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 Pimephales promelas

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 ℃

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

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

Test organism Ceriodaphnia dubia

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 ℃

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 \geq 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 Selenastrum capricornutum

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 ℃

Dilution water Nutrient-enriched deionized water

Test concentrations (% sample) 100 a, and 0 (control)

Initial cell density $10,000 \text{ cells/ml} \pm 10\%$

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 $\ge 1.0 \times 10^6$ cells/ml with $\le 20\%$ variability

among test replicates.

^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.

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 Atherinops affinis

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 ℃

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

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 Americamysis bahia

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 ℃

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 \geq 80% survival and \geq 0.20 mg biomass

^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 Mytilus galloprovincialis

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 ℃

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

^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 Macrocystis pyrifera

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 ℃

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 \geq 70% germination and tube length of \geq 10 μ m.

^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 CETISTM 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 (LC_{50}) or Median Effect Concentration (EC_{50}) values were determined for marine and freshwater reference toxicant bioassays using Maximum Likelihood Probit, Trimmed Spearman-Karber, 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 μ g/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 μ g/L. Laboratory seawater was polished by filtration through a Gelman 0.20- μ m 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 μ g/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

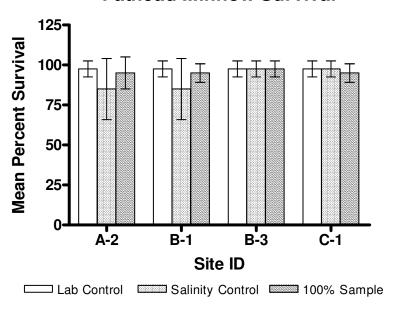
Salinity did not affect survival of *Ceriodaphnia*. Mean survival in the 1.0 and 2.2 ppt salinity controls was 90 and 100 percent, respectively. Survival in the estuary samples ranged from 90 to 100 percent (Figure 2), depending upon the site.

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).

Fathead Minnow Survival



Fathead Minnow Growth

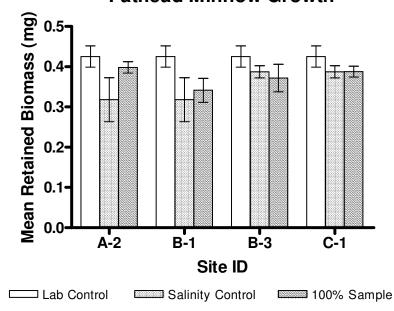
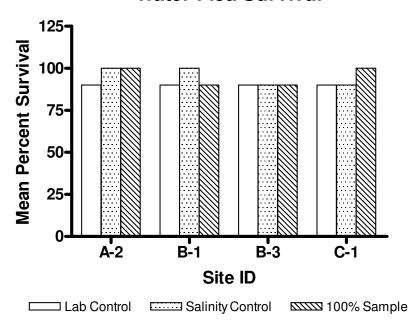


Figure 1. Summary of toxicity test results for fathead minnow 7-day survival and growth. Mean (±1SD) values in 100 percent sample are displayed. No statistically significant decreases were observed compared to concurrent salinity controls.

Water Flea Survival



Water Flea Reproduction

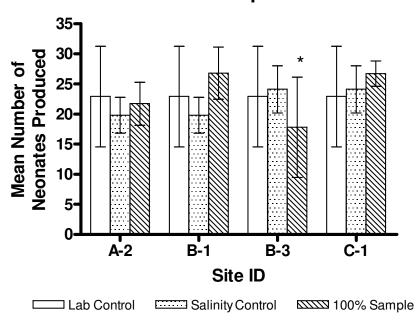


Figure 2. Summary of toxicity test results for water flea 7-day survival and reproduction. Mean (±1SD for reproduction) values in 100 percent sample are displayed. Reproduction in sample B-3 was reduced compared to the salinity control.

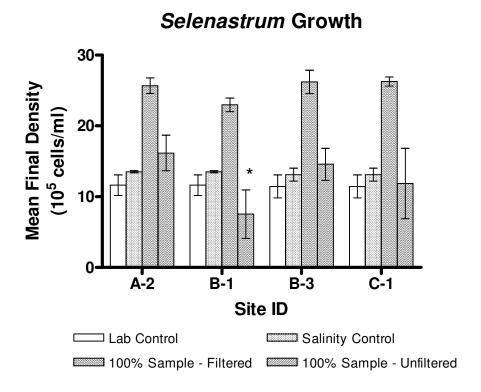


Figure 3. Summary of toxicity test results for algal growth inhibition. Mean (±1SD) values in 100 percent sample are displayed. Only unfiltered sample from site B-1 showed a significant decrease in cell density relative to the salinity control.

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).

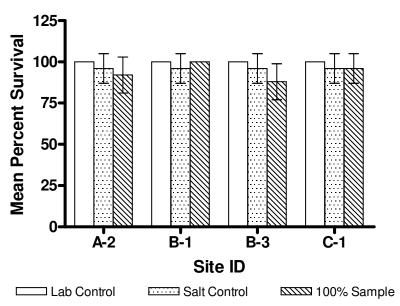
Bivalve Embryo Development

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 μ m (Figure 7).

Pacific Topsmelt Survival



Pacific Topsmelt Growth

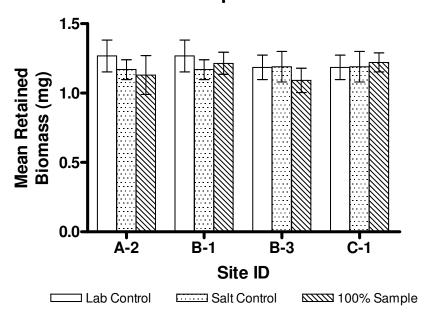
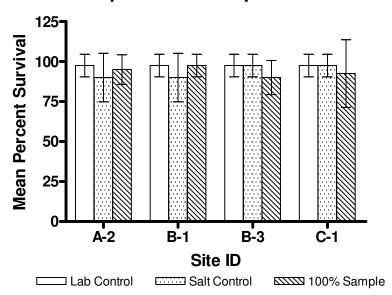


Figure 4. Summary of toxicity test results for Pacific topsmelt 7-day survival and growth. Mean $(\pm 1SD)$ values in 100 percent sample are displayed. No reductions in germination or growth were observed relative to the appropriate salt control.

Opossum Shrimp Survival



Opossum Shrimp Growth

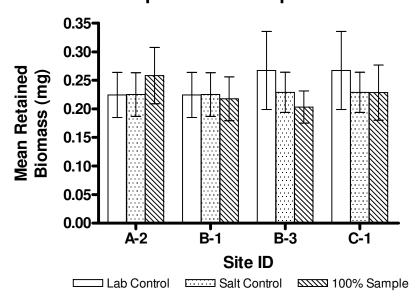


Figure 5. Summary of toxicity test results for opossum shrimp 7-day survival and growth. Mean (±1SD) values in 100 percent sample are displayed. No statistically significant decreases in survival or growth were observed compared to concurrent salt controls.

Mussel Larval Development

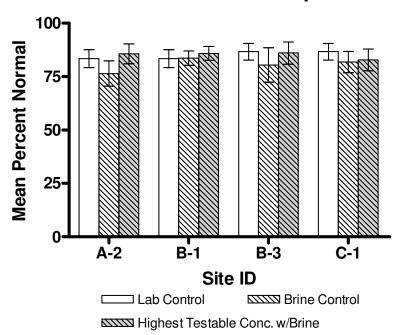
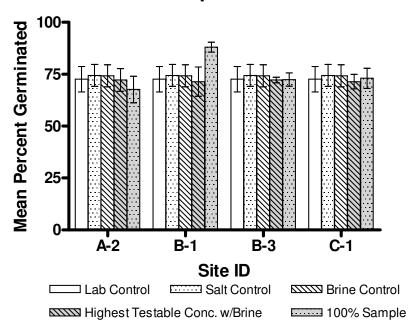


Figure 6. Summary of toxicity test results for bivalve 48-hour embryo development using *Mytilus galloprovincialis*. Mean (±1SD) values in the highest testable concentration with brine (71%) are displayed. No statistically significant decreases were observed compared to the appropriate concurrent controls.

Giant Kelp Germination



Giant Kelp Growth

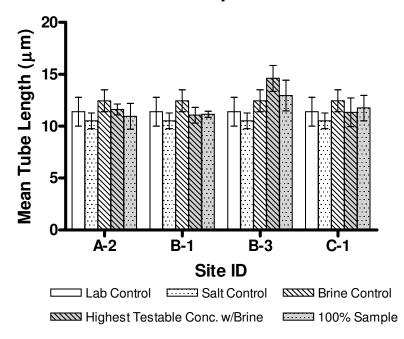


Figure 7. Summary of toxicity test results for giant kelp spore germination and growth. Mean $(\pm 1SD)$ values for each site are displayed. No statistically significant decreases in germination or growth were observed compared to appropriate concurrent controls.

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 Sente Clare Piver February Semples Collected January 21, 2005

in Santa Clara River Estuary Samples Collected January 31, 2005

Sample	Form		Concentration (μg/L)						
<u>Janiple</u>	1 01111	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			
0-1	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).

	Concentration (μg/L)						
Sample	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	22	13	470	13-186 ^d	120		
EPA Freshwater Chronic CCC °	5.2	9.0	52	5 total	120		

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

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

^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

WATER-EFFECT RATIO

Copper EC $_{50}$ 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 EC $_{50}$ values calculated for estuary samples based on measured copper concentrations ranged from 31.6 to 92.5 μ g/L. For comparison, the mean EC $_{50}$ calculated for polished seawater spiked with copper was 17.9 μ g/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.

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.

^b Seawater from the Scripps Institute of Oceanography was sand filtered on-site prior to collection.

This seawater was used used to conduct a standard copper reference toxicant test included here, and in the laboratory reference toxicant control chart.

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

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).

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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
	Α	10	100			0.43		
Lab Control	В	10	100	98	5.0	0.42	0.43	0.03
Lab Control	С	10	100	30	0.0	0.40	0.40	0.00
	D	9	90			0.46		
Salinity	Α	10	100			0.28		
Control #1	В	8	80	85	19	0.32	0.32	0.05
(1.3 ppt)	С	10	100		10	0.40	0.02	0.05
A-2, B-1	D	6	60			0.28		
Salinity	Α	10	100	98		0.40	0.39	0.01
Control #2	В	9	90		5.0	0.37		
(0.7 ppt) B-3, C-1	С	10	100		3.0	0.39		
	D	10	100			0.39		
	Α	10	100	95		0.41	0.40	0.01
A-2	В	8	80		10	0.40		
A-2	С	10	100		10	0.38		
	D	10	100			0.41		
	Α	10	100			0.30		
B-1	В	9	90	95	5.8	0.36	0.34	0.03
B-1	С	9	90	33	5.0	0.37	0.04	
	D	10	100			0.33		
	Α	10	100			0.41		
B-3	В	10	100	98	5.0	0.37	0.37	0.03
D-3	С	9	90	30	0.0	0.33		0.00
	D	10	100			0.39		
	Α	10	100			0.38		
C-1	В	9	90	95	5.8	0.38	0.39	0.01
0-1	С	9	90	93	5.0	0.38	0.55	0.01
	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
	1	100		28		
Lab Control	2	100		27		
	3	100		28		
	4	100		27		
	5	100	90	25	23	8.4
Lab Control	6	100	30	24	20	0.4
	7	0		0		
	8	100		21		
	9	100		23		
	10	100		26		
Salinity Control #1	1	100		17		
	2	100		19	20	3.0
	3	100		16		
	4	100	100	19		
(2.2 ppt)	5	100		20		
A-2, B-1	6	100		22		
/. _ , _ .	7	100		16		
	8	100		22		
	9	100		22		
	10	100		25		
	1	100		24	22	3.6
	2	100		27		
	3	100		16		
	4	100		24		
A-2	5	100	100	26		
A-2	6	100	100	20		
	7	100		21		
	8	100		22		
	9	100		19		
	10	100		18		
	1	100		25		
	2	100		31		
	3	100		27		
	4	100		21		
B-1	5	100	90	31	27	4.2
D-1	6	100	90	26	27	4.3
	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
	1	100		28		
	2	100		27		
	3	100		28		
	4	100		27		
Lab Control	5	100	90	25	23	8.4
Lab Control	6	100	90	24	23	0.4
	7	0		0		
	8	100		21		
	9	100		23		
	10	100		26		
	1	100		24		
	2	100		25	24	3.9
	3	100	90	24		
Salinity Control #2	4	100		28		
(1.0 ppt)	5	100		24		
B-3, C-1	6	100		22		
2 0, 0 .	7	100		30		
	8	100		24		
	9	100		25		
	10	0		15		
	1	100		16	18	8.3
	2	100		20		
	3	100		7		
	4	100		24		
B-3	5	100	90	21		
	6	100	30	19		
	7	0		0		
	8	100		22		
	9	100		28		
	10	100		21		
	1	100		29		
	2	100		30		
	3	100		25		
	4	100		26		
C-1	5	100	100	25	27	0.4
0-1	6	100	100	25	27	2.1
	7	100		29		
	8	100		24		
	8 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.



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
	Α	0.100	12.9		12800	11525
Lab Control #1	В	0.100	12.8	11.6 +/- 1.46	12700	
Lab Control #1	С	0.100	9.9	11.0 +/- 1.40	9800	
	D	0.100	10.9		10800	
0-11-14-041-44	Α	0.100	13.4		13300	
Salinity Control #1 (1.3 ppt)	В	0.100	13.7	13.5 +/- 0.114	13600	13425
(1.3 ppt) Α-2, Β-1	С	0.100	13.5	13.5 +/- 0.114	13400	13423
	D	0.100	13.5		13400	
	Α	0.100	26.6		26500	
A-2 Filtered	В	0.100	24.1	25.7 +/- 1.12	24000	25575
A-2 Fillereu	С	0.100	25.8		25700	
	D	0.100	26.2		26100	
	Α	0.100	12.7	16.2 +/- 2.51	12600	
A-2 Unfiltered	В	0.100	16		15900	16075
A-2 Offintered	С	0.100	18.3		18200	10073
	D	0.100	17.7		17600	
	Α	0.100	22.5		22400	22850
B-1 Filtered	В	0.100	22.4	22.9 +/- 0.983	22300	
D-11 littered	С	0.100	24.4	22.5 +1- 0.903	24300	
	D	0.100	22.5		22400	
	Α	0.100	6.45		6350	
B-1 Unfiltered	В	0.100	5.15	7.53 +/- 3.41	5050	7438
D-1 Offittered	С	0.100	5.95	7.55 +7- 5.41	5850	
	D	0.100	12.6		12500	
Filtered Blank A-2	Α	0.100	0.05	NA	-50	NA
Unfiltered Blank A-2	Α	0.100	3.60	NA	3500	NA
Filtered Blank B-1	Α	0.100	0.21	NA	110	NA
Unfiltered Blank B-1	Α	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.

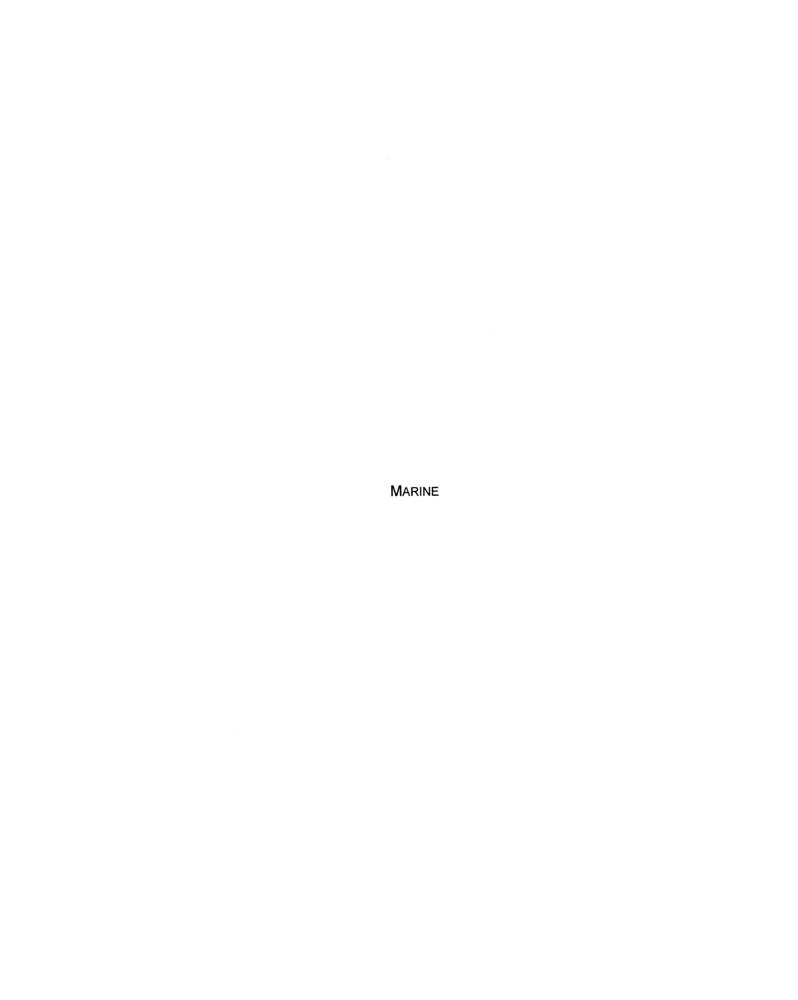
Appendix Table A-3 (Con'd). 96-Hour Algal Growth Inhibition Test Results City of Buenaventura

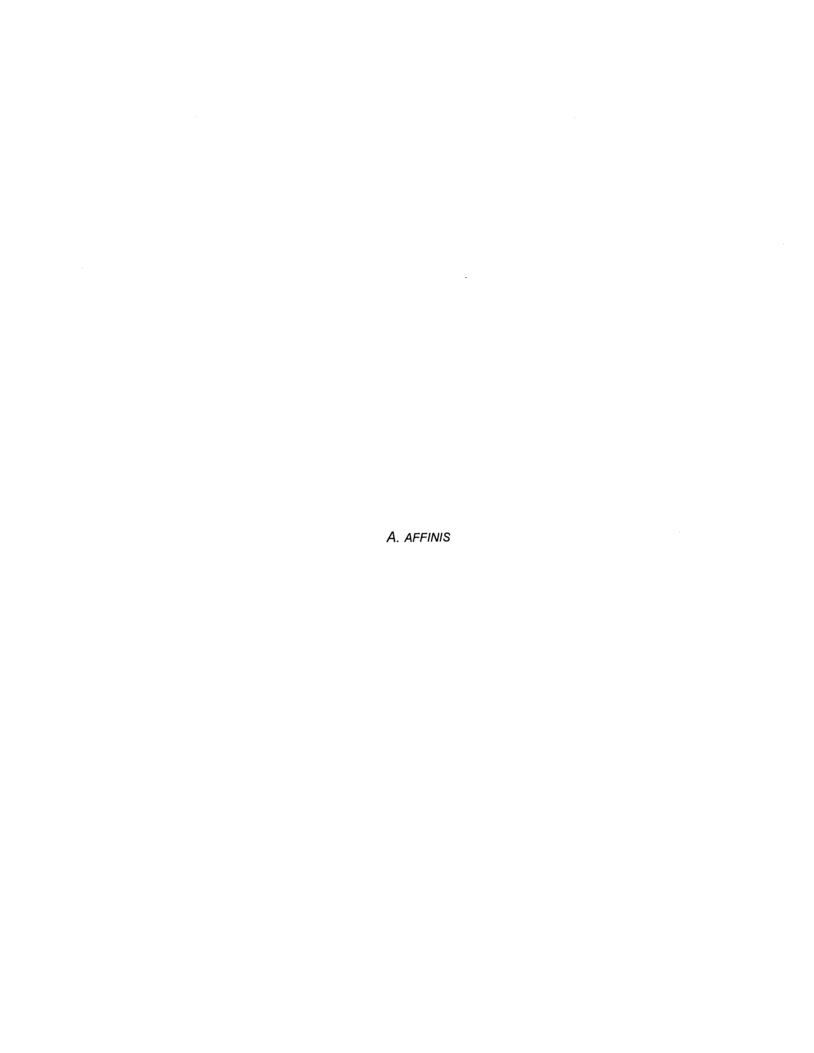
Santa Clara River Estuary Wet Weather Sampling Event

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
	Α	0.100	10.5		10400	
Lab Control #2	В	0.100	12.4	11.4 +/- 1.64	12300	11343
Lab Control #2	С	0.100	13.2	11.4 +/- 1.04	13100	
	D	0.100	9.67		9570	
0-11-14-0-4-1-140	Α	0.100	13.2		13100	
Salinity Control #2 (0.7ppt)	В	0.100	14.3	13.1 +/- 0.946	14200	13000
(о.7 ррг) В-3, С-1	С	0.100	12.8	13.1 +/- 0.946	12700	13000
	D	0.100	12.1		12000	
	Α	0.100	23.8	26.2 +/- 1.63	23700	26100
B-3 Filtered	В	0.100	26.6		26500	
D-3 Fillered	С	0.100	27.3		27200	
	D	0.100	27.1		27000	
	Α	0.100	17.9	14.5 +/- 2.26	17800	14475
B-3 Unfiltered	В	0.100	13.3		13200	
D-3 Offittered	С	0.100	13		12900	
	D	0.100	14.1		14000	
	Α	0.100	27.2		27100	26150
C-1 Filtered	В	0.100	25.9	26.2 +/- 0.668	25800	
O-11 intered	С	0.100	26	20.2 +/- 0.000	25900	
	D	0.100	25.9		25800	
	Α	0.100	9.19		9090	
C-1 Unfiltered	В	0.100	10.7	11.9 +/- 4.99	10600	44700
3-1 dillillered	С	0.100	19.2	11.8 7/- 4.88	19100	11763
	D	0.100	8.36		8260	
Filtered Blank B-3	Α	0.100	0.07	NA	-30	NA
Unfiltered Blank B-3	Α	0.100	3.31	NA	3210	NA
Filtered Blank C-1	Α	0.100	0.04	NA	-60	NA
Unfiltered Blank C-1	Α	0.100	2.41	NA	2310	NA

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





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
	Α	5	100			1.4		
	В	5	100			1.3		
Lab Control #1	С	5	100	100	0.00	1.3	1.3	0.11
	D	5	100			1.2		
	E	5	100			1,1		
	Α	4	80			1.1		
	В	5	100			1.2		
Salt Control #1	С	5	100	96	8.9	1.1	1.2	0.07
	D	5	100			1.2		
	Ε	5	100			1.3		
	Α	5	100			1.1		
	В	5	100			1.1		
25%	С	5	100	100	0.00	1.2	1.1	0.12
	D	5	100			1.0		
	E	5	100			1.3		
	Α	5	100			1.3		
	В	5	100			1.2		
50%	С	5	100	100	0.00	1.1	1.2	0.07
	D	5	100			1.3		
	E	5	100			1.2		
	Α	4	80			1.1		
	В	5	100			1.2		
69%	С	5	100	96	8.9	1.1	1.2	0.10
	D	5	100			1.3		
	E	5	100			1.3		
	A	4	80			1.0		
	В	4	80			0.94		
100%	C	5	100	92	11	1.2	1.1	0.14
	D	5	100			1.3		
	Ē	5	100			1.2		

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
	Α	5	100			1.4		
	В	5	100			1.3		
Lab Control #1	С	5	100	100	0.00	1.3	1.3	0.11
	D	5	100			1.2		
	E	5	100			1.1		
	Α	4	80			1.1		
	В	5	100			1.2		
Salt Control #1	С	5	100	96	8.9	1.1	1.2	0.07
	D	5	100			1.2		
	Ε	5	100			1.3		
	Α	5	100			1.1		
	В	5	100			1.2		
25%	С	5	100	100	0.00	1.2	1.2	0.05
	D	5	100			1.1		
	E	5	100			1.2		
	A	4	80			1.0		
	В	5	100			1.1		
50%	С	4	80	92	11	0.86	1.0	0.11
	D	5	100			1.2		
	E	5	100			1.0		
	Α	5	100			1.1		
	В	5	100			1.2		
69%	С	5	100	100	0.00	1.2	1.2	0.05
	D	5	100			1.2		
	E	5	100			1.3		
	Α	5	100			1.20		
	В	5	100			1.2		
100%	C	5	100	100	0.00	1.3	1.2	0.08
	D	5	100			1.1		5.55
	E	5	100			1.2		

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
	Α	5	100			1.3		
	В	5	100			1.3		
Lab Control #2	С	5	100	100	0.00	1.1	1.2	0.09
	D	5	100			1.1		
	E	5	100			1.2		
	Α	5	100			1.3		
	В	5	100			1.2		
Salt Control #2	С	4	80	96	8.9	1.0	1.2	0.11
	D	5	100			1.2		
	E	5	100			1.2		
	Α	5	100			1.0		
	В	5	100			1.1		
25%	С	5	100	96	8.9	1.3	1.1	0.12
	D	5	100			1.0		
	E	4	80			1.0		
	Α	4	80			1.2		
	В	4	80			1.1		
50%	С	5	100	92	11	1.2	1.2	0.10
	D	5	100			1.1		
	E	5	100			1.3		
	A	5	100			1.4		
	В	5	100			1.2		
69%	С	5	100	100	0.00	1.3	1.3	0.07
	D	5	100		5.55	1.3		0.0.
	E	5	100			1.3		
	A	5	100			1.0		
	В	4	80			1.2		
100%	C	5	100	88	11	1.2	1.1	0.09
	D	4	80			1.1		0.00
	Ē	4	80			1.0		

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
	Α	5	100			1.3		
	В	5	100			1.3		
Lab Control #2	С	5	100	100	0.00	1.1	1.2	0.09
	D	5	100			1.1		
	E	5	100			1.2		
	Α	5	100			1.3		
	В	5	100			1.2		
Salt Control #2	С	4	80	96	8.9	1.0	1.2	0.11
	D	5	100			1.2		
	E	5	100			1.2		
	Α	5	100			1.4		
	В	5	100			1.3		
25%	С	5	100	100	0.00	1.3	1.3	0.10
	D	5	100			1.2		
	E	5	100			1.2		
	Α	5	100			1.2		
	В	5	100			1.2		
50%	С	5	100	100	0.00	1.1	1.2	0.05
	D	5	100			1.2		
	E	5	100			1.3		
	Α	5	100			1.2		
	В	5	100			1.2		
69%	С	5	100	96	8.9	1.3	1.2	0.10
	D	5	100			1.2		
	E	4	80			1.0		
	Α	5	100			1.3		
	В	5	100			1.2		
100%	С	5	100	96	8.9	1.2	1.2	0.07
	D	4	80			1.1		
	E	5	100			1.3		



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
	A	5	100			0.29		
	В	5	100			0.25		
	C	5	100			0.18		
Lab Control #1	D E	5 5	100	98	7.1	0.22	0.22	0.04
	F	4	100 80			0.25		
	G	5	100			0.20 0.21		
	Н	5	100			0.18		
	A	5	100			0.29		
	В	3	60			0.18		
	Č	5	100			0.24		
	D	5	100			0.22		
Salt Control #1	E	5	100	90	15	0.23	0.23	0.04
	F	5	100			0.26		
	G	4	80			0.22		
	Н	4	80			0.17		
	Α	5	100			0.23		
	В	4	80			0.21	0.24	0.03
	С	5	100			0.25		
25%	D	5	100	98	7.1	0.24		
2376	E	5	100	90	7.1	0.25		
	F	5	100			0.23		
	G	5	100			0.23		
	Н	5	100			0.32		
	A	5	100		7.1	0.29	0.25	0.04
	В	5	100			0.28		
	С	5	100			0.26		
50%	D	5	100	98		0.30		
	E F	5 4	100 80			0.26		
	G	5	100			0.19 0.21		
	H	5	100			0.25		
	A	5	100			0.21		
	В	5	100			0.26		
	C	5	100			0.26		
	Ď	5	100			0.21		
69%	Ē	5	100	98	7.1	0.22	0.22	0.02
	F	4	80			0.20		
	G	5	100			0.22		
	H	5	100			0.22		
	Α	4	80			0.22		
	В	4	80			0.21		
	С	5	100			0.24		
100%	D	5	100	95	9.3	0.28	0.26	0.05
10070	E	5	100		3.5	0.24		
	F	5	100			0.37		
	G	5	100			0.25		
	Н	5	100			0.26		

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
	A	5	100			0.29		
	В	5	100			0.25		
	C	5	100			0.18		
Lab Control #1	D	5	100	98	7.1	0.22	0.22	0.04
	E F	5	100			0.25		0.0-1
	G G	4 5	80			0.20		
	Н	5	100 100			0.21 0.18		
	A	5	100			0.18		
	В	3	60			0.18		
	Č	5	100			0.24		
	D	5	100			0.22		
Salt Control #1	E	5	100	90	15	0.23	0.23	0.04
	F	5	100			0.26		
	G	4	80			0.22		
	Н	4	80			0.17		
	Α	5	100			0.22		
	В	5	100			0.22		
	С	5	100			0.23		
25%	D	5	100	98	7.1	0.21	0.23	0.03
2070	Ē	5	100	•••		0.29	0.20	0.00
	F	5	100			0.24		
	G	4	80			0.20		
	H	5	100			0.23		
	A B	5 5	100			0.17		0.03
	C	5	100 100			0.22 0.25		
	D	4	80			0.25		
50%	Ē	5	100	98	7.1	0.19	0.22	
	F	5	100			0.22		
	Ġ	5	100			0.24		
	H	5	100			0.25		
	A	5	100			0.21		
	В	5	100			0.23		
	С	5	100			0.22		
69%	D	5	100	100	0.00	0.20	0.33	0.00
03/0	Ε	5	100	100	0.00	0.27	0.22	0.02
	F	5	100			0.23		
	G	5	100			0.22		
***************************************	Н	5	100			0.20		
	A	4	80			0.18		
	В	5	100			0.21		
	С	5	100			0.26		
100%	D	5	100	98	7.1	0.17	0.22	0.04
	E F	5	100			0.21		
	G	5	100			0.19		
	H	5 5	100 100			0.23 0.28		

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
	Α	5	100			0.42		
	В	5	100			0.28		
	C	5	100			0.27		
Lab Control #2	D	5	100	98	7.1	0.26	0.27	0.07
	E	5	100			0.24		
	F G	4	80			0.19		
	H	5 5	100 100			0.27		
	Ä	5	100			0.21 0.24	····	
	В	5	100					
	Č	4	80			0.29 0.19		
	Ď	5	100			0.19		
Salt Control #2	Ē	5	100	98	7.1	0.22	0.23	0.04
	F	5	100			0.21		
	G	5	100			0.26		
	H	5	100			0.21		
	Α	4	80			0.24		
	В	5	100			0.31		
	С	10	100			0.20		
25%	D	10	100	95	0.2	0.22	0.22	0.08
25%	E	5	100	95	9.3	0.29	0.22	
	F	5	100			0.21		
	G	4	80			0.05		
	Н	5	100			0.24		
	Α	4	80			0.23		
	В	5	100			0.26	0.24	0.03
	C	4	80		11	0.24		
50%	D	5	100	90		0.27		
	E	4	80			0.28		0.00
	F	5	100			0.23		
	G	4	80			0.22		
	<u> </u>	<u>5</u>	100 100	W		0.19		
	A B	5	100			0.36		
	Č	5	100			0.27		
	D	3	60			0.22 0.15		
69%	Ē	5	100	95	14	0.13	0.24	0.06
	F	5	100			0.26		
	Ġ	5	100			0.21		
	H	5	100			0.21		
	A	4	80			0.22		
	В	4	80			0.20		
	Č	5	100		0.22 90 11 0.19			
4009/	D	4	80	00 44		0.00		
100%	Ē	5	100	90		0.23	0.20	0.03
	F	5	100	0.:		0.21		
	G	5	100		0.22			
	Н	4	80			0.14		

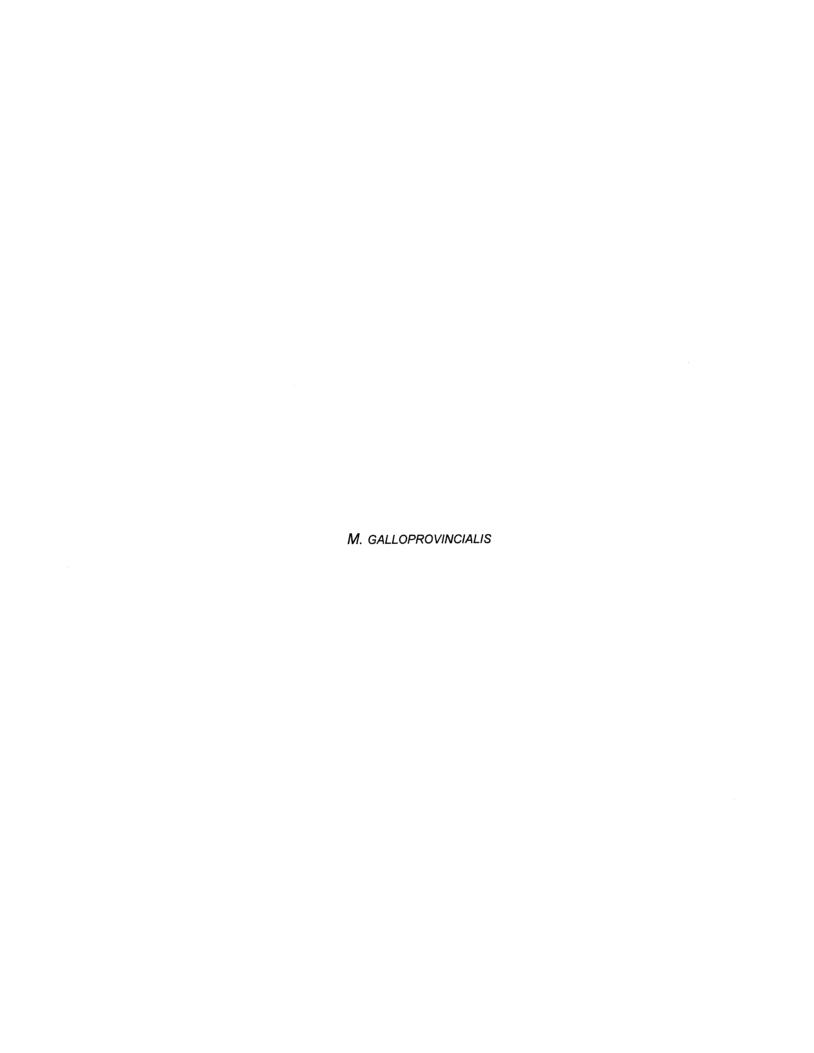
Appendix Table A-5 (Con'd). Site C-1 Opossum Shrimp 7-Day Survival and Growth Test Results City of Buenaventura

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
	A	5	100			0.42		
	В	5	100			0.28		
	C	5	100			0.27		
Lab Control #2	D	5	100	98	7.1	0.26	0.27	0.07
	E	5	100			0.24		0.07
	F	4	80			0.19		
	G	5	100			0.27		
	<u>H</u>	5	100	~		0.21		
	A	5	100			0.24		
	В	5	100			0.29		
	C	4	80			0.19		
Salt Control #2	D	5	100	98	7.1	0.20	0.23	0.04
	E	5	100			0.22		
	F	5	100			0.21		
	G	5	100			0.26		
	H	5	100			0.21		
	A	4	80			0.23		
	В	5	100			0.22		0.03
	С	5	100			0.26		
25%	D	4	80	93	10	0.17	0.22	
	E	5	100			0.21		
	F	4	80			0.21		
	G	5	100			0.20		
	н	5	100			0.23		
	A	5	100			0.26		0.03
	В	5	100		7.1	0.20	0.24	
	C	5	100			0.24		
50%	D	5	100	98		0.21		
	E	5	100			0.28		
	F	4	80			0.21		
	G	5	100			0.25		
	Н	5	100			0.27		
	A	5	100			0.21		
	В	5	100			0.24		
	С	5	100			0.20		
69%	D	5	100	100	0.00	0.20	0.22	0.02
	E	5	100			0.20		
	F	5	100			0.20		
	G	5	100			0.26		
	H	5	100			0.24		
	A	5	100			0.25		
	В	5	100			0.20		
	С	5	100			0.22		
100%	D	5	100	93	21	0.25	0.23	0.05
	E	5	100				0.29 0.23	
	F	5	100					
	G H	5 2	100 40		0.25 0.13			



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

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

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

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

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



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

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

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

Concentration ^a	Replicate	Percent Germinated	Mean Percent Germinated	Standard Deviation	Spore Length (μm)	Mean Spore Length (μm)	Standard Deviation
	Α	68			10		
	В	70			11		
Lab Control	С	67	73	6.1	14	11	1.4
	D	81			11		
	E	77			11		
	Α	83			11		
	В	73			11		
Salt Control	С	69	74	5.3	10	11	0.75
	D	72			10		
	E	75			11		
	A	76			13		
	В	78			14		
Brine Control	С	79	74	5.3	12	12	1.1
	D	72			12		
	E	66			12		
	Α	68			12	***************************************	
	В	71			14		
25%	С	79	76	7.4	14	13	0.86
	D	75			13		
	E	87			14		
	A	70			14		
	В	70			12		
50%	С	77	72	3.6	15	14	1.3
	D	75			15		1.0
	E	69			13		
	Α	71			17		
	В	73			14		
69%	С	74	72	1.3	14	15	1.2
	D	72			14	, •	
	E	71			15		
	A	74			15		
	В	69			12		
100%	C	70	72	3.2	14	13	1.5
	Ď	77	. -	- · · ·	12	.5	1.0
	Ē	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

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





CETIS Test Summary

Report Date:

15 Feb-05 2:30 PM

Link:

12-6853-7174/0502-031

Fathead Minn	ow 7-d Larval S	Survival a	nd Growth T		Nautilus Environmental (CA			
Test No: Start Date: Ending Date: Setup Date:	11-2737-7126 01 Feb-05 05: 08 Feb-05 01: 01 Feb-05 05:	00 PM 40 PM 00 PM	Protocol: Dil Water: Brine:	Diluted Min Frozen Sea	-02-013 (200 eral Water (water (fer	8:2) wntrol)	Duration: Species: Source:	Pimephales promelas Aquatic Biosystems, CO
Comments:	sample to the			ot) so a contr	oi was adde	d to match the	salinity. All an	nalyses were made comparing the
•	04-1606-8825 31 Jan-05 03: 31 Jan-05 10: 26h	20 PM	Material: Code: Source: Station:	0502-031	City of Buenaventura		Client: Project:	City of Buenaventura
Comparison S	Summary							
Analysis	Endpoint		NOEL			L ChV		Method
00-5449-0874 04-7825-2553	7d Proportion Mean Dry Bior		100 100	> 100 > 100		N/A N/A		Equal Variance t Equal Variance t
Test Acceptat	oility							
Analysis	Endpoint		Attrib	ute	Statistic	Acceptable	e Range	Decision
00-5449-0874	7d Proportion	Survived	Contro	l Response	0.85000	0.8 - N/A		Passes acceptability criteria
04-7825-2553	Mean Dry Bior	mass-mg	Contro	l Response	0.318	0.25 - N/A		Passes acceptability criteria
04-7825-2553	Mean Dry Bior	nass-mg	MSDp		0.17205	0.12 - 0.3		Passes acceptability criteria
7d Proportion	Survived Sum	mary						
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 Bio	mass-mg Sumi	mary						
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 Deta	il					7	
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 Bior	mass-mg Detai	I						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	0.42500	0.41900	0.39700	0.46000			
	Salt Control	0.28300	0.31500	0.39600	0.27800			
100		0.41100	0.39700	0.37900	0.40600			

Analyst;

Approval: 2714/) S

000-089-125-1

Comparisons:

Page 1 of 2

Report Date:

15 Feb-05 2:20 PM

Analysis:

00-5449-0874/0502-031

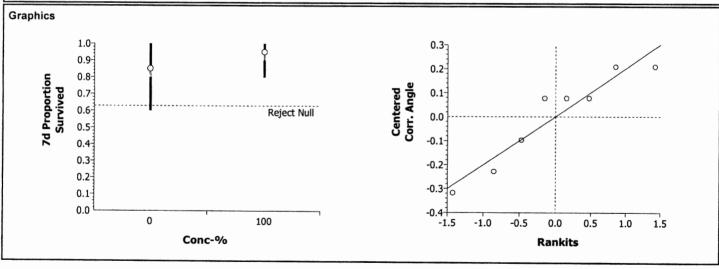
Fathead Minnow 7-d Larval	athead Minnow 7-d Larval Survival and Growth Test Nautilus Environmental (CA)									
Endpoint	Analysis 1	Гуре	Sam	ple Lin	ık (Control Link	Date Analyzed		Version	
7d Proportion Survived	Compariso	on	12-6	853-71	74	12-6853-7174	15 Feb-05 2:20	PM	CETISv1.025	
Method	Alt H	Data 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 Ran	ge l	Decisio	n					
Control Response	0.85000	0.8 - N/A	F	Passes acceptability criteria						

ANOVA Assun	nptions					
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	<u>-</u>			

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 Summ	ary			Origii	nal 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



Page 2 of 2

Report Date:

15 Feb-05 2:20 PM

Analysis:

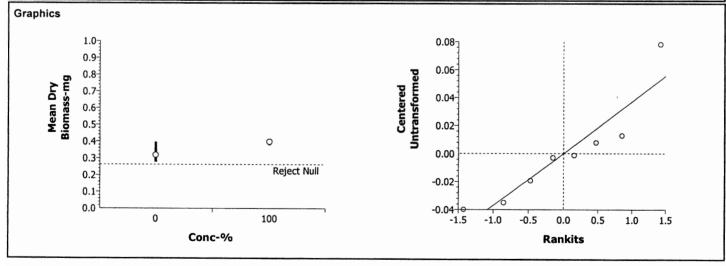
04-7825-2553/0502-031

CETIS Analysis Detail

Fathead Minne	ow 7-d Larval Survi	val and G	rowth Test						1	Nautilus	s Environme	ntal (CA
Endpoint		Analysis	Туре		Sample l	ink C	ontro	Link	Date Analyze	d	Version	
Mean Dry Biom	nass-mg	Comparis	on		12-6853-	7174 1	2-6853	3-7174	15 Feb-05 2:2	0 PM	CETISv1.02	5
Method	thod Alt H Data Transform Z NOEL LOEL				.OEL	Toxic Units	Ch\	/ MS	SDp			
Equal Variance	t t	C > T	Untransform	ed		100	>	100	1.00	N/A	17	.20%
Test Acceptab	ility											
Attribute		Statistic	Accepta	able Range	Deci	sion						
Control Respon	nse	0.318	0.25 - N	/A	Pass	es accep	tability	criteria				
MSDp		0.17205	0.12 - 0.	.3	Pass	es accep	tability	criteria				
ANOVA Assun	nptions											
Attribute	Test		Statistic	Critica	l F	Level		Decisio	n(0.01)			
Variances	Variance Ratio		14.99429	47.467	23 0	.05207		Equal V	ariances			
Distribution	Shapiro-Wilk W		0.87676	0.7493	5 C	.17218		Normal	Distribution			
ANOVA Table												
Source	Sum of Squa	res Me	an Square	DF	F Statis	tic P	Level		Decision(0.05	5)		
Between	0.0128801	0.0	12880	1	8.12	0.0	02917		Significant Effe	ect		
Error	0.0095127	0.00	01585	6								
Total	0.02239287	0.0	144656	7								

Group Comp	ariso	ns					
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				



							1	est Sr	ecies:	P. promelas				
Client Name:		City	f Duan	oventu	**									
Chefft Name:		City 0	Duen	aventu	га		-	Test Date: 2/1/2005						
Sample ID:		A-2, B	-1				_	Test No.: 0502-031, 032						
Conc.		1		~~~	Test	Day				Percent	nan wt	pan + fish		
(%)	Rep.	o	1	2	3	Day 4	5	6	7	Survival	pan wt.	1		
Lab Cont. #1	а	10	10		***********	to	10		10		(g)	(g)		
Lab Cont. #1	a	10	10	10	10	10	10004	10		100	0.63236	0.03655		
		10	10	10	10	16	10	10	10	100	0.02899	0.03318		
	d	10	a	9	9	9	9	9	10	90	0.62656	0.03053		
Salinity	a	10	io	10	10	 	_		+	100	0.02399	0.02859		
Control #1	<u>a</u>	10	10	10	9	10	9	18	8	80	0.02304	0.02587		
CONTO #1		10	10	10	10	160	10	8	10	100	0.02474	0.02789		
	d	10	10	9	7	7	1	10		60	0.000	0.02522		
A-2 100%		10		 	 		17	6	6		0.02384	0.02662		
A-2 100%	a b	10	10	10	10	10	10	10	18	100	0.03198	0.03609		
		10	(3	10	10	16	9	A 3	8	-88	0.02976	0.03373		
		10	(4	10	10	10		A 9 10		- VQQ	0.02679	0,03058		
D 4 4000/	d		10	10	10	10	10	10	10	100	0.02984	0.03390		
B-1 100%	a	10	10	10	9	10	10	10	10	100	0.02750	0.03054		
	b	10	10	10	10	9	9	9	9	90	0.02251	0.02615		
	C	10	ίυ	10		16	19	9	9	90	0.03/87	0.03554		
	d	10	10	10	10	10	10	10	10	100	0.02550	0,02880		
	a						ļ				7.3			
	b										919			
	С													
	d) di			
	а													
	b			<u> </u>										
	С													
	d													
	а													
	b													
	С													
	d													
Tech Initials		SD	RU	AH.	uc	me	Ry	#	42		Weigh	nt Data:		
Feeding Times	(dav	:	0	1	2	3	4	5	6		_	2-8-05/1515		
	(== ==)		·	0830	0830		.,		1915		Date/Time out:			
				1400	1430	1330	1130	1480	1400		Oven Temp (°C):			
			1730	1600	1545	1530	1430		1530	•	Tech Initials:			
			1750	11400	1- 10	1770	11.430	11100	11350		recir illitidis.	TH		
Comments:											QC Check: Final Review:			

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Test Species: P. promelas Client: City of Buenaventura

Start Date/Time: 2/1/2005 1700 Sample ID: A-2, B-1

End Date/Time: 2/8/2005 1340 **Test No:** 0502-031, 032

Concentration				Lab C	ontrol #1			
Day	0	1	2	3	4	5	~ 6	7
				lr.	nitial			
рН	1823	8.19	8.02	8.16	8.12	7.99	7.99	
DO (mg/L)	7.7	7.4	7.8	7,6	18	77.7	90	
Cond. (µmhos/cm)	213	204	215	201	204	203	203	
Temp (°C)	24.4	249	25.9	25.0	25.4	24	247	
				F	Inal			
рН		8.10	7.91	7.96	8.10	7.94	7.92	811
DO (mg/L)		7.1	10.5	6.1	6.4	6.2	4.3	(e)
Temp (°C)		251	252	243	24.0	24.1	24.3	24.8

Concentration	1			Salinity	Control #	#1 Ox.	1,3	PP+)
Day	0	1	2	3	4	5	6	7
				ln	itial			
рН	18,17	827	7.89	8.14	8.14	1506	8.01	
DO (mg/L)	7.0	8.1	7.9	7.7	7.9	1,7	75	
Cond. (µmhos/cm)	D240	2270	2223	2290	2270	22)0	2900	
Temp (°C)	24.4	25.0	25.cg	25.0	254	25.3	24.8	
**************************************				F	inal			
рН		8.07	757	7.81	7.83	7.84	7.83	7.82
DO (mg/L)		7,2	6.5	5.9	6.5	6.2	6.3	ie. Le
Temp (°C)		25.0	25.1	24.2	24.0	74.3	24.3	25-1

Concentration	A-2 100%									
Day	0	1	2	3	4	5	6	7		
				ln	itlal					
рН	1821	822	8.13	8.01	8.01	8,00	297			
DO (mg/L)	8.7	8.9	9.0	9.1	9.3	9.2	9.0			
Cond. (µmhos/cm)	2130	2120	SIDD	2120	2120	2.100	1909			
Temp (°C)	24.7	24.1	25.3	24.8	24.3	,25.)	24.4			
				F	inal	_				
рН		8,46	8.37	8.28	8.29	8.57	8.36	8:27		
DO (mg/L)		7.1	4-2	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		
				In	itial					
pН	D.81	7.85	7.76	7.76	7.92	7.87	7.88			
DO (mg/L)	8,9	9.0	9.1	4,3	9.7	9.5	9.1			
Cond. (µmhos/cm)	2240	2260	2240	2240	2266	2240	2030			
Temp (°C)	24.0	241	24.3	24.2	24.1	25.4	241			
				F	inal					
pH		8.33	8.16	8.10	8.15	8.07	8.21	8.0		
DO (mg/L)		7.0	U-3	2.8	63	62	6,4	58		
Temp (°C)		24.1	25.0	24,2	24.0	24.2	24 2	25.)		

Analysts:

Initial:

2 3 4 S> 24 66 MC 20 Rly me 412 FR. Ry Final:

Comments:

Animal Source/Date Received:

ABS / 2-1-05

Animal Age at Initiation: < 48 hours

QC Check:

Final Review: 2/24/09

CETIS Test Summary

Report Date:

15 Feb-05 2:30 PM

Link:

07-3934-3719/0502-032

Fathead Minn	ow 7-d Larval S	Survival a	nd Growth T	est				Nautilus Environmental (CA
Test No: Start Date: Ending Date: Setup Date: Comments:	11-2737-7126 01 Feb-05 05:0 08 Feb-05 01:4 01 Feb-05 05:0 The sample was sample to the s	10 PM 00 PM as slightly	Protocol: Dil Water: Brine: saline (1.3 p	Diluted Min	-02-013 (2002 eral Water (8: water (चि <i>र</i> ट	2) ontroi)	Duration: Species: Source: salinity. All an	6d 20h Pimephales promelas Aquatic Biosystems, CO alyses were made comparing the
	17-0778-5011 31 Jan-05 02:3 31 Jan-05 10:1 27h		Material: Code: Source: Station:	Estuarine M 0502-032 City of Bue B-1	Monitoring San	nple	Client: Project:	City of Buenaventura
Comparison S	Summary							
Analysis	Endpoint		NOEL	LOI	EL C	hV	MSDp	Method
	7d Proportion S Mean Dry Bion		100 100	> 100 > 100		/A /A	23.38% 19.01%	Equal Variance t Equal Variance t
Test Acceptat	bility							
Analysis	Endpoint		Attrib	ute	Statistic	Acceptable	e Range	Decision
14-1037-6390	7d Proportion	Survived	Contro	ol Response	0.85000	0.8 - N/A		Passes acceptability criteria
09-0164-7620	Mean Dry Bion	nass-mg	Contro	ol Response	0.318	0.25 - N/A		Passes acceptability criteria
09-0164-7620	Mean Dry Bion	nass-mg	MSDp		0.19009	0.12 - 0.3		Passes acceptability criteria
7d Proportion	Survived Sum	mary						
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 Bio	mass-mg Sumr	nary						
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 Deta	il						
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			
					4 00000			
100		1.00000	0.90000	0.90000	1.00000			
· · · · · · · · · · · · · · · · · · ·	mass-mg Detail		0.90000	0.90000	1.00000	W		
Mean Dry Bio	mass-mg Detail		0.90000 Rep 2	0.90000 Rep 3	Rep 4			
Mean Dry Bio	-							

Analyst:_______

Approval: 2/24/05

100

0.30400

0.36400

0.36700

0.33000

Page 2 of 2

Report Date:

15 Feb-05 2:28 PM

Analysis:

14-1037-6390/0502-032

CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test Nautilus Environmental (CA)									
Endpoint	Analysis	Туре	Sample L	ink	Control Link	Date Analyzed	ı	Version	
7d Proportion Survived	Comparis	Comparison		719	12-6853-7174	15 Feb-05 2:26	S PM	CETISv1.025	
Method	Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	Ch\	/ MSDp	
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	23.38%	

Test	Accep	tabi	lity

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

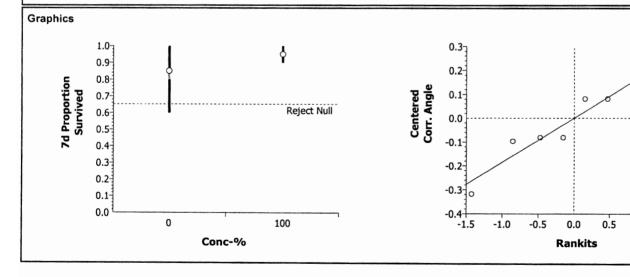
ANOVA Table

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 Summa	ary			Origi	nal 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	



Analyst:

Approval: 2/24/85

1.5

1.0

Page 1 of 2

Report Date:

15 Feb-05 2:28 PM

Analysis: 0

09-0164-7620/0502-032

CETIS Analysis Detail

Fathead Minnow 7-d Larval	Survival and (Growth Test				N	lautilus	Environmental (CA)
Endpoint	Analysi	s Type	Sample L	ink	Control Link	Date Analyzed	i	Version
Mean Dry Biomass-mg	Compar	ison	07-3934-3	3719	12-6853-7174	15 Feb-05 2:26	6 PM	CETISv1.025
Method	Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed		100	>100	1.00	N/A	19.01%
Tost Assentability								

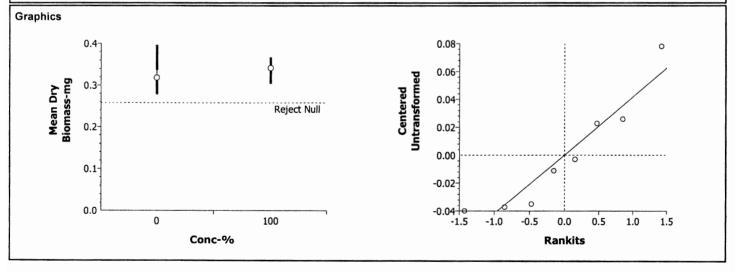
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.318	0.25 - N/A	Passes acceptability criteria
MSDp	0.19009	0.12 - 0.3	Passes acceptability criteria

ANOVA Assum	ptions					
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 Comp	ansu	113						
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 Summ	ary		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

16-9749-5672/0502-033

Fathead Minn	ow 7-d Larval S	Survival a	nd Growth T	est				Nautilus Environmental (CA
Test No: Start Date: Ending Date: Setup Date: Comments:	06-5114-4566 01 Feb-05 05:0 08 Feb-05 02: 01 Feb-05 05:0 The sample wa	10 PM 00 PM as slightly	Protocol: Dil Water: Brine: saline (0.7 pr	EPA/821/R Diluted Min Frozen Sea	Growth-Survival (7d) EPA/821/R-02-013 (2002) Diluted Mineral Water (8:2) Frozen Seawater (for control) i) so a control was added to match the		Duration: Species: Source:	6d 21h Pimephales promelas Aquatic Biosystems, CO
	sample to the	salinity co	ntrol.					
Sample No:	08-9283-1651		Material:		fonitoring San	nple	Client:	City of Buenaventura
	31 Jan-05 12:1		Code:	0502-033			Project:	
	31 Jan-05 10:1	10 PM	Source:	City of Bue				
Sample Age:	29h		Station:	B-3 - (+0)	control)	-		
Comparison S	Summary							
Analysis	Endpoint		NOEL			hV	MSDp	Method
04-4501-9617	•		100	> 100		/A	7.07%	Mann-Whitney U
18-0212-1022	Mean Dry Bion	nass-mg	100	> 100	N	I/A 	9.37%	Equal Variance t
Test Acceptab	oility							
Analysis	Endpoint		Attrib	ute	Statistic	Acceptabl	e Range	Decision
04-4501-9617	7d Proportion	Survived	Contro	ol Response	0.975	0.8 - N/A		Passes acceptability criteria
18-0212-1022	Mean Dry Bion	nass-mg	Contro	ol Response	0.38725	0.25 - N/A		Passes acceptability criteria
18-0212-1022	Mean Dry Bion	nass-mg	MSDp		0.09373	0.12 - 0.3		Fails acceptability criteria
7d Proportion	Survived Sum	mary						
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 Bio	mass-mg Sumr	mary						
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 Deta	il						
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 Bio	mass-mg Detai	l						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	0.42500		0.39700	0.46000			
0	Salt Control	0.40300		0.39100	0.38800			
100		0.40700	0.37000	0.32600	0.38500			

Analyst: AH

Approval: 2/24/05

Comparisons:

Page 1 of 2

15 Feb-05 2:38 PM

Report Date:

CETIS An	nalysis Detail								Report Date Analysis:		15 Feb-05 2:38 PN 04-4501-9617/0502-03
Fathead Minne	ow 7-d Larval Survi	val and	Growth Test						h	Nautilus	Environmental (CA)
Endpoint		Analysi	s Type		Sample	Link	Contro	l Link	Date Analyze	d	Version
7d Proportion S	Survived	Compar	ison		16-9749	-5672	16-9749	9-5672	15 Feb-05 2:3	8 PM	CETISv1.025
Method		Alt H	Data Trans	form	z	NOE	L I	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney	U	C > T	Angular (Co	orrected)		100	;	>100	1.00	N/A	7.07%
Test Acceptab	oility										
Attribute	•	Statistic	c Accept	table Rai	nge Dec	ision					
Control Respon	nse	0.975	0.8 - N	/A	Pas	ses acce	ptability	y criteria		**	
ANOVA Assur	nptions										
Attribute	Test		Statistic	Crit	ical	P Level		Decisio	n(0.01)		
Variances	Variance Ratio		1.00000	47.4	6723	1.00000		Equal V	ariances		
Distribution	Shapiro-Wilk W		0.56623	0.74	935	0.00002		Non-nor	rmal Distribution	n	
ANOVA Table											
Source	Sum of Squa	res M	ean Square	DF	F Stati	stic F	2 Level		Decision(0.05	5)	
Between	0	0		1	0.00		1.00000)	Non-Significan	nt Effect	
	0.039839	0.	00664	6							
Error	0.00000										

Control	vs Conc-	/6	Statistic	Critical	P Level	Ties	Decisio	on(0.05)		
Salt Control	100		8		0.4429	2	Non-Si	gnificant Effect		
Data Summa	ary			Origi	nal Data			Transfo	rmed 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

Graphics			
7d Proportion Survived	1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0	100	O.05 O.00 O.05
	Co	onc-%	Rankits

Comparisons:

Page 2 of 2

Report Date:

15 Feb-05 2:38 PM

Analysis:

18-0212-1022/0502-033

CETIS	Analysis	Detail
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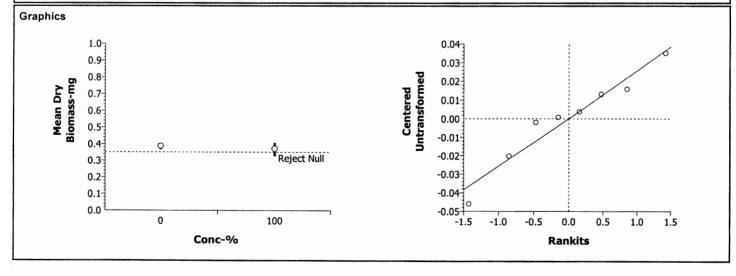
Fathead Minnow 7-d Larval Survival and Growth Test Nautilus Environmental (CA)											
Endpoint Analysis Type Sample Link Control Link Date Analyzed Ver											
Mean Dry Biomass-mg	Comparisor	1	16-9749-5672 16-9749-5672		15 Feb-05 2:38 PM		CETISv1.025				
Method	Alt H [Data Transform	Z	NO	EL	LOEL	Toxic Units	ChV	MSDp		
Equal Variance t	C > T (Intransformed		100)	>100	1.00	N/A	9.37%		
Test Acceptability											
Attribute	Statistic	Acceptable Rang	e Dec	ision							
Control Response	0.38725	0.25 - N/A	Passes acceptability criteria								
MSDn	0.09373	0.12 - 0.3	Fails acceptability criteria								

