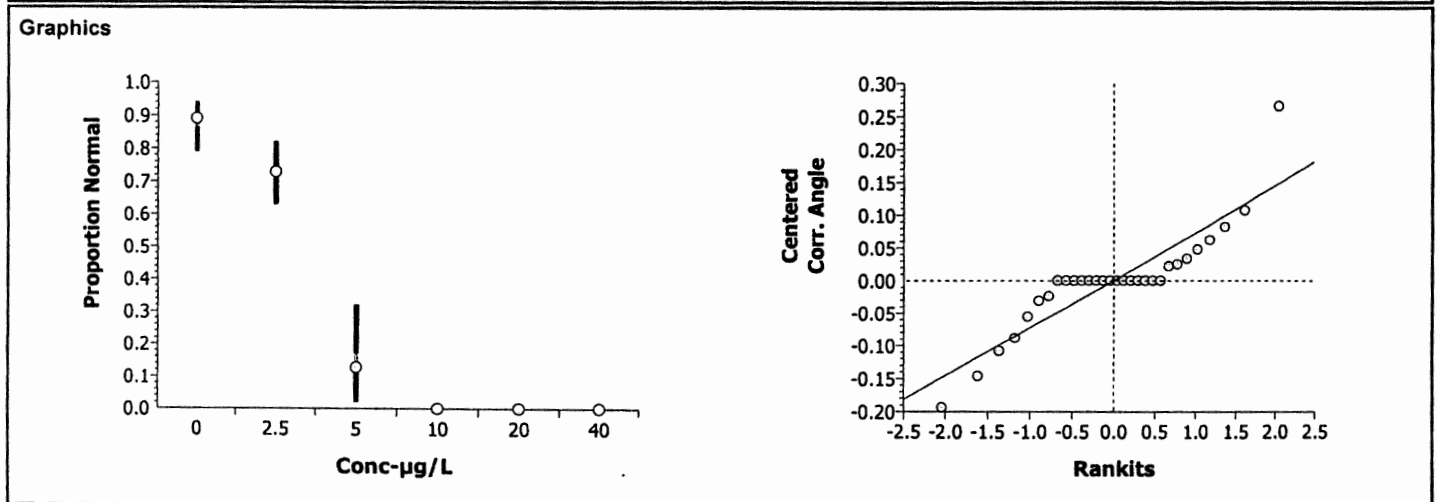
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	7.243294	1.448659	5	192.82	0.00000	Significant Effect
Error	0.180315	0.007513	24			
Total	7.42360929	1.456172	29			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Control		2.5	16	16	<= 0.0500	0	Significant Effect
		5	15	16	<= 0.0500	0	Significant Effect
		10	15	16	<= 0.0500	1	Significant Effect
		20	15	16	<= 0.0500	1	Significant Effect
		40	15	16	<= 0.0500	1	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	5	0.89000	0.79000	0.94000	0.06042	1.24086	1.09476	1.32333	0.09112
2.5		5	0.72800	0.63000	0.82000	0.07396	1.02502	0.91691	1.13265	0.08364
5		5	0.12600	0.02000	0.32000	0.11696	0.33576	0.14190	0.60126	0.17257
10		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
20		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
40		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001

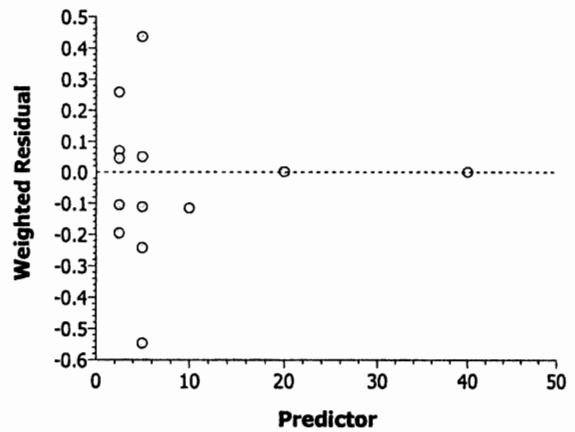
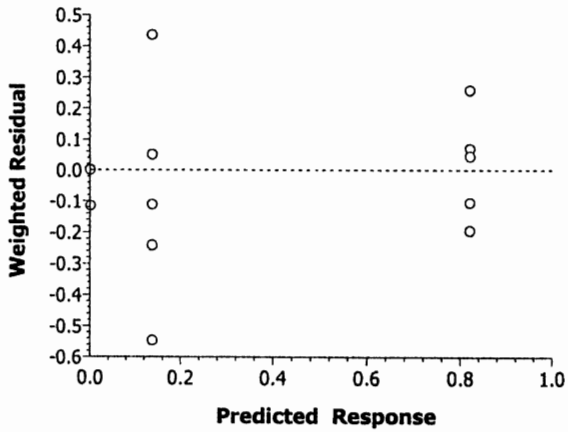
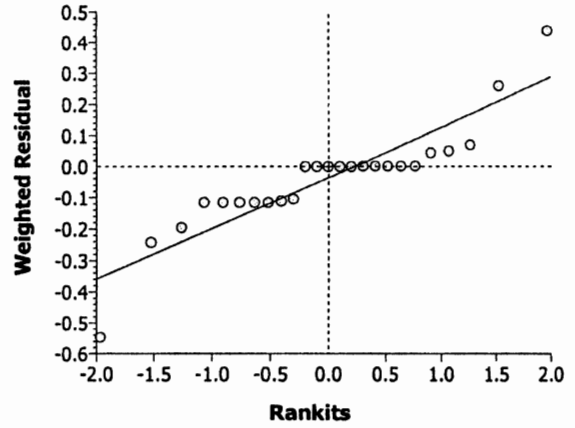
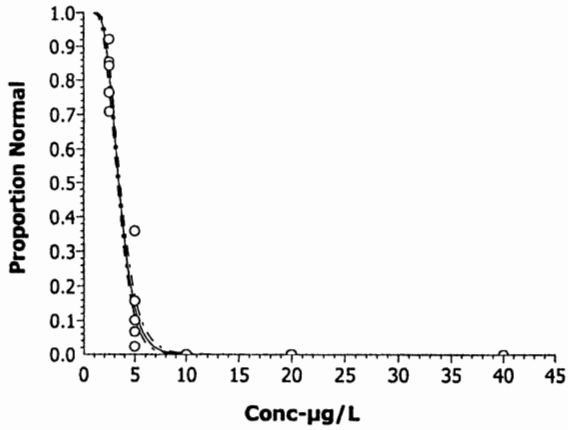


CETIS Analysis Detail

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)		
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Normal	Linear Regression	09-1499-2257	09-1499-2257	27 Feb-05 6:49 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.11	Yes	Yes	No	Yes			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.11071	0.02306	0.06301	0.15840	4.802	0.01719	Significant		
Slope	6.67627	0.61898	5.39581	7.95674	10.786	0.00170	Significant		
Intercept	1.42248	0.37021	0.65665	2.18831	3.842	0.03110	Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
4	-220.47730	0.21306	0.14978	0.03678	62.41047	35.17247	0.00002	Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	8.93464	2.74006	0.00017	Unequal Variances				
Distribution	Shapiro-Wilk W	0.75178	0.91820	0.00001	Non-normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	2.72162	2.41572	2.97945						
50	3.43444	3.15690	3.69568						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Control	5	0.89000	0.79000	0.94000	0.01233	0.06042	445	500
2.5		5	0.72800	0.63000	0.82000	0.01510	0.07396	364	500
5		5	0.12600	0.02000	0.32000	0.02387	0.11696	63	500
10		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500
20		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500
40		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500

CETIS Analysis Detail

Graphics



CETIS Data Worksheet

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Start Date: 01 Feb-05 Species: Mytilus galloprovincialis Sample Code: 050201mgt
 Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: Reference Toxicant
 Sample Date: 01 Feb-05 Material: Copper chloride Sample Station:

Conc-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
			1	100	77 81 76	w
			2	100	73 75	AA w
			3	100	6	AA w
			4			w
			5	100		AA w
			6	100		AA w
			7			AA
			8			AA
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16		48 74	JR
			17			AA
			18			
			19			
			20			
			21			
			22		93	
			23			
			24		06 4	
			25			
			26			
			27			JR
			28			AA
			29			AA
			30			AA

CETIS Data Worksheet

Report Date: 31 Jan-05 12:51 PM
 Link: 09-1499-2257

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 01 Feb-05 Species: Mytilus galloprovincialis Sample Code: 050201mgt
 Ending Date: 03 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: Reference Toxicant
 Sample Date: 01 Feb-05 Material: Copper chloride Sample Station:

Conc-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
0	LC	1	24			
0	LC	2	29			
0	LC	3	21			
0	LC	4	22			
0	LC	5	19			
2.5		1	1			
2.5		2	2			
2.5		3	14			
2.5		4	28			
2.5		5	30			
5		1	26			
5		2	15			
5		3	3			
5		4	11			
5		5	16			
10		1	10			
10		2	6			
10		3	20			
10		4	23			
10		5	17			
20		1	25			
20		2	9			
20		3	8			
20		4	12			
20		5	27			
40		1	4			
40		2	13			
40		3	18			
40		4	7			
40		5	5			

Marine Chronic Bioassay

Bivalve Development Worksheet

Client: City of Buena Vista, Internal
 Test No.: 0502-027, 030, 050201 mgrt
 Test Species: M. galloprovincialis
 Animal Source: Carlsbad Aquafarms/Mission Bay
 Date Received: 1/28/05

Start Date/Time: 2/1/05 1645
 End Date/Time: 2/3/05 1545
 Technician Initials: MC

Test Chambers: Shell vials

Sample Volume: 10ml

First Gamete Release Time: 1145

Spawn Information		
Sex	Number	Condition
Male	16	Good
Female	7	Good

Egg Fertilization Time: 1440

Embryo Stock Density Calculation:

Number Counted:	<u>12</u>	<u>15</u>			
	<u>25</u>	<u>16</u>			
	<u>16</u>	<u>38</u>			Mean: <u>20.3</u>
	<u>22</u>	<u>19</u>			
	<u>18</u>	<u>22</u>			

$$\text{Mean } \frac{20.3}{18.6} \times 42 = 853 \text{ embryos/ml}$$

$$\frac{\text{Initial Density: } 853}{\text{Desired Final Density: } 400} = 2.13 \text{ (dilution factor)}$$

$$1/1.13 = 100/113$$

Prepare the embryo stock according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Percent Division Upon Inoculation: 90

Time Zero Counts: /
/
/
/

48-h QC: 93/100

Inoculation Time: 1645

Comments: _____

QC Check: AH 2/10/05

Final Review: [Signature] 2/28/05

Marine Chronic Bioassay

Water Quality Measurements

Client: Internal
 Sample ID: CuCl₂
 Test No.: 050201mgrt

Test Species: M. galloprovincialis
 Start Date/Time: 2/1/2005 1645
 End Date/Time: 2.3.05 1545

Concentration ____µg/L____	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	33.7	33.8	33.9	14.0	14.1	15.1	8.8	8.4	8.1	8.25	8.04	8.07
2.5	33.7	33.9	34.1	14.0	14.0	15.1	8.4	8.5	8.2	8.22	8.07	8.09
5	33.8	33.9	34.0	14.0	14.0	15.2	8.9	8.5	8.1	8.22	8.07	8.09
10	33.6	33.9	34.0	14.0	14.0	15.1	8.9	8.5	8.1	8.23	8.07	8.10
20	33.6	33.8	34.0	14.0	14.1	15.1	8.9	8.5	8.0	8.23	8.07	8.09
40	33.6	33.7	33.9	14.0	14.1	15.0	8.8	8.5	8.1	8.23	8.08	8.09

Technician Initials:

0	24	48
ML	JR	RLG

Animal Source/Date Received: Mission Bay field collected 1/28/05

Comments: 0 hrs: _____
 24 hrs: _____
 48 hrs: _____

QC Check: At 2/10/05 Final Review: [Signature] 3/3/05

CETIS Test Summary

Report Date: 27 Feb-05 6:51 PM

Link: 11-4568-9952/050202mgt

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)		
Test No:	08-0883-8162	Test Type:	Development	Duration:	47h				
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis				
Ending Date:	04 Feb-05 02:15 PM	Dil Water:	Scripps Seawater	Source:	Field Collected				
Setup Date:	02 Feb-05 03:30 PM	Brine:	Not Applicable						
Sample No:	12-4747-1301	Material:	Copper chloride	Client:	Internal				
Sample Date:	02 Feb-05	Code:	050202mgt	Project:					
Receive Date:	02 Feb-05	Source:	Reference Toxicant						
Sample Age:	16h	Station:							
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
09-0344-7778	Proportion Normal	2.5	5	3.536	4.09%	Steel's Many-One Rank			
Point Estimate Summary									
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method			
02-8162-7236	Proportion Normal	25	3.44108	3.22899	3.62729	Linear Regression			
		50	4.30472	4.12364	4.47532				
Proportion Normal Summary									
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	0.95400	0.93000	0.98000	0.00872	0.01949	2.04%	
2.5		5	0.88600	0.84000	0.94000	0.02040	0.04561	5.15%	
5		5	0.32800	0.23000	0.47000	0.04432	0.09910	30.21%	
10		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%	
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 Normal Detail									
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	0.94000	0.96000	0.96000	0.98000	0.93000			
2.5		0.92000	0.89000	0.94000	0.84000	0.84000			
5		0.47000	0.23000	0.24000	0.33000	0.37000			
10		0.00000	0.00000	0.00000	0.00000	0.00000			
20		0.00000	0.00000	0.00000	0.00000	0.00000			
40		0.00000	0.00000	0.00000	0.00000	0.00000			

CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	11-4568-9952	11-4568-9952	27 Feb-05 6:51 PM	CETISv1.025

Method	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	3.536	4.09%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	23.40011	3.89507	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.85553	0.89981	0.00078	Non-normal Distribution

ANOVA Table

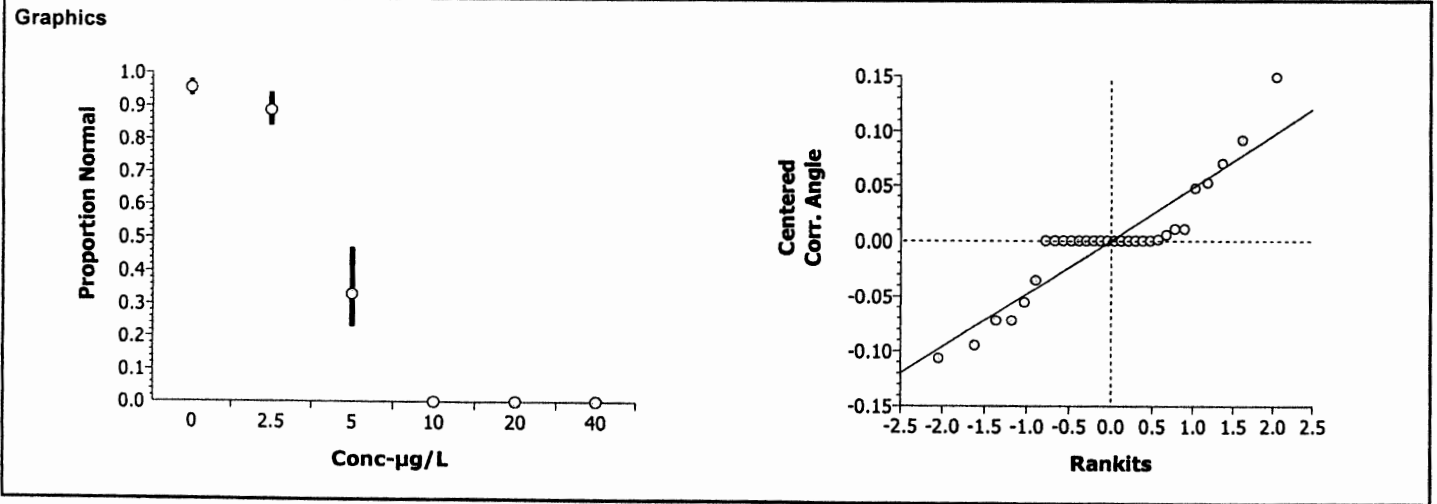
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	9.358684	1.871737	5	592.52	0.00000	Significant Effect
Error	0.075814	0.003159	24			
Total	9.43449758	1.8748957	29			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Control		2.5	16.5	16	> 0.0500	3	Non-Significant Effect
		5	15	16	<= 0.0500	1	Significant Effect
		10	15	16	<= 0.0500	2	Significant Effect
		20	15	16	<= 0.0500	2	Significant Effect
		40	15	16	<= 0.0500	2	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	5	0.95400	0.93000	0.98000	0.01949	1.35883	1.30303	1.42890	0.04876
2.5		5	0.88600	0.84000	0.94000	0.04561	1.23173	1.15928	1.32333	0.07353
5		5	0.32800	0.23000	0.47000	0.09910	0.60667	0.50018	0.75538	0.10569
10		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
20		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
40		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001

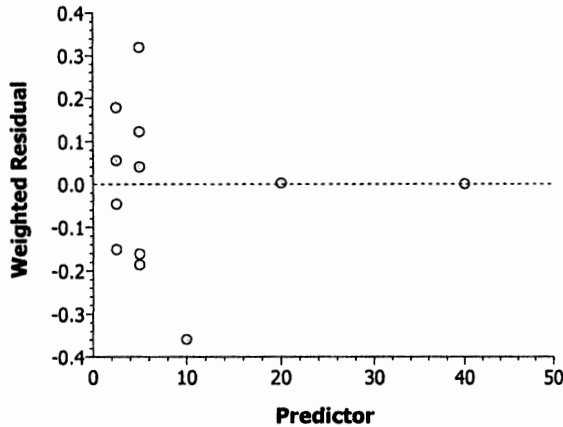
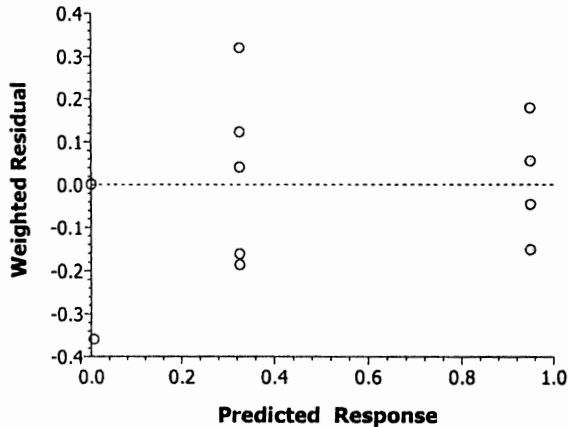
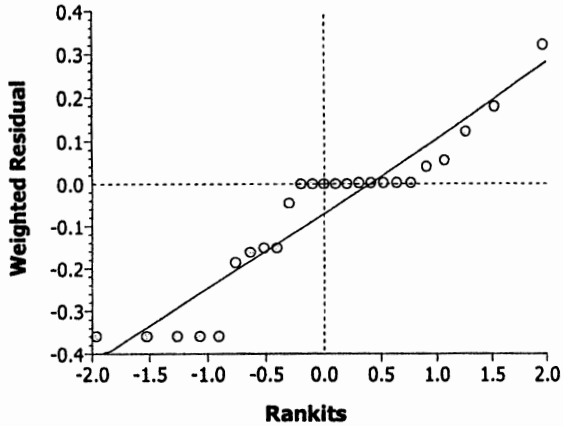
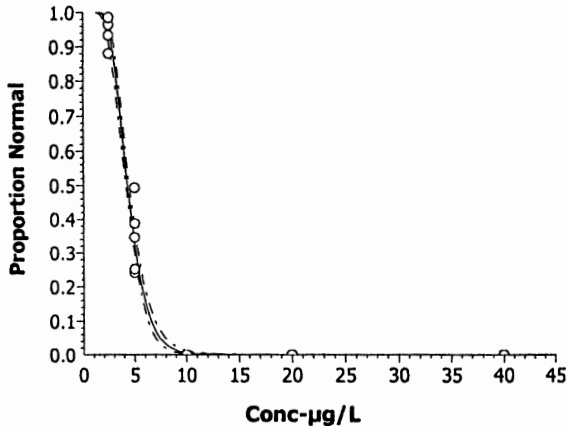


CETIS Analysis Detail

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)		
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Normal	Linear Regression	11-4568-9952	11-4568-9952	27 Feb-05 6:51 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.046	Yes	Yes	No	No			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.05201	0.00955	0.03329	0.07073	5.445	0.01216	Significant		
Slope	6.93554	0.43278	6.08730	7.78378	16.026	0.00053	Significant		
Intercept	0.60324	0.29596	0.02316	1.18333	2.038	0.13427	Not Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
6	-229.20650	0.08698	0.14418	0.01496	32.17877	35.17247	0.09648	Non-Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	18.88369	2.74006	0.00000	Unequal Variances				
Distribution	Shapiro-Wilk W	0.80003	0.91820	0.00012	Non-normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	3.44108	3.22899	3.62729						
50	4.30472	4.12364	4.47532						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Control	5	0.95400	0.93000	0.98000	0.00398	0.01949	477	500
2.5		5	0.88600	0.84000	0.94000	0.00931	0.04561	443	500
5		5	0.32800	0.23000	0.47000	0.02023	0.09910	164	500
10		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500
20		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500
40		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500

CETIS Analysis Detail

Graphics



CETIS Data Worksheet

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 02 Feb-05 Species: Mytilus galloprovincialis Sample Code: 050202mgrt
 Ending Date: Protocol: ASTM E724-98 (1999) Sample Source: Reference Toxicant
 Sample Date: 02 Feb-05 Material: Copper chloride Sample Station:

Conc-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
			1	100	0	AH
			2			
			3			
			4			
			5	100	0	
			6			
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20		47	
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			
			30			

CETIS Data Worksheet

Report Date: 02 Feb-05 9:25 AM

Link: 11-4568-9952/050202mgt

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 02 Feb-05 Species: Mytilus galloprovincialis Sample Code: 050202mgt
 Ending Date: Protocol: ASTM E724-98 (1999) Sample Source: Reference Toxicant
 Sample Date: 02 Feb-05 Material: Copper chloride Sample Station:

Conc-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
0	LC	1	24	100	94	AH 2/25/05 ↓
0	LC	2	18	100	96	
0	LC	3	23	100	96	
0	LC	4	27	100	98	
0	LC	5	5	100	93	
2.5		1	10			
2.5		2	11			
2.5		3	14			
2.5		4	17			
2.5		5	3			
5		1	19			
5		2	6			
5		3	13			
5		4	16			
5		5	20			
10		1	4			
10		2	28			
10		3	8			
10		4	21			
10		5	29			
20		1	30			
20		2	12			
20		3	22			
20		4	25			
20		5	15			
40		1	2			
40		2	26			
40		3	7			
40		4	9			
40		5	1			

GC: me

Marine Chronic Bioassay

Water Quality Measurements

Client: Internal
 Sample ID: CuCl₂
 Test No.: 050202 mg rt

Test Species: U. galapagensis
 Start Date/Time: 2/27/05 1530
 End Date/Time: 2-4-05 1415

Concentration <u>µg/L</u>	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
LL	33.5	33.2	33.5	14.2	14.5	14.7	9.0	8.1	8.5	8.29	7.96	8.06
25	33.5	33.1	33.5		14.6	14.4	9.1	8.0	8.5	8.27	7.97	8.01
50	33.5	33.1	33.6		14.6	14.4	9.2	8.0	8.5	8.27	7.97	8.01
10	33.4	33.0	33.6		14.6	14.4	9.3	7.9	8.5	8.26	7.99	8.01
20	33.5	33.0	33.6		14.6	14.3	9.4	7.9	8.6	8.24	7.99	8.01
40	33.4	33.1	33.4		14.4	14.3	9.5	7.9	8.6	8.23	7.99	8.01

Technician Initials:

0	24	48
mc	EG	SA

Animal Source/Date Received: Mission Bay Field collected 1/28/05

Comments: 0 hrs: _____
 24 hrs: _____
 48 hrs: _____

QC Check: AH 2/10/05 Final Review: JR 2/28/05

Marine Chronic Bioassay

Bivalve Development Worksheet

Client: City of Buena Ventura - WER Start Date/Time: 2/2/05 1530
 Test No.: 0502-048 → 052 End Date/Time: 2-4-05 1415
 Test Species: M. galloprovincialis Technician Initials: mc
 Animal Source: Field collected
 Date Received: 1/28/05

Test Chambers: Shell vials Sample Volume: 10ml

First Gamete Release Time: 1200

Spawn Information		
Sex	Number	Condition
Male	8	GOOD
Female	14	GOOD

Egg Fertilization Time: 1330

Embryo Stock Density Calculation:

Number Counted:	<u>44</u>	<u>42</u>	
	<u>57</u>	<u>45</u>	
	<u>47</u>	<u>38</u>	Mean: <u>46</u>
	<u>42</u>	<u>48</u>	
	<u>54</u>	<u>43</u>	
	<u>48.8</u>	<u>43.2</u>	

Mean 46 X 42 = 1,932 embryos/ml

Initial Density: 1,932 = 4.83 (dilution factor)
 Desired Final Density: 400 eggs/ml