ANOVA Assump	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				
D 4 0											

Data Summa	iry			Origin	nal 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					



Analyst: A

Approval: 2174/06

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		pan wt.	pan + fish
	кер.	0	1	2	3	4	5	6	7	Survival	rvival	(g)	(g)
Lab Cont. #2	_a	10							111111111111111111111111111111111111111				
	b	10											
	С	10											
	d	10											
Salinity	а	10	10	10	10	16	10	10	10	100		0.02460	0.02863
Control #2	b	10	100	19	9	9	9	9	9	100		0.02537	0.02904
	С	10	10	10	10	10	10	10	10	100	3.762 97.38		0.03039
	d	10	10	10	10	16	10	10	10	iw		0.02729	0.03117
B-3 100%	а	10	10	10	10	16	10	10	10	100		0.02858	0.03265
	b	10	10	10	10	10	(5)	10	10	100		0.02998	0.03368
	С	10	9	9	9	9	9	9	9	90		0.02333	0,02659
	d	10	10	10	10	10	Lu	(0	10	100		0.02892	0,03277
C-1 100%	а	10	10	io	10	10	10	10	10	100		0.02732	0,03115
	b	10	10	9	9	9	9	9	9	90		0 02478	0,02855
	С	10	(0	10	9	9	9	9	9	90		0.02527	0,02910
	d	10	()	10	10	10	Là	10	10	100		0.02891	0.03299
	а												
	b												
	С										(E) 1.50		
	d										200		
	а										WA.		
	b												
	С										(3)44		
	d										100		
	а												
	b												
	С												
	d												
Tech Initials		5	Rh	AH	mal	MI	Rls	ALI	90_		_ '		

Feeding Times (day):

0 1 2 3 4 5 6 - 0830 0830 0815 CTIU 1000 CP15 - 1400 1430 1330 1130 1400 1400 1730 1600 1540 1530 1480 1900 1550

Comments: See A-2,8-1 for lab control data

Weight Data:

Date/Time in: 2.8.05/1515Date/Time out: 2.10.05/1025Oven Temp (°C): 6.8Tech Initials: 4.8

QC Check: At Z/15/05 Final Review: (XXX 2/14/00)

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Client: City of Buenaventura Test Species: P. promelas 1700 Sample ID: B-3, C-1 Start Date/Time: 2/1/2005 End Date/Time: 2/8/2005 Test No: 0502-033, 034 1410 Concentration Lab Control #2 Day 0 2 3 5 6 7 Initial рН DO (mg/L) Cond. (µmhos/cm) Temp (°C) Final pН DO (mg/L) Temp (°C) 0.7 PP+ Salinity Control #2 Concentration Day 0 1 2 3 5 Initial 8.i6 7.6 8.04 7.5 pН 8.17 79 DO (mg/L) 7.9 Cond. (µmhos/cm) BUO 1377 1262 25.4 Temp (°C) 24 25.0 25. Final & 7.96 8.07 7.82 8.02 рΗ 8.00 DO (mg/L) 10.4 5.4 5.8 6.0 7,1 24.2 Temp (°C) 249 24.8 242 24.0 Concentration B-3 100% 2 3 6 7 Day 0 1 5 8.20 Initial 8,10 рΗ 9,0 9.0 9.4 DO (mg/L) 1197 1196 1190 494 Cond. (µmhos/cm) 1194 135CM 25.4 24.3 Temp (°C) 24. 24.7 24.1 Final 855 8.44 8.31 28.39 pН 8.34 8.26 8.21 6.1 DO (mg/L) 7,0 6.0 6.1 Temp (°C) 24,6 24.4 24.7 C-1 100% Concentration 7 Day 2 3 6 0 1 5 Initial 6.20 8.08 pН 8.10 811 9,0 9 9.4 DO (mg/L) 0 J. 3 91,-9.0 1234 Cond. (µmhos/cm) 1265 124 1538 1256 1118 24.8 249 Temp (°C) 24-1 7.4.5 Final 6,29 6,2 8.39 8.32 pН 8.32 8.33 6,9 6.2 0 DO (mg/L) 7.0 €3. C 65 25.1 Temp (°C) 248 24 24.7 2 3 4 5 6 30 SD 3) ≤₩ CCM Analysts: Initial: 24 30 27 SH Ry MC 72 Final: Comments: ABS / 2-1-05 Animal Source/Date Received: Animal Age at Initiation: < 48 hours

QC Check:

Report Date: 15 Feb-05 2:45 PM

Link:

Project:

11-5192-2119/0502-034

Nautilus Environmental (CA)

Test No: 06-5114-4566 Test Type: Growth-Survival (7d) Duration: 6d 21h

0502-034

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 (fir control)

Code:

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

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		

	oility				
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 Propor	d 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 Sum	mary									
		_									

Wean Dry B	mean bry blomass-ing 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%			

ion Survived Deta	d i l			
Control Type	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.00000	1.00000	1.00000	0.90000
Salt Control	1.00000	0.90000	1.00000	1.00000
	1.00000	0.90000	0.90000	1.00000
	Control Type Lab Control	Lab Control 1.00000 Salt Control 1.00000	Control Type Rep 1 Rep 2 Lab Control 1.00000 1.00000 Salt Control 1.00000 0.90000	Control Type Rep 1 Rep 2 Rep 3 Lab Control 1.00000 1.00000 1.00000 Salt Control 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		0.38300	0.37700	0.38300	0.40800				

Analyst:

Approval: Approval

Page 2 of 2

Report Date:

15 Feb-05 2:45 PM

Analysis:

13-6457-1721/0502-034

CETIS Analysis Detail

Fathead Minnow 7-d Larval	Survival and C	Frowth Test			Nautilus Environmen				
Endpoint	Analysis	Туре	Sample Link		Control Link	Date Analyzed		Version	
7d Proportion Survived	Compari	Comparison		119	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%	

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

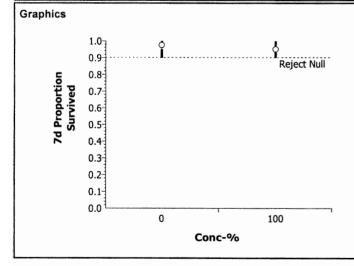
ANOVA Table

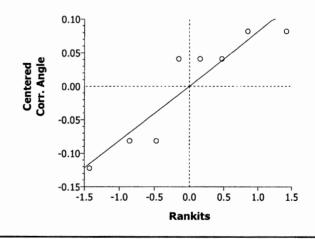
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0033199	0.00332	1	0.43	0.53696	Non-Significant Effect
Error	0.0464788	0.007746	6			
Total	0.04979875	0.0110664	7	_		

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 S	ummary			Origi	nal Data			Transformed Data			
Conc-9	6 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	





Analyst: AH

Approval:

Page 1 of 2

Report Date:

15 Feb-05 2:45 PM

CETIS Analysis De	etail			Report Date: Analysis:	09-8245-3264/0502-034
Fathead Minnow 7-d Larval	Survival and Growth Test			Nautil	us Environmental (CA)
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

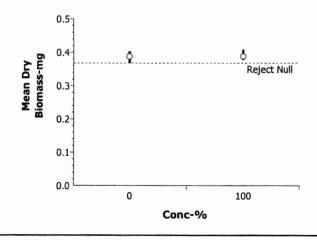
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	5.001E-07	5.00E-07	1	0.00	0.96242	Non-Significant Effect
Error	0.0012435	0.000207	6			
Total	0.00124401	0.0002078	7	- -		

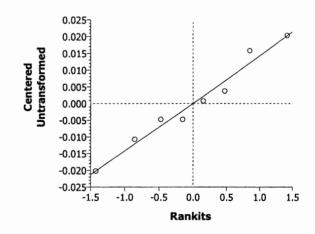
Group Comparisons

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 Summa	ıry		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	0.38775	0.37700	0.40800	0.01379				

Graphics





C. DUBIA

Report Date:

24 Feb-05 11:20 AM

Link:

17-3049-9849/0502-035

Nautilus Environmental WA

Test No:

01-1942-5425

Test Type: Reproduction-Survival (7d)

Duration:

6d 23h

Start Date: **Ending Date:**

02 Feb-05 04:20 PM 09 Feb-05 03:30 PM Protocol: EPA/821/R-02-013 (2002) Dil Water: Diluted Mineral Water (8:2) Species:

Ceriodaphnia dubia

Setup Date:

Estuarine Monitoring Sample

Source:

In-House Culture

Comments:

02 Feb-05 04:20 PM

Brine: Frozen Seawater

The sample was slightly saline (2.2ppt) so a control was added to match the salinity. Analyses were made comparing the sample

Client: City of Buenaventura

Sample No: 06-6609-1492

Material: Code:

0502-035

Project:

Receive Date: 02 Feb-05 09:40 AM

Sample Date: 31 Jan-05 03:20 PM

Source:

City of Buenaventura

Sample Age: 49h

Station: A-2

Comparison Summary

10-1703-8234 Reproduction

Analysis **Endpoint** 7d Proportion Survived 15-9259-8070

NOEL 100 100

LOEL > 100 > 100

ChV N/A N/A

to the salinity control. Due to a poor Ceriodaphnia culture in San Diego, samples were sent to the northwest lab for testing.

MSDp N/A 12.85% Method Fisher's Exact 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

74	Proportion	Survivad	Summanı
/a	Proportion	Survivea	Summarv

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 Surv	ived	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

000-089-125-1 CETIS™ v1.025B

Page 1 of 1

CETIS A	nalysis Deta	ail					Report Date Analysis:		24 Feb-05 11:20 AM 5-9259-8070/0502-03
Ceriodaphni	a 7-d Survival and	Reproduction	Test	/ #- 				Nautilus	Environmental WA
Endpoint 7d Proportion	n Survived	Analysis Type Comparison		Sample L 17-3049-9		ntrol Link 3049-9849	Date Analyzed		Version CETISv1.025
Method Fisher's Exac	at		Data Transform Untransformed		NOEL 100	LOEL >100	Toxic Units	ChV N/A	MSDp
Test Accepta Attribute Control Respo		Statistic 1	Acceptable R			bility criteria			
Group Comp Control Salt Control	oarisons vs Conc-% 100	Statistic 1.00000	Critical 0.05000	Decision(0.0					
Data Summa Conc-% 0 100	Control Type Salt Control	Non-Respor	nders Responde 0 0	rs Total Ob	served				
7d Proportion Survived	1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1		100						
	Ü	Conc-%	100						

Page 1 of 1

Report Date:

24 Feb-05 11:20 AM

Analysis:

10-1703-8234/0502-035

CETIS Analysis Detail

Version
05710 4 005
CETISv1.025
/ MSDp
12.85%

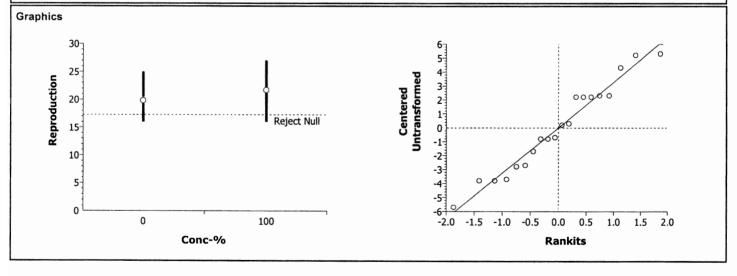
Ι.	est Acceptability			
A	Attribute	Statistic	Acceptable Range	Decision
C	Control Response	19.8	15 - N/A	Passes acceptability criteria
V	MSDp	0.12848	0.13 - 0.47	Fails acceptability criteria

ANOVA Assum	nptions					
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	_		

ControlvsConc-%StatisticCriticalP LevelMSDDecision(0.05)Salt Control100-1.29511.734060.89422.54395Non-Significant Effect	
Salt Control 100 1 2051 1 73406 0 8942 2 54305 Non Significant Effect	
Sair Control 100 -1.2951 1.75400 0.8942 2.54595 Non-Significant Effect	

Data Summ	ary			Origiı	nal 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				



Analyst:

Approval: 41105

Montaine Contractor

Review.

Ceriodaphnia Brood Board

	Date/T	ime sta	erted:	1/25	915		Tech	CP)
	Day	1	2	3	4	5	6	7	В
	Date	1/26	1/27	1/28	1/29		Y31	301	2/02
	Time	GOD	0915	1130	1/29		0930	1000	0530
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5	/	-	_	5	10	-	X	
6	,	_	_	5	9	_	13	14
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21	1	-	-	5	9	`	11	12
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30		-	4		9		4	10 8
Tech	CD	1889	SH	MA	18A	CP	CP	CP

Day	1	2	3	4	5	6	7	8
Date	Y26	1/27	1/28			Y31	401	2/02
Time						0930	loves	0940

Cont#								
31	-	-	5	_	10	15	14	~
32	-	-	4	-	9	10	12	_
33	,	-	4	7	-	8	13	9
34	-	-	3	-	10	14	12	-
35	1	-	4	-	9	15	11	-
36	١	1		6	1	1)	15	-
37	1	1	7	ı	7	11	_	15
38	1	1	-	4	10	11	_	14
39	١	1	4	-	10	14		13
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42	١	1	1	5	10	1	X:-	
43	١	١	1	6	7	_	10.	13
44	١	-	,	6		-	14	15
45	1	1	١	6	9	-	10	13
46	١	1)	6	10	1	12	14
47	١	1	_	5	11		12	15
48	1	+	•	5	8	1	12	13
49	1	-	6	,	10	11	15	1
50	1	-	5	1	9	14	14	-
51	1	_	5	ļ	11	14	1	-
52	-	,	5	ļ	10	11		-
53	-	-	١	6	9	1	12	11
54		-	1	5	10	_	12	12
55		-		5	10	-	14	12
56			_	4	9	,	Ш	
57		-	1	6	10	-	11	14
58	-	-	_	6	10	-	13	14
59	,	-	_	5	9	_	13	15
60		_		1	10	_	13	14
Tech	4	SM	M	MR	MA	CP	CP	CP

Test Set Up

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

Client: Buenaventura Start Date: 2/2/05

Test#: 0502-035 3038

Nautilus Environ mental AMEC Earth and Environmental Northwest Bioassay Laboratory

Review. 2/24/05

	Nautilus Environmen	tal						Initial an	d Final	Chemisti	ics					
	Northwest Laborat	ory						Seven D	ay Chron	nic Fresh	water B	oassay				
	Client:	Bu	enav	entres	18.			Start Da	te & Tin	ıe:	2/2/	05	162	0		
	Sample ID.	A-2.6	3-1.3	- 2 ;-	er			Stop Da	te & Tir	ne:	2/9/	05	153			
	Test No:	050	2 -05	- All	.	44		Test Spe	cies:	Cer	iedas	hnia	Lubio			
	DTOST ID'S	0502	- 0	35-	D2	87			•		-					
								Da	ys							
	Concentration	0			1	2	:	3		-	1		5		5	
	control 8:2		1171号第	The same		10年刊明				20113	行門場			ALL SHOP SHOP	图 沙默定	
- 1	рН	1119	9 24	8.03	7.13	9-15	8.39	8-19	8.29	8-20	8/1	8.03	8.50	8.12	8-38	যে
	DO (mg/l)	77.7	7.3	73	7.6	8.2	7.7	8-8	9.1	8.0	7.8	10:24	7.4		8-2	×8.5
1	Cond. (µmhos-cm)	161	176	80	168	158	171	170	172	171	177	101	207-	162	179	
1	Temperature (°C)	21.5	24.6	25.0	25.2	24.9	25.1	24.0	24.3	25.0	35.5	35.0	24.7	25.5	25.0	
1		-	<u> </u>					Da	ys							
	Concentration	0			1	2	:	3	,		1		5	(6	
~	con. 1-0 Salinet		" 建羅 但		7	1011 E						(III) SETTING		Title:	建工程 格	
B-3	pН		8.19	8.06	8.14	8-12	8.35	8.17	8.32	8-19	3.14	8.01	8.52	3,05	8-27	<u></u>
4	DO (mg/l)	8,2	7.3	7.4	7.7	8-0	8-0	8-1	8-3	8.3	8.7	40.8	7.4	8.4	8-3	×8.6
(-1	Cond. (µmhos-cm)	1950	2030	1857	1785	1954	1926	1862	1908	1979	3030	1850	1974	1521	2000	
	Temperature ('C)	24.5	24.6	25.0	25.2	24-9	25.1	24.0	24.3	25-0	ass	250	24.7	255	25-0	
								Da	ys							
	Concentration	0			1	_2	2	3	3		4	!	5		6	
×	con . 2.2 salinity											Medical mass	725 h			
1-2	рН	8.01	213	797	8.08	8-10	8.27	8-16	8-25	8-15	808	8.00	8.47	8 23	3-51	
A-2 B-1	DO (mg/1)	8.4	7.7	7.3	7.3	8-1	8.0	8-0	8.2	8-4	7.3	10.4	7.5	83	_	* 8.6
15	Cond. (µmhos-cm)	3840	3980	3500	3760	3990	<u> 3890</u>	3880	3960	3940	3980	3830	4110	3900	4060	
	Temperature (°C)	24.5	24.6	25.0	25,2	24.7	25-1	24.0	24.3	25-0	a5,5	35.0	24.7	25.5	25.0	
								Da	rys							
	Concentration	0	and the second	mile water to	1	2	·	3	10852	OH/Diving a con-	4		5	-1117.00 Careton	6	
	SCRE A-2				VID.						E					
	pН	8,00	<i>%</i> .55	8.24	8.50	8:17	8-67	8.20	8-68		7,55	8.15	8.7	7116	8.69	~^
	DO (mg/l)	3,7	7,5	7.6	7.9	8.2	7.8	8.4	8.3	8.3		10.5		9.8		×8.9
	Cond. (µmhos-cm)	3010	4140	380	4000	340	4030	3780	4020	4140	4170		41903	890	4200	
	Temperature (°C)	24.5	24.4	25.0	25.2	24-9	25-1	24-0	<u> 24.3</u>	25-0	255	250	24.7	25.5	25-0	
								Da	ys	·						
	Concentration	0	San Direct Start cell for comme	Convey over	1	en en d'aller	2	CHACTER NAME OF	La reconstitu	Mary be at 10 to	4	REFER PROPERTY.	5	and the second	Strategy and	1
	SCRE B-1															
	pH	7.81	8.57		8.56	1.87	8-70	1-87	8- 99	8.03	8.56	7.78	0.74	1.17	8-73	0.
	DO (mg/l)	7.7	7.7	7.6	75	8-2	8.2	8-8	8.3	8-5	7.1	10.9	1.5	24	8.8	*9.0
	Cond. (µmhos-cm)	-	3160	_	2090	2070	2100	1755	2080	2130	3160		280	7	2180	
	Temperature (°C)	24-5	24.4	25.0	24.2	24.4	125-1	24.0	24.5	25-0	as.5	aso	24.7	25.5	25.0	ĺ
								Da	Lys .			Τ				
	Concentration	0		(10元) (10.00 (1	1 ************************************	PRINCEPHE E	ट स्टान्टाहर अभगस्य	Carrier Proc 18	Sugarano area	Out Perferbiell	4 messenicas	Total and the second	5	227:5291clei	D Secretaria	l
	SCRE B. 3	E		The County of Lands			1			福文思。 [1]					靈 加麗	į.
	pH	100	79	420	3	3.22			8-16		260	V. 8	3.77	13.19	2-66	
	DO (mg/l)	Rich		1099	1125	1091	8.4	1055	1101	1147	1155	1140	11/-2	1000	3.7	
	Cond. (µmhos-cm) Temperature (°C)	1 3 3 3	1145		11/	24.9	110 t	24.0	21 3			35.0	1162	1070	25 1	İ
	Temperature (C)	24-5	24.6			24-1	77.1	27	741-2	23.0	43,3	14-10	Let 1	100	2 3.0	İ
				*	8.2											,
		Con	tral	50	RE 192	SCRE	12/	SCRE	R7	GRECI	Analyst		JOIL!	QL.	SH c	P
	Hardness*	80				32		33		1	Analy 31	" <i>K</i>	MW.	W	yn C	•
	Alkalinity*	3	4		100	18		20		300	Review	ed:	adiz	2.124	-116	
	Initial Chlorinel			20-		<0.		20		20.03		Lu.	VICA.	4	100	
	Ammonia I				0	21-		21	-	1			V			
	*mg/L as CaCO3; I mg		no chlor							141-0						
	argy L as Cacos, 1 m)	5 L, 11 D, 1	TO CHIOI													
	Sample Description:															
	Animal Source:	Tula	mal					Date Re	ceived:	ΛD	b	Date of	Hatch:	2/2/17		
	Comments	-	71111				•	244		-/-				-1-10		
*	nade by ad	.1	1 14		الحديم	-	to 8	5:1_								
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	q	ď														

Report Date: Link:

City of Buenaventura

24 Feb-05 11:20 AM 04-8187-4866/0502-036

Nautilus Environmental WA

Ceriodaphnia 7-d Survival and Reproduction Test

01-1942-5425 Test Type: Reproduction-Survival (7d)

6d 23h Duration: Test No: Ceriodaphnia dubia Start Date: 02 Feb-05 04:20 PM Protocol: EPA/821/R-02-013 (2002) Species: Source: In-House Culture **Ending Date:** 09 Feb-05 03:30 PM Dil Water: Diluted Mineral Water (8:2)

02 Feb-05 04:20 PM Brine: Frozen Seawater (for control) Setup Date:

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.

Client: Sample No: 14-7289-2275 Material: **Estuarine Monitoring Sample** Project: Sample Date: 31 Jan-05 02:30 PM Code: 0502-036

City of Buenaventura Receive Date: 02 Feb-05 09:40 AM Source:

Sample Age: 50h Station: B-1

10

26.8

Comparison Summary NOEL LOEL ChV **MSDp** Method **Analysis** Endpoint Fisher's Exact 18-5294-7795 7d Proportion Survived 100 > 100 N/A N/A 10-9306-0227 100 > 100 N/A 14.51% Equal Variance t Reproduction

Test Acceptability Statistic Acceptable Range Decision **Analysis** Endpoint **Attribute** Passes acceptability criteria 18-5294-7795 7d Proportion Survived Control Response 0.8 - N/A 10-9306-0227 Reproduction Control Response 19.8 15 - N/A Passes acceptability criteria 0.14515 0.13 - 0.47 Passes acceptability criteria 10-9306-0227 Reproduction MSDp

7d Proportion Survived Summary CV Conc-% SE SD **Control Type** Reps Mean Minimum Maximum 0.31623 35.14% 0 Lab Control 10 0.90000 0.00000 1.00000 0.10000 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 22.9 36.50% 10 0 28 2.6434 8.3593 0 Salt Control 25 10 19.8 0.9404 2.974 15.02% 16

21

7d Proportion Survived Detail Conc-% **Control Type** Rep 1 Rep 2 Rep 4 Rep 5 Rep 10 Rep 3 Rep 6 Rep 7 Rep 8 Rep 9 1.00000 0 Lab Control 1.00000 1.00000 1.00000 1.00000 1.00000 1.00000 0.00000 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

1.3646

4.3153

16.10%

34

Reproduction Detail Conc-% **Control Type** Rep 1 Rep 2 Rep 10 Rep 3 Rep 4 Rep 5 Rep 6 Rep 7 Rep 8 Rep 9 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 31 26 34 21 28 24 21

Analyst: Approval:

100

Report Date:

Page 1 of 1 24 Feb-05 11:20 AM

Analysis:

18-5294-7795/0502-036

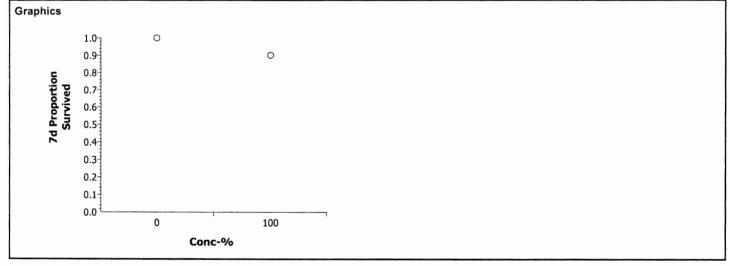
CETIS Analysis Detail

Ceriodaphnia 7-d Survival ar	Ceriodaphnia 7-d Survival and Reproduction Test Nautilus Environmental WA											
Endpoint	Analysis	ontrol Link	Date Analyzed		Version							
7d Proportion Survived	Compari	son	04-8187-4	866 1	7-3049-9849	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					

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

Group Comp	oaris	sons			
Control	vs	Conc-%	Statistic	Critical	Decision(0.05)
Salt Control		100	0.50000	0.05000	Non-Significant Effect
Data Summa	ary				

Control Type	Non-Responders	Responders	Total Observed
Salt Control	10	0	10
	9	1	10
	Control Type	Control Type Non-Responders	Control Type Non-Responders Responders



Page 1 of 1

Report Date:

24 Feb-05 11:20 AM

Analysis:

is: 10-9306-0227/0502-036

Ceriodaphnia 7-d Surviva	l and Reproduction Test			Nautilu	ıs Environmental W
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

CETIS Analysis Detail

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	

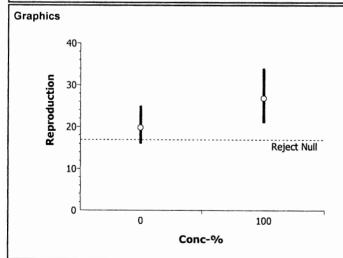
ANOVA Table

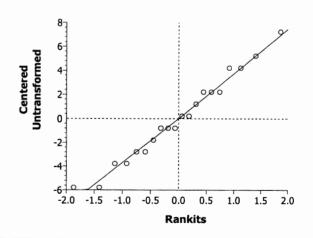
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	245	245	1	17.84	0.00051	Significant Effect
Error	247.2	13.73333	18			
Total	492.199997	258.73333	19	_		

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 Original Data				Transfo	rmed 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	26.8	21	34	4.3153				





Analyst:

Approval: 2 https://

Report Date:

16 Feb-05 6:47 PM

Link:

07-9807-2296/0502-037

Ceriodaphnia	7-d Survival ar	d Reprod	luction Test						Nautil	us Environ	mental WA
Test No: Start Date: Ending Date: Setup Date:	04-7816-6381 02 Feb-05 04:2 09 Feb-05 03:3 02 Feb-05 04:2	30 PM 20 PM	Protocol: Dil Water: Brine:	EPA/821/R Diluted Min Frozen Sea	Reproduction-Survival (7d) EPA/821/R-02-013 (2002) Diluted Mineral Water (8:2) Frozen Seawater (6r control)			cies: Ce rce: In-	: 6d 23h Ceriodaphnia dubia In-House Culture		
Comments:	The sample wa to the salinity of	as slightly control. D	saline (1.0 pp ue to a poor (ot) so a contr Ceriodaphnia	rol was adde culture in S	ed to match t an Diego, sa	he salinity. amples wer	Analyses of the sent to the	were made o e northwest	comparing the lab for testing	ie sample ig.
Sample No: Sample Date: Receive Date: Sample Age:	02 Feb-05 09:4		Material: Code: Source: Station:	Estuarine M 0502-037 City of Bue B-3	Monitoring Sa	ample	Clie Proj		y of Buenav	entura	
Comparison S	Summary										
Analysis 08-6669-4799 18-0621-0988	Endpoint 7d Proportion S Reproduction	Survived	100 < 100	> 100 100		N/A N/A	MSDp N/A 20.94%	Fi	ethod sher's Exact qual Varianc		
Point Estimate Analysis 15-3333-9481	e Summary Endpoint Reproduction		% Effe 25 50	95.6	nc-% 63492 1.00000	95% LCL 53.27103 N/A	95% U N/A N/A		ethod near Interpo	lation	
Test Acceptat	oility										
Analysis 08-6669-4799 15-3333-9481 18-0621-0988 18-0621-0988	Endpoint 7d Proportion S Reproduction Reproduction Reproduction	Survived	Contro	ol Response ol Response ol Response	Statistic 0.9 24.1 24.1 0.20943	0.8 - N/A 15 - N/A 15 - N/A 0.13 - 0.		Pi Pi	ecision asses accep asses accep asses accep asses accep	tability criter	ia ia
7d Proportion	Survived Sum	mary									
Conc-% 0 0 100 Reproduction	Control Type Lab Control Salt Control Summary	10 10 10	Mean 0.90000 0.90000 0.90000	Minimum 0.00000 0.00000 0.00000	Maximun 1.00000 1.00000 1.00000	0.10000 0.10000 0.10000		23 35.	14% 14% 14%		
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv			
0 0 100	Lab Control Salt Control	10 10 10	22.9 24.1 17.8	0 15 0	28 30 28	2.6434 1.2423 2.6323	8.3593 3.9288 8.324	3 36.5 5 16.5	50% 30% 76%		
7d Proportion	Survived Deta	il									
0 0 100	Control Type Lab Control Salt Control	Rep 1 1.00000 1.00000 1.00000	Rep 2 1.00000 1.00000 1.00000	Rep 3 1.00000 1.00000 1.00000	Rep 4 1.00000 1.00000 1.00000	Rep 5 1.00000 1.00000 1.00000	Rep 6 1.00000 1.00000 1.00000	Rep 7 0.00000 1.00000 0.00000	Rep 8 1.00000 1.00000 1.00000	Rep 9 1.00000 1.00000 1.00000	Rep 10 1.00000 0.00000 1.00000
Reproduction		Day 4	D- 0	D 2							
Conc-%	Control Type Lab Control	Rep 1 28	Rep 2 27	Rep 3 28	Rep 4 27	Rep 5 25	Rep 6	Rep 7	21	Rep 9	Rep 10 26

Salt Control

Page 1 of 1

Report Date:

15 Feb-05 4:14 PM

CETIS Analysis Det	ail		Report Date: 15 Feb-05 4:14 PM Analysis: 08-6669-4799/0502-037
Ceriodaphnia 7-d Survival and	d Reproduction Test		Nautilus Environmental WA
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	Otable III	D. dalam	
Attribute Control Response	Statistic Acceptable Ra	ange Decision Passes acceptability criteria	
Group Comparisons			
Control vs Conc-%	Statistic Critical	Decision(0.05)	
Salt Control 100	0.76316 0.05000	Non-Significant Effect	
Data Summary			
Conc-% Control Type	Non-Responders Responde	rs Total Observed	
0 Salt Control	9 1	10	
100	9 1	10	
Graphics			
0.9 0.8 0.7 0.7	0		

0.4 0.3 0.2 0.1 0.0

0

Conc-%

100

Page 1 of 1

Report Date:

15 Feb-05 4:14 PM 18-0621-0988/0502-037

Analysis:

CETIS Analysis Detail

Ceriodaphnia 7-d Surviva	I and Reproduct	ion Test	Nautilus Environmental W						
Endpoint	Analysi	з Туре	Sample I	_ink C	Control Link	Date Analyzed	ł	Version	
Reproduction	Compar	Comparison		07-9807-2296 07-9807-229		6 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									

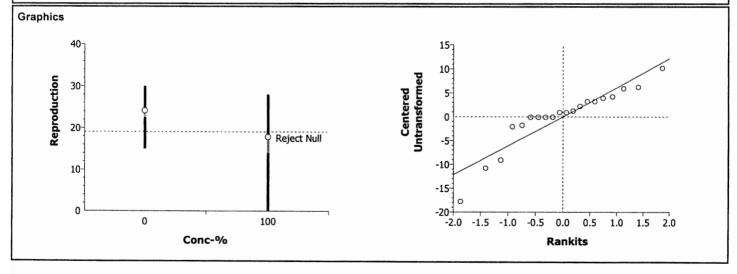
rest Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	24.1	15 - N/A	Passes acceptability criteria
MSDp	0.20943	0.13 - 0.47	Passes acceptability criteria

-	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 Comp	roup 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 Summ	ary			Origi	nal 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				



Page 1 of 1

Report Date:

15 Feb-05 4:14 PM

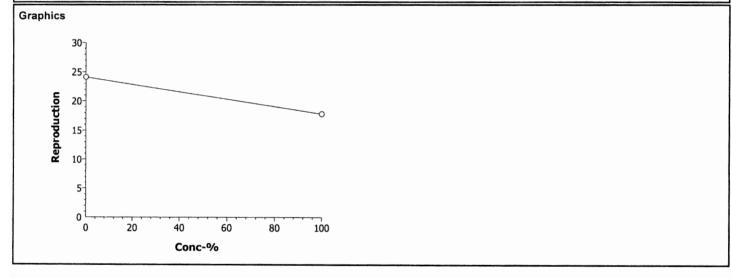
Analysis:

15-3333-9481/0502-037

CETIS Analysis Detail

	, ,					Analysis.	10 0000 040 110002 00
Ceriodap	hnia 7-d Surviv	al and Reproduc	ction Test			Nautil	us Environmental WA
Endpoint		Analys	is Type	Sample Link	Control Link	Date Analyzed	Version
Reproduc	eproduction Linear Interpolation		07-9807-2296	07-9807-2296	15 Feb-05 4:11 PM	CETISv1.025	
Linear In	terpolation Opti	ons					
X Transfe	orm Y Trans	sform Seed	Resamples	Expanded CL	Method		
Linear	Linear	289562	24 200	Yes	Two-Point Inte	erpolation	
Test Acc	eptability						
Attribute		Statist	ic Acceptable Ran	ge Decision			
Control R	esponse	24.1	15 - N/A	Passes acc	eptability criteria		
Point Est	imates						
% Effect	Conc-%	95% LCL	95% UCL				
25	95.63492	53.27103	N/A				
50	> 100.00000	N/A	N/A				

Data Sum	mary			Cal	culated Varia	ite	
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



Analyst:

Approval: Approval: 2/4/05

100

Report Date:

16 Feb-05 6:48 PM

Link:

13-8410-4944/0502-038

Ceriodaphnia	7-d Survival and Reprod	luction 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 (0) Ithol)

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

10

26.7

24

Comparison Summary Endpoint NOEL LOEL ChV MSDp Method **Analysis** 100 N/A Fisher's Exact 06-3088-6589 7d Proportion Survived > 100 N/A 11-6141-1999 Reproduction 100 > 100 N/A 10.15% Equal Variance t

Test Acceptab	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 Proporti	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%		
Reproducti	on 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%		

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

0.6675

30

Reproductio	eproduction 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

7.91%

2.1108

Page 1 of 1

Report Date:

15 Feb-05 4:16 PM

Analysis:

06-3088-6589/0502-038

CETIS Analysis Detail

0.4-0.3-0.2-0.1-0.0

0

Conc-%

100

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Ceriodaphnia 7-d Survival an	d Reproduction Test			N	autilus Environmental WA
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	NO	EL LOEL	Toxic Units	ChV MSDp
Fisher's Exact	C > T Untransformed	100	>100	1.00	N/A
Test Acceptability					
Attribute	Statistic Acceptable R	tange Decision			
Control Response	0.9 0.8 - N/A	Passes ac	ceptability criteria		
Group Comparisons					
Control vs Conc-%	Statistic Critical	Decision(0.05)			
Salt Control 100	1.00000 0.05000	Non-Significant E	ffect		
Data Summary					
Conc-% Control Type	Non-Responders Responde	ers Total Obser	ved		
0 Salt Control	9 1	10			•
100	10 0	10			
Graphics					
1.0¬	0				
0.9	O				
2.0					
5 0.8-					
0.8 0.7 0.6					
8 ≶ 0.6∃					

Analyst; AH

Approval: 2/15/05

Page 1 of 1

Report Date:

15 Feb-05 4:16 PM

Analysis:

11-6141-1999/0502-038

Ceriodaphnia 7-d Survival and Reproduction Test Nautilus Environmental WA								
Endpoint	Analysis	з Туре	Sample L	ink C	ontrol Link	Date Analyzed		Version
Reproduction	Compari	son	13-8410-4	13-8410-4944 07-980		807-2296 15 Feb-05 4:16 P		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%

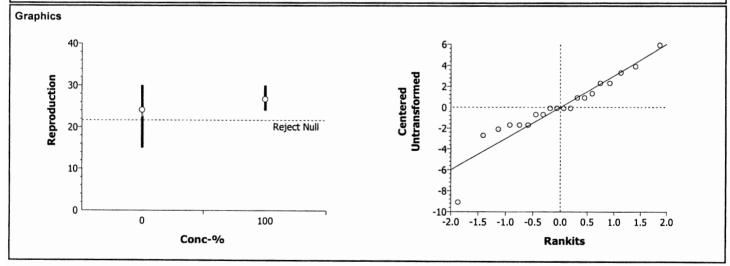
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	24.1	15 - N/A	Passes acceptability criteria
MSDp	0.10147	0.13 - 0.47	Fails acceptability criteria

ANOVA Assum	ptions					
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 Summ	ary			Origi	nal 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	26.7	24	30	2.1108					



CETIS Analysis Detail

Client/S	Sampl	e ID:	Ru	enar	entu	ra 1 +	1-7	3-1,	B-3	<u>, (-</u>	1				nd Tin		-2/,	2/0	5	160					
Client/S Test Nu	mber:		0	502	-05	N	<u>ر ر</u>	950	200	5-20	38		Stop	Date a	nd Tin	ne:	279	1/0	<u> </u>	15	50	- 			
					Daily	Repro	ductio	n			Day 6	Day 7						Daily	Repro	ductio	a			Day 6	Day 7
Conc.	Rep	Cont					a sala			le le	Total	Total	Conc	. Rep	Cont	no a		#						Total	Total
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Analyst		M	1	MA	MA	SH	€t+	ce	SA																
Time					<u> </u>	L	<u> </u>		L	L	Day 6	Day 7												Day 6	Day 7
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Nauthus Environm							Initial a	nd Final	Chemist	ries				
Northwest Laborate	ory						Seven D	ay Chro	nic Frest	water B	ioassay			
Client:	Buc	na ve	entre	-a			Start Da	te & Tio	nc;	2/2	405	1	620	
Sample ID.	1-2,8	5-1.	3-3.	C-1		'	Stop Da	te & Ti	me:	2/9	105		530	
Test No:	25	32	-	1.1.2			Test Spe		^	dillo	nica			
USESD TEST IT	1'5 1	507	-03	5-0	38					TAXO.				
C-DC JO IN S	<i>/</i> ·				30		Da	Lys						
Concentration)	T	1		2		3		4		5		5
SCRE C-1	ALE STREET	語といけて語	·提斯特子提前	SECTION 15	WAR PERSON	ansanir.3	NOTE OF	新沙水湖	d000013	P4.25 at 1.05	· 经自由的证据	in statistical	(1) YES	Mr oreg
pH	X.11	8.63	8.20	8.47	8-08	8-65	9.7	9 10	8.20	267	8.04	1001	9 10	8-21
DO (mg/l)	9 7	9.5	7.4	7.3	9.7	8-1	8.8	9.4	8-2	73	9.2	70	91	8.0
Cond. (pmhos-cm)	1004	1154	1103	1132	1091	1115	1076		1144	159	12/4	1163	1117	111.9
Temperature (°C)	24-5	741	25.0	252	219	251	24.0		250	25.5	25.0	24.5	25.5	25.0
TEMPORALITY (O)	24.7	<i></i>	1 0 3.0	123.2	-4- (I	A 3.1		lys	20-0	4,4	Inch	1=11	25.5	220
Concentration	()	I	1	- 2	2		3		4		5	1	5
	Va(3)	S. Property	澤門部	AT THE			排除分裂	M 14	1000000		BOTTON THE	1	原产生	祖君母
pН		Anna Market Control	South Court Real	C. C. C. C. C. C. C. C. C. C. C. C. C. C	1100	The state of the Section	Tara-January 18572		911112 C 1 C 1 C 1	Personal and a Po	1985-4-11225	1015 (401241)91, 131	N. 10 T T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Anger A street and
DO (mg/l)														
Cond. (µmhos-cm)								**************************************						
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			-	7			70.00			<u> </u>			<u> </u>	
Concentration)						300		4		5		5
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рН	A LESS OF MARKET	a minimist erastantil	Abraham VIVANIA	and the state of	- 1 - 1 m	25			-14-3152-MARIES	NAME OF STREET	Contra management	A SHAREST CO.	, total (station)	1 200227 Joseph F.
DO (mg/l)														
Cond. (µmhos-cm)				n c	0									
Temperature (°C)								1						
				100 C	Virginia	多种的								
Concentration		0						SV (A)		4		5		6
			建 量 20 m		7.5	100	100				N. C. C.		311133	The second
рН				SV Property	11. C. 42		47							
DO (mg/l)						7.2	1							
Cond. (µmbos-cm)				400	1 645	5-2-3-5								
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рΗ				To a constant		n 11.2								
DO (mg/l)				2006/8/10/2019										
Cond. (µmhos-cm)														
Temperature (°C)														
							D	ays						
Concentration		0		1		2		3		4		5		6
	The second		#E7.79							bill marcal				
pΗ														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (*C)														
	Cor	ntrol								Analyst	s:			
Hardness*									1					
Alkalinity*									1	Review	ed:	000	(2/1	4105
Initial Chlorinel												0	1	• (
Ammonia I		·												
mg/L as CaCO3; I mg	yL; ND :	no chlo	rine dete	cted										
Sample Description:									1				5/-	1.1
Animal Source:		ntur	M				Date Ro	cceived:	_A\A_		Date of	Hatch:	411	US
Comments:			1						•					

S. CAPRICORNUTUM

Report Date:

24 Feb-05 9:51 AM

Link:

07-5552-6371/0502-039

Selenastrum (Growth Test							Nautilus Environmental (CA
Test No: Start Date: Ending Date: Setup Date:	15-8916-2915 01 Feb-05 04:0 05 Feb-05 02:0 01 Feb-05 04:0	00 PM	Test Type: Protocol: Dil Water: Brine:		n -02-013 (200 rriched Wate		Duration: Species: Source:	94h Selenastrum capricornutum In-House Culture
	06-9815-8290 31 Jan-05 03:2 31 Jan-05 10:1 25h		Material: Code: Source: Station:	Estuarine M 0502-039 City of Bue A-2	Monitoring Sa	ample	Client: Project:	City of Buenaventura
Comparison S	Summary							
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
02-0824-5471 04-2617-8581	Cell Density		100 101	> 100 > 101		N/A N/A	9.77% 21.90%	Unequal Variance t Unequal Variance t
Test Acceptab	ility							
Analysis	Endpoint		Attribu	ute	Statistic	Acceptab	ole Range	Decision
02-0824-5471	Cell Density		Contro	I CV	0.00844	N/A - 0.2		Passes acceptability criteria
04-2617-8581	Cell Density		Contro	I CV	0.00844	N/A - 0.2		Passes acceptability criteria
02-0824-5471	Cell Density		Contro	l Response	1351000	1000000	- N/A	Passes acceptability criteria
04-2617-8581	Cell Density		Contro	l 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 S	ummary							
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%
401 100/ un	filtere d	4	1.62E+6	1.27E+6	1.83E+6	1.26E+5	2.51E+5	15.50%
Cell Density D	etail							
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			

Approval:

101 100% unfiltered

1.27E+6

1.60E+6

1.83E+6

1.77E+6

Page 1 of 2

CETIS Analy	yolo bota	• •							Analysi		02-0824	
Selenastrum Grov	wth Test									Nau	tilus Enviro	onmental (CA
Endpoint		Analysi	is Type		Sample L	ink	Control	Link	Date Anal	yzed	Versio	
Cell Density		Compa	rison		07-5552-6	371	07-5552	-6371	10 Feb-05	11:10 A	AM CETIS	v1.025
Method		Alt H	Data 1	Transform	Z	NOI	EL L	OEL	Toxic Un		ChV	MSDp
Unequal Variance t	t	C > T	Untrar	nsformed		100	>	100	1.00		N/A	9.77%
Test Acceptability	,											
Attribute		Statisti	c A	cceptable R	ange Decis	sion						
Control CV		0.00844	4 N/	/A - 0.2			eptability					
Control Response		135100	0 10	000000 - N/A			eptability					
MSDp		0.09775	5 0.	091 - 0.29	Pass	es acc	eptability	criteria				
ANOVA Assumpti	ons											
Attribute	Test		Statis			Leve		Decisio				
Variances	Variance Ratio		95.884			.0035			I Variances			
Distribution	Shapiro-Wilk V	N	0.8360	01 0.7	74935 0	.0734	5	Normal	Distribution	1		
ANOVA Table												
Source	Sum of Squ	uares M	lean Squa	are DF	F Statist	tic	P Level		Decision(0.05)		
Between	2.965E+12	2.	.96E+12	1	470.76		0.00000		Significant	Effect		
C												
Error	3.779E+10	6.	.3E+09	6								
Total	3.779E+10 3.0024E+12		.3E+09 .971E+12									
	3.0024E+12											
Total	3.0024E+12	2 2.			P Level	MS	5D	Dec	cision(0.05			
Total Group Compariso	3.0024E+12	2 2.	.971E+12	7	P Level 0.9999		SD 2056		cision(0.05			
Total Group Compariso Control vs	3.0024E+12 ons Conc-%	2 2. Stat	.971E+12	7 Critical 2.35336					n-Significan	t Effect	med Data	
Total Group Compariso Control vs Salt Control Data Summary	3.0024E+12 ons Conc-% 100	Stat -21.0	.971E+12	7 Critical 2.35336	0.9999	132	2056		n-Significan T	t Effect		SD
Total Group Compariso Control vs Salt Control Data Summary Conc-% Cor	3.0024E+12 ons Conc-% 100	Stat -21.6	.971E+12 tistic 697	7 Critical 2.35336 Orig	0.9999 Jinal Data	132 SD	2056	Nor	n-Significan T	t Effect ransfor	med Data	SD
Total Group Compariso Control vs Salt Control Data Summary Conc-% Cor	3.0024E+12 ons Conc-% 100 ntrol Type C	Stat -21.0 ount M 1.	.971E+12 tistic 697	7 Critical 2.35336 Orig	0.9999 Jinal Data Maximum	132 SD 1.1	2056	Nor	n-Significan T	t Effect ransfor	med Data	SD
Total Group Compariso Control vs Salt Control Data Summary Conc-% Cor 0 Salt	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4	Stat -21.0 ount M 1.	.971E+12 tistic 697 lean .35E+6	7 Critical 2.35336 Orig Minimum 1.34E+6	0.9999 Jinal Data Maximum 1.37E+6	132 SD 1.1	2056 	Nor	n-Significan T	t Effect ransfor	med Data	SD
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4	Stat -21.6 ount M 1. 2.	.971E+12 tistic 697 lean .35E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6	132 SD 1.1	2056 	Mean	n-Significan T	t Effect ransfor	med Data	SD Rep 10
Total Group Compariso Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4 ntrol Type R	Stat -21.9 ount M 1. 2.	.971E+12 tistic 697 lean .35E+6	7 Critical 2.35336 Orig Minimum 1.34E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6	132 SD 1.1 1.1	4E+4 2E+5	Mean	n-Significan T Mini	ransfor	med Data Maximum	
Total Group Compariso Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor	3.0024E+12 ons Conc-% 100 ntrol Type Ct Control 4 4 ntrol Type Rt Control 1.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6	132 SD 1.1 1.1	4E+4 2E+5	Mean	n-Significan T Mini	ransfor	med Data Maximum	
Total Group Compariso Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt	3.0024E+12 ons Conc-% 100 ntrol Type Ct Control 4 4 ntrol Type Rt Control 1.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1	4E+4 2E+5	Mean	n-Significan T Mini	ransfor	med Data Maximum	
Total Group Compariso Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4 ntrol Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1	4E+4 2E+5 Rep	Mean 6	n-Significan T Mini	ransfor	med Data Maximum	
Total Group Compariso Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4 ntrol Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1	4E+4 2E+5	Mean 6	n-Significan T Mini	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics	3.0024E+12 ons Conc-% 100 Introl Type C t Control 4 4 Introl Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	4E+4 2E+5 Rep	Mean 6	n-Significan T Mini	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics	3.0024E+12 ons Conc-% 100 Introl Type C t Control 4 4 Introl Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	2056 4E+4 2E+5 Rep	Mean 6	n-Significan T Mini	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics	3.0024E+12 ons Conc-% 100 Introl Type C t Control 4 4 Introl Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6 2.41E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	2056 4E+4 2E+5 Rep	Mean 6	n-Significan T Mini	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4 ntrol Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6 2.41E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6 2.58E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	2056 4E+4 2E+5 Rep	Mean 6	n-Significan T Mini Rep 7	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4 ntrol Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6 2.41E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6 2.58E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	2056 4E+4 2E+5 Rep	Mean 6	n-Significan T Mini Rep 7	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics 4000000 20000000	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4 ntrol Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6 2.41E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6 2.58E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	2056 4E+4 2E+5 Rep	Mean 6	n-Significan T Mini Rep 7	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4 ntrol Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6 2.41E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6 2.58E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	100000 50000 -50000	Mean 6	n-Significan T Mini Rep 7	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics 4000000 20000000	3.0024E+12 ons Conc-% 100 ntrol Type C t Control 4 4 ntrol Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6 2.41E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6 2.58E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	100000 50000	Mean 6	n-Significan T Mini Rep 7	ransfor	med Data Maximum	
Group Comparison Control vs Salt Control Data Summary Conc-% Cor 0 Salt 100 Data Detail Conc-% Cor 0 Salt 100 Graphics 4000000 20000000	3.0024E+12 ons Conc-% 100 Introl Type C t Control 4 4 Introl Type R t Control 1. 2.	Stat -21.0 ount M 1.2. ep 1 34E+6	971E+12 tistic 697 lean .35E+6 .57E+6 Rep 2 1.37E+6 2.41E+6	7 Critical 2.35336 Orig Minimum 1.34E+6 2.41E+6 Rep 3 1.35E+6 2.58E+6	0.9999 ginal Data Maximum 1.37E+6 2.66E+6 Rep 4 1.35E+6	132 SD 1.1 1.1 Rep 5	100000 50000 -50000	Mean 6	n-Significan T Mini Rep 7	ransfor	med Data Maximum	

Rankits

Conc-%

Page 2 of 2

Report Date:

10 Feb-05 11:10 AM

Analysis:

04-2617-8581/0402-039

Selenastru	ım Growth Test								Nautil	us Enviror	nmental (CA)
Endpoint	3// 0 (1// 2 / 1// 2 	Ana	lysis Type		Sample I	ink	Control Lin	k Date Analy	zed	Version	
Cell Density	у		nparison		07-5552-		07-5552-637	71 10 Feb-05 1	11:10 AN	1 CETISV	1.025
Method		Alt	H Data	Transform	Z	NOE	L LOE	Toxic Unit	s Ch	٦V	MSDp
Unequal Va	ariance t	C >	T Untra	nsformed		101	>101	0.99	N/	A	21.90%
Test Accep	otability										
Attribute		Sta	tistic A	cceptable Ra	inge Deci	sion					
Control CV		0.00)844 N	I/A - 0.2			eptability crite				
Control Res	sponse			000000 - N/A			eptability crite				
MSDp		0.2	1896 0	.091 - 0.29 	Pass	es acc	eptability crite	eria ———————			
ANOVA As	sumptions										
Attribute	Test		Statis	stic Cri		Leve		ision(0.01)			
Variances	Variance		485.1			0.00032		equal Variances			
Distribution	Shapiro-	Wilk W	0.833	23 0.7	4935 (.06917	Nor	mal Distribution			
ANOVA Ta	ble										
Source	Sum o	f Squares	Mean Squ	are DF	F Statis	tic	P Level	Decision(0	.05)		
Between	1.447	+11	1.45E+11	1	4.58		0.07614	Non-Signific	ant Effe	ct	
Error	1.896		3.16E+10	6							
Total	3.3432	E+11	1.763E+11	7							
Group Con	mparisons										
Control	vs Conc-	6	Statistic	Critical	P Level	MS	D	Decision(0.05)			
Salt Contro	101		2.1401	2.35336	0.9391	295	810	Non-Significant	Effect		
Data Sumr	mary			Orig	inal Data			Tra	ansform	ed Data	
Conc-%	Control Type	Count	Mean	Minimum	Maximum		Me	an Minin	num I	Maximum	SD
0	Salt Control	4	1.35E+6	1.34E+6	1.37E+6		4E+4				
101 100% U	unfiltered	4	1.62E+6	1.27E+6	1.83E+6	2.5	1E+5				
Data Detail	I										
Conc-%	Control Type		Rep 2	Rep 3		Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Salt Control	1.34E+6		1.35E+6	1.35E+6						
	unfil tered	1.27E+6	1.60E+6	1.83E+6	1.77E+6						
Graphics											
	25000007						3000007		•		
	1						200000-				6
>	2000000-					eq	1			9/	
ısit	1			J		red orm	100000-		/		
_	1500000-			Ì		Centered transform	0]		0		
Der	15000007	0				Centered Untransformed	-100000				
Cell Der		0				_					
J lle	1000000	0		Reject Null		_	1				
Cell Der	1000000	0	• • • • • • • • • • • • • • • • • • • •	Reject Null		_	-200000				
Cell Der		0		Reject Null		5	1				
Cell Der	1000000	0				5	-200000				_
Cell Der	500000	0 Conc		Reject Null		5	-200000	-1.0 -0.5	0.0 0.	5 1.0	1.5

CETIS Analysis Detail

Page 1 of 1

CETIS Data Worksheet

Report Date:

01 Feb-05 10:43 AM

Link:

07-5552-6371

Selenastru	ım (Grow	th Te	st						Nautilus Environme	ental (CA)
Start Date	:	01 F	eb-05	5	Species	Selenasti	rum capricorni	ıtum	Sample Code:	0502-039	
Ending Da	ite:	05 F	eb-05	5	Protoco	: EPA/821/	/R-02-013 (20)	02)	Sample Source:	City of Buenaventura	
Sample Da	ate:	31 J	an-05	5	Material	Estuarine	Monitoring S	ample	Sample Station:	A-2	
Conc-%		Code	Rep	Pos	Cell Density A	bsorbance	Biomass	Chlorophyll a		Notes	
,	0	LC	1	2					- manufacture de la co		
CCAL	0	LC	2	5	1						
	0	LC	3	1							
	0	LC '	4	3	1 "				· · · · · · · · · · · · · · · · · · ·	11.101.100	
C.	0	SC	1	10	. 1	. +					
L.II.	o	SC .	2	. 6							
	0	sc	3	. 8	1			1	*	-108 E 988 E 98	
	0	SC	4	9		,				41 1199	
	100			12							
l	100		2	4				1			
1	100		3	11		ŧ	1				
1	100		4	7				· · · · · · · · · · · · · · · · · · ·	M 11 Ma 1		
L	100										



2/4/05

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

Client: City of Brenaventura

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

Test Species: S. Capricor nutures

Test Date: $\frac{2/1/65}{1600/1400}$ Start/End Times: $\frac{1600/1400}{1600}$

Test No:	0502-039-042	Analyst: 🚜 , Śtł
		•
		Cell Density Cell Density

Random Number	Dilution	Cell Density (fluorometric) (cells/ml *10 ⁵)	Cell Density (microscopic) (cells/mi *10 ⁴)
Blank	NA	0.0000000000000000000000000000000000000	N. A. C.
Cal Check 1 (NEW, Solid, Effluent Blanks)	0,00 -	0.00, 2.22	
/		9,90	
2		12.86	
3 4		10.93	
4		24.08	
5		12.83	
5		13.67	
7		26.24	
8		13.49	
9		13.48	
10		13.40	
11		25, 82	
12		26.60	
Cal Check 2 (NEW, Solid, Effluent Blanks)		0.00,2.21	
15		24.41	
Up		22, 39	
18		22.46	
20		22.49	
25		14.34	
26		23.78	
27		12.69	
28		27.07	,
29		26,56	
30		13.21	
31		21,32	
32		12.37	
Cal Check 3 (NEW, Solid, Effluent Blanks)		0,00, 2,20	

Comments:		
QC Check:	AH 2/10/05	Final Review: 4405

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

Client: <u>(14y of Bueraventura</u>)

Sample ID: <u>A-2, B-1, B-3, C-1</u>

Test No: <u>0502-039-> 042</u>

Test Species: S. capricornatum

Test Date: 41/05

Start/End Times: 16:00 / 1400

Analyst: / Sपे

Random Number	Dilution	Cell Density (fluorometric) (cells/mi *10 ⁸)	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		13:30	
37		27.24	
44		25.39	
45		25,85	
46		25.99	
A-2 unfiltered A		16.03	
A-2 " B		18.33	
i , C		17.72	
11 P		12.73	
Cal Check 2 (NEW, Solid, Effluent Blanks)		0.00,2.21	
B-1 unfiltered A		5.15	
l B		6.45	
C		5.95	
V D		12.58	
B-3 unfiltered A		13.25	
1 B		17,85	
C		4.05	
A 9		12.95	
C-1 unfiltered A		10.73	
B		19.21	
c		ક.ક્રહ	
y 0		9.19	
Cal Check 3 (NEW, Solid, Effluent Blanks)		0.00,2.21	

Comments:			
QC Check:	AH 2/10/05	Final Review:	Al 2/4/00

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

	Test Species: 5. capricornutum
Client: City of Buenaventura	Test Date: 2-1-05
Sample ID: A-2, B-1, B-3, C-1	Start/End Times: <u>ಟಿಯ/ಟಿ</u> ಯ
Test No: 0502-039 7 042	Analyst: Sit

Random Number	Dilution	Cell Density (fluorometric) (cells/ml *10 ⁵)	Cell Density (microscopic) (cells/mi *10 ⁴)
Blank	NA		
Cal Check 1 (NEW, Solid, Effluent Blanks)		0.00, 2.22	
AZ filteren blank		0.05	
81		0.21	
EB		0.07	
cı 🗸		0.04	
A2 unfiltered blank		3,60	
8!		2.03	
83		3,31	
CI V		2.41	
Cal Check 2 (NEW, Solid, Effluent Blanks)		0.00,2.21	
Cal Check 3 (NEW, Solid, Effluent Blanks)			

Comments:			
QC Check:	AH 2/10/05	Final Review:	2/24/00

Freshwater Chronic Bioassay

Algal Growth Inhibition Worksheet

Client :	City of Bue	emventura, Inte	rna(Test Sp	becies: \underline{S} -	capricornitum
Sample ID:	A-2,B-1, B	6-3, C-1, CUC	2 Tes	t Date: <u>]</u>	11/05
Test No:	0502-039-	>042, 050 201 9	SCA A	nalyst: _ <i>_/</i>	AH
Source/Date Stock (Culture Started:	1/27/	05		
Stock Cell Density N	Measurements:	3043			
		<u>30.36</u> <u>36.07</u>	Mean: 💆	<u>80.13</u>	
		<u>29.91</u> 29.87			
(mean no. * 100,000	0)/(500,000) = x (dilu	ution factor):		6.03	
Prepare inoculum a 500,000 cells/ml.	ccording to the diluti	ion factor. This yields ຄ	a solution with	the desired	cell density of
Example: (35 *	100,000)/(500,000) :	= 7 (e.g. 25 ml Sele sto	ock + 150 ml 1	NEW)	
		containing 50 ml of NE 10,000 cells/ml ± 10%.		unt on the h	nemacytometer.
Inoculum Cell Dens	ity Confirmation Cou	unts:/	M	lean:) (10,000)
Test Initiation Time:	160	Ö			
Test Termination Ti	me: <u>/too</u>	Name of the Control o			
Comments:					
QC Check:	AH 2/10/0	5	Final	Review:	JE 1/24/05

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Test Species: S. capricornutum

Client: City of Buenaventura Test Date: 2/1/05

Start/End Times: 2/8/05 /6.00 /400 A-2, B-1 Sample ID:

Analyst: AH Test No: 0502-039, 040

		Initial R	Final R	Final Readings		
Concentration (%)	D.O. (mg/L)	Conductivity (umhos-cm)	Alkalinity (mg/L)	Hardness (mg/L)	D.O. (mg/L)	Conductivity (umhos-cm)
Lab Control #1	1.0	92		11	4.0 7.1	93
Salt Control #1	1.2	2460	15	229	9.2	2420
A-2 100% filtered	7.9	2150	_	_	9.4	1879
B-1 100% filtered	8.1	2290	_	, confidence	9,3	5180
A-2 100% unfiltered	9.4	2200	223	580	9.1 9.2 SI	1219
B-1 100% unfiltered	9.5	2330	185	542	9.1 9.4	2180 977
	-1,2)	V200	185	542	-1, 1	

			\circ	27.8	_	
		0 Hour	24 Houra	48 Hour	72 Hour	96 Hour(💝
pH/Temperature (°C):	Д/ Lab Control	1.27/250	7.64127.8	7.80/27.80	8.12126.7	7.63/27.0
pH/Temperature (°C):	Salt Cont#1	135/25.0	75028.3	7.91/22.9	8.761271	8,65/27.0
pH/Temperature (°C):	A-2 filt	8251250	8.63127.9	877 130	8.55127.1	9.09/27.0
pH/Temperature (°C):	B-1 F11+	8.04/250	8.5427.8	8.73/27.7	898127.3	q 93/27.0
pH/Temperature (°C):	B3A-2 un.	8.27/25,0	8.63/275	8.48/27.3	8.441269	3.671 27.0
pH/Temperature (°C):	B-1 un.	197125.0	8.69276	8.87/27.6	9.04 127.2	1.23 /27.0
pH/Temperature (°C):		1250	1	1	1	1

Att 8/10/05 Final Review: aft 2/24/05 Comments:

QC Check:

Selenastrum Growth Test

Report Date: 24 Feb-05 9:52 AM

Nautilus Environmental (CA)

Link:	13-1105-5896/0502-04

Test No: 15-8916-2915 Test Type: Cell Growth **Duration:**

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

Project: Sample Date: 31 Jan-05 02:30 PM Code: 0502-040

Receive Date: 31 Jan-05 10:10 PM Source: City of Buenaventura

Station: B-1 Sample Age: 26h

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 Acceptab	ility				
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	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%	unfiltered	4	7.53E+5	5.15E+5	1.26E+6	1.70E+5	3.41E+5	45.24%				

Cell Density	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							
101 100% U	nfiltered	6.45E+5	5.15E+5	5.95E+5	1.26E+6							

Analyst: Approval:

000-089-125-2

Page 2 of 2

CETIS A	analy	sis De	tail						Repo Analy	rt Date: sis:		b-05 11:10 Al 7480/0502-04
Selenastrun	n Grow	th Test								Nau	tilus Enviror	nmental (CA)
Endpoint			Anal	ysis Type		Sample	_ink	Control Lin			Version	
Cell Density			Com	parison		13-1105-	5896	13-1105-589	96 10 Feb-	05 11:09 /	AM CETISV	1.025
Method			Alt i	l Data	Transform	Z	NO	EL LOEI	_ Toxic l	Jnits	ChV	MSDp
Unequal Var	iance t		C > 1	Untra	nsformed		100	>100	1.00		N/A	8.62%
Test Accept	tability											
Attribute			Stati	stic A	cceptable Ra	ange Deci	sion					
Control CV			0.008	344 N	/A - 0.2			eptability crite				
Control Resp	ponse		1351	000 1	000000 - N/A			eptability crite				
MSDp			0.086	615 0	.091 - 0.29	Fails	accep	tability criteria	3			
ANOVA Ass	umptio	ns										
Attribute	٦	Гest		Statis	tic Cri	itical	Leve	l Dec	ision(0.01)			
Variances	\	√ariance R	tatio	74.26	346 47.	.46723	0.0051		equal Varianc			
Distribution	(Shapiro-W	ilk W	0.769	82 0.7	4935	0.0164	7 Nor	mal Distribut	ion		
ANOVA Tab	le											
Source		Sum of	Squares	Mean Squ	are DF	F Statis	tic	P Level	Decisio			
Between		1.778E+		1.78E+12	1	363.35		0.00000	Significa	ant Effect		
Error Total		2.935E+ 1.8069E		4.89E+09 1.782E+12	6 7							
Group Com	parisor											
Control	vs	Conc-%		tatistic	Critical	P Level	MS		Decision(0.			
Salt Control		100	-	9.062	2.35336	0.9998	11	6392	Non-Signific	ant Effect		
Data Summ	ary		_		Orig	inal Data				Transfo	rmed Data	
Conc-%		trol Type	Count	Mean	Minimum	Maximun			ean M	inimum	Maximum	SD
0 100	Salt	Control	4	1.35E+6 2.29E+6	1.34E+6 2.24E+6	1.37E+6 2.44E+6		4E+4 3E+4				
			4	2.292+0	2.246+0	2.446+0	9.0	35574				
Data Detail							_					
Conc-%		trol Type Control	Rep 1 1.34E+6	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
100	Sail	Control	2.25E+6	1.37E+6 2.24E+6	1.35E+6 2.44E+6	1.35E+6 2.25E+6						
Graphics						2.202.40						
3	000000							150000				0
2	500000-				_		-					
					Ŷ		a e	100000-				/
Sus 2	000000-						ere	50000				
Cell Density	.500000						Centered transform	30000				
ວິ			0	· · · · · · · · · · · · · · · · · · ·	Dojoet N. II		Centered Untransformed	0			0 . 0	
1	.000000				Reject Null			1	/	8		
	500000							-50000-	0/0			
	500000											
	0	L	0	Υ	100			-100000 -1.5	-10 05	0.0	0.5 1.0	1.5
					100			-1.5	-1.0 -0.5		0.5 1.0	1.5
			Conc-	70					,	Rankits		

Page 1 of 2

Report Date:

10 Feb-05 11:10 AM

Analysis:

07-6526-3759/0502-040

C	ET	IS	Ana	ysis	De	tail

Selenastrum Growth Test Nautilus Environmental								
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

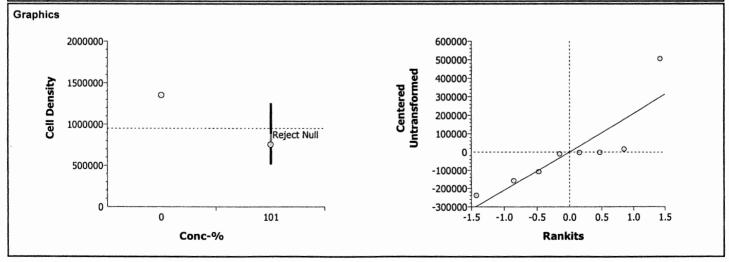
ANOVA Assumptions										
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)					
Variances	Variance Ratio	893.06860	47.46723	0.00013	Unequal Variances					
Distribution	Shapiro-Wilk W	0.78675	0.74935	0.02453	Normal Distribution					

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 Comp	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 Summa	ry		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						
101 100% und	filtered	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						
107 100% W	Viltered	6.45E+5	5.15E+5	5.95E+5	1.26E+6						



Analyst:

Approval.