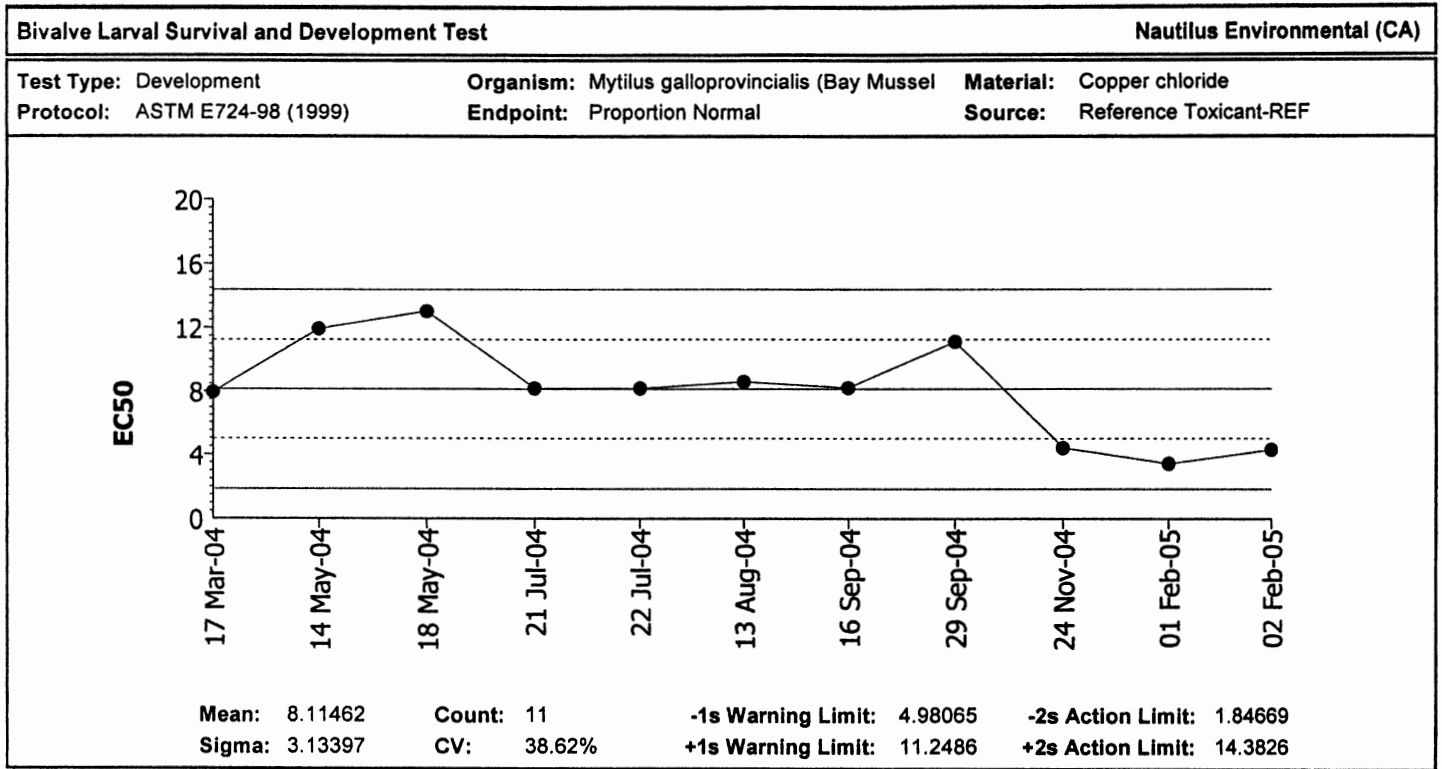
Prepare the embryo stock according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Percent Division Upon Inoculation: 90+ Time Zero Counts: _____ 48-h QC: 93
 _____ 48-h QC: 95
 Inoculation Time: 1530

Comments: _____

QC Check: At 2/10/05 Final Review: JR 2/28/05

CETIS QC Chart



Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2004	Mar	17	7.94845	-0.16617	-0.05302			07-0718-5439	06-5279-9544
2		May	14	11.93694	3.82232	1.21964	(+)		12-7186-2401	03-8733-5192
3			18	13.02629	4.91167	1.56724	(+)		13-7134-0508	18-1746-8913
4		Jul	21	8.17105	0.05644	0.01801			09-2239-2847	03-8913-8180
5			22	8.17076	0.05615	0.01792			10-6041-7464	12-5495-9475
6		Aug	13	8.56574	0.45112	0.14395			12-2022-9458	14-1756-2838
7		Sep	16	8.19887	0.08425	0.02688			14-8927-7427	10-7122-5839
8			29	11.11001	2.99539	0.95578			08-9050-7758	05-8719-5453
9		Nov	24	4.39353	-3.72109	-1.18734	(-)		02-7516-8886	19-8822-1821
10	2005	Feb	1	3.43444	-4.68018	-1.49337	(-)		09-1499-2257	05-3428-2661
11			2	4.30472	-3.80989	-1.21568	(-)		11-4568-9952	02-8162-7236

M. PYRIFERA

Report Date: 10 Feb-05 10:11 AM

Link: 02-7445-0462/050201mprt

CETIS Test Summary

Macrocystis Germination and Germ Tube Growth Test						Nautilus Environmental (CA)		
Test No:	11-2901-1037	Test Type:	Growth-Germination	Duration:	48h			
Start Date:	01 Feb-05	Protocol:	EPA/600/R-95/136 (1995)	Species:	Macrocystis pyrifera			
Ending Date:	03 Feb-05	Dil Water:	Laboratory Seawater	Source:	Field Collected			
Setup Date:	01 Feb-05 12:00 AM	Brine:	Not Applicable					
Sample No:	15-8436-2001	Material:	Copper chloride	Client:	Internal			
Sample Date:	01 Feb-05	Code:	050201mprt	Project:				
Receive Date:	01 Feb-05	Source:	Reference Toxicant					
Sample Age:	N/A	Station:						
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
18-7920-7826	Mean Length	100	180	134.164	18.06%	Dunnett's Multiple Comparison		
09-8731-7438	Proportion Germinated	180	320	240.000	18.08%	Dunnett's Multiple Comparison		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
05-2437-1155	Mean Length	25	118.28950	95.23988	141.81110	Linear Interpolation		
		50	177.10530	152.66830	240.68720			
11-2737-3711	Proportion Germinated	50	264.12440	254.73730	273.85740	Trimmed Spearman-Kärber		
Test Acceptability								
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision			
05-2437-1155	Mean Length	Control Response	10.35	10 - N/A	Passes acceptability criteria			
18-7920-7826	Mean Length	Control Response	10.35	10 - N/A	Passes acceptability criteria			
09-8731-7438	Proportion Germinated	Control Response	0.69800	0.7 - N/A	Fails acceptability criteria			
11-2737-3711	Proportion Germinated	Control Response	0.69800	0.7 - N/A	Fails acceptability criteria			
18-7920-7826	Mean Length	MSDp	0.18058	N/A - 0.2	Passes acceptability criteria			
09-8731-7438	Proportion Germinated	MSDp	0.18078	N/A - 0.2	Passes acceptability criteria			
Mean Length Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	10.35	9.5	11.5	0.35	0.7826	7.56%
18		5	10	9.25	10.75	0.3162	0.7071	7.07%
32		5	11.35	8.5	13.75	1.0741	2.4018	21.16%
56		5	13	12	14.25	0.3953	0.8839	6.80%
100		5	9.25	8.25	10.5	0.4031	0.9014	9.74%
180		5	5.45	4	7.5	0.6295	1.4076	25.83%
320		5	2.85	2.5	3.25	0.1275	0.2850	10.00%
Proportion Germinated Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	0.69800	0.61000	0.76000	0.02596	0.05805	8.32%
18		5	0.61600	0.44000	0.79000	0.05555	0.12422	20.17%
32		5	0.71400	0.56000	0.83000	0.05192	0.11610	16.26%
56		5	0.78000	0.71000	0.87000	0.02793	0.06245	8.01%
100		5	0.70600	0.66000	0.74000	0.01536	0.03435	4.87%
180		5	0.57800	0.51000	0.66000	0.02728	0.06099	10.55%
320		5	0.23800	0.17000	0.31000	0.02354	0.05263	22.11%

CETIS Test Summary

Mean Length Detail						
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	11.5	10.5	10.5	9.5	9.75
18		9.25	10.75	10.25	9.25	10.5
32		13.75	11.25	13.75	8.5	9.5
56		12.75	12.5	12	13.5	14.25
100		9.5	10.5	8.5	9.5	8.25
180		5.75	5.75	4.25	4	7.5
320		2.75	2.75	2.5	3.25	3

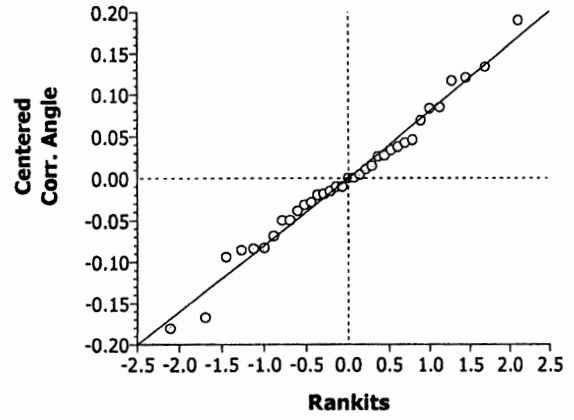
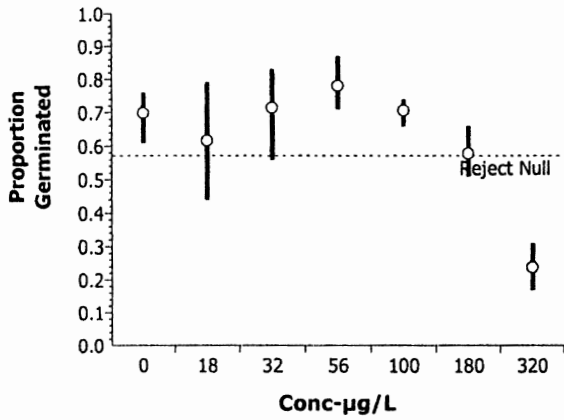
Proportion Germinated Detail						
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.69000	0.74000	0.69000	0.61000	0.76000
18		0.79000	0.60000	0.62000	0.44000	0.63000
32		0.72000	0.82000	0.83000	0.56000	0.64000
56		0.71000	0.81000	0.74000	0.77000	0.87000
100		0.68000	0.72000	0.66000	0.74000	0.73000
180		0.62000	0.51000	0.54000	0.56000	0.66000
320		0.24000	0.21000	0.26000	0.17000	0.31000

CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test							Nautilus Environmental (CA)				
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version						
Proportion Germinated	Comparison	02-7445-0462	02-7445-0462	10 Feb-05 10:10 AM	CETISv1.025						
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp			
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		180	320	0.56	240.000	18.08%			
Test Acceptability											
Attribute	Statistic	Acceptable Range	Decision								
Control Response	0.69800	0.7 - N/A	Fails acceptability criteria								
MSDp	0.18078	N/A - 0.2	Passes acceptability criteria								
ANOVA Assumptions											
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)						
Variances	Bartlett	8.41473	16.81190	0.20927	Equal Variances						
Distribution	Shapiro-Wilk W	0.98396	0.91004	0.90903	Normal Distribution						
ANOVA Table											
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)					
Between	1.098735	0.183123	6	24.09	0.00000	Significant Effect					
Error	0.2128809	0.007603	28								
Total	1.31161614	0.1907254	34								
Group Comparisons											
Control	vs	Conc-µg/L	Statistic	Critical	P Level	MSD	Decision(0.05)				
Lab Control		18	1.52997	2.40857	> 0.0500	0.13282	Non-Significant Effect				
		32	-0.41	2.40857	> 0.0500	0.13282	Non-Significant Effect				
		56	-1.7362	2.40857	> 0.0500	0.13282	Non-Significant Effect				
		100	-0.1439	2.40857	> 0.0500	0.13282	Non-Significant Effect				
		180	2.28562	2.40857	> 0.0500	0.13282	Non-Significant Effect				
		320	8.75078	2.40857	<= 0.0500	0.13282	Significant Effect				
Data Summary											
Data Summary		Original Data					Transformed Data				
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD	
0	Lab Control	5	0.69800	0.61000	0.76000	0.05805	0.99029	0.89631	1.05882	0.06284	
18		5	0.61600	0.44000	0.79000	0.12422	0.90592	0.72525	1.09476	0.13116	
32		5	0.71400	0.56000	0.83000	0.11610	1.01290	0.84554	1.14581	0.12975	
56		5	0.78000	0.71000	0.87000	0.06245	1.08603	1.00212	1.20193	0.07807	
100		5	0.70600	0.66000	0.74000	0.03435	0.99822	0.94826	1.03573	0.03753	
180		5	0.57800	0.51000	0.66000	0.06099	0.86425	0.79540	0.94826	0.06214	
320		5	0.23800	0.17000	0.31000	0.05263	0.50771	0.42499	0.59050	0.06218	
Data Detail											
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	0.69000	0.74000	0.69000	0.61000	0.76000					
18		0.79000	0.60000	0.62000	0.44000	0.63000					
32		0.72000	0.82000	0.83000	0.56000	0.64000					
56		0.71000	0.81000	0.74000	0.77000	0.87000					
100		0.68000	0.72000	0.66000	0.74000	0.73000					
180		0.62000	0.51000	0.54000	0.56000	0.66000					
320		0.24000	0.21000	0.26000	0.17000	0.31000					

CETIS Analysis Detail

Graphics



CETIS Analysis Detail

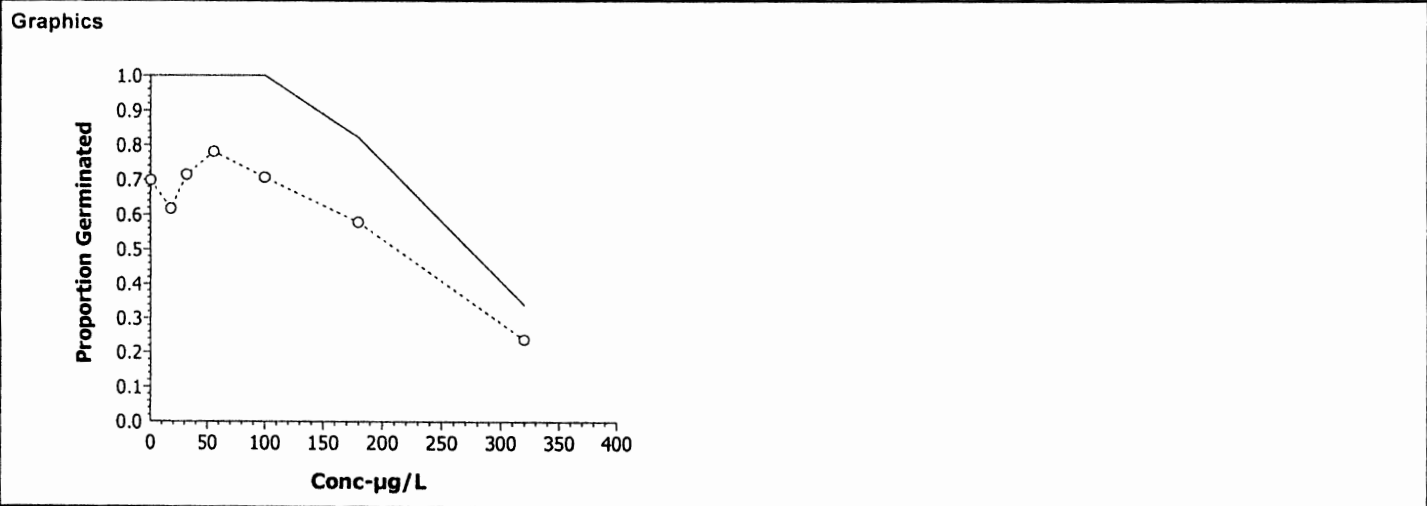
Macrocystis Germination and Germ Tube Growth Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Germinated	Trimmed Spearman-Karber	02-7445-0462	02-7445-0462	10 Feb-05 10:11 AM	CETISv1.025

Spearman-Karber Options					Point Estimates		
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL
Control Threshold	0.302	33.86%	2.421808	0.00785802	264.12440	254.73730	273.85740

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.69800	0.7 - N/A	Fails acceptability criteria

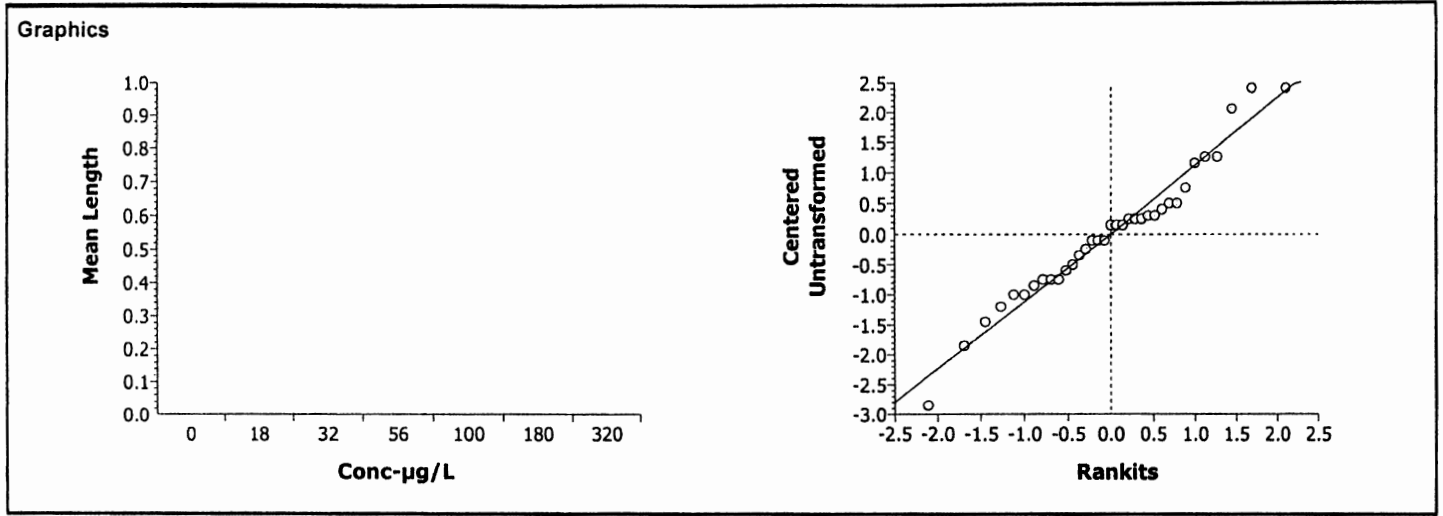
Data Summary		Calculated Variate(A/B)							
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Control	5	0.69800	0.61000	0.76000	0.01185	0.05805	349	500
18		5	0.61600	0.44000	0.79000	0.02536	0.12422	308	500
32		5	0.71400	0.56000	0.83000	0.02370	0.11610	357	500
56		5	0.78000	0.71000	0.87000	0.01275	0.06245	390	500
100		5	0.70600	0.66000	0.74000	0.00701	0.03435	353	500
180		5	0.57800	0.51000	0.66000	0.01245	0.06099	289	500
320		5	0.23800	0.17000	0.31000	0.01074	0.05263	119	500



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test							Nautilus Environmental (CA)				
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version					
Mean Length	Comparison		02-7445-0462	02-7445-0462	10 Feb-05 10:11 AM	CETISv1.025					
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp			
Dunnett's Multiple Comparison	C > T	Untransformed		100	180	1.00	134.164	18.06%			
Test Acceptability											
Attribute	Statistic	Acceptable Range	Decision								
Control Response	10.35	10 - N/A	Passes acceptability criteria								
MSDp	0.18058	N/A - 0.2	Passes acceptability criteria								
ANOVA Assumptions											
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)						
Variances	Bartlett	16.70908	16.81190	0.01041	Equal Variances						
Distribution	Shapiro-Wilk W	0.96961	0.91004	0.50544	Normal Distribution						
ANOVA Table											
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)					
Between	373.7607	62.29345	6	41.38	0.00000	Significant Effect					
Error	42.15	1.505357	28								
Total	415.910713	63.798810	34								
Group Comparisons											
Control	vs	Conc-µg/L	Statistic	Critical	P Level	MSD	Decision(0.05)				
Lab Control		18	0.45104	2.40857	> 0.0500	1.869	Non-Significant Effect				
		32	-1.2887	2.40857	> 0.0500	1.869	Non-Significant Effect				
		56	-3.4150	2.40857	> 0.0500	1.869	Non-Significant Effect				
		100	1.41757	2.40857	> 0.0500	1.869	Non-Significant Effect				
		180	6.31461	2.40857	<= 0.0500	1.869	Significant Effect				
		320	9.66522	2.40857	<= 0.0500	1.869	Significant Effect				
Data Summary											
Data Summary			Original Data				Transformed Data				
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD	
0	Lab Control	5	10.35	9.5	11.5	0.7826					
18		5	10	9.25	10.75	0.7071					
32		5	11.35	8.5	13.75	2.4018					
56		5	13	12	14.25	0.8839					
100		5	9.25	8.25	10.5	0.9014					
180		5	5.45	4	7.5	1.4076					
320		5	2.85	2.5	3.25	0.2850					
Data Detail											
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	11.5	10.5	10.5	9.5	9.75					
18		9.25	10.75	10.25	9.25	10.5					
32		13.75	11.25	13.75	8.5	9.5					
56		12.75	12.5	12	13.5	14.25					
100		9.5	10.5	8.5	9.5	8.25					
180		5.75	5.75	4.25	4	7.5					
320		2.75	2.75	2.5	3.25	3					

CETIS Analysis Detail



CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Length	Linear Interpolation	02-7445-0462	02-7445-0462	10 Feb-05 10:11 AM	CETISv1.025

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Expanded CL	Method
Linear	Linear	7090378	200	Yes	Two-Point Interpolation

Test Acceptability

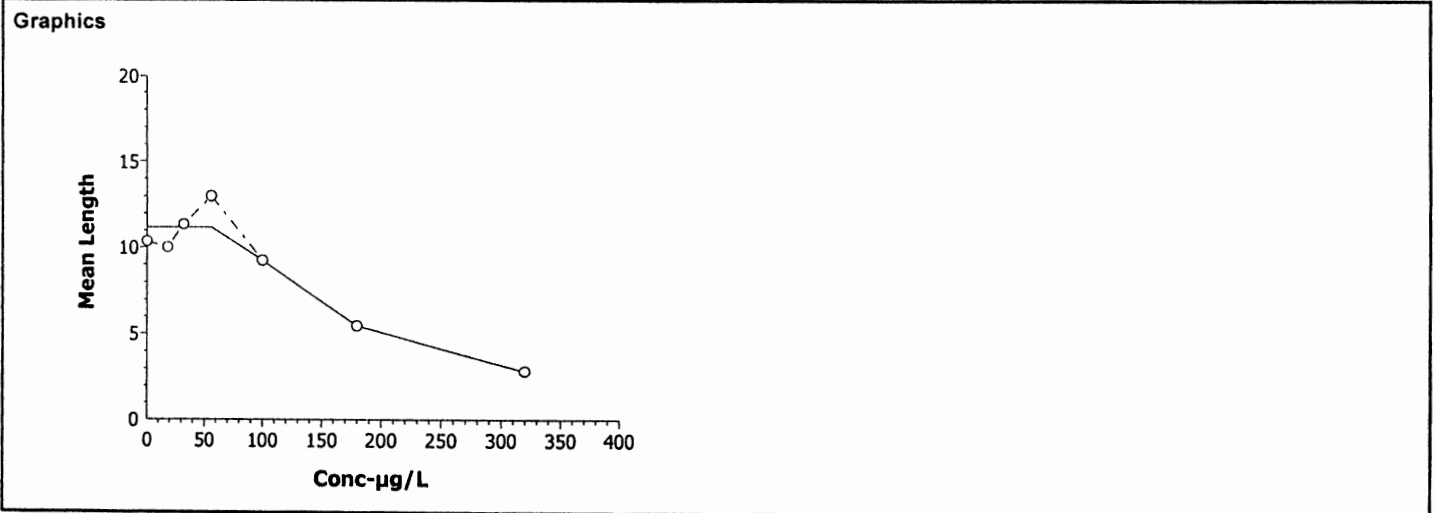
Attribute	Statistic	Acceptable Range	Decision
Control Response	10.35	10 - N/A	Passes acceptability criteria

Point Estimates

% Effect	Conc-µg/L	95% LCL	95% UCL
25	118.28950	95.23988	141.81110
50	177.10530	152.66830	240.68720

Data Summary

Conc-µg/L	Control Type	Count	Calculated Variate				
			Mean	Minimum	Maximum	SE	SD
0	Lab Control	5	10.35	9.5	11.5	0.15975	0.78262
18		5	10	9.25	10.75	0.14434	0.70711
32		5	11.35	8.5	13.75	0.49027	2.40182
56		5	13	12	14.25	0.18042	0.88388
100		5	9.25	8.25	10.5	0.184	0.90139
180		5	5.45	4	7.5	0.28732	1.40757
320		5	2.85	2.5	3.25	0.05818	0.28504



Macrocystis Germination and Germ Tube Growth Test

Nautilus Bioassay Laboratory - San Diego

Start Date: 1-Feb-05

Species: *Macrocystis pyrifera*

Test ID: 050201mprt

End Date: 3-Feb-05

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

Sample Source: Internal

Sampled:

Sample Station: CuCl₂

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)										Calibration Factor	Mean Tube Length (µm)
1	100	61	3	5	4	4	5	3	3	4	3	4	2.5	9.5
2	100	64	4	4	4	4	3	5	3	3	4	4	2.5	9.5
3	100	62	2	2	3	3	3	2	2	2	2	2	2.5	5.75
4	100	82	7	3	4	4	3	7	4	5	4	4	2.5	11.25
5	100	21	1	2	1	1	1	1	1	1	1	1	2.5	2.75
6	100	74	4	4	5	5	5	5	4	6	5	5	2.5	12
7	100	69	5	5	5	4	3	5	6	4	4	5	2.5	11.5
8	100	56	3	1	1	1	1	2	1	2	3	1	2.5	4
9	100	26	1	1	1	1	1	1	1	1	1	1	2.5	2.5
10	100	24	1	1	1	2	1	1	1	1	1	1	2.5	2.75
11	100	77	4	6	5	6	5	5	5	6	6	6	2.5	13.5
12	100	71	5	5	5	4	6	5	6	6	4	5	2.5	12.75
13	100	44	4	4	4	3	3	4	3	4	4	4	2.5	9.25
14	100	63	5	3	3	5	4	5	4	5	4	4	2.5	10.5
15	100	66	4	5	2	3	3	3	3	4	4	3	2.5	8.5
16	100	31	2	1	1	1	2	1	1	1	1	1	2.5	3
17	100	51	3	3	2	2	1	3	2	2	2	3	2.5	5.75
18	100	69	4	4	4	4	3	6	5	4	5	3	2.5	10.5
19	100	56	3	3	3	2	2	2	5	4	5	5	2.5	8.5
20	100	83	6	6	6	6	5	4	5	6	6	5	2.5	13.75
21	100	66	3	3	4	2	2	2	1	6	3	4	2.5	7.5
22	100	76	4	4	3	4	4	5	3	3	4	5	2.5	9.75
23	100	54	3	2	2	1	1	2	1	1	3	1	2.5	4.25
24	100	81	7	4	4	4	4	7	6	5	5	4	2.5	12.5
25	100	17	4	1	1	1	1	1	1	1	1	1	2.5	3.25
26	100	74	3	5	5	6	3	3	3	4	5	5	2.5	10.5
27	100	73	2	2	4	5	2	3	3	4	4	4	2.5	8.25
28	100	74	3	6	4	4	4	4	4	3	4	2	2.5	9.5
29	100	79	4	4	3	5	3	3	4	4	3	4	2.5	9.25
30	100	62	5	4	4	4	5	4	3	4	4	4	2.5	10.25
31	100	60	6	6	4	3	4	4	3	4	4	4	2.5	10.75
32	100	87	7	5	6	6	5	6	4	5	7	6	2.5	14.25
33	100	72	6	6	5	3	7	6	7	7	3	5	2.5	13.75
34	100	72	5	5	2	4	5	5	5	4	3	4	2.5	10.5
35	100	68	3	4	4	5	5	6	3	2	2	4	2.5	9.5

QC Check: AH 2/7/05

Final Review: [Signature] 3/3/05

Analyst: AHSH

Macrocyctis Germination and Germ Tube Growth Test

Nautilus Bioassay Laboratory - San Diego

Start Date: 1-Feb-05

Species: *Macrocyctis pyrifera*

Test ID: 050201mprt

End Date: 3-Feb-05

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

Sample Source: Internal

Sampled:

Sample Station: CuCl₂

Random Number	Number Counted	Number Germinated	Tube Length Measurements (micrometer units)											Calibration Factor	Mean Tube Length (µm)
1	100	61	3	5	4	4	5	3	2	4	3	4	2.5	#DIV/0!	
2	100	64	4	4	4	4	3	5	2	3	4	4		#DIV/0!	
3	100	62	2	2	2	2	3	2	2	2	2	2		#DIV/0!	
4	100	58 32	7	2	4	4	3	2	4	4	4	4		#DIV/0!	
5	100	21	1	2	1	1	1	1	1	1	1	1		#DIV/0!	
6	100	74	4	4	5	5	5	5	4	5	5	5		#DIV/0!	
7	100	69	5	5	5	5	3	5	5	5	5	5		#DIV/0!	
8	100	56	3	1	1	1	1	2	1	2	2	1		#DIV/0!	
9	100	26	1	1	1	1	1	1	1	1	1	1		#DIV/0!	
10	100	24	1	1	1	2	1	1	1	1	1	1		#DIV/0!	
11	100	77	5	6	5	5	5	5	6	6	6	6		#DIV/0!	
12	100	71	5	5	5	5	6	5	5	6	5	5		#DIV/0!	
13	100	44	4	4	4	4	3	4	4	4	4	4		#DIV/0!	
14	100	63	5	3	3	3	5	4	5	5	5	5		#DIV/0!	
15	100	66	5	3	2	3	3	2	3	3	4	4		#DIV/0!	
16	100	31	2	1	1	1	2	1	1	1	1	1		#DIV/0!	
17	100	51	3	3	2	2	2	1	3	2	2	2		#DIV/0!	
18	100	69	4	4	4	4	4	3	4	5	4	4		#DIV/0!	
19	100	56	2	3	3	3	2	2	2	4	4	4		#DIV/0!	
20	100	83	6	6	6	6	5	4	5	6	6	5		#DIV/0!	
21	100	66	2	2	4	2	2	2	1	6	2	4		#DIV/0!	
22	100	76	4	4	3	4	4	5	2	6	4	5		#DIV/0!	
23	100	54	3	2	2	1	1	2	1	1	2	1		#DIV/0!	
24	100	81	4	4	4	4	4	4	7	6	5	5		#DIV/0!	
25	100	17	1	1	1	1	1	1	1	1	1	1		#DIV/0!	
26	100	74	3	5	5	6	3	3	3	3	4	5		#DIV/0!	
27	100	73	2	2	4	4	4	2	3	3	4	4		#DIV/0!	
28	100	74	3	6	4	4	4	4	4	4	4	4		#DIV/0!	
29	100	79	4	4	4	4	4	3	4	4	4	4		#DIV/0!	
30	100	62	5	4	4	4	4	4	4	4	4	4		#DIV/0!	
31	100	60	6	6	4	4	4	4	4	4	4	4		#DIV/0!	
32	100	87	4	4	6	6	4	4	4	4	4	4		#DIV/0!	
33	100	72	6	6	5	2	2	4	6	4	3	5		#DIV/0!	
34	100	72	5	5	2	4	4	4	4	4	4	4		#DIV/0!	
35	100	68	3	4	4	4	4	6	2	2	2	4		#DIV/0!	

QC Check: AH 2/3/05

Final Review: [Signature] 3/3/05

Analyst: SH

CETIS Data Worksheet

Report Date: 31 Jan-05 12:53 PM

Link: 02-7445-0462/050201mprt

Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 01 Feb-05

Species: Macrocystis pyrifera

Sample Code: 050201mprt

Ending Date: 03 Feb-05

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

Sample Source: Reference Toxicant

Sample Date: 01 Feb-05

Material: Copper chloride

Sample Station:

Conc-µg/L	Code	Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor	Notes
0	LC	1	7	100			1	
0	LC	2	26	100			1	
0	LC	3	18	100			1	
0	LC	4	1	100			1	
0	LC	5	22	100			1	
18		1	29	100			1	
18		2	31	100			1	
18		3	30	100			1	
18		4	13	100			1	
18		5	14	100			1	
32		1	33	100			1	
32		2	4	100			1	
32		3	20	100			1	
32		4	19	100			1	
32		5	2	100			1	
56		1	12	100			1	
56		2	24	100			1	
56		3	6	100			1	
56		4	11	100			1	
56		5	32	100			1	
100		1	35	100			1	
100		2	34	100			1	
100		3	15	100			1	
100		4	28	100			1	
100		5	27	100			1	
180		1	3	100			1	
180		2	17	100			1	
180		3	23	100			1	
180		4	8	100			1	
180		5	21	100			1	
320		1	10	100			1	
320		2	5	100			1	
320		3	9	100			1	
320		4	25	100			1	
320		5	16	100			1	

QC-R6

Marine Chronic Bioassay

Water Quality Measurements

Client : Internal

Test Species: Macrocystis pyrifera

Sample ID: CuCl₂

Start Date/Time: 2/1/2005 1 15 30

Test No: 050201mprt

End Date/Time: 2/3/2005 1 12 00

Analyst: RG

Test Type: Kelp Spore Germination and Growth

Concentration (<u> </u> $\mu\text{g/L}$ <u> </u>)	Initial Readings				Final Readings			
	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)	DO (mg/L)	pH (units)	Salinity (ppt)	Temperature (°C)
Lab Control	7.9	33.7	7.97	14.0	7.1	7.96	33.3	14.2
18	8.1	33.5	8.04	14.0	7.2	8.00	33.0	14.2
32	8.3	33.6	8.05	14.0	7.5	8.02	34.0	14.2
56	8.5	33.7	8.05	14.0	7.4	8.03	33.4	14.2
100	8.6	33.6	8.05	14.0	7.5	8.01	33.2	14.2
180	8.4	33.4	8.05	14.0	7.3	8.02	33.9	14.2
320	8.5	32.9	8.05	14.0	7.3	8.01	32.6	14.2

Comments: _____

QC Check: AH 2/3/05

Final Review: [Signature] 3/3/05

Marine Chronic Bioassay

Kelp Spore Germination & Growth Worksheet

Client: City of Buena Ventura, Internal
Test No. 0502-023-7026, 050201mpt
Tech. Initials: RG

Start Date/Time: 2-1-05 / 1530
End Date/Time: 2-3-05 / 1200
Test Species: Macrocystis pyrifera

Date Collected: 2/1/05
Kelp Collector: Dave Gutoff
Collection Location: La Jolla Cove
Conditions (weather, etc.): Sunny, moderate to strong swell - 4' sets 3-4' vis.
Dilution Water Source (Client I: _____): SCRIPPS pier
Dilution Water Source (Client II: _____): _____
Dilution Water Source (Client III: _____): _____
Dilution Water Source (Reference Toxicant): _____

Time of Initial Rinsing and Dessication: 10:15 (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers: 1415 (keep kelp from each collecting bag separated)
Conditions of Zoospore Density and Motility (beaker 1): Density Low motility good
Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed): 1515

Density Counts (target = 90): 14 17 13 23 19 Mean: 17.6
Mean 17.6 * 10,000 = 176,000 spores per ml (Density of Spore Release)

Calculate the volume of spore stock to add to each test container:
(225,000 spores/container)/(density of spore release) = 1.28 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 new spore stock of 900,000 cells/ml and add 0.25 ml:

Density of spore release _____ * $\frac{0.25 \text{ ml}}{1 \text{ container}}$ = $\frac{\text{_____ spores}}{225,000 \text{ spores}}$ = _____ (x)

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 volume added should not exceed 0.5 ml. (This volume exceeds the EPA and MBP required volume of no greater than 1% of the total test solution volume. However, it may sometimes be necessary to exceed the 0.3 ml requirement in order to achieve the desired spore density.

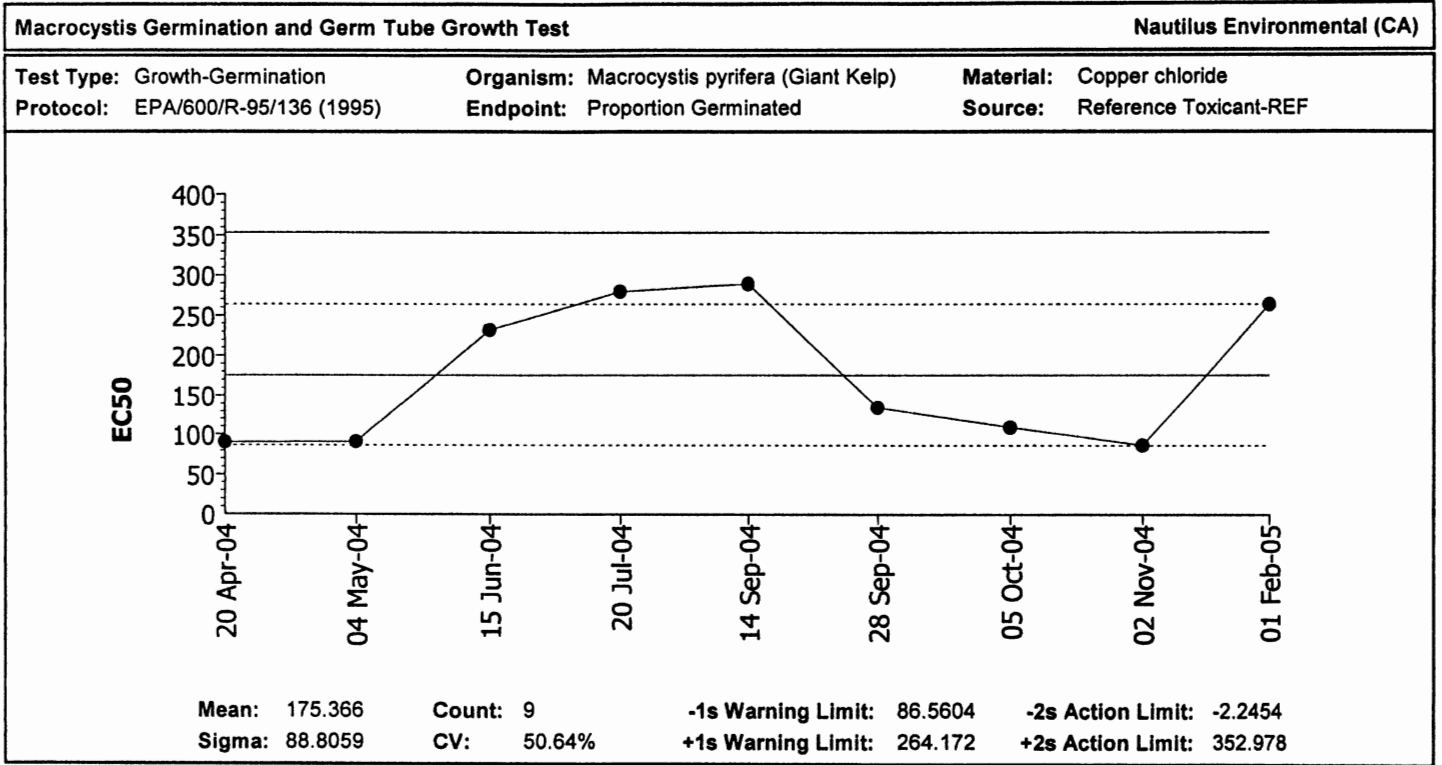
If the density of spore release is < 450,000 spores/ml, check the density of the spores in the second release beaker.

Time of Inoculation: 1530 Amount inoculated: .5 ml 24-hour germination check: 84%

Comments: _____

QC Check: AH 2/3/05 Final Review: AH 2/10/05

CETIS QC Chart



Quality Control Data										
Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2004	Apr	20	90.67673	-84.6895	-0.95365			09-9230-3313	18-8028-7365
2		May	4	90.92757	-84.4387	-0.95082			09-6750-3359	18-3325-2147
3		Jun	15	232.1032	56.73688	0.63889			16-6144-9264	12-3527-2896
4		Jul	20	279.8408	104.4744	1.17644	(+)		16-4174-1254	04-1965-4293
5		Sep	14	289.2860	113.9196	1.28279	(+)		10-8312-4875	04-4461-0912
6			28	135.0249	-40.3414	-0.45427			14-9538-8730	05-4617-1680
7		Oct	5	109.3339	-66.0324	-0.74356			04-4302-4876	17-5095-7787
8		Nov	2	86.97938	-88.3869	-0.99528			08-0075-9181	07-5161-4736
9	2005	Feb	1	264.1244	88.75808	0.99946			02-7445-0462	11-2737-3711

CETIS QC Chart

Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Test Type: Growth-Germination

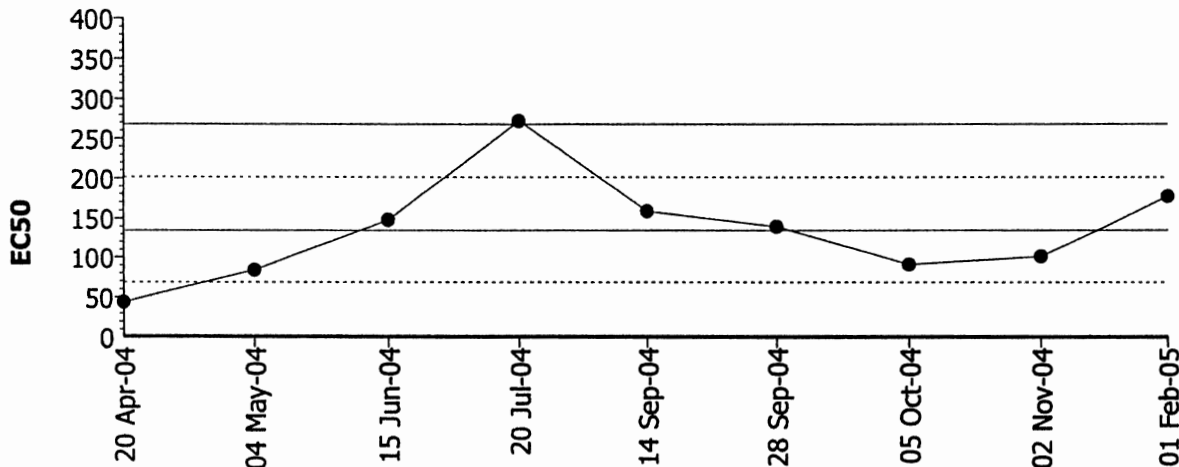
Organism: Macrocystis pyrifera (Giant Kelp)

Material: Copper chloride

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

Endpoint: Mean Length

Source: Reference Toxicant-REF



Mean: 135.100 Count: 9 -1s Warning Limit: 68.5669 -2s Action Limit: 2.03342
 Sigma: 66.5334 CV: 49.25% +1s Warning Limit: 201.634 +2s Action Limit: 268.167

Quality Control Data

Point	Year	Month	Day	Data	Delta	Sigma	Warning	Action	Link	Analysis
1	2004	Apr	20	43.80952	-91.2907	-1.37210	(-)		09-9230-3313	13-1201-9241
2		May	4	84.13953	-50.9607	-0.76594			09-6750-3359	06-5122-8145
3		Jun	15	148.00000	12.89970	0.19388			16-6144-9264	14-9178-8375
4		Jul	20	272.43590	137.3356	2.06416	(+)	(+)	16-4174-1254	13-3196-6978
5		Sep	14	158.86920	23.76890	0.35725			10-8312-4875	06-7384-9813
6			28	139.50620	4.40590	0.06622			14-9538-8730	06-0423-0465
7		Oct	5	90.94118	-44.1591	-0.66371			04-4302-4876	06-2964-8266
8		Nov	2	101.09590	-34.0044	-0.51109			08-0075-9181	11-1943-7189
9	2005	Feb	1	177.10530	42.00500	0.63134			02-7445-0462	05-2437-1155

APPENDIX D
ANALYTICAL CHEMISTRY DATA

February 13, 2005

Chris Stransky
Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, CA 92121

Subject: **Calscience Work Order No.: 05-02-0122**
Client Reference: **SCRE**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 2/2/2005 and analyzed in accordance with the attached chain-of-custody.

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

Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/02/05
 Work Order No: 05-02-0122
 Preparation: EPA 3005A, Filt.
 Method: EPA 6020
 Units: ug/L

Project: SCRE

Page 1 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
SCRE A-2	05-02-0122-1	01/31/05	Aqueous	02/04/05	02/04/05	050204L02

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Copper	2.79	1.00	1		Selenium	3.81	1.00	1	
Nickel	6.79	1.00	1		Zinc	10.3	5.0	1	

SCRE B-1	05-02-0122-2	01/31/05	Aqueous	02/04/05	02/04/05	050204L02
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Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Copper	4.87	1.00	1		Selenium	4.26	1.00	1	
Nickel	6.10	1.00	1		Zinc	21.9	5.0	1	

SCRE B-3	05-02-0122-3	01/31/05	Aqueous	02/04/05	02/04/05	050204L02
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Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Copper	2.77	1.00	1		Selenium	3.40	1.00	1	
Nickel	6.58	1.00	1		Zinc	ND	5.00	1	

SCRE C-1	05-02-0122-4	01/31/05	Aqueous	02/04/05	02/04/05	050204L02
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Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Copper	3.39	1.00	1		Selenium	3.65	1.00	1	
Nickel	6.64	1.00	1		Zinc	ND	5.00	1	

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



Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/02/05
 Work Order No: 05-02-0122
 Preparation: EPA 3020A Total
 Method: EPA 6020
 Units: ug/L

Project: SCRE

Page 2 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID			
SCRE A-2	05-02-0122-1	01/31/05	Aqueous	02/04/05	02/04/05	050204L02			
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Copper	4.49	1.00	1		Selenium	3.77	1.00	1	
Nickel	6.74	1.00	1		Zinc	10.2	5.0	1	
SCRE B-1	05-02-0122-2	01/31/05	Aqueous	02/04/05	02/04/05	050204L02			
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Copper	9.70	1.00	1		Selenium	4.48	1.00	1	
Nickel	6.60	1.00	1		Zinc	23.8	5.0	1	
SCRE B-3	05-02-0122-3	01/31/05	Aqueous	02/04/05	02/04/05	050204L02			
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Copper	3.23	1.00	1		Selenium	5.94	1.00	1	
Nickel	6.24	1.00	1		Zinc	11.0	5.0	1	
SCRE C-1	05-02-0122-4	01/31/05	Aqueous	02/04/05	02/04/05	050204L02			
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Copper	3.11	1.00	1		Selenium	3.77	1.00	1	
Nickel	6.30	1.00	1		Zinc	11.0	5.0	1	
Method Blank	096-06-003-767	N/A	Aqueous	02/04/05	02/04/05	050204L02			
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Copper	ND	1.00	1		Selenium	ND	1.00	1	
Nickel	ND	1.00	1		Zinc	ND	5.00	1	

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

Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, CA 92121

Date Received: 02/02/05
Work Order No: 05-02-0122

Project: SCRE

Page 1 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix
SCRE A-2	05-02-0122-1	01/31/05	Aqueous

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	238	1.0	1		mg/L	N/A	02/03/05	EPA 160.2
Cyanide, Total	ND	0.050	1		mg/L	N/A	02/09/05	EPA 335.2
Carbon, Total Organic	5.9	0.5	1		mg/L	N/A	02/02/05	EPA 415.1
Carbon, Dissolved Organic	6.5	0.5	1	B	mg/L	N/A	02/02/05	EPA 415.1

Client Sample Number	Lab Sample Number	Date Collected	Matrix
SCRE B-1	05-02-0122-2	01/31/05	Aqueous

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	4.0	1.0	1		mg/L	N/A	02/03/05	EPA 160.2
Cyanide, Total	ND	0.050	1		mg/L	N/A	02/09/05	EPA 335.2
Carbon, Total Organic	11	0.50	1		mg/L	N/A	02/02/05	EPA 415.1
Carbon, Dissolved Organic	9.5	0.5	1	B	mg/L	N/A	02/02/05	EPA 415.1

Client Sample Number	Lab Sample Number	Date Collected	Matrix
SCRE B-3	05-02-0122-3	01/31/05	Aqueous

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	462	1.0	1		mg/L	N/A	02/03/05	EPA 160.2
Cyanide, Total	ND	0.050	1		mg/L	N/A	02/09/05	EPA 335.2
Carbon, Total Organic	4.4	0.5	1		mg/L	N/A	02/02/05	EPA 415.1
Carbon, Dissolved Organic	5.7	0.5	1	B	mg/L	N/A	02/02/05	EPA 415.1

Client Sample Number	Lab Sample Number	Date Collected	Matrix
SCRE C-1	05-02-0122-4	01/31/05	Aqueous

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	275	1.0	1		mg/L	N/A	02/03/05	EPA 160.2
Cyanide, Total	ND	0.050	1		mg/L	N/A	02/09/05	EPA 335.2
Carbon, Total Organic	5.0	0.5	1		mg/L	N/A	02/02/05	EPA 415.1
Carbon, Dissolved Organic	5.5	0.5	1	B	mg/L	N/A	02/02/05	EPA 415.1

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

Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/02/05
 Work Order No: 05-02-0122

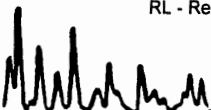
Project: SCRE

Page 2 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix
Method Blank		N/A	Aqueous

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	ND	1.0	1		mg/L	N/A	02/03/05	EPA 160.2
Cyanide, Total	ND	0.050	1		mg/L	N/A	02/09/05	EPA 335.2
Carbon, Total Organic	ND	0.50	1		mg/L	N/A	02/02/05	EPA 415.1
Carbon, Dissolved Organic	0.86	0.50	1		mg/L	N/A	02/02/05	EPA 415.1

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





Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/02/05
 Work Order No: 05-02-0122
 Preparation: EPA 3020A Total
 Method: EPA 6020

Project SCRE

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
05-02-0183-1	Aqueous	ICP/MS A	02/04/05	02/04/05	050204S02

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Copper	91	88	80-120	3	0-20	
Nickel	90	91	80-120	1	0-20	
Selenium	80	78	80-120	3	0-20	3
Zinc	80	78	80-120	2	0-20	3

RPD - Relative Percent Difference . CL - Control Limit



Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received 02/02/05
 Work Order N 05-02-0122
 Preparation: EPA 3020A Total
 Method: EPA 6020

Project: SCRE

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
05-02-0183-1	Aqueous	ICP/MS A	02/04/05	02/04/05	050204S02

Parameter	PDS %REC	PDSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Copper	86	86	75-125	0	0-20	
Nickel	87	88	75-125	1	0-20	
Selenium	74	77	75-125	3	0-20	3
Zinc	89	80	75-125	9	0-20	

RPD - Relative Percent Difference , CL - Control Limit



Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/02/05
 Work Order No: 05-02-0122

Project: SCRE

Matrix: Aqueous

<u>Parameter</u>	<u>Method</u>	<u>Quality Control</u> <u>Sample ID</u>	<u>Date</u> <u>Analyzed</u>	<u>Date</u> <u>Extracted</u>	<u>MS%</u> <u>REC</u>	<u>MSD %</u> <u>REC</u>	<u>%REC</u> <u>CL</u>	<u>RPD</u>	<u>RPD</u> <u>CL</u>	<u>Qualifiers</u>
Carbon, Total Organic	EPA 415.1	SCRE A-2	02/02/05	N/A	108	109	70-130	1	0-25	
Carbon, Dissolved Organic	EPA 415.1	SCRE A-2	02/02/05	N/A	108	100	70-130	5	0-25	

RPD - Relative Percent Difference , CL - Control Limit



Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/02/05
 Work Order No: 05-02-0122

Project: SCRE

Matrix: Aqueous

<u>Parameter</u>	<u>Method</u>	<u>QC Sample ID</u>	<u>Date Analyzed</u>	<u>Sample Conc</u>	<u>DUP Conc</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Solids, Total Suspended	EPA 160.2	05-02-0169-1	02/03/05	6500	6200	4	0-25	

RPD - Relative Percent Difference , CL - Control Limit



Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: N/A
 Work Order No: 05-02-0122
 Preparation: EPA 3020A Total
 Method: EPA 6020

Project: SCRE

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
096-06-003-767	Aqueous	ICP/MS A	02/04/05	02/04/05	050204L02

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Copper	89	90	80-120	2	0-20	
Nickel	87	89	80-120	2	0-20	
Selenium	85	88	80-120	3	0-20	
Zinc	89	88	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:

N/A
 05-02-0122

Project: SCRE

Matrix: Aqueous

<u>Parameter</u>	<u>Method</u>	<u>Quality Control</u> Sample ID	<u>Date</u> <u>Extracted</u>	<u>Date</u> <u>Analyzed</u>	<u>LCS %</u> <u>REC</u>	<u>LCSD %</u> <u>REC</u>	<u>%REC</u> <u>CL</u>	RPD	<u>RPD</u> <u>CL</u>	<u>Qual</u>
Cyanide, Total	EPA 335.2	099-05-061-1,584	N/A	02/09/05	108	100	80-120	9	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience

Environmental

Laboratories, Inc.