Page 1 of 1

CETIS Data Worksheet

Report Date:

01 Feb-05 10:48 AM

Link:

13-1105-5896/0502-040

Selenastrum	Grow	th Te	st							Nautilus Environmental (CA)
Start Date: Ending Date Sample Date		Proto	col:	EPA/821/	um capricorn R-02-013 (20 Monitoring S	002)	Sample Code: Sample Source: Sample Station:	0502-040 City of Buenaventura B-1		
Conc-%	Code	Rep	Pos	Cell Density	Abs	orbance	Biomass	Chlorophyll a		Notes
Show Stay		1 2 3 4 1 2 3 4	24 13 21 23 22 14 19							
100 100 100	o l	1 2 3	20 16 15							
100)	4	18							

QCIAH

Analyst: Att

Report Date:

24 Feb-05 9:52 AM

Link:

13-4875-1569/0502-041

Selenastrum (Growth Test							Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	15-8916-2915 01 Feb-05 04:0 05 Feb-05 02:0 01 Feb-05 04:0	00 PM	Test Type: Cell Growth Protocol: EPA/821/R-02-013 (2002) Dil Water: Nutrient Enriched Water Brine:					94h Selenastrum capricornutum In-House Culture
Sample No: Sample Date: Receive Date: Sample Age:					Client: Project:	City of Buenaventura		
Comparison S	ummary							
Analysis 03-2370-9554 10-4575-7769	Endpoint Cell Density		101 100	LOI > 101 > 100	N	i/A I/A	MSDp 18.21% 14.00%	Method Equal Variance t Equal Variance t
Test Acceptab	ility							
Analysis	Endpoint		Attrib	ute	Statistic	Acceptab	le Range	Decision
03-2370-9554	Cell Density		Contro	ol CV	0.07221	N/A - 0.2		Passes acceptability criteria
10-4575-7769	Cell Density		Contro	I CV	0.07221	N/A - 0.2		Passes acceptability criteria
03-2370-9554	Cell Density		Contro	l Response	1309750	1000000 -	N/A	Passes acceptability criteria
10-4575-7769	Cell Density		Contro	l Response	1309750	1000000 -	· N/A	Passes acceptability criteria
03-2370-9554	Cell Density		MSDp		0.18206	0.091 - 0.2	29	Passes acceptability criteria
10-4575-7769	Cell Density		MSDp		0.13996	0.091 - 0.2	29	Passes acceptability criteria
Cell Density S	ummary							
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%
10 1 100% U	rfiltered	4	1.45E+6	1.30E+6	1.79E+6	1.13E+5	2.26E+5	15.59%
Cell Density D	etail							
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			
401 100% Ur	ufiltered	1.79E+6	1.33E+6	1.30E+6	1.41E+6			

Analyst: Approval: 1 lb L / x

Page 2 of 2

Report Date:

10 Feb-05 11:18 AM

C	ET	IS.	Anal	ysis	Det	ail

7E 112 AI	naiysis De	tall							Analysis:		10-4575-7	769/0502-04
Selenastrum	Growth Test									Nautilu	ıs Environ	mental (CA
Endpoint		Ana	lysis Type		Sample	Link	Contro	Link D	ate Analyze	d	Version	
Cell Density		Com	parison		13-4875-	1569	13-4875	5-1569 10	0 Feb-05 11	:17 AM	CETISV	1.025
Method		Alt	H Data	Transform	Z	N	DEL L	OEL 1	Toxic Units	Ch	٧	MSDp
Equal Varianc	ce t	C >	T Untra	nsformed		10	0 >	100 1	.00	N/A	١	14.00%
Test Accepta	bility											
Attribute		Stat	istic A	cceptable Ra	ange Deci	sion						
Control CV		0.07	221 N	I/A - 0.2	Pass	ses ac	cceptability	criteria				
Control Respo	onse	1309	9750 1	000000 - N/A			cceptability					
MSDp		0.13	996 0	.091 - 0.29	Pass	ses ac	cceptability	criteria				
ANOVA Assu	ımptions											
Attribute	Test		Statis	stic Cri	itical	P Lev	'el	Decision(0.01)			
Variances	Variance R	atio	2.979	97 47.	46723	0.393	78	Equal Var	iances			
Distribution	Shapiro-W	ilk W	0.907	77 0.7	4935	0.318	45	Normal Di	stribution			
ANOVA Table	е											
Source	Sum of	Squares	Mean Squ	are DF	F Statis	tic	P Level	D	ecision(0.0	5)		
Between	3.424E+	12	3.42E+12	1	192.39		0.00001	S	ignificant Ef	fect		
Error	1.068E+	11	1.78E+10	6								
Total	3.5311E	+12	3.442E+12	? 7								
Group Comp	arisons											
Control	vs Conc-%	S	Statistic	Critical	P Level	M	ISD	Decis	ion(0.05)			
Salt Control	100	-	13.870	1.94318	1.0000	18	83314	Non-S	Significant Et	ffect		
Data Summa	iry			Orig	inal Data				Tran	sforme	ed Data	
Conc-%	Control Type	Count	Mean	Minimum	Maximun	n S	D	Mean	Minimu	m M	laximum	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 Re	p7 Re	p 8	Rep 9	Rep 10
0	Salt Control	1.32E+6		1.28E+6	1.21E+6							
100		2.38E+6	2.66E+6	2.73E+6	2.71E+6							
Graphics												
400	000007						150000	O _¬	!		/	
	1						100000	1			9/	0
>						7		1		%		
بَدِ 300	00000-					B	50000	0-		0/		
Jen	1			Ŷ		te de		o][<i></i>		
Cell Density	00000-					Centered	-50000	o-i	%			
ŏ	1					<u> </u>	10000	1				
	1	•				-	-100000	7] ?				

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Conc-%

Reject Null

100

-150000 -200000--250000 0 -1.5

Comparisons:

Page 1 of 2

CETIS Analys	sis Detail						Report Dat Analysis:		eb-05 11:18 AM 9554/0502-04
Selenastrum Growti	h Test							Nautilus Enviro	nmental (CA)
Endpoint	Ana	alysis Type		Sample L	ink	Control Lir	k Date Analyze	d Version	1
Cell Density	Cor	mparison		13-4875-1	569	13-4875-15	69 10 Feb-05 11:	18 AM CETIS	1.025
Method	Alt	H Data	Transform	Z	NOI	L LOE	L Toxic Units	ChV	MSDp
Equal Variance t	C >	T Untrar	nsformed		101	>101	0.99	N/A	18.21%
Test Acceptability									
Attribute	Sta	tistic A	cceptable Ra	inge Decis	ion				
Control CV	0.0		/A - 0.2		s acc	eptability crit	eria		
Control Response	130	9750 10	000000 - N/A	Passe	es acc	eptability crit	eria		
MSDp	0.18	8206 0.	091 - 0.29	Passe	es acc	eptability crit	eria		
ANOVA Assumption	ıs								
Attribute Te	est	Statis	tic Cri	tical P	Leve	l De	cision(0.01)		
Variances Va	ariance Ratio	5.7346	60 47.	46723 0.	1853	7 Eq	ual Variances		
Distribution SI	hapiro-Wilk W	0.869	19 0.7	4935 0.	1474	3 No	rmal Distribution		
ANOVA Table									
Source	Sum of Squares	Mean Squ		F Statist	ic	P Level	Decision(0.0		
Between	4.076E+10	4.08E+10	1	1.35		0.28889	Non-Significat	nt Effect	
Error Total	1.807E+11 2.2146E+11	3.01E+10 7.087E+10	6 7						
	Conc-%	Statistic -1.1633	Critical 1.94318	P Level 0.8556 inal Data	MS 238	D 3457	Decision(0.05) Non-Significant Ef	fect sformed Data	
_	ol Type Count	Mean	Minimum	Maximum	SD	M	ean Minimu	m Maximum	SD
0 Salt C		1.31E+6	1.21E+6	1.43E+6		6E+4			
101/00% unfiltered	4	1.45E+6	1.30E+6	1.79E+6	2.2	6E+5			
Data Detail									
Conc-% Contr	ol Type Rep 1	Rep 2	Rep 3	Rep 4 F	Rep 5	Rep 6	Rep 7 Re	p8 Rep9	Rep 10
	ontrol 1.32E+6		1.28E+6	1.21E+6					
101100% unfiltered	1.79E+6	3 1.33E+6	1.30E+6	1.41E+6					
Graphics									
20000007						400000¬			
1			ı]			0
1500000					ned ned	300000-			
Cell Density	ţ.		I		Centered transform	200000-			
1000000	-		Reject Null		ent	100000		6	
ن ا			. 10,000 11011		Centered Untransformed	-30000			
F00000						0]		΄ο ο	
500000-						-100000			
]						0			
0	0	1	.01			-200000 -1.5	-1.0 -0.5 0.0	0.5 1.0	1.5
	Con		.01			-1.5	Ranki		1.5
	Con	C- 70					капкі	LS	

Approval:

CETIS Data Worksheet

Report Date:

01 Feb-05 10:46 AM

Link:

13-4875-1569

Selenastrum	Grow	th Tes	st						Nautilus Environmental (CA)
Start Date: Ending Date: Sample Date:	05 F	eb-05 eb-05 an-05	i		col: EPA/82	strum capricorr 1/R-02-013 (20 ne Monitoring S	002)	Sample Code: Sample Source: Sample Station:	0502-041 City of Buenaventura B-3
Conc-%	Code Rep Pos Cell Density Absorbance Biomass Chlorophyll a						Notes		
0	LC	1	33	prompter of	Marian 197				
400	LC	2	32						
4 2 0	LC	3	30			1			
0	LC	4	35						
Sept 0	SC	1	36						
2 0	SC	2	25			<u></u>			AUTO-CARACTER CONTRACTOR CONTRACT
0	SC	3	34					111 VIII F 100 C 1	
100	SC	4	27 26						
100	- :	2	29						
100	i	. 3	31			-	1	Contract of the Contract of th	
100		4	28					Control State Committees with the section of the	



Analyst:

Test Species: S. capricornutum

City of Buenaventura Test Date: 2/1/05 Client:

Start/End Times: 2/8/05 16:00/1400 B-3, C-1 Sample ID:

Analyst: AH **Test No:** 0502-041, 042

		Initial R	eadings		Final Readings			
Concentration (%)	D.O. (mg/L)	Conductivity (umhos-cm)	Alkalinity (mg/L)	Hardness (mg/L)	D.O. (mg/L)	Conductivity (umbos-cm)		
Lab Control #2	7.1	95	11	11	9.0	93		
Salt Control #2	1.3	1507	17	144	9.2	1519		
B-3 100% filtered	1.8	1225		~	9.2	477 2180 1519 5H		
C-1 100% filtered	8.7	1254			9.4 9.4	1030 177		
B-3 100% unfiltered	9.7	1254	213	498	٩.\	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	752/25.0	1741-27.1	759/27.8	8.311272	7.63/27-0
pH/Temperature (°C):	SC#2	150/25.0	1.81/28.0	774229	8.93127.2	8.81 /27.0
pH/Temperature (°C):	B-3 filt	831/250	8.63/28.1	8.75/20	8.75127.4	9.16 /27.0
pH/Temperature (°C):	e-1 filt	8.34 25.0	8.63128.4	8.74/26.1	8.75127.4	9.13 /270
pH/Temperature (°C):	13-3 un	8341250	8.65128.0	8.57/22.9	8.62127.2	8.92/27.0
pH/Temperature (°C):	C-lun	8301250	8.65/285	853/279	8.56/27.3	8.88/27.0
pH/Temperature (°C):		1	1	1	1	1

(a) Temp. out of range 25.0°CT1, added fans+turned room temp down

AH 2/10/05 Final Review: 2/24/05 Comments:

QC Check:

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Report Date:

24 Feb-05 9:52 AM

Link:

09-2007-3234/0502-042

Selenastrum (Growth Test							Nautilus Environmental (CA
Test No: Start Date: Ending Date: Setup Date:	15-8916-2915 01 Feb-05 04:0 05 Feb-05 02:0 01 Feb-05 04:0	00 PM	Test Type: Protocol: Dil Water: Brine:		-02-013 (200) riched Water		Duration: Species: Source:	94h Selenastrum capricornutum In-House Culture
•	te: 31 Jan-05 08:45 AM				Client: Project:	City of Buenaventura		
Comparison S	Summary							
Analysis	Endpoint		NOEL	LO	EL (ChV	MSDp	Method
03-9845-2945 11-0764-3373	Cell Density		101 100	> 101 > 100		N/A N/A	37.67% 8.59%	Equal Variance t Equal Variance t
Test Acceptab	oility							
Analysis	Endpoint		Attrib	ute	Statistic	Acceptab	le Range	Decision
03-9845-2945	Cell Density		Contro	ICV	0.07221	N/A - 0.2		Passes acceptability criteria
11-0764-3373	Cell Density		Contro	I CV	0.07221	N/A - 0.2		Passes acceptability criteria
03-9845-2945	Cell Density		Contro	l Response	1309750	1000000 -	N/A	Passes acceptability criteria
11-0764-3373	Cell Density		Contro	l Response	1309750	1000000 -	N/A	Passes acceptability criteria
03-9845-2945	Cell Density		MSDp		0.3767	0.091 - 0.2	29	Fails acceptability criteria
11-0764-3373	Cell Density		MSDp		0.08587	0.091 - 0.2	29	Fails acceptability criteria
Cell Density S	ummary							
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%
101 100% U	nfiltered	4	1.19E+6	8.36E+5	1.92E+6	2.49E+5	4.99E+5	42.02%
Cell Density D	etail							
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			
101 100% un	filtered	9.19E+5	1.07E+6	1.92E+6	8.36E+5			

Analyst:

Approval: 2/24/05

Comparisons:

Page 2 of 2

Report Date:

10 Feb-05 11:22 AM

CETIS	Analy	sis De	tail							Analys			3373/0502-04
Selenastr	rum Grov	vth Test									Nau	tilus Enviror	nmental (CA)
Endpoint			Anal	ysis Type		Samp			ol Link	Date Ana		Version	
Cell Dens	ity		Com	parison		09-200	07-323	34 09-20	07-3234	10 Feb-0	5 11:22	AM CETISV	1.025
Method			Alt i		Transform	Z		NOEL	LOEL	Toxic U		ChV	MSDp
Equal Var	iance t		C > 7	T Untra	nsformed			100	>100	1.00		N/A	8.59%
Test Acce	eptability												
Attribute			Stati	stic A	cceptable Ra	ange D	ecisio	n					
Control C	V		0.072	221 N	I/A - 0.2	Pa	asses	acceptabil	ity criteria	а			
Control Re	esponse		1309	750 1	000000 - N/A	Pa	asses	acceptabil	ity criteria	a			
MSDp			0.08	587 0	.091 - 0.29	Fa	ails ac	ceptability	criteria				
ANOVA A	ssumpti	ons	-										
Attribute		Test		Statis	stic Cri	itical	PL	evel	Decis	ion(0.01)			
Variances	3	Variance R	Ratio	2.006	82 47.	46723	0.58	3177	Equal	Variances			
Distributio	n	Shapiro-W	ilk W	0.884	35 0.7	4935	0.20	0071	Norma	al Distributio	on		
ANOVA T	able												
Source		Sum of	Squares	Mean Squ	are DF	F Sta	tistic	P Leve	el	Decision	(0.05)		
Between		3.456E+		3.46E+12	1	515.7	'5	0.0000	0	Significat			
Error		4.020E+	10	6.70E+09	6								
Total		3.4960E	+12	3.463E+12	2 7								
Group Co	omparisc	ns											
Control	vs	Conc-%	s	tatistic	Critical	P Level		MSD	D	ecision(0.0	5)		
Salt Contr	rol	100	-2	22.710	1.94318	1.0000		112475	N	on-Significa	nt Effect		
Data Sum	nmary				Orig	inal Data					Transfo	rmed Data	
Conc-%	Cor	ntrol Type	Count	Mean	Minimum	Maxim	um	SD	Mear	n Mir	nimum	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 Deta	ail												
Conc-%	Cor	ntrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Re	p5 R	ер 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							
Graphics													
	4000000	h						1500	000-				
								1500					0
_								p 1000	000-			0 /	
sity	3000000	4					7	Untransformed 2000	1				
Cell Density		1			٥		Centered	500 ق ر	000-				
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-100000-

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Reject Null

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Conc-%

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Comparisons:

Page 1 of 2

Report Date:

10 Feb-05 11:22 AM

Analysis:

03-9845-2945/0502-042

Selenastrum Grow	th Test								Allalys		tilus Enviro	onmental (CA
Endpoint		Analys	sis Type		Sample l	ink	Control	Link D	ate Ana	lyzed	Version	on
Cell Density		Compa	arison		09-2007-	3234	09-2007-	3234 1	0 Feb-0	5 11:22	AM CETIS	v1.025
Method		Alt H	Data [*]	Transform	Z	NO	EL LO	DEL	Toxic U		ChV	MSDp
Equal Variance t		C > T	Untra	nsformed		101	>1	01	0.99		N/A	37.67%
Test Acceptability												
Attribute		Statist		cceptable Ra								
Control CV		0.0722		/A - 0.2			eptability					
Control Response		130979 0.3767		000000 - N/A .091 - 0.29			eptability o					
MSDp		0.3767	0.	091 - 0.29	raiis	accep	tability Crit	ena				
ANOVA Assumptio	ns											
	est		Statis			Leve		Decision				
	/ariance Ratio		27.83			0.0217		Equal Va				
Distribution S	Shapiro-Wilk V	V	0.840	35 0.7	4935 (0.0805	9 1	Normal D	istributio	n ———		
ANOVA Table												
Source	Sum of Squ		Mean Squ		F Statis	tic	P Level		Decision			
Between	3.001E+10		3.00E+10	1	0.23		0.64657	1	lon-Sign	ificant E	ffect	
Total	7.736E+11 8.0362E+11		1.29E+11 1.589E+11	6 7								
			1.5092+11									
Group Comparisor												
Control vs	Conc-%		tistic	Critical	P Level	MS			sion(0.0			
Salt Control	101	0.4	8247	1.94318	0.3233	49.	3382	Non-	Significa			
Data Summary					inal Data						rmed Data	
			Mean	Minimum	Maximum			Mean	Mir	imum	Maximum	n SD
			1.31E+6 1.19E+6	1.21E+6 8.36E+5	1.43E+6 1.92E+6		6E+4 9E+5					
101 100% unfilter	eix		1.102.0	0.002.0	1.022.0	4.0						
Data Detail							_		_			
		ep 1 28E+6	Rep 2 1.32E+6	Rep 3 1.43E+6	Rep 4 1.21E+6	Rep 5	Rep	6 R	ep 7	Rep 8	Rep 9	Rep 10
10tivo/ unfilter		20E+6 19E+5	1.32E+6 1.07E+6	1.43E+6 1.92E+6	8.36E+5							
Graphics				1.022.0	0.00210							
Orapinos .												
20000007							800000-	}				0
				1		-	600000-					
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ens	\$					for	400000-]			/	
Cell Density 1500000-				Ĭ		Centered :ransform	200000-					
Ö				Reject Null		Centered Untransformed				/	/ •	
F00000				Reject Null		_	0			0	.0	
500000- 1							-200000-		9/	0		
							200000	/	~			
0 (0		1	.01			-400000-	1.5 -1.0	-0.5	0.0	0.5 1.0	1.5
	J	Conc-%						1.0		ankits	0.5 1.0	1.5
		20116-7							K	andit2		

CETIS Analysis Detail

CETIS Data Worksheet

Report Date:

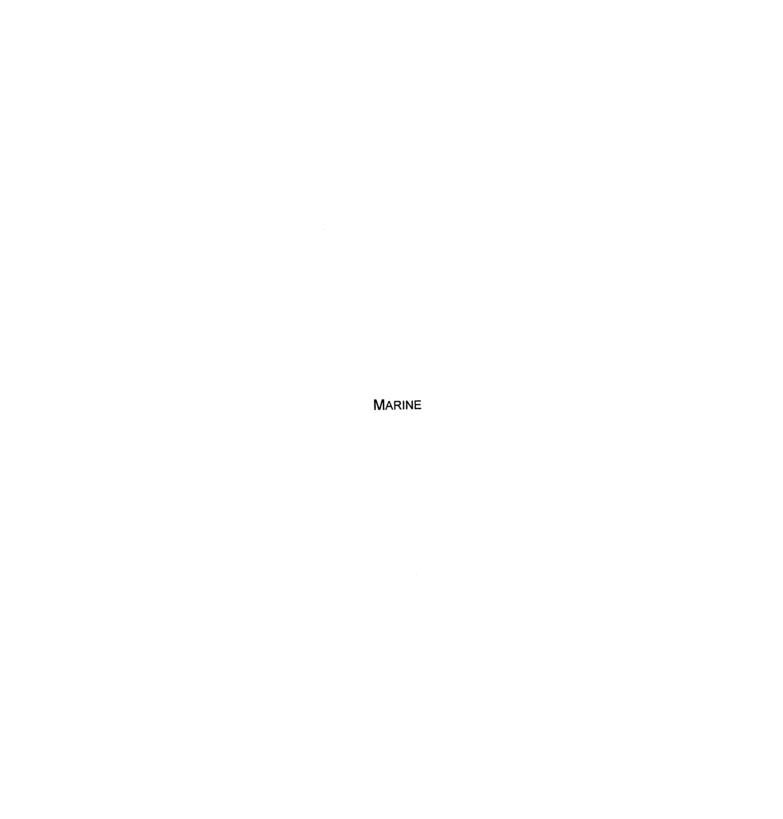
01 Feb-05 10:51 AM

Link:

09-2007-3234/0502-042

Selenastrum	Grow	th Te	st							Nautilus Environmental (CA)
Start Date:	01 F	eb-05	5	Spec	ies:	Selenast	rum capricorni	utum		0502-042
Ending Date	: 05 F	eb-05	5	Proto	Protocol: EPA/821/R-02-013 (2002)				Sample Source:	City of Buenaventura
Sample Date	: 31 J	Jan-05	5	Mate					Sample Station:	C-1
Conc-%	Code	Rep	Pos	Cell Density	Abs	sorbance	Biomass	Chlorophyll a		Notes
	1,C	1	39		1					
52 0	LÓ	2	40						The second second second second second	The state of the s
< 9m 0	LC	3	47							
250	LC	4	43		1					
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3 0	sc	3	38	-		1				AND THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TO THE PERSON NAMED IN COLU
C	sc	4	41							
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100	o l	3	46		-					
100		. 4	45						and the second of the second of	
										

Reviewed By



A. AFFINIS

Report Date:

24 Feb-05 11:42 AM

Link:

05-7289-1881/0502-015

Pacific Topsm	nelt 7-d Surviva	l and Gro	wth Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	08-1113-5423 01 Feb-05 02: 08 Feb-05 11:: 01 Feb-05 02:	20 AM	Test Type: Protocol: Dil Water: Brine:	EPA/600/R- Laboratory	Growth-Survival (7d) EPA/600/R-95/136 (1995) Laboratory Seawater Forty Fathoms Estuarine Monitoring Sample			6d 21h Atherinops affinis Aquatic Biosystems, CO
Sample No: Sample Date: Receive Date: Sample Age:	31 Jan-05 10:		Material: Code: Source: Station:	0502-015	City of Buenaventura			City of Buenaventura
Comparison S	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 Bior	mass-mg	100	> 100		N/A	13.00%	Dunnett's Multiple Comparison
Test Acceptal	oility							
Analysis	Endpoint		Attrib	ute	Statistic	Acceptable	Range	Decision
14-5961-1816	7d Proportion	Survived	Contro	l Response	0.96000	0.8 - N/A		Passes acceptability criteria
12-2235-6839			Contro	l Response	1.1692	0.85 - N/A		Passes acceptability criteria
14-5961-1816	•		MSDp		0.11836	N/A - 0.25		Passes acceptability criteria
12-2235-6839	Mean Dry Bior	mass-mg	MSDp		0.12996	N/A - 0.5		Passes acceptability criteria
7d Proportion	Survived Sum	mary						
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 Bio	mass-mg Sum	mary						
Conc-%	Control Type	Reps	Mean	Minimum	Maximum		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%
	Survived Deta		_					
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 69		1.00000	1.00000	1.00000	1.00000	1.00000		
100		0.80000	1.00000 0.80000	1.00000 1.00000	1.00000 1.00000	1.00000 1.00000		
	mana ma Data		0.80000	1.00000	1.00000	1.00000		
Conc-%	mass-mg Detai		Pon ?	Don 2	Por 4	Pon f		
0	Control Type Lab Control	Rep 1 1.40400	Rep 2 1.32800	Rep 3 1.31000	Rep 4 1.15600	Rep 5 1.14200		
0	Salt Control	1.11400	1.18600	1.09800	1.16800	1.28000		
25	2 20	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		

Analyst: Approval:

Page 2 of 2

Report Date:

15 Feb-05 1:08 PM

Analysis:

14-5961-1816/0502-015

CETIS Analysis Detail

0.1587821

0.19053853

0.007939

0.0158782

Error

Total

Pacific Topsmelt 7-d Surviva	al and Growth T	est					N	lautilus	Environmental (CA)
Endpoint	Analysis	Analysis Type		Sample Link Contro		ntrol Link	Link Date Analyzed		Version
7d Proportion Survived	Comparis	on	05	-7289-1	881 05-	7289-1881	15 Feb-05 1:06	6 PM	CETISv1.025
Method	Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	C > T Angular (Corrected)			100	>100	1.00	N/A	11.84%
Test Acceptability									
Attribute	Statistic	Acceptable R	lange	Decis	ion				
Control Response	0.96000	0.8 - N/A		Passes acceptability criteria					
MSDp	0.11836	N/A - 0.25		Passe	s accepta	bility criteria	l		
ANOVA Assumptions									
Attribute Test		Statistic C	ritical	P	Level	Decisi	on(0.01)		

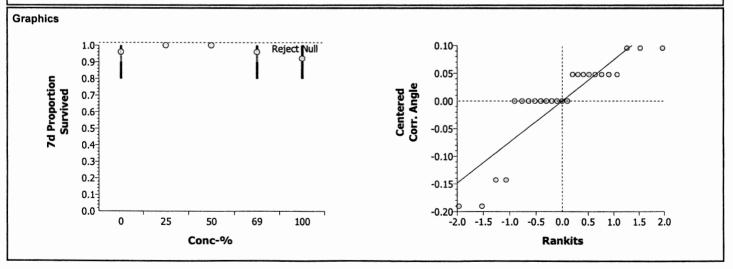
Variances	Modified Levene	1.72000	4.430	069 0.18	510	Equal Variances	
Distribution	Shapiro-Wilk W	0.78117	0.88	746 0.000	005	Non-normal Distribution	
ANOVA Table							
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)	
Between	0.0317564	0.007939	4	1.00	0.43068	Non-Significant Effe	ect

20

24

Group Comp	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 Summ	ary		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



Page 1 of 2

Report Date:

15 Feb-05 1:08 PM

12-2235-6839/0502-015

CETIS Analysis Detail	Analysis:
Pacific Topsmelt 7-d Survival and Growth Test	

Analysis Type

Nautilus	s Environmental (CA)
Date Analyzed	Version
15 Feb-05 1:06 PM	CETISv1.025

Mean Dry Biomass-mg	Co	mparison		05-7289-18	381 05-7	289-1881	15 Feb-05 1:06	PM C	ETISV1.025
Method	Alt	H D	ata Transform	z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comp	arison C	> T U	ntransformed		100	>100	1.00	N/A	13.00%

Sample Link

Control Link

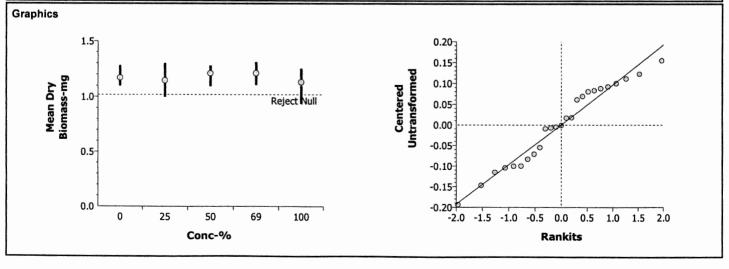
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	1.1692	0.85 - N/A	Passes acceptability criteria
MSDp	0.12996	N/A - 0.5	Passes acceptability criteria

ANOVA Assum	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 Comp	ariso	ns					
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 Summ	ary			Origi	nal 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	1.14520	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							



Endpoint

		City of Buenaventura								A security					
Client Name:		City o	Buen	aventu	ıra			Test Sp	oecies:	A. affinis				_	
Sample ID:		<u>A</u> -	2				Sta	rt Date	e/Time:	2/1/2005 /	14	00		_	
Test No.:		050	12 -	-015	Ď		_ Er	nd Date	e/Time:	2/8/2005	000 000	20 20		-	
Conc.	Rep.		BERTELE		Surviva	Berner Street Street	granda a de la compansión de la compansión de la compansión de la compansión de la compansión de la compansión	A CONTRACTOR OF THE	(888288)	Percent		pan wt.	pan + fish]	
		0	1	2	3	4	5	6	7	Survival	-	(g)	(g)	4	
Lab cont.	a b	5	5	5	5	5	5	3	5	100		0.03403	0,04105	-	
#1	C	5	5	5	2	5	5	3	5	100	-	0.03608	0.04272	-	
	d	5	5	5	5	5	3	5	5	100		0.02188	0.03443	1	
	e	5	5	5	5	5	5	5	5	100		0.02909	0.03480	1	
Salt Cont.	a	5	5	14	4	4	4	4	4	80		0.02199	0.03256	4	
#1	b	5	5	5	5	=	13	13	5	100		0.02531	8-836-49	1	
	C	5	5	5	5	5	5	5	5	100		0.02531	0.03475	1	
	d	5	5	5	5	5	5	15	5	100		0.02426	0.03210	1	
	е	5	5	5	5	5	5	13	5	100		0.02451	0.03091	1	
25	а	5	5	5	5	5	5	5	5	100		0.03939	0.04470	1	
	b	5	5	5	5	5	13	3	5	100			0.03549	1	
	С	5	5	5	5	5	3	5	5	100		0.02771	0.03385	1	
	d	5	5	5	5	5	13	3	5	100	7	0.02916	0.03415	1	
	е	5	5	5	8	5	5	<	5	100	1	0.02468	0.03118	1	
50	а	5	5	5	5	5	5	5	5	100		0.02750	0.03389	7	
	b	5	5	5	5	5	3	<	5	100		0.02710	0.03312	1	
	С	5	5	5	5	5	13	5	5	100		0.02407	0.02954	1	
	d	5	5	5	5	5	15		5	100	-	0.02337	0.02574	T.0.0	
	е	5	5	5	5	5	13	3	5	100		0.02481	0.03081	٦	
69	а	5	5	_	14	4	64	14	4	80		0.02698	0.03253	1	
	b	5	5	5	5	5	5	13	5	TOD	-	0.02437	C . 03051	1	
	С	5	5	5	S	5	5	5	15	100		0.02340	0.02893	1	
	d	5	5	5	5	5	5	15	5	100		0.02157	0,02812	1	
	е	5	5	5	5	5	5	5	5	100		0.02385	0.03034	1	
100	а	5	5	4	4	4	4	1.4	4	80		0.02512	0.03027	1	
	b	5	5	5	4	4	19	9	4	80		0.02367	0.02835	1	
	С	5	5	5	5	5	5	5	5	100	7	0.02884	0.03489	7	
	d	5	5	5	5	5	15	S	5	100		0.02820	0.03446	1	
	е	5	5	5	5	5	3	S	5	100		0.02466	0.03077		
	а	5										0.0]	
	b	5													
	C	5													
	a	5		ļ											
	е	5	15												
Tech Initials		AS.	9e	92	SH	MC	SN	21	YR						
Fanding Time	- /al=: \		_		_			_	_			. Weigh			
Feeding Time	s (day)):	0	1	2	3	4	5	6	1		Date/Time in:	2.8-05/112	O	
				0830	0830	0815	6710	1000	0915	-		ate/Time out:			
			1 /30	1600	1545	1230	1430	1900	1530]		en Temp (°C):			
												Tech Initials:	4R		
Comments												00.61	111210		
Comments:					***					-	_	QC Check:		211	
											F	inal Review:	20012	1410	

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

"autilus Environmental, LLC. 5550 Morehouse Drive, Suite 150, San Diego, CA 92121.

Client: City of Buenaventura Test Species: A. affinis 1400 Start Date/Time: 2/1/2005 Sample ID: 0502-015 End Date/Time: 2/8/2005 Test No: # Concentration Concentration Lan Control 0 Day Day Initia Initial 8.628.35 8.37 8.31 8.04 7.96 800 pН рН 6.8 DO (mg/L) DO (mg/L) 30.029. 305 29. 29.4 Salinity (ppt) 30 4 Salinity (ppt) 20.9 20.5 Temp (°C) 20.020.8 20.3 20.6 20.4 Temp (°C) 200 20.7 Final Final 8.18 8.08 8.14 8 DS 7.79 7.78 7.68 pН pΗ 6.0 58 DO (mg/L) k.9 6.5 DO (mg/L) 56 19-8 19.2 Temp (°C) Temp (°C) + Control 69% Concentration Concentration Day Day Initia pН 8.33 8.17 8.21 pΗ 8.35 76 7.4 4.9 0 DO (mg/L) DO (mg/L) 29.6 29,4 306 29.1 29.5 31.0 3).0 29.2 30.1 Salinity (ppt) Salinity (ppt) 20.5 009 20.9 200 Temp (°C) 20.4 20.1 20.3 20.4 Temp (°C) 20.8 20.8 Final 8.23 8.23 8.14 7.92 7.65 7.63 pН pН 811 1,2 5.8 6.2 6-2 Le.O DO (mg/L) DO (mg/L) 7.0 25-2019.7 28.2 197 19.2 Temp (°C) 19.1 19.5 Temp (°C) 195 25% 100 1. Concentration Concentration Day Day Initial Initia 8,39 8.36 pН pН 6.6 DO (mg/L) DO (mg/L) 30.7 29.0 29.5 Salinity (ppt) Salinity (ppt) 303 20.8 200 209 20.9 205 Temp (°C) Temp (°C) 20.6 Final 8,25 8.21 pН 8.01 7.97 pΗ 7.0 DO (mg/L) 5.7 DO (mg/L) 6.1 5,5 6. 6.0 2500 19.8 19.2 19.5 Temp (°C) 19.5 195 Temp (°C) 19.8 24 7 30 SD Sit MC Analysts: Initial: Animal Source/Date Received: ABS / 1-29-05 54 MC Animal Age at Initiation: 13 days Comments: QC Check: Final Review:

Report Date:

24 Feb-05 11:47 AM

Link: 09-

09-5145-7631/0502-016

Pacific Topsn	nelt 7-d Surviva	l and Gro	wth Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	08-1113-5423 01 Feb-05 02:0 08 Feb-05 11:2 01 Feb-05 02:0	20 AM	Test Type: Protocol: Dil Water: Brine:	Growth-Sur EPA/600/R- Laboratory S Forty Fatho	95/136 (199 Seawater	5)	Duration: Species: Source:	6d 21h Atherinops affinis Aquatic Biosystems, CO
Sample No: Sample Date: Receive Date: Sample Age:	: 31 Jan-05 10:1		Material: Code: Source: Station:	Estuarine M 0502-016 City of Buer B-1	Ionitoring Sa	mple	Client: Project:	City of Buenaventura
			otation. D-1					
•	son Summary Endpoint NOEL LOEL ChV					?h\/	MSDp	Method
Analysis 12-3768-8576	7d Proportion	Survived	100	> 100		V/A	10.36%	Steel's Many-One Rank
12-1539-4690	•		100	> 100		V/A	9.59%	Dunnett's Multiple Comparison
Test Acceptal	hility							
Analysis	Endpoint		Attrib	ıte	Statistic	Acceptable	Range	Decision
12-3768-8576	7d Proportion	Survived		ontrol Response 0.96000 0.8 - N/A				Passes acceptability criteria
12-1539-4690	Mean Dry Bion		Contro	l 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 Bion	nass-mg	MSDp		0.09592	N/A - 0.5		Passes acceptability criteria
7d Proportion	Survived Sum	mary						
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 Bio	mass-mg Sumr	mary						
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%
69 100		5 5	1.17720 1.21400	1.10600 1.13000	1.25000 1.34200	0.02347	0.05249	4.46%
			1.21400	1.13000	1.34200	0.03576	0.07996	6.59%
-	Survived Deta		D 0	D 0	54	.		
Conc-%	Control Type Lab Control	Rep 1 1.00000	Rep 2 1.00000	Rep 3		Rep 5 1.00000		
0	Salt Control	0.80000	1.00000	1.00000		1.00000		
25	Jul John of	1.00000	1.00000	1.00000		1.00000		
50		0.80000	1.00000	0.80000		1.00000		
69		1.00000	1.00000	1.00000		1.00000		
100		1.00000	1.00000	1.00000		1.00000		
Mean Dry Bio	mass-mg Detai							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	1.40400	1.32800	1.31000		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		1.01000		
69		1.10600	1.15800	1.19400		1.25000		
100		1.20400	1.17000	1.34200	1.13000	1.22400		

Analyst:

Approval: 2/24

Page 2 of 2

	nalysis D	Jelaii							Analysis:	12-3	3768-85	76/0502-0
Pacific Tops	melt 7-d Surv	vival and G	rowth Test						N	autilus Ei	nvironn	nental (CA
Endpoint		Ar	nalysis Type		Sample L	.ink	Contro	Link D	ate Analyzed	Ve	rsion	
7d Proportion	Survived	Co	omparison		09-5145-7	7631	05-7289	9-1881 1	5 Feb-05 1:19	PM C	ETISv1.	025
Method		Al	t H Dat	a Transform	z	NOE	L L	OEL 1	Toxic Units	ChV		MSDp
Steel's Many-	-One Rank	С	> T Ang	ular (Correcte	d)	100	>	100 1	.00	N/A		10.36%
Test Accepta	ability											
Attribute		St		Acceptable F	Range Decis	ion						
Control Respo	onse			0.8 - N/A			eptability					
MSDp		0.	10358 —————	N/A - 0.25	Passe	es acce	eptability	criteria				
ANOVA Assu	umptions											
Attribute	Test		Sta	tistic C	ritical P	Level		Decision(0.01)			
Variances	Modified	d Levene	2.54	1286 4.	43069 0	.07160)	Equal Var				
Distribution	Shapiro	-Wilk W	0.75	5773 0.	88746 0	.00002	!	Non-norm	al Distribution			
ANOVA Table	e											
Source	Sum	of Squares	s Mean So	uare DF	F Statist	ic i	P Level	D	ecision(0.05))		
Between	0.036	52931	0.009073		1.60	(0.21322	N	on-Significant	Effect		
Error	0.113	34158	0.005671	20								
Total	0.149	970886	0.014744	11 24								
	vs Conc	-%	Statistic 30	Critical 17	P Level > 0.0500	Ties	S	Non-S	ion(0.05) Significant Effe			
Salt Control	25 50 69 100	-%		17 17 17 17	> 0.0500 > 0.0500 > 0.0500 > 0.0500		S	Non-S Non-S Non-S	Significant Effe Significant Effe Significant Effe Significant Effe	ect ect ect		
Salt Control Data Summa	25 50 69 100		30 25 30 30	17 17 17 17 17	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data	1 2 1 1	S	Non-S Non-S Non-S	Significant Effe Significant Effe Significant Effe Significant Effe Trans	ect ect ect formed D		
Salt Control Data Summa Conc-%	25 50 69 100 ary Control Tyj	pe Count	30 25 30 30 30 Mean	17 17 17 17 17 Ori Minimun	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data	1 2 1 1		Non-S Non-S Non-S Non-S	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun	ect ect ect formed D	num	SD
Salt Control Data Summa Conc-% 0	25 50 69 100	pe Count	30 25 30 30 30 Mean 0.96000	17 17 17 17 17 Ori Minimun 0.80000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data Maximum 1.00000	1 2 1 1 1 SD	8944	Non-S Non-S Non-S Non-S Mean	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715	ect ect ect formed D n Maxii 1.345	num 28	0.10650
Data Summa Conc-% 0 25	25 50 69 100 ary Control Tyj	pe Count 5 5	30 25 30 30 Mean 0.96000 1.00000	17 17 17 17 17 Ori Minimun 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data 1.00000 1.00000	1 2 1 1 1 SD 0.08	B944 0000	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528	ect ect formed D n Maxin 1.345 1.345	mum 28 28	0.10650 0.00020
Data Summa Conc-% 0 25	25 50 69 100 ary Control Tyj	pe Count 5 5 5	30 25 30 30 Mean 0.96000 1.00000 0.92000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data Maximum 1.00000 1.00000	1 2 1 1 1 SD 0.08 0.00 0.10	3944 0000 0954	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715	ect ect ect formed D n Maxii 1.345 1.345 1.345	mum 28 28 28	0.10650 0.00020 0.13043
Data Summa Conc-% 0 25 50 69	25 50 69 100 ary Control Tyj	pe Count 5 5	30 25 30 30 Mean 0.96000 1.00000	17 17 17 17 17 Ori Minimun 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data 1.00000 1.00000	1 2 1 1 1 SD 0.08 0.00 0.10 0.00	B944 0000	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528	ect ect formed D n Maxin 1.345 1.345	num 28 28 28 28	0.10650 0.00020
Data Summa Conc-% 0 25 50 69 100	25 50 69 100 ary Control Tyj	pe Count 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 0.92000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 SD 0.08 0.00 0.10 0.00	3944 0000 0954 0000	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528	ect ect ect formed D n Maxii 1.345 1.345 1.345	num 28 28 28 28	0.10650 0.00020 0.13043 0.00020
Data Summa Conc-% 0 25 50 69	25 50 69 100 ary Control Ty	pe Count 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 SD 0.08 0.00 0.10 0.00	3944 0000 0954 0000 0000	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020
Data Summa Conc-% 0 25 50 69 100	25 50 69 100 ary Control Tyj	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 SD 0.08 0.00 0.10 0.00	8944 0000 0954 0000 0000	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020
Data Summa Conc-% 0 25 50 69 100 Graphics	25 50 69 100 ary Control Tyi Salt Control	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 0.08 0.00 0.10 0.00	3944 0000 0954 0000 0000	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020
Data Summa Conc-% 0 25 50 69 100 Graphics	25 50 69 100 ary Control Tyi Salt Control	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 0.08 0.00 0.10 0.00	0000 0954 0000 0000 0.10	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020
Data Summa Conc-% 0 25 50 69 100 Graphics	25 50 69 100 ary Control Tyr Salt Control	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 0.08 0.00 0.10 0.00	8944 0000 0954 0000 0000	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020
Data Summa Conc-% 0 25 50 69 100 Graphics	25 50 69 100 ary Control Tyl Salt Control	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 0.08 0.00 0.10 0.00	0000 0954 0000 0000 0.10	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020
Data Summa Conc-% 0 25 50 69 100 Graphics	25 50 69 100 ary Control Tyr Salt Control	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 SD 0.08 0.00 0.10 0.00	0.000 0.10 0.05 0.005	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020
Data Summa Conc-% 0 25 50 69 100 Graphics	25 50 69 100 ary Control Tyi Salt Control	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 0.08 0.00 0.10 0.00	0000 0954 0000 0000 0.10 0.05	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020
Data Summa Conc-% 0 25 50 69 100 Graphics	25 50 69 100 ary Control Tyl Salt Control	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data n Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 0.08 0.00 0.10 0.00	0.000 0.10 0.05 0.005	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020
Data Summa Conc-% 0 25 50 69 100 Graphics	25 50 69 100 ary Control Tyl Salt Control	pe Count 5 5 5 5 5	30 25 30 30 Mean 0.96000 1.00000 1.00000 1.00000	17 17 17 17 Ori Minimun 0.80000 1.00000 0.80000 1.00000	> 0.0500 > 0.0500 > 0.0500 > 0.0500 ginal Data Maximum 1.00000 1.00000 1.00000 1.00000	1 2 1 1 1 0.08 0.00 0.10 0.00	0.10 0.05 0.05 0.05	Non-S Non-S Non-S Non-S Mean 1.29766 1.34528 1.25003 1.34528	Significant Effe Significant Effe Significant Effe Significant Effe Trans Minimun 1.10715 1.34528 1.10715 1.34528 1.34528	formed D Maxim 1.345 1.345 1.345	mum 28 28 28 28 28 28	0.10650 0.00020 0.13043 0.00020 0.00020

Rankits

Conc-%

Page 1 of 2

Report Date:

15 Feb-05 1:19 PM

Analysis:

12-1539-4690/0502-016

CETIS Analysis Detail

Pacific Topsmelt 7-d Survival a	nd Growth	Test				N	autilus	Environmental (CA)
Endpoint	Analysi	s Type	Sample L	ink C	ontrol Link	Date Analyzed		Version
Mean Dry Biomass-mg	Compar	ison	09-5145-7631		5-7289-1881	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%

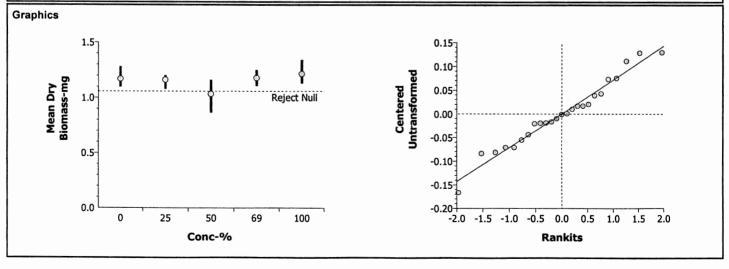
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	1.1692	0.85 - N/A	Passes acceptability criteria
MSDp	0.09592	N/A - 0.5	Passes acceptability criteria

ANOVA Assum	nptions					
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	
ANIOVA Table						

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 Comp	ariso	ns					
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 Summ	ata Summary			Origi	nal 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							



Analyst: AH

Approval: Approval: 24 24 25

Client Name: City of Buenaventura Test Species: A. affinis

Sample ID: Start Date/Time: $2/1/2005/_{1400}$

Test No.: 0502 - 016 End Date/Time: 2/8/2005 1100

Conc.	Rep.			S	urviva	l on Te		:		Percent		pan wt.	pan + fish
(()	itep.	0	1	2	3	4	5	6	7	Survival		(g)	(g)
25	а	5	5	5	5	5	5	5	5	100	0	,02492	0.03062
	b	5	5	5	5	5	S	.3	5	100	0	02633	0.03234
	С	5	5	5	5	5	5	S	5	100		02302	0.02901
	d	5	5	5	5	5	3	3	5	LOD		02395	0.02934
	е	5	5	5	5	5	<	5	5	100	0	,02686	0.03276
50	а	5	5	4	ų	4	ч	ч	4	80	0	.03320	0.03827
	b	5	5	5	8	5	<	3	5	100	0	02324	0.02877
	С	5	5	4	4	4	Ū	4	4	80	0	.03228	0-03660
	d	5	5	5	5	5	5	S	5	100	O.	03228	0.04114
	е	5	5	5	5	5	Š	5	5	100	0.	02671	0.03176
69	а	5	5	5	5	5	2	5	5	100	0.	02814	0.03367
	b	5	5	<u>5</u>	5	5	5	حَر	5	100	0.	02195	0.02774
	С	5	5	5	5	5	S	S	5	100		.02502	0.03099
	d	5	5	5	5	5	5	ک	5	100	0	.02773	0.03362
	е	5	5	5	5	5	S	S	5	100	0	.02337	0.02962
100	а	5	5	5,	5	5	<	5	5	100	0.	02317	0.02919
	b	5	5	5	5	5	3	5	5	100	0	.02498	0.03083
	С	5	5	5	5	5	S	5	5	ion	0	.02459	0.03130
	d	5	5	5	5	5	S	5	5	100		02492	0.03057
	е	5	5	5	5	5	S	_5	5	1.00	0.	02379	0.02991
	а										10,000		
	b												
	С												
	d												
	е												
	а												
	b										19		
	С												
	d										1		
	е												
	а												
	b												
	С										100		
	d										2011		
	е												
Tech Initials		TIL	72	qe	SH	nc	20	50	MEAB	•		Woigh	

Feeding Times (day):

0 1 2 3 4 5 6 - 0830 0830 0815 0720 /000 0915 1730 1600 1745 1530 1430 1400 1530

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

Weight Data:

Date/Time in: 2.8.05/1120Date/Time out: 2-10-05/1315Oven Temp (°C): 64°

Tech Initials: 144

QC Check: All His CS Final Review: Aff 2/24/05

Client:	City of Buenaventura	Test Species:	: A. affin	is						
		·		,						
Sample ID:	B-1	Start Date/Time:	2/1/200	5 /)	400					
Test No:	0502-016	End Date/Time:	2/8/200	5 / to	20 74					
Concentration	25%	Concentration	T		10	0'	/,			
	0 1 2 3 4 5 6 7		-	1	10	$\frac{\mathcal{O}}{\mid 3}$, A	5	6	7
Day	initial	Day	1 0	· •	1 2		itial	1 3		,
pH	18.7218:35 8.38 8.36 8.34 827 8.29	pН	18.44	8,35	8,22	8.38	8.29	8.35	8.29	
DO (mg/L)	79 47 72 66 71 76 71	DO (mg/L)	8.5	7.7	59	7.0	7.2	66	7.1	
Salinity (ppt)	30.2 303 295 296 295 30.3 30)	Salinity (ppt)	30.2	30.7	29.5	29.3	29.9	31.9		3), P
Temp (°C)	20.3 209 20.5 20.8 20.6 20.3 19.3	Temp (°C)	20.5	20.9	20.5	20.5	20.7	20.8	19.3	
	Final		_				nat	12 22	- A	
pH	8.44 805 802 797 87.97 7.98 8D	pН	_	8.36	825	8.21	8.16	8.23		819
DO (mg/L)	6.9 (1.) 5.5 (00 (00 6.0 (0.0)	DO (mg/L)	4	6.7	(0)	5.3	5.8	5.6	6.1	100
Temp (°C)	257, 198 19.3 19.6 19.3 19.5 19.9	Temp (°C)		19.9	19.5	19.3	19.5	19,5	19.4	1919
	19.9			19,4						
Concentration	50%	Concentration								
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	4	5	6	7
	Initial			r	T	<u>In</u>	itial	т	Τ	1
pH	8.41833 832 9.39 8.31 8.31 8.31	pН				<u> </u>	 	<u> </u>		-
DO (mg/L)	C1 (0.8 (0.8 7.0 7.1 7.3 (c.)	DO (mg/L)			ļ		 	-		4
Salinity (ppt)	30.2 30.3 29.6 29.4 29.7 31.0 31.)	Salinity (ppt)				+	-		 	-
Temp (°C)	3-D-1 20.9 120.9 20.16 20.73 193	Temp (°C)	1	<u> </u>	1	<u> </u>	ina i		1	1
a.U	8.41 Ros 8.11 8.05 810 8.09 505	рН	T		T	-	Hat	T	T	T
pH DO (mg/L)	6.7 6.7 5.7 6.2 60 6.1 6.0	DO (mg/L)	-				 	 	1	
Temp (°C)	25,3, 19,8 19,3 19,5 19,7 19,5 200	Temp (°C)	┪	·	 	+	 	 		1
Temp (C)	19,8	Temp (o)	•	1						
		0	T							
Concentration	69.1.	Concentration								1 -
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	itial	5	6	7
pH	######################################	pH	T	l .	T		HIET	T	T	T
DO (mg/L)	194 7.1 6.9 7.0 7.0 1.8	DO (mg/L)	+		 	+	 	 	 	┪
	30 30.5 29.8 24.5 29.7 31.7 31.)	Salinity (ppt)	+		-	+	 	 	 	7
Salinity (ppt) Temp (°C)	20.0 20.9 20.8 20.8 20.7 20.0 19.3	Temp (°C)	 			 	 	 	 	1
remp (C)	Final	remp (o)		l	1	F	nai	1	1	
pН	8.39 818 3.15 8.10 8.17 B.(6 B.)6	pH			T	T	T	T		
DO (mg/L)	6,8 6.3 5.8 6.0 61 6.2 60	DO (mg/L)	7							
Temp (°C)	250 J 197 19.4 19.5 19.4 19.5 19.9	Temp (°C)								
	19.81		_		_			_	_	_
			0	1	2	3	4	5	- 6	7
				27	12	112	uc	27	20	
Animal Source/Date	Received: ABS / 1-29-05	Analysts: Initial	:27		120	-	+	-	120	
	40.1	Final		42	137	SH	MC	120	RG	20
Animal Age at Initiati	^	Final	l- [L			<u> </u>	<u> </u>	1.17	<u> </u>
Comments:	See A-2 for lab and salt control	5					~	121	. , ,	
QC Check:	AH 415/05				Fin	al Review	8 A	4-2	124/0	2

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Report Date:

24 Feb-05 11:54 AM

Link:

09-5088-0808/0502-017

Pacific Topsm	nelt 7-d Surviva	I and Gro	wth Test					Nautilus	Environmental (CA
Test No:	02-4775-0258		* -	Growth-Su			Duration:	6d 21h	
Start Date:	01 Feb-05 02:0		Protocol:		-95/136 (199	95)	Species:	Atherinops affinis	
Ending Date:	08 Feb-05 11:5 01 Feb-05 02:0		Dil Water:	Laboratory Forty Fatho			Source:	Aquatic Biosyste	ms, CO
Setup Date:	01 Feb-05 02:0	JO PIVI	Brine:						
Sample No:	15-1681-1477 31 Jan-05 12:1	IO DM	Material: Code:	Estuarine Monitoring Sample 0502-017			Client: Project:	City of Buenaven	tura
Sample Date: Receive Date:			Source:	City of Bue	naventura		Project:		
Sample Age:		101111	Station:	B-3	naventura				
Comparison S	Summary								
Analysis	Endpoint		NOEL			ChV	MSDp	Method	
10-4340-2955	7d Proportion		100	> 100		N/A	13.78%	Dunnett's Multip	•
07-5757-1789	Mean Dry Bion	nass-mg	100	> 100		N/A	11.93%	Dunnett's Multip	le Comparison
Test Acceptab	oility								
Analysis	Endpoint	0	Attrib		Statistic	Acceptable	e Range	Decision	hilibranita al
10-4340-2955	7d Proportion			l Response	0.96000	0.8 - N/A		Passes accepta	•
07-5757-1789 10-4340-2955	Mean Dry Bion 7d Proportion		MSDp	l Response	1.18960 0.13782	0.85 - N/A N/A - 0.25		Passes accepta Passes accepta	
07-5757-1789	•		MSDp		0.13762	N/A - 0.25 N/A - 0.5		Passes accepta	•
					0.1100	1477 0.0			
Conc-%	Survived Sum Control Type	mary Reps	Mean	Minimum	Maximum	ı 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 Bio	mass-mg Sumi	mary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	n 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 50		5	1.07960	0.99400	1.28200	0.05223	0.11679	10.82%	
69		5 5	1.15760 1.29640	1.05600 1.17400	1.29200 1.36200	0.04286 0.03191	0.09585 0.07136	8.28% 5.50%	
100		5	1.09200	0.98200	1.18400	0.03191	0.07130	8.00%	
	Survived Deta		1.00200	0.50200	1.10400	0.00000	0.00702	0.0070	
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 Bion Conc-%	mass-mg Detai		Pan 2	Don 2	Pon 4	Pon F			
0	Control Type Lab Control	Rep 1 1.27400	Rep 2 1.25000	Rep 3 1.09000	Rep 4 1.09200	Rep 5 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			
000-089-125-1				(CETIS™ v1.	025B	Ar	nalyst:	Approval:
									40

Page 2 of 2

Report Date:

15 Feb-05 1:35 PM

Analysis:

10-4340-2955/0502-017

C	LI	15	Anai	ysis	Detail	
_						-

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)										
Endpoint Analysis Type 7d Proportion Survived Comparison			ink C	ontrol Link	ol Link Date Analyzed		Version			
Comparison		09-5088-0808 09-5088-0808		9-5088-0808	15 Feb-05 1:34 PM		CETISv1.025			
Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp			
C > T	Angular (Corrected)		100	>100	1.00	N/A	13.78%			
	Analysis Compari Alt H	Analysis Type Comparison Alt H Data Transform	Analysis Type Sample L Comparison 09-5088-0 Alt H Data Transform Z	Analysis Type Sample Link Comparison 09-5088-0808 0 Alt H Data Transform Z NOEL	Analysis Type Sample Link Control Link Comparison 09-5088-0808 09-5088-0808 Alt H Data Transform Z NOEL LOEL	Analysis Type Sample Link Control Link Date Analyzed Comparison 09-5088-0808 09-5088-0808 15 Feb-05 1:34 Alt H Data Transform Z NOEL LOEL Toxic Units	Analysis Type Sample Link Control Link Date Analyzed Comparison 09-5088-0808 09-5088-0808 15 Feb-05 1:34 PM Alt H Data Transform Z NOEL LOEL Toxic Units ChV			

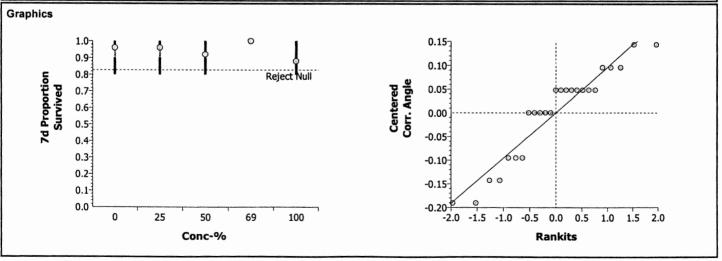
rest Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.96000	0.8 - N/A	Passes acceptability criteria
MSDp	0.13782	N/A - 0.25	Passes acceptability criteria

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 Comp	ariso	ns					
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 Sumn	nary		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	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



Analyst:___

Approval:

Page 1 of 2

Report Date:

15 Feb-05 1:35 PM

Analysis:

07-5757-1789/0502-017

CETIS Analysis Detail

Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)											
Endpoint	Analysi	з Туре	Sample L	Sample Link Control Link		Date Analyzed		Version			
Mean Dry Biomass-mg	Compar	Comparison		09-5088-0808 09-		15 Feb-05 1:3	35 PM	CETISv1.025			
Method	Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	ChV	/ MSDp			
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	11.93%			

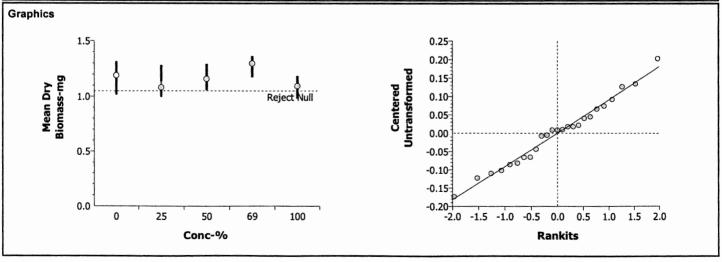
lest Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	1.18960	0.85 - N/A	Passes acceptability criteria
MSDp	0.1193	N/A - 0.5	Passes acceptability criteria

ANOVA ASSUM	ptions					
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 Comp	ariso	ns						
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 Summ	nary			Origi	nal 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

Client Name:	City of Buenaventura	Test Species: A. affinis
Sample ID:	B-3	Start Date/Time: <u>2/1/2005</u>
Test No.:	0502-017	End Date/Time: 2/8/2005 150

Conc.	Rep.				urviva	on Te	st Day	:		Percent		pan wt.	pan + fish
(_*/-)	Nep.	0	1	2	3	4	5	6	7	Survival		(g)	(g)
Lab Cont.	а	5	5	5	5	5	5	S	5	100		0.02828	0.03465
#2	b	5	5	5	5	5	S	5	5	100		0.03121	0.03746
	С	5	5	5	5	5	5	\leq	5	100		0.02421	0.0 2966
	d	5	5	5	2	5	5	S	5	100		0.02682	0 03228
	е	5	5	5	5	5	5	3	5	100		0.03054	0.03663
Salt Cont.	а	5	5	5	2	5	3	5	-5	100		0.03039	0.03697
#2	b	5	5	5	5	5	5	5	5	IDD		0.02832	0.03431
	С	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
	е	5	5	5	5	5	5	_2	5	100		0.03361	0.03978
25	а	5	5	5	5	5	S	2	5	וטו		0.03340	0.03847
	b	5	5	5	S	5	S	S	5	100		002803	0.03339
	С	5	5	5	5	5	5	S	5	100		0.03732	0.04373
	d	5	<u>5</u>	5	5	5	.5	5	5	100		0.04016	0.04513
	е	5		5	5	5	4	9	4	80		0.03024	0.03542
50	а	5	5	4	4	4	4	4	4	80		0.02558	0.03141
	b	5	5	4	4	4	9	4	4	80		0.02591	0.03139
	С	5	5	5	S	5	S	3	5	100		0.02023	0.02622
	d	5	5	5	5	3	3	5	5	100		0.02224	0.02752
	е	5	5	5	5	5	5	5	5	100		0.02237	0.02883
69	а	5	5	5'	5	5	ゴ	5	5	100		0.02374	0.03055
	b	5	5	5	5	5	5	3	5	100		0.03065	0.03652
	С	5	5	5	5	5	5	S	5	100		0.02577	0.03236
	d	5	5	5	5	5	13	5	5	100		0.02526	0.03183
	е	5	5	5	5	5	3	5	5	100		0.02921	0.03578
700	а	5	5	5	2	5	5	5	5	100		003135	0.03648
	b	5	4	4	4	4	9	4	4	80		0.03454	0.04046
	С	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
	е	5	5	24	4	4	Ч	4	4	80	LMAGE	0.02265	0.02756
	а	5											
	b	5											
	C	5											
	à	5				1							
	е	5											
Tech Initials		92	72	20	SH	M	5)	31	4R		arca such		

/		b	5											
		C	5											
		ď	_ 5											
		е	5			1								
Tech Ini	itials		9R	72	20	SH	IK	3	31	YR	*	reporto		'
											•	Weigh	t Data:	
Feeding	g Times	s (day)	;	0	1	2	3	4	5	6		Date/Time in:	2.8.05/1180	٥
					0830	C630	0815	0710	1000	0915		Date/Time out:	2-10-05/13	315
				1730	1600	1545	1530	1430	1900	1530		Oven Temp (°C):		•
											•	Tech Initials:		
Comme	nts:											QC Check:	AH 26510	<u> </u>
											•	Final Review:	affill 14	lB

Client:	City of Buenaventura	Test Species: A. affinis	
Sample ID:	B-3	Start Date/Time: 2/1/2005 //4(1)	
Test No:	0502-017	End Date/Time: 2/8/2005 / 150	
Concentration	Lab Control #2	Concentration 50%	***************************************
Day	0 1 2 3 4 5 6 7	Day 0 1 2 3 4 5 6	7
	Intial Intial	lnitial	
pH	8.06 8.05 7.93 8.04 7.96 8.05 8.05 S.D	pH 8.64 8.38 8.35 8.45 8.47 8.57 8.35	
DO (mg/L)	84 8.2 8.0 8.1 8.6 9.9 \$58.	DO (mg/L) 8) 69 69 7.1 7.4 50 6.3	
Salinity (ppt)	30.0 29.9 20.3 20.6 70.4 20.5 19.6	Salinity (ppt) 30.3 80.7 30.1 29.2 30.1 30.4 30.3	_
Temp (°C)	20.0 20.9 20.3 21.6 70.4 20.5 19%	Temp (°C) 20.3 30.9 20.9 20.9 20.7 20.7 20.1	
pН	7.90 7.82 7.81 7.74 7.72 7.75 7.70	PH 8.47 9.21 8.17 9.13 8.15 8.1	160 500
DO (mg/L)	7,4 (14) 6.5 6.0 5.4 5.5 5.55		8.03
Temp (°C)	25-1-1-19.7 19.2 19.5 19.4 19.4 20.0	DO (mg/L) 7.1 (4.3 5.2 5.9 6.4 5.5 Temp (°C) 25+1,19.8 19.4 19.6 19.4 (4.4	752
	19,9	Temp (°C) 25+ 19.8 19.4 19.6 19.4 (4.4)	20:1
Concentration	Salt Control #2		
		Concentration 69.1.	
Day	0 1 2 3 4 5 6 7	Day 0 1 2 3 4 5 6	7
pH	8.97 8.37 8.47 8.21 8,19 8.22	ph (8.60 8.39 8.3, 8.45 8.50 8.4) 8.38	T
DO (mg/L)	77 67 76 74 77 77 71		-
Salinity (ppt)	30.2 29.4 294 29.2 29.3 30.5	Salinity (ppt) 30.2 30.2 30.3 29.1 30.1 30.0 30.1	-
Temp (°C)	20.0 20.4 20.1 20.3 20.4 20.2 20.0	Temp (°C) 26.1 20.9 26.9 20.9 10.7 20.9 70.2	-
	Final	Final	
pH	8,49 7,74 7,94 7,69 7,70 7,758	pH 8.45 8,25 8,12 8.18 8,2) 8.21	8:11
DO (mg/L)	7,2 6.1 6.0 6.0 58 5.5 5.9	DO (mg/L) 6.9 6.3 5.4 6.0 6.2 5.7	5.3
Temp (°C)	25-Tyl 19.7 19.2 19.5 19.3 19.4 20.1	Temp (°C) 19.5 19.4 19.5 19.4 19.5	201
	20.0	20.01	
Concentration	25%	Concentration (7)	
Day	0 1 2 3 4 5 6 7	Day 0 1 2 3 4 5 6	7
	Initial	Initial	1
pH	8.76 935 8.41 844 8.39 8.29 8.31	pH 8.53 840 826 845 8.51 845 8.41	
DO (mg/L)	79 66 73 7.2 7.4 7.4 68	DO (mg/L) 9,5 7.9 (c.) 6.8 7.1 (c.) 5.6	
Salinity (ppt)	30.2 30.5 29.7 29.3 30.2 80.3 BDD	Salinity (ppt) 303 807 30.9 29.0 30 30.9 30.5	
Temp (°C)	20.1 20.5 20.5 20.4 205 20.4 20.0	Temp (°C) 19.5 20.9 20.9 20.9 21.6 20.3	
-11	\$-12 Final	Final	,
pH	8.50 8 2 8.14 8.04 7 8 7.97 7.86 7.2 (12 5.7 6.1 (0.2 5.4 5.4.5	pH 8.44 8.3) 8.25 8.25 8.3) 8.33	8.23
DO (mg/L) Temp (°C)		DO (mg/L) 6.9 5.9 5.3 5.8 (0.2 5.4	5,6
remp (C)	15-0 19.8 19.3 19.5 19.3 19.5 DAO	Temp (°C) 25.1 [9.7] 19.4 19.5 19.4 19.4	20-1
	20.0	0 1 2 3 4 5 6	7
			,
Animal Source/Date R	Received: ABS / 1-29-05	Analysts: Initial: SD SD SD SH LLC Sn SD	
			C*
Animal Age at Initiation	on: 13 days	Final: PRE DD SH NC DD KY	20
Comments:			
00.01	AH 2(15)05	Cally and	
QC Check:	MI 413 103	Final Review: 2740	5

Report Date:

24 Feb-05 11:57 AM

Link:

15-7773-9986/0502-018

Pacific Topsm	nelt 7-d Survival	and Gro	wth Test					Nautilus Environmental (CA
Test No: Start Date: Ending Date: Setup Date:	02-4775-0258 01 Feb-05 02:0 08 Feb-05 11:5 01 Feb-05 02:0	0 AM	Test Type: Protocol: Dil Water: Brine:	Growth-Surv EPA/600/R- Laboratory S Forty Fathor	95/136 (199 ! Seawater	5)	Duration: Species: Source:	6d 21h Atherinops affinis Aquatic Biosystems, CO
Sample No: Sample Date: Receive Date: Sample Age:	31 Jan-05 10:1		Material: Code: Source: Station:	Estuarine M 0502-018 City of Buer C-1	onitoring Sai	mple	Client: Project:	City of Buenaventura
Comparison S	Summary							
Analysis	Endpoint		NOEL	LOE	L (ChV	MSDp	Method
01-2547-0302	7d Proportion S	Survived	100	> 100		N/A	11.12%	Steel's Many-One Rank
10-0734-0324	Mean Dry Biom	nass-mg	100	> 100	1	√A 	11.00%	Dunnett's Multiple Comparison
Test Acceptal	oility							
Analysis	Endpoint		Attrib		Statistic	Acceptable	Range	Decision
01-2547-0302	7d Proportion S			l Response	0.96000	0.8 - N/A		Passes acceptability criteria
10-0734-0324	Mean Dry Biom			l Response	1.18960	0.85 - N/A		Passes acceptability criteria
01-2547-0302	7d Proportion S		MSDp MSDp		0.11120 0.10998	N/A - 0.25 N/A - 0.5		Passes acceptability criteria Passes acceptability criteria
10-0734-0324			MISUP		0.10998	19/4 - 0.5		r asses acceptability citiena
-	Survived Sum		Maan	Minimum	Mavimum	SE	SD	CV
Conc-%	Control Type Lab Control	Reps 5	Mean 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	Sait Control	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 Bio	mass-mg Sumn	nary						
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%
•	Survived Deta							
Conc-%	Control Type	Rep 1	Rep 2	Rep 3		Rep 5		
0	Lab Control	1.00000	1.00000	1.00000		1.00000 1.00000		
0 25	Salt Control	1.00000 1.00000	1.00000 1.00000	0.80000 1.00000		1.00000		
50		1.00000	1.00000	1.00000		1.00000		
69		1.00000	1.00000	1.00000		0.80000		
100		1.00000	1.00000	1.00000		1.00000		
	mass-mg Detai						Water Control of the	
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	1.27400	1.25000	1.09000		1.21800		
0	Salt Control	1.31600	1.19800	1.01600	1.18400	1.23400		
25		1.43200	1.28600	1.28200		1.16000		
50		1.19400	1.21600	1.12800		1.25600		
69		1.24800	1.18800	1.29800	1.21800	1.02200		
100		1.25400	1.22600	1.24200	1.10200	1.27800		6.71

Analyst:

Approval:_

Page 1 of 2

CETIS A	nalysis De	tail						Report Date: Analysis:		eb-05 1:45 F 302/0502-0
Pacific Tops	melt 7-d Surviva	and Gro	wth Test					Nau	tilus Environ	mental (CA
Endpoint		Ana	llysis Type		Sample L	ink Co	ntrol Link	Date Analyzed	Version	
7d Proportion	Survived	Con	nparison		15-7773-9	986 09-	5088-0808	15 Feb-05 1:44 P	M CETISv	1.025
Method		Alt	H Data	Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-	One Rank	C >	T Angul	ar (Corrected	d)	100	>100	1.00	N/A	11.12%
Test Accepta	bility									
Attribute		Stat	tistic A	cceptable R	ange Decis	ion				
Control Respo	onse	0.96	S000 O.	.8 - N/A			bility criteria			
MSDp		0.11	1120 N	/A - 0.25	Passe	es accepta	bility criteria			
ANOVA Assu	ımptions									
Attribute	Test		Statis	itic Cr	ritical P	Level	Decisio	on(0.01)		
Variances	Modified Le	evene	0.866	67 4.4	43069 0	.50091	Equal V	/ariances		
Distribution	Shapiro-Wi	lk W	0.603	69 0.	88746 0	.00000	Non-no	rmal Distribution		
ANOVA Table	e									
Source	Sum of	Squares	Mean Squ	are DF	F Statist	ic PL	evel	Decision(0.05)		
Between	0.013609	99	0.003402	4	0.50	0.73	3604	Non-Significant E	ffect	
Error	0.136099	9	0.006805	20						
Total	0.14970	885	0.0102074	24						
Group Comp										
Control	vs Conc-%		Statistic	Critical	P Level	Ties		cision(0.05)		
Salt Control	25		30 30	17 17	> 0.0500 > 0.0500	1		n-Significant Effect n-Significant Effect		
	50 69		30 27.5	17	> 0.0500	1 2		n-Significant Effect		
	100		27.5 27.5	17	> 0.0500	2		n-Significant Effect		
Data Summa	arv			Orio	ginal Data			Transfo	rmed Data	
Conc-%	Control Type	Count	Mean	Minimum		SD	Mean	Minimum	Maximum	SD
0	Salt Control	5	0.96000	0.80000	1.00000	0.0894			1.34528	0.10650
25		5	1.00000	1.00000	1.00000	0.0000	0 1.3452	28 1.34528	1.34528	0.00020
50		5	1.00000	1.00000	1.00000	0.0000	0 1.3452	28 1.34528	1.34528	0.00020
69		5	0.96000	0.80000	1.00000	0.0894	4 1.2976	66 1.10715	1.34528	0.10650
100		5	0.96000	0.80000	1.00000	0.0894	4 1.2976	66 1.10715	1.34528	0.10650
Graphics										
rion q	0.9-	0	0	•		O	0.05	00000	000000	•
7d Proportion Survived	0.7- 0.6- 0.5- 0.4- 0.3- 0.2-					Corr.	0.10			
	0.1	25	50 69	100	ר		0.20	-1.0 -0.5 0.0 0.	5 1.0 1.5	2.0
			nc-%					Rankits		

Approval:

Page 2 of 2

Report Date:

15 Feb-05 1:45 PM

Analysis:

10-0734-0324/0502-018

CETIS Analysis Detail

	maiysis De	lall						Analysis:	10-0734-	0324/0502-
Pacific Tops	melt 7-d Surviva	al and G	rowth Test					Na	utilus Enviro	nmental (C
ndpoint		Ar	nalysis Type		Sample I	_ink Contro	ol Link D	ate Analyzed	Version	n
lean Dry Bio	mass-mg	Co	omparison		15-7773-	9986 09-508	38-0808 1	5 Feb-05 1:44	PM CETISV	1.025
lethod		Ai	t H Data	Transform	Z	NOEL	LOEL 1	oxic Units	ChV	MSDp
unnett's Mu	Itiple Comparisor	n C	> T Untra	ansformed		100	>100 1	.00	N/A	11.00%
est Accepta	ability									
Attribute		St		Acceptable I	Range Deci	sion				
Control Resp	onse			0.85 - N/A		es acceptabili	-			
/ISDp		0.	10998 h	N/A - 0.5	Pass	es acceptabili	ty criteria			
NOVA Assu	umptions									
Attribute	Test		Stati			Level	Decision(
/ariances	Bartlett Shanira W	CIL IA/	3.213).52282).12850	Equal Var Normal Di			
Distribution	Shapiro-W	IIK VV	0.936	015 0	.88746 0	J. 1285U	Normal Di	stribution		
ANOVA Tabl										
Source		Squares						ecision(0.05)	T#aat	
Between Error	0.02478 0.16177		0.006196 0.008089	4 20	0.77	0.5598	1 N	on-Significant	Епест	
Total	0.18656		0.0142846							
Group Comp	narisons									
Control	vs Conc-%		Statistic	Critical	P Level	MSD	Decis	ion(0.05)		
Salt Control	25		-1.4908	2.3	> 0.0500	0.13083		Significant Effe	ct	
	50		-0.1195	2.3	> 0.0500	0.13083		Significant Effe		
	69		-0.0914	2.3	> 0.0500	0.13083	Non-S	Significant Effe	ct	
	100		-0.5415	2.3	> 0.0500	0.13083	Non-S	Significant Effe	ct	
Data Summa	ary			Ori	iginal Data			Transf	ormed Data	
Conc-%	Control Type	Count	Mean	Minimur	n 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				
Graphics	ı									
	1.07			Reject Null	•	0.20	7	1		
	0.9					0.15				ø
50	0.8						1			
Dry S-m	0.7					0.10			600	
S	0.6					0.00 transform		_000	50000	
2 2	0.5					Centered On.0 0.00 0.05		600000000		
Mean Dry iomass-m	1					Ξ	1			
Mean Dry Biomass-mg	0.4					→ -0.05	1			
Mea Bioma	1					0.03		28		
Mea Bioma	0.4					-0.10	00	28		
Mea Bioma	0.4 0.3 0.2 0.1					-0.10-	00			
Mea	0.4- 0.3- 0.2-	25	50 69	9 100	٦	-0.10 -0.15 -0.20	2.0 -1.5 -1.	0 -0.5 0.0	0.5 1.0 1.5	2.0

Marine Chronic Bioassay

Client Name: City of Buenaventura Test Species: A. affinis

Sample ID: C -/ Start Date/Time: 2/1/2005/1400

Test No.: 0502 - 018 End Date/Time: 2/8/2005 / +125

Conc.	Ben			S	urviva	l on Te	st Day	' :		Percent	pan wt.	pan + fish
(-/-)	Rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
25	а	5	5	5	5	5	5	5	5	100	0.02992	0.03708
	b	5	5	5	5	5	5	Ś	5	100	0.02946	0.03589
	С	5	5	5	5	5	5	3	5	100	0.02974	0.03615
	d	5	5	5	5	5	5	S	5	100	0.02888	0.03494
	е	5	5	5	5	5	5	5	5	LOD	0.02527	0.03107
50	а	5	5	5	5	5	5	5	5	100	0.02841	0.03438
	b	5	5	5	5	15	5	5	5	100	0.02437	0.03045
	С	5	5	5	5	S	5	5	5	100	0.02396	0.02960
	d	5	5	5	5	5	S	5	5	100	0.02642	0.03236
	е	5	5	5	5	5	5	3	5	100	0.02755	0.03383
69	a	5	5	5	5	5	5	5	5	100	0.025 70	0.03194
	b	5	5	5	5	5	5	S	5	100	0.03580	0.04174
	С	5	5	5	5	5	3	5	5	100	0.03318	0.03967
	d	5	5	5	5	5	5	5	5	100	0.02626	0.03235
	е	5	5	4	박	4	4	4	4	80	0.02674	0.03185
100	а	5	5.	5	5	5	5	5	5	100	0.02800	0,03427
	b	5	5	5	5	5		2	5	100	0.03444	0.04057
	С	5	5	5	5	5	5	5	5	100	0.02440	0.03361
	d	5	5	5	4	4	9	4	4	80	0.02817	0.03368
	е	5	5	5	5	5	5	5	5	100	0.02764	0.03403
	а										1.00	
	b											
	С											
	d											
	е											
	a											
	b	ļ				ļ						
	C	ļ		ļ								
	d			ļ								
	е											
	a	ļ		ļ		ļ						
	b					<u> </u>		<u> </u>				
	С											
	d			ļ				1				
	e			ļ							ri k	
Tech Initials		TR	36	202	SH	uc	BN	22	YR			

Feeding Times (day):

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

Comments: See B-3 for laboard Salt control data QC Cher

Weight Data:

Date/Time in: 2-8.05/1\50

Date/Time out: 2-10-05/1\00

Oven Temp (°C): 68°

Tech Initials: ♀€

QC Check: 4 2

Client:	City of Buen	aventura					Test	Species:	A. affir	nis						
Sample ID:	C-1						Start D	ate/Time:	2/1/200	5 /	1400					
Test No:	0502	-018					End D	ate/Time:	2/8/200	5 /-11	50 25					Jun 1970
Concentration		25%					Conce	ntration			100	٠/.				
Day	0 1	2 3	4	5	6	7		ay	0	1	2	3	4	5	6	7
			nitial										itial			
pH	874 635	8.41 3.41			3.30			H		239	828	4.38	8.48		8.34	
DO (mg/L)	7.8 6.7	7.2 7.1	7.4		7,0			mg/L)	80	7.9	6.3	6.6	WX10.8		6.7	
Salinity (ppt)	30.2 29.9	298 29.2		30.4 8	30.5			ty (ppt)	50.4	30.9	30.9	29.1	30.1	631.8		
Temp (°C)	50 y 20 20 30 30 30 30 30 30 30 30 30 30 30 30 30	203 206		20.6	19.8		Tem	p (°C)	119.2	209	20.9	≥0.28	120.7	20.9	19.9	
			inal	<u> </u>		55.4				10	100	F	inal	12.19	100	102 \ 0
pH	8,39	8.05 8.01	7.92	J.02)		385		H	1	8.42	831	4.26	8.20	811		809
DO (mg/L)	6.9	(e.) 5.3	5.6			45		mg/L)	-	7.1	4.3	5.9	5.9	4-9	4.9	4.2
Temp (°C)	19.0		19.7	19.4	19.5	20.1	Tem	p (°C)		19.7	12 19.0	19.2	19.4	19.3	19.5	199
	1410									14.7						
Concentration	İ	50%					Conce	ntration								
Day	0 1	2 3	4	5	6	7	D	ay	0	1	2	3	4	5	6	7
•			nitial		0.4							ln.	itial			
pH	8.65831				333			H	ļ							_
DO (mg/L)	9.2 6-9	6.9	7.0	7.3 1	·D			mg/L)								
Salinity (ppt)	30.2-30.0				300			ty (ppt)								_
Temp (°C)	100000		20.7	209	95		Tem	p (°C)	1				1	<u> </u>		<u> </u>
-11	I Krani		inal	800 800	805	7.97		.u	I		T		ina l	T	T ·	T
pH	8.44	8 20 8.15 W.9 5.5	8.05	\$4.8	4.9			H ma// \	-				 	 	 	
DO (mg/L)	7.1					5.1		mg/L)	1		 		-	-		
Temp (°C)	19.8	18 19.6 19.3	19.5	19.7	17.4	200	Tem	p (°C)		81						
	71.8															
Concentration		69.1.					Conce	ntration								
Day	0 1	2 3	4	5	6	7	D	ay	0	1	2	3	4	5	6	7
			Hitial		2 (D-3				,		т	<u>in</u>	itial	<u></u>	1	1
pH	8,248:32	8.37 8.38	8.47	8.41 8	,33			Н							ļ	4
DO (mg/L)	184 7.7	6.8			6.0			mg/L)					ļ	 		
Salinity (ppt)	30.3 30.6			313	30.0			ty (ppt)	 	 		ļ				-
Temp (°C)	19.9 20.9	70,9 20,9		209 1	9,9		Tem	p (°C)	1							<u> </u>
-U	0/11		inal 8.14	8 N T	0 16	505		Н	T	1	T		inat		T	T
pH	8.42	8.25 8.23 6.4 5.8	5.8	8.01	3.4	3.2			1	 			-		 	
DO (mg/L)	7.0	10,19,4 19.3	19.5	19-9	133	19.8		mg/L) p (°C)	1		-				 	
Temp (°C)	19.7		1000	1-1-)	17-7	11.0	Telli	P (C)	F	1						ــــــــــــــــــــــــــــــــــــــ
	-(. (, 0	1	2	3	4	5	6	7
									RA	5	2		T .	0	0	
Animal Source/Date	Received:	ABS / 1-29-05					Analys	ts: Initial:	$ \mathcal{L} $	20	20	SH	Luc	20	22	
							,				0			6,	01	(2)
Animal Age at Initiati	ion:	13 days						Final:		饱	27	SH	uc	20	RG	1377
Comments:		for 1ab	and	Salt	(0)	ntrol	Vata									
													Q	Of.	2/01/	~
QC Check:	AH HISLO	3									Fina	l Review	4	/0	1241	



Report Date:

24 Feb-05 12:55 PM

Link:

16-1911-1762/0502-019

Mysid 7-d Sur	vival and Grow	th Test							Nautili	us Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	11-7062-8689 01 Feb-05 04:0 08 Feb-05 05:0 01 Feb-05 04:0	00 PM	Protocol:	Growth-Sur EPA/821/R- Artificial Sal Forty Fatho	-02-014 (200 Itwater)2)	Dura Spec Soul	cies: An	1h nericamysis juatic Biosys	
1 -	04-1856-7943 31 Jan-05 03:2 31 Jan-05 10:1 25h		Material: Code: Source: Station:	Estuarine M 0502-019 City of Buer A-2	fonitoring Sa	ample	Clier Proj		ty of Buenav	entura
Comparison S	Summary									
Analysis	Endpoint		NOEL	LOE	EL .	ChV	MSDp	M	ethod	
09-1570-9388 01-5564-4480	7d Proportion S Mean Dry Biom		100 100	> 100 > 100		N/A N/A	11.61% 18.43%		teel's Many- unnett's Mul	One Rank tiple Comparison
7d Proportion	Survived Sum	mary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV		
0	Lab Control	8	0.97500	0.80000	1.00000	0.02500	0.0707	71 7.2	5%	
0	Salt Control	8	0.90000	0.60000	1.00000	0.05345	0.1511	19 16.	80%	
25		8	0.97500	0.80000	1.00000	0.02500	0.0707	71 7.2	5%	
50		8	0.97500	0.80000	1.00000	0.02500	0.0707	71 7.2	5%	
69		8	0.97500	0.80000	1.00000	0.02500	0.0707	71 7.2	5%	
100		8	0.95000	0.80000	1.00000	0.03273	0.0925	58 9.7	5%	
Mean Dry Bior	mass-mg Sumn	nary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	cv		
0	Lab Control	8	0.22450	0.18200	0.29400	0.01392	0.0393	36 17.	53%	
0	Salt Control	8	0.22525	0.17200	0.28800	0.01346	0.0380	07 16.	90%	
25		8	0.24375	0.21000	0.32200	0.01213	0.0343	32 14.	08%	
50		8	0.25400	0.19000	0.30000	0.01317	0.0372	25 14.	66%	
69		8	0.22400	0.20200	0.25800	0.00746	0.0211	11 9.4	2%	
100		8	0.25825	0.21200	0.36800	0.01739	0.0491	18 19.	04%	
7d Proportion	Survived Deta	il								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	
0	Lab Control	1.00000	1.00000	1.00000	1.00000	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 Bior	mass-mg Detail	l								
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	
l	Lab Control	0.29400	0.25400	0.18400	0.22000	0.25200	0.19600	0.21400	0.18200	
1	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			ህ ጋዕሀሀህ	0.25600	0.30000	0.25800	0.19000	0.21200	0.25000	•
l		0.28600	0.28000							
69 100		0.21000 0.22200	0.25800 0.25800 0.21200	0.25600 0.25600 0.24200	0.21200 0.28200	0.21800 0.23600	0.20200	0.21600 0.24800	0.22000 0.25600	

CETIS Analysis Detail

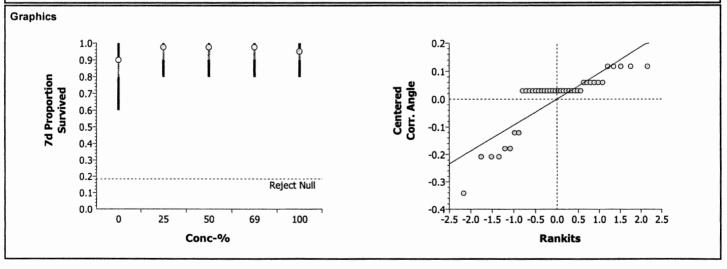
Mysid 7-d Survival and Growth Test Nautilus Environmental (CA)										
Analysis	Туре	Sample L	ample Link Control Link		Date Analyzed		Version			
Compari	Comparison		762	16-1911-1762	24 Feb-05 12:5	5 PM	CETISv1.025			
Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	ChV	MSDp			
C > T	Angular (Corrected)		100	>100	1.00	N/A	11.61%			
	Analysis Comparis	Analysis Type Comparison Alt H Data Transform	Analysis Type Sample Li Comparison 16-1911-1 Alt H Data Transform Z	Analysis Type Sample Link Comparison 16-1911-1762 Alt H Data Transform Z NOE	Analysis Type Sample Link Control Link Comparison 16-1911-1762 16-1911-1762 Alt H Data Transform Z NOEL LOEL	Analysis Type Sample Link Control Link Date Analyzed Comparison 16-1911-1762 16-1911-1762 24 Feb-05 12:50 Alt H Data Transform Z NOEL LOEL Toxic Units	Analysis Type Sample Link Control Link Date Analyzed Comparison 16-1911-1762 16-1911-1762 24 Feb-05 12:55 PM Alt H Data Transform Z NOEL LOEL Toxic Units ChV			

ANOVA Assum	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 Summ	nary		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



Comparisons:

Page 1 of 2

Report Date:

24 Feb-05 12:55 PM

Analysis:

01-5564-4480/0502-019

Cl	=	IS	Ana	lysis	De	tall

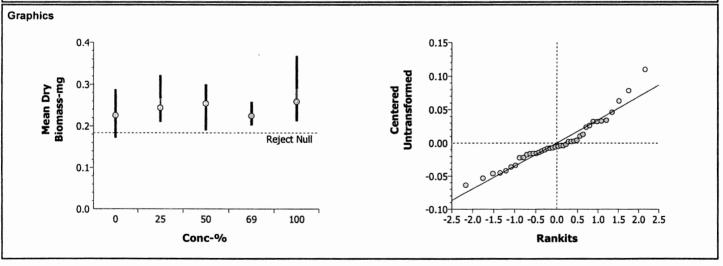
Mysid 7-d Survival and Growth	Test					٨	lautilus	Environmental (CA)	
Endpoint	Analysi	s Type	Sample Link		Control Link Date Analyzed		i	Version	
Mean Dry Biomass-mg	Compar	Comparison		762 1	6-1911-1762	24 Feb-05 12:55 PM		CETISv1.025	
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	18.43%	

ANOVA Assump	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 Summa	ary			Origi	nal Data		Transformed Data			
Conc-%	Control Type	Count	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				



Client Name:	City of Buenaventura	Test Species: <i>A. bahia</i>	
Sample ID:	A-2-	Start Date/Time: <u>2/1/2005</u> / 1 ₺⊅⊅	
Test No.:	0502-019	End Date/Time: 2/8/2005 1530 1700	

Conc.	Rep.			S	urviva	on Te	st Day	:		Percent	pan wt.	pan + mysid
(*/0)	Kep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
Lab Control	а	5	5	5	5	5	5	5	5	100	0.03757	0.03904
#1	b	5	5	5	5	5	5	5	5	100	0.04018	0.04145
	С	5	5	N	5	5	5	5	5	100	0.03780	0.03872
	d	5	5	5	5	5	5	5	5	100	0.03888	0.03998
	е	5	5	N	5	5	5	5	5	100	0.03818	0.03944
	f	5	5	5	5	5	4	45	4	80	0.03873	0.03971
	g	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	а	5	5	5	5	5	5	5	5	100	0.03838	0.03982
#1	b	5	5		3	3	3	36	3	60	0.04504	0.04594
	С	5	5	5	5	S	5	É	5	100	0.03984	0.04103
	d	5	5	5	5	5	5	5	5	100	0.03809	0.03918
	е	5	5	5	5	5	5	5	5	100	0.03682	0.03796
	f	5	5	5	5	5	5	3	5	100	0.03232	0.03361
	g	5	5	5	5	5	5	4	4	80	0.035/3	0.03623
	h	5	5	5	4	4	150	4	4	80	0.04100	0.04186
25%	а	5	5	5	5	5	5	5	5	100	0.03953	0.04066
	b	5	4	4	4	ц	4	4	4	90	0.04001	0,04106
	С	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
	е	5	5	5	5	5	2	5	5	100	0.03932	0.0 4055
	f	5	5	3	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%	а	5	5	5	5	5	5	5	5	100	0.03921	0.04064
	b	5	5	5	5	5	5		5	100	0.03760	0.03900
	С	5	5	5	5	5	5	5	5	100	0.03749	0.03877
	d	5	5	S	5	5	5	5	5	100	0.03513	0.03663
	е	5	5	5	5	5	5	5	5	100	0.03857	0.03986
	f	5	5	S	5	5	5	4	4	80	0.04287	0.04382
	g	5	5	<u>5</u>	5	5	5	5	5	100	0.04029	0.04/35
	h	5	5		5	5	5	5	5	100	0.03832	0.83957
Tech Initials		SHAL	Ria	S	ME	SH	Ry	144	402			

rech initials	STYYK	1 KB	-37	ME	2011	109	7.747	412	
		,							Weight Data:
Feeding Times (day)	:	0	1	2	3	4	5	6	Date/Time in: 2.8.05 / 1700
			0830	0830	0815	3710	1000	0915	Date/Time out: 2/15/05/32
		1730	1600	WW	1530	1430	1900	1530	Oven Temp (°C): 67
									Tech Initials: SM
Comments:									QC Check: Att 2/16/05 Final Review: Att 2/28/08
									Final Review: AH 2/28/05

Client Name:		City o	of Bue	enave	ntura		_ 7	Test Sp	ecies:	A. bahia		
		1	2									
Sample ID:		H-	0				_ Sta	rt Date	e/Time:	2/1/2005/	.600	
Test No.:		A- 05	502	01	q		En	nd Date	/Time:	2/8/2005/ _t	600 1700	
											00 3-7700	
Conc.	Rep.			S	urviva	I on Te	est Day	:		Percent	pan wt.	pan + mysid
(*/)	rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
691.	а	5	5	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	5	5	5	5	5	100	1000	0.03947
	b	5	5	5	5 5 5 5	5	5	5	5	100	0.0375/	0.03880
	С	5	5	5	5	2	5	5 5 5	5	100		0.03784
	d	5	3	5	5	2	5	5	5	100		0.03631
	е	5	5	5 5		5	5		5	100	0.03869	0.03978
	f	5	5	5	4	4	5	4 5	4	80		0.03800
	g	5	3	12	5	2	15-	5	5	100	0.039/2	0.04020
	h	5				5	5	5	5	100	0.03560	0.03670
100 %	a	5	5	4	4	4	4	4	4	80	400	0.03638
	b	5	L	5	4	4		4	4	80	0.03410	0.03522
	C	5	5	5	5	5	5	5	5	100	0.03190	0.03311
	d	5	5	5	5	5	5	5 5 5	5	100	0.03808	0.03949
	e	5	5	<u> </u>	5	5	5	2	5	100		0.04187
	f	5			1	5		5	5	100	0.03778	0.03962
	g	5	5	<u>S</u>	5	5	5	5	5	100	0.03880	0.04004
	h	5	5	S	5	5	12	5	5	100	0.03768	0.03896
	a	-					-		-		1/1	
	b						-		-			
	C								-		-	
	d				-		-	ļ	-		-	
	e					 			-			
	 		ļ	<u> </u>				 				
	g h							 	 			
		-		-	-	-	-	-				-
	a b							-	-			
	С						-				<u> </u>	
	d	-	 				 	 	 			
	e						 	 				
	f											
	g		<u> </u>	<u> </u>					 			
	h											
Tech Initials		34/40	RY	SD	mc	SH	RG	AH	90_			
									-			nt Data:
Feeding Time	s (day)):	0	1	2	3	4	5	6	1	Date/Time in:	2.8.05/1700
				0830		0812	0710	1000	6915			2/15/05132
			1730	1600	MAL	1230	1439	1900	1530		Oven Temp (°C):	
											Tech Initials:	SM
Commonto											OC Chasles	AH Wallet
Comments:			·					···			QC Check:	AT 416/05

Client:	City of Buenaventura	Test Species	: A. bah	ia						V
Sample ID:	A-2	Start Date/Time	2/1/200	5 / 1	600					
Test No:	0502-019	End Date/Time	: <u>2/8/200</u>	15 / 17	100					
Concentration	Lab Control #1	Concentration	T		T	500/	,			
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	4	5	6	7
	finitial Section 15.05				100		itial			
pH	8.06 8.65 7.95 8.04 7.96 800 8.05	pH	8,62	8.35	8.17	8,37	8.2	8.35		_
DO (mg/L)	8.4 8.2 8.8 81 8.6 7.4 8.1	DO (mg/L)	80	6.8	7.5	8.6	7.0	6.7	62	_
Salinity (ppt)	30 0 29.7 29.5 30.4 367 30.3 30.1 25.0 25.0 25.0 25.1 24.5 24.2 25.5 25.0	Salinity (ppt)	30.5	36.5	30.0	29.1	29.4	31.0	32.9 25.0	-
Temp (°C)	500	Temp (°C)	1 2000	25.0	25,2	20, 24	5 24.2 nai	125.0	145.0	
pН	7.95 756 7.80 7.08 7.79 7.86 707	pН	7	8.32	822	8.15	8.68	18.10	8,24	818
DO (mg/L)	8.1 59 5.2 5.4 5.4 5.5.	DO (mg/L)	7	7,7	50	5.2	5.4	5.2	6.0	57
Temp (°C)	24.9 25.5 24.6 24.1 25.3	Temp (°C)	1	25-3	25.7	24.7	24.6	24.7		253
			P.000 (1000)	12)	ادرما	- V- I	1 1	150		
Concentration	Salt Control #1	Concentration			6	9.1.				
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	4	5	6	7
	initial						tial			
pH	897 8.33 8.17 8.21 8.19 822	pН	855	8.35	8.18	4.35	8.31	8.37		
DO (mg/L)	77 77 71	DO (mg/L)	8.2	109	7.4	6.6	10.7	6.3	(O.D	_
Salinity (ppt)	302 29.6 29.7 29.2 29.3 306 30 S	Salinity (ppt)	35,5	30.6		29.1	29.5	31.0	31.0	
Temp (°C)	25.0 25.0 247 24.5 24.2 25.2 25.0	Temp (°C)	125. D	25.0	125-1	20.8 24	524.7 nai	125-1	750	J.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
nU	8.17 5.00 3.00 7.92 7.97 8.02 7 97	pH	T	8,35	827	8.22	8112	8.11	8.32	825
pH DO (mg/L)			-	7.8	55	5.4	5.3	5.1	57	57
Temp (°C)	7.8 5.7 5.1 5.3 5.7 5.9 5.5 52 25.6 24.7 24.5 24.6 24.7 25.2	DO (mg/L) Temp (°C)	-	25-3	257	24.7	24.7	24.5	24.7	25,4
Temp (C)	12 A J. C. 1 24 1 124 1 1 1 1 1 1 1 1 1 1 1 1 1 1	remp (C)		125-2	145.1	124	21.1	129.1	124.	الحين بط
	\mathcal{L}		T				./			
Concentration	$\Delta D / \sigma$	Concentration				00	/-			
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	4	5	6	7
-U	B.75 (8.34 (9.16) (8.39) (8.30) (8.24) (8.36)	-11	TO, ICT	1021	। ਉਹਨੀਂ		itial	10 20	R 20	T
pH DO (mg/L)		pH	88	8.36	8.18	8.34	8.29	8.39	6.33	-
		DO (mg/L)	30.3	30.7	30.2	6-2	29.5	31.5	40	-
Salinity (ppt) Temp (°C)		Salinity (ppt) Temp (°C)	20.0		354	29.0	5 24.2	35.0	306	-
remp (C)	250 25.0 25.5 24.5 24.2 25.0 250	remp (C)	120.00	7 25.0	120 W	SW F	nai	<u>(4)</u>	(L) (A)	
pH	8,26 813 8.07 7.99 8,03 8.13 8.06	рН	1	8,38	14.23	8.26	8.21	18.22	8.37	8.28
DO (mg/L)	7.5 S.6 5.0 5.4 5,1 5.4 S.4	DO (mg/L)	1	7,6	3.5	5.0	5.1	5,2		
Temp (°C)	US13 25.7 24.8 247 24.7 24.6 25.7	Temp (°C)	1	25.1	25.6	24,7	24.60	24.7	zille	235
			- Formania de la compania del compania del compania de la compania del compania de la compania de la compania del compania de la compania de la compania de la compania de la compania del						12-1-6	
			0	1	2	3	4	5	6	7
	100		55	SD	SD	54	me	6	SD	
Animal Source/Date R	Received: ABS 2/1/05	Analysts: Initial			100	13W	ļ	SD	17,7	
	7 2			92	30	#Z	ne	RG	RG	20
Animal Age at Initiation	on: Cays	Final	:[116	1 3/3		1.500	1 24	124	100
Comments:	@ Temperatus chelow minimum of 24°C.									
QC Check:	St 2/15/05				Fin:	al Review	AH	2/28/	05	

Report Date:

24 Feb-05 1:07 PM

Link:

13-8535-5322/0502-020

Mysid 7-d Sur	vival and Grow	th Test							}	Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	Date: 01 Feb-05 04:00 PM Protocol: EPA/821/R-02-014 (2002) Special							cies:		mysis bahia Biosystems, CO	
Sample No: Sample Date: Receive Date: Sample Age:	11-5540-6558 31 Jan-05 02:3 31 Jan-05 10:1 26h		Material: Code: Source: Station:	Estuarine M 0502-020 City of Buer B-1		ample	Clie Proj		City of B	duenaventura	
Comparison S	Summary										
Analysis	Endpoint		NOEL	LOE	EL	ChV	MSDp		Method	i	
10-8027-0523	7d Proportion S	Survived	100	> 100		N/A	10.48%	,	Steel's	Many-One Rank	
02-6089-0179	Mean Dry Biom	nass-mg	100	> 100		N/A	15.51%	, ,	Dunnet	t's Multiple Comparison	
7d Proportion	Survived Sumi	mary									
	Control Type	Reps	Mean	Minimum	Maximun		SD		CV		
1	Lab Control	8	0.97500	0.80000	1.00000	0.02500			7.25%		
	Salt Control	8	0.90000	0.60000	1.00000	0.05345			16.80%		
25		8	0.97500	0.80000	1.00000	0.02500			7.25%		
50		8	0.97500	0.80000	1.00000	0.02500			7.25%		
69		8	1.00000	1.00000	1.00000	0.00000			0.00%		
100		8	0.97500	0.80000	1.00000	0.02500	0.070	71	7.25%		
Mean Dry Bior	mass-mg Sumn	nary									
	Control Type	Reps	Mean	Minimum	Maximun		SD		CV		
ı	Lab Control	8	0.22450	0.18200	0.29400	0.01392			17.53%		
1	Salt Control	8	0.22525	0.17200	0.28800	0.01346	0.0380		16.90%		
25		8	0.22900	0.20200	0.29000	0.00961	0.027		11.87%		
50		8	0.21950	0.17400	0.24800	0.00941	0.0266		12.12%		
69		8	0.22325	0.20400	0.27000	0.00781	0.0220		9.89%		
100		8	0.21775	0.17000	0.28400	0.01365	0.0386	50 ·	17.72%		
7d Proportion	Survived Detai	i									
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rej	p 8	
i	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.0000		0000	
	Salt Control	1.00000	0.60000	1.00000	1.00000	1.00000	1.00000	0.8000		0000	
25		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.8000		0000	
50		1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.0000		0000	
69		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.0000		0000	
100		0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.0000	1.00	0000	
	mass-mg Detail		_								
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7			
1	Lab Control	0.29400	0.25400	0.18400	0.22000	0.25200	0.19600	0.2140		8200	
i	Salt Control	0.28800	0.18000	0.23800	0.21800	0.22800	0.25800	0.2200		7200	
25		0.22200	0.21600	0.23200	0.20800	0.29000	0.23600	0.2020		2600	
50		0.17400	0.22400	0.24600	0.18800	0.22200	0.21600	0.2380		4800	
69 100		0.20600 0.18200	0.23200 0.21200	0.21800 0.25800	0.20400 0.17000	0.27000 0.21400	0.23200 0.19200	0.2200		0400 8400	
		0.10200	0.21200	0.23000	0.17000	0.21400	0.13200	0.2300	0.20	0400	

Page 2 of 2

Report Date:

24 Feb-05 1:07 PM

Analysis:

10-8027-0523/0502-020

CETIS Analysis Detail

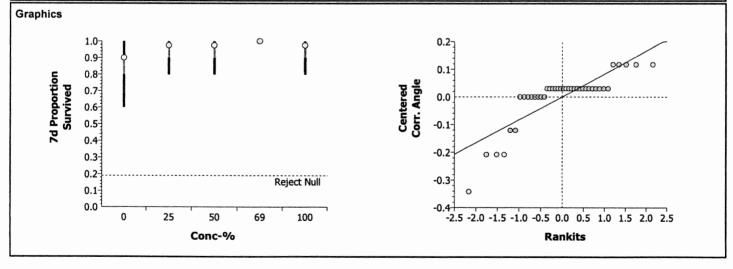
lysid 7-d Survival and Growth Test Nautilus Environmental (CA)											
Analysis	Туре	Sample L	ink C	ontrol Link	Date Analyzed		Version				
Compari	Comparison		322 16	5-1911-1762	24 Feb-05 1:06 PM		CETISv1.025				
Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp				
C > T	Angular (Corrected)		100	>100	1.00	N/A	10.48%				
	Analysis Compari Alt H	Analysis Type Comparison Alt H Data Transform	Analysis Type Sample L Comparison 13-8535-5 Alt H Data Transform Z	Analysis Type Sample Link C Comparison 13-8535-5322 16 Alt H Data Transform Z NOEL	Analysis Type Sample Link Control Link Comparison 13-8535-5322 16-1911-1762 Alt H Data Transform Z NOEL LOEL	Analysis Type Sample Link Control Link Date Analyzed Comparison 13-8535-5322 16-1911-1762 24 Feb-05 1:06 Alt H Data Transform Z NOEL LOEL Toxic Units	Analysis Type Sample Link Control Link Date Analyzed Comparison 13-8535-5322 16-1911-1762 24 Feb-05 1:06 PM Alt H Data Transform Z NOEL LOEL Toxic Units ChV				

ANOVA Assun	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 Comp	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 Summ	nary			Origi	nal 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	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	



Analyst:

Approval:

Page 1 of 2

Report Date:

24 Feb-05 1:07 PM

Analysis:

02-6089-0179/0502-020

CETIS Analysis Detail

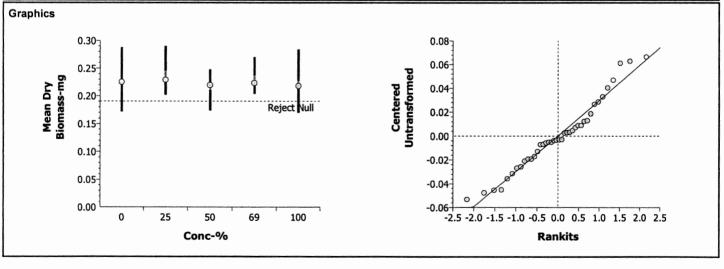
Mysid 7-d Survival and Growth	ysid 7-d Survival and Growth Test Nautilus Environmental (CA)											
Endpoint	Analysis	Туре	Sample L	ink C	ontrol Link	Date Analyzed		Version				
Mean Dry Biomass-mg	Compari	son	13-8535-5	322 1	6-1911-1762	24 Feb-05 1:06 PM		CETISv1.025				
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp				
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	15.51%				

ANOVA Assum	nptions					
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 Comp	ariso	ns					
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 Sumn	nary			Origi	nal Data		Transformed Data				
Conc-%	Control Type	Count	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					



Analyst:

Approval:

Client Name:	City of Buenaventura	Test Species: A. bahia
Sample ID:	B-1	Start Date/Time: 2/1/2005 / 600
Test No.:	0502-020	End Date/Time: 2/8/2005 / 1000

Conc.	Rep.			S	urviva	I on Te	st Day	•		Percent	pan wt.	pan + mysid
(<u>'/·</u>)	Rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
25	а	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
	С	5	5	3	5	5	5	5	5	100	0.03581	0.03697
	d	5	5	3	5	5	5	.5	5	100	0.04216	0.04320
	е	5	5	3	5	2	5	5	5	100	0.04115	0.09260
	f	5	5	.3	5	S	5	5	5	100	0.03000	0.03718
	g	5	4	4	4	4	4	4	4	80	0.03618	0.03719
	h	5	5	5	5	5	5	5	5	100	0.03126	0.03239
50	а	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
	С	5	5	5	5	5	5	5	5	100	0.0 3093	0.03216
	d	5	5	5	5	5	4	4	4	80	0.03039	0.03133
	е	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	0,83136
	g	5	5	5	5	5	5	5	5	100	0.02947	0.03066
	h	5	5	5	5	5	<	5	5	100	0.03100	0.03224
691).	а	5	.5	5	5	5	5	<u>5</u>	5	100	0.02967	0.03070
	b	5	5	5	5	5	5		5	100	0.6 340 8	0.03524
	С	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	0.03079
	е	5	5	5	5	S	5	5	5	100	0.03069	0.03204
	f	5	5	5	5	5	5	5	5	100	0.03462	0.0378
	g	5	3	S	5	5	5	5	5	100	0.03445	0.03555
	h	5	5	5	5	5	3	5	5	100	0.03371	0.03473
100	а	5	5	4	4	4	M	4	4	80	0.0 3367	0.03458
	b	5	5	5	5	5	5	5	5	100	0.03/98	0.03304
	С	5	5	S	5	5	5	5	5	100	0.03347	0.03476
	d	5	5	5	5	5	5	5	5	100	0.03203	0.03288
	е	5	5	5	5	5	5	5	5	100	0.03278	0.03385
	f	5	- <u>5</u> - 5	5	5	5	5	5	5	100	0.03166	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	0.0 3381	0.03523
Tech Initials		SH/4R	14	BD	me	SM	RIa	AH	42			

- / (6	. ~-	1312	INC	>V J	1 1/12	1111	10	
								Weight Data:
eeding Times (day):	0	1	2	3	4	5	6	Date/Time in: 2-8.05/1750
		0330	0830	0815	0710	1000	915	Date/Time out: 2/15/05 1320
	1730	1600	1542	1230	1430	1900	1530	Oven Temp (°C): 67
								Tech Initials: SM
ommonte:								and all alula

Client:	City of Buenaventura	Test Species	: <u>A. bah</u>	ia						
Sample ID:	B-1	Start Date/Time	: 2/1/200	ما ا 5	00					
Test No:	0502-020	End Date/Time		1	00					
Concentration	251/	Concentration	Τ			100	•/			
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	1 4	5	6	7
	Initial	<u> </u>			1 2		itia	1 3		
pH	872 833 816 836 834 829 829	pH	1844	8.35	8.22	8.34	8.29	8.35	R29	
DO (mg/L)	79 6.7 7.6 6.6 7.1 7.6 7.1	DO (mg/L)	135	7.8	39	7.0	7.2	6.40	7	-
Salinity (ppt)	3D 2 303 29.7 29.6 29.5 30.3 30.1	Salinity (ppt)	30.2	30.7	29.5	29.3	29.9	319	3)8	-
Temp (°C)	263 25.0 24.5 24.5 24.2 25.0 25.0	Temp (°C)	25.0	25.0	25.0	24.5	24.2		25.0	-
-11	Final						inal	1 9	D),O	
pH	8.25 8.12 8.08 8.02 8.11 8.05 8.00	pН		8.35	8.28	8.28	8.19	8,26	6 34	828
DO (mg/L)	7.5 53 5.0 54 5.4 5.3 5.3	DO (mg/L)		706	5.3	5.1	5.1	5.0	5.6	5.0
Temp (°C)	25. 25.7 24.7 24.3 24.3 24.5 25.5	Temp (°C)		25.3	25.6	24.7	24.3	243		25.7
									15.	W. J.
Concentration	5D'/	Concentration	T							
Day	0 1 2 3 4 5 6 7		 	1	T		,			γ
	initial	Day	1 0	1	2	3	4 tial	5	6	7
pН	801 835 8.6 839 831 831 831	pH	T	T T	T	121	itiet	T	<u> </u>	T
DO (mg/L)	8.1 6.8 7.5 7.0 7.1 7.3 (0.)	DO (mg/L)	 		 		 	 		-
Salinity (ppt)	30.7 30.3 29.7 29.4 29.7 310 31.)	Salinity (ppt)		<u> </u>	 		 	 		-
Temp (°C)	150 250 247 24.5 24.2 250 250	Temp (°C)	1	-	 	 	 	 		-
	Final	р (о)	1		1	F	nai	I		I
pH	8.30 8.17 8.12 8.08 8.17 8.19 8.13	pН					T	T		T
DO (mg/L)	7.4 5.5 5.0 5.3 5.6 5.4 51	DO (mg/L)								1
Temp (°C)	25,3 25.6 24.8 24.4 24.3 24.5 25.5	Temp (°C)	1	HE AND						†
			***************************************				 			<u> </u>
Concentration	691.	Concentration								
Day	0 1 2 3 4 5 6 7									
,	Initial	Day	0	1	2	3	4	5	6	7
рН	8.55 8.35 8.28 8.38 8.31 8.33 8.31	pH	T	BERRY CO.	Γ	111	tial	l		T
DO (mg/L)	84 71 69 69 70 70 68	DO (mg/L)			<u> </u>					
Salinity (ppt)	36.1 30.5 29.8 29.5 29.7 317 31	Salinity (ppt)	 		ļ					-
Temp (°C)	25-0 25.0 258 245 242 25VD 250	Temp (°C)	 				 			1
	Final		I		l	 	na t			J
pН	8.33 8.24 8.23 8.14 B.23 8.25 8.P	pН				•••••••••••••••••••••••••••••••••••••••		************	<u> </u>	T
DO (mg/L)	7.6 58 5.0 5.1 5.4 5.6 52	DO (mg/L)	1							
Temp (°C)	15.5 Q5.6 24.7 24.3 24.2 24.6 25.7	Temp (°C)	1							
			0	1	2	3	4	55	6	7
Animal Source/Date Re	ceived:		50	SD	37	< i2		c2 - F	0,	
Ammai Gource/Date Re	MID - MILLON	Analysts: Initial:	رار			K≥	nc	SD	27	
Animal Age at Initiation	1 days			NO	SD	SV	me	01	01	SD
	C	Final:		YR	-2	-3 V1	- Duc	RG	RG	22
Comments:	See A-2 for lab and salt control da	+n								
•		14.						7		
QC Check:	CM 2/K/05						1 Va	1 2	121/10	_