Quality Control - Laboratory Control Sample



Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, CA 92121

Date Received:

N/A

Work Order No:

05-02-0122

Project: SCRE

Matrix: Aqueous

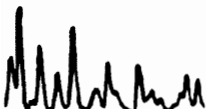
<u>Parameter</u>	<u>Method</u>	<u>Quality Control Sample ID</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Conc. Added</u>	<u>Conc Recovered</u>	<u>LCS %Rec</u>	<u>%Rec CL</u>	<u>Qualifiers</u>
Carbon, Total Organic	EPA 415.1	099-05-097-1,832	02/02/05	N/A	10	11	107	80-120	
Carbon, Dissolved Organic	EPA 415.1	099-05-115-324	02/02/05	N/A	10	11	99	80-120	

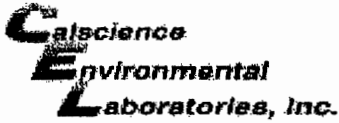
RPD - Relative Percent Difference , CL - Control Limit

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL:(714) 895-5494 • FAX: (714) 894-7501

Work Order Number: 05-02-0122

<u>Qualifier</u>	<u>Definition</u>
*	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.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	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.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

A handwritten signature in black ink, appearing to be 'M. M. M.', is located at the bottom left of the page.



WORK ORDER #:

05 - 02 - 0122

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: Nautilus

DATE: 2/2/5

TEMPERATURE - SAMPLES RECEIVED BY:

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.

LABORATORY (Other than CalScience Courier):

- C Temperature blank.
C IR thermometer.
Ambient temperature.

4.3 C Temperature blank.

Initial: [Signature]

CUSTODY SEAL INTACT:

Sample(s): Cooler: No (Not Intact): Not Applicable (N/A):

Initial: [Signature]

SAMPLE CONDITION:

Table with 3 columns: Yes, No, N/A. Rows include Chain-Of-Custody document(s) received with samples, Sample container label(s) consistent with custody papers, Sample container(s) intact and good condition, Correct containers for analyses requested, Proper preservation noted on sample label(s), VOA vial(s) free of headspace, Tedlar bag(s) free of condensation.

Initial: [Signature]

COMMENTS:

Blank lines for handwritten comments.

APPENDIX E
FIELD COLLECTION DATA

Appendix Table E-1. Field Sample Collection Summary
City of Beunaventura - Santa Clara River Estuary Wet Weather Sampling Event
Sample Collection Date: January 31, 2005

Site	Collection Time ^a	Latitude 34°...	Longitude 119°...	Water Depth (m)
A-1	1405	13.986	15.890	0.30
A-2	1520	13.866	15.855	NR
A-3	1615	13.744	15.805	0.30
B-1	1430	14.093	15.794	0.91
B-2	1145	13.963	15.702	0.30
B-3	1210	13.915	15.651	0.61
B-4	1225	13.881	15.558	0.76
C-1	0845	14.112	15.397	0.46
C-2	NA	NA	NA	NA
C-3	0905	14.010	15.379	NR
D-1	0830	14.122	15.335	0.30

^a Time of start of collection at each site location.

Highlighted sites are those used for toxicity testing.

NR - Not recorded.

NA - Not applicable: No water was present at site C-2.

Appendix Table E-2. Field Water Quality Measurements

City of Buenaventura - Santa Clara River Estuary Wet Weather Sampling Event

Sample Collection Date: January 31, 2005

Sample	Measurement Depth	Temperature (°C)	Salinity (ppt)	Conductivity (umhos/cm)	pH (units)	DO (mg/L)
A-1	Middle	18.7	2.1	3660	8.03	10.3
A-2	Surface	18.1	2.5	4380	8.34	9.5
A-3	Surface	17.1	9.5	NM	8.27	8.9
B-1	Surface	18.3	1.2	2160	7.89	9.3
	Middle	18.3	1.2	2160	7.90	9.4
	Bottom	18.3	1.2	2170	7.92	9.5
B-2	Middle	14.6	0.7	1310	8.33	10.2
B-3	Middle	13.4	0.6	1142	8.44	10.7
B-4	Middle	14.2	2.7	4300	7.46	6.2
C-1	Surface	12.9	0.6	1135	8.75	11.1
C-2	No Water					
C-3	Surface	16.4	1.9	3330	7.92	6.1
D-1	Surface	13.2	0.7	1178	8.45	11.8

Note: Water quality measurements were taken at the surface or in the middle of the water column only at sites with shallow depths.

NM - Not measured.

APPENDIX F
WATER-EFFECT RATIO RESULTS

DATA SUMMARY

Appendix Table F-1. Water-Effect Ratio Summary Results
City of Buenaventura
Santa Clara River Estuary Wet Sampling Event
Test Initiation Date: February 2, 2005
Test Species: *Mytilus galloprovincialis*

Site ID	Nominal Spiked Copper (µg/L) ^a	Measured Total Copper (µg/L)	Mean Percent Normal Development ^b	EC ₅₀ (µg/L total copper) ^{c, d}
A-2	NR	NR	NR	NR
B-1	Lab Control	ND	95 +/- 2	92.5 (86.8-98.0)
	Salt Control	NM	93 +/- 4	
	0 (Unspiked Sample)	9.70	86 +/- 3	
	12	NM	91 +/- 3	
	19	NM	92 +/- 2	
	32	NM	88 +/- 6	
	54	75.8	79 +/- 11	
90	122	7.2 +/- 7		
150	203	0.00 +/- 0.00		
B-3	Lab Control	ND	95 +/- 2	31.6 (28.2-34.8)
	Salt Control	NM	93 +/- 2	
	0 (Unspiked Sample)	3.23	86 +/- 5	
	12	NM	92 +/- 2	
	19	21.5	86 +/- 7	
	32	32.5	42 +/- 23	
	54	56.8	1.8 +/- 2	
90	NM	0.00 +/- 0.00		
150	NM	0.00 +/- 0.00		
C-1	Lab Control	ND	95 +/- 2	31.7 (28.1-34.3)
	Salt Control	NM	95 +/- 2	
	0 (Unspiked Sample)	3.11	83 +/- 5	
	12	NM	95 +/- 4	
	19	21.9	89 +/- 5	
	32	39.8	15 +/- 14	
	54	57.0	0.00 +/- 0.00	
90	NM	0.00 +/- 0.00		
150	NM	0.00 +/- 0.00		
Laboratory Polished Seawater (PSW)	0 (Lab Control)	ND	91 +/- 3	17.9 (17.5-18.2)
	1.8	NM	93 +/- 3	
	3.0	NM	91 +/- 3	
	5.0	NM	94 +/- 3	
	8.4	11.3	91 +/- 4	
	14	17.4	48 +/- 38	
	23	28.2	0.00 +/- 0.00	
39	NM	0.00 +/- 0.00		
Copper Reference Toxicant Test	0 (Lab Control)	NM	95 +/- 2	4.30 (4.12-4.48)
	2.5	NM	89 +/- 5	
	5.0	NM	33 +/- 10	
	10	NM	0.00 +/- 0.00	
	20	NM	0.00 +/- 0.00	
40	NM	0.00 +/- 0.00		

^a Nominal spiked concentrations do not include the background concentrations of copper in the field samples.

^b Values presented for mean percent normal development in unspiked samples are results from the tests initiated on February 1, 2005 for 71% sample, the highest testable concentration with the addition of hypersaline brine. All values are presented +/- 1 standard deviation.

^c EC₅₀ values were calculated based on comparison to the salt control.

Development in the unspiked sample was not included in the analysis. 95% confidence intervals are displayed below each value in parentheses.

^d Measured rather than nominal total copper concentrations were used to generate EC₅₀ values.

NM - Not Measured.

ND - Not Detected.

NR - Not reported, contamination was observed in one or more of the test chambers.

Values in bold indicate a significant decrease in normal development was observed in that test concentration relative to the control.

**STATISTICAL ANALYSIS SUMMARIES
& RAW BENCH DATASHEETS**

CETIS Test Summary

Report Date: 01 Mar-05 2:59 PM

Link: 06-8984-4527/0502-049a

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)		
Test No:	19-5018-1302	Test Type:	Development	Duration:	47h	Species:	Mytilus galloprovincialis	
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Source:	Mission Bay			
Ending Date:	04 Feb-05 02:15 PM	Dil Water:	Scripps Seawater					
Setup Date:	02 Feb-05 03:30 PM	Brine:	Forty Fathoms					
Comments:	EC50 calculations are based on measured copper concentrations.							
Sample No:	18-3718-3930	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 02:30 PM	Code:	0502-049a	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	49h	Station:	WER (B-1)					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
16-3103-0847	Proportion Normal	< 75.8	75.8	N/A	9.67%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
09-2876-6153	Proportion Normal	25	81.18239	74.50291	86.56600	Linear Regression		
		50	92.52814	86.79805	97.97511			
Proportion Normal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Salt Control	5	0.93400	0.90000	0.99000	0.01568	0.03507	3.75%
75.8		5	0.79200	0.69000	0.91000	0.04684	0.10474	13.22%
122		5	0.07200	0.00000	0.18000	0.03277	0.07328	101.78
203		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Proportion Normal Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Salt Control	0.91000	0.99000	0.90000	0.93000	0.94000		
75.8		0.91000	0.90000	0.72000	0.69000	0.74000		
122		0.18000	0.11000	0.00000	0.05000	0.02000		
203		0.00000	0.00000	0.00000	0.00000	0.00000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	06-8984-4527	06-8984-4527	01 Mar-05 2:58 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		<75.8	75.8		N/A	9.67%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	7.09988	5.29221	0.00301	Unequal Variances
Distribution	Shapiro-Wilk W	0.93739	0.86826	0.21220	Normal Distribution

ANOVA Table

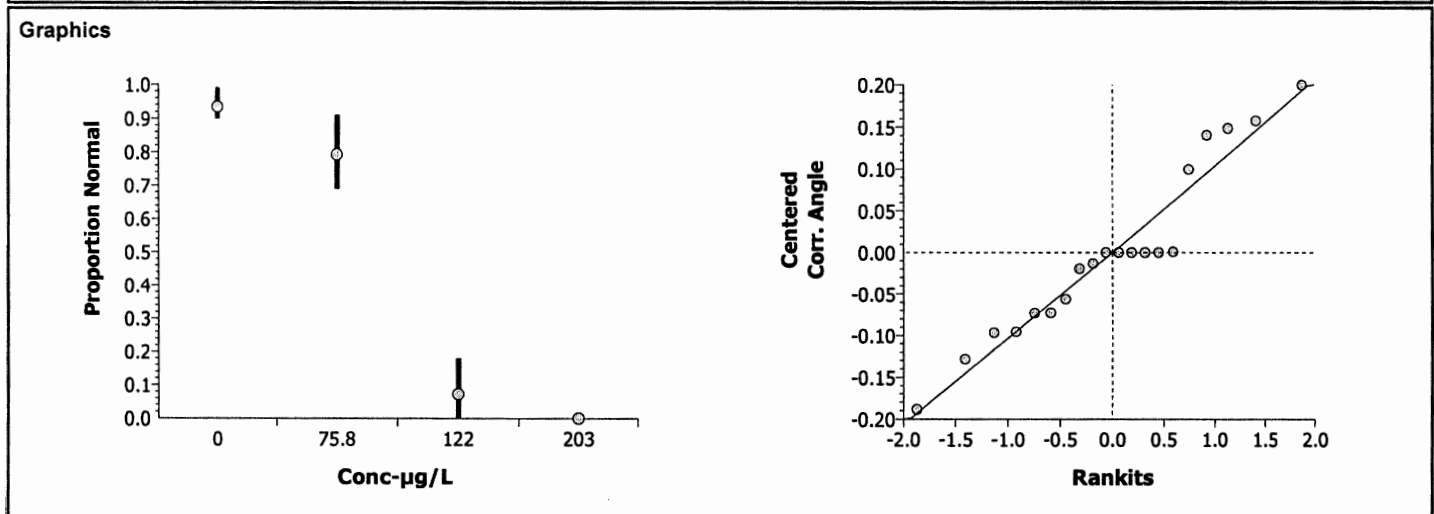
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	5.941202	1.9804	3	157.56	0.00000	Significant Effect
Error	0.201102	0.012569	16			
Total	6.14230365	1.9929693	19			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		75.8	17	17	<= 0.0500	2	Significant Effect
		122	15	17	<= 0.0500	0	Significant Effect
		203	15	17	<= 0.0500	1	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.93400	0.90000	0.99000	0.03507	1.32243	1.24905	1.47063	0.08789
75.8		5	0.79200	0.69000	0.91000	0.10474	1.10887	0.98030	1.26610	0.13730
122		5	0.07200	0.00000	0.18000	0.07328	0.23873	0.05002	0.43815	0.15395
203		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001

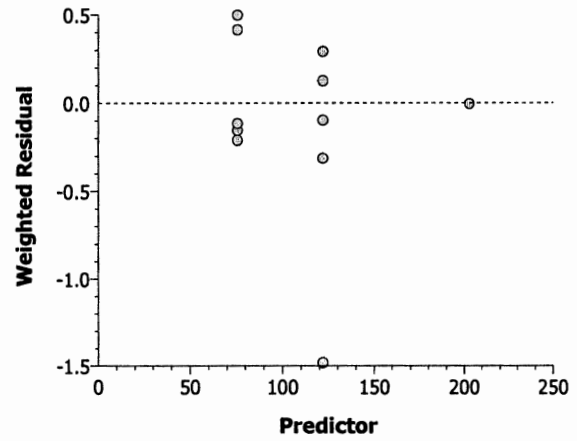
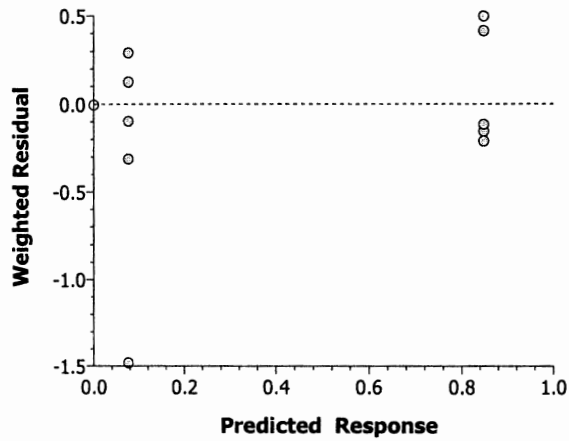
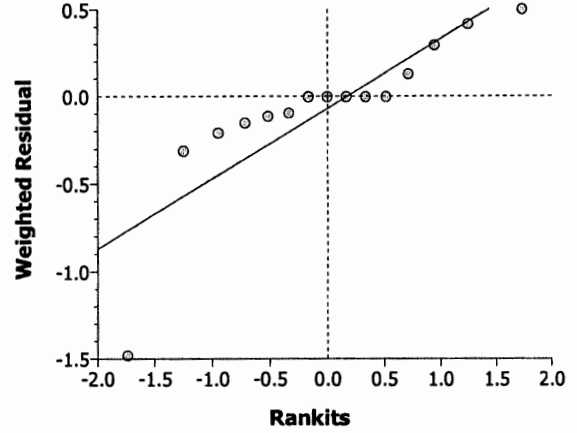
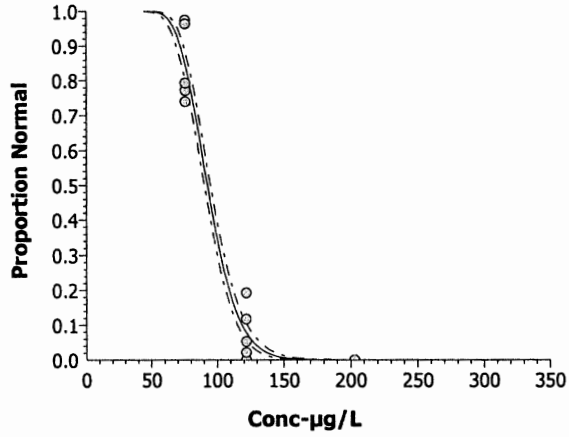


CETIS Analysis Detail

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)		
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Normal	Linear Regression	06-8984-4527	06-8984-4527	01 Mar-05 2:58 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.066	Yes	Yes	No	Yes			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.06602	0.02362	0.01498	0.11706	2.795	0.21876	Not Significant		
Slope	11.87230	1.27658	9.11441	14.63020	9.300	0.06819	Not Significant		
Intercept	-18.34420	2.53079	-23.81165	-12.87675	-7.248	0.08728	Not Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
4	-180.20160	-1.54513	0.08423	0.05396	58.84725	22.36203	0.00000	Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	2.49744	3.58743	0.11391	Equal Variances				
Distribution	Shapiro-Wilk W	0.85458	0.88071	0.01987	Non-normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	81.18239	74.50291	86.56600						
50	92.52814	86.79805	97.97511						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Salt Control	5	0.93400	0.90000	0.99000	0.00716	0.03507	467	500
75.8		5	0.79200	0.69000	0.91000	0.02138	0.10474	396	500
122		5	0.07200	0.00000	0.18000	0.01496	0.07328	36	500
203		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500

CETIS Analysis Detail

Graphics



CETIS Test Summary

Report Date: 28 Feb-05 10:50 AM

Link: 08-9338-0328/0502-049

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)	
Test No:	09-7535-1799	Test Type:	Development	Duration:	47h			
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis			
Ending Date:	04 Feb-05 02:15 PM	Dil Water:	Scripps Seawater	Source:	Mission Bay			
Setup Date:	02 Feb-05 03:30 PM	Brine:	Forty Fathoms					
Comments:	Full-strength sample was spiked with 6 concentrations of copper. EC50 calculations are based on nominal concentrations.							
Sample No:	07-3377-3694	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 02:30 PM	Code:	0502-049	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	49h	Station:	WER (B-1)					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
12-0234-7102	Proportion Normal	54	90	69.714	8.78%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
08-7108-2602	Proportion Normal	25	58.99115	55.06904	62.30937	Linear Regression		
		50	67.61506	64.16940	70.93740			
Proportion Normal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	0.95400	0.93000	0.98000	0.00872	0.01949	2.04%
0	Salt Control	5	0.93400	0.90000	0.99000	0.01568	0.03507	3.75%
12		5	0.91200	0.86000	0.94000	0.01393	0.03114	3.42%
19		5	0.92400	0.91000	0.95000	0.00748	0.01673	1.81%
32		5	0.88400	0.82000	0.97000	0.02619	0.05857	6.63%
54		5	0.79200	0.69000	0.91000	0.04684	0.10474	13.22%
90		5	0.07200	0.00000	0.18000	0.03277	0.07328	101.78
150		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Proportion Normal Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	0.93000	0.96000	0.94000	0.96000	0.98000		
0	Salt Control	0.91000	0.99000	0.90000	0.93000	0.94000		
12		0.91000	0.94000	0.86000	0.92000	0.93000		
19		0.95000	0.93000	0.92000	0.91000	0.91000		
32		0.90000	0.97000	0.89000	0.82000	0.84000		
54		0.91000	0.90000	0.72000	0.69000	0.74000		
90		0.18000	0.11000	0.00000	0.05000	0.02000		
150		0.00000	0.00000	0.00000	0.00000	0.00000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	08-9338-0328	08-9338-0328	25 Feb-05 12:55 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		54	90	1.85	69.714	8.78%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	6.10266	3.52756	0.00035	Unequal Variances
Distribution	Shapiro-Wilk W	0.94466	0.91004	0.10444	Normal Distribution

ANOVA Table

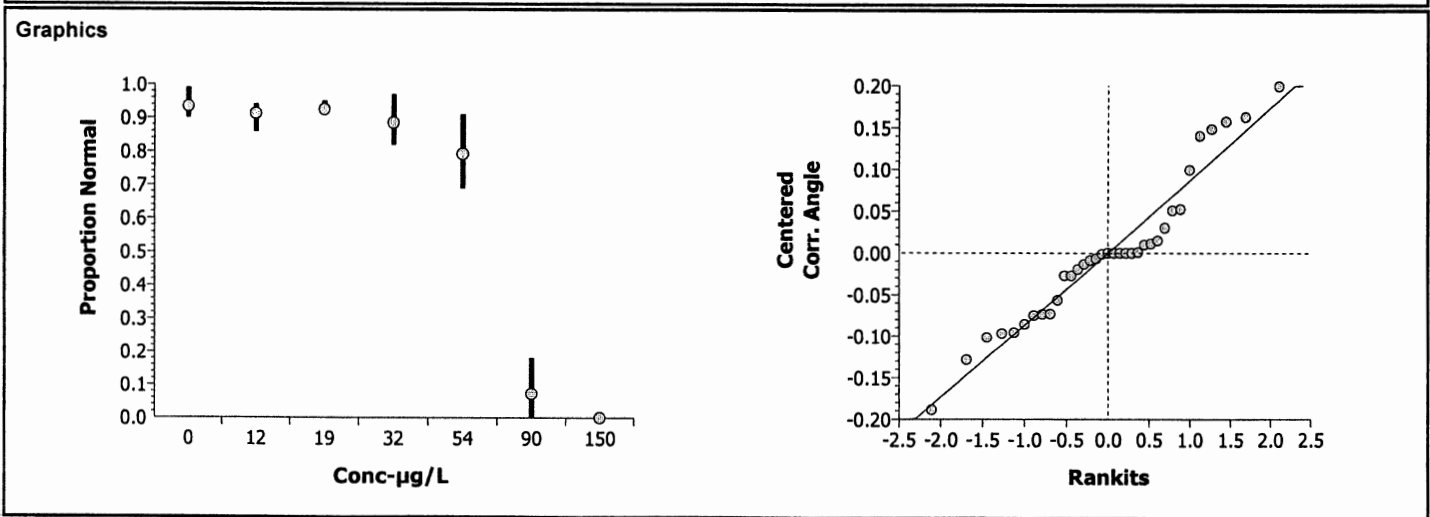
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	8.89929	1.483215	6	160.37	0.00000	Significant Effect
Error	0.2589711	0.009249	28			
Total	9.15826115	1.4924639	34			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		12	24.5	16	> 0.0500	3	Non-Significant Effect
		19	26.5	16	> 0.0500	2	Non-Significant Effect
		32	19.5	16	> 0.0500	1	Non-Significant Effect
		54	17	16	> 0.0500	2	Non-Significant Effect
		90	15	16	<= 0.0500	0	Significant Effect
		150	15	16	<= 0.0500	1	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.93400	0.90000	0.99000	0.03507	1.32243	1.24905	1.47063	0.08789
12		5	0.91200	0.86000	0.94000	0.03114	1.27276	1.18730	1.32333	0.05232
19		5	0.92400	0.91000	0.95000	0.01673	1.29291	1.26610	1.34528	0.03302
32		5	0.88400	0.82000	0.97000	0.05857	1.23408	1.13265	1.39671	0.10315
54		5	0.79200	0.69000	0.91000	0.10474	1.10887	0.98030	1.26610	0.13730
90		5	0.07200	0.00000	0.18000	0.07328	0.23873	0.05002	0.43815	0.15395
150		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001

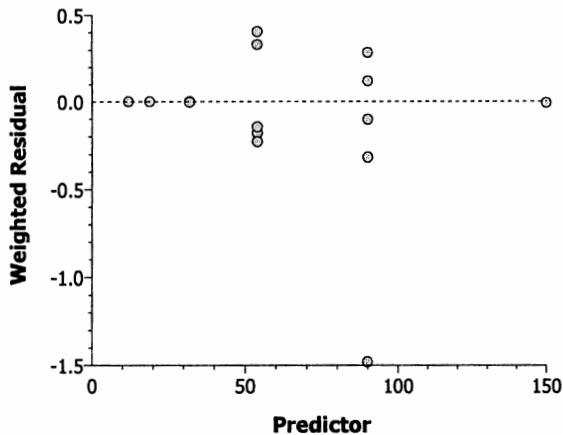
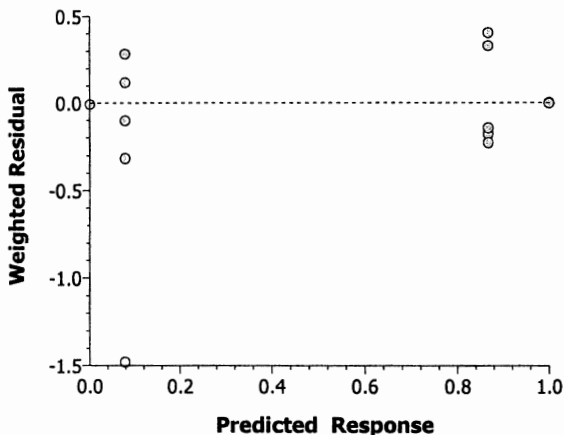
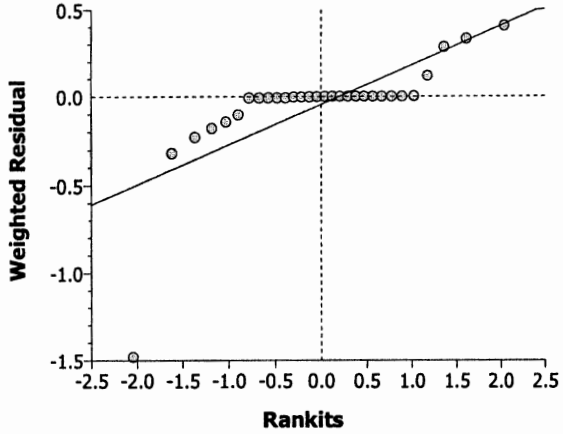
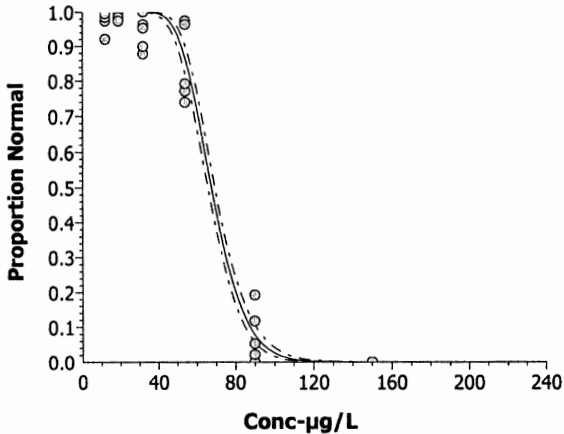