Report Date:

24 Feb-05 3:13 PM

06-6762-0296/0502-021 Link:

Mysid 7-d Sur	vival and Grow	th Test								Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	00-8578-6125 01 Feb-05 04:0 08 Feb-05 05:0 01 Feb-05 04:0	00 PM	Test Type: Protocol: Dil Water: Brine:	Growth-Survival (7d) EPA/821/R-02-014 (2002) Artificial Saltwater Forty Fathoms			Dura Spec Sour	ies: A		amysis bahia Biosystems, CO
•	13-2325-9246 31 Jan-05 12:1 31 Jan-05 10:1 28h		Material: Code: Source: Station:	Estuarine M 0502-021 City of Buen B-3		ample	Clien Proje		City of I	Buenaventura
Comparison S	Summary									
Analysis	Endpoint		NOEL	LOE	L	ChV	MSDp		Metho	d
05-1376-5500 04-9615-0856	7d Proportion S Mean Dry Bion		100 100	> 100 > 100		N/A N/A	12.84% 24.39%			Many-One Rank tt's Multiple Comparison
7d Proportion	Survived Sum	mary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	С	V	
0	Lab Control	8	0.97500	0.80000	1.00000	0.02500	0.0707	1 7	.25%	
0	Salt Control	8	0.97500	0.80000	1.00000	0.02500	0.0707		.25%	
25		8	0.95000	0.80000	1.00000	0.03273	0.0925		.75%	
50		8	0.90000	0.80000	1.00000	0.03780	0.1069		1.88%	
69		8	0.95000	0.60000	1.00000	0.05000	0.1414		4.89%	
100		8	0.90000	0.80000	1.00000	0.03780	0.1069	0 1	1.88%	
Mean Dry Bior	mass-mg Sumr	nary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD		٧	
0	Lab Control	8	0.26725	0.18600	0.41600	0.02417	0.0683	6 2	5.58%	
0	Salt Control	8	0.22900	0.18800	0.29400	0.01242	0.0351	3 1	5.34%	
25		8	0.21912	0.04600	0.31000	0.02802	0.0792		6.17%	
50		8	0.24075	0.19400	0.27600	0.00938	0.0265		1.02%	
69		8	0.23900	0.15400	0.35600	0.02073	0.0586		4.53%	
100		8	0.20325	0.14200	0.22800	0.00996	0.0281	8 1	3.87%	
7d Proportion	Survived Deta	il								
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Re	ep 8
0	Lab Control	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.0000		00000
0	Salt Control	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.0000		00000
25		0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	0.8000		00000
50 69		0.80000	1.00000 1.00000	0.80000 1.00000	1.00000	0.80000	1.00000	0.8000		00000
100		1.00000 0.80000	0.80000	1.00000	0.60000 0.80000	1.00000 1.00000	1.00000 1.00000	1.0000		00000 80000
	mass-mg Detai		0.00000	1.00000	0.80000	1.00000	1.00000	1.0000	0.0	30000
Conc-%	_		Pen 2	Pan 3	Pon 4	Pon 6	Pan 6	Dan 7	D,	an R
0	Control Type Lab Control	Rep 1 0.41600	Rep 2 0.28200	Rep 3 0.27200	Rep 4 0.26000	Rep 5 0.24200	Rep 6 0.18600	Rep 7		ep 8 21200
0	Salt Control	0.24000	0.29400	0.18800	0.20200	0.22000	0.21200	0.2640		21200
25		0.23800	0.31000	0.19800	0.22100	0.28600	0.21200	0.0460		24000
50		0.23400	0.26200	0.23800	0.26600	0.27600	0.23200	0.2240		19400
69		0.35600	0.27200	0.21800	0.15400	0.22600	0.25600	0.2140		21600

CETIS™ v1.025B

Analyst: Approval: 4

000-089-125-1

Comparisons:

Page 2 of 2

Report Date:

24 Feb-05 3:13 PM

Analysis:

05-1376-5500/0502-021

Mysid 7-d Survival and Growth Test

Nautilus Environmental (CA)

Endpoint	Analysis	Туре	Sample L	ink C	ontrol Link	Date Analyzed		Version
7d Proportion Survived	Compari	son	06-6762-0	296 0	6-6762-0296	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
-------	-------

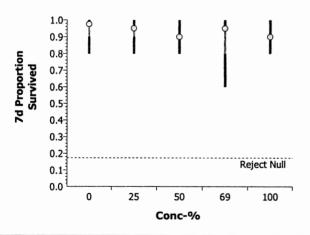
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0581106	0.014528	4	0.89	0.47773	Non-Significant Effect
Error	0.5685955	0.016246	35			
Total	0.62670613	0.0307732	39	_		

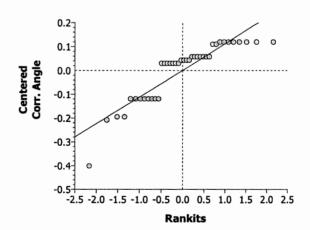
Group Comparisons

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 Sumn	nary			Origiı	nal Data		Transformed Data					
Conc-%	Control Type	Count	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		







Comparisons:

Page 1 of 2

Report Date:

24 Feb-05 3:13 PM

Analysis:

04-9615-0856/0502-021

CETIS Analysis Detail

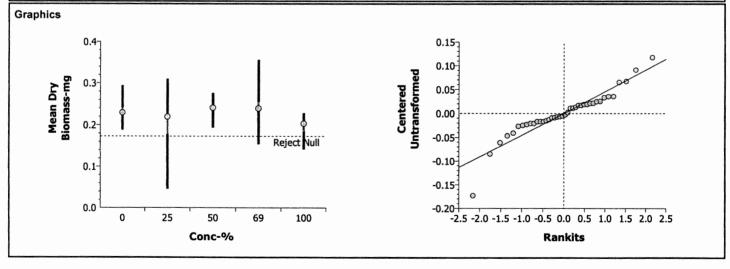
Mysid 7-d Survival and Growth Test Nautilus Environmental (CA									
Endpoint	Analysis	Туре	Sample L	ink C	ontrol Link	Date Analyzed		Version	
Mean Dry Biomass-mg	Compari	son	06-6762-0	296 06	6-6762-0296	24 Feb-05 3:13 PM		CETISv1.025	
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Dunnett's Multiple Comparison	C > T	Untransformed		100	>100	1.00	N/A	24.39%	

ANOVA Assump	otions					
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 Comp	ariso	ns					
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				Origi	nal Data		Transformed Data					
Conc-%	Control Type	Count	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						



Client Name: City of Buenaventura Test Species: A. bahia

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

Test No.: 0502-021 End Date/Time: 2/8/2005 / 100

Conc.	Rep.				Surviva	l on Te	st Day	:		Percent	pan wt.	pan + mysid]
(Kep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)	(mas
Lab Control	а	5	5	5	5	5	5	5	5	/00	0.63188	0.03346	
#2	b	5	5	S	5	5	5	5	5	100	0.03164	0.03305] V
	С	5	5	3	5	5	5	5	5	100	0.03905	0.04041	
	d	5	5	5	S	5	M45	5	5	100	0.04003	0.04133	
	е	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	2	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	<u>'</u>
Salt-Control	а	5	5	5	5	5	5	5	5	100	00 3740	0.03860	
#2	b	5	5	S	5	5	5	5	5	100	0.03870	0.04017	
·	С	5	5	5	5	5	ŝ	4	4	80	0.03882	0.03976	1
	d	5	5	5	5	5	5	5	5	/00	0.0 4438	0.04539	1
	е	5	5	5	5	5	5	5	5	100	0.04104	0.09214	
	f	5	5	3	5	5	5	5	5	100	0.0 3785	0.03891	1
	g	5	5	S	5	5	5	5	5	100	0.03742	0.03874	<i>i</i> l
	h	5	5	5	~	5	5	5	5	100	0.03492	0.03598	
25	а	5	5	14	4	4	4	4	4	80	0.03493	0.03448	
_	b	5	5	5	5	5	Z	5	5	100	0.03589	0.03334	
	A) c	Sio	10	10	16	10	10	10	10	100	0.03517	0-03824	37.
\	⊅ d	\$10	10	10	10	10	10	10	10	100	0.03456	0-03343	:\\\\34
	е	5	5	5	5	5	5	5	5	100	0.03421	0.03360	73
	f	5	5	5	5	5	5	5	5	100	0.03452	0.03428	
	g	5	5	5	W 54	4	4	4	4	80	0.0 3434		35.
	h	5	5	3	mex 5	5	-5	5	5	100	0.03481	0.04055	
50	а	5	5	5	5	5	5	5	4	80	0.0383/	0-04076	
	b	5	5	5	5	5	5	5	5	100	0.03646	0.03919	37,
	С	5	丁	3	5	5	165	5	9	80	0.0 3446	0.03860	
	d	5	5	5	5	5	5	5	3	100	0.0 36/2	0.04118	1,03
	е	5	6	5	5	5	7	5	9	80	0.0 3311	0.04072	
	f	5	5	Ś	5	5	5	5	5	160	0.03705	0.04019	38
	g	5	3	5	5	5	5	4	4	20	0.03529	0.03911	36.
	h	5	3	5	5	5	5	5	\$	$\widetilde{\omega}$		0.0377	1 -
Tech Initials		SH/JR	RG	SD	Me	SH	Rla	AH	W/S		Pok St		100
			·		17.72			, u .				t Data:	

Feeding Times (day):

Py-

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

Date/Time in: 2-805/1760

Date/Time out: 2/15/05 13 76

Oven Temp (°C): 67

Comments (A) Rops card in 25% concentration accidentally

Client Name:	City of Buenaventura	Test Species: <i>A. bahia</i>
Sample ID:	B-3	Start Date/Time: 2/1/2005
Test No.:	0502-021	End Date/Time: 2/8/2005/ 1403 1700

Conc.	Rep.		Survival on Test Day:						Percent	pan wt.	pan + mysid]	
(/)	rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)	(ma
69%	а	5	5	5	5	5	5	<u>5</u> ^	5	100	0.035/2	0.04248	1/3
	b	5	5	S	5	5	3		S	100	0.0 3465	0.03995	3610
	С	5	5	5	5	2	5	5	5 0	/00	0.03361	0.04282	34-7
	d	5	5	5	4	4	4	128	200 T	3 60	0.03463	0.04378	35.4
	е	5		(8)	3	5	5	5	5	100	0.0330/	0.04501	34.1
	f	5	5		5	5		5	5	100	0.03761	0.08657	12M3
	g	5	5		5	5	5	5		100	0.03696	0.03803]
	h	5	5	1	5	5	5	5	5	/00		0,03098	
1001.	а	5	5	5	4	4	Y.	4	4	80		0.03637	
	b	5	4	4	4	4	4	4	4_	80		0.03217	1
	С	5	5	5	5	5	5	5	5	/∞		0.03442	1
	d	5	5	5	5	5	5	4	Y	26		0.03493	4
	е	5	5	S	5	5	5	5	5	100		0.03464	
	f	5	5	5	5	5	5	5	2	100	0.03188	0.03295	1
	9	5	5	5	5	5	5	5	S	100	0.03321	0.03431	1
	h	5	5	3	5	5	5	4	4	80	0.032100	0.03331	1
	a						ļ						1
	b										\$		1
	С												1
	d											ļ	
	e			ļ				ļ					1
	f				ļ	ļ	<u> </u>						1
	g												4
	h												1
	a						-)		-
	b										5		-
	d						ļ						1
											1		
	e												
											X		-
	g h										·		
Tech Initials		SH/AL	Rb	SD	ur	sH	R4	A4	32			L	j

Feeding Times (day):

0 1 2 3 4 5 6

- 0836 0830 0816 0710 1066 0916

1730 1600 1745 1530 1430 1900 1538

Weight Data:
Date/Time in: 2-8-05 175

Date/Time out: 2/15/05 1320

Oven Temp (°C): 67
Tech Initials: SM

Comments: D Too clarky the accurate counts (completed

QC Check:

Client:	City of Buenaventura	Test Species:	A. bahi	a						
Sample ID:	B-3	Start Date/Time:	2/1/200	5 [600					
Test No:	0502-021	End Date/Time: 2/8/2005 / 1700								
Concentration	Lab Control #2	Concentration	50 7.							
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	4	5	6	7
pH	106 8.05 7.93 804 7.96 8.02 805		8104	0.0%	1 2 (24		itial	17. 25	D. 75	1
DO (mg/L)	8.06 8.05 1.93 804 7.96 8.03 805 8.4 8.2 8.0 8.1 8.0 7.9 81	pH	8.)	6.9	7.5	8,45	8.47		8.35 4.5	4
Salinity (ppt)	300 297 39.5 304 307 303 300	DO (mg/L) Salinity (ppt)	303	30.7	30.2	7.1	30.1		303	1
Temp (°C)	250 250 250 245 242 250 24.7 250	Temp (°C)	23.0	25.0	855	24.5	24.2		250	ł
	Final	Temp (c)	120.0	24.0	10 3 5		mal	123-3		·
pH	7.89 7.89 7.86 7.81 7.93 7.90 7.89	рН		8,35	8.23		8.13	18.17	8.25	
DO (mg/L)	7.8 45.1 5.1 5.7 5.7 5.8	DO (mg/L)		7.1	54	5.2	5.4	3.1	6.0	5.1
Temp (°C)	25.2 259 24.9 24.5 24.6 24.7 DS.4	Temp (°C)		25.1	25.9	24,9	24.4	124.5	24.8	25.8
Concentration	Salt Control #2	Concentration	1			9-1,				
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	1 4	5	6	7
,	initial ,	Suy	1	•			itial			
pH	897 8.33 8.47 8.17 8.21 8.19 8.22	рН	800	8.39	8.21	845	8.50	8.41	8.38	
DO (mg/L)	77 67 76 77 77 71	DO (mg/L)	8.3	7.3	フ・サ	6.9	7.0	6.7	62	1
Salinity (ppt)	30.2 29.6 29.4 29.2 29.3 30.6 30.5	Salinity (ppt)	30.2	30.2	30.4	29.1	30.1	35.6	30.)	
Temp (°C)	15. D 25.0 25.0 245 24.2 250 250 250	Temp (°C)	25,0	25.0	8.29	24.5	24.2	12500	25.0	
pН	8-17 7.94 7.91 7.93 7.95 8.02 7.94	рН	T I	8.37	8.29		nai 8.18	18.19	B. 27	822
DO (mg/L)	7.6 55 5.0 5.6 5.7 5.8 5.2	DO (mg/L)	1	7.3	5.6	5.1	5.4	5,2		5.5
Temp (°C)	25-1 259 25.0 24.3 24.4 24.8 25.8	Temp (°C)	1	25.2	259	248	24.5	24.4	24.7	25.7
							1 10	1		
Concentration	25%	Concentration			10	00%	<i>'</i>			
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	4	5	6	7
рН	1876 8.35 8.17 8.44 8.39 8.29 8.31	рН	K.53 I	8.40	8.24		Kiat 8,52	845	R41	T
DO (mg/L)	79 66 77 7.2 74 7.4 6.8	DO (mg/L)	9,0	7.9	(0.)	8.45	7.1		5.6	
Salinity (ppt)	30.2 30.5 30.0 20.3 30.2 30.3 30.0	Salinity (ppt)	30.3	30.7	30.9	29.0	30.1	30.9		1
Temp (°C)	25.0 25.0 25.5 24.5 242 2510 25.0	Temp (°C)	23.0	25.0	250	24.5	24.2		25 D	
	Final		10				nal			
pH	8, 29 8, 13 8,06 8.04 13.11 13.13 8.59	pН		8-41	833	8,23	8.25	8.27		827
DO (mg/L)	7.4 62 5.1 5.1 5.7 6.2	DO (mg/L)		7.5	15,6	4.7	2.4	512		5.4
Temp (°C)	25.1 259 249 244 245 24.8 25.9	Temp (°C)		251	25,9	24.9	24.5	24.4	24.8	25.5
			0	1	2	3	4	5	6	7
	124				50	T		1		
Animal Source/Date Re	eceived: <u>APS 2/1/05</u>	Analysts: Initial:	20	SD	313	SH	me	Sp	20	
Animal Age at Initiation	7 days	Final:		92	20	42	nc	R4	RG	37
Comments:								X		
OC Chock:	SM 2/16/05						(A	X	1211	25

Report Date:

24 Feb-05 3:24 PM

Link:

03-8102-5010/0502-022

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 to Ending Date: 08 Feb-05 05:00 PM Dil Water: Artificial Saltwater Source: Aquatic Biosystem Setup Date: 01 Feb-05 04:00 PM Brine: Forty Fathoms Sample No: 08-0113-2659 Material: Estuarine Monitoring Sample Client: City of Buenave 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	stems, CO
Sample Date: 31 Jan-05 08:45 AM Code: 0502-022 Project: Receive Date: 31 Jan-05 10:10 PM Source: City of Buenaventura	ventura
Comparison Summary	
Analysis Endpoint NOEL LOEL ChV MSDp Method	
06-3506-8900 7d Proportion Survived	-One Rank Itiple 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 0.00000 0.00000 0.000%	
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 0.80000 1.00000 1.00000	
0 Salt Control 1.00000 1.00000 1.00000 1.00000 1.00000 1.00000 1.00000	
25 0.80000 1.00000 1.00000 1.00000 0.80000 1.00000 1.00000	
50 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	
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	

Analyst: Approval:

CETIS Analysis Detail

Comparisons:

Page 1 of 2 24 Feb-05 3:24 PM

Report Date: Analysis:

06-3506-8900/0502-022

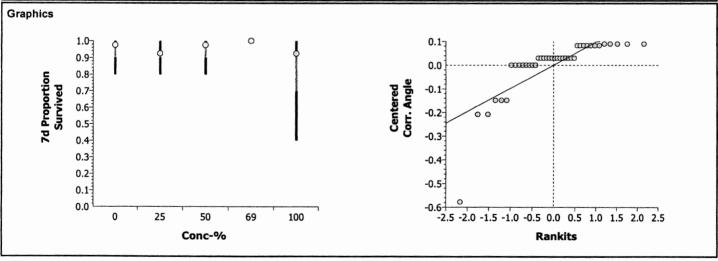
Mysid 7-d Survival and Growth Test Nautilus Environmental (CA)									
Analysis	Туре	Sample Link Control		Control Link	Date Analyzed		Version		
Compari	Comparison		03-8102-5010 06-		-6762-0296 24 Feb-05 3:24		CETISv1.025		
Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	ChV	MSDp		
C > T	Angular (Corrected)		100	>100	1.00	N/A	13.01%		
	Analysis Compari Alt H	Analysis Type Comparison Alt H Data Transform	Analysis Type Sample L Comparison 03-8102-5 Alt H Data Transform Z	Analysis Type Sample Link Comparison 03-8102-5010 Alt H Data Transform Z NOE	Analysis Type Sample Link Control Link Comparison 03-8102-5010 06-6762-0296 Alt H Data Transform Z NOEL LOEL	Analysis Type Sample Link Control Link Date Analyzed Comparison 03-8102-5010 06-6762-0296 24 Feb-05 3:24 Alt H Data Transform Z NOEL LOEL Toxic Units	Analysis Type Sample Link Control Link Date Analyzed Comparison 03-8102-5010 06-6762-0296 24 Feb-05 3:24 PM Alt H Data Transform Z NOEL LOEL Toxic Units ChV		

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 Comp	ariso	ns					
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 Sumn	Data Summary			Origi	nal Data		Transformed Data			
Conc-%	Control Type	Count	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



Page 2 of 2

Report Date: Analysis: 24 Feb-05 3:24 PM 10-3420-1731/0502-022

CETIS Analysis Detail

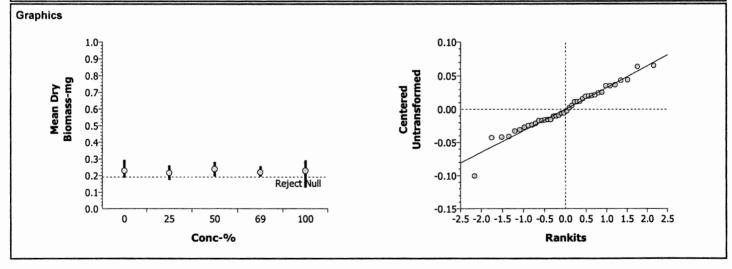
Mysid 7-d Survival and Growth Test Nautilus Environmental (CA)									
Endpoint	Analysis	Туре	Sample L	ink	Control Link	Date Analyzed		Version	
Mean Dry Biomass-mg	Compari	Comparison		010	06-6762-0296	24 Feb-05 3:24 PM		CETISv1.025	
Method	Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	ChV	MSDp	
Dunnett's 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 Summ	ary			Origi	nal Data		Transformed Data			
Conc-%	Control Type	Count	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: Start Date/Time: 2/1/2005 / 1 2000

Test No.: 0502 - 022 End Date/Time: 2/8/2005/1670

Conc.	Rep.			S	urviva	I on Te	st Day	:		Percent	pan wt.	pan + mysid
(0/0)	Kep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
25	а	5	3	14	4	Ч	14	4	4	PO	0.03334	0-03448
	b	5	5	3	5	5	5	5	5	100	0.03225	0,03334
	С	5	5	5	5	5	5	5	5	100	003694	0.03824
	d	5	5	5	5	5	4	4	4	86	0.03256	0.03343
	е	5	5	S	5	S	5	5	5	100	0.0 3257	0.03360
	f	5	5	4	4	P THE	4	4	4	80	0.03323	0.03428
	g	5	5	S	5	5	5	5		/00	0.03592	0.03692
	h	5	ケ	5	5	5	5	5	5	/00	0.03939	0.04055
50	а	5	5	S	5	5	5	5	5	100	0.03947	0.04076
	b	5	5 8	45	5	5	5	5	5	100	0.03821	0.03919
	С	5	5	5	5	5	5	5	5	/00	003742	0.03860
	d	5	5	3	5	5	3 5	5	5	100	0.64015	0.04118
	е	5	5	5	5	5	5	5	5	100	0.03931	0.04072
	f	5	5	145	5	5	5	4	4	80	0.0 3915	0.04019
	g	5	5	S	5	5	5_	5	5	100	0.03786	0.03911
	h	5	5	5	5	5	5	5	5	100	0.04536	0.04673
69.7.	а	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
	С	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
	е	5	5	5	5	5	5	5	5	100	0.04399	0.04561
	f	5	5	8	5	5	5	5	5	100	0.0 4552	0.04651
	g	5	5	5	5	5	5	5	5	100	0.04306	0-04434
	h	5	5	5	5	5	5	5	5	100	0.04367	0.04487
100	а	5	5	5	5	5	5	5	5	/00	0,04440	0.04565
-	b	5	5	S	5	5	5	5	5	180	0.04414	0.04516
	С	5	5	5	5	5	3	S	5	(00		0.04518
	d	5	5	5	5	5	5	5	5	100	0.04548	0.04675
	е	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	0.05/71
	g	5	5	S	15	5	5	5	5	100	0.04339	0.04463
	h	5	5	5	3	3	3	.3	w & 2	40	0.04997	0.05061
Tech Initials		SH/200	RG	SIN	114	SH	Ria	Au	w			

Feeding Times (day):

0 1 2 3 4 5 6 - 0430 0870 0815 0740 1000 10915 1730 1800 1144 1530 1430 1900 1530

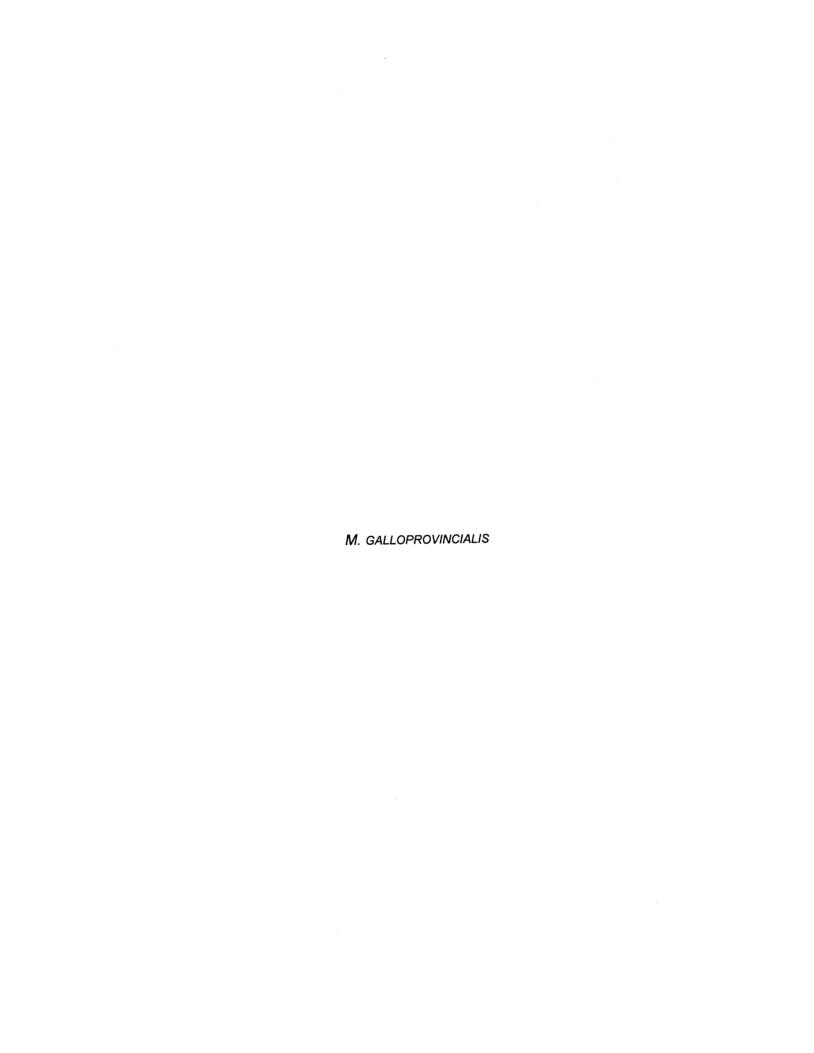
Comments: See B-3 for lah and salt control

Weight Data:

Date/Time in: 218165 (しさ)
Date/Time out: 2/15/05 1328
Oven Temp (°C): 67
Tech Initials: SM

QC Check: All 2/16/05 Final Review: 2/16/05

Client:	City of Buenaventura	Test Species:	A. bahi	ia	J					
Sample ID:	<u>C-1</u>	Start Date/Time:	2/1/200	5 /	1000					
Test No:	0502-022	End Date/Time:	2/8/200	5 /+	700 D	7620	٥			
				, 						
Concentration	25'/.	Concentration			/	100'	/.			
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	4	5	6	7
pН	8.74 8.35 8.18 844 8.31 8.30	pH	R-50	8.39	823		11tial 8.48	8.44	1× 24	•
DO (mg/L)	7.8 6.7 7.7 7M 7.4 7.4 7.67.0	DO (mg/L)	8,9	7.9	7.3	6-6	6.8	6.9	60	
Salinity (ppt)	30.2 29.9 30.1 29.2 30.4 30.4 30.5	Salinity (ppt)	324	30.9	3).5	29.1	30.1	31.0	30.6	
Temp (°C)	23. 0 25. 6 25.7 24.5 24.9 25.0 25.0	Temp (°C)	125.0	25.0	258	24.5	24.2	25-0	1250	<u> </u>
pН	8,27 8,13 8,07 802 8.64 8.15 809	pH	T	8.39	18. 3≥		8.22	8-24	0 30	830
DO (mg/L)	7.4 5.3 4.9 46.054 5.2 5.6 54	DO (mg/L)	1	7,8	53	4.8	5.5	51	5.4	5.4
Temp (°C)	25.2 25.8 24.8 24.3 24.2 24.5 258	Temp (°C)		15.0	25.9	24,8	24.4	24-1	24.5	25.8
Concentration	50%	Concentration								
Day	0 1 2 3 4 5 6 7 Initial	Day	0	1	2	3	4	5	6	7
pH	8.63 8.36 8.20 8.38 8.46 8.38 8.33	pH	T		T	in lan	itial	T	Γ	T
DO (mg/L)	8,2 69 76 69 70 73 70	DO (mg/L)	†		 	 	 	 		1
Salinity (ppt)	30.2 30.3 30.4 29.2 30.4 30.9 300	Salinity (ppt)			1		†			1
Temp (°C)	25.0 25.0 25.6 24.5 24.2 25.0 25.0	Temp (°C)								
pH	8.33 8.23 8.15 8.11 8.15 8.24 818		1	I	T	F.	ina l	T	т —	1
DO (mg/L)	7.3 5.7 4.8 5.3 5.1 5.3 5.5	pH DO (mg/L)	1		 		 			
Temp (°C)	251 259 24.8 243 243 24.5 55	Temp (°C)	1		 		 	 		
		p (0)						<u> </u>	L	<u> </u>
Concentration	691.	Concentration	T							
Day	0 1 2 3 4 5 6 7	Day	0	1	2	3	4	5	6	7
-11	initial						itial			
pH DO (mg/L)	8.58 8.37 822 8.38 8.47 8.41 8.35 8.4 7.2 7.4 6.8 7.0 8.9 (0.8	pH					-	ļ		_
Salinity (ppt)	30.5 30.6 30.9 24.3 30.1 36.3 30.0	DO (mg/L)			 		-	ļ		_
Temp (°C)	25.0 25.0 25.4 24.5 24.2 25.0 25.0	Salinity (ppt) Temp (°C)			 		 	 		-
	Final	Temp (o)	l		1	F	inal	1	I	<u> </u>
pH	8.34 8.26 8.21 8.18 8.17 831 824	pH								
DO (mg/L) Temp (°C)	7,5 5,2 4,8 5.4 5.2 5.5 54 25-1 25-9 24.8 24.4 (4.3 24 5 258	DO (mg/L)			ļ					
remp (C)	25-1 25-9 24.8 24.4 24.3 24.5 258	Temp (°C)		L	<u></u>	L		L		<u></u>
			0	1	2	3	4	5	6	7
Animal Source/Date R	eceived: ABS Z/165	Analysts: Initial:	32	SD	8)	s#	uc	50	\$	
Animal Age at Initiatio		Final:		Te.	20	5#	Mc	Kh	RY	30
Comments:	See B-3 for lab and salt cont	nd data.								
QC Check:	SM 2/16/05				Fina	I Review:		1 2	124/0	5



Report Date:

28 Feb-05 9:55 AM

Link:

14-8546-3756/0502-027

Bivalve Larva	Survival and D	Developm	ent Test					Nautilus Environmental (CA
Test No:	16-0870-9544		Test Type:	Developme	nt		Duration:	47h
Start Date:	01 Feb-05 04:4	5 PM	Protocol:	ASTM E724	4-98 (1999)		Species:	Mytilus galloprovincialis
Ending Date:	03 Feb-05 03:4	15 PM	Dil Water:	Scripps Sea	awater		Source:	Carlsbad Aquafarms
Setup Date:	01 Feb-05 04:4	15 PM	Brine:	Frozen Sea	water			
Comments:	The 100 perce hypersaline bri		ration was pr	epared by th	e addition o	f artificial salts	, all other conce	entrations were made by adding
Sample No:	10-7764-7639		Material:	Estuarine M	nonitoring S	ample	Client:	City of Buenaventura
Sample Date:	31 Jan-05 03:2	0 PM	Code:	0502-027		Project:		
Receive Date:	31 Jan-05 10:1	0 PM	Source:	City of Buer	naventura			
Sample Age:	25h		Station:	A-2				
Comparison S	parison Summary							
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
07-5510-9096	Proportion Nor	mal	100	> 100		N/A	96.72%	Equal Variance t
13-5387-4314	•		71	> 71		N/A	10.06%	Dunnett's Multiple Comparison
Proportion No	ormal Summary							
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n 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 No	ormal 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		

Analyst: Approval:_

Approval:

Page 1 of 2

Report Date:

28 Feb-05 9:55 AM 07-5510-9096/0502-027

Analysis:

CET	S	Anal	lysis	Detail

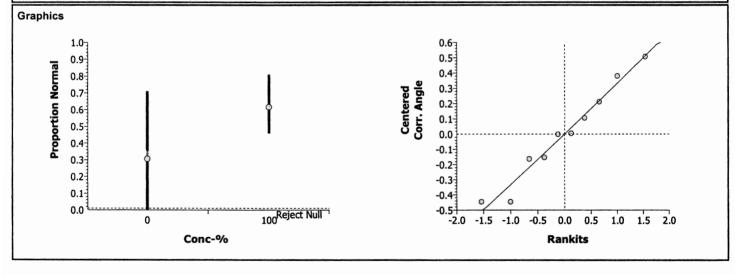
Bivalve Larval Survival and Development Test Nautilus Environmental (CA)									
Endpoint	Sample L	ink (Control Link	Date Analyzed		Version			
Proportion Normal	Comparis	Comparison		756 1	4-8546-3756	28 Feb-05 9:49 AM		CETISv1.025	
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	/ MSDp	
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	96.72%	

ANOVA Assum	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 Comp	oariso	ns					
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 Summa	ary			Origi	nal 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	



Comparisons:

Page 2 of 2

Report Date:

28 Feb-05 9:55 AM 13-5387-4314/0502-027

CETIS Analysis Detail

Analysis:

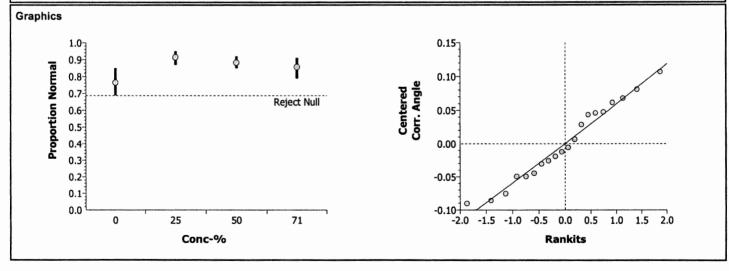
Bivalve Larval Survival and Development Test Nautilus Environmental (CA)										
Endpoint	s Type	Sample Link		Control Link Date Analyzed			Version			
Proportion Normal	Compar	ison	14-8546-3756 14-		14-8546-3756	28 Feb-05 9:50 AM		CETISv1.025		
Method	Alt H	Data Transform	Z	NOE	. LOEL	Toxic Units	ChV	MSDp		
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		71	>71	1.41	N/A	10.06%		

ANOVA Assum	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 Comp	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						
İ		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 Summ	nary		Original Data				Transformed Data				
Conc-%	Control Type	Count	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 | 1645
End Date/Time: 2/3 5 5 | 545

Concentration		Salinity			Temperature			Dissolved Oxygen			pH		
%	(ppt)		(°C)			(mg/L)			(pH units)				
	0	24	48	0	24	48	0	24	48	0	24	48	
Lab Control #1	30.0	29.5	29.6	14.0	15,5	15.2	g. 9	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	140	15.0	15.2	7.9	8.0	7.9	8.16	7.81	9.93	
25	30.7	32.0	32.7	14.0	14.9	15.2	8.60	8.4	8.0	8.10	7,98	8,03	
50	296	31.3	31.2	140	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	80	8.04	8.16	8:32	
100	30.1	30.7	30.2	14.0	14.7	15.1	8.9	8-3-1AR	8-1	8.52	8.37	8.37	
											ļ		

	0	24	48		
Technician Initials:	ne	72	RG		
Animal Source/Date Reco	eived:	Mission I	calected	1/28/05	
Comments: 0 hr 24 hr 48 hr	s:				
QC Check:	HAD AH	t 2/10/05	Final Revie	ew: AR	2/20/00

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

150

Effluent

0.41

Test Dilution Volume

•

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) =

Brine Control

0.43

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

Total Brine Volume Required (ml): 133.8

Client:	City of	Buenquentor	anternal	Start Date/Time:	2/1/05	1645
Test No.:	0502-0	27,7030,05	odoimant	End Date/Time:	2/3/05	1545
Test Species:		prouvudia		Technician Initials:	ne	
Animal Source:	Carlsbad,	guaragms/ Mis	Sun Bay			
Date Received:			28/05			
		,				
	O(1)) ^ ;			. 6	
Test Chambers:	<u>Dhel</u>	Lials		Sample Volume:	10mc	-
First Gamete Rele	ase Time	1145				
		" ()				
		Sp	oawn Informatio	on		
Sex	Number			Condition		
Male	16	Good				
Female	٦	G002				
Egg Fertilization Ti	ime: 14	10				
Embryo Stock Den	sity Calculati	on:				
Number Counted:	12					
	25	<u> 16</u> 38		707		
	16	38	Mean	20.3		
	22					
	18	22				
	70.	3				
	Mean 48.		853 emb	rvos/ml		
	70.	<u> </u>	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 9 00/11/1		
					/	100/
Initial D	ensity: 25	3 =	Z.13 (dilu	tion factor)	1/13 =	100/12
Desired Final D			(4.17.2	,	11.13	/113
	. (0				•	
Prepare the embry					if the dilution	factor is 2.25, use
100 ml of existing s	stock (1 part)	and 125 ml of dilu	ition water (1.25	parts).		
		60				
Percent Division U	pon Inoculation	on: <u>90</u>	Time Z	ero Counts:	48	8-h QC: 93/100
		1/11		-		
	Inoculation 1	Time: 1645				
				/		
Comments:						
00.05	And dunla-	_				CAA. 1
QC Check:	AH 2/10/05	,		Fi	nal Review: _	2/28/

CETIS Data Worksheet

Report Date:

31 Jan-05 12:34 PM

Link:

14-8546-3756

Bivalve Larva	al Sur	vival a	and D	evelopment Test				Nautilus Environmental (CA)
Start Date:01 Feb-05Species:Ending Date:03 Feb-05Protocol:Sample Date:31 Jan-05Material:			Protocol:	Mytilus galloprov ASTM E724-98 Estuarine Monito	(1999) S	ample Code: ample Source: ample Station:	0502 ーク2_7 City of Buenaventura A-2	
Conc-%	Code	Rep	Pos	# Counted	# Normal		Note	s
			31	106	85	ye		
		1	32	100	25 39	50 MC		
244			33	100	72	mc		
		1	34	100	95	uc		
		,	35	100	85	MC		
			36	100	81	uc		
	i		37	100	+7771	ST MC		
			38	100	92	nc		
			39	100	↔ 23	50 MC		
			40	100	87	uc		
			41	100	91	MC		
	1		42	100	79	uc		
	4		43	100	85	uc		
			44	ibe	94	uc .		
			45	100	92	me	11 M - A-1 - M - P-1	
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			60		80			
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65

CETIS Data Worksheet

Report Date:

31 Jan-05 12:34 PM

Link:

14-8546-3756

Bivalve Larva	I Survival and De	evelopment Test		Nautilus Environmental (CA)				
Start Date:	01 Feb-05	Species:	Mytilus galloprovincialis	Sample Code: 0502 - 027				
Ending Date:		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	1	85					
0	.B 3 65		69					
0	B 4 53		75					
0	B 5 42		79					
0	LC 1 50		81 85 80					
1-(#) 0	LC 2 31		85					
0	LC 3 60		80					
0	LC 4 48		90					
0	LC 5 36		81					
c cattle	SC 1 32		59	1 (Freeholds)				
SC#1 0	SC 2 39		23					
0	SC 3 63		0					
0	SC 4 62		O					
0	SC 5 37		71					
25 25	1 46		89					
25	3 45		17					
25	4 34		92 95	Page and the second of the sec				
25	5 40							
50	1 64		87					
50	2 .51		88					
50	3 38		92					
50	4 55		16					
50	5 43	1	\$5					
65	1 41		87					
64			S					
711 0	AH 2 47 61		95					
55	4 56		Su.					
65	5 54		79					
100	1 49		47					
100	2 58		(2					
100	3 59		\$					
100	4 33		72					
100	5 52		46	The same of the sa				

Report Date:

28 Feb-05 10:02 AM

Link:

06-0849-1893/0502-028

		,						LIIIK. 00-00-3-1033/0302-0
Bivalve Larva	I Survival and I	Developm	ent Test					Nautilus Environmental (C
Test No: Start Date: Ending Date: Setup Date: Comments:	16-0870-9544 01 Feb-05 04: 03 Feb-05 03: 01 Feb-05 04: The 100 perce	45 PM 45 PM ent concen	Protocol: Dil Water: Brine:	ASTM E72 Scripps Se Frozen Sea	Development ASTM E724-98 (1999) Scripps Seawater Frozen Seawater epared by the addition of artificial salts,			47h Mytilus galloprovincialis Carlsbad Aquafarms entrations were made by adding
•	09-3000-5498		Code: Source:	Estuarine Monitoring Sample 0502-028 City of Buenaventura B-1			Client: Project:	City of Buenaventura
Comparison S	Summary							
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
07-0274-5421 00-7972-5090	Proportion No	rmal	100 71	> 100 N/A > 71 N/A		96.59% 5.64%	Equal Variance t Dunnett's Multiple Comparison	
Proportion No	ormal 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 No	ormal 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		
400								

0.03000

0.16000

Analyst: AH

Approval: Approval: 2/18/05

100

0.30000

0.09000

0.07000

Comparisons:

Page 1 of 2

Analysis:

28 Feb-05 10:02 AM 00-7972-5090/0502-028

CETIS Analysis Detail

Report Date:

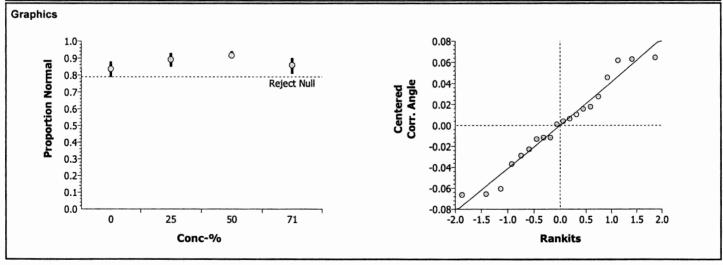
Bivalve Larval Survival and Deve	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)										
Endpoint	Analysis	Туре	Sample Link		Control Link	Date Analyzed		Version			
Proportion Normal	Comparis	son	06-0849-1893 06-0849-1893		28 Feb-05 10:01 AM		CETISv1.025				
Method	Alt H	Data Transform	Z	NOE	. LOEL	Toxic Units	ChV	MSDp			
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		71	>71	1.41	N/A	5.64%			

ANOVA Assumpti	ions				
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 Comp	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 Summ	ary		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



Comparisons:

Page 2 of 2

Report Date:

28 Feb-05 10:02 AM

Analysis:

07-0274-5421/0502-028

Bivalve Larval Survival and Development Test

CETIS Analysis Detail

Nautilus	Environmental	(CA)
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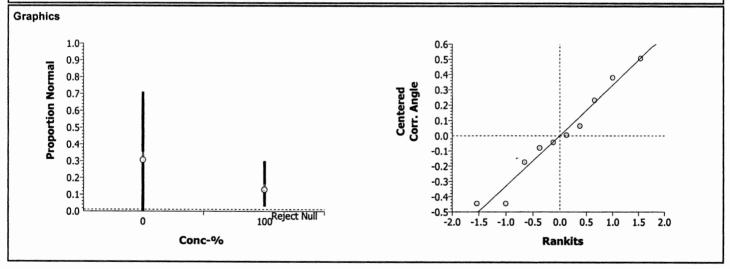
Endpoint	oint Analysis Type				trol Link	Date Analyzed	Ven	sion	
Proportion Normal	Comparis	Comparison		06-0849-1893 06-0849-1893		28 Feb-05 10:01	AM CET	CETISv1.025	
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	96.59%	

ANOVA Assum	ptions				
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			

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

Data Summa	ary		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	0.13000	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 Larva	al Sur	vival a	and De	evelopment Test				Nautilus Enviror	nmental	(CA)
Start Date: Ending Date:		eb-05		Species:	Mytilus galloprovi ASTM E724-98 (Sample Code:	0502-028 City of Buenaventura		
Sample Date				Material:	Estuarine Monitor		Sample Station:			
Conc-%	Code		Pos	# Counted	# Normal		Note	9S		
		-	66	- Contract of the Contract of	-	The state of the s	THE SAME OF THE SA		AND DESCRIPTION OF THE PERSON	
			67	100	81	3.7				
			68	100	90	AA				
			69 70	100	79, 90	505				
		· į	70	100	92 85	SD AA SD				
			72	100	a -	32				
			73	100	DE 88	V				
			74	-						
		. :	75	-	40	1.,,				
	1		. 76 . 77	100	93	AA				
			78	100	91	SD SD	AND THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON OF TH	And the second s		
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***	-	1	85	100	37	50				
			86	100	37 91	SD AA				
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	-	-	96	100	94					**********
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Annual St. post and a single data constraints and a great	1		98	100	59 79	50				
		1	99 100	100	VR 973	SD	The second secon			

Sherre LC and SC W/ 1-2 LC SC

<u>SC</u> 59/100 71/100 23/100 85/100 81/100 0/100 81/100 0/100 80/100

CETIS Data Worksheet

Report Date:

31 Jan-05 2:08 PM

Link:

06-0849-1893

Bivalve Larva	I Surviv	val and D	evelopment Test				Nautilus Environmental (CA)
Start Date: Ending Date: Sample Date:		b-05	Species: Protocol: Material:	Mytilus galloprov ASTM E724-98 Estuarine Monito	(1999)	Sample Code: Sample Source: Sample Station:	0502-028 City of Buenaventura B-1
Conc-%	Code F	Rep Pos	# Counted	# Normal		Note	28
0	В	1 82	100	8482	32	The second secon	
0	В	2 81	100	&4	JR	, Constitution of the Cons	
0	В	3 73					
0	i .	4 97					
0		5 98					
LCHI O	Α	1 79					
	111	2 92					
0		3 99		· · · · · · · · · · · · · · · · · · ·			
0		74					
0	rc /	5 80 7 2 95					
SC#1 0	SC SC	1					
		2 × 5 3 87		The second secon			AMMAN AND AND AND AND AND AND AND AND AND A
		4 84				delication of the second secon	
0		5 66					
25		1 76	100	93	A4		
25		2 71	100	85	10		
25		3 89	100	90	35		
25		4 90	100	87	SX		
25		5 91	100	87	SN	(A) All Comments	
50		1 68	100	90	SN		
50		2 86	100	91	1.4		
50	ļ	3 70	(PD)	92	25 CC 65	The second secon	
50		4 78	100	91	35		
50		5 96	CUI	96	20		
65		1 94	106	86	SD		
65		2 : 69	100	90	SD	THE RESIDENCE OF THE PARTY OF T	And the second s
65		3 85	100	87	SD		Maria 1
65		4 67 5 83	i i	85	1/2		
65 100		5 83	<u> </u>		9		
100		2 72	100	36	6D		
100		3 77	100	9	++	(Married) is appropriately of the Person of	
100		4 93		7	16		
100		5 100	b	3	TE		
,,,,,			V		1//		

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura	Test Species: M. galloprovincialis
Sample ID: B-I	Start Date/Time: 2/1/2005
Test No.: 0502-028	End Date/Time: 2.3 -DS 1545
<u> </u>	

Concentration		Salinity		Te	emperat	ure	Diss	olved Ox	ygen		рН	
%		(ppt)			(°C)			(mg/L)			(pH units	s)
	0	24	48	0	24	48	0	24	48	0	24	48
Brine Control	30.1	3010	30,2	140	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	6.03
50	30.4	30.7	30.9	14.0	15.0	15.2	8.8	8.0	7.9	7.97	8.06	8,05
71.0	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
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	0 24 48	
Technician Initial	s: Mc 92 Rig	
Animal Source/D	ate Received: field collected 1/28/05	
Comments:	Ohrs: See A-2 for Lab and Salt central date 24 hrs: 48 hrs:	_
QC Check:	G3/100 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-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

Effluent Brine Control

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) = 0.41 0.43

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

Total Brine Volume Required (ml): 133.1

Report Date:

28 Feb-05 10:05 AM

Link:

12-5295-7283/0502-029

Nautilus Environmental (CA)

Test No: Start Date: 16-0870-9544

Test Type: Development

Duration: Species:

47h

Mytilus galloprovincialis

01 Feb-05 04:45 PM Ending Date: 03 Feb-05 03:45 PM Protocol: ASTM E724-98 (1999)

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: Source:

City of Buenaventura

0502-029

Project:

Receive Date: 31 Jan-05 10:10 PM Sample Age: 29h

Station:

Comparison S	ummary					
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	Mormal	Summan
Flobortion	Nonnai	Summary

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	Norma	l Detail

1 Toportion	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™ v1.025B 000-089-125-2

Page 1 of 2

28 Feb-05 10:05 AM 03-2801-2674/0502-029

Report Date: Analysis:

CETIS	Analysis	S Detail
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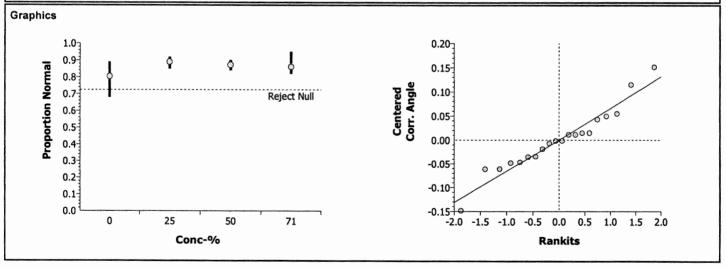
Bivalve Larval Survival and Deve	N	autilus	Environmental (CA)					
Endpoint	Analysis	Туре	Sample Link Control Link			Date Analyzed Version		Version
Proportion Normal	Comparis	son	12-5295-7283 12-5295-7		12-5295-7283	28 Feb-05 10:04 AM		CETISv1.025
Method	Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		71	>71	1.41	N/A	9.94%

ANOVA Assum	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 Comp	ariso	ns					
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 Summa	ıry			Origi	nal Data		Transformed Data			
Conc-%	Control Type	Count	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



Page 2 of 2

Report Date:

28 Feb-05 10:05 AM

Analysis:

04-6960-7781/0502-029

Nautilus Environmental (CA)

1							
۱	Division	11	Survival	1	\ -		Tan
1	Bivaive	Larvai	Survivai	and t	Jeveic	oomeni	168

CETIS Analysis Detail

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

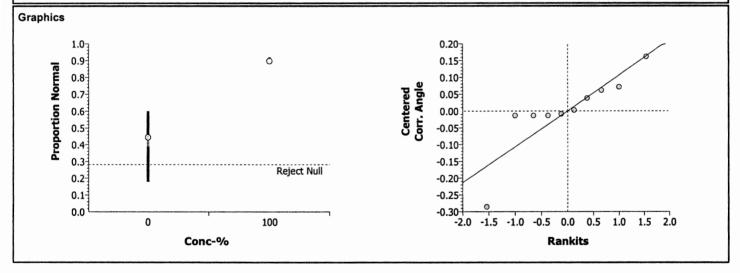
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	36.52%

ANOVA Assumptions Statistic Attribute Test Critical P Level Decision(0.01) Variances Variance Ratio 58.92915 23.15450 0.00165 **Unequal Variances** Shapiro-Wilk W 0.79664 0.78055 0.01545 Normal Distribution 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 Summa	ary			Origin	nai Data		Transformed Data			
Conc-%	Control Type	Count	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: Link:

31 Jan-05 2:10 PM 12-5295-7283

Bivalve Larva	l Survival	and De	velopment Test				Nautilus Environmental (CA
Start Date:	01 Feb-0		Species:	Mytilus galloprovi		Sample Code:	0502-029
Ending Date:				ASTM E724-98 (1			City of Buenaventura
Sample Date:	31 Jan-0	5	Material:	Estuarine Monitor	ing Sample Station:		B-3
Conc-%	Code Rep	A	# Counted	# Normal	1 Ha L 100	Note	es .
	1	101	100	, 88	AA		
		102	100	He 50	20		
	!	103	100	92	<u> </u>	To compare to 199 Mr. Householdings and special appropriate with the second	
	;	104	100	18 82			
	ı	105 106		88	i		The state of the s
	1	100	100	787		THE RESERVE OF THE PROPERTY OF	
		108	8	100 J	VAA		
		109	100	92	AA		
1	!	110	100	90	177		
1	1	111	100	83			
		112	100	9 1		Commence of the Commence of th	
	-	113	100 8		AAE		
		114	100	89	SD		
		115	100	89 90	1		
	t	116	100	90			
		117	100	95	<u> </u>		
		118	100	95	SD	The second secon	
		119	100 100	3043	SD		
		121	100	830	2D		
	:	→ 122		70 98	ÄA		
	į	123	100	89	AA	Maries and the second of the s	
	-1	124	100	89 80	AA		The second secon
		125	100	70 87	À		The state of the s
		126	100	84	AA	100	
		127	100	68	ÁΑ		
		128	100	8 9	SD		
		129	100	25	SD		
		130	100	78 89	SD		
		131	100	84	SD		
		132	100	60 86	SD SD	A constant - Lipson and Addition - make being a second	
		134	100	83			
	:	135	100	82	AA		
		1.00	100	<u> </u>			

CETIS Data Worksheet

Report Date: Link:

31 Jan-05 2:10 PM

12-5295-7283

Bivalve Lan	ve Larval Survival and Development Test							Nautilus Environmental (C.
Start Date:	01	Feb-0	5	Species:	Mytilus galloprovi	ncialis	Sample Code:	0502-029
Ending Date	e: 03	Feb-0	5	Protocol:	ASTM E724-98 (1999)	Sample Source:	City of Buenaventura
Sample Date	e: 31	Jan-05	5	Material:	Estuarine Monitoring Sample		Sample Station:	B-3
Conc-%	Code	Rep	Pos	# Counted	# Normal		Note	es .
	0 B	1	127	100	6.8	M	A CONTRACTOR OF THE CONTRACTOR	
	0 B	2	104	100	85	SD	A STATE OF THE PARTY OF THE PAR	
	0 B	3	129	100	82	30		
	0 B	4	130	100		52)	Martine Charles - In 1987 S. Afficia (M. B. M. 1980 S. M. 1981 M. M. 1981 M. 1981 M. 1981 M. 1981 M. 1981 M. 1	
	0 B	5	131	100	78 89	5D SD	The state of the s	
	0 LC	1	122	100	70/90	50 / H	900 AX	
15#2	0 LC	2	125	100	78 / 87	SD / #A	MAN	JONES ES
1	0 LC	3	108	106	77 / 89	5D / WAT	ANDA	
	0 LC	4	124	100	29/80	SD /A		
	0 LC	5	113	106	76/87	SD / M	THE REAL PROPERTY OF THE PERSON NAMED IN COLUMN TWO	
_	o sc	1	119	100	26 43	50	* Contraction of the Contraction	
S(#2	o sc	. 2	121	100	019	20	The state of the s	
JO .	0 SC	3	107	100	TU 51	SD		
	o sc	, 4	132	160	60	20		
	0 SC	5	102	100	50	SD		
2	.5	1	109	100	92	M	The same and the s	
. 2	.5	2	110	100	90	M	The state of the s	
2	5	3	120	100	88	az		
. 2	5	4	106	(US)	89	SD	THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAM	A STATE OF THE STA
2	25	5	114	100	89 . 88	20		
5	0	1	101	100	. 88	M		
5	60	2	126	100	. 84	₩.		
5	50	3	105	[0]	88	\$6	THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	
5	0	4	135	100	90	So	A A DECEMBER OF THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, THE OWNE	The state of the s
5	60	5	128	100	860	87 20		
6	55	, 1	134	100	82	M.	ACTION OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF T	
. 6	55	2	112	106	84	SD		
6	55	3	133	100	84	3)		
6	55	4	118	100	95	50		
6	55	5	111	100	83	SO		
10	00	1	123	100	89	M		
10	00	2	116	108	90	50		
10	00	3	103	100	92	SD	The state of the s	
10	00	4	117	160	89	SD		
10	00	5	115	100	89	50	THE RESERVE OF THE PROPERTY OF	

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura
Sample ID: B-3

Test No.: 0502-02-9

Test Species: M. galloprovincialis

Start Date/Time: 2/1/2005 1045
End Date/Time: 2.3.55 1545

Concentration		Salinity			Temperature			Dissolved Oxygen			рН		
%		(ppt)			(°C)			(mg/L)			(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	79	8.22	7,99	7.95	
Salt Control Ha	29.7	29.3	29.4	140	15.3	15.2	7.4	7.7	7.9	8.00	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	80.8	8.17	8.18	
70.6	29.4	30.5	30.6	14.0	14.9	15-1	9.0	7,9	80	8.06	8.23	8.25	
(00)	30.0	29.3	29.7	14.80	14,8	15-1	9.0	7.9	8-1	8.58	8.48	8.47	

								L					

		0 2	4 48	_		
Technician Initia	ls:	ic ge	26			
Animal Source/D	ate Received:	E.	Mission Bo	ted	1/28	los
Comments:	0 hrs: 24 hrs: 48 hrs:					
QC Check:	AH 2/10/05	<u></u>	Final	Review: _	AH	2/28/05

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

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

150

Test Dilution Volume

•

Brine Control

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) =

0.42

Effluent

0.43

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

Total Brine Volume Required (ml): 135.3

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121

CETIS Test Summary

Report Date:

28 Feb-05 10:06 AM

Link:

03-2227-1595/0502-030

Bivalve Larva	l Survival and I	Developm	ent Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date:	16-0870-9544 01 Feb-05 04:4 03 Feb-05 03:4		Protocol:	Development ASTM E724-98 (1999) Scripps Seawater			Duration: Species: Source:	47h Mytilus galloprovincialis Carlsbad Aquafarms
Setup Date:	01 Feb-05 04:4		Brine:	Frozen Sea				
Comments:	The 100 perce hypersaline bri	nt concenine.	tration was pr	epared by th	ne addition o	f artificial salts	s, all other conce	entrations were made by adding
Sample No:	09-0791-7830		Material:		Monitoring S	ample	Client:	City of Buenaventura
	31 Jan-05 08:4		Code:	0502-030			Project:	
Receive Date: Sample Age:	31 Jan-05 10:1 32h	10 PM	Source: Station:	City of Bue C-1	naventura			
Comparison S	Summary							
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
18-5884-7087	Proportion Nor	mal 100 3		> 100			34.36%	Equal Variance t
02-6940-5382		71		> 71 N/A		N/A	13.77%	Dunnett's Multiple Comparison
Proportion No	ormal Summary	1						
Conc-%	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	CV
	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 No								
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		

Analyst:

Approval: Approval: 2/24/05

CETIS Analysis Detail

Comparisons:

Page 1 of 2 28 Feb-05 10:06 AM

Report Date: Analysis:

02-6940-5382/0502-030

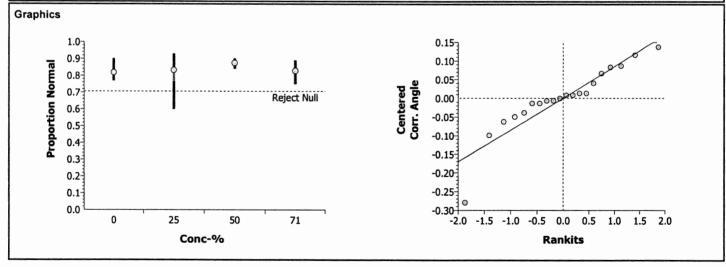
Bivalve Larval Survival and Dev	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)										
Endpoint	Analysi	s Type	Sample Link		ontrol Link	Date Analyzed		ersion			
Proportion Normal	Compar	ison	03-2227-1595 03-2		3-2227-1595	28 Feb-05 10:0	6 AM C	ETISv1.025			
Method	Alt H	Data 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 Assump	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 Comp	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 Summ	nary			Origi	nal Data		Transformed Data				
Conc-%	Control Type	Count	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	



Page 2 of 2 28 Feb-05 10:06 AM

Report Date: Analysis:

18-5884-7087/0502-030

I Survival and Develo	pment Test
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Nautilus Environmental (CA)	Nautilus	Environmental	(CA)
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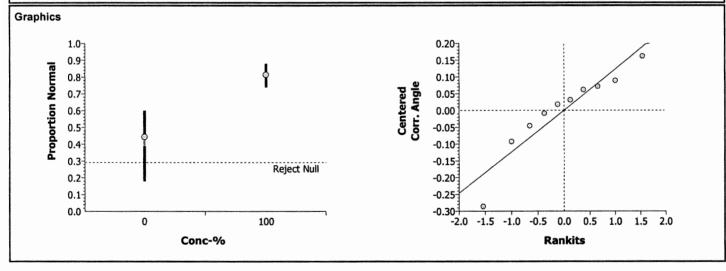
Endpoint	Analysis	Туре	Sample Link Control Link		Date Analyzed		Version		
Proportion Normal	Comparis	on	03-2227-1595 03-2227-1595			28 Feb-05 10:06 AM		CETISv1.025	
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		100	>100	1.00	N/A	34.36%	

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 Summa	Summary Original Data						Transformed Data				
Conc-%	Control Type	Count	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

Report Date:

31 Jan-05 2:13 PM

03-2227-1595/0501-030

Link:

Bivalve Larva	Survival and Develo	opment 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

ample Dat	e: 31.	Jan-05	5		Estuarine Moni	toring Sample	Sample Station: C-1
Conc-%	Code	Rep		# Counted	# Normal		Notes
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Reviewed By:

CETIS Data Worksheet

Report Date:

31 Jan-05 2:13 PM

Link: 03-2227-1595/0501-030

Bivalve Larva	al Sur	vival	and D	evelopment Test			Nautilus Environmental (CA)		
	•			Protocol:	Mytilus galloprovincial ASTM E724-98 (1999 Estuarine Monitoring S)	Sample Code: Sample Source: Sample Station:	0502-030 City of Buenaventura C-1	
Conc-%	Code	Rep	Pos	# Counted	# Normal		Note	es .	
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Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura	Test Species: M. galloprovincia	alis
Sample ID: (Y-/	Start Date/Time: 2/1/2005	1645
Test No.: 0502-030	End Date/Time: 23.05	1545

Concentration	Salinity			Te	Temperature			Dissolved Oxygen			pH (nH units)		
%		(ppt)		(°C)			(mg/L)			(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	1711	7.8	8.0	8.0	8,13	7.88	794	
25	31.0	30.9	31.1	14.0	15.2	15.0	8.4	7,8	7.4	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	
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	0	24	48	
Technician Initials:	Mc	42	25	
Animal Source/Date Receiv	red:	Sield	collected	1/28/05
Comments: 0 hrs: 24 hrs: 48 hrs:	See	B-3 for	lab and	salt control data
QC Check: AH 2/10	05		Final Review	1: At 2/28/05
Nautilus Environmental, LLC. 5	550 Mo	rehouse Drive	e, Suite 150. Sa	n Diego, CA 92121.