CETIS Analysis Detail

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)			
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Normal	Linear Regression	08-9338-0328	08-9338-0328	25 Feb-05 12:55 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.066	Yes	Yes	No	Yes			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.08645	0.01125	0.06341	0.10950	7.684	0.00154	Significant		
Slope	11.38252	1.03146	9.26967	13.49537	11.035	0.00038	Significant		
Intercept	-15.83051	1.91328	-19.74969	-11.91133	-8.274	0.00116	Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
8	-202.66560	-1.39077	0.08785	0.03446	89.59099	41.33714	0.00000	Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	3.90717	2.52766	0.00777	Unequal Variances				
Distribution	Shapiro-Wilk W	0.66266	0.92671	0.00000	Non-normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	58.99115	55.06904	62.30937						
50	67.61506	64.16940	70.93740						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Salt Control	5	0.93400	0.90000	0.99000	0.00716	0.03507	467	500
12		5	0.91200	0.86000	0.94000	0.00636	0.03114	456	500
19		5	0.92400	0.91000	0.95000	0.00342	0.01673	462	500
32		5	0.88400	0.82000	0.97000	0.01195	0.05857	442	500
54		5	0.79200	0.69000	0.91000	0.02138	0.10474	396	500
90		5	0.07200	0.00000	0.18000	0.01496	0.07328	36	500
150		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500

CETIS Analysis Detail

Graphics



CETIS Data Worksheet

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)
Start Date:	02 Feb-05	Species:	Mytilus galloprovincialis	Sample Code:	0502-049	
Ending Date:	04 Feb-05	Protocol:	ASTM E724-98 (1999)	Sample Source:	City of Buenaventura	
Sample Date:	31 Jan-05 02:30 PM	Material:	Estuarine Monitoring Sample	Sample Station:	WER (B-1)	
Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
			41	100	11	MC
			42	100	0	AH
			43	100	0	MC
			44	100	0	JR AH 100/93
			45	100	95	MC
			46	100	0	AH
			47	100	0	MC AH 100/96
			48	AH 100	93	AH
			49	100	86	AH
			50	100	93	MC
			51	100	93	AH
			52	100	94	AH
			53	100	0	MC
			54	100	97	MC
5C			55	100	91	JR
			56	100	0	AH 100/96
			57	100	92	↓
			58	100	0	100/94
			59	100	91	↓
			60	100	90	MC
12			61	100	94	JR
			62	100	0	AH
			63	100	5	AH
			64	100	69	↓
			65	↓	0	↓
			66	100	0	100/98
			67	↓	92	↓
			68	100	18	MC
			69	100	82	AH
			70	↓	72	↓
			71	↓	2	↓
			72	↓	91	↓
			73	↓	84	↓
			74	↓	90	↓
5C			75	100	99	JR
			76	100	90	MC
			77	100	74	AH
12			78	100	91	JR
			79	100	91	MC
			80	100	89	AH

Share LC w/reflex; possible LC cup contamination.

CETIS Data Worksheet

Report Date: 01 Feb-05 4:07 PM

Link: 08-9338-0328/0502-049

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 02 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502-049
 Ending Date: 04 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 02:30 PM Material: Estuarine Monitoring Sample Sample Station: WER (B-1)

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
Share Control w/ref tox	LC	1	44	100	0	MC
	LC	2	47	100	0	MC
	LC	3	58			
	LC	4	56			
	LC	5	68			
	SC	1	55	100	91	JR MC
	SC	2	75	100	97	MC 99 JR
	SC	3	74			
	SC	4	48			
	SC	5	52			
12		1	78	100	89	MC 91 JR
12		2	61	83	75	MC 100/94 JR
12		3	49			
12		4	57			
12		5	51			
19		1	45	100	95	MC
19		2	50	100	93	MC
19		3	67			
19		4	72			
19		5	59			
32		1	76	100	90	MC
32		2	54	100	97	MC
32		3	80			
32		4	69			
32		5	73			
54		1	79	100	91	MC
54		2	60	100	90	MC
54		3	70			
54		4	64			
54		5	77			
90		1	68	100	18	MC
90		2	41	100	11	MC
90		3	42			
90		4	63			
90		5	71			
150		1	53	100	0	MC
150		2	43	100	0	MC
150		3	62			
150		4	46			
150		5	65			

QC: MC
 Share Lab control w/ref tox

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buena Vista
 Sample ID: WER - Site B-1
 Test No.: 0562-049

Test Species: H. galliprovencialis
 Start Date/Time: 2/2/05 1530
 End Date/Time: 2-4-05 1415

Concentration %	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
LL	29.6	29.2	29.2	14.2	14.7	15.1	7.8	7.9	8.4	8.01	7.93	7.95
SC	29.1	29.0	29.3	14.2	14.5	15.1	7.5	8.1	8.4	7.97	8.01	8.07
12	29.7	29.1	29.1	14.2	14.9	14.8	7.8	8.1	8.4	8.35	8.36	8.34
19	29.8	29.2	29.2		15.0	14.9	8.0	8.0	8.4	8.35	8.36	8.34
32	29.8	29.2	29.3		14.8	14.9	8.0	8.0	8.3	8.35	8.34	8.34
54	29.8	29.1	29.3		14.7	14.9	8.0	8.1	8.4	8.35	8.34	8.33
96	29.6	28.9	29.1		14.9	14.9	8.0	8.1	8.3	8.36	8.36	8.34
150	29.5	28.9	29.1		14.9	15.0	8.0	7.9	8.2	8.36	9.36	8.34

Technician Initials:

0	24	48
SD	RG	SH

Animal Source/Date Received: Mission Bay Field collected 1/28/05

Comments: 0 hrs: _____
 24 hrs: _____
 48 hrs: _____

QC Check: AH 2/10/05 Final Review: [Signature] 2/28/05

CETIS Test Summary

Report Date: 01 Mar-05 3:02 PM
 Link: 10-9751-9495/0502-050a

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)			
Test No:	09-7535-1799	Test Type:	Development	Duration:	47h	Species:	Mytilus galloprovincialis	Source:	Mission Bay
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Dil Water:	Scripps Seawater	Brine:	Forty Fathoms		
Ending Date:	04 Feb-05 02:15 PM								
Setup Date:	02 Feb-05 03:30 PM								
Sample No:	09-7409-8095	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura	Project:			
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-050a						
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura						
Sample Age:	51h	Station:	WER (B-3)						
Comments:	EC50 calculations are based on measured copper concentrations.								
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
12-2171-4325	Proportion Normal	21.5	32.5	26.434	13.87%	Steel's Many-One Rank			
Point Estimate Summary									
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method			
08-4360-2680	Proportion Normal	25	26.21885	21.98126	29.18851	Linear Regression			
		50	31.59857	28.21879	34.81617				
Proportion Normal Summary									
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Salt Control	5	0.93000	0.91000	0.95000	0.00837	0.01871	2.01%	
21.5		5	0.86200	0.75000	0.95000	0.03216	0.07190	8.34%	
32.5		5	0.42000	0.17000	0.69000	0.10218	0.22847	54.40%	
56.8		5	0.01800	0.00000	0.05000	0.00970	0.02168	120.44	
Proportion Normal Detail									
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Salt Control	0.91000	0.94000	0.94000	0.91000	0.95000			
21.5		0.95000	0.87000	0.75000	0.86000	0.88000			
32.5		0.21000	0.17000	0.69000	0.44000	0.59000			
56.8		0.00000	0.00000	0.05000	0.03000	0.01000			

CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	10-9751-9495	10-9751-9495	01 Mar-05 3:02 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		21.5	32.5	4.65	26.434	13.87%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	11.87453	11.34487	0.00783	Unequal Variances
Distribution	Shapiro-Wilk W	0.96369	0.86826	0.59840	Normal Distribution

ANOVA Table

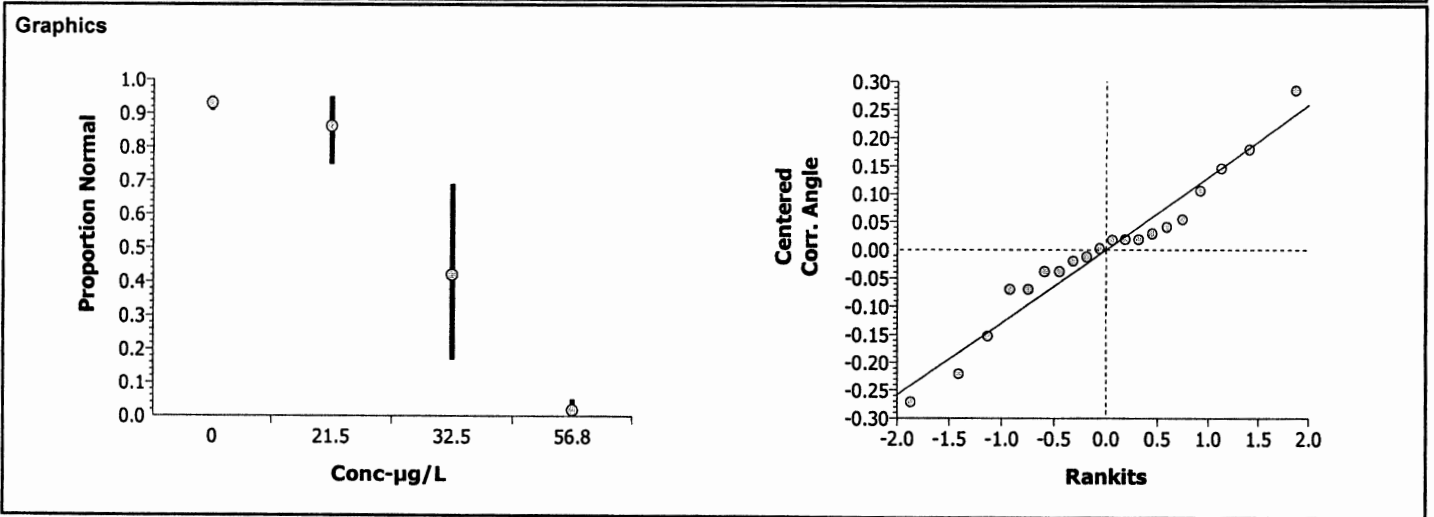
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	4.420801	1.4736	3	75.97	0.00000	Significant Effect
Error	0.3103492	0.019397	16			
Total	4.73114991	1.4929971	19			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		21.5	19.5	17	> 0.0500	3	Non-Significant Effect
		32.5	15	17	<= 0.0500	2	Significant Effect
		56.8	15	17	<= 0.0500	3	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.93000	0.91000	0.95000	0.01871	1.30483	1.26610	1.34528	0.03647
21.5		5	0.86200	0.75000	0.95000	0.07190	1.19975	1.04720	1.34528	0.10596
32.5		5	0.42000	0.17000	0.69000	0.22847	0.69649	0.42499	0.98030	0.24283
56.8		5	0.01800	0.00000	0.05000	0.02168	0.11996	0.05002	0.22551	0.07785

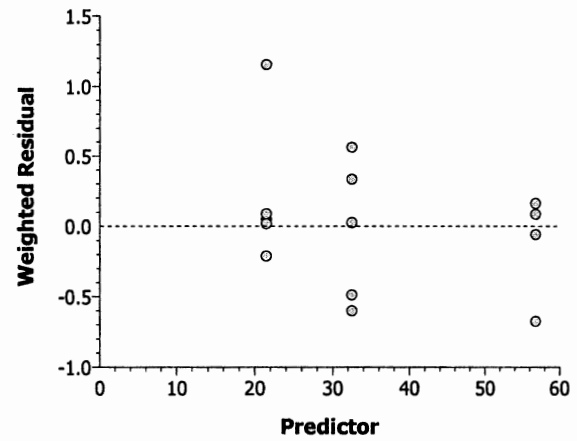
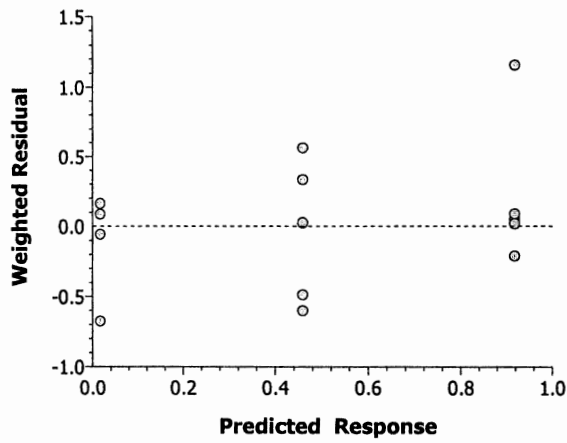
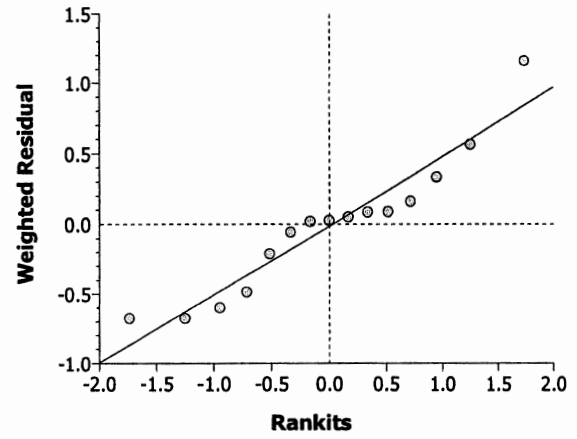
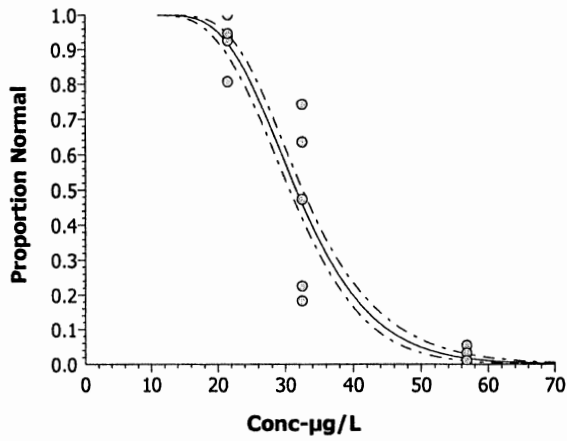


CETIS Analysis Detail

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)		
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Normal	Linear Regression	10-9751-9495	10-9751-9495	01 Mar-05 3:02 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.07	Yes	Yes	No	Yes			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.06787	0.03212	-0.00152	0.13726	2.113	0.28140	Not Significant		
Slope	8.32149	1.35639	5.39118	11.25181	6.135	0.10286	Not Significant		
Intercept	-7.47947	2.04900	-11.90606	-3.05289	-3.650	0.17023	Not Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
4	-271.52530	-0.89881	0.12017	0.12400	114.49950	22.36203	0.00000	Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	1.63931	3.58743	0.23693	Equal Variances				
Distribution	Shapiro-Wilk W	0.92839	0.88071	0.25802	Normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	26.21885	21.98126	29.18851						
50	31.59857	28.21879	34.81617						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Salt Control	5	0.93000	0.91000	0.95000	0.00382	0.01871	465	500
21.5		5	0.86200	0.75000	0.95000	0.01468	0.07190	431	500
32.5		5	0.42000	0.17000	0.69000	0.04664	0.22847	210	500
56.8		5	0.01800	0.00000	0.05000	0.00443	0.02168	9	500

CETIS Analysis Detail

Graphics



CETIS Test Summary

Report Date: 28 Feb-05 10:52 AM

Link: 09-6988-7052/0502-050

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)	
Test No:	09-7535-1799	Test Type:	Development	Duration:	47h			
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis			
Ending Date:	04 Feb-05 02:15 PM	Dil Water:	Scripps Seawater	Source:	Mission Bay			
Setup Date:	02 Feb-05 03:30 PM	Brine:	Forty Fathoms					
Comments:	Full-strength sample was spiked with 6 concentrations of copper. EC50 calculations are based on nominal concentrations.							
Sample No:	06-3827-9277	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 12:10 PM	Code:	0502-050	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	51h	Station:	WER (B-3)					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
02-0943-4098	Proportion Normal	19	32	24.658	10.92%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
01-4656-7974	Proportion Normal	25	25.29449	22.38222	27.47275	Linear Regression		
		50	30.58405	28.28372	32.63980			
Proportion Normal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	0.95400	0.93000	0.98000	0.00872	0.01949	2.04%
0	Salt Control	5	0.93000	0.91000	0.95000	0.00837	0.01871	2.01%
12		5	0.92400	0.90000	0.94000	0.00678	0.01517	1.64%
19		5	0.86200	0.75000	0.95000	0.03216	0.07190	8.34%
32		5	0.42000	0.17000	0.69000	0.10218	0.22847	54.40%
54		5	0.01764	0.00000	0.05085	0.00966	0.02160	122.49
90		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
150		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Proportion Normal Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	0.96000	0.93000	0.98000	0.96000	0.94000		
0	Salt Control	0.91000	0.94000	0.94000	0.91000	0.95000		
12		0.90000	0.93000	0.94000	0.92000	0.93000		
19		0.95000	0.87000	0.75000	0.86000	0.88000		
32		0.21000	0.17000	0.69000	0.44000	0.59000		
54		0.00000	0.00000	0.05085	0.02703	0.01031		
90		0.00000	0.00000	0.00000	0.00000	0.00000		
150		0.00000	0.00000	0.00000	0.00000	0.00000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test					Nautilus Environmental (CA)	
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	09-6988-7052	09-6988-7052	25 Feb-05 12:49 PM	CETISv1.025

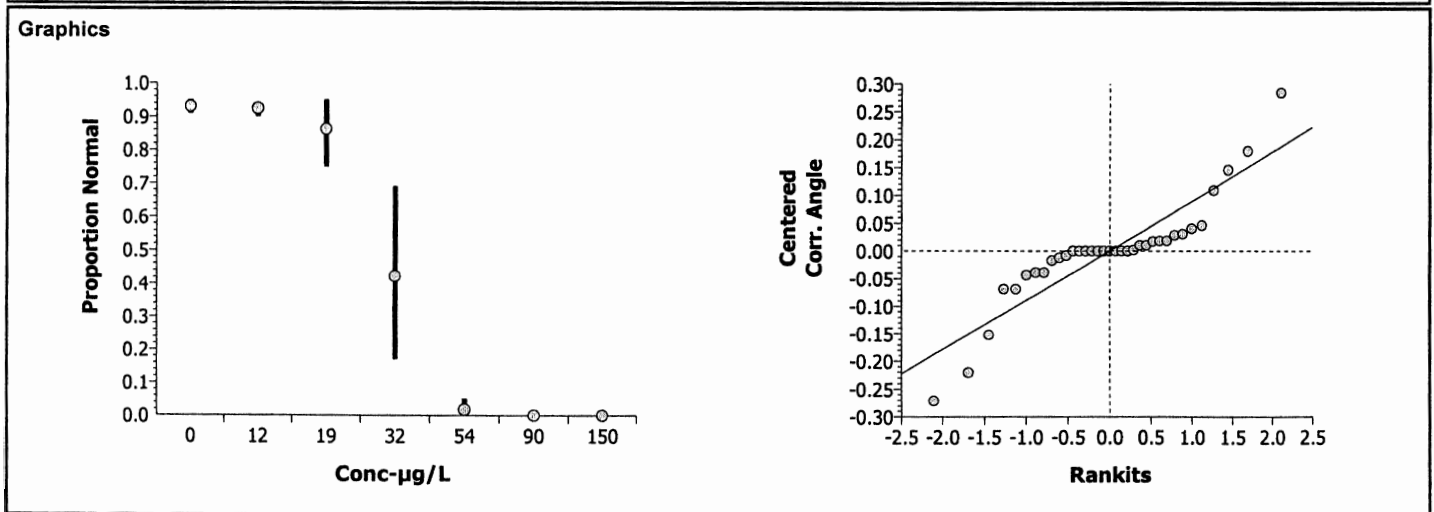
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		19	32	5.26	24.658	10.92%

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	23.55158	3.52756	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.85363	0.91004	0.00026	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	10.72136	1.786893	6	159.88	0.00000	Significant Effect
Error	0.3129421	0.011177	28			
Total	11.0342984	1.7980693	34			

Group Comparisons							
Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		12	24	16	> 0.0500	3	Non-Significant Effect
		19	19.5	16	> 0.0500	3	Non-Significant Effect
		32	15	16	<= 0.0500	2	Significant Effect
		54	15	16	<= 0.0500	3	Significant Effect
		90	15	16	<= 0.0500	3	Significant Effect
		150	15	16	<= 0.0500	3	Significant Effect

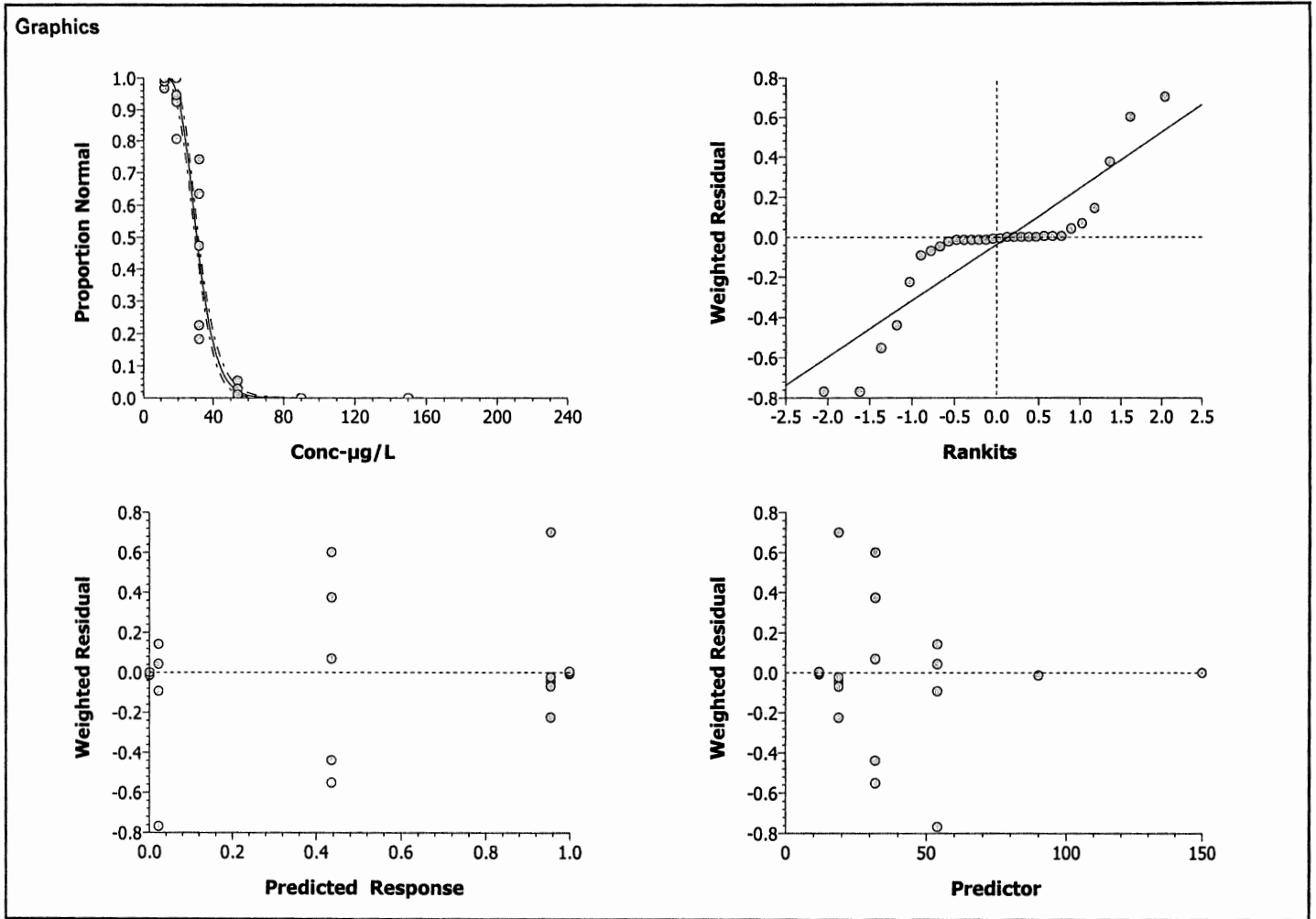
Data Summary			Original Data				Transformed Data			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.93000	0.91000	0.95000	0.01871	1.30483	1.26610	1.34528	0.03647
12		5	0.92400	0.90000	0.94000	0.01517	1.29250	1.24905	1.32333	0.02798
19		5	0.86200	0.75000	0.95000	0.07190	1.19975	1.04720	1.34528	0.10596
32		5	0.42000	0.17000	0.69000	0.22847	0.69649	0.42499	0.98030	0.24283
54		5	0.01764	0.00000	0.05085	0.02160	0.11887	0.05002	0.22745	0.07698
90		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
150		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001