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

150

Effluent

Test Dilution Volume

Brine Control

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) =

0.42

0.43

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

1			·		
	Brine Control	103	0.43	44.2	150

Total Brine Volume Required (ml):

135.3

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121



CETIS Test Summary

Test No:

Report Date:

03-2798-4268/0502-023

Nautilus Environmental (CA)

24 Feb-05 3:37 PM Link:

Macrocystis Germination and Germ Tube Growth Test

11-8620-2502 Test Type: Growth-Germination **Duration:**

01 Feb-05 03:30 PM Start Date: EPA/600/R-95/136 (1995) Macrocystis pyrifera Protocol: Species: 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 Estuarine Monitoring Sample City of Buenaventura Material: Client:

Sample Date: 31 Jan-05 03:20 PM Code: 0502-023 Project:

Receive Date: 31 Jan-05 10:10 PM City of Buenaventura Source:

Sample Age: 24h Station:

Comments: Control data shared with B-3.

1	Comparison Summary									
	Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method			
ſ	15-4740-2362	Mean Length	100	> 100	N/A	11.49%	Equal Variance t			
1	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%

Analyst: Approval:

000-089-125-2

CETIS Test Summary

Report Date:

24 Feb-05 3:37 PM

Link:

03-2798-4268/0502-023

Mean Lengt	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 Deta	il						
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		

Page 2 of 4 24 Feb-05 3:37 PM

Report Date: Analysis:

12-3785-0173/0502-023

	Macrocystis Germination ar	nd Germ Tube Growth Test	Nautilus Environmental (CA
ř			

Endpoint	Analysis	Sample Li	ink	Control Link	Date Analyzed		Version	
Proportion Germinated	Comparis	on	03-2798-4	268	06-8754-7222	24 Feb-05 3:37 I	PM	CETISv1.025
Method	Alt LI	Data Transform	7	NOE	LOFI	Toxic Units	ChV	/ MSDn

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	n Shapiro-Wilk W	0.97470	0.86826	0.82318	Normal Distribution

ANOVA Table

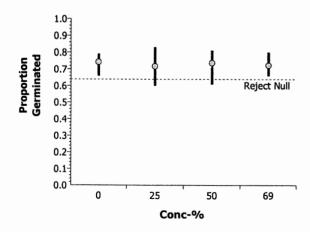
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0024387	0.000813	3	0.13	0.94380	Non-Significant Effect
Error	0.1038581	0.006491	16			
Total	0.10629684	0.0073040	19			

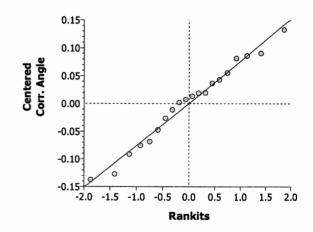
Group Comparisons

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 Summ	ary			Origi	nal 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	0.71600	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	







Analyst:

Approval:

000-089-125-1

Page 1 of 4

24 Feb-05 3:37 PM

Report Date: Analysis:

06-8149-9079/0502-023

Macrocystis Germination and C	Germ Tube	Growth Test				N	autilus E	invironmental (CA)
Endpoint	Analysi	s Type	Sample I	ink C	ontrol Link	Date Analyzed	V	ersion
Mean Length	Compar	ison	03-2798-	4268 06	6-8754-7222	24 Feb-05 3:37	PM C	ETISv1.025
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								

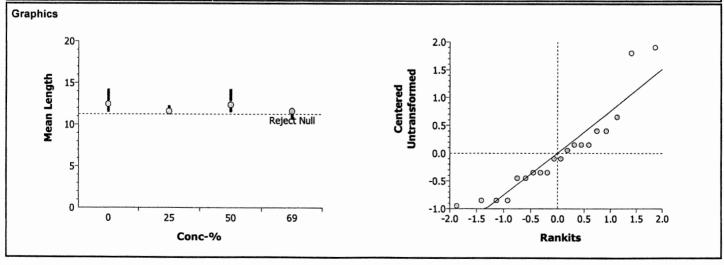
lest Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	12.45	10 - N/A	Passes acceptability criteria
MSDp	0.09614	N/A - 0.2	Passes acceptability criteria

ANOVA Assump	otions					
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 Comp	ariso	ns					
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
l		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 Summ	Data Summary			Origi	nal 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	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						



Page 3 of 4

Report Date:

24 Feb-05 3:37 PM

Analysis:

13-4664-9869/0502-023

Macrocystis Germination and Germ Tube Growth Test

CETIS Analysis Detail

Hautilus Littifolilliental (OA)	Nautilus	Environmental	(CA)	ì
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		Sample Li	nk Control Link		Date Analyzed		Version	
Proportion Germinated	Comparis	omparison		03-2798-4268 06-8754-7222		24 Feb-05 3:36 PM		ETISv1.025
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%

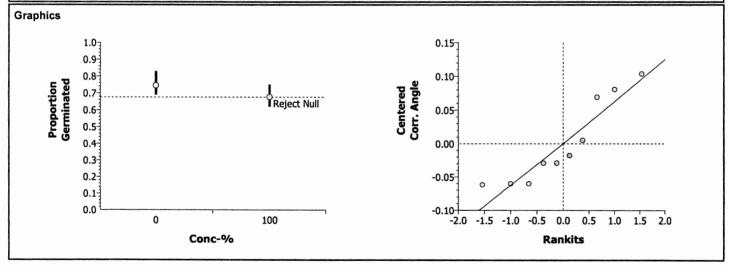
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74400	0.7 - N/A	Passes acceptability criteria
MSDp	0.09257	N/A - 0.2	Passes acceptability criteria

ANOVA	ANOVA Assumptions											
Attribu	te Te	st	Statistic	Critical	P Level	Decision(0.01)						
Variand	ces Va	riance Ratio	1.22614	23.15450	0.84815	Equal Variances						
Distribu	ition Sh	apiro-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 Comp	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 Summ	ary			Origi	nal 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			



Page 4 of 4

Report Date:

24 Feb-05 3:37 PM

Analysis:

15-4740-2362/0502-023

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	an Length Comparison				6-8754-7222	24 Feb-05 3:36	PM (M 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												

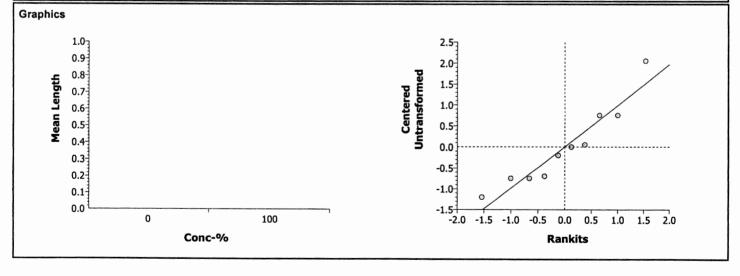
lest Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	10.5	10 - N/A	Passes acceptability criteria
MSDp	0.11494	N/A - 0.2	Passes acceptability criteria

ANOVA Assum	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 v	/S	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)				
Salt Control		100	-0.6933	1.85955	0.7461	1.20692	Non-Significant Effect				

Data Summa	ary			Origir	nai 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

31-Jan-05 Sampled:

Sample Station: A-2

Random	Number	Number			Т	ube Length	Measurem	ents (micro	meter units)			Calibration Factor	Mean Tube Length (μm)
Number	Counted	Germinated												13.25
LC 36	100	80	7	7	7	3	3	4	5	4		<u>6</u> 4	2.5 2.5	11.75
37	100	66	6	5	6	4	4	5	6	3	4	3	2.5	9
S (38	100	71	2	6	2	5	3	4	4	3	4	5	2.5	11.5
39	100	61	5	5	5	6	4	4	5	3	4	4	2.5	10.25
40	100	62	3	4	4	4	3	6	4	5	4	5	2.5	11.25
LC 41	100	67	7	4	4	3	4	4	4	6	4	5	2.5	12
42	100	73	4	6	6	4	5	4	4	5	5		2.5	11.75
SC 43	100	64	4	4	4	5	5	4	5	6	5	5		10
LC 44	100	70	3	3	4	5	6	2	3	3	7	4	2.5	12
LC 45	100	81	5	5	3	7	4	5	3	6	5	5	2.5	
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	3	4	2.5	11.25
49	100	77	7	5	5	6	4	7	6	6	4	7	2.5	14.25 9.75
50	100	75	5	4	4	4	3	4	3	4	4	4	2.5	11.75
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 2.5	11.25
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	11.5
55	100	71	3	5	6	4	6	5	3	6	4	4		10.75
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	12
58	100	80	5	5	3	4	5	4	5	5	7	5	2.5	10.75
SC 59	100	77	5	5	5	4	5	3	5.	5	3	3	2.5	
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

Macrocystis Germination and Germ Tube Growth Test

Nautilus Environmental (CA)

Start Date: 1-Feb-05 Species: Macrocystis pyrifera

Test ID: 0502-023

End Date:

Sampled:

3-Feb-05

31-Jan-05

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

Sample Source: City of Buenaventura

Sample Station: A-2

Random Number	Number Counted	Number Germinated			Т	ube Length	Measurem	ents (micro	meter units)			Calibration Factor	Mean Tube Length (μm)
36	100 A	ide 1	(O	5	6	4	4	5	6	3	4	4	2.5	#DIV/0!
37	100	80		7		3	3	4	5	4	7	6	1	#DIV/0!
38	100	71	7	(0	7 2	5	3	4	4	3	4	.3		#DIV/0!
	100		5		5	(o	4	U	5	3	4	5		#DIV/0!
39	100	<u>()</u>	3	<u> </u>	, J	7	3	6	Ĭ	5	4	4		#DIV/0!
40	100	67	7	4	4	3	Ų	4	ų.	9	Ч	5		#DIV/0!
41	100	73		9	Le	4	5	4	4	5	5	5		#DIV/0!
42			4		4	5	5	4	5	9	5	5	1-1-	#DIV/0!
43	100	64	3	4	4	2		2	3	3	7	4		#DIV/0!
44	100	10		3	3		94	5	3	0	5	5		#DIV/0!
45	100	81	5	5		U	7 7	4	5	Ľ	41	3		#DIV/0!
46	100	73	5	4	4	5	3	5	5	5	3	3		#DIV/0!
47	100	66	3 4	3	5			(((, 4	4	3	4		#DIV/0!
48	100	83	7			(4 (6	9	3	<u> </u>	6	ŭ	7		#DIV/0!
49	100	17	5	5 4	5	را د	3	4	<u>(c</u>	4	4	4		#DIV/0!
50	100	75		<u> </u>	3	5	5	5	4	4	5	3		#DIV/0!
51	100	74	7	4		4	5	7	3	6	4	5		#DIV/0!
52	100		3	5	4	· · · · · · · · · · · · · · · · · · ·	3	3	4	5	5	4	1-1-	#DIV/0!
53	100	65			5	4	5	3	4	4	Ч	4	1-1-	#DIV/0!
54	100	<i>ie4</i>		5	3	4	6	5	3	6	4	4		#DIV/0!
55	100	71	3	<u>5</u> 3	3	3	5	4	4	5	4	5		#DIV/0!
56	100	68	5			6	5	4	7	3	4	4		#DIV/0!
57	100	74	5	5	3	4	5	4	5	5	7	5		#DIV/0!
58	100	80				+	5	3	5	5	3	3	1-1	#DIV/0!
59	100	77	5	5	5	<u> </u>	3	3		ia	4	(0	1	#DIV/0!
60	100	81		6	3	(o	7		5	4	5	5	1-1-	#DIV/0!
61	100	65	5		3	3	3	<u>6</u>	5	4	3	4	-	#DIV/0!
62	100	70	U	5		14	4	<u>u</u>	3	5	5	17		#DIV/0!
63	100	62	<i>ا</i>	<u> </u>	4	4	4	3	3	5	4	4		#DIV/0!
64	100	71	4	4	4	4	5		5	4	3	3		#DIV/0!
65	100	75	5	5	7	4	5	5	3	io	4	4	1	#DIV/0!
66	100	79	4	9	6	3	4	5	5	(0)	5	5		#DIV/0!
67	100	14	3	5	5	4	5	4	3	3	4	5	1	#DIV/0!
68	100	83	3	4	5	3	4	4	6	4	3	4	1-1-	#DIV/0!
69	100	72		4	3	3	4	4	3	3	14	4	1 1	#DIV/0!
70	100	75	3	4	5	1 2		<u> </u>						

QC Check: AH 2/3/85

Final review: Att 2/7/05

Analyst: LC

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 Ending Date: 03 Feb-05

Sample Date: 31 Jan-05

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

Species: Macrocystis pyrifera

Material: Estuarine Monitoring Sample

Sample Code: 0502-023

Sample Source: City of Buenaventura

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	
a continuent and the administrative beautiful and annual comm	0 B	3	64	100			1	
	0 B	4	68	100			1	
	0 B	5	47	100			1	
	O LC	1	45	100			1	
1261	O LC	2	44	100			1	
(#)	O LC	3	36	100			1	
nalla	0 LC	4	41	100			1	
133	O LC	5	46	100			1	
Mr '	o sc		38	100			1	
SCHILL	o sc	2	43	100			1	
5000	o sc	3	62	100			1	
	o sc	4	69	100			1	
	0 SC	5	59	100			1	
2	5	1	51	100			1	
2	5	2	48	100			1	
2	5	3	66	100	1		1	
2	5	4	53	100	112		1	
2	an andreas	5	55	100			1	
5	0	1	65	100			1	
5	0	2	49	100			1	
5	0	3	60	100			1	
5	0	4	39	100			1	
5	0	5	52	100			1	
6	5	1	67	100			1	
6	5	2	42	100			1	
6	5	3	58	100	1	AT ANY COMMENTS OF THE PERSON	1	
6	5	4	56	100			1	
6	5	5	37	100			1	
10	0	1	40	100			1	
10		2	50	100			1	
10		3	63	100			1	
10		4	61	100	-		1	
10	4	5	57	100			1	

Marine Chronic Bioassay	Kelp Spore Germination & Growth Worksheet
client: Coty of Buenaventura, Internal	Start Date/Time: 2-1-05 / 1530
Test No. 0502-023-7026, 050201 mprt	End Date/Time: 2-3-05 / 1200
Tech. Initials: RG	Test Species: Macrocystis pyrifera
Dilution Water Source (Client II:): Dilution Water Source (Client III:): Dilution Water Source (Reference Toxicant):	strong Swell - 4' sets 3-4' vis. Scripps pier
Time of Ringing and Transfer to Release Regions:	(keep kelp from each collecting bag separated) 14/5 (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers: Conditions of Zoospore Density and Motility (beaker 1):	Density Low mo tility good
Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed):	1515
Density Counts (target = 90): 14 17 13 23	19 Mean:
Mean 17.6 · 10,000 = 17 6,000 spores per ml (Density of Spor	e Release)
Calculate the volume of spore stock to add to each test container: (225,000 spores/container)/(density of spore release) = 1.25 ml stock/ 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 management of the spore release.	
in density 2 300,000 sporeshin, edicate a dilation factor, x, and oreate a n	
Density of spore release	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 volum and MBP required volume of no greater than 1% of the total test solution v 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	f the spores in the second release beaker.
Time of Inoculation: (536 Amount inoculated	d: .5 mc 24-hour germination check: 647_6
Comments:	****
QC Check: AH 2/3/05 Final Review: AH	410/05

Nautilus Environmental, LLC 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura Test Species: Macrocystis pyrifera

Sample ID:

Start Date/Time: 2/1/2005

1 (530

Test No:

0502-023

End Date/Time: 2/3/2005

11200

Analyst:

Test Type: Kelp Spore Germination and Growth

Concentration		Initial R	eadings			Final R	eadings	
(%)	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	140	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	6.5	8.01	32.5	14.0	7,2	ల . 3ర	32,4	14.2
100	8.4	8.49	320	14.0	7.2	8.36	31.8	14,2

Comment	s:
---------	----

QC Check:

AH 2/3/05

Final Review:

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura

Analyst: MC/RG

Sample ID: Site A-2 Test Date: 2/1/2005

0502-023 **Test No:**

Test Type: Kelp spore germination and Growth

Salinity of Effluent

1.1

Salinity of Brine 100.2

Target Salinity 32

Test Dilution Volume 150

> **Brine Control Effluent**

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) =0.45 0.47

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 100 150 0.47 46.8

> Total Brine Volume Required (ml): 144.5

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121

CETIS Test Summary

Report Date: Link:

24 Feb-05 3:39 PM 13-7798-2771/0502-024

Nautilus Environmental (CA)

Test No: 11-8620-2502 Start Date: 01 Feb-05 03:30 PM

Ending Date: 03 Feb-05 12:00 PM

Test Type: Growth-Germination

EPA/600/R-95/136 (1995) Protocol: Dil Water: Laboratory Seawater

Duration: Species:

Macrocystis pyrifera

Setup Date: 01 Feb-05 03:30 PM

Brine:

Frozen Seawater

Source: Field Collected

The 100 % concentration was prepared by adding artificial salts. All other concentrations were made by adding hypersaline brine.

08-4215-6469

Material: **Estuarine Monitoring Sample** 0502-024

Client:

City of Buenaventura

Sample Date: 31 Jan-05 02:30 PM

Code:

City of Buenaventura

Project:

Receive Date: 31 Jan-05 10:10 PM Source:

Sample Age: 25h

Comments:

Sample No:

Station:

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

	41.	•
wean	Lenath	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%

Approval:

000-089-125-2

CETIS™ v1.025B

CETIS Test Summary

Report Date:

24 Feb-05 3:39 PM

Mean Leng	th 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 Deta	il				
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

Analyst:

Approval: 474

000-089-125-2

CETIS™ v1.025B

Page 1 of 4

Report Date:

24 Feb-05 3:39 PM

Analysis:

04-7873-5942/0502-024

CETIS Analysis Detail

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA)								
Endpoint	Analysis	Туре	Sample Link		Control Link	Date Analyzed		Version
Proportion Germinated	Compari	son	13-7798-2771 06-8754		06-8754-7222	24 Feb-05 3:38	PM	CETISv1.025
Method	Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		69	>69	1. 4 5	N/A	16.70%

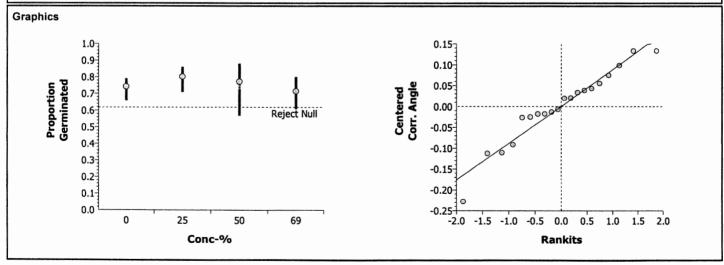
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74200	0.7 - N/A	Passes acceptability criteria
MSDp	0.16702	N/A - 0.2	Passes acceptability criteria

ANOVA Assum	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 Summa	ary		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	



Page 2 of 4

Report Date:

24 Feb-05 3:39 PM

Analysis:

05-3796-1273/0502-024

CETIS Analysis Detail
Macrocystis Germination and Ger

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA)								
Endpoint	Analysis	s Type	Sample L	.ink	Control Link	Date Analyzed	١ ١	Version
Mean Length Comparison		13-7798-2771 06-8		06-8754-7222	-8754-7222 24 Feb-05 3:38		CETISv1.025	
Method	Alt H	Data Transform	Z	NOE	L LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Untransformed		69	>69	1.45	N/A	13.20%
Test Acceptability								

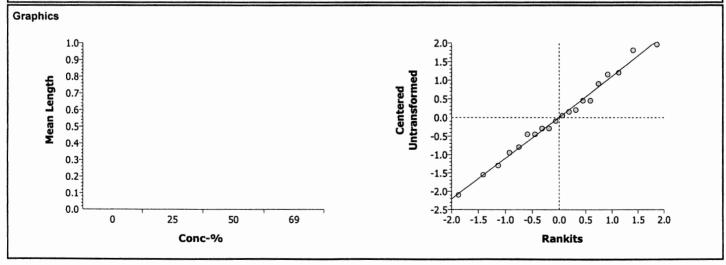
l les	st Ассертав иту			
Att	ribute	Statistic	Acceptable Range	Decision
Co	ntrol Response	12.45	10 - N/A	Passes acceptability criteria
MS	SDp	0.13200	N/A - 0.2	Passes acceptability criteria

ANOVA Assum	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 Summ	ary		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					



Page 3 of 4

Report Date:

24 Feb-05 3:39 PM

Analysis:

12-9363-1556/0502-024

Macrocystis	Germination an	d Germ 1	Րube Growth	Test					Na	autilus Enviro	nmental (CA)
Endpoint		An	alysis Type		Sample L	.ink	Contro	l Link	Date Analyzed	Version	n
Proportion G	erminated	Co	mparison		13-7798-2	2771	06-8754	4-7222	24 Feb-05 3:39	PM CETIS	/1.025
Method		Alt	H Data	Transform	Z	NOE	L L	OEL	Toxic Units	ChV	MSDp
Equal Varian	ce t	C >	T Angu	lar (Corrected))	100	>	100	1.00	N/A	6.98%
Test Accept	ability										
Attribute		Sta	tistic /	Acceptable Ra							
Control Resp	onse).7 - N/A				criteria			
MSDp		0.0	6984 N	N/A - 0.2	Passe	es acce	eptability	criteria			
ANOVA Ass	umptions										
Attribute	Test		Stati	stic Cri	tical P	Level		Decisio	on(0.01)		
Variances	Variance R		3.249			.28012			/ariances		
Distribution	Shapiro-Wi	ilk W	0.925	537 0.7	8055 0	.38249		Normal	Distribution		
ANOVA Tabl	le										
Source	Sum of	Squares	Mean Squ	are DF	F Statist	ic I	P Level		Decision(0.05)		
Between	0.07743		0.077431	1	30.08		0.00058		Significant Effect	xt	
Error	0.02059		0.002575	8							
Total	0.09802	715	0.0800053	9							
Group Com	parisons										
Control	vs Conc-%		Statistic	Critical	P Level	MS	D	De	cision(0.05)		
Salt Control	100		-5.4841	1.85955	0.9997	0.05	5967	No	n-Significant Effe	ct	
Data Summa	ary			inal 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	0.05	273	1.0421	8 0.98030	1.14581	0.06275
100		5	0.88000	0.84000	0.90000	0.02	2345	1.2181	7 1.15928	1.24905	0.03481
Graphics											
	1.0-3						0.15				
	0.9			•			0.15				
	0.8			φ			0.10			0	
ortion inated	0.7) 				ered Angle	0.10			/	
orti	0.6			Reject Null		tered	0.05				
Proportion Germinated	0.5					Corr. /	3.00			/ 0	
ق م	0.4					ح ح	0.00		9	• •	
	0.3						1				
	0.2						-0.05				
	0.1						-)			
	0.01			100			-0.10	1.5	10 05 00 (25 10 15	
	U		nc-%	100			-2.0	7 -1.5	1.0 -0.5 0.0 (Rankits	0.5 1.0 1.5	2.0
		-	/0						Kankits		

Analyst: Approval: Approval: 2146

CETIS Analysis Detail

Page 4 of 4

Report Date:

24 Feb-05 3:39 PM

Analysis:

18-7313-7334/0502-024

	Macrocystis Germination and Germ Tube Growth Test	Nautilus Environmental (CA)
- 1		

Endpoint	Analysis	Analysis Type		ink Co	ntrol Link	Date Analyzed		Version	
Mean Length	Compari	Comparison		13-7798-2771 06-8754-72		2 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%	

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	

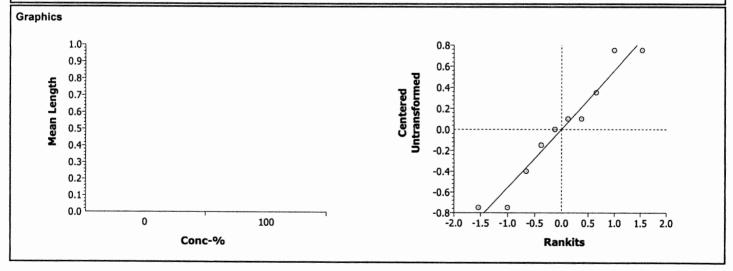
ANOVA Table

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 Summa	iry			Origi	nal 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					



Approval:

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

Sample Station: B-1

Sampled:	31-Jan-05										Sample	Station:	B-1	
Random	Number	Number Tube Length Measurements (micrometer units)											Calibration Factor	Mean Tube Length (μm)
Number	Counted	Germinated											2.5	9.75
71	100	65	5	4	4	5	4	3	6	5	6	5	2.5	11.75
72	100	88	3	5	3	6	3	5	- 6	- 5				
73	100								5	4	7	2	2.5	9.25
74	100	82	3	2	3	4	2	5 4	6	5	3		2.5	11.5
75	100	88	6	5	5	3	4	4	-					
76	100												 	
77	100								4	4	4	3	2.5	10.75
78	100	75	4	4	4	6	5	5	5	4	5	5	2.5	11
79	100	83	4	4	4	5	4	4	4	5	5	3	2.5	11
80	100	90	5	4	6	5	3	4	5	4	4	5	2.5	11.25
81	100	89	5	5	4	4	4	5 6	4	4	6	5	2.5	11.25
82	100	61	5	5	3	4	3	- 6						
83	100													
84	100													
85	100							6	6	4	4	4	2.5	11.5
86	100	71	6	4	5	3	5	5	5	4	4	4	2.5	11.5
87	100	88	5	5	4	5	5	3			· ·			
88	100						4	3	6	6	6	5	2.5	10.75
89	100	57	3	3	3	3	3	6	5	5	4	5	2.5	10.75
90	100	89	4	4	4		5	5	5	5	6	6	2.5	12.5
91	100	86	5	4	5	4	3	3						
92	100						4	4	3	5	3	5	2.5	10.25
93	100	58	4	3	4	6	3	4	5	5	5	4	2.5	10.25
94	100	64	4	4	4	3	4	6	5	4	3	3	2.5	10.75
95	100	70	5	4	5	3	4	3	4	6	4	4	2.5	11
96	100	71	5	6	5	3	4	3						
97	100						6	4	6	4	4	4	2.5	10.5
98	100	76	4	3	4	3	4	5	5	4	5	5	2.5	12.25
99	100	71	5	6	5	5	5	4	3	5	3	5	2.5	10.25
100	100	80	4	4	6	2		4	2	2	3	4	2.5	8.5
101	100	77	5	3	3	3	4	3	5	4	4	3	2.5	9
102	100	79	3	3	4	3	4		 	· ·	 			
103	100			 			5	4	5	4	5	5	2.5	11.25
104	100	84	4	4	5	3	4	4	3	4	6	5	2.5	10
105	100	81	4	4	3	3	4							

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

Sampled:

31-Jan-05

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

Sample Source: City of Buenaventura

Sample Station: B-1

Random	Number Counted	Number Tube Length Measurements (micrometer units) Germinated										Calibration Factor	Mean Tube Length (μm)	
Number				4	4	5	4	3	2	4	3	5	2.5	#DIV/0!
71	100	65	5	5	3	<u> </u>	3	5	6	5	6	5	1	#DIV/0!
72	100	88		3	3									#DIV/0!
73	100					4	2	5	5	4	7	2		#DIV/0!
74	100	82	3	2 5	3 5	3	4	4	io	5	3	5		#DIV/0!
75	100	88	4	-	3									#DIV/0!
76	100													#DIV/0!
77	100						5	5	4	4	4	3		#DIV/0!
78	100	75	4	4	4	6	4	4	5	4	5	5		#DIV/0!
79	100	83	4	4	4	5	3	4	4	5	5	3		#DIV/0!
80	100	90	5	4	Le	5	4	5	5	4	4	5		#DIV/0!
81	100	89	5	5	4	4	3	م)	. 4	4	6	5		#DIV/0!
82	100	101	5	5	3	4	<u> </u>		7	7	0			#DIV/0!
83	100													#DIV/0!
84	100													#DIV/0!
85	100			<u> </u>	-				6	4	4	4		#DIV/0!
86	100	71	6	4	5	3	4	5	5	4	4	4	1-1-	#DIV/0!
87	100	88	5	5	4	5	5	-5	-			 		#DIV/0!
88	100						()	3	6	10	6	5		#DIV/0!
89	100	57	3	3	3	4	3			5	4	5		#DIV/0!
90	100	89	4	4	4	3		0	5	5	6	6		#DIV/0!
91	100	86	5	4	5	4	5	5	5	5	1 0	1 0		#DIV/0!
92	100						ļ				~7	5		#DIV/0!
93	100	58	4	3	4	6	4	4	3	5	3 5	4	+	#DIV/0!
94	100	04	4	4	4	3	3	4	1	5		3	 	#DIV/0!
95	100	70	5	4	5	4	4	Co	5	4	3	4		#DIV/0!
96	100	71	5	6	5	3	4	3	4	6	4	4		#DIV/0!
97	100	-					<u> </u>	<u> </u>	 	 	 	4		#DIV/0!
98	100	76	4	3	4	3	6	4	LQ.	4	4		1	#DIV/0!
99	100	71	5	9	5	5	4	5	5	4	5	5		#DIV/0!
100	100	80	4	4	6	2	5	4	3	5		5 4		#DIV/0!
101	100	77	5	3	3	4	4	4	2	2	3	3		#DIV/0!
102	100	79	3	.3	4	3	4	3	5	4	4	+ 2	1	#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	1 2		#21070:

QC Check: At 23 05

Final review: AH 2/1/05

Analyst: wc

Marine Chronic Bioassay	Kelp Spore Germination & Growth Worksheet
Client: Coty of Buenaventura, Internal	Start Date/Time: 2-1-05 / 1530
Test No. 0502-023-7026, 050201 mprt	End Date/Time: 2-3-05 / 200
Tech. Initials: RG	Test Species: Macrocystis pyrifera
Date Collected: 2 1 1 0 5	
Kelp Collector Dave Gutoff	
Collection Location: La Jolla Cove	
Conditions (weather, etc.): Sunny, moderate to	strong Swell - 4 sets 3-4 vis. Scripps pier
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 . Time of Rinsing and Transfer to Release Beakers: Conditions of Zoospore Density and Motility (beaker 1): Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed):	(keep kelp from each collecting bag separated) 14/5 (keep kelp from each collecting bag separated) Density Low Motifity Good 15/5
Density Counts (target = 90): 14 17 13 23 Mean 17.6 • 10,000 = 17 6000 spores per ml (Density of Spores)	•
Calculate the volume of spore stock to add to each test container:	
(225,000 spores/container)/(density of spore release) = 1.2 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 r	new spore stock of 900,000 cells/ml and add 0.25 ml:
Density of spore release * 0.25 ml = 1 container	spores =(x)spores
Example: 980,000 * 0.25 / 225,000 = 1.09 (100 ml stock + 9 ml sw)	
In cases of a spore release from 450,000 to 899,000 spores/ml, the volum and MBP required volume of no greater than 1% of the total test solution will requirement in order to achieve the desired spore density.	
If the density of spore release is < 450,000 spores/ml, check the density of	f the spores in the second release beaker.
Time of Inoculation: (530) Amount inoculated	d: .5 mc 24-hour germination check: 8476
Comments:	
QC Check. AH 2/3 05 Final Review: AH	410/05

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

CETIS Data Worksheet

Report Date: Link:

31 Jan-05 2:29 PM

13-7798-2771

		114	110							LI	nk:	3-1198-211
Macrocy	stis (Germ	inatio	n and	Germ Tube	Grow	th Test				Nautilus Environ	mental (CA
Start Dat	art Date: 01 Feb-05 Species: Macrocystis pyrifera									Sample Code:	0502-024	
Ending [Date:	03 1	Feb-0	5	Prot	ocol:	EPA/60	0/R-95/136 (19	Sample Source:	City of Buenaventura		
Sample Date: 31 Jan-05			5	Material: Estuarine Monitoring Sample					Sample Station:	B-1		
Conc-%	/6	Code	Rep	Pos	# Counted	# Ge	rminated	Mean Length	CalFactor		Notes	
	0	В	1	86	100				1	The second secon		
	0	В	2	93	100				1			
	0	В	3	94	100				1			
	0	В	4	71	100				1			
	0	В	5	105	100	1			1	THE RESIDENCE OF THE PROPERTY	THE PROPERTY OF THE PROPERTY O	
	0	/LC	1	84	100			í	1			
بلدما	0	y c	2	76	100				1			
几(井)	0	rg	3	103	100				1		### ##################################	
hare W/8-3 Sc#1	0	LC	4	97	100				1			
WINO	0	LC	\5	77	100				1			
16.3	, 0	SC	1	73	100				1			
	> 0	SC	2	88	100				1			
50#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	I			1			
	25		3	96	100				1			
	25		4	79	100		* 1110,74,74		1	of \$ 100; State of the state of	and Mill Martin and Child The Company of the Child The Company of the Child The Company of the Child The C	119900111111111111111111111111111111111
	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			1			
	100		2	104	100			I	1			
	100		3	80	100			Î	1			

100

100

4

87

81

100

100

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Buenaventura Test Species: Macrocystis pyrifera

Sample ID:

Start Date/Time: 2/1/2005

1530

Test No:

End Date/Time: 2/3/2005

1200

Analyst:

Test Type: Kelp Spore Germination and Growth

Concentration		Initial R	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	8.16	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:

for lab and salt control data

QC Check:

AH 2/3/05

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

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

150

Test Dilution Volume

Brine Control

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) =

0.45

Effluent

0.47

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

Total Brine Volume Required (ml): 143.8

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121

CETIS Test Summary

Report Date:

24 Feb-05 3:43 PM

Nautilus Environmental (CA)

Link: 06-8754-7222/0502-025

Macrocystis	Germination	and Germ	Tube	Growth Tes	st

11-8620-2502 01 Feb-05 03:30 PM

Test Type: Growth-Germination Protocol:

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

Duration: 44h Species:

Macrocystis pyrifera

Ending Date: 03 Feb-05 12:00 PM Setup Date: 01 Feb-05 03:30 PM Dil Water: Laboratory Seawater Brine: Frozen Seawater

Field Collected Source:

Comments:

The 100 % concentration was prepared by adding artificial salts. All other concentrations were made by adding hypersaline brine.

Sample No: 04-5385-2456

Test No:

Start Date:

Material: Code:

Estuarine Monitoring Sample 0502-025

Client: City of Buenaventura

Sample Date: 31 Jan-05 12:10 PM Receive Date: 31 Jan-05 10:10 PM

Source:

City of Buenaventura

Project:

Sample Age: 27h

Station:

Comparison S	omparison 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 Acceptab	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 Leng	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** CV Mean Minimum Maximum SD 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 9.76% 0.76000 0.68000 0.87000 0.03317 0.07416 50 5 0.72200 0.69000 0.77000 0.01594 0.03564 4.94% 5 69 0.72200 0.71000 0.74000 0.00583 0.01304 1.81% 100 0.72400 0.69000 0.77000 0.01435 0.03209 4.43%

Page 2 of 2

CETIS Test Summary

Report Date:

24 Feb-05 3:43 PM

Link:

06-8754-7222/0502-025

Mean Lengt	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 Deta	it							
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			

Analyst:

Approval: 274105

Page 2 of 4

Report Date:

24 Feb-05 3:43 PM

Analysis:

04-3468-8614/0502-025

CET	IS	Αı	nal	ys	is	De	tail	

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA)									
Endpoint	Analysis	Analysis Type		Sample Link Control Link		Date Analyzed		Version	
Proportion Germinated	Comparis	Comparison		222	06-8754-7222	24 Feb-05 3:42 PM		CETISv1.025	
Method	Alt H	Data Transform	Z	NOE	LOEL	Toxic Units	ChV	MSDp	
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		69	>69	1.45	N/A	9.92%	

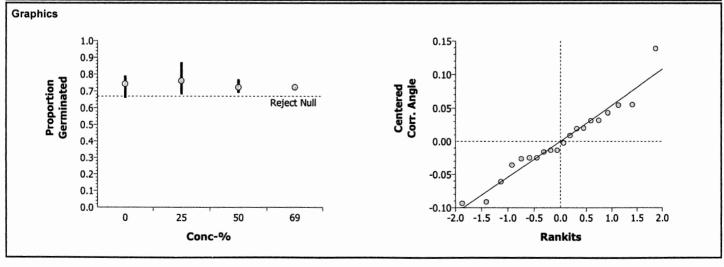
1	Test Acceptability			
	Attribute	Statistic	Acceptable Range	Decision
	Control Response	0.74200	0.7 - N/A	Passes acceptability criteria
	MSDp	0.09923	N/A - 0.2	Passes acceptability criteria

ANOVA Assumpt	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	0.06232002	0.0059803	19	_		

Group Compa	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			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	0.76000	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	



Page 3 of 4

Report Date:

24 Feb-05 3:43 PM

Analysis:

04-8976-9731/0502-025

CETIS Analysis Detail Macrocystis Germination and Germ Tube Growth Test

Nautilus	Environmental	(CA)
Nautilus	Ellynollillelital	

Endpoint	point Analysis Type		Sample L	ink Co	ntrol Link	Date Analyzed		Version	
Mean Length	Compari	Comparison		06-8754-7222 06-8		754-7222 24 Feb-05 3:43 P		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%	

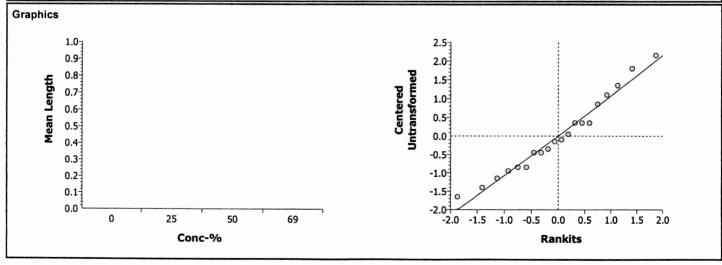
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	12.45	10 - N/A	Passes acceptability criteria
MSDp	0.12947	N/A - 0.2	Passes acceptability criteria

ANOVA Assumptions										
Test	Statistic	Critical	P Level	Decision(0.01)						
Bartlett	0.79066	11.34487	0.85170	Equal Variances						
Shapiro-Wilk W	0.96774	0.86826	0.68174	Normal Distribution						
	Test Bartlett	Test Statistic Bartlett 0.79066	TestStatisticCriticalBartlett0.7906611.34487	Test Statistic Critical P Level Bartlett 0.79066 11.34487 0.85170	TestStatisticCriticalP LevelDecision(0.01)Bartlett0.7906611.344870.85170Equal Variances					

Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
11.7125	3.904167	3	2.99	0.06215	Non-Significant Effect
20.9	1.30625	16			
32.6124992	5.2104167	19	_		
	11.7125 20.9	11.7125 3.904167 20.9 1.30625	11.7125 3.904167 3 20.9 1.30625 16	11.7125 3.904167 3 2.99 20.9 1.30625 16	11.7125 3.904167 3 2.99 0.06215 20.9 1.30625 16

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						



Page 4 of 4

Report Date:

24 Feb-05 3:43 PM

Analysis:

06-3062-2675/0502-025

Macrocystis Germination and Germ Tube Growth Test	

Mautilue	Environmental	CAN
Nauthus	Environmental	CAI

Endpoint Analysis Type		Sample L	ink Co	ntrol Link	Date Analyzed		Version	
Proportion Germinated Comparison		06-8754-7222 06-8754-		-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	Acceptabi	lity
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CETIS Analysis Detail

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	

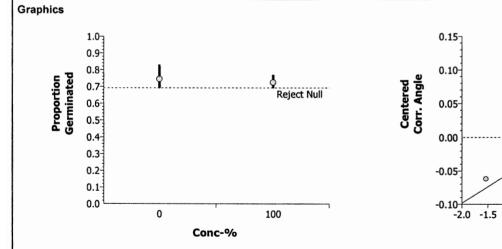
ANOVA Table

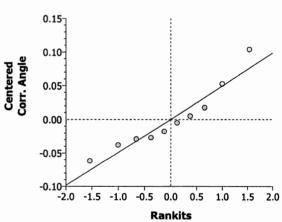
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)	
Between	0.0014377	0.001438	1	0.55	0.48039	Non-Significant Effect	
Error	0.0209974	0.002625	8				
Total	0.02243507	0.0040623	9				

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 Su	mmary			Origi	nal 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





Approval:

Page 1 of 4

Report Date: Analysis:

24 Feb-05 3:43 PM 03-4401-2511/0502-025

CETIS Analysis Detail

Macrocystis Germinatio	n and Germ Tube Growth Test			Nautilu	ıs 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

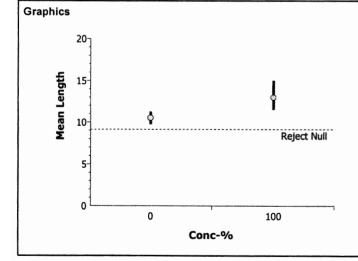
ANOVA Table

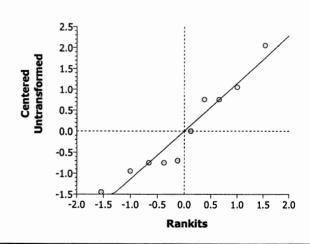
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)	
Between	15.00625	15.00625	1	10.86	0.01092	Significant Effect	
Error	11.05	1.38125	8				
Total	26.0562506	16.387500	9				

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				Origi	nal 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: Sampled:

3-Feb-05

31-Jan-05

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

Sample Source: City of Buenaventura

Sample Station: B-3

Random	Number	Number											T a "" "	<u> </u>
Number	Counted	Germinated		Tube Length Measurements (micrometer units)									Calibration	Mean Tube
106	100	87	6	6	6	7	4	5	6	7	T =	T 6	Factor	Length (µm)
SC 107	100	83	3	3	4	6	5	5	5		5	5	2.5	14.25
SC 108	100	75	4	4	4	4	6	5	5	4	4	3	2.5	10.5
109	100	71	5	6	6	6	6	4	5		5 7	4	2.5	11.25
110	100	74	5	5	5	4	4	7	6	6 7		7	2.5	14.5
111	100	77	6	4	4	5	5	4	5		6	6	2.5	13.75
112	100	76	4	6	6	5	4	5	5	5	5	5	2.5	12
113	100	78	5	6	7	6	5	7		6	4	5	2.5	12.5
114	100	70	3	6	5	5	4		7	4	5	5	2.5	14.25
115	100	71	7	8	8	5	6	2	6	6	7	4	2.5	12
116	100	72	6	7	4	6	6	6		8	7	5	2.5	16.75
117	100	70	5	5	7	7		5	5	6	5	5	2.5	13.75
LC 118	100	70	5	5	5	5	6 5	4	5	4	6	7	2.5	14
119	100	73	6	8	8	5		4	5	4	3	4	2.5	11.25
120	100	69	4	6	5	5	5 4	4	5	4	5	7	2.5	14.25
121	100	79	5	6	5	5	5	5	5	6	4	6	2.5	12.5
122	100	72	5	5	5	6	4	5 6	4	4	4	5	2.5	12
123	100	68	6	6	4	4	5	5	4	4	6	4	2.5	12.25
124	100	74	5	6	8	6	6	5	5	5	4	4	2.5	12
125	100	70	4	4	6	6	6	6	<u> </u>	5	7	5	2.5	15
SC 126	100	73	4	6	4	4	5		6	5	6	7	2.5	14
127	100	71	5	6	7	2	4	4	5	5	4	4	2.5	11.25
LC 128	100	67	7	6	7	6	6	6	6	7	6	6	2.5	13.75
129	100	75	5	7	5	5	5	4	4	4	4	7	2.5	13.75
130	100	79	7	5	4	9		5	6	7	7	7	2.5	14.75
131	100	66	6	6	4		4	4	5	4	6	7	2.5	13.75
LC 132	100	68	5	4	4	<u>4</u> 5	4	4	3	5	4	6	2.5	11.5
(C133	100	81	4	4	4	3	4	3	4	3	5	4	2.5	10.25
134	100	75	6	5	5	6	5	5	4	6	5	5	2.5	11.25
135	100	72	5	4	5		5	5	6	4	5	6	2.5	13.25
SC 136	100	69	5	4	3	4	7	5	5	5	4	4	2.5	12
SC 137	100	72	4	4	3	2	4	3	5	5	4	3	2.5	9.75
LC 138	100	77	4	4	4		5	4	4	4	4	5	2.5	9.75
139	100	69	6	6	5	5	5	6	4	3	4	4	2.5	10.5
140	100	77	8	6	7	7	5 7	4	3	4	4	4	2.5	11.5
				U				5	4	5	6	5	2.5	15

QC Check: AH 2/7/05

Final review:

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Analyst: Sy

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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	187	6	6	6	٦	ų	5	6	7	5	5	2.5	#DIV/0!
107	100	33	3	3	نر	6	5	5	5	4	4	3	11	#DIV/0!
108	100	75	24	4	ц	4	6	5	5	4	5	4		#DIV/0!
109	100	71	5	G	6	6	6	4	. 5	6	7	1		#DIV/0!
110	100	74	б	5	5	4	ч	7	6	7	6	6		#DIV/0!
111	100	77	Ġ	4	4	5	5	3	5	5	5	5		#DIV/0!
112	100	76	4	6	6	5	4	J0	5	4	4	5		#DIV/0!
113	100	78	5	6	7	6	5	7	٦	4	5	5		#DIV/0!
114	100	70	3	6	5	5	it	2	6	6	7	4	L	#DIV/0!
115	100	71	7	8	8	S,	G	6	٢	8	7	5		#DIV/0!
116	100	72	6	7	4	6	6	5	5	4	5	5		#DIV/0!
117	100	70	5	4	7	.7	4	4	5	4	6	7		#DIV/0!
118	100	70	5	5	5	5	5	4	5	ч	3	4		#DIV/0!
119	100	73	6	8	8	5	5	۲	5	4	5	7		#DIV/0!
120	100	69	4	6	5	5	4	5	5	C	ч	6		#DIV/0!
121	100	79	5	6	5	5	5	5	ц	4	4	5		#DIV/0!
122	100	72	5	5	5	6	i,	6	9	4	6	4		#DIV/0!
123	100	68	6	6	4	4	5	5	5	5	4	4		#DIV/0!
124	100	74	5	6	8	6	6	5		5	7	5		#DIV/0!
125	100	70	ч	Ч	6	6	6	6	6	5	6	<u> </u>		#DIV/0!
126	100	73	4	6	ц	Ц	5	4	5	5	ч	4		#DIV/0!
127	100	71	5	6	7	2	ч	6	6		6	6		#DIV/0!
128	100	67	7	6	7	6	6	ц	ч	ų	4	7		#DIV/0!
129	100	75	5	7	5	5	5	5	6	7	٦	1		#DIV/0!
130	100	79	7	5	ц	9	ч	4	5	ų	G	٦		#DIV/0!
131	100	66	6	6	ч	ч	ч	ч	3	150	4	6		#DIV/0!
132	100	68	5	4	4	5	ч	3	ц	3	5	4		#DIV/0!
133	100	31	4	4	٦	3	5	2	ц	б	5	5		#DIV/0!
134	100	75	6	5	5	6	5	5	6	4	5	6		#DIV/0!
135	100	72	5	ч	5	ч	7	5	5	5	4	4		#DIV/0!
136	100	69	5	4	3	3	H	3	5	5	Ц	3		#DIV/0!
137	100	72	4	4	3	2	5	4	4	4	4	5		#DIV/0!
138	100	77	4	n	ц	4	5	6	4	3	ų	4		#DIV/0!
139	100	69	6	6	5	5	5	ц	3	ч	ц	4		#DIV/0!
140	100	77	ઢ	6	7	7	7	2	4	5	6	5	1 1	#DIV/0!

QC Check: AH 2/3/05

Final review: AH 2/1/05

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

Sample Date: 31 Jan-05			Mate	erial: Estuarir	ne Monitoring S	ample	Sample Station: B-3		
Conc-%	Cod	e 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		
1 retra	0 LC	1	132	100			1		
41	0 LC	2	118	100			1	THE PARTY OF THE P	
	0 LC		128	100			1	The state of the s	
	0 LC	- reformo	133	100			1		
İ	0 LC	4	138	100			1		
	0 SC	5	107	100			1	parent of a final parent	
C+12	o sc	2	126	100	ļ	1	1		
1	0 SC	1	136	100			1		
	0 SC		137	100			1		
	0 SC	5	108	100	1		1	(A. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	
1	25	1	123	100			1	11 1230000	
1	25	2	127	100	1		1	12,000.00 \$60.00 \$1.000	
1	25	3	130	100	,	1.	1		
1.	25	4	134	100			1	A APPLICATION OF THE PROPERTY	
	25	5	106	100	1		1		
1	50	1	125	100			1	Principle Comment	
·	50	2	114	100			1		
1	50	3	140	100	1		1		
1	50	4	129	100	ļ	· · · · · ·	1	a manage of the state of the st	
1	50	5	120	100			1	Company of the compan	
	65	1	115	100			1		
1	65	. 2	119	100	1		11		
	65	3	110	100	1		1		
	65	4	116	100	·		1		
	65	5	109	100			1		
	00	1	124	100			1		
1	00	2	139	100	+		1		
	00	3	117	100	-		1		
I.	00	4	111	100	}		1		
1	00	5	122	100			1 1		

Marine Chronic Bioassay

Water Quality Measurements

Client:

City of Buenaventura

Test Species: Macrocystis pyrifera

Sample ID:

Start Date/Time: 2/1/2005

1 1530

Test No:

0502-025

End Date/Time: 2/3/2005

1200

Analyst:

Test Type: Kelp Spore Germination and Growth

Concentration		Initial R	eadings		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	305	31.9	14.0	7.3	7.98	31.2	14.2	
Salt Control #2		<u></u>			_				
	74	8.20	31.9	14.0	7.3	8.00	31.8	14.2	
Brine Control		0 10	20.1				_		
	7.8	8.17	32.4	14.0	7,3	7,98	31.7	14.2	
25	7.6	8.08	32.5	111	7.2	8,06	2) (
	7.9	0.00	20,3	14.0	7, 6	0,00	31.6	14,2	
50	8.1	8.05	32.4	144.0	. 7	0 21	32,3		
	D. (0.03	/	14.0	7.2	8.21	3213	14.2	
68.5	8.3	8.03	327	1// 0	_ ,	0.20	22.11		
	0.3		261	14.0	7,2	8,3°	32,4	14.2	
100	8.5	8.55	31.9	14.0		0 35	2) (
	0.5		01.1	17.0	7,3	8.35	31,6	14.2	

Co	mme	ents:

QC Check:

AH 2/3/05

Final Review: 4 24 05

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Marine Chronic Bioassay	Kelp Spore Germination & Growth Worksheet
Client: City of Buenaventura, Internal	Start Date/Time: 2-1-05 / 1530
Client: Coty of Buenaventura, Internal Test No. 0502-023-7026, 050201 mprt	End Date/Time: 2-3-05 / 1200
Tech. Initials: RG	Test Species: Macrocystis pyrifera
Date Collected: 2 11 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: Time of Rinsing and Transfer to Release Beakers: Conditions of Zoospore Density and Motility (beaker 1): Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed):	(keep kelp from each collecting bag separated) 14/5 (keep kelp from each collecting bag separated) Density Low Motifity Good 15/5
Density Counts (target = 90): 14 17 13 23	19 Mean: 17.6
Mean 17.6 • 10,000 = 17 6,000 spores per ml (Density of Spor	
spores per mi (Density of Spor	e Release)
Calculate the volume of spore stock to add to each test container:	
(225,000 spores/container)/(density of spore release) = 1.2 ml stock/	container
In cases of a spore release = 900,000 spores/ml, the volume is 0.25 ml.	
If density > 900,000 spores/ml, calculate a dilution factor, x, and create a n	new spore stock of 900,000 cells/ml and add 0.25 ml:
Density of spore release * 0.25 ml = 1 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 and MBP required volume of no greater than 1% of the total test solution vml requirement in order to achieve the desired spore density.	
If the density of spore release is < 450,000 spores/ml, check the density of	f the spores in the second release beaker.
Time of Inoculation: (530 Amount inoculated	d: .5 mc 24-hour germination check: <u>647</u> 6
Comments:	
QC Check: AH 2/3/05 Final Review: AH	410/05

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Marine Chronic Bioassay

Brine Dilution Worksheet

Client: City of Buenaventura Analyst: MC ACG

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

Effluent

Brine Control

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) =

0.46 0.47

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 0.47 101 47.2 150

Total Brine Volume Required (ml):

146.0

CETIS Test Summary

Report Date:

24 Feb-05 3:44 PM

Link:

14-4317-2771/0502-026

Nautilus Environmental (CA)

Test No:

11-8620-2502

Test Type: Growth-Germination

44h **Duration:**

Start Date: Ending Date: 03 Feb-05 12:00 PM

01 Feb-05 03:30 PM

Protocol: EPA/600/R-95/136 (1995) Dil Water: Laboratory Seawater

Macrocystis pyrifera Species: Field Collected Source:

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

Receive Date: 31 Jan-05 10:10 PM

Sample Date: 31 Jan-05 08:45 AM

Code: 0502-026

Project:

Source:

City of Buenaventura

Sample Age: 31h

Station: C-1

Comments: Control data shared with B-3.