CETIS Analysis Detail

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)		
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Normal	Linear Regression	09-6988-7052	09-6988-7052	25 Feb-05 12:50 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.07	Yes	Yes	No	Yes			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.07703	0.01660	0.04303	0.11103	4.641	0.00973	Significant		
Slope	8.17870	1.02103	6.08722	10.27017	8.010	0.00132	Significant		
Intercept	-7.14941	1.55062	-10.32571	-3.97311	-4.611	0.00995	Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
8	-256.31420	-0.87415	0.12227	0.06539	116.47060	41.33714	0.00000	Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	7.07591	2.52766	0.00023	Unequal Variances				
Distribution	Shapiro-Wilk W	0.88521	0.92671	0.00425	Non-normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	25.29449	22.38222	27.47275						
50	30.58405	28.28372	32.63980						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Salt Control	5	0.93000	0.91000	0.95000	0.00382	0.01871	465	500
12		5	0.92400	0.90000	0.94000	0.00310	0.01517	462	500
19		5	0.86200	0.75000	0.95000	0.01468	0.07190	422	488
32		5	0.42000	0.17000	0.69000	0.04664	0.22847	210	500
54		5	0.01764	0.00000	0.05085	0.00441	0.02160	6	430
90		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500
150		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500

CETIS Analysis Detail



CETIS Data Worksheet

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Start Date: 02 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502-050
 Ending Date: 04 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 12:10 PM Material: Estuarine Monitoring Sample Sample Station: WER (B-3)

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	LC	1	95	100	0	MC AH 100/96
0	LC	2	87	100	0	SD 100/93
0	LC	3	109	100	0	SD 100/98
0	LC	4	90	100	0	SD 100/96
0	LC	5	104	100	0	SD 100/94
0	SC	1	115	91	91	MC
0	SC	2	86	94	94	MC
0	SC	3	119	94	94	SD
0	SC	4	114	91	91	SD
0	SC	5	89	95	95	SD
12		1	83	90	90	MC
12		2	97	93	93	MC
12		3	112	94	94	SD
12		4	106	92	92	SD
12		5	99	93	93	SD
19		1	94	95	95	MC
19		2	101	87	87	MC
19		3	118	86	86	SD
19		4	111	86	86	SD
19		5	105	88	88	SD
32		1	113	21	21	MC
32		2	100	17	17	MC
32		3	92	69	69	SD
32		4	91	44	44	SD
32		5	102	59	59	SD
54		1	93	0	0	MC
54		2	116	0	0	MC
54		3	84	3	3	SD
54		4	117	74	74	SD
54		5	85	1	1	SD
90		1	82	0	0	MC - cells lysed
90		2	96	0	0	MC - cells lysed
90		3	88	0	0	SD ↓
90		4	108	0	0	SD ↓
90		5	81	0	0	SD cells lysed
150		1	98	0	0	MC - cells lysed
150		2	110	0	0	MC cells lysed
150		3	103	0	0	SD ↓
150		4	120	0	0	↓ ↓
150		5	107	0	0	↓ ↓

MC:MC
 Share Lab control w/ ref tox, possible MC cup contamination

CETIS Data Worksheet

Report Date: 01 Feb-05 4:10 PM

Link: 09-6988-7052/0502-050

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 02 Feb-05	Species: Mytilus galloprovincialis	Sample Code: 0502-050
Ending Date: 04 Feb-05	Protocol: ASTM E724-98 (1999)	Sample Source: City of Buenaventura
Sample Date: 31 Jan-05 12:10 PM	Material: Estuarine Monitoring Sample	Sample Station: WER (B-3)

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
			81	100	0	
			82		0	
			83			
			84			
			85			
			86			
			87			
			88			
			89			
			90			
			91			
			92			
			93			
			94			
			95			
			96			
			97			
			98			
			99			
			100			
			101			
			102			
			103			
			104			
			105			
			106			
			107			
			108			
			109			
			110			
			111			
			112			
			113			
			114			
			115			
			116			
			117			
			118			
			119			
			120			

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura
 Sample ID: WER - Site B-3
 Test No.: 0502-050

Test Species: M. galloprovincialis
 Start Date/Time: 2/2/05 1530
 End Date/Time: 2-4-05 1415

Concentration <u>1.</u>	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
LC	29.6	29.2	29.2	14.2	14.7	15.1	7.8	7.9	8.4	8.01	7.93	7.95
SC	29.1	29.0	29.3	14.2	14.5	15.1	7.5	8.1	8.4	7.97	8.02	8.07
12	30.2	29.5	29.6	14.2	14.6	14.9	7.8	7.9	8.5	8.44	8.39	8.38
19	30.2	29.5	29.6		14.7	14.9	8.0	7.9	8.4	8.41	8.41	8.35
32	29.9	29.6	29.5		14.7	14.9	8.0	7.9	8.4	8.41	8.42	8.37
54	30.0	29.6	29.5		14.7	15.0	8.0	8.0	8.3	8.43	8.41	8.39
90	29.9	29.5	29.4		14.7	15.0	8.1	8.1	8.3	8.43	8.41	8.40
150	29.8	29.5	29.2		14.7	15.1	8.1	8.0	8.3	8.43	8.41	8.41

Technician Initials:

0	24	48
SD	RU	SH

Animal Source/Date Received: Mission Bay Field collected 1/28/05

Comments: 0 hrs: _____
 24 hrs: _____
 48 hrs: _____

QC Check: AH 2/10/05 Final Review: JR 2/28/05

CETIS Test Summary

Report Date: 01 Mar-05 3:01 PM

Link: 07-2205-2712/0502-051a

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)	
Test No:	09-7535-1799	Test Type:	Development	Duration:	47h			
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis			
Ending Date:	04 Feb-05 02:15 PM	Dil Water:	Scripps Seawater	Source:	Mission Bay			
Setup Date:	02 Feb-05 03:30 PM	Brine:	Forty Fathoms					
Sample No:	06-1625-0359	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 08:45 AM	Code:	0502-051a	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	55h	Station:	WER (C-1)					
Comments:	EC50 calculations are based on measured copper concentrations.							
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
09-9790-1107	Proportion Normal	21.9	39.8	29.523	8.20%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
07-0209-6211	Proportion Normal	25	27.24657	22.87085	30.21243	Linear Regression		
		50	31.66179	28.07135	34.33063			
Proportion Normal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Salt Control	5	0.94800	0.93000	0.97000	0.00663	0.01483	1.56%
21.9		5	0.89200	0.84000	0.96000	0.02223	0.04970	5.57%
39.8		5	0.15400	0.05000	0.39000	0.06120	0.13686	88.87%
57		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Proportion Normal Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Salt Control	0.93000	0.97000	0.94000	0.95000	0.95000		
21.9		0.85000	0.92000	0.96000	0.84000	0.89000		
39.8		0.07000	0.12000	0.05000	0.39000	0.14000		
57		0.00000	0.00000	0.00000	0.00000	0.00000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	07-2205-2712	07-2205-2712	01 Mar-05 3:00 PM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		21.9	39.8	4.57	29.523	8.20%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	5.80379	5.29221	0.00699	Unequal Variances
Distribution	Shapiro-Wilk W	0.82718	0.86826	0.00166	Non-normal Distribution

ANOVA Table

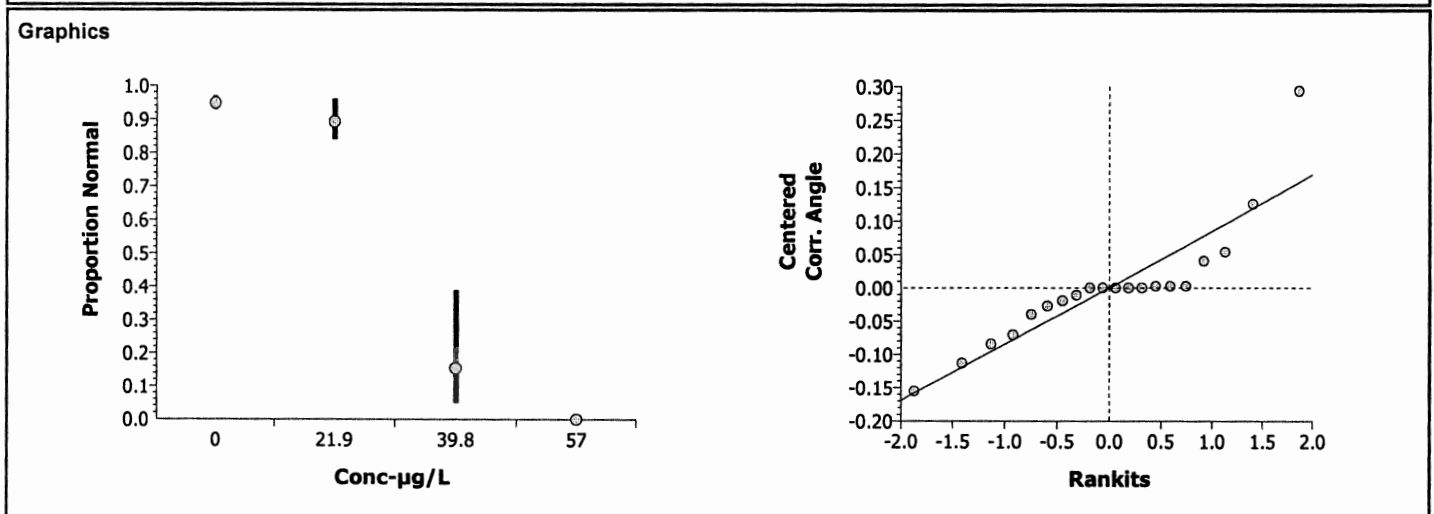
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	6.10569	2.03523	3	205.54	0.00000	Significant Effect
Error	0.1584337	0.009902	16			
Total	6.26412366	2.0451320	19			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		21.9	19	17	> 0.0500	1	Non-Significant Effect
		39.8	15	17	<= 0.0500	1	Significant Effect
		57	15	17	<= 0.0500	2	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.94800	0.93000	0.97000	0.01483	1.34273	1.30303	1.39671	0.03493
21.9		5	0.89200	0.84000	0.96000	0.04970	1.24372	1.15928	1.36944	0.08612
39.8		5	0.15400	0.05000	0.39000	0.13686	0.38100	0.22551	0.67449	0.17599
57		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001



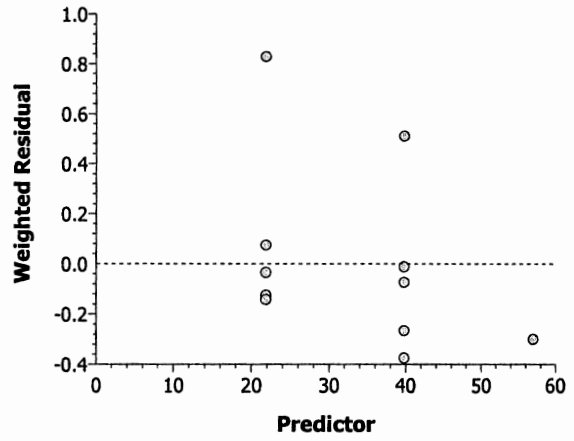
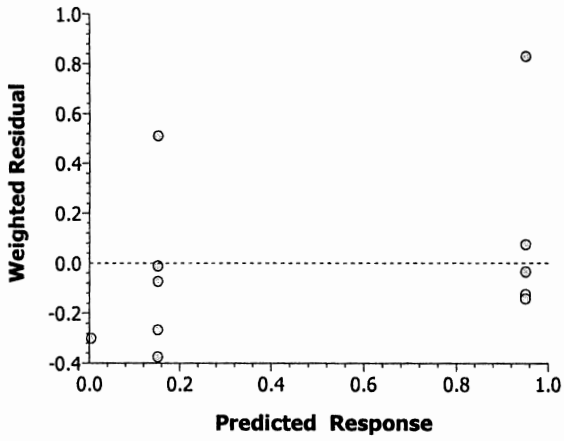
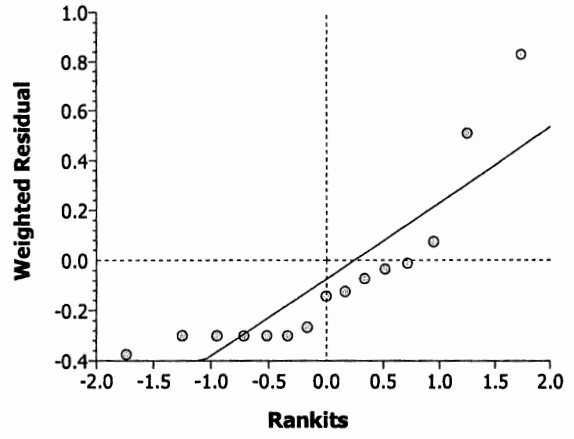
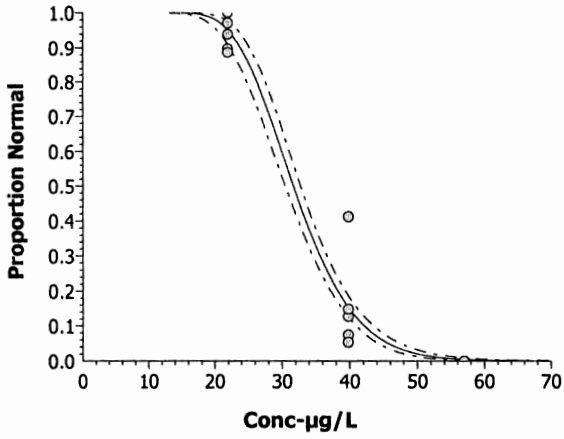
CETIS Analysis Detail

Linear Regression: Page 1 of 2
 Report Date: 01 Mar-05 3:01 PM
 Analysis: 07-0209-6211/0502-051a

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)			
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Normal	Linear Regression	07-2205-2712	07-2205-2712	01 Mar-05 3:00 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.052	Yes	Yes	No	Yes			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.05516	0.02402	0.00326	0.10706	2.296	0.26148	Not Significant		
Slope	10.34118	1.49166	7.11865	13.56372	6.933	0.09120	Not Significant		
Intercept	-10.51731	2.33403	-15.55968	-5.47495	-4.506	0.13903	Not Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
6	-155.51810	-1.01703	0.09670	0.09711	74.59520	22.36203	0.00000	Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	1.95800	3.58743	0.17886	Equal Variances				
Distribution	Shapiro-Wilk W	0.78988	0.88071	0.00196	Non-normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	27.24657	22.87085	30.21243						
50	31.66179	28.07135	34.33063						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Salt Control	5	0.94800	0.93000	0.97000	0.00303	0.01483	474	500
21.9		5	0.89200	0.84000	0.96000	0.01014	0.04970	446	500
39.8		5	0.15400	0.05000	0.39000	0.02794	0.13686	77	500
57		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500

CETIS Analysis Detail

Graphics



CETIS Test Summary

Report Date: 28 Feb-05 10:52 AM

Link: 15-2703-7396/0502-051

Bivalve Larval Survival and Development Test							Nautilus Environmental (CA)	
Test No:	09-7535-1799	Test Type:	Development	Duration:	47h			
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Species:	Mytilus galloprovincialis			
Ending Date:	04 Feb-05 02:15 PM	Dil Water:	Scripps Seawater	Source:	Mission Bay			
Setup Date:	02 Feb-05 03:30 PM	Brine:	Forty Fathoms					
Comments:	Full-strength sample was spiked with 6 concentrations of copper. EC50 calculations are based on nominal concentrations.							
Sample No:	03-1067-9554	Material:	Estuarine Monitoring Sample	Client:	City of Buenaventura			
Sample Date:	31 Jan-05 08:45 AM	Code:	0502-051	Project:				
Receive Date:	31 Jan-05 10:10 PM	Source:	City of Buenaventura					
Sample Age:	55h	Station:	WER (C-1)					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
02-8271-3405	Proportion Normal	19	32	24.658	7.30%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
08-3143-8751	Proportion Normal	25	22.82769	21.05909	24.21026	Linear Regression		
		50	26.18271	24.75949	27.42503			
Proportion Normal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	0.95400	0.93000	0.98000	0.00872	0.01949	2.04%
0	Salt Control	5	0.94800	0.93000	0.97000	0.00663	0.01483	1.56%
12		5	0.94600	0.90000	0.99000	0.01806	0.04037	4.27%
19		5	0.89200	0.84000	0.96000	0.02223	0.04970	5.57%
32		5	0.15400	0.05000	0.39000	0.06120	0.13686	88.87%
54		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
90		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
150		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Proportion Normal Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	0.93000	0.96000	0.94000	0.96000	0.98000		
0	Salt Control	0.93000	0.97000	0.94000	0.95000	0.95000		
12		0.99000	0.98000	0.91000	0.90000	0.95000		
19		0.85000	0.92000	0.96000	0.84000	0.89000		
32		0.07000	0.12000	0.05000	0.39000	0.14000		
54		0.00000	0.00000	0.00000	0.00000	0.00000		
90		0.00000	0.00000	0.00000	0.00000	0.00000		
150		0.00000	0.00000	0.00000	0.00000	0.00000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	15-2703-7396	15-2703-7396	25 Feb-05 1:02 PM	CETISv1.025

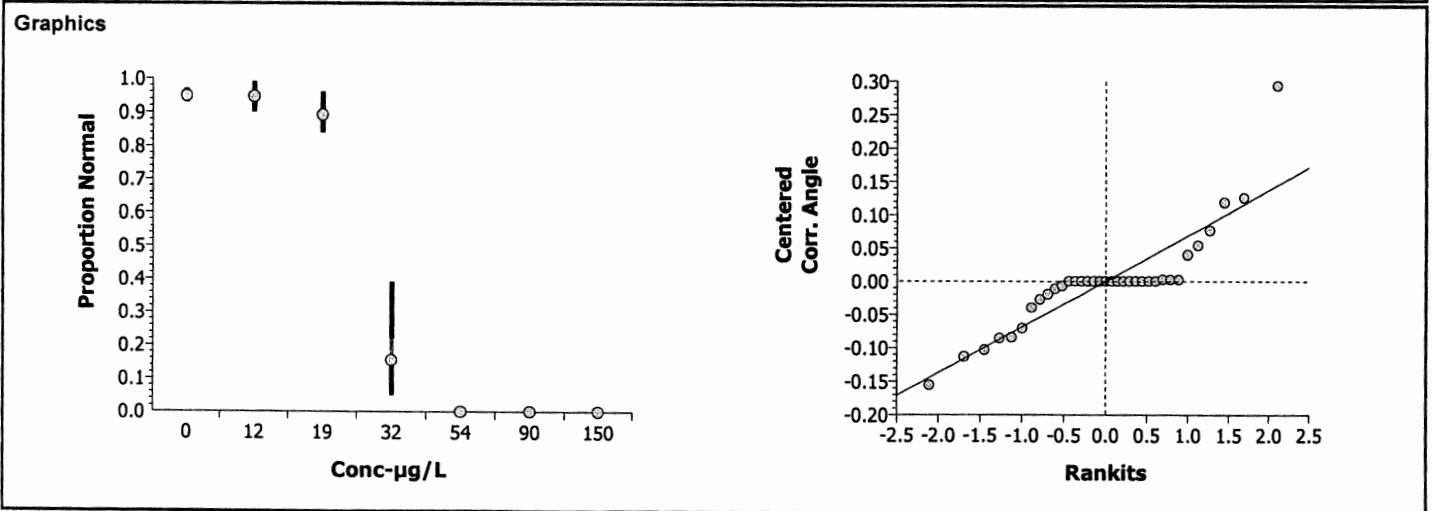
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		19	32	5.26	24.658	7.30%

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	7.68017	3.52756	0.00006	Unequal Variances
Distribution	Shapiro-Wilk W	0.81083	0.91004	0.00002	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	12.38262	2.063771	6	294.16	0.00000	Significant Effect
Error	0.1964428	0.007016	28			
Total	12.5790675	2.0707866	34			

Group Comparisons							
Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Salt Control		12	28	16	> 0.0500	1	Non-Significant Effect
		19	19	16	> 0.0500	1	Non-Significant Effect
		32	15	16	<= 0.0500	1	Significant Effect
		54	15	16	<= 0.0500	2	Significant Effect
		90	15	16	<= 0.0500	2	Significant Effect
		150	15	16	<= 0.0500	2	Significant Effect

Data Summary		Original Data					Transformed Data			
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.94800	0.93000	0.97000	0.01483	1.34273	1.30303	1.39671	0.03493
12		5	0.94600	0.90000	0.99000	0.04037	1.35199	1.24905	1.47063	0.09748
19		5	0.89200	0.84000	0.96000	0.04970	1.24372	1.15928	1.36944	0.08612
32		5	0.15400	0.05000	0.39000	0.13686	0.38100	0.22551	0.67449	0.17599
54		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
90		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
150		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001

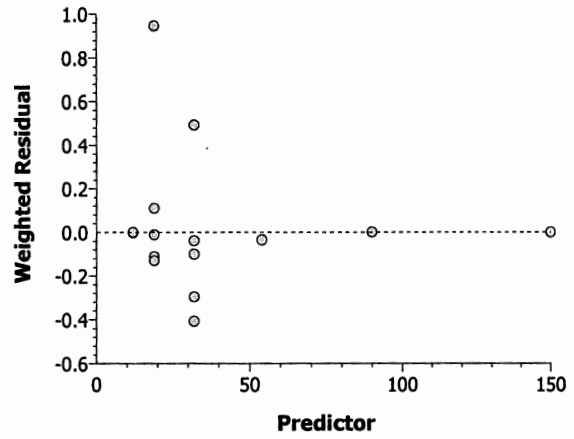
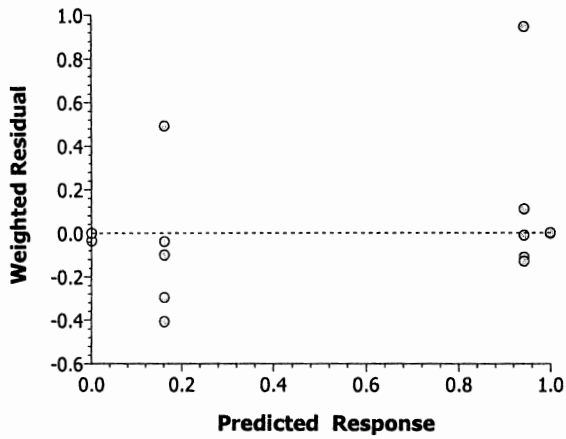
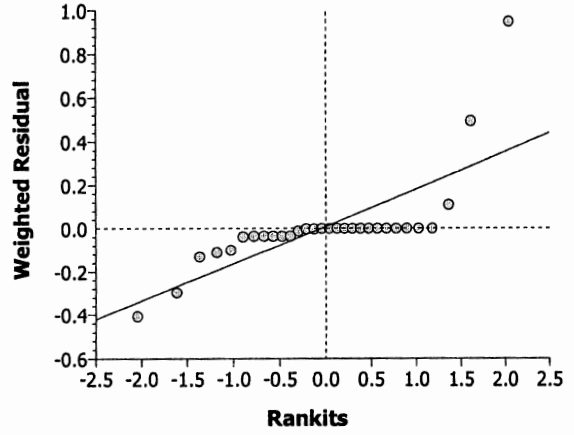
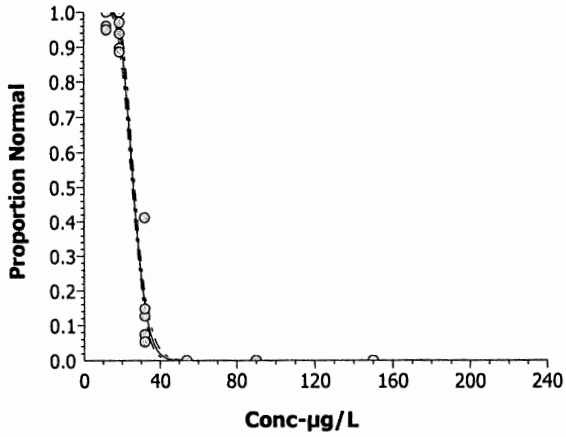


CETIS Analysis Detail

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)			
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Normal	Linear Regression	15-2703-7396	15-2703-7396	25 Feb-05 1:03 PM	CETISv1.025				
Linear Regression Options									
Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.			
Log-Normal	Control Threshold	0.052	Yes	Yes	No	Yes			
Regression Parameters									
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)		
Threshold	0.05310	0.01207	0.02837	0.07782	4.398	0.01171	Significant		
Slope	11.32595	1.14584	8.97881	13.67310	9.884	0.00059	Significant		
Intercept	-11.06037	1.67011	-14.48143	-7.63930	-6.623	0.00270	Significant		
Regression Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)	
6	-161.50600	-0.97655	0.08829	0.04295	81.09963	41.33714	0.00000	Significant Heterogeneity	
Residual Analysis									
Attribute	Method	Statistic	Critical	P Level	Decision(0.05)				
Variances	Modified Levene	3.09003	2.52766	0.02281	Unequal Variances				
Distribution	Shapiro-Wilk W	0.62575	0.92671	0.00000	Non-normal Distribution				
Point Estimates									
% Effect	Conc-µg/L	95% LCL	95% UCL						
25	22.82769	21.05909	24.21026						
50	26.18271	24.75949	27.42503						
Data Summary									
Conc-µg/L	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	B
0	Salt Control	5	0.94800	0.93000	0.97000	0.00303	0.01483	474	500
12		5	0.94600	0.90000	0.99000	0.00824	0.04037	473	500
19		5	0.89200	0.84000	0.96000	0.01014	0.04970	446	500
32		5	0.15400	0.05000	0.39000	0.02794	0.13686	77	500
54		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500
90		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500
150		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500

CETIS Analysis Detail

Graphics



CETIS Data Worksheet

Report Date: 01 Feb-05 4:13 PM
 Link: 15-2703-7396/0502-051

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)

Start Date: 02 Feb-05 Species: Mytilus galloprovincialis Sample Code: 0502-051
 Ending Date: 04 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 08:45 AM Material: Estuarine Monitoring Sample Sample Station: WER (C-1)

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
			121	100	0	MC
			122		91	SH
			123		94	SH
			124		7	MC
			125		5	SH
			126	100	0	MC 100/93 AH
			127		95	SH
			128		96	SH
			129		92	MC
			130		95	SH
			131		0	MC - cells lysed
			132		1	SH 100/96 AH
			133		0	SH
			134		85	MC
			135		0	MC - cells lysed
			136	100	0	MC 100/96 AH
			137		0	SH - cells lysed
			138		99	MC
			139		0	SH
			140		0	MC
			141		0	SH - cells lysed
			142		95	SH
			143		0	SH - cells lysed
			144		0	SH
			145		0	MC - cells lysed
			146		0	SH 100/94 AH
			147		40	SH
			148		98	MC
			149		0	SH
			150		0	SH
			151		14	SH
			152		39	SH
			153		0	MC
			154		89	SH
			155		0	SH 100/98 AH
			156		84	SH
			157		93	MC
			158		0	SH - cells lysed
			159		12	MC
			160		97	MC

Share Lab Control with reftax; possible LC cup contamination.

CETIS Data Worksheet

Report Date: 01 Feb-05 4:13 PM

Link: 15-2703-7396/0502-051

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 02 Feb-05 Species: *Mytilus galloprovincialis* Sample Code: 0502-051
 Ending Date: 04 Feb-05 Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura
 Sample Date: 31 Jan-05 08:45 AM Material: Estuarine Monitoring Sample Sample Station: WER (C-1)

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
Share LC w/ reflex	0 LC	1	126		0	UC
	0 LC	2	136		0	UC
	0 LC	3	146			
	0 LC	4	132			
	0 LC	5	156			
0	SC	1	157	100	93	UC
0	SC	2	160	100	97	UC
0	SC	3	123			
0	SC	4	130			
0	SC	5	127			
12		1	138	100	99	UC
12		2	148	100	98	UC
12		3	122			
12		4	147			
12		5	142			
19		1	134	100	85	UC
19		2	129	100	92	UC
19		3	128			
19		4	156			
19		5	154			
32		1	124	100	7	UC
32		2	159	100	12	UC
32		3	125			
32		4	152			
32		5	151			
54		1	153	100	0	UC
54		2	140	100	0	UC
54		3	133			
54		4	139			
54		5	149			
90		1	135	100	0	UC - all lysed
90		2	121	100	0	UC
90		3	158			
90		4	144			
90		5	150			
150		1	145	4	0	UC - cells lysed
150		2	131		0	UC - cells lysed
150		3	137			
150		4	143			
150		5	141			

UC-UC

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Brea/ventura
 Sample ID: WER - Site C1
 Test No.: 0502-051

Test Species: M. galloprovincialis
 Start Date/Time: 2/2/05 1530
 End Date/Time: 2-4-05 1415

Concentration %	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
LC	29.6	29.5	29.2	14.2	14.7	15.1	7.8	7.9	8.4	8.01	7.93	7.95
SC	29.1	29.0	29.3		14.5	15.1	7.75	8.1	8.4	7.97	8.01	8.07
12	30.2	29.4	29.5		15.1	15.3	8.40	7.6	8.2	7.88 8.40	8.36	8.38
19	30.2	29.4	29.9		15.1	14.9	7.8	7.9	8.4	8.40	8.39	8.38
32	30.2	29.5	29.7		14.9	14.9	8.0	7.9	8.3	8.40	8.39	8.29
54	30.2	29.5	29.6		14.9	14.9	8.0	7.9	8.3	8.40	8.37	8.39
90	30.0	29.4	29.3		14.7	15.0	8.6	7.9	8.3	8.41	8.39	8.40
150	29.9	29.7	29.3		14.9	15.1	8.0	7.9	8.4	8.41	8.39	8.40

Technician Initials:

0	24	48
SD	EK	SH

 Animal Source/Date Received: Mission Bay Field collected 1/28/05

Comments: 0 hrs: _____
 24 hrs: _____
 48 hrs: _____

QC Check: AH 2/10/05 Final Review: JR 2/28/05

Report Date: 28 Feb-05 11:13 AM

Link: 04-3005-7063/0502-052a

CETIS Test Summary

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)		
Test No:	08-6647-1051	Test Type:	Development	Duration:	47h	Species:	Mytilus galloprovincialis	
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Dil Water:	Scripps Seawater	Source:	Mission Bay	
Ending Date:	04 Feb-05 02:15 PM	Brine:	Forty Fathoms					
Setup Date:	02 Feb-05 03:30 PM							
Comments:	EC50 calculations are based on measured copper concentrations.							
Sample No:	18-1876-8008	Material:	Copper chloride	Client:	Internal			
Sample Date:	02 Feb-05	Code:	0502-052a	Project:				
Receive Date:	02 Feb-05	Source:	INTERNAL					
Sample Age:	16h	Station:	Polished Sea Water					
Comparison Summary								
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method		
05-8489-6226	Proportion Normal	11.3	17.4	14.022	27.40%	Steel's Many-One Rank		
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method		
06-4918-8506	Proportion Normal	50	17.87435	17.51323	18.24292	Trimmed Spearman-Kärber		
Proportion Normal Summary								
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Control	5	0.90800	0.87000	0.96000	0.01463	0.03271	3.60%
11.3		5	0.90800	0.87000	0.97000	0.01744	0.03899	4.29%
17.4		5	0.48200	0.05000	0.88000	0.16995	0.38003	78.84%
28.2		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
Proportion Normal Detail								
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	0.87000	0.90000	0.96000	0.90000	0.91000		
11.3		0.89000	0.97000	0.89000	0.92000	0.87000		
17.4		0.88000	0.70000	0.10000	0.68000	0.05000		
28.2		0.00000	0.00000	0.00000	0.00000	0.00000		

CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	04-3005-7063	04-3005-7063	28 Feb-05 11:13 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		11.3	17.4	8.85	14.022	27.40%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	7.14769	5.29221	0.00292	Unequal Variances
Distribution	Shapiro-Wilk W	0.84398	0.86826	0.00345	Non-normal Distribution

ANOVA Table

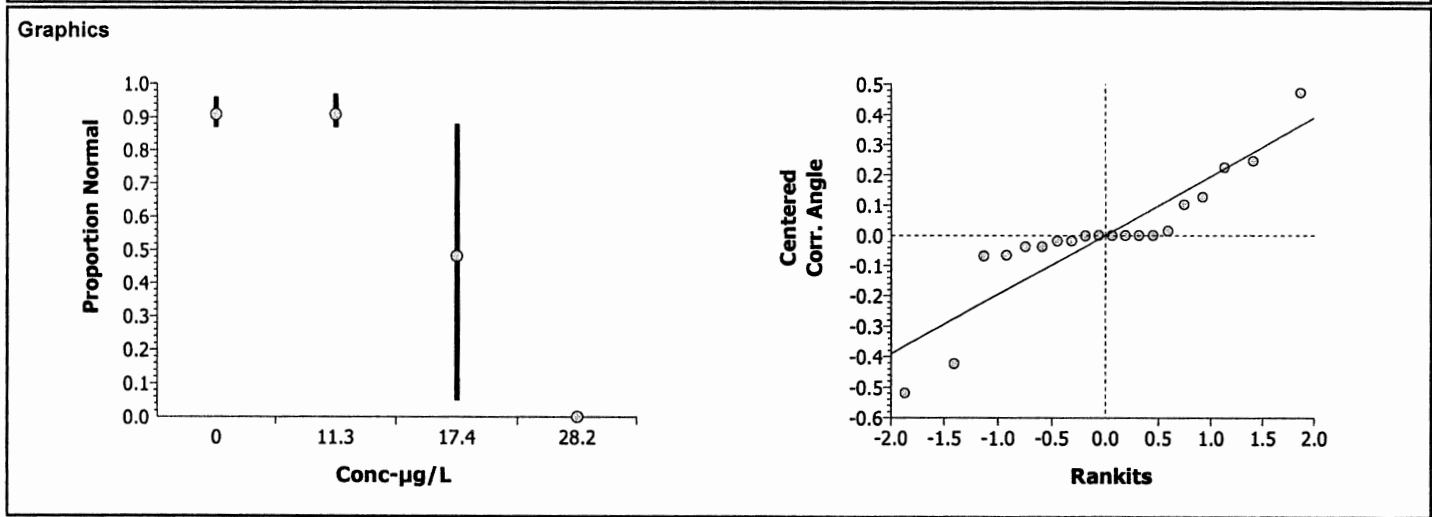
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	4.9995	1.6665	3	32.44	0.00000	Significant Effect
Error	0.8218862	0.051368	16			
Total	5.82138652	1.7178679	19			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Control		11.3	26.5	17	> 0.0500	3	Non-Significant Effect
		17.4	16	17	<= 0.0500	1	Significant Effect
		28.2	15	17	<= 0.0500	2	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	5	0.90800	0.87000	0.96000	0.03271	1.26711	1.20193	1.36944	0.06199
11.3		5	0.90800	0.87000	0.97000	0.03899	1.26963	1.20193	1.39671	0.07692
17.4		5	0.48200	0.05000	0.88000	0.38003	0.74500	0.22551	1.21705	0.44239
28.2		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001



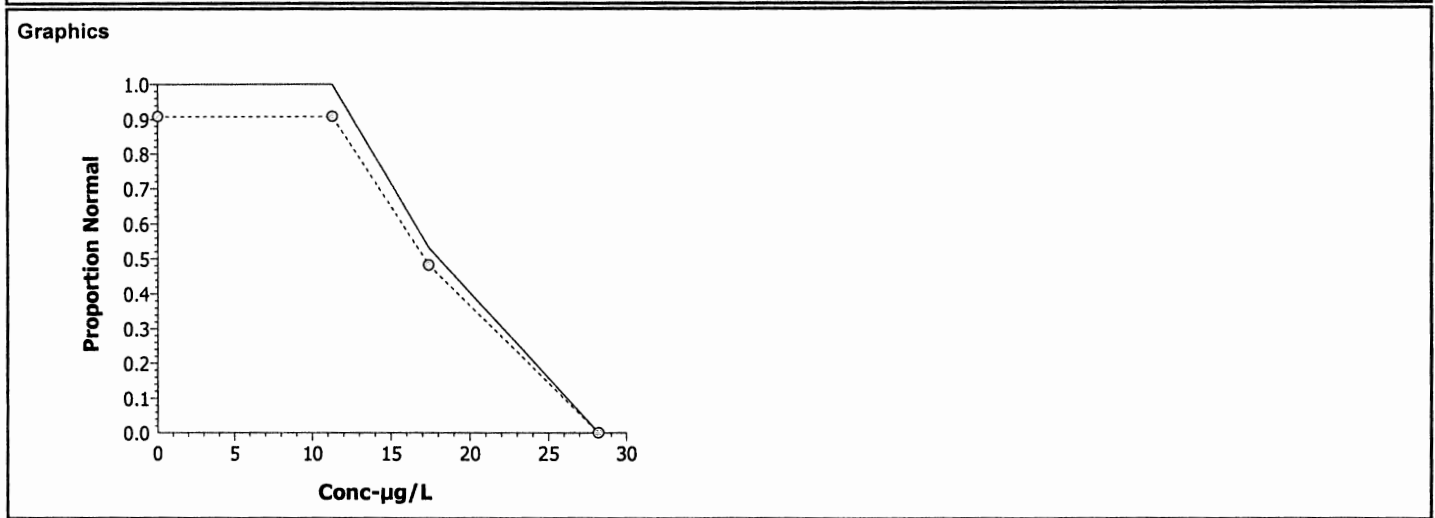
CETIS Analysis Detail

Bivalve Larval Survival and Development Test	Nautilus Environmental (CA)
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Trimmed Spearman-Kärber	04-3005-7063	04-3005-7063	28 Feb-05 11:13 AM	CETISv1.025

Spearman-Kärber Options					Point Estimates		
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL
Control Threshold	0.092	0.00%	1.25223	0.00443205	17.87435	17.51323	18.24292

Data Summary		Calculated Variate(A/B)							
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Control	5	0.90800	0.87000	0.96000	0.00668	0.03271	454	500
11.3		5	0.90800	0.87000	0.97000	0.00796	0.03899	454	500
17.4		5	0.48200	0.05000	0.88000	0.07757	0.38003	241	500
28.2		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500



CETIS Test Summary

Report Date: 28 Feb-05 10:57 AM

Link: 12-1300-6143/0502-052

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)			
Test No:	09-7535-1799	Test Type:	Development	Duration:	47h	Species:	Mytilus galloprovincialis	Source:	Mission Bay
Start Date:	02 Feb-05 03:30 PM	Protocol:	ASTM E724-98 (1999)	Dil Water:	Scripps Seawater	Brine:	Forty Fathoms		
Ending Date:	04 Feb-05 02:15 PM								
Setup Date:	02 Feb-05 03:30 PM								
Comments:	Full-strength sample was spiked with 6 concentrations of copper. EC50 calculations are based on nominal concentrations.								
Sample No:	12-3605-7083	Material:	Copper chloride	Client:	Internal				
Sample Date:	02 Feb-05	Code:	0502-052	Project:					
Receive Date:	02 Feb-05	Source:	INTERNAL						
Sample Age:	16h	Station:	Polished Sea Water						
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
12-5746-4573	Proportion Normal	8.4	14	10.844	20.69%	Steel's Many-One Rank			
Point Estimate Summary									
Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method			
00-1832-4423	Proportion Normal	50	13.99071	13.66938	14.31960	Trimmed Spearman-Kärber			
Proportion Normal Summary									
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Lab Control	5	0.90800	0.87000	0.96000	0.01463	0.03271	3.60%	
1.8		5	0.93150	0.89000	0.97000	0.01312	0.02935	3.15%	
3		5	0.91400	0.87000	0.95000	0.01288	0.02881	3.15%	
5		5	0.93800	0.90000	0.98000	0.01281	0.02864	3.05%	
8.4		5	0.90800	0.87000	0.97000	0.01744	0.03899	4.29%	
14		5	0.48200	0.05000	0.88000	0.16995	0.38003	78.84%	
23		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%	
39		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%	
Proportion Normal Detail									
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
0	Lab Control	0.87000	0.90000	0.96000	0.90000	0.91000			
1.8		0.93750	0.97000	0.94000	0.92000	0.89000			
3		0.95000	0.92000	0.91000	0.92000	0.87000			
5		0.98000	0.94000	0.93000	0.90000	0.94000			
8.4		0.89000	0.97000	0.89000	0.92000	0.87000			
14		0.88000	0.70000	0.10000	0.68000	0.05000			
23		0.00000	0.00000	0.00000	0.00000	0.00000			
39		0.00000	0.00000	0.00000	0.00000	0.00000			

CETIS Analysis Detail

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Comparison	12-1300-6143	12-1300-6143	25 Feb-05 11:01 AM	CETISv1.025

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		8.4	14	11.90	10.844	20.69%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	6.69870	3.25834	0.00006	Unequal Variances
Distribution	Shapiro-Wilk W	0.75792	0.91882	0.00000	Non-normal Distribution

ANOVA Table

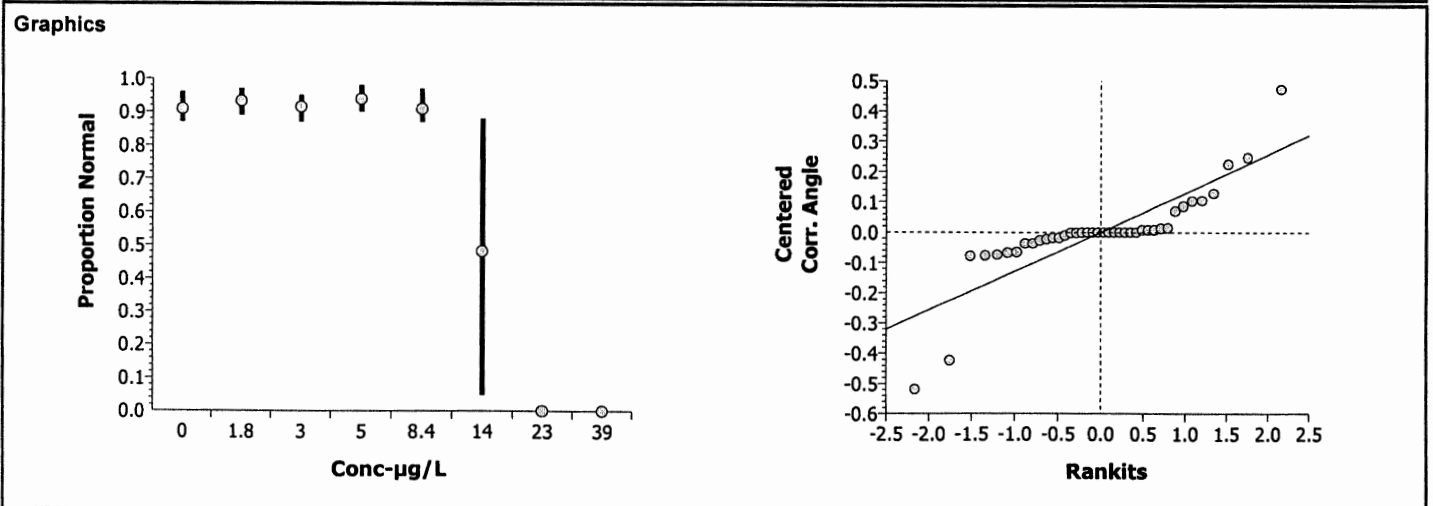
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	11.15402	1.593431	7	59.03	0.00000	Significant Effect
Error	0.8638522	0.026995	32			
Total	12.0178687	1.6204263	39			

Group Comparisons

Control	vs	Conc-µg/L	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Control		1.8	33	16	> 0.0500	1	Non-Significant Effect
		3	31	16	> 0.0500	4	Non-Significant Effect
		5	34	16	> 0.0500	2	Non-Significant Effect
		8.4	26.5	16	> 0.0500	3	Non-Significant Effect
		14	16	16	<= 0.0500	1	Significant Effect
		23	15	16	<= 0.0500	2	Significant Effect
		39	15	16	<= 0.0500	2	Significant Effect

Data Summary

Conc-µg/L	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Control	5	0.90800	0.87000	0.96000	0.03271	1.26711	1.20193	1.36944	0.06199
1.8		5	0.93150	0.89000	0.97000	0.02935	1.31099	1.23273	1.39671	0.06000
3		5	0.91400	0.87000	0.95000	0.02881	1.27628	1.20193	1.34528	0.05127
5		5	0.93800	0.90000	0.98000	0.02864	1.32553	1.24905	1.42890	0.06529
8.4		5	0.90800	0.87000	0.97000	0.03899	1.26963	1.20193	1.39671	0.07692
14		5	0.48200	0.05000	0.88000	0.38003	0.74500	0.22551	1.21705	0.44239
23		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001
39		5	0.00000	0.00000	0.00000	0.00000	0.05002	0.05002	0.05002	0.00001



CETIS Analysis Detail

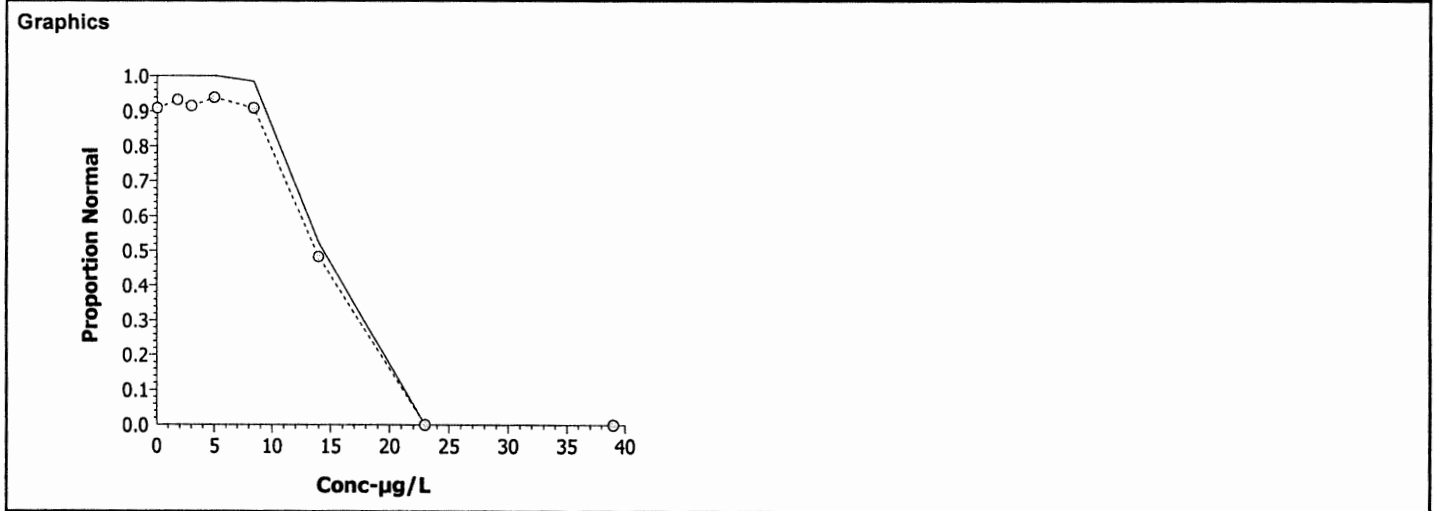
Spearman-Kärber: Page 1 of 1
 Report Date: 28 Feb-05 10:59 AM
 Analysis: 00-1832-4423/0502-052

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Trimmed Spearman-Kärber	12-1300-6143	12-1300-6143	25 Feb-05 11:02 AM	CETISv1.025

Spearman-Kärber Options					Point Estimates		
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL
Control Threshold	0.092	0.00%	1.14584	0.00504548	13.99071	13.66938	14.31960

Data Summary			Calculated Variate(A/B)						
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Control	5	0.90800	0.87000	0.96000	0.00668	0.03271	454	500
1.8		5	0.93150	0.89000	0.97000	0.00599	0.02935	462	496
3		5	0.91400	0.87000	0.95000	0.00588	0.02881	457	500
5		5	0.93800	0.90000	0.98000	0.00585	0.02864	469	500
8.4		5	0.90800	0.87000	0.97000	0.00796	0.03899	454	500
14		5	0.48200	0.05000	0.88000	0.07757	0.38003	241	500
23		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500
39		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500



CETIS Data Worksheet

Report Date: 01 Feb-05 4:22 PM

Link: 12-1300-6143/0502-052

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)
Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
			161	100	0	cells lysed
			162	100	0	"
			163	100	90	
			164	100	94	
			165	100	89	
1.8			166	100	89	
			167	100	97	
			168	100	92	
1.8			169	96	90	
			170	100	0	
			171	100	68	
			172	100	90	
			173	100	92	
			174	100	92	
			175	100	94	
			176	100	0	
			177	100	0	
			178	100	96	
			179	100	0	cells lysed
			180	100	88	
			181	100	0	
			182	100	71	
			183	100	70	
			184	100	89	
			185	100	90	
			186	100	95	
			187	100	97	
			188	100	5	
			189	100	93	
			190	100	0	cells lysed
			191	100	87	
			192	100	92	
			193	100	98	
			194	100	0	
LC			195	100	87	
			196	100	90	
			197	100	94	
LC			198	100	87	
			199	100	0	cells lysed
			200	100	91	

CETIS Data Worksheet

Bivalve Larval Survival and Development Test						Nautilus Environmental (CA)
Start Date:	02 Feb-05	Species:	Mytilus galloprovincialis	Sample Code:	0502-052	
Ending Date:	04 Feb-05	Protocol:	ASTM E724-98 (1999)	Sample Source:	City of Buenaventura	
Sample Date:	01 Feb-05 11:30 AM	Material:	Estuarine Monitoring Sample	Sample Station:	WER (PSW)	
Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	LC	1	198	100	87	MC
0	LC	2	196	100	90	MC
0	LC	3	178			
0	LC	4	163			
0	LC	5	200			
1.8		1	169	96	90	MC
1.8		2	167	100	97	MC
1.8		3	197			
1.8		4	192			
1.8		5	165			
3		1	186	100	95	MC
3		2	174	100	92	MC
3		3	182			
3		4	168			
3		5	195			
5		1	193	100	98	MC
5		2	164	100	94	MC
5		3	189			
5		4	185			
5		5	175			
8.4		1	184	100	89	MC
8.4		2	187	100	97	MC
8.4		3	166			
8.4		4	173			
8.4		5	191			
14		1	180	100	88	MC
14		2	183	100	70	MC
14		3	177			
14		4	171			
14		5	188			
23		1	170	100	0	MC
23		2	181	100	0	MC
23		3	172			
23		4	176			
23		5	194			
39		1	161	100	0	MC - cells lysed @ seawater entire cell
39		2	179	100	0	MC - " " " "
39		3	162			
39		4	190			
39		5	199			

QC: MC

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buena Ventura
 Sample ID: WER - Polished SW
 Test No.: 0507-152

Test Species: M. galloprovincialis
 Start Date/Time: 2/2/05 1530
 End Date/Time: 2-4-05 1415

Concentration %	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)			
	0	24	48	0	24	48	0	24	48	0	24	48	
LL	30.0	30.0	30.5	14.2	14.7	14.8	7.6	7.9	8.4	7.90	7.91	7.92	
1.8	30.3	29.9	30.5		14.6	14.7	7.7	8.1	8.4	7.93	7.92	7.94	
3	30.3	30.0	30.5		14.5	14.7	7.6	8.0	8.4	7.93	7.92	7.94	
5	30.2	29.9	30.5		14.5	14.7	7.6	7.9	8.4	8.01	7.92	7.94	
8.4	30.3	30.0	30.6		14.6	14.8	7.6	8.0	8.4	7.96	7.91	7.94	
14	30.3	30.0	30.5		14.6	14.7	7.6	8.1	8.5	7.95	7.91	7.94	
23	30.3	30.1	30.6		14.7	14.6	7.6	8.1	8.4	7.95	7.91	7.95	
39	30.3	29.9	30.7		14.7	14.6	7.6	8.2	8.4	7.95	7.90	7.96	
		29.9											

Technician Initials:

0	24	48
SD	RN	SH

Animal Source/Date Received: Mission Bay Field collected 1/28/05

Comments:
 0 hrs: _____
 24 hrs: _____
 48 hrs: _____

QC Check: AH 2/10/05 Final Review: JR 2/28/05

Marine Chronic Bioassay

Bivalve Development Worksheet

Client: City of Buena Ventura - WER Start Date/Time: 2/2/05 1530
 Test No.: 0502-048 → 052 End Date/Time: 2-4-05 1415
 Test Species: M. galaprinialis Technician Initials: mc
 Animal Source: Field collected
 Date Received: 1/28/05

Test Chambers: Shell vials Sample Volume: 10ml

First Gamete Release Time: 1200

Spawn Information		
Sex	Number	Condition
Male	8	GOOD
Female	14	GOOD

Egg Fertilization Time: 1330

Embryo Stock Density Calculation:

Number Counted:	<u>44</u>	<u>42</u>	
	<u>57</u>	<u>45</u>	
	<u>47</u>	<u>38</u>	Mean: <u>46</u>
	<u>42</u>	<u>48</u>	
	<u>54</u>	<u>43</u>	
	<u>48.8</u>	<u>43.2</u>	

Mean 46 X 42 = 1,932 embryos/ml

Initial Density: 1,932 = 4.83 (dilution factor)
 Desired Final Density: 400 eggs/ml

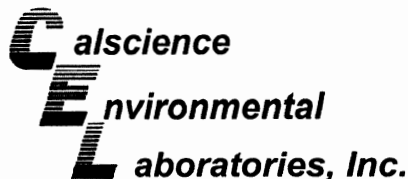
Prepare the embryo stock according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Percent Division Upon Inoculation: 90+ Time Zero Counts: _____ 48-h QC: 93
 Inoculation Time: 1530 _____ 95

Comments: _____

QC Check: AH 2/10/05 Final Review: JRC 2/28/05

ANALYTICAL CHEMISTRY DATA



February 20, 2005

Chris Stransky
Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, CA 92121

Subject: **Calscience Work Order No.: 05-02-0937**
Client Reference: Buenaventura/ WER

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 2/16/2005 and analyzed in accordance with the attached chain-of-custody.

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,

A handwritten signature in black ink, appearing to read "R. Stearns", written over a horizontal line.

Calscience Environmental
Laboratories, Inc.
Robert Stearns
Project Manager

A handwritten signature in black ink, located at the bottom left of the page.

Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/16/05
 Work Order No: 05-02-0937
 Preparation: EPA 3010A Total
 Method: EPA 6010B

Project: Buenaventura/ WER

Page 1 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
B-1-54	05-02-0937-1	02/02/05	Aqueous	02/16/05	02/17/05	050216L09

Parameter	Result	RL	DF	Qual	Units
Copper	75.8	5.0	1		ug/L

B-1-90	05-02-0937-2	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	122	5	1		ug/L

B-1-150	05-02-0937-3	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
---------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	203	5	1		ug/L

B-3-19	05-02-0937-4	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	21.5	5.0	1		ug/L

B-3-32	05-02-0937-5	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	32.5	5.0	1		ug/L

B-3-54	05-02-0937-6	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	56.8	5.0	1		ug/L

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



Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/16/05
 Work Order No: 05-02-0937
 Preparation: EPA 3010A Total
 Method: EPA 6010B

Project: Buenaventura/ WER

Page 2 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
C-1-19	05-02-0937-7	02/02/05	Aqueous	02/16/05	02/17/05	050216L09

Parameter	Result	RL	DF	Qual	Units
Copper	21.9	5.0	1		ug/L

C-1-32	05-02-0937-8	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	39.8	5.0	1		ug/L

C-1-54	05-02-0937-9	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	57.0	5.0	1		ug/L

Method Blank	097-01-003-4,589	N/A		Aqueous	02/16/05	02/17/05	050216L09
--------------	------------------	-----	--	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	ND	5.00	1		ug/L

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



Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/16/05
 Work Order No: 05-02-0937
 Preparation: EPA 3010A Total
 Method: EPA 6010B

Project Buenaventura/ WER

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
05-02-0938-1	Aqueous	ICP 3300	02/16/05	02/17/05	050216S09

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Copper	133	133	80-120	0	0-20	3

RPD - Relative Percent Difference , CL - Control Limit

Calscience

Environmental Quality Control - Laboratory Control Sample
Laboratories, Inc.



Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, CA 92121

Date Received: N/A
Work Order No: 05-02-0937
Preparation: EPA 3010A Total
Method: EPA 6010B

Project: Buenaventura/ WER

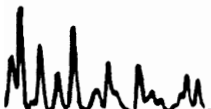
Quality Control Sample ID	Matrix	Instrument	Date Analyzed	Lab File ID	LCS Batch Number
097-01-003-4,589	Aqueous	ICP 3300	02/17/05	050216-I-09	050216L09

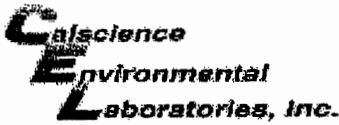
<u>Parameter</u>	<u>Conc Added</u>	<u>Conc Recovered</u>	<u>LCS %Rec</u>	<u>%Rec CL</u>	<u>Qualifiers</u>
Copper	1.00	0.993	99	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Work Order Number: 05-02-0937

<u>Qualifier</u>	<u>Definition</u>
*	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.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	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.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.





WORK ORDER #:

05 - 02 - 0937

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: Nautelas

DATE: 2/16/5

TEMPERATURE - SAMPLES RECEIVED BY:

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.
4, 2 C Temperature blank.

LABORATORY (Other than Calscience Courier):

- C Temperature blank.
C IR thermometer.
Ambient temperature.

Initial: [Signature]

CUSTODY SEAL INTACT:

Sample(s): Cooler: No (Not Intact): Not Applicable (N/A): Initial: [Signature]

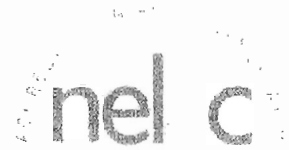
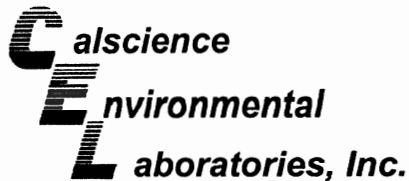
SAMPLE CONDITION:

Table with 4 columns: Yes, No, N/A and 7 rows of sample condition checks with checkmarks.

Initial: [Signature]

COMMENTS:

Blank lines for handwritten comments.



February 20, 2005

Chris Stransky
Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, CA 92121

Subject: **Calscience Work Order No.: 05-02-0938**
Client Reference: Buenaventura/ WER

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 2/16/2005 and analyzed in accordance with the attached chain-of-custody.

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,

A handwritten signature in black ink, appearing to read "R. Stearns", written over a horizontal line.

Calscience Environmental
Laboratories, Inc.
Robert Stearns
Project Manager

A handwritten signature in black ink, appearing to read "R. Stearns", written over a horizontal line.



Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, CA 92121

Date Received: 02/16/05
Work Order No: 05-02-0938
Preparation: EPA 3010A Total
Method: EPA 6010B

Project: Buenaventura/ WER

Page 1 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
PSW-LC	05-02-0938-1	02/02/05	Aqueous	02/16/05	02/17/05	050216L09

Parameter	Result	RL	DF	Qual	Units
Copper	ND	5.00	1		ug/L

PSW-8.4	05-02-0938-2	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
---------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	11.3	5.0	1		ug/L

PSW-14	05-02-0938-3	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	17.4	5.0	1		ug/L

PSW-23	05-02-0938-4	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	28.2	5.0	1		ug/L

A-2-12	05-02-0938-5	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	16.9	5.0	1		ug/L

A-2-19	05-02-0938-6	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	20.0	5.0	1		ug/L

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

Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/16/05
 Work Order No: 05-02-0938
 Preparation: EPA 3010A Total
 Method: EPA 6010B

Project: Buenaventura/ WER

Page 2 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
A-2-32	05-02-0938-7	02/02/05	Aqueous	02/16/05	02/17/05	050216L09

Parameter	Result	RL	DF	Qual	Units
Copper	36.3	5.0	1		ug/L

A-2-54	05-02-0938-8	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
--------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	56.9	5.0	1		ug/L

Lab Control	05-02-0938-9	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
-------------	--------------	----------	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	ND	5.00	1		ug/L

Method Blank	097-01-003-4,589	N/A	Aqueous	02/16/05	02/17/05	050216L09
--------------	------------------	-----	---------	----------	----------	-----------

Parameter	Result	RL	DF	Qual	Units
Copper	ND	5.00	1		ug/L

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



Nautilus Environmental
 5550 Morehouse Drive, Suite 150
 San Diego, CA 92121

Date Received: 02/16/05
 Work Order No: 05-02-0938
 Preparation: EPA 3010A Total
 Method: EPA 6010B

Project Buenaventura/ WER

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PSW-LC	Aqueous	ICP 3300	02/16/05	02/17/05	050216S09

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Copper	133	133	80-120	0	0-20	3

RPD - Relative Percent Difference , CL - Control Limit

Calscience

Environmental Quality Control - Laboratory Control Sample
Laboratories, Inc.



Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, CA 92121

Date Received: N/A
Work Order No: 05-02-0938
Preparation: EPA 3010A Total
Method: EPA 6010B

Project: Buenaventura/ WER

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	Lab File ID	LCS Batch Number
097-01-003-4,589	Aqueous	ICP 3300	02/17/05	050216-I-09	050216L09

Parameter	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Copper	1.00	0.993	99	80-120	

RPD - Relative Percent Difference , CL - Control Limit

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL:(714) 895-5494 • FAX: (714) 894-7501



Work Order Number: 05-02-0938

<u>Qualifier</u>	<u>Definition</u>
*	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.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	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.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

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APPENDIX G
CHAIN-OF-CUSTODY FORMS

Client: City of Buena Ventura

Test Initiation Date: 2-1-05

Sample ID: _____

Test No.(s): 0502-031 to 042

Test(s) Performed: Ceriodaphnia / Fathead /
 Sebenastrium

Sample (A, B, C, Receiving Water, etc.)				
	A-2	B-1	B-3	C-1
Alkalinity (mg/L)*	222	185	213	212
Hardness (mg/L)*	580	542	498	507
Check-in Temp (°C)				
DO (mg/L)	10.6	10.7	11.6	12.0
pH (units)	8.23	7.83	8.36	8.31
Cond. (µmhos-cm)	200	2280	1198	1267
Total Chlorine (mg/L)	0.02	0.01	0.01	0.01
Free Chlorine (mg/L)	-	-	-	-
STS added (g)	-	-	-	-
Final Free Chlorine (mg/L)	-	-	-	-

* = mg/L as CaCO₃, NA = Not Applicable

Sample Description: A-2, B-3, C-1: light yellow color, clear, no odor, no debris
B-1: no color, clear, no odor, no debris

Dilution Water Source: 8:2 Culligan Other: _____ Alkalinity: _____ Hardness: _____

Additional Control? Y N = _____ Alkalinity: _____ Hardness: _____

Sample Manipulations Required? Y N

Filtration? Y N Filter Pore Size: _____ Organisms Debris Post-check: _____

Aeration? Y N Length of Time: _____ Final DO: _____ Final pH: _____

pH Adjustment? Y N Initial pH: _____ Final pH: _____

Subsamples Collected for Additional Chemistry? Y N Sample Type(s): _____

Sample Shipped Via: Hand

Comments: _____

Analysts: MC

QC Check: _____

Client: City of Buena Ventura

Test Initiation Date: 2-1-05

Sample ID: _____

Test No.(s): 0502-015 to 030

Test(s) Performed: Kelp/topsmelt/mysid/bride

	Sample (A, B, C, Receiving Water, etc.)			
	A-2	B-1	B-3	C-1
Alkalinity (mg/L)*	222	185	213	212
Hardness (mg/L)*	580	542	498	507
Check-in Temp (°C)				
DO (mg/L)	10.6	10.7	11.6	12.6
pH (units)	8.23	7.83	8.36	8.31
Salinity (ppt)	1.1	1.3	0.7	0.7
Cond. (µmhos-cm)	2010	2280	1198	1267
Total Chlorine (mg/L)	0.02	0.01	0.01	0.01
Free Chlorine (mg/L)	-	-	-	-
STS added (g)	-	-	-	-
Final Free Chlorine (mg/L)	-	-	-	-

* = mg/L as CaCO₃, * = Measured for freshwater samples only, NA = Not Applicable

Sample Description: A-2, B-3, C-1: light yellow color, clear, no odor, no debris
B-1: no color, clear, no odor, no debris

Dilution Water Source: LAB SW ART SW Other: _____ Alkalinity: _____ Salinity: _____

Additional Control? Y N = _____ Alkalinity: _____ Salinity: _____

Sample Manipulations Required? Y N _____

Sample Salted w/ artificial salt? Y N If yes, what ppt? _____

Sample salted w/brine? Y N If yes, what ppt? _____

Filtration? Y N Filter Pore Size: _____ Organisms Debris Post-check: _____

Aeration? Y N Length of Time: _____ Final DO: _____ Final pH: _____

pH Adjustment? Y N Initial pH: _____ Final pH: _____

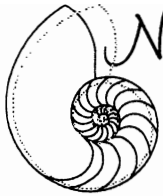
Subsamples Collected for Additional Chemistry? Y N Sample Type(s): _____

Sample Shipped Via: Hand

Comments: _____

Analysts: MC

QC Check: _____



Nautilus Environmental, LLC

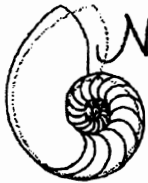
CALIFORNIA
5550 Morehouse Drive • Suite 150
San Diego, California 92121
Phone 858.587.7333
Fax 858.587.3961

WASHINGTON
5009 Pacific Highway East • Suite 2
Tacoma, Washington 98424
Phone 253.922.4296
Fax 253.922.5814

Chain of Custody

Date 1/31/05 Page 1 of 2

Sample Collection by: <u>John Rudolph + Chris Stravsky</u>							ANALYSES REQUIRED										RECEIPT TEMPERATURE (°C)
Report to:				Invoice to:			Topshell Chronic	Mysid Chronic	Bivalve Chronic	Bivalve WER	Kelp	Fathead Chronic	Coriophantia - C	Selenastrum	Total + Dissolved CN-, Cu, Zn, Se, Ni	TOC, DOC, TSS	
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS											
SCRE A-1	1/31/05	1405	H2O	plastic bottle	1												
SCRE A-2		1520			8		X	X	X	X	X	X	X	X	X	X	
SCRE A-3		1615			1												
SCRE B-1		1430			8		X	X	X	X	X	X	X	X	X	X	
SCRE B-2		1145			1												
SCRE B-3		1210			8		X	X	X	X	X	X	X	X	X	X	
SCRE B-4		1225			1												
SCRE C-1		0845			8		X	X	X	X	X	X	X	X	X	X	
SCRE C-3		0905			1												
PROJECT INFORMATION			SAMPLE RECEIPT			RELINQUISHED BY (CLIENT)					RELINQUISHED BY (COURIER)						
CLIENT			TOTAL NO. OF CONTAINERS			Signature: <u>[Signature]</u> 2210 (Signature) (Time) Printed Name: <u>John Rudolph</u> (Printed Name) Date: <u>1/31/05</u> (Date)					Signature: _____ (Signature) (Time) Printed Name: _____ (Printed Name) Date: _____ (Date)						
P.O. NO.			REC'D GOOD CONDITION			(Company) <u>Nautilus Env.</u>					(Company) _____						
SHIPPED VIA:			MATCHES TEST SCHEDULE			RECEIVED BY (COURIER)					RECEIVED BY (LABORATORY)						
SPECIAL INSTRUCTIONS/COMMENTS:						Signature: _____ (Signature) (Time) Printed Name: _____ (Printed Name) Date: _____ (Date)					Signature: <u>[Signature]</u> 2210 (Signature) (Time) Printed Name: <u>Steven Hackford</u> (Printed Name) Date: <u>1-31-05</u> (Date)						
						(Company) _____					Nautilus Environmental Log-in No.						



Nautilus Environmental, LLC

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 San Diego, California 92121
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 Fax 858.587.3961

WASHINGTON
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 Tacoma, Washington 98424
 Phone 253.922.4296
 Fax 253.922.5814

Chain of Custody

Date 1/31/05 Page 1 of 1

Sample Collection by: <u>BCS, JR</u>						ANALYSES REQUIRED												
Report to: Company <u>Nautilus - San Diego</u> Address _____ City _____ State _____ Zip _____ Contact _____ Phone No. _____			Invoice to: Company _____ Address _____ City _____ State _____ Zip _____ Contact _____ Phone No. _____			C. dubia Chronic						RECEIPT TEMPERATURE (°C)						
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS								COMMENTS					
SCRF B-1	1/31/05	1430	AQ	4-L (wh)	1									X		Log in #	05-057	47
SCRF B-3	↓	1210	↓	↓	↓									↓		Log in #	05-058	70
SCRF A-2	↓	1520	↓	↓	↓		↓		Log in #	05-059	42							
SCRF C-1	↓	0845	↓	↓	↓		↓		Log in #	05-060	49							
PROJECT INFORMATION			SAMPLE RECEIPT			RELINQUISHED BY (CLIENT)			RELINQUISHED BY (COURIER)									
CLIENT <u>Bucaventura</u>			TOTAL NO. OF CONTAINERS <u>4</u>			(Signature) <u>Chris Steady</u> (Time) <u>1700</u>			(Signature) _____ (Time) _____									
P.O. NO.			RECD GOOD CONDITION <u>Y</u>			(Printed Name) <u>Chris Steady</u> (Date) <u>1/31/05</u>			(Printed Name) _____ (Date) _____									
SHIPPED VIA:			MATCHES TEST SCHEDULE <u>N</u>			(Company) <u>Nautilus</u>			(Company) _____									
SPECIAL INSTRUCTIONS/COMMENTS: <u>out of holding time</u>						RECEIVED BY (COURIER)			RECEIVED BY (LABORATORY)									
						(Signature) _____ (Time) _____			(Signature) <u>Eric Tolleson</u> (Time) <u>9:40</u>									
						(Printed Name) _____ (Date) _____			(Printed Name) <u>ERIC TOLLESON</u> (Date) <u>2/2/05</u>									
						(Company) _____			Nautilus Environmental Log-in No. <u>05-057-060</u>									

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CHAIN OF CUSTODY RECORD

Date 2/2/05
Page 1 of 1

LABORATORY CLIENT: Nautilus Environmental

ADDRESS: 5550 Morehouse Dr.

CITY: San Diego STATE: CA ZIP: 92121

TEL: 658-567-7333 FAX: _____ E-MAIL: _____

TURNAROUND TIME:
 SAME DAY 24 HR 48 HR 72 HR 5 DAYS 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
 RWQCB REPORTING FORMS COELT EDF _____

SPECIAL INSTRUCTIONS:

CLIENT PROJECT NAME / NUMBER: SCRE

P.O. NO.: _____

PROJECT CONTACT: Chris Stramsky

LAB USE ONLY: 02-0122

SAMPLER(S) / SIGNATURE: [Signature] COELT LOG CODE:

COOLER RECEIPT: TEMP = _____ °C

REQUESTED ANALYSES

LAB USE ONLY	SAMPLE ID	FIELD POINT NAME (FOR COELT EDF)	SAMPLING		MATRIX	NO. OF CONT.	TPH (G)	TPH (D) or	BTEX/MTBE (8021B) or (8260B)	OXYGENATES (8260B)	VOCs (8260B)	5035 ENCORE PREP	SVOCs (8270C)	PEST (8081A)	PCBs (8082)	CAC, T22 METALS (6010B)	PNAs (8310) or (8270C)	VOCs (TO-14A) or (TO-15)	TPH(G) (TO-3M)	Total + Dissolved Cu, Zn, Se, Ni			Total CN-	TOC, DOC, TSS	
			DATE	TIME																X	X	X			
1	SCRE A-2		1/11/05	1520	H2O	4															X	X	X		
2	SCRE B-1		↓	1430	↓	4															X	X	X		
3	SCRE B-3		↓	1210	↓	4															X	X	X		
4	SCRE C-1		↓	0845	↓	4															X	X	X		

Relinquished by: (Signature) <u>[Signature]</u>	Received by: (Signature) <u>[Signature]</u>	Date: <u>2/2/05</u>	Time: <u>1215</u>
Relinquished by: (Signature) <u>[Signature]</u>	Received by: (Signature) <u>[Signature]</u>	Date: _____	Time: _____
Relinquished by: (Signature) <u>[Signature]</u>	Received for Laboratory by: (Signature) <u>[Signature]</u>	Date: <u>2/2/05</u>	Time: <u>1645</u>

DISTRIBUTION: White with final report, Green to File, Yellow and Pink to Client.
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Date 2/16/05 Page 1 of 1

Sample Collection by: <u>John Rudolph</u>						ANALYSES REQUIRED										RECEIPT TEMPERATURE (°C)
Report to: Company <u>Nautilus</u> Address _____ City _____ State _____ Zip _____ Contact _____ Phone No. _____			Invoice to: Company <u>Nautilus</u> Address _____ City _____ State _____ Zip _____ Contact _____ Phone No. _____			Total Copper										
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS										
B-1-54	2/16/05		AG	250ml plastic	1											X
B-1-90	↓		↓	↓	↓											↓
B-1-150	↓		↓	↓	↓											↓
B-3-19	↓		↓	↓	↓											↓
B-3-32	↓		↓	↓	↓											↓
B-3-54	↓		↓	↓	↓											↓
C-1-19	↓		↓	↓	↓											↓
C-1-32	↓		↓	↓	↓											↓
C-1-54	↓		↓	↓	↓											↓
PROJECT INFORMATION			SAMPLE RECEIPT			RELINQUISHED BY (CLIENT)					RELINQUISHED BY (COURIER)					
CLIENT <u>Bonaventura / WER</u>			TOTAL NO. OF CONTAINERS			(Signature) <u>[Signature]</u> (Time) <u>1205</u>					(Signature) <u>[Signature]</u> (Time) <u>1610</u>					
P.O. NO.			REC'D GOOD CONDITION			(Printed Name) <u>Chris Stansky</u> (Date) <u>2/16/05</u>					(Printed Name) <u>BAILEY</u> (Date) <u>2/16/05</u>					
SHIPPED VIA:			MATCHES TEST SCHEDULE			(Company) <u>Nautilus</u>					(Company) <u>CEI</u>					
SPECIAL INSTRUCTIONS/COMMENTS:						RECEIVED BY (COURIER)					RECEIVED BY (LABORATORY)					
						(Signature) <u>[Signature]</u> (Time) <u>1205</u>					(Signature) <u>[Signature]</u> (Time) <u>1602</u>					
						(Printed Name) <u>BAILEY</u> (Date) <u>2/16/05</u>					(Printed Name) <u>NOEL CRUISE</u> (Date) <u>2/16/05</u>					
						(Company) <u>CEI</u>					Nautilus Environmental Log-in No.					

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Date 2/16/05 Page 1 of 1

Sample Collection by: <u>John Rudolph</u>						ANALYSES REQUIRED										RECEIPT TEMPERATURE (°C)
Report to: Company <u>Nautilus</u> Address _____ City _____ State _____ Zip _____ Contact _____ Phone No. _____			Invoice to: Company <u>Nautilus</u> Address _____ City _____ State _____ Zip _____ Contact _____ Phone No. _____			Total Copies										
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS										
PSW-LC	2/2/05		AQ	250ml plastic	1											
PSW-8.4	↓		↓	↓	↓											
PSW-14	↓		↓	↓	↓											
PSW-23	↓		↓	↓	↓											
A-2-12	↓		↓	↓	↓											
A-2-19	↓		↓	↓	↓											
A-2-32	↓		↓	↓	↓											
A-2-54	↓		↓	↓	↓											
Lab Control	↓	1830	↓	↓	↓											
PROJECT INFORMATION			SAMPLE RECEIPT			RELINQUISHED BY (CLIENT)					RELINQUISHED BY (COURIER)					
CLIENT <u>Burnaventura/WER</u>			TOTAL NO. OF CONTAINERS			(Signature) <u>Chris Strangley</u> (Time) <u>1203</u>					(Signature) <u>NOEL BAILEY</u> (Time) <u>1600</u>					
P.O. NO.			REC'D GOOD CONDITION			(Printed Name) <u>Chris Strangley</u> (Date) <u>2/16/05</u>					(Printed Name) <u>NOEL BAILEY</u> (Date) <u>2/16/05</u>					
SHIPPED VIA:			MATCHES TEST SCHEDULE			(Company) <u>Nautilus</u>					(Company) <u>PEL</u>					
SPECIAL INSTRUCTIONS/COMMENTS:						RECEIVED BY (COURIER)					RECEIVED BY (LABORATORY)					
						(Signature) <u>NOEL BAILEY</u> (Time) <u>1205</u>					(Signature) <u>NOEL CRUSE</u> (Time) <u>1600</u>					
						(Printed Name) <u>NOEL BAILEY</u> (Date) <u>2/16/05</u>					(Printed Name) <u>CALYENNE</u> (Date) <u>2/16/05</u>					
						(Company) <u>PEL</u>					Nautilus Environmental Log-In No.					

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