Comparison Summa	ry
------------------	----

	,								
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			

Toct	Accontability	
1621	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	Lenath	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%

Analyst: Approval: Approval: Willos

000-089-125-2

CETIS™ v1.025B

CETIS Test Summary

Report Date:

24 Feb-05 3:44 PM

Link:

14-4317-2771/0502-026

Mean Leng	th Detail					
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Ö	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 Deta	il				
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

Analyst:

Approval:

CETIS Analysis Detail

Comparisons:

Page 4 of 4 24 Feb-05 3:44 PM

Report Date: Analysis:

10-4925-2663/0502-026

Nautilus Environmental (CA)

Endpoint	Analysis Type		Sample Link Control Link		Date Analyzed		Version		
Proportion Germinated	Comparis	Comparison		14-4317-2771 06		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

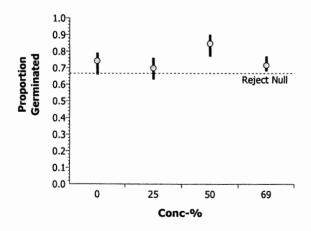
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.1013662	0.033789	3	9.22	0.00089	Significant Effect
Error	0.0586174	0.003664	16			
Total	0.15998356	0.0374523	19			

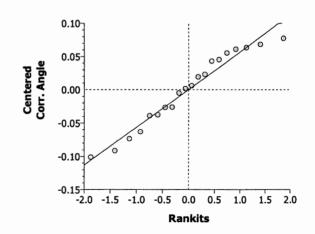
Group Comparisons

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
İ		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 Summ	ary			Origi	nal 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	0.69800	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	

Graphics





Analyst: App

Approval:

000-089-125-1

CETIS™ v1.025B

Page 3 of 4

Report Date:

24 Feb-05 3:44 PM

Analysis:

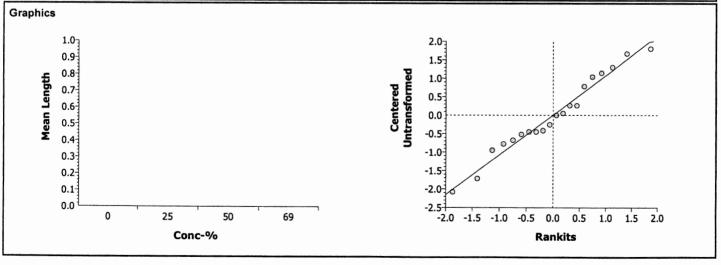
09-1077-2870/0502-026

Macrocystis G	ermination and Ge	rm Tube C	Frowth Test					N	lautilus	Environmental (CA
Endpoint		Analysis	Туре	Sa	mple Li	nk Con	ntrol Link	Date Analyzed	l	Version
Mean Length		Comparis	on	14	-4317-2	771 06-8	3754-7222	24 Feb-05 3:44	PM	CETISv1.025
Method		Alt H	Data Transfor	m	z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multip	le Comparison	C > T	Untransformed 69			>69	1.45	N/A	12.98%	
Test Acceptabi	lity									
Attribute Statistic Acceptable					Decisi	on				
Control Respon	se	12.45	10 - N/A		Passe	s acceptat	oility criteria			
MSDp		0.12975	N/A - 0.2		Passe	s acceptat	oility criteria			
ANOVA Assum	ptions									
Attribute	Test		Statistic	Critical	Р	Level	Decision	on(0.01)		
Variances	Bartlett		2.27405	11.34487	0.	51751	Equal \	/ariances		
Distribution Shapiro-Wilk W 0.96852				0.86826	0.0	69796	Norma	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 Comp	ariso	ns					
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Brine Control		25	3.18884	2.23	<= 0.0500	1.61542	Significant Effect
1		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 Summ	ary		Original Data					Transformed Data			
Conc-%			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					



Analyst: Approval:

Page 2 of 4

Report Date:

24 Feb-05 3:44 PM

Analysis:

09-0502-3916/0502-026

CETIS Analysis Detail

Macrocystis G	ermination and Germ Tube Grov	wth Test		Nautilu	s Environmental (CA	1)
Endpoint	Analysis Typ	pe Sample Link	Control Link	Date Analyzed	Version	
Proportion Gerr	minated 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%

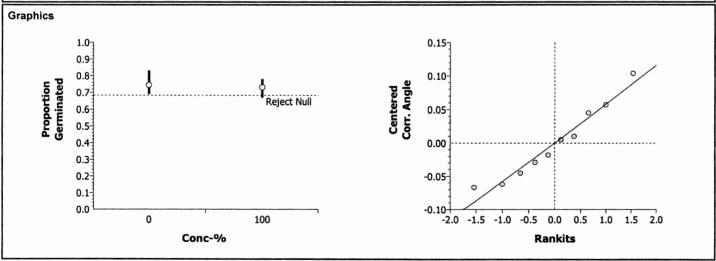
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.74400	0.7 - N/A	Passes acceptability criteria
MSDp	0.08161	N/A - 0.2	Passes acceptability criteria

ANOVA Assump	tions					
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 Compa	ariso	ns					
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 Summa	ry			Origiı	nal 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	



Page 1 of 4

Report Date:

24 Feb-05 3:44 PM

Analysis:

07-8225-9297/0502-026

CETIS Analysis Detail Macrocystis Germination and Germ Tube Growth Test

Na	utilus Environmental (CA)
Analyzed	Version

Endpoint	Analysis	Туре	Sample L	ink Cor	ntrol Link	Date Analyzed	Ve	ersion
Mean Length	Compari	son	14-4317-2	771 06-	8754-7222	24 Feb-05 3:44 PM		ETISv1.025
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%

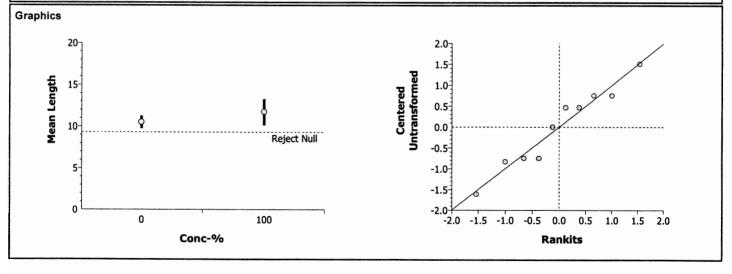
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	10.5	10 - N/A	Passes acceptability criteria
MSDp	0.11376	N/A - 0.2	Passes acceptability criteria

ANOVA Assum	nptions	•				
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 Comp	ai 130	113					
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 Summa	ary			Origiı	nal 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 Lengt	h Measurer	ments (micr	ometer unit	s)			Calibration Factor	Mean Tub Length (μπ
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				·		 	 	+			3	2.0	10.92
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						 	-	 	1 -	 	3	2.0	11.44
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	10.14
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	10.14
155	100	74	4	4	4	3	3	4	4	3	6	5	2.6	10.32
156	100								<u> </u>	 	ļ	<u> </u>	2.0	10.4
157	100													
158	100													
159	100													
160	100										<u> </u>			
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												1	12.10
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 los and salt controls, share u/six B-3.

QC Check: A12705

Final review: 2122

Analyst:

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

Dandan	Monaless	I Maria											10.00	T
Random	Number	Number				Tube Lengt	h Measurer	nents (micro	ometer units	s)			Calibration	Mean Tube
Number	Counted	Germinated								·			Factor	Length (μm)
141	100	68	<u> </u>	14	5	5	3	5	2	3	3	2	12,6	#DIV/0!
142	100	16	14	3	4	H	ط	4	4	4	6	3		#DIV/0!
143	100	~~		ļ	 				1					#DIV/0!
144	100	82	15)115	6	53	3	3	5	4	4	5	3		#DIV/0!
145	100	15	5	4		4	4	6	4	4	3	Ct		#DIV/0!
146	100	74	4	4	5	_5	世	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	-	1 7	14	3	2	6	4	5		#DIV/0!
151	100	69	8	5	14	4	5	5	3	4	8	5		#DIV/0!
152	100	(06	4	6	3	5	4	4	4	5	6	4		#DIV/0!
153	100	18	3	it	4	3	4	4	3	6	3	5		#DIV/0!
154	100	71	S	l u`	14	3	4	5	7	3	3	4		#DIV/0!
155	100	74	Ц	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	Ŋ	5	3	5	7	5	3	C	5	5		#DIV/0!
162	100	85 85 AH	Z	5	5	5	6	2	3	3	7	14		#DIV/0!
163	100	47.	3	5	4	4	3	3	7	4	4	14		#DIV/0!
164	100	103	3	3	u	4	5	<	4	2	¥			#DIV/0!
165	100	64	3	4	3	5	5	7	14	=	7	2		#DIV/0!
166	100	90	5	5	5	4	4	3	4	8	5	3		#DIV/0!
167	100					1						-		#DIV/0!
168	100	76	5	5	ił	7	5	7	6	6	7	3		#DIV/0!
169	100	89	<	4	5	5	4	-	4	~	1	14		#DIV/0!
170	100	109	5	5	7	4	1	>=	5	i.i	2	6		#DIV/0!
171	100	77	4	5	5	4	5	4	3	3	4	5		#DIV/0!
172	100	.72	3	.4	4	\	1	7	6	5	6	4		#DIV/0!
173	100		Á	\	· ·	· · · · ·						 		#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: At 2/7/05

Analyst: _AH

Page 1 of 1

CETIS Data Worksheet

Report Date:

31 Jan-05 2:31 PM

14-4317-2771 Link:

Macrocystis	Germ	inatio	n and	Germ Tube	Growt	h Test				Nautilus Environmental (CA
Start Date: Ending Date Sample Date	: 03 F		5	Prot		EPA/60	ystis pyrifera 0/R-95/136 (19 ne Monitoring S		Sample Code: Sample Source: Sample Station:	0502-026 City of Buenaventura C-1
Conc-%		Rep	l	# Counted	# Ge	rminated	Mean Length	CalFactor		Notes
(В	1	175	100				1		
(В	2	152	100				1		
(В	3	149	100				1		
(В	4	168	100				1		
(В	5	145	100				1		
1)/rc	1	173	100				1		
LC#7 () rjC	2	156	100	1			1		
(l rc/	3	157	100				1		
Share 9 WB3?	LC	4	160	100				1		
11/8-2	LC	\5	159	100				1		
のアン	sc	1	167	100	1		1	1		
	sc	2	143	100	T			1		
SC#2 (sc	3	148	100	1		THE PERSON NAMED IN COLUMN 1	1		
XIII (sc	4	168	100				1		
(o sc	5	174	100	:			1		
25	5	1	165	100	1		i i	1		
25	5	2	163	100				1		
25	5	3	155	100				1	The second second	
25	5	4	164	100	1			1	THE R. P. LEWIS CO., LANSING MICH. LANSING, MICH. LANSING, MICH. LANSING, MICH. LANSING, MICH. LANSING, LANSING	
25	5	5	142	100	1		1	1	and the state of t	The state of the s
50	0	1	166	100				1		
50	0	2	144	100	-		1	1	The state of the s	4 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
50	0	3	147	100	†			1		
50	0	4	162	100				1		
50	0	5	169	100	1			1	I I MANAGEMENT AND CONTROL OF THE PARTY OF T	
6	5	1	172	100				1	and the same of th	To leave the second sec
6:	5	2	150	100		***************************************		1		
6	5	3	154	100	†			1		
6	5	4	141	100				1		
6	5	5	170	100	-			1		
100	0	1	171	100	+			1		
100	0	2	153	100	1			1		
100	ļ.	3	161	100				1	CONTRACT CONTRACTOR CO	
100		4	146	100	1			1		
100	.4	5	151	100	-			1		The state of the s

Client: Coty of Buenaventura, Internal Test No. 0502-023-7026, 050201 mprt	Start Date/Time: 2-1-05 / 1530 End Date/Time: 2-3-05 / 1200
Tech. Initials: RG	Test Species: Macrocystis pyrifera
Date Collected: Kelp Collector: Collection Location: Conditions (weather, etc.): Dilution Water Source (Client II:): Dilution Water Source (Reference Toxicant):	to strong Swell - 4 sets 3-4 vis. Scripps pier
Dilution water Source (Reference Toxicant).	
Time of Initial Rinsing and Dessication Time of Rinsing and Transfer to Release Beakers: Conditions of Zoospore Density and Motility (beaker 1): Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed	10:15 (keep kelp from each collecting bag separated) 14/5 (keep kelp from each collecting bag separated) Density Low Mo +i (i. by good) 15/5
Density Counts (target = 90): 14 17 13 2: Mean 17.6 • 10,000 = 17 6000 spores per ml (Density o	•
Calculate the volume of spore stock to add to each test contain	er:
(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 crea	ate a new spore stock of 900,000 cells/ml and add 0.25 ml:
Density of spore release	spores =(x) 225,000 spores
Example: 980,000 * 0.25 / 225,000 = 1.09 (100 ml stock + 9 ml sw)	
	volume added should not exceed 0.5 ml. (This volume exceeds the EPA ution volume. However, it may sometimes be necessary to exceed the 0.3
If the density of spore release is < 450,000 spores/ml, check the der	nsity of the spores in the second release beaker.
Time of Inoculation: (536) Amount inoc	
OC Check AH 2/3/05 Final Review	At Violo

Kelp Spore Germination & Growth Worksheet

Marine Chronic Bioassay

Marine Chronic Bioassay

Water Quality Measurements

Client:

City of Buenaventura

Test Species: Macrocystis pyrifera

Sample ID:

Start Date/Time: 2/1/2005

1 1530

Test No:

0502-026

End Date/Time:

2/3/2005

1200

Analyst:

Test Type: Kelp Spore Germination and Growth

Concentration		Initial R	eadings		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	٦,3	8,61	32,6	14,2			
25	8.3	8.02	32.6	14.0	7,2	8.11	32,3	14.2			
50	8.4	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

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Marine Chronic Bioassay

Brine Dilution Worksheet

Client:

City of Buenaventura

Analyst: MC AC

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

Effluent

Brine Control

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) =

0.46

0.47

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

Total Brine Volume Required (ml):

146.0

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121

APPENDIX C
REFERENCE TOXICANT DATA

FRESHWATER

P. PROMELAS

Report Date:

03 Mar-05 2:44 PM

Nautilus Environmental (CA) Fathead Minnow 7-d Larval Survival and Growth Test Organism: Pimephales promelas (Fathead Minn Copper chloride Test Type: Growth-Survival (7d) Material: Reference Toxicant-REF Protocol: EPA/821/R-02-013 (2002) Endpoint: 7d Proportion Survived Source: 400-350 300-250 200 150 100 50 Apr-04-08 Jan-05-Feb-05-24 Aug-04-16 Nov-04 07 Dec-04-18 Mar-04 Mean: 110.579 -1s Warning Limit: 56.3015 -2s Action Limit: 2.02418 Count: 10 Sigma: 54.2773 CV: 49.08% +1s Warning Limit: 164.856 +2s Action Limit: 219.134

Qualit	y Contr	ol 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

Sigma: 36.0014

CV:

37.43%

Report Date:

+2s Action Limit: 168.189

03 Mar-05 2:44 PM

Fathead Minnow 7-d Larval Survival and Growth Test Nautilus Environmental (CA) Copper chloride Test Type: Growth-Survival (7d) Organism: Pimephales promelas (Fathead Minn Material: Protocol: EPA/821/R-02-013 (2002) Reference Toxicant-REF Endpoint: Mean Dry Biomass-mg Source: 2003 160-120-80-40 08 Jan-05-18 Mar-04 Sep-04 16 Nov-04 Mean: 96.1858 -1s Warning Limit: 60.1844 Count: 10 -2s Action Limit: 24.183

Qualit	y Conti	ol Data								
Point	Year	Month	Day	Data	Deita	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

+1s Warning Limit:

132.187

CETIS Test Summary

Report Date: 15

15 Feb-05 2:05 PM

Link: 11-40

11-4099-7607/050201pprt

Fathead Minn	ow 7-d Larval S	Survival a	and Growth T	est				Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	04-6411-6053 01 Feb-05 05:0 08 Feb-05 02:0 01 Feb-05 05:0	50 PM	Test Type: Protocol: Dil Water: Brine:	Dil Water: Diluted Mineral Water (Duration: Species: Source:	6d 21h Pimephales promelas Aquatic Biosystems, CO
Sample No: Sample Date: Receive Date: Sample Age:	01 Feb-05		Material: Copper chic Code: 050201ppri Source: Reference Station:		prt		Client: Project:	Internal
Comparison S	Summary							
Analysis	Endpoint		NOEL	L	OEL	ChV	MSDp	Method
07-8119-7997 10-6359-2704	7d Proportion Mean Dry Bior		< 15 15	1		N/A 21.213	11.59% 21.43%	Dunnett's Multiple Comparison Dunnett's Multiple Comparison
Point Estimat	e Summary							
Analysis	Endpoint		% Effe	ect C	onc-μg/L	95% LCL	95% UCL	Method
14-2687-2529	7d Proportion	Survived	25 50	2	8.72981 2.32289	13.54850 55.84048	44.06039 121.17940	Linear Regression
06-7554-9464	Mean Dry Bior	mass-mg	25 50		3.56589 6.80593	1.95336 36.71645	48.93977 104.00750	Linear Interpolation
Test Acceptal	oility					T-1		
Analysis	Endpoint		Attrib	ute	Statistic	Acceptable	e Range	Decision
07-8119-7997	7d Proportion	Survived	Contro	Respons	e 0.95000	0.8 - N/A		Passes acceptability criteria
14-2687-2529	7d Proportion	Survived	Contro	l Respons	e 0.95000	0.8 - N/A		Passes acceptability criteria
06-7554-9464	Mean Dry Bior	-		l Respons		0.25 - N/A		Passes acceptability criteria
10-6359-2704	Mean Dry Bior			l Respons		0.25 - N/A		Passes acceptability criteria
10-6359-2704	Mean Dry Bior	nass-mg	MSDp		0.21430	0.12 - 0.3		Passes acceptability criteria
7d Proportion	Survived Sum	mary						
Conc-µg/L	Control Type	Reps	Mean	Minimun	n Maximur	n 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%
Mean Dry Bio	mass-mg Sumi	mary	0.25000	0.20000	0.30000	0.02887	0.05774	23.09%
	_	•	Maan	10 1 m 1 m 2 m 2 m 2		- 05		04
Conc-µg/L	Control Type Lab Control	Reps 4	Mean 0.37900	Minimun 0.35100	0.41300		SD 02833	7 40%
15	Lab Control	4	0.37900	0.35100	0.41300	0.01417 0.02745	0.02833 0.05490	7.48% 17.61%
30		4	0.29575	0.23700	0.34700	0.02743	0.03490	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%

Analyst: AH

Approval:

Page 2 of 2

CETIS Test Summary

Report Date:

15 Feb-05 2:05 PM

Link:

11-4099-7607/050201pprt

7d Proportio	d 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 Bi	omass-mg Detai	I										
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							

Analyst:

Approval:

Page 1 of 2

Report Date:

15 Feb-05 2:05 PM

Analysis:

07-8119-7997/050201pprt

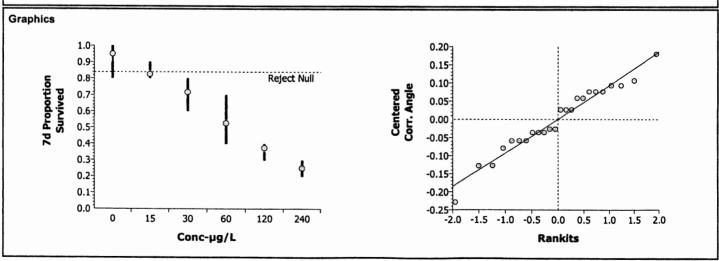
CETIS Analysis Detail

Endpoint		Analysis	Туре	Sa	mple Lin	k Con	trol Link	Date Analyzed	l Ve	ersion
7d Proportion 8	Survived	Comparis	on	11-	-4099-760	07 11-4	099-7607	15 Feb-05 2:04	PM C	ETISv1.025
Method		Alt H	Data Transfor	rm	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multi	ple Comparison	C > T	Angular (Corre	ected)		<15	15		N/A	11.59%
Test Acceptab	oility		<u> </u>							
Attribute		Statistic	Acceptab	le Range	Decisio	n				
Control Respon	nse	0.95000	0.8 - N/A		Passes	acceptat	oility criteria			
ANOVA Assur	nptions									
Attribute	Test		Statistic	Critical	PL	evel	Decisi	on(0.01)		
Variances	Bartlett		4.36785	15.08628	0.49	9776	Equal \	/ariances		
Distribution	Shapiro-Wilk W		0.96706	0.88421	0.59	9112	Norma	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 Comp	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 Summa	ıry	Original Data Transformed Data								
Conc-µg/L Control Type Count		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



Linear Regression:

Page 1 of 2

15 Feb-05 2:05 PM

CETIS	Analysis D	etail								Report D Analysis		14-2	15 Feb-05 2:05 P 687-2529/050201pp
	innow 7-d Larva		and Grow	th Test						7.11.01,010			Environmental (CA)
Endpoint		Ana	alysis Typ	96		Sample	Link	Contro	l Link	Date Analy	zed	٧	ersion
7d Proporti	on Survived	Lin	ear Regre	ssion		11-4099	9-7607	11-409	9-7607	15 Feb-05	2:05 PM	/ C	ETISv1.025
Linear Reg	ression Options	3			***************************************								
Model	Threshold	Option	Lower Th	reshold	Threst	nold Optim	ized	Reweig	hted	Pooled Gro	ups	Heter	rogeneity Corr.
Log-Norma	Control Th	reshold	0.05		Yes		,	Yes		No		No	
Regressio	n Parameters												
Parameter	Estimate	Std Err	or 9	5% LCL	95	% UCL	t Stat	istic	P Leve	l Decis	sion(0.0	05)	
Threshold	0.04885	0.03383	3 -(0.01745	0.1	11515	1.444		0.2444		ignifica		
Slope	1.47530	0.27433	3 0	.93761	2.0	1299	5.378		0.0125	9 Signi	ficant		
Intercept	2.17403	0.52182	2 1	.15126	3.1	19680	4.166		0.0251	6 Signi	ficant		
Regressio	n Summary												
Iters	Log Likelihood	Mu	Sigma	G	Stat	Chi-Sq	Cri	tical	P Lev	vel Deci	ision(0.	.05)	
3	-58.69785	1.47362	0.6778		13283	4.93751		86930	0.998	.,			leterogeneity
Residual A	nalvsis												
Attribute	Method		St	atistic	Cri	tical	P Level		Decision	on(0.05)			
Variances	Modified	Levene		54386		5825	0.74040			/ariances			
Distribution	Shapiro-	Wilk W	0.	95510	0.9	0456	0.43843	;	•	Distribution			
Test Accep	otability												
Attribute	•	Sta	tistic	Accen	table Ra	nge Dec	cision						
Control Res	sponse		5000	0.8 - N			ses acce	eptability	y criteria				
Point Estir	natos											_	
% Effect	Conc-µg/L	95% LCL	0.50	% UCL									
25	28.72981	13.54850		06039									
50	82.32289	55.84048		1.17940									
Data Sumr	nary				Calcula	ated Variat	e(A/B)						
	Control Type	Count	Mean	Mini	mum	Maximum		S	D	- A	В		
0	Lab Control	4	0.95000	0.80		1.00000	0.020		.10000	38	40		
15		4	0.82500	0.80		0.90000	0.010	-	.05000	33	40		
30		4	0.71667	0.60		0.80000	0.020		.10000	26	36		
60		4	0.52500	0.40		0.70000	0.025		.12583	21	40		
120		4	0.37500	0.30		0.40000	0.010		.05000	15	40		
0.40													

40

10

240

0.25000

0.20000

0.30000

0.01179

0.05774

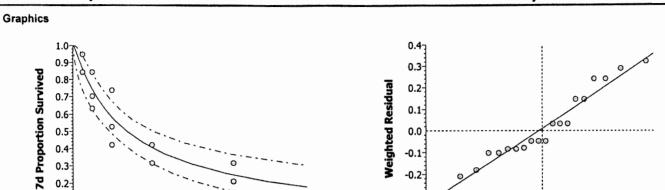
Linear Regression:

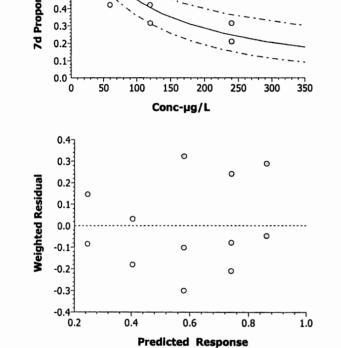
Page 2 of 2

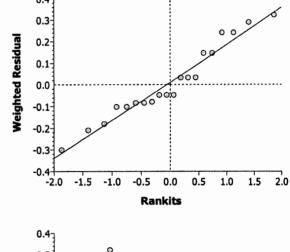
Report Date:

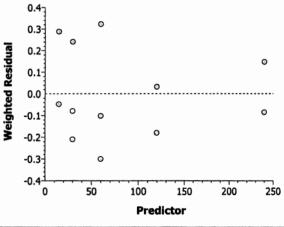
15 Feb-05 2:05 PM 14-2687-2529/050201pprt











Page 2 of 2

Report Date:

15 Feb-05 2:05 PM

Analysis:

10-6359-2704/050201pprt

	CET	IS A	Analy	sis'	Deta	il	
ĺ							-

Fathead Minnow 7-d Larval Survival and Growth Test Nautilus Environmental (CA)												
Endpoint Analysis Type Sample Link Control Link Date Analyzed Version												
Compari	son	11-4099-7	607 11	-4099-7607	15 Feb-05 2:05	PM C	ETISv1.025					
Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp					
C > T	Untransformed		15	30	6.67	21.213	21.43%					
	Analysis Compari	Analysis Type Comparison Alt H Data Transform	Analysis Type Sample L Comparison 11-4099-7 Alt H Data Transform Z	Analysis Type Sample Link Co Comparison 11-4099-7607 11 Alt H Data Transform Z NOEL	Analysis Type Sample Link Control Link Comparison 11-4099-7607 11-4099-7607 Alt H Data Transform Z NOEL LOEL	Analysis Type Sample Link Control Link Date Analyzed Comparison 11-4099-7607 11-4099-7607 15 Feb-05 2:05 Alt H Data Transform Z NOEL LOEL Toxic Units	Analysis Type Sample Link Control Link Date Analyzed Ve Comparison 11-4099-7607 11-4099-7607 15 Feb-05 2:05 PM Cl Alt H Data Transform Z NOEL LOEL Toxic Units ChV					

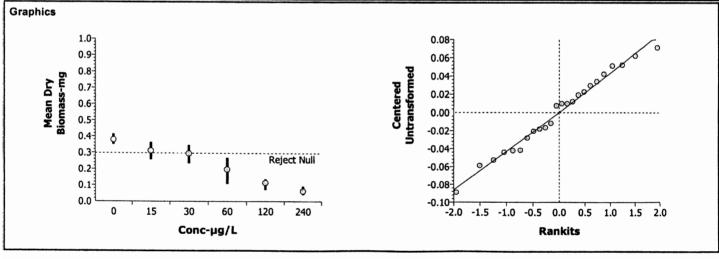
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.379	0.25 - N/A	Passes acceptability criteria
MSDp	0.21430	0.12 - 0.3	Passes acceptability criteria

ANOVA Assumpt	ions				
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 Summa	ary			Origi	nal 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						



Analyst:

Approval:

Linear Interpolation:

Page 1 of 1

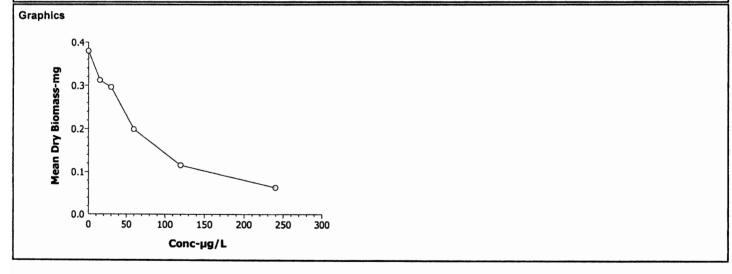
Report Date:

15 Feb-05 2:05 PM

CETIS An	alysis Deta	Report Date: Analysis:	15 Feb-05 2:05 PN 06-7554-9464/050201ppi									
Fathead Minnow 7-d Larval Survival and Growth Test Nautilus Environment												
Endpoint		Analysis Ty	pe	Sample Link	Control Link	Date Analyzed	Version					
Mean Dry Biom	ass-mg	Linear Interp	oolation	11-4099-7607	11-4099-7607	15 Feb-05 2:05 PM	M CETISv1.025					
Linear Interpol	ation Options											
X Transform	Y Transform	Seed	Resamples	Expanded CL	Method							
Linear	Linear	5795186	200	Yes	Two-Point Inte	erpolation						
Test Acceptab	ility											
Attribute		Statistic	Acceptable Rang	e Decision								
Control Respon	ise	0.379	0.25 - N/A	Passes acc	eptability criteria	1						
Point Estimate												

Point Esti	mates		
% Effect	Conc-µg/L	95% LCL	95% UCL
25	33.56589	1.95336	48.93977
50	66.80593	36.71645	104.00750

Data Summ	nary			Cal	culated Varia	ite	
Conc-µg/L	Control Type	Count	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



Approval:_

Freshwater Chronic Bioassay

Larval Fish Survival & Weights

		Test Species:	P. promela	s		
Client Name:	Internal	Test Date:	2/1/2005			
Sample ID:	CuCl ₂	Test No.:	050201pprt			· · · · · · · · · · · · · · · · · · ·
Conc.	Test Day		Percent		pan wt.	pan + fish

Conc.	Rep.				Test	Day				Percent	pan	wt.	pan + fish
(µg/L)	Rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
Lab	а	10	10	10	10	10	10	10	10	100	0.028	42	0,03203
Control	b	10	10	10	10	10	12	10	10	100	0.024		0.02829
	С	10	10	9	9	8	8	૪	8	80	0.026	76	0.03047
	d	10	10	10	10	10	10	10	10	100	0.025	52	0.02943
15	а	10	10	9	9	8	Ę	8	8	80	0.624	99	0.02853
	b	10	10	9	9	9	9	8	8	80	0.023	36	0.02606
	С	10	10	9	9	9	9	8	8	80	0.0211	2	0.02371
	d c	10	10	10	10	10	(5	9	9	90	0.027	171	0.02635
30	a 3	10	10	dotal	6	4	4	4	4	gento 67	0.022	∞	0.02389
	b	10	10	70	8	7	7	6	6	(OO)	0.023	64	0.02601
	С	10	9	A	8	8	Ŕ	8	8	80	0.024	09	0.02693
	d	10	9	9	9	જ	B	8	8	80	0.027	52	0.03049
60	а	10	9	9	6	6	m/65	5	5	50	0.6230	>2	0.02563
	b	10	10	7	6	5	5	4		40	0.027	94	0.02904
	С	10	10	8	8	7	7	1	7	70	0.03117	L	0.03382
	d	10	9	6	5	9	5	5	5	50	0.026		0.02808
120	а	10	10	À	ક	17	5-	4	4	40	0.0290		0.03026
	b	10	9	8	6	4	14	4	4	40	0.024	13	0.02598
	С	10	10	9	Q	9	4	4	4	40	0.030	93	0,03231
	d	10	7	_ ``_	6	3	3	3	3	30	0.021		0.02250
240	а	10	7	7	4	3	2	2	2	30	0.623	51	0.02444
	b	10	8	14.	2	2	2	2	2	20	0.025		0,02635
	С	10	8	3	4	4	3	3	3	30	0.026		0.02759
	d	10	10	17	6	5	4	3	3	36	0.029		0.02981
	а												
	b												
	С												
	d												
ech Initials		50	86	77	MC	WEC	11/15	Atl	90				

Comments: Day spilled -4 LIP, use 6 origine of 5h in analysis. QC Check

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Client: Internal

CuCl₂ Sample ID:

050201pprt Test No:

Concentration		Lab Control							
Day	0	1	2	3	4	5	6	7	
		500	797	ໄກເ	tial		-		
рН	1619	8,05	8.19	8.17	8:11	(817)	8:12		
DO (mg/L)	7.4	7.6	7.9	7.6	7.7	17.7	17.7		
Cond. (µmhos/cm)	209	207	209	203	207	208	191		
Temp (°C)	15:3	25.2	24.9	266	25.6	328	25.5		
	1	346	303	Fi	nai			,	
рН	1		304	7.97	8.02	7.99	1.98	8.01	
DO (mg/L)	1	A	6.8	6.3	٥.0	6.2	4.0	10.U	
Temp (°C)	1		25.60	24.6	24.7	124.5	24.5	US :3	

Concentration		15 μg/L							
Day	0	1	2	3	4	5	6	7	
			796	lni	tial		0		
рН	18,19	8,15	8.20	8.19	8.11	31)3	8.10		
DO (mg/L)	17.4	7,7	78	7.5	7.7	J, V2_	7.5		
Cond. (µmhos/cm)	202	201	200	200	207	207	190		
Temp (°C)	25.68	25.2	25.8	25.8	25.6	25.9	25 5		
.ср (-)	102			Fi	nai				
Hq	T		8.05	8'03	7.93	7.97	7.98	854	
DO (mg/L)	1	(A)	7.0	6.7	6.3	6.1	6.5	1.2	
Temp (°C)	1		25.10	246	24.7	24.6	24.4	12.8	

Concentration		30 μg/L								
Day	0	1	2	3	4	5	6	7		
				,១ ព	tial					
pH	8,20	8.20	8. 2º	8.17	8.09	8.17	7.12			
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)	250	25.1	25.6	25.7		25.0	25.5			
	ly /			F	nai					
pH			8.05	803	7.91	7.92	8.00	8:00		
DO (mg/L)	1	(A)	7.0	6.8	6.7	6.1	6.1	7.2		
Temp (°C)	1		256	24.8	24.7	24.7	24.10	25.7		

Animal Source/Date Received:

ABS / 2-1-05

Animal Age at Initiation:

QC Check:

< 48 hours

Comments:

ater changed before final readings

Test Species: P. promelas

Start Date/Time: 2/1/2005

700

End Date/Time: 2/8/2005 / 14.50

Concentration		60 μg/L								
Day	0	1	2	3	4	5	6	7		
				ln	tial			<u> </u>		
Hq	820	8.20	7.94	8.17	8.09	18:14	2002			
DO (mg/L)	77	7.6	2.8	7.6	78	13,7	7.4			
Cond. (µmhos/cm)	202	200	199	129	204	203	187			
Temp (°C)	255	25,5	25.7	25.6	2515	2516	25,7			
				Fi	nal		<u></u>			
рН		_	8.05	6.03	7.91	7.40	7.94	7.43		
DO (mg/L)	1	(A)	7.0	6.9	6.9	6.4	45	le.9		
Temp (°C)			25.6	24.8	24.7	24.8	24.7	256		

Concentration	120 μg/L									
Day	0	1	2	3	4	5	6	7		
				In	itial			······································		
На	212	6.19	7.93	316	8.07	8112	80.08]		
DO (mg/L)	74	7.5	7.8	7,6	7.8	フユ	7.4			
Cond. (µmhos/cm)	200	198.5	199	198	204	201	18-8			
Temp (°C)	254	25.5	25.8	25.6	25.5	<u> 25.5</u>	352			
				F	nal			<u> </u>		
рН	T .		8.04	5.01	7.86	7.90	7.94	7.96		
DO (mg/L)	1	A	7.1	6.8	te .4	20. L	46	7.0		
Temp (°C)	1	10	25.7	248	24.7	24.7	24.6	255		

Concentration								
Day	0	1	2	3	4	5	6	7
				lni	tial			
рН	RIU	8-18	7.92	8-12	8.07	8.09	202	
DO (mg/L)	7.4	7.7	5.8	7.0	7.8	7.7	7:5	
Cond. (µmhos/cm)	195	197	1960	195	202	500	1860	
Temp (°C)	244	25-2	25.7	25.5	25.5	25.4	45.0	
101111111111111111111111111111111111111	1000			Fi	mal			
рН			8.07	8.02	7.88	7.90	7.95	757
DO (mg/L)	1	(A)	7.2	6.9	le.7	6.3	6.4	13
Temp (°C)	1	1	35.5	24.8	24.7	24-9	24.7	BZ3

Analysts: Initial:

511 SH

nil

C. DUBIA

CETIS Test Summary

Report Date: 15 Feb-05 4:45 PM

Link: 00-2473-8252/RT020105CD

Ceriodaphnia	7-d Survival ar	d Repro	duction Test					Nautilus Environmental WA
Test No: Start Date: Ending Date: Setup Date:	06-9968-6418 01 Feb-05 11: 08 Feb-05 10:4 01 Feb-05 12:0	15 AM	Test Type: Protocol: Dil Water: Brine:	EPA/821/R	on-Survival (:-02-013 (200 ieral Water (i)2)	Duration: Species: Source:	6d 23h Ceriodaphnia dubia In-House Culture
Sample No:	02-7537-3725		Material:	Sodium ch			Client:	Reference Toxicant Test
Sample Date:			Code:	RT020105			Project:	
Receive Date:			Source:	Reference	Toxicant			
Sample Age:	N/A	,	Station:					
Comparison S	Summary							
Analysis	Endpoint		NOEL	LO	EL	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 Estimat	e Summary							
Analysis	Endpoint		% Effe	ct Co	nc-gm/L	95% LCL	95% UCL	Method
17-1082-8154	7d Proportion	Survived	50	1.5	1280	1.28441	1.78181	Trimmed Spearman-Karber
09-1188-2215	Reproduction		25	1.0	6498	0.44336	1.23009	Linear Interpolation
i			50	1.3	9652	1.13545	1.52398	
Test Acceptal	oility							
Analysis	Endpoint		Attribu	ıte	Statistic	Acceptable	Range	Decision
07-3637-8553	7d Proportion	Survived	Contro	Response	0.8	0.8 - N/A		Passes acceptability criteria
17-1082-8154	7d Proportion	Survived	Contro	l Response	8.0	0.8 - N/A		Passes acceptability criteria
09-1188-2215	Reproduction		Contro	l Response	26.7	15 - N/A		Passes acceptability criteria
10-9702-9484	Reproduction			I 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 Sum	mary						
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	-							
Conc-gm/L	Control Type	Reps	Mean	Minimum	Maximum		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 2		10 10	21.333	9	29	2.4381	7.3144	34.29%
4		10 10	1.2 0	0	12	1.2	3.7947	316.23
		10		0	0	0	0	0.00%

Analyst:

Approval: 3/3/09

000-089-125-1

Page 2 of 2

CETIS Test Summary

Report Date:

15 Feb-05 4:45 PM

	00 0470 0050/0700040500
Link:	00-2473-8252/RT020105CD

7d Proportio	on Survived Deta	il									
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
Reproductio	n 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

Analyst: ##

Approval:

Page 1 of 1

Report Date:

15 Feb-05 4:45 PM

Analysis:

07-3637-8553/RT020105CD

Ceriodaphnia 7-d Survival a	Nautil	us 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

CETIS Analysis Detail

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

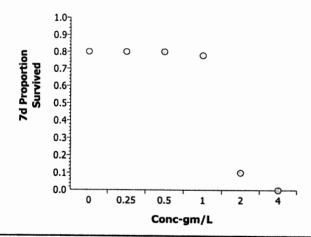
Group Comparisons

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

Graphics



Analyst:

Approval: 0 3 3 1 3 1 0 5

Spearman-Karber:

Page 1 of 1

Report Date:

15 Feb-05 4:45 PM

Analysis:

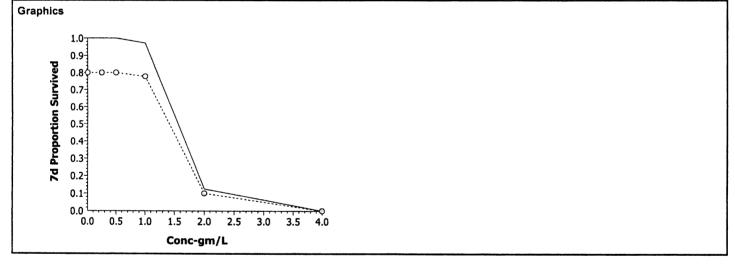
17-1082-8154/RT020105CD

EndpointAnalysis TypeSample LinkControl LinkDate AnalyzedVersion7d Proportion SurvivedTrimmed Spearman-Karber00-2473-825200-2473-825215 Feb-05 4:45 PMCETISv1.025	Ceriodaphnia 7-d Survival a	nd Reproduction Test			Nautil	us Environmental \	WA
7d Proportion Survived Trimmed Spearman-Karber 00-2473-8252 00-2473-8252 15 Feb-05 4:45 PM CETISv1.025	Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version	
	7d Proportion Survived	Trimmed Spearman-Karber	00-2473-8252	00-2473-8252	15 Feb-05 4:45 PM	CETISv1.025	

Spearman-Karber C	Options .	Point Estimates	3				
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
B + 6			2 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4

Data Summary			Calculated Variate(A/B)							
Conc-gm/	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	В	
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	



Analyst:

Approval: 2/3/05

000-089-125-1

CETIS Analysis Detail

Page 1 of 1

Report Date:

15 Feb-05 4:45 PM

Analysis:

10-9702-9484/RT020105CD

CETIS.	Analysis	Detail
--------	----------	--------

Ceriodaphnia 7-d Survival and R	lautilus En	vironmental WA							
Endpoint	Analysi	з Туре	Sample L	ink C	ontrol Link	Date Analyzed	Ver	sion	
Reproduction	Compar	Comparison		252 0	0-2473-8252	15 Feb-05 4:45	PM CET	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%	

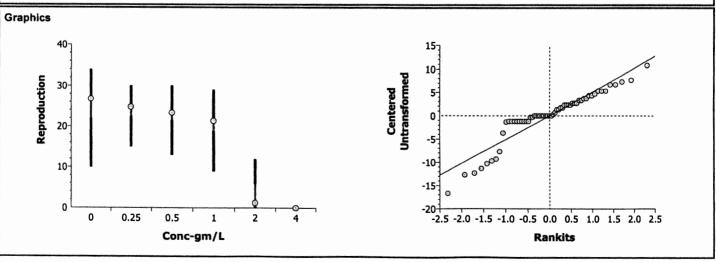
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	26.7	15 - N/A	Passes acceptability criteria
MSDp	0.22472	0.13 - 0.47	Passes acceptability criteria

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 Summa	nry			Origi	nal Data		Transformed Data				
Conc-gm/L	Control Type	Count	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					



Analyst:

Approval: <u>4</u>

Linear Interpolation:

Page 1 of 1

Report Date:

15 Feb-05 4:45 PM

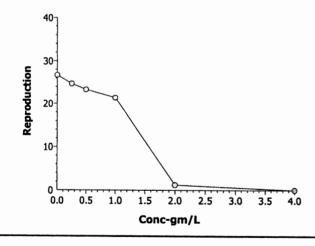
Analysis:

09-1188-2215/RT020105CD

Ceriodaphnia 7-d Survival and Reproduction Test Nautilus Environmental WA										
Endpoint		Anaiysis	Туре	Sample Link	Control Link	Date Analyzed	Version			
Reproduction	on	Linear In	terpolation	00-2473-8252	00-2473-8252	15 Feb-05 4:45 PM	CETISv1.025			
Linear Inte	rpolation Option	ns								
X Transfor	m Y Transfe	orm Seed	Resamples	Expanded CL	Method					
Linear	Linear	7747400	200	Yes	Two-Point Inte	rpolation				
Test Accep	tability									
Attribute		Statistic	Acceptable Ran	ge Decision						
Control Res	ponse	26.7	15 - N/A	Passes acc	eptability 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 Sumn	nary		Calculated Variate					
Conc-gm/	Control Type	Count	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	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	

Graphics



Analyst:_____

Approval: 2006

Client/Sample ID: Ref Tox	Ceriodaphnia 7-Day Chronic Su	rvival and Reproduction Start Date and Time:	1 Feb 05 1115	
Test Number: RT020105CD)	Stop Date and Time:	8 Feb 05 1045	
Daily Rep		30-1872 to 1-2-	Daily Reproduction	Day 6 Day 7
Conc. Rep Cont	Total Total	Conc. Rep Cont	1-3-8911	Total Total
CON 1 40 4 -	10 13 14 27	2 23 -	4 11 13 -	28
3 45 5 -	11 15 15 31	3 34 -	5 8 13 -	26
4 3 4	10 7-1410	4 43 -	- 5 - 6 14 10 - 5 - 8 16 -	25
5 2 6 -	- 8 16 - 30 - 9 18 16 34	6 24 -	3 4 2 X	912
6 59 6 -		7 30 -	10 13	10
8 60 4	9 15 - 28	8 57 -	5 7 9 -	21 4P
9 1	10 X 10d 30	9 53 -	- 4 g - 13 X	24/2
10 19 5 - Analyst CP M P3 SM M	4 MIST OP			
	Day 6 Day 7			Day 6 Day 7
Conc. Rep Cont	Total Total	Conc. Rep Cont		Total Total
0.25 1 37 4 -	7 70 11 2	2.00 1 20 X		= 0/d
2 7 6 -	10 14 14 30	2 32 - 3 56 -	1 Table 1	
3 49 6 -	140 10 10	4 38 -	1%-	
5 44 3 -	9 14 14 26	5 50 -	1×+++++++++++++++++++++++++++++++++++++	
6 51 6 -		6 26 -	1/2	
7 36 6 - 8 79 6		8 4 -	X	
9 42 5 -	9 13 15 27	9 28 -	2 - 3 7	12- 01d
10 /0 6 7	1 - 10x - 39/9	10 25 -	- - X -	
	Day 6 Day 7			Day 6 Day 7 Total Total
Conc. Rep Cont	Total Total	Conc. Rep Cont.		<u>δ/d</u>
0.50 1 35 4		29 -	\times	
3 18 4	6 3 - 23	3 15 X 4 5Z X		
5 41 6 1	6 5 11 27 30	4 52 X 5 13 X		
6 31 6	7/X - 13/d	6 54 X		
7 46 - 6 -		7 22 X 8 14 X		
8 4 5 9 8 5 -		9 1Z X		- 11
10 39 - 4 8	- 14 16 26	10 33 X		
Comments: X=mortality	△ - cup spilled.			

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 7	59		6	24	
		48		7	30	
	8	60		8	57	
	9	1		9	- 53-	
	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	<u>2</u> 8 25	
0.50	1	35	4.00	1	27	
	2	47		2	9	
	3	18		3	15	
	4	21		4	52	
	5	4 1		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 9/5 Tech: CP

Day	1 1	2	3	4	5	6	7	8
Date	26	1/27	1/28	1/29		731	401	
Time	e 0900	0915	1130	1045		0930	1000	

Cont #								
1	~	- 1	~	5	8	_	10	
2	/	-	-	5	9	~	14	
3	7	-	-	5	7	_	12	
4	•	-		5	10	-	1/	
5	1	-	-	5	10	_	X	
6	•	-	_	6	9	_	13	
7	1	-	-	5	9	_	10	
В	•	-	-	5	10	_	12	
9	1	-		6	8	-	12	
10	•	-	-	5	8	•	11	
11		,	,	5	8	_	X	
12	•	-	-	6	10	-	11	
13	1	-	-	5	8	~	11	
14	7	1	~	6	8	•	12	
15	•	1	-	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	-	u	
22	-	_	-	6	9	-	11	
23	•	-	`	6	10		115	
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26	•	_	=	6	1)	-	14	
27	-	-	-	6	11	7	10	
28		-	-	4	10	-	12	
29	-	-	16	=	111	10	3	
30	-	-	4	_	9	l ii	4	
Tech	CD	MA	M	MA	MA	CP	CP	

Day	1	2	3	4	5	6	7	8
Date	Yzb	1/27	1/28			Y31	401	
Time			,			0930		

Cont#								
31)	-	5	_	10	15	14	
32	1	-	4	-	9	10	12	
33	1	-	4	7	-	8	13	
34	1	_	3	_	10	14	12	
35	Ì	_	4	-	9	17	1	
36	١	-		6	_	11	15	
37	1	1	4		7	11	_	
38	١	-	_	4	10	_11_	-	
39	1	-	4	_	10	14]	
40	•		1	5	X .—			
41	-	-	1	6	6	1	6	
42	1	ſ	-	5	10	1	X-	
. 43	7	1	-	6	7	1	10	
44	-	~	1	6		1	14	
45	•	-	-	6	9	1	10	
46	-	1	1	6	10	1	12	
47	-	1	1	5	11		12	
48	7	į	•	5	8	•	12	
49	-	1	6	1	10	11	15	
50	-	1	5	1	9	14	14_	
51	-	-	5	-	11	14		
52	-	1	5		10	11	Π	
53	-		_	8	9	^	12	
54		-	_	5	10	-	12	
55		-	-	5	10	^	14	
56		-	_	4	9	-	III	
57	-	-	_	6	10	-	III	
58	-	_	_	6	10	-	1/3	
59	-	_	_	5	9	_	13	
60		-	^		10	-	13	
Tech	CP	MA	M	MR	MA	CP	ICP	

Test Set Up

Test	Brood Board
Rep#	Cont#
1	2
2	3
3	6
4	8
5	9
6	14
7	15
8	16
9	19
10	20

Client: Ref Toy Start Date: 21105 Test #: RT 82 0/05 DCD

AMEC Earth and Environmental Northwest Bioassay Laboratory

Renew: 2005 3/3/05

Nautilus Environmen	ital						Initial as	nd Final	Chemists	nies				
Northwest Laborat	tory						Seven D	ay Chro	nic Fresh	water B	oassay			
Client:	Raf	Tox					Start Da	te & Tin	ne:	1 Fel	5 05	. 11	15	
Sample ID.	4.0	an/L	Na	Cl			Stop Da	te & Tir	me: ··	8 Feb	, 05	i	045	
Test No:	RTO	2010	5 CA				Test Spe	cies:	Cer	ivde	asch	aia.	de	bea
	<u></u>				,			ys						
Concentration CoN	NISS TO SERVICE) Zaji _e terev šejiji	Contraction of the second	TOTAL PROPERTY.	PERSONAL PROPERTY.	2 ************************************	ergrandi res	عند. دالالأيلان ا	444	9, 9, 1, 245 137	Historiae	5 ::::::::::::::::::::::::::::::::::::	1083月八八日本	William Co. Society
pH	17 CH6	419	7 98	6. IU	8.05	9.19	8-15	8.52	0.19	8.79	8.20	244	740	787
DO (mg/l)	1640	2'8	812	7.1	8.7	8.3	8.2	7.9	8.8	8-1	8.0	7.3	10.4	76
Cond. (µmhos-cm)	831	797	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	35 5	250	25.0
								ys.						
Concentration	Ga (Calabarana)) #671150919114.4	- of the latest and the latest		A Tanton	2 Sala alamanda	Sign chase		Signification 4	10 - 20 de	550070 mg/2	5		1100
0,2 ≤ pH	17 9N	(1.0	8.01	8.17	V.00	9.16	8-08	マ・53	4.7C	9 40	2.21	851	8.01	196
DO (mg/l)	184	3 2	8.2	7.2	8.7	8.1	8.0	8.3	9.5	8.2	7.9	7.3	10.4	7.1
Cond. (µmhos-cm)	419	1,55	639	688	616	227	212	644	635	667	649	658	622	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	255	250	25.0
								y's						
Concentration	dr 1 1627) ************************************	The section of the se	1	**************************************	2	THE PARTY OF THE P	3	NO. A DESCRIPTION OF THE PARTY	4		S.	100.33450	5
0.5	# MA	2001							000	6 20				经报人的特
pH DO (mg/l)	1697	7.4	8.2	7.2	9.04	8.4	0-14	8.1	8.5	2-27	8-15	3,77	10.7	7.7
Cond. (µmhos-cm)	This	1/24	1108	1145	1024	11/2	1060	1107	1095	1134	1114	1122	1084	1/70
Temperature (*C)	74.D	21.7	24-5	245	25.0	25.2	24.0	25-1	24.5	24-3	25-0	355	250	25.0
							Da	Lys .						
Concentration	WANTED SECTION	0		1		2	Market Market	3		4	10000	5		5
1.0			de la				111102-1-0							
pH	1289	821	8.02	8/14	8:05	8.67	8-16	8.57	8.24	8:27	8-18	8.51	8.01	758
DO (mg/l) Cond. (µmhos-cm)	1038	1000	2010	7.2	1012	200	1929	7.9	1921	2010	2030	7.5	10.6	2200
Temperature (°C)	140	710 1	24.5	24.5	25.0	25 2	21.0	25.1	21.5	24.3	25-0	255	250	25.0
	1	- false	15/4"	10114	100.0		D	Lys			-,	-20.00	0.0	
Concentration		0		i		2		3		4		5		5
2.0	WY. Land		2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		111 115 144 (1)					ALC: N		10		30
pH	7.92	8,20	8.01	8.11		8.68		8.44	8.20	8-26	8-17	8.53	-	7.93
DO (mg/l) Cond. (µmhos-cm)	77.4	8.3	8.2	4040	8.8	7.9	3/20	3590	3210	3330	3850	2874	0.5	7.4
Temperature (*C)	24.0	392	215	24 6	3700	25.2	3630		24.5	3+10	250	355	350	7040
Temperature (o)	24.0	744 - F	- N	Dho	100.0	127.2	1 ~ V ~ V	ays	127.7		63.0	101-1-	13.0	12 3,0
Concentration		0		1	T	2	_	3		4		5		6
4.0		-براد فيار بالما				enatitu	1170				操作 背景	HE TES	441.4	#7
pН	7.93	813	7.99	8.00	8.0									
DO (mg/l)	8.7	8.2	8.2	7.6	8.8				-					
Cond. (µmhos-cm) Temperature (°C)	24.0	14 9 EC	3140	3,40	25.0	'	 	!	 					
Tempulature (C)	24.0	144-+	243	124.5	125.0		1					<u> </u>	1	
													-	
	Co	ntrol							7	Analyst	s: (-	Bh	SH.	8-CP
Hardness*		6							1				4.1	
Alkalinity	5	2_							1	Review	ed:	9	X 3	3/05
Initial Chlorinel Ammonia (1		-		4			V	•	
* mg/L as CaCO3; I m	g/L: ND:	no chie	rine dete	cted	.1		<u> </u>		J					
	g =,					•								
Sample Description:			<u> </u>											
Animal Source:	whe	rnal	- 1 -		7.5		Date R	eceived:	NA		Date of	Hatch:		
Comments:	A PH	_gusi	belo	W 7.	40 m	num	un_							
	•	-												

Report Date:

03 Mar-05 2:42 PM

Nautilus Environmental WA Ceriodaphnia 7-d Survival and Reproduction Test Sodium chloride Test Type: Reproduction-Survival (7d) Organism: Ceriodaphnia dubia (Water Flea) Material: Protocol: EPA/821/R-02-013 (2002) Endpoint: 7d Proportion Survived Source: Reference Toxicant-REF 4.0-3.5 3.0 2.5 2.0 1.5 0.5 0.0 27 Oct-03-04 May-04-18 Nov-03-39 Dec-03-14 Jan-04 17 Feb-04 09 Mar-04 23 Mar-04 19 May-04 22 Jun-04 20 Jul-04 17 Aug-04 22 Sep-04 14 Oct-04 09 Nov-04 08 Dec-04 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

Qualit	y Contr	ol 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

Report Date:

03 Mar-05 2:43 PM

Nautilus Environmental WA Ceriodaphnia 7-d Survival and Reproduction Test Material: Sodium chloride Test Type: Reproduction-Survival (7d) Organism: Ceriodaphnia dubia (Water Flea) Protocol: EPA/821/R-02-013 (2002) Reference Toxicant-REF **Endpoint:** Reproduction Source: 1.8 1.6 1.4 1.2 EC50 1.0 0.8 17 Feb-04-09 Dec-03-14 Jan-04-18 Nov-03-09 Mar-04-23 Mar-04-27 Oct-03-04 May-04 19 May-04 22 Jun-04 14 Oct-04 08 Dec-04 20 Jul-04 17 Aug-04 22 Sep-04 09 Nov-04 Mean: 1.17709 Count: 20 -1s Warning Limit: 0.94540 -2s Action Limit: 0.71371 Sigma: 0.23169 CV: 19.68% +1s Warning Limit: +2s Action Limit: 1.64046

Qualit	y Conti	roi 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



CETIS Test Summary

Report Date:

24 Feb-05 9:51 AM

Link:

08-6576-8297/050201scrt

Selenastrum (Growth Test							Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	Date: 01 Feb-05 04:00 PM Protocol: EPA/821/R-02-013 (2002) g Date: 05 Feb-05 02:00 PM Dil Water: Nutrient Enriched Water Date: 01 Feb-05 04:00 PM Brine:				Duration: Species: Source:	94h Selenastrum capricornutum In-House Culture		
Sample No: Sample Date: Receive Date: Sample Age:			Material: Code: Source: Station:	Copper co 050201so Reference			Client: Project:	Internal
Comparison S	Summary							
Analysis 13-2261-1015	Endpoint Cell Density	water-	NOEL 37.5	L(OEL 5	ChV 53.033	MSDp 12.90%	Method Steel's Many-One Rank
Point Estimat Analysis 04-4949-2996	e Summary Endpoint Cell Density		% Effe 25 50	4	onc-µg/L 5.40844 9.37500	95% LCL 40.36261 53.92220	95% UCL 50.85952 67.09946	Method Linear Interpolation
Test Acceptat	oility							
Analysis	Endpoint		Attrib	ute	Statistic	Acceptat	ole Range	Decision
04-4949-2996	Cell Density		Contro	I CV	0.07761	N/A - 0.2		Passes acceptability criteria
13-2261-1015	Cell Density		Contro	I CV	0.07761	N/A - 0.2		Passes acceptability criteria
04-4949-2996	Cell Density		Contro	Respons	e 1019000	1000000	- N/A	Passes acceptability criteria
13-2261-1015	Cell Density		Contro	l Respons	e 1019000	1000000	- N/A	Passes acceptability criteria
13-2261-1015	Cell Density		MSDp		0.12899	0.091 - 0.	29	Passes acceptability criteria
Cell Density S	ummary							
Conc-µg/L	Control Type	Reps	Mean	Minimun	n Maximun	1 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 D	Detail							
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Lab Control	1.06E+6		1.11E+6				
9.4		9.77E+5		8.54E+5				
18.8		9.38E+5		1.02E+6				
37.5		9.14E+5		8.78E+5				
75		2.04E+5		4.06E+5				
150		6.00E+3	5.00E+3	9.00E+3	7.00E+3			

Analyst:

Approval: 2/14/05

Comparisons:

Page 1 of 2

10 Feb-05 10:53 AM

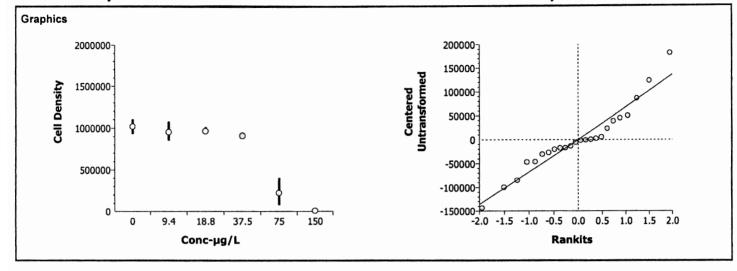
CETIS A	nalysis De	tail							port Date: alysis:		o-05 10:53 AM 15/050201scr
Selenastrum	Growth Test			-		***************************************			Nau	tilus Environ	mental (CA)
Endpoint		Anal	ysis Type		Sample	Link C	ontrol L	ink Date	Analyzed	Version	
Cell Density			parison		08-6576	-8297 08	3-6576-8	297 10 F€	b-05 10:53	AM CETISV	1.025
Method		Alt I	H Data	Transform	Z	NOEL	LO	EL Toxi	c Units	ChV	MSDp
Steel's Many-	-One Rank	C > -	T Untra	nsformed		37.5	75	2.67		53.033	12.90%
Test Accepta	ability										
Attribute		Stati	istic A	cceptable F	lange Dec	ision					
Control CV		0.07	761 N	/A - 0.2	Pas	ses accep	tability c	riteria			
Control Resp	onse	1019	9000 1	000000 - N/A	A Pas	ses accep	tability c	riteria			
MSDp		0.12	899 0	.091 - 0.29	Pas	ses accep	tability c	riteria			
ANOVA Assu	umptions										
Attribute	Test		Statis	stic C	ritical	P Level	D	ecision(0.0	1)		
Variances	Bartlett		25.34	433 15	5.08628	0.00012	U	nequal Varia	inces		
Distribution	Shapiro-Wi	lk W	0.945	31 0.	88421	0.22122	N	ormal Distrib	oution		
ANOVA Tabl	le										
Source	Sum of	Squares	Mean Squ	are DF	F Statis	stic P	Level	Decis	sion(0.05)		
Between	3.936E+		7.87E+11	5	132.34	0.0	00000	Signi	ficant Effect		
Error	1.071E+	11	5.95E+09	18							
Total	4.0432E	+12	7.932E+11	23							
Group Comp	parisons										-
Control	vs Conc-μg/	L S	itatistic	Critical	P Level	Ties		Decision	(0.05)		
Lab Control	9.4	1	5	10	> 0.0500	0		Non-Sign	ificant Effect		
	18.8	1	5	10	> 0.0500	0		Non-Sign	ificant Effect		
	37.5	1	1	10	> 0.0500	0		Non-Sign	ificant Effect	ł	
	75	1	0	10	<= 0.0500	0		Significar	t Effect		
	150	1	0	10	<= 0.0500	0		Significar	t Effect		
Data Summa	ary			Ori	ginal Data				Transfo	rmed Data	
Conc-µg/L	Control Type	Count	Mean	Minimum	n Maximur	m 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					
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		9.00E+3	7.00E+3						

CETIS Analysis Detail

Comparisons: Report Date: Page 2 of 2 10 Feb-05 10:53 AM

Analysis:

13-2261-1015/050201scrt



Analyst: AH

Page 1 of 1

Report Date:

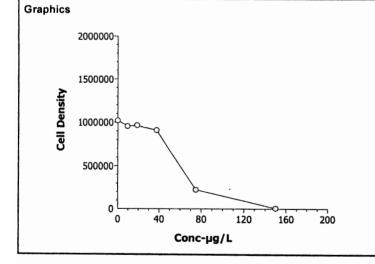
10 Feb-05 10:53 AM

Analysis:

04-4949-2996/050201scrt

Selenastru	ım Growth Test					Nautilu	s Environmental (CA
Endpoint		Analysis	Туре	Sample Link	Control Link	Date Analyzed	Version
Cell Densit	У	Linear Int	erpolation	08-6576-8297	08-6576-8297	10 Feb-05 10:53 AM	CETISv1.025
Linear Inte	erpolation Option)S					
X Transfo	rm Y Transfo	orm Seed	Resamples	Expanded CL	Method		
Linear	Linear	453527	200	Yes	Two-Point Inte	rpolation	
Test Acce	ptability						
Attribute		Statistic	Acceptable Rang	ge Decision			
Control CV		0.07761	N/A - 0.2	Passes acc	eptability criteria		
Control Re	sponse	1019000	1000000 - N/A	Passes acc	eptability criteria		
Point Esti	mates						
% 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	



CETIS Analysis Detail

Analyst: A Approval: 2

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

	Test Species: S. capricornutum
client: Internal	Test Date: 2/1/05
Sample ID: CuCl2	Start/End Times: 16:00 / 1400
Test No: <u>050701</u> Scrt	Analyst: 5th

Random Number	Dilution	Cell Density (fluorometric) (cells/ml *10 ⁸)	Cell Density (microscopic) (cells/mi.*10*)
Blank	NA		
Cal Check 1 (NEW, Solid, Effluent Blanks)		0.00 , 2.20	
49		J.31	
50		q,38	
51		9.14	
51 52		9.73	
53		10.15	
54		9.47	
55		8.54	
56		8,78	
57		0,06	
58		רד.ט	
59		2.04	
60		2,07	
Cal Check 2 (NEW, Solid, Effluent Blanks)		ه	
61		4.06	
62		9,07	
63		H.05	
64		9.59	
65		8.95	
66		4.34	
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, 2.26	

Comments:				
QC Check:	AH	2/10/05	Final Review:	Al yap

Page 1 of 1

CETIS Data Worksheet

Report Date:

01 Feb-05 11:02 AM

Link:

08-6576-8297/050201scrt

Selenastrum	Grow	th Te	st						Nautilus Environmental (C.	
Start Date: Ending Date: Sample Date				Species: Selenastrum capricornutum Protocol: EPA/821/R-02-013 (2002) Material: Copper chloride				Sample Code: 050201scrt Sample Source: Reference Toxicant Sample Station:		
Conc-µg/L	Code	Rep	Pos	Cell Density	Absorbance	Biomass	Chlorophyll a		Notes	
0	LC	1	71					and a statement of the		
0	LC	2	52	1	and the second second second				The second secon	
0	LC	3	63							
0	LC	4	66							
9.4		1	70							
9.4	1	. 2	62	1				THE PERSON NAMED OF THE PERSON		
9.4	į	. 3	55	.i			-4	CONTRACTOR OF THE PART OF THE		
9.4		4	58				-			
18.8	i	1	50	 					CATALLY MARKET A REST. AND AND AND AND AND AND AND AND AND AND	
18.8		. 2	69	<u> </u>				Communication of the continue to the	Control of the contro	
18.8	1	3	53							
18.8	-i	4	64			; }				
37.5	1	1	54		-			Market and the second of the s	A CONTRACTOR OF THE CONTRACTOR	
37.5		2	51							
37.5 37.5	1	3	65 56							
37.5 75	į.	. 4	59						The second section is a second	
75 75	1	2	60			THE PARTY OF THE P			AND AND AND AND AND AND AND AND AND AND	
75	ŧ.	: 2	61					The state of the s		
75	1	; 4	49	·						
150		+ 1	57				+			
150	ł-	2	72							
130	1		12		and the second second second second			1.110 Mar - 14		

RC=AH

Test Species: S. capricornutum

Client : Internal Test Date: 2/1/05

Sample ID: CuCl₂ Start/End Times: 2/8/05 16:00 / Ha

Test No: 050201scrt Analyst: A

		Initial R	Final F	Final Readings			
Concentration (µg/L)	D.O. (mg/L)	Conductivity (umhos-cm)	Alkalinity (mg/L)	Hardness (mg/L)	D.O. (mg/L)	Conductivity (umbos-cm)	
Lab Control	7.4	90	į 1	()	8.7	85	
9.4	7.2	90	_	_	વ્ર. દ	86	
18.8	1.4	90	13	12	8.5	۹٦	
37.5	1.6	90	<i>~</i>	_	8.7	88	
75	.7.5	29	_	-	8.4	89	
150	1.6	89	12	12	8.3	91	

		0 Hour	24 Hout @	48 Hour 🕢	72 Hour 🙆	96 Hour @
pH/Temperature (°C):	Lab Control	1.87/25.0	194127.9	14/20.3	8.27/27.5	8.32/27.0
pH/Temperature (°C):	9.4	1851 250	7.78/29.0	7.79/27.3	8.55 /2 7.8	8.18/27.0
pH/Temperature (°C):	18.8	7741 250	1.65/29.0	7.881206	864 127.9	8.16 /27.0
pH/Temperature (°C):	37.5	7.701 150	7.61/29.5	7.83/29:5	8.64128.1	8.12/27.0
pH/Temperature (°C):	75	1.64 25.0	757129.5	7.521277	8.20/28.3	7.74 /27.0
pH/Temperature (°C):	150	1.571 250	TH7 129.4	7.40/27.7	7,93/28.4	7.61/27.0
pH/Temperature (°C):		1	1	1	1	1

QC Check: @Temp of out of range 25°C ± 1, added Fans + turned room

All 2/10/05 Final Review: All 2/10/05 temp. down

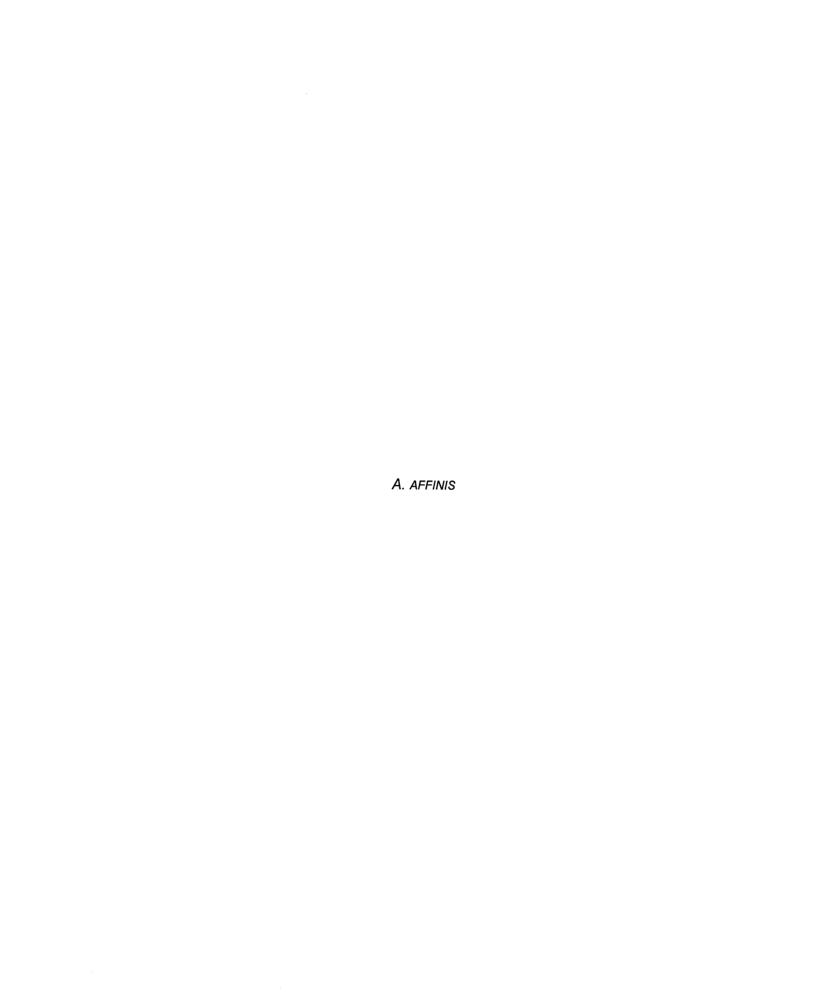
CETIS QC Chart Report Date:

Report Date: 24 Feb-05 9:57 AM

Selenastrum Growth Test Nautilus Environmental (CA) Copper chloride Test Type: Cell Growth Organism: Selenastrum capricornutum (Green Material: Protocol: EPA/821/R-02-013 (2002) Reference Toxicant-REF Endpoint: Cell Density Source: 80₇ 75-70 65 60 55-50-45-11 Jan-05-18 Mar-04 12 Oct-04 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

Qualit	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



CETIS Test Summary

Report Date: 1

15 Feb-05 12:49 PM

Link: 0

07-9201-8053/050201aart

Pacific Topsm	nelt 7-d Surviva	l and Gro	wth Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	12-5261-5370 01 Feb-05 03: 08 Feb-05 01: 01 Feb-05 03:	05 PM	Test Type: Protocol: Dil Water: Brine:	EPA/600	Growth-Survival (7d) EPA/600/R-95/136 (1995) Laboratory Seawater Not Applicable		Duration: Species: Source:	6d 21h Atherinops affinis Aquatic Biosystems, CO
Sample No: Sample Date: Receive Date: Sample Age:			Material: Code: Source: Station:	Copper c 050201aa Referenc			Client: Project:	Internal
Comparison S	Summary							
Analysis	Endpoint		NOEL	L	OEL	ChV	MSDp	Method
12-6994-1462	7d Proportion	Survived	100	2	00	141.421	14.21%	Steel's Many-One Rank
10-4427-5019	Mean Dry Bior	nass-mg	100	2	00	141.421	13.96%	Steel's Many-One Rank
Point Estimat	e Summary							
Analysis	Endpoint		% Effe	ect C	onc-µg/L	95% LCL	95% UCL	Method
04-4294-9245	7d Proportion	Survived	25		15.62750	88.50483	135.22030	Linear Regression
			50	14	44.26220	121.01210	168.58500	
07-2772-8128	Mean Dry Bior	nass-mg	25	1	13.62980	92.85388	127.54740	Linear Interpolation
			50	1	49.92170	136.53470	161.13150	
Test Acceptal	bility							
Analysis	Endpoint		Attrib	ute	Statistic	Acceptable	e Range	Decision
04-4294-9245	7d Proportion	Survived	Contro	l Respons	e 0.92000	0.8 - N/A		Passes acceptability criteria
12-6994-1462	7d Proportion	Survived	Contro	l Respons	e 0.92000	0.8 - N/A		Passes acceptability criteria
07-2772-8128	Mean Dry Bior	nass-mg	Contro	l Respons	e 1.26560	0.85 - N/A		Passes acceptability criteria
10-4427-5019	Mean Dry Bior	nass-mg	Contro	l Respons	e 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 Bior	nass-mg	MSDp		0.13962	N/A - 0.5		Passes acceptability criteria
7d Proportion	Survived Sum	mary						
Conc-µg/L	Control Type	Reps	Mean	Minimun	n Maximur	n 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 Bio	mass-mg Sumi	mary						
Conc-µg/L	Control Type	Reps	Mean	Minimun	n Maximur		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%

Analyst: AH

Approval: 4

000-089-125-1

CETIS Test Summary

Report Date:

15 Feb-05 12:49 PM

Link:

07-9201-8053/050201aart

7d Proportio	on Survived Deta	il				
Conc-µg/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 Bi	omass-mg Detai	l				
Conc-µg/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

Page 2 of 2

Report Date:

15 Feb-05 12:49 PM

Analysis:

12-6994-1462/050201aart

CETIS Ana	lysis	Detail
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ANOVA Assumptions

Pacific Topsmelt 7-d Surviva	al and Growth	Test				N	autilus Envir	onmental (CA
Endpoint	Analysis	Туре	Sample L	ink Co	ntrol Link	Date Analyzed	Versi	on
7d Proportion Survived	Compari	Comparison		07-9201-8053 07-9201-8053		15 Feb-05 12:47 PM CETISv1.0		Sv1.025
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								

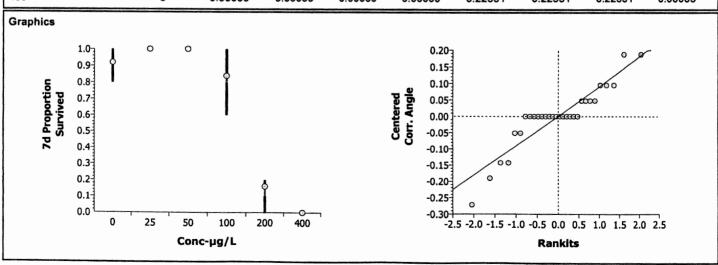
Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.92000	0.8 - N/A	Passes acceptability criteria
MSDp	0.14209	N/A - 0.25	Passes acceptability criteria

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					

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 Comp	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						
ł		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 Summa	ary			Origi	nal 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	



Analyst: A

Approval:

Linear Regression:

Page 1 of 2

Report Date:

15 Feb-05 12:49 PM

CETIS	Analysis D	etail						-	ort Date: ysis:	15 Feb-05 12:49 PN 04-4294-9245/050201aar
	smelt 7-d Survi		owth Test					7 (1764)		llus Environmental (CA)
Endpoint		Ana	alysis Type		Sample	Link Co	ontrol Lini	Date A	nalyzed	Version
7d Proportion	roportion Survived Linear Regression				07-920	1-8053 07	7-9201-805	3 15 Feb	-05 12:48 P	M CETISv1.025
Linear Reg	ression Options	3								
Model	Threshold	Option	Lower Thre	shold Thi	reshold Optim	ized Re	weighted	Pooled	Groups	Heterogeneity Corr.
Log-Norma	Control Th		0.08	Yes		Ye	S	No		No
Regression	n Parameters									
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Statist	ic PLe	vel D	ecision(0.0)5)
Threshold	0.02690	0.01885	-0.0	1004	0.06383	1.427	0.24	881 N	lot Significa	nt
Slope	7.01924	1.47803	3 4.12	230	9.91619	4.749	0.01	771 S	ignificant	
Intercept	-10.15562	3.22383	-16.	47433	-3.83691	-3.150	0.05	126 N	lot Significa	nt
Regression	n Summary	g (y may								
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critic	al Pi	_evel	Decision(0.	05)
6	6.20144	-1.44683	0.14247	0.1703					<u> </u>	ant Heterogeneity
Residual A	nalysis									
Attribute	Method		Stati	stic	Critical	P Level	Dec	ision(0.05)		
Variances	Modified	Levene	2.19	598	2.74006	0.09740		al Variance		
Distribution	Shapiro-	Wilk W	0.81	197	0.91820	0.00026	•	-normal Dis		
Test Accep	tability									
Attribute	•	Sta	tistic	Acceptable	Range De	cision				
Control Res	sponse).8 - N/A		sses accept	ability crite	ria		
Point Estin	nates			W						
% Effect	Conc-µg/L	95% LCL	95% (ICI						
25	115.62750	88.50483	135.2							
50	144.26220	121.01210								
Data Sumr	nary			Cal	culated Variat	te(A/B)				
Conc-µg/L	Control Type	Count	Mean	Minimun	n Maximum	SE	SD	A	В	
0	Lab Control	5	0.92000	0.80000	1.00000	0.02236			25	

25

25

25

25

25

25

25

21

4

0

25

50

100

200

400

5

5

5

5

5

1.00000

1.00000

0.84000

0.16000

0.00000

1.00000

1.00000

0.60000

0.00000

0.00000

1.00000

1.00000

1.00000

0.20000

0.00000

0.00000

0.00000

0.03416

0.01826

0.00000

0.00000

0.00000

0.16733

0.08944

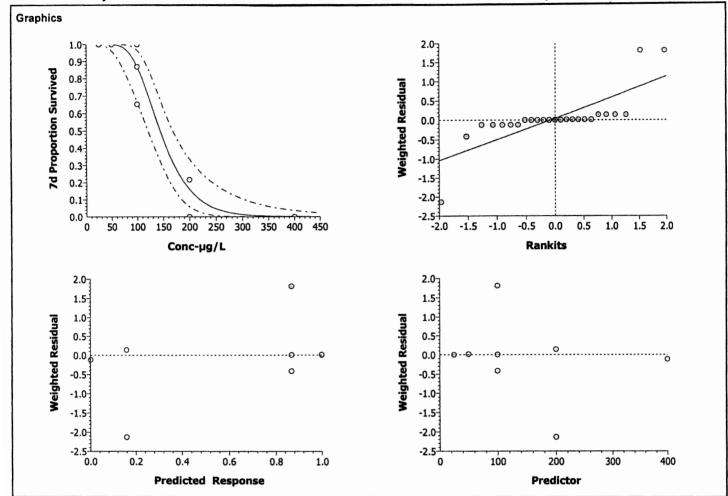
0.00000

Linear Regression:

Page 2 of 2 15 Feb-05 12:49 PM

Report Date: Analysis:

04-4294-9245/050201aart



Page 1 of 2

Report Date:

15 Feb-05 12:49 PM

Analysis:

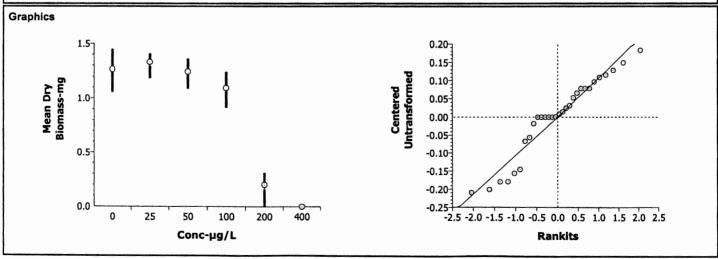
10-4427-5019/050201aart

Endpoint		Analysis	Туре	S	ample Li	nk Cor	trol Link	Date Analyzed	Ve	ersion
Mean Dry Biomass-mg Comparison 07-9201-8053 07-9201-8053				201-8053	15 Feb-05 12:4	9 PM CI	ETISv1.025			
Method Alt H Data Transform Z NOEL				LOEL	Toxic Units	ChV	MSDp			
Steel's Many-C	ne Rank	C > T	Untransforme	d	100 200 1.00				141.42	1 13.96%
Test Acceptab	ility									
Attribute Sta			Acceptab	le Range	Decisi	ion				
Control Respor	nse	1.26560	0.85 - N/A	\	Passe	s acceptat	oility criteria			
MSDp		0.13962	N/A - 0.5		Passe	s acceptat	oility criteria			
ANOVA Assur	nptions									
Attribute	Test		Statistic	Critical	P	Level	Decisio	on(0.01)		
Variances	Modified Levene		5.31920	3.89507	0.0	00199	Unequa	al 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 Summa	ary			Origi	nal Data		Transformed Data					
Conc-µg/L	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						



Analyst: Att

Approval:

CETIS Analysis Detail

Page 1 of 1

Report Date:

15 Feb-05 12:49 PM

Analysis:

07-2772-8128/050201aart

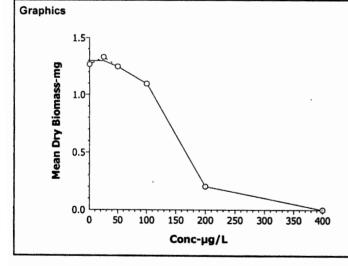
Pacific Topsmo	Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental (CA)												
Endpoint		Analysis Ty	ре	Sample Link	Control Link	Date Analyzed	Version						
Mean Dry Biomass-mg		Linear Interp	oolation	07-9201-8053	3 07-9201-8053 15 Feb-05 12:49 PM CETISv1.								
Linear Interpol	ation Options												
X Transform	Y Transform	Seed	Resamples	Expanded CL	Method								
Linear Linear		5334240	200	Yes	Two-Point Inte	rpolation							
Test Acceptabl	lity												
Attribute		Statistic	Acceptable Rang	ge Decision									
Control Respon	se	1.26560	0.85 - N/A	Passes acc	eptability criteria								

Point Esti	mates			
% Effect	Conc-µg/L	95% LCL	95% UCL	

25 113.62980 92.85388 127.54740 50 149.92170 136.53470 161.13150

CETIS Analysis Detail

Data Sumn	nary		Calculated Variate						
Conc-µg/L	Control Type	Count	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		



Analyst: <u>AH</u>

Approval:

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Marine Chr	Marine Chronic Bioassay									Larval	Fis	sh Survival	& Weights	
Client Name:		Internal						Test Sp	A. affinis					
Sample ID:		CuCl	2				Sta	rt Date	/Time:	2/1/2005 /153D				
Test No.:		05020	1aart				_ Er	nd Date	/Time:	2/8/2005	1 305			
Conc.		T			Surviva	I on Te	st Day	•		Percent	W	pan wt.	pan + fish	
(μg/L)	Rep.	0		2	3	4	5	6	7	Survival		(g)	(g)	
Lab Control	а	5	5	5	5	5	3	5	5	100		0.03226	0.03950	
200 00111101	b	5	5	5	5	5	5	S	5		-	0.0 2504	0.03176	
	С	5	5	5	5	5	3	4	4	188		0.0 22.07	0.02750	
	d	5	5	5	5	*5	5	5	5	100		0.02752		
	е	5	4	4	4	4	14	PA	4	80		0.02663	0.03191	
25	а	5	5	5	5	5	5	5	5	100	1	0.02340	0.63044	
	b	5	5	5	5	5	S	5	5	100		0.02724	0.03428	
	С	5	5	5	5	5	5	3	5	100		0.02435	0.03091	
	d	5	5	5	5	5	5	5	5	100		0.02332	0.02924	
	е	5	5	5	5	5	5	5	5	100		0.02697	0.03366	
50	а	5	5	5	8	5	5	5	5	(00)		0.02600	0.03239	
	b	5	5	5	5	5	2	3	5	100		0.02965	0.03560	
	С	5	5	5	5	5	5	3	5	100		0.02908	0.03453	
	d	5	5	5	5	ξ	5	5	5	100		0.03143	0.03824	
	е	5	5	5	5	5	<	2	5	100		0.02867	0.03523	
100	a	5	5	5	S	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	45	5	5	5	80	4	003184	0.03806	
	d	5	5	5	S	4	4	9	4	80	4	0.02845	0.03359	
200	е	5	5	4	4	4	3	3	3		-	0.02785	0.03243	
200	a	5	S	4	4	3	9	1	1	20	4	0.03215	0.03323	
	b	5	3	3	3	2	8	0		0	4	0.0		
	d	5	3	3	2	1	 	<i>j</i>	1	20	4	0.02340	0.02495	
	a	1 5	3	12	3	3	1		1	90		0.02893	0.03020	

d 5 O 1 0 5 е 0 0 0 а b C d **Tech Initials** 74 R TR SH MC 22 SD YR Weight Data: Feeding Times (day): 1 Date/Time in: 2:8-05 /1335 0830 Date/Time out: 2-10-05/1100 0830 0815 ONEO 0915 1000 1730 1600 154 1530 1430 1900 Oven Temp (°C): 68°

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Comments:

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QC Check:

Tech Initials: PR

0.02647

0.02760

Client:

Internal

Test Species: A. affinis

Sample ID:

CuCl₂

Start Date/Time: 2/1/2005

Test No:

050201aart

End Date/Time: 2/8/2005 / 1305

Concentration				Lab C	Control			
Day	0	1	2	3	4	5	6	7
				In	itial			
pН	8.0	8.02	8.01	8.03	8.00	81.08	806	
DO (mg/L)	8.1	.8.1	79	8.3	7.4	7.5	8.0	
Salinity (ppt)	30.0	43.40	,529.4	30.9	30.6	21.8	27.5	
Temp (°C)	19.8	20,2	209	20.8	20.7	20.0	20.1	
				Fi	nal			
pН		7.90	7.85	7.86	7.74	7.64	7.70	7.57
DO (mg/L)		7.4	is . 7	6.7	10.10	(01)	6.2	400
Temp (°C)		20.0	199	19.5	19.9	19.9	19.7	20.0

Concentration		100 μg/L										
Day	0	1	2	3	4	5	6	7				
				ln	itial		<u></u>					
pН	800	2.06	8.51	4.04	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	300	27.3					
Temp (°C)	197	20. 2	20.5	20.5	20.6	20,7	200					
				Fi	nal							
pН		7.96	7.89	7,90	7.83	188	7-79	765				
DO (mg/L)		7.7	49	6.9	7.2	46.9	6.3	7.0				
Temp (°C)		19.9	20.0	19.7	19.9	198	19.6	200				

11530

Concentration		25 μg/L										
Day	0	1	2	3	4	5	6	7				
				in	itial							
pН	みり	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	2					
Salinity (ppt)	29.9	29.5	293	30.9	30.le	300	29.5					
Temp (°C)	198	20.3	208	20.7	20.7	20.9	2011					
				Fi	nal							
pН		7.95	7.98	7.91	7.80	7.78	7.74	7.64				
DO (mg/L)		7.6	670	6.9	6.8	6.3	6.1	6.4				
Temp (°C)		20.1	19.8	19.5	19.8	198	19.6	2015				

Concentration	200 μg/L										
Day	0	1	2	3	4	5	6	7			
				Ini	tial						
pН	8.00	8.06	8.00	804	7.99	805	8.05				
DO (mg/L)	81	8.2	79	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	500	20.5	20.6	20.7	20.0				
				Fi	nal						
рН		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	49	6.4	(o. 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				
				in	itial							
pН	8-D1	8.00	8.01	8.03	7.98	8.06	8.06					
DO (mg/L)	8.1	8.3	7.9	8.0	7.5	20	8.0					
Salinity (ppt)	29.9	29.5	29.3	30.5	30.6	301	29.4					
Temp (°C)	19.5	20.6	268	20.6	20.6	20.7	201					
				Fi	nal							
pН		7,96	7.88	7.90	7.81	7.83	7.77	76				
DO (mg/L)		7,7	6.9	7.0	6.9	7.0	6.4	69				
Temp (°C)		20.0	19.9	19.5	19.9	198	19.10	200				

Concentration		400 μg/L											
Day	0	1	2	3	4	5	6	7					
					tial								
pН	7,49	7.99	7.99	804	7.99	8051	0						
DO (mg/L)	8-1	8.0	7.9	7,9	7.4	7,7	400						
Salinity (ppt)	223	28,9	222	29.4	29.6	29.0	4	n					
Temp (°C)	19.7	20.1	30.6	20.5	20.00	20.7	1	V					
				Fi	nal	. 011		001					
рН		7.97	7.92	7,94	7.86	7.79		189					
DO (mg/L)		7.9	7.2	7.2	7.4	7.2		X					
Temp (°C)		14.9	201	19.8	19.9	19.9							

Animal Source/Date Received:

ABS / 1-29-05

Animal Age at Initiation:

13 days

Analysts:

Initial: SD

9 92 D

SH uc

SD SD SD SD SD M SD

Comments:

QC Check:

AH 2/15/05

Final Review:

13/0/05

Report Date:

03 Mar-05 2:45 PM

Nautilus Environmental (CA) Pacific Topsmelt 7-d Survival and Growth Test Material: Copper chloride Test Type: Growth-Survival (7d) Organism: Atherinops affinis (Topsmelt) Protocol: EPA/600/R-95/136 (1995) Endpoint: 7d Proportion Survived Reference Toxicant-REF Source: 400 230 60 06 Aug-03-06 Jan-04 08 Jun-04-21 Jul-04-05 Oct-04-18 May-04-29 Sep-04-14 Sep-04--1s Warning Limit: 105.739 Mean: 149.050 Count: 13 -2s Action Limit: 62.4277 Sigma: 43.3111 CV: 29.06% +1s Warning Limit: 192.361 +2s Action Limit: 235.672

Quality	y Contr	ol 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

Report Date:

03 Mar-05 2:45 PM

Nautilus Environmental (CA) Pacific Topsmelt 7-d Survival and Growth Test Copper chloride Test Type: Growth-Survival (7d) Organism: Atherinops affinis (Topsmelt) Material: Protocol: EPA/600/R-95/136 (1995) Reference Toxicant-REF Endpoint: Mean Dry Biomass-mg Source: 400-350-300 250-200 150 100-50 06 Jan-04-08 Jun-04-06 Aug-03-18 May-04-21 Jul-04 05 Oct-04 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	y Contr	ol 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

CETIS Test Summary

Report Date:

: 03 Mar-05 3:04 PM

ink:	04-7135-6208/050201myrt

Mysid 7-d Sun	vival and Grow	th Test						Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	14-7450-3755 01 Feb-05 04:4 08 Feb-05 04:2 01 Feb-05 04:4	0 PM	Test Type: Protocol: Dil Water: Brine:	EPA/821	/R-02-014 (20 ry Seawater	02)	Duration: Species: Source:	6d 23h Americamysis bahia Aquatic Biosystems, CO
Sample No: Sample Date: Receive Date: Sample Age:	01 Feb-05		Material: Code: Source: Station:	Code: 050201myrt Source: Reference Toxicant			Client: Project:	Internal
Comparison S	ummary							
Analysis 08-9515-7927 09-1570-6602	7d Proportion S Mean Dry Biom		NOEL 150 150	3	OEL 300 300	ChV 212.132 212.132	MSDp 17.27% 18.77%	Method Steel's Many-One Rank Dunnett's Multiple Comparison
Point Estimate	Summary							
Analysis	Endpoint		% Effe	ect C	Conc-µg/L	95% LCL	95% UCL	Method
10-4148-5562	7d Proportion S	Survived	25 50		97.00960 241.45370	153.77180 206.41580	225.86510 272.30040	Linear Regression
11-9854-0277	Mean Dry Biom	nass-mg	5 10 15 20 25 40 50	1 1 1 1	0.51926 06.10910 131.69890 53.19320 64.40420 98.03700 220.45890	18.49014 36.98027 61.01170 70.79610 119.83630 175.86640 200.79630	103.96650 144.66720 158.41030 169.13250 179.76320 212.94820 236.25960	Linear Interpolation
7d Proportion	Survived Sum	mary						
Conc-µg/L	Control Type	Reps	Mean	Minimu	m Maximur	n SE	SD	cv
0 37.5 75 150 300 600	Lab Control	8 8 8 8 8	0.95000 0.97500 0.95000 0.90000 0.23750 0.00000	0.80000 0.80000 0.60000 0.60000 0.00000	1.00000 1.00000 1.00000 0.80000	0.03273 0.02500 0.05000 0.05345 0.09989 0.00000	0.09258 0.07071 0.14142 0.15119 0.28253 0.00000	9.75% 7.25% 14.89% 16.80% 118.96 0.00%
Mean Dry Bior	mass-mg Sumn	nary						
-	Control Type Lab Control	8 8 8 8 8	Mean 0.23725 0.24725 0.23275 0.19725 0.03519 0.00000	0.18200 0.17600 0.11800 0.15000 0.00000	0.29400 0.29600 0.28000 0.24400 0.12000	0.01356 0.01527 0.01770 0.01172 0.01584 0.00000	0.03837 0.04320 0.05005 0.03314 0.04482 0.00000	CV 16.17% 17.47% 21.50% 16.80% 127.36 0.00%

Analyst:



Page 2 of 2

Report Date:

03 Mar-05 3:04 PM

OFTIO T								Rep	ort Date:	03 Mar-05 3:04 PM
CE 115 1	est Summa	ary						Lini	c: 04	-7135-6208/050201myrt
7d Proportio	on Survived Deta	nil								
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 Bi	omass-mg Detai	il								
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	

Page 1 of 2 03 Mar-05 3:04 PM

Report Date: Analysis:

Non-normal Distribution

08-9515-7927/050201myrt

CETIS Analysis Detail

Distribution

Shapiro-Wilk W

Mysid 7-d Su	Mysid 7-d Survival and Growth Test Nautilus Environmental (CA										
Endpoint	5	Sample Li	nk	Control Link	Date Analyzed Version		on				
7d Proportion	Survived	Compar	ison	C	04-7135-6	208	04-7135-6208	16 Feb-05 6:35	PM CETI	Sv1.025	
Method		Alt H	Data Transform		Z	NOE	L LOEL	Toxic Units	ChV	MSDp	
Steel's Many-0	One Rank	C > T	Angular (Correcte	d)		150	300	0.67	212.132	17.27%	
ANOVA Assu	mptions					· · · · · · · · · · · · · · · · · · ·					
Attribute	Test		Statistic C	ritical	l P	Leve	Decisi	on(0.01)			
Variances	Modified Leven	9	2.17247 3.	48823	3 0.	07539	Equal	Variances			

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	-		

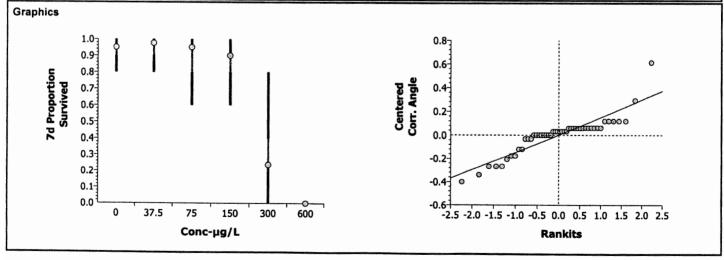
0.00002

0.92871

0.85501

Group Comp	ariso	ns					
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 Summa	ary			Origi	nal Data			Transfo	rmed Data	
Conc-µg/L	Control Type	Count	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



Analyst: Approval:

Linear Regression:

Page 1 of 2

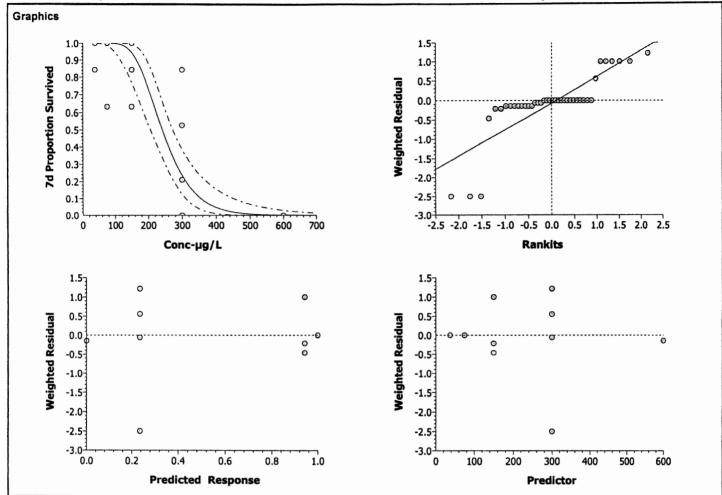
CETIS	Analysis D	etail						Repo Analy	rt Date:	03 Mar-05 3:04 PN 10-4148-5562/050201myr
	Survival and Gr							Allaly		utilus Environmental (CA)
Endpoint		Ana	lysis Type		Sample	Link C	ontrol Lin	k Date An	alyzed	Version
7d Proporti	on Survived		ear Regression		04-713		4-7135-620	08 16 Feb-	05 6:35 P	PM CETISv1.025
Linear Reg	ression Options	S								
Model	Threshold	Option	Lower Thresh	old Thr	eshold Optim	ized R	eweighted	Pooled (Groups	Heterogeneity Corr.
Log-Norma	I Control Th	reshold	0.05	Yes		Ye		No		No
Regressio	n Parameters									
Parameter	Estimate	Std Err	or 95% L	CL	95% UCL	t Statis	tic P L	evel De	ecision(0	0.05)
Threshold	0.04203	0.01827	0.0062	2	0.07784	2.301	0.10	0492 No	ot Signific	eant
Slope	7.63460	1.53277	4.6303	7	10.63884	4.981	0.01	1555 Si	gnificant	
Intercept	-13.19199	3.71186	-20.46	724	-5.91674	-3.554	0.03	3798 Si	gnificant	
Regressio	n Summary									
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Criti	cal P	Level D	ecision(0.05)
10	-2.68931	-1.72792	0.13098	0.1548	4 46.8371	0 53.3	8354 0.	15399 N	lon-Signif	ficant Heterogeneity
Residual A	nalysis									
Attribute	Method		Statisti	c (Critical	P Level	Dec	ision(0.05)		
Variances	Modified	Levene	4.47802	?	2.49362	0.00305		egual Variano	es	
Distribution	Shapiro-	Wilk W	0.80903	3 (0.93992	0.00000	Non	n-normal Dist	ribution	
Point Estir	nates									
% Effect	Conc-µg/L	95% LCL	95% UC	L						
25	197.00960	153.77180	225.865	10		***************************************				
50	241.45370	206.41580	272.300	40						
Data Sumi	mary			Calc	ulated Variat	e(A/B)				
Conc-µg/L	Control Type	Count	Mean I	Minimum	Maximum	SE	SD	Α	В	
0	Lab Control	8	0.95000	.80000	1.00000	0.0189	0 0.0925		40	
37.5		8	0.97500	.80000	1.00000	0.0144			40	
75		8	0.95000	.60000	1.00000	0.0288	7 0.1414		40	
150		8	0.90000	.60000	1.00000	0.0308	6 0.1511	19 36	40	
300		8	0.23750	.00000	0.80000	0.0576	7 0.2825	53 9	39	
600		8	0.00000	.00000	0.00000	0.0000	0.0000	0 0	40	

Analyst: Approval: 3/2

Linear Regression: 03 Mar-05 3:04 PM Report Date:

10-4148-5562/050201myrt Analysis:

Page 2 of 2



Page 2 of 2

Report Date: Analysis:

03 Mar-05 3:04 PM 09-1570-6602/050201myrt

CETIS Analysis Detail

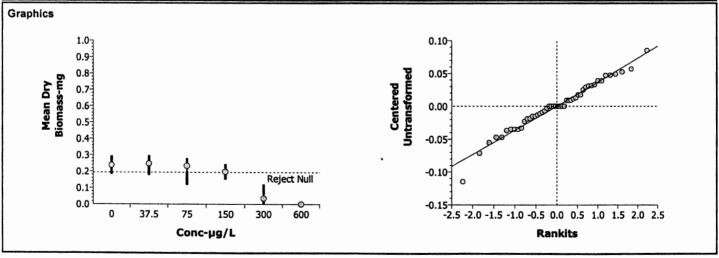
Mysid 7-d Survival and Growth	Test					N	autilus Envir	onmental (CA)
Endpoint	Analysi		Sample I		ontrol Link	Date Analyzed		on Sv1.025
Mean Dry Biomass-mg	Compar		04-7135-0	NOEL	-7135-6208 LOEL	Toxic Units	ChV	MSDp
Method Dunnett's Multiple Comparison	C > T	Untransformed		150	300	0.67	212.132	18.77%
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						
	0 6 0	Mana Causan	DE E 64	adada Di	nuel Decision(0.05)	

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 Comp	ariso	ns						
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 Summa	ary			Origi	nal Data			Transfo	med Data	
Conc-µg/L	Control Type	Count	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				



Analyst: Approval: 3

Linear Interpolation:

Page 1 of 1

Report Date:

03 Mar-05 3:04 PM

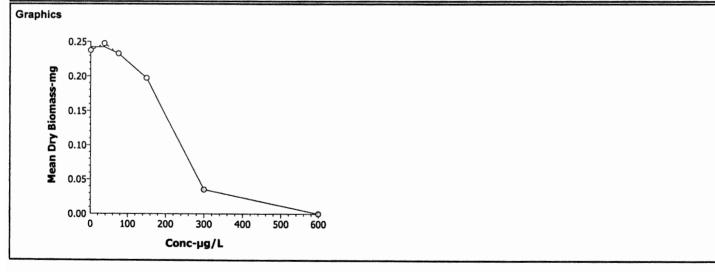
Analysis:

11-9854-0277/050201myrt

CETIS Analysis Deta	il
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Mysid 7-d	Survival and G	rowth T	est					Nautilu	ıs Environmental (CA)
Endpoint			Analysi	s Type		Sample Link	Control Link	Date Analyzed	Version
Mean Dry	Biomass-mg		Linear I	nterpolation		04-7135-6208	04-7135-6208	03 Mar-05 3:04 PM	CETISv1.025
Linear Inte	rpolation Opti	ons							
X Transfo	m Y Trans	form	Seed	F	esamples	Expanded CL	Method		
Linear	Linear		705547	5 2	00	Yes	Two-Point Inte	rpolation	
Point Esti	mates								
% Effect	Conc-µg/L	95%	LCL	95% UC	_				
5	80.51926	18.49	014	103.9665	50				
10	106.10910	36.98	3027	144.6672	20				
15	131.69890	61.01	1170	158.4103	30				
20	153.19320	70.79	9610	169.132	50				
25	164.40420	119.8	33630	179.7632	20				
40	198.03700	175.8	36640	212.9482	20				
50	220.45890	200.7	9630	236.2596	60				

Data Summ	nary			Cal	culated Varia	te	
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



Analyst: Approval: 3

Client Name:	Internal	Test Species: A. bahia
Sample ID:	CuCl ₂	Start Date/Time: 2/1/2005 / 16 45
Test No :	050201mvrt	End Date/Time: 2/8/2005 ///27/

Conc.	Ban			S	urviva	l on Te	st Day	:		Percent	pan wt.	pan + mysid
(µg/L)	Rep.	0	1	2	3	4	5	6	7	Survival	(g)	(g)
Lab Control	а	5	5	5	5	5	5	5	5	100	0.0 2706	0.02841
	b	5	5	5	7	4	4	4	4	80	0.02346	1.02446
	С	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
	е	5	5	5	5	5	4	4	4	80	0.0 2525	0.02672
	f	5	ゔ	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	а	5	5	5	5	S	5	5	5	100	0.01997	0.02140
	b	5	5	5	5	5	5	5	5	100	0.02121	0.02260
	С	5	5	Ŋ	S	5	3	5	5	100	0.02/0/	0.07201
	d	5	5	5	5	5	Ÿ	14	4	80	0.02039	0,02127
	е	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	3	5	5	100	0.02355	0-02503
	h	5	5	5	5	5	3	5	5	100	0.022.99	0.02435
75	а	5	5	5	5	5	5	5	5	100	0.02350	0.02482
	b	5	5	び	5	5	5	5	5	100	0.02279	0.02386
	С	5	5	5	5	5	5	5	5	iii	0.02084	0.02276
	d	5	Š	5	3	5	5	5	5	100	0.02527	0.07652
	е	5	5	5	5	5	.5	5	5	100	0.02/30	0.0225
	f	5	5	5	5	5	5	5	5	100	0.0 2280	0-02401
	g	5	5	5	5	5	4	3	3	60	0.02187	0.02246
	h	5	5	5	V	5	5	5	5	100	0.0 1991	0.02116
150	а	5	3	5	5	5	5	5	5	100	0.01293	0-02411
	b	5	5	5	5	5	5	5	5	100	0.02490	0.02612
	С	5	5	5	5	5	5	5	5	100	0.02616	0.027//
	d	5	5	5	5	5	5	5	5	100	0.02452	0.02557
	е	5	5	4	7	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	W/5	5	5	4	4	4	80	0.02377	0,02952
	h	5	5	Ä	14	H	4	4	4	80	0.02074	0.02163
ech Initials		Pe/	RLY	92	MC	SH	RU	AH	Me			

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Marine Chronic Bioassay

Larval Mysid Survival & Weights

Client Name:	Internal	Test Species: A. bahia	
Sample ID:	CuCl ₂	Start Date/Time: <u>2/1/2005</u>	1645
Toot No :	050201mvrt	End Date/Time: 2/8/2005	11120

Conc.	Bon			S	urviva	I on Te	st Day	:		Percent	pan wt.	pan + mysid
(μg/L)	Rep.	10 AC	, 1	2	3	4	5	6	7	Survival	pan wt. (g)	(g)
300	а	N84	43	21	4	3	3	3	23	50		0.02412
	b	5	3	2	2	2	(l	0	0		
	С	5	2	1	(1	1	1	1	20	0.0 28 53	0.02869 0.02823 0.02781 0.02491
	d	5	3	3	2	2	1	1	1	20	0.02812	0.02823
	е	5	3	7	1	i		ı	1	20	0.02771	0,02781
	f	5	4		4	4	1 2m	4	4	80	0.02431	0.02491
	g	5	3	0	_	-	'-		-	0		_
	h	5	7	1	1	1		0	<u></u>	0		-
600	а	5	6								N. C. C. C. C. C. C. C. C. C. C. C. C. C.	
	b	5										
	С	5				41						
	d	5				~					Š.	
	е	5					CAR					
	f	5										
	g	5				<u> </u>						
	h	5	V									
	а											
	b											
	С											
	d											
	е											
	f										W.	
	g											
	h										i i	
	а										1	
	b										4	
	С											
	d											
	е											
	f										N	
	g										<u>.</u>	
	h											
Tech Initials		TR/SH	KY	YR	Luc	5 H	Rb	AH	MC			

Feeding Times (day):

0	1	2	- 3	4	5	6
	0830	6830	0815	0170	1000	0915
1730	1600	1545	1530	1430	1900	1530

Oven Temp (°C): 67
Tech Initials: SM

Comments:

Done lost in progress, use 4 as original

QC Check: Att 216/05 Final Review: Star 3/3/05

Weight Data:

Date/Time in: 2/8/05 16/20
Date/Time out: 2/15/05/320

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

3/3/05

Final Review:

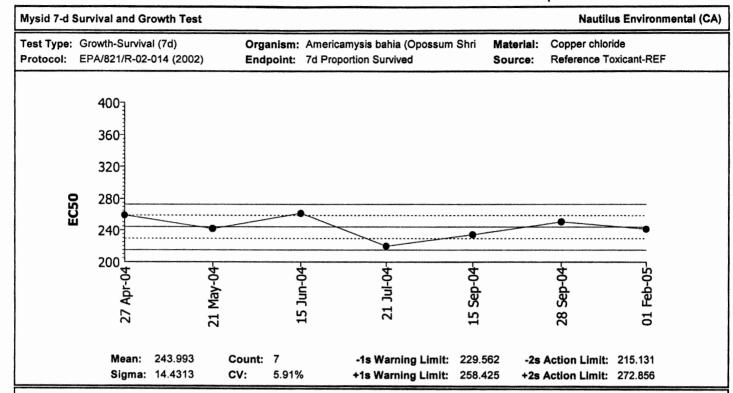
Client: Internal Test Species: A. bahia Sample ID: CuCl₂ Start Date/Time: 2/1/2005 Test No: 050201myrt End Date/Time: 2/8/2005 Concentration Lab Control Concentration 150 µg/L Day 5 6 Day Initial Initial pH 7.99 10.8 800 800 Hq 8.02 8.00 DO (ma/L) 648 000 7.3 DO (mg/L) Salinity (ppt) 304 303 290 258 258 244 C.3 7.1 7.2 Salinity (ppt) 302 × 190 2 \$.7 29:6 Temp (°C) 25.8 3).1 30:3 24.4 Temp (°C) 249 302425.4 24.6 24.6 250 150 793 Final 8.02 797 1745 782 рH 7.88 7.63 pН DO (mg/L) 5.7 5.4 DO (mg/L) 8,3 6. 5.66.857 Temp (°C) 25.3 248 24.5 24.4 24.6 25.4 Temp (°C) 24.8 24.5 24.4 24.1251 Concentration 37.5 μg/L Concentration 300 μg/L Day 6 Day 0 6 Initial pΗ 6.0 7.98 D.95 Initial 8.02 7.99 8.00 800 pН 10.8 7.94 8.01 DO (mg/L) 8.00 CO.B8.0 7.2 7.9 7.1 7.3 8.0 DO (mg/L) Salinity (ppt) 7.2 7.7 305 30.2 (g. (G 29.0 30.3 3.5 Salinity (ppt) 29.3 28.3 29.3 Temp (°C) 24.4 24.7 24.7 248 240 Temp (°C) 25,4 24.6 pН 8,02 7.88 7.74 7.90 7.87 pН 7.93 7.81 7,99 DO (mg/L) 10-1 5.8 5.5 DO (mg/L) 8.2 Temp (°C) 6.3 5.7 25.4 24.8 24.5 Temp (°C) 75.2 24.8 24.7 Concentration 75 μg/L Concentration 600 μg/L Day 0 5 6 7 Day 3 pΗ 8.D) 8.02 8.00 8,00 pН C0.8 DO (mg/L) 80 7.1 0.8 1. U.S.O DO (mg/L) Salinity (ppt) 130.4 30,2 29.1 30.2 Salinity (ppt) 28.7 28.8 Temp (°C) 250 25.2 124.6 24,4 Temp (°C) 24.724.8 pН 7.96 7.85 pН 7.99 DO (mg/L) 5.6 5.5 DO (mg/L) 8.3 Temp (°C) 25.6 24.8 24.10 Temp (°C) Animal Source/Date Received: SD 412 Analysts: Initial: uc Animal Age at Initiation: Pe 54 M Final Comments:

Nautilus Environmental II C ESSO Marchanta D. C. C. C.

QC Check:

Report Date:

03 Mar-05 2:41 PM



Qualit	y Contr	ol 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

Report Date:

03 Mar-05 3:10 PM

Mysid 7-d Survival and Growth Test Nautilus Environmental (CA) Copper chloride Test Type: Growth-Survival (7d) Organism: Americamysis bahia (Opossum Shri Material: Protocol: EPA/821/R-02-014 (2002) Reference Toxicant-REF Endpoint: Mean Dry Biomass-mg Source: 400 350 300-250-200-150-100-50 Mean: 204.469 Count: 7 -1s Warning Limit: 120.609 -2s Action Limit: 36.7480 Sigma: 83.8604 CV: 41.01% +2s Action Limit: 372.19 +1s Warning Limit: 288.329

Qualit	y Contr	rol 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



CETIS Test Summary

Report Date:

27 Feb-05 6:49 PM

Link:

09-1499-2257/050201mgrt

Bivalve Larva	Survival and [Developm	ent Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	09-9798-9542 01 Feb-05 04:4 03 Feb-05 03:4 01 Feb-05 04:4	45 PM	Test Type: Protocol: Dil Water: Brine:	Developme ASTM E72 Scripps Se Not Applica	4-98 (1999) awater		Duration: Species: Source:	47h Mytilus galloprovincialis Field Collected
Sample No: Sample Date: Receive Date: Sample Age:	01 Feb-05		Material: Code: Source: Station:	Copper chli 050201mgi Reference	nt		Client: Project:	Internal
Comparison S Analysis 06-9318-4816	Endpoint	mal	NOEL < 2.5	LOI 2.5		ChV N/A	MSDp 9.72%	Method Steel's Many-One Rank
Point Estimate Analysis 05-3428-2661	e Summary Endpoint Proportion Nor	mal	% Effe 25 50	2.7	nc-µg/L 2162 3444	95% LCL 2.41572 3.15690	95% UCL 2.97945 3.69568	Method Linear Regression
Proportion No	ormal Summary							
Conc-μg/L 0 2.5 5 10 20 40	Control Type Lab Control	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.89000 0.72800 0.12600 0.00000 0.00000 0.00000	Minimum 0.79000 0.63000 0.02000 0.00000 0.00000 0.00000	Maximum 0.94000 0.82000 0.32000 0.00000 0.000000 0.000000	0.02702 0.03308 0.05231 0.00000 0.00000 0.00000	SD 0.06042 0.07396 0.11696 0.00000 0.00000 0.00000	CV 6.79% 10.16% 92.83% 0.00% 0.00%
Proportion No	rmal Detail							
Conc-μg/L 0 2.5 5 10 20 40	Control Type Lab Control	Rep 1 0.94000 0.76000 0.32000 0.00000 0.00000	Rep 2 0.88000 0.75000 0.14000 0.00000 0.00000 0.00000	Rep 3 0.91000 0.68000 0.06000 0.00000 0.00000 0.00000	Rep 4 0.93000 0.82000 0.02000 0.00000 0.00000	Rep 5 0.79000 0.63000 0.09000 0.00000 0.00000 0.00000		

Analyst:

Approval: 3/3/05

Comparisons:

Page 1 of 1

Report Date:

27 Feb-05 6:49 PM

Analysis:

06-9318-4816/050201mgrt

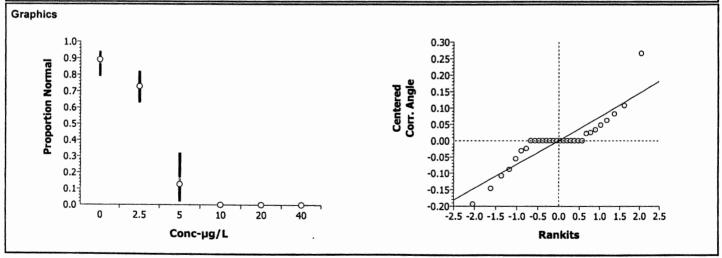
Bivalve Larval Survival and	Development	Test				N	autilus E	nvironmental (CA)
Endpoint	Analysi	з Туре	Sample	ink Co	ntrol Link	Date Analyzed	Ve	ersion
Proportion Normal	Compar	son	09-1499-	2257 09-	1499-2257	27 Feb-05 6:49	PM C	TISv1.025
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		<2.5	2.5		N/A	9.72%
ANOVA Assumptions								

ANOVA ASSUIT	iptions					
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 Summa	ary			Origi	nal Data		Transformed Data				
Conc-µg/L	Control Type	Count	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	



Analyst: AH

Approval:

Linear Regression:

Page 1 of 2

Report Date:

27 Feb-05 6:49 PM

Analysis:

05-3428-2661/050201mgrt

Bivalve La	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)											
Endpoint		Analy	sis Type	Samı	Sample Link Control Link			Date Analyzed	Version			
Proportion	Proportion Normal Linear Regress			09-14	199-2257	09-1499	-2257	27 Feb-05 6:49 PM	M CETISv1.025			
Linear Re	gression Options		<u> </u>									
Model	Threshold	Option Lo	wer Threshold	Threshold Opt	imized	Reweig	hted (Pooled Groups	Heterogeneity Corr.			
Log-Norma	al Control Thre	eshold 0.	11	Yes		Yes	1	No	Yes			
Regression	on Parameters											
Paramete	r Estimate	Std Error	95% LCL	95% UCL	t Sta	tistic	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	10.78	86	0.00170	Significant				
Intercept	1.42248	0.37021	0.65665	2.18831	3.842	2	0.03110	Significant				
Regression	on Summary											
Iters	Log Likelihood	Mu	Sigma G	Stat Chi-S	q C	ritical	P Leve	el Decision(0	.05)			
4	-220.47730	0.21306	0.14978 0	.03678 62.410	047 3	5.17247	0.0000	2 Significant	Heterogeneity			
Residual	Analysis											
Attribute	Method		Statistic	Critical	P Leve	H	Decisio	n(0.05)				
Variances	Modified L	evene	8.93464	2.74006	0.0001	7	Unequa	l Variances				
Distribution	n Shapiro-V	Vilk W	0.75178	0.91820	0.0000	1	Non-nor	mal Distribution				

Data Summary			Calculated Variate(A/B)							
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	Α	В	
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	

Analyst:

Approval: 3/3/05

Point Estimates
% Effect Con

25

50

Conc-µg/L

2.72162

3.43444

95% LCL

2.41572

3.15690

95% UCL

2.97945 3.69568

CETIS Analysis Detail

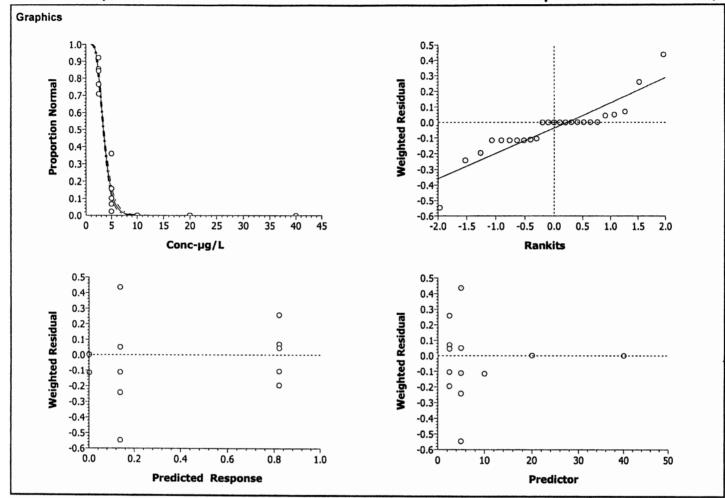
CETIS Analysis Detail

Linear Regression:

Page 2 of 2 27 Feb-05 6:49 PM

Report Date: Analysis:

05-3428-2661/050201mgrt



Analyst:

CETIS Data Worksheet

Report Date:

31 Jan-05 12:51 PM

Link: 09-1499-2257

Nautilus Environmental (CA)

Bivalve Larv	al Survival and De	velopment Test		Nautilus Environmental (CA
Start Date:	01 Feb-05	Species:	Mytilus galloprovincialis	Sample Code: 050201mgrt
Ending Date	: 03 Feb-05	Protocol:	ASTM E724-98 (1999)	Sample Source: Reference Toxicant
Sample Date	e: 01 Feb-05	Material:	Copper chloride	Sample Station:
Conc-µg/L	Code Rep Pos	# Counted	# Normal	Notes
	1	100	77 87 76 W	*
	2	100	75 Atm.	
	3	100	to & AHINV,	
	4	. !	O AH	15 1 Page 21 September 1988 Confession and 15 188-01 and 1
	5	100	SG O AH W	The state of the s
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	27		5 V O VZ	
	28		82 0 VR	
	29		88 AH	
	30		C3 AH	

Page 1 of 1

CETIS Data Worksheet

Report Date:

31 Jan-05 12:51 PM

Link:

09-1499-2257

Bivalve Larva	l Sur	vival a	and De	velopment Test		Nautilus Environmental (CA)
Start Date: Ending Date: Sample Date:	03		i	Species: Protocol: Material:	Mytilus galloprovi ASTM E724-98 (* Copper chloride	
Conc-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
0	LC	1	24	·-		The second secon
0	LC	2	29	-		
0	LC	3	21			
o	LC	4	22	•	1996.00	
o	LC	5	19			The state of the s
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2.5		. 2 ,	2	•		A SECTION OF THE PROPERTY OF T
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2.5		5	30			The second secon
5		1	26			The second secon
5		2	15			to the second se
5		3	3			The second secon
5		4	11			The second secon
5		5	16		Market Commission of the Commi	
10		1	10			The control of the co
10		2	6			AND THE CONTRACTOR MANAGEMENT AND THE PROPERTY OF THE PAR
10		3	20 .	İ		the state of the s
10		4	23	ļ		the second secon
10		5	17		11	THE CONTROL OF THE RESERVE OF THE PROPERTY OF
20		1	25	·		
20		2	9		1 18 40 1 400 1	THE RESIDENCE OF THE PROPERTY
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20		4	12	•	a decisión model	THE STANDARD CONTRACT OF STANDARD STANDARD CO. STANDARD C
20		5	27			The second section of the section of the section of
40		1	4		*** ***	A description of the control of the
40		2	13			
40		3	18			AND THE RESIDENCE OF THE PARTY
40		4	7 :			
40		5 ,	5			

Marine Chronic Bioassay

Bivalve Development Worksheet

Client:	CHIA	Buerajertor	anternal	Start Date/Time	: 2/1/05	1645
Test No.:	_ \	27.7030,05	1	End Date/Time		1545
Test Species:		principlia	0,	Technician Initials		
Animal Source:		quality ms/ Nis	Sin Bau			
Date Received:			28/05			
		7				
Test Chambers:	Shell	lials		Sample Volume	: <u>10m</u>	
First Gamete Relea	sso Timo:	1145				
i iist Gamete Nelee		1112				
		Sį	oawn Informa	ition		
Sex	Number	•		Condition		
Male	16	6700d				
Female	٦	G002				
Egg Fertilization Tir	me: 14	10				
Embryo Stock Den	sity Calculation	on:				
Normalia a Carrata de						
Number Counted:	17	15				
		38	Ma	an: 70.3		
	16	38	ivie	an: 40.5		
	<u>22</u> 18					
	70.					
	Mean	6 × 42 = .	853 er	nbryos/ml		
	~		7 17		,/	_ 100/
		<u> </u>	<u> </u>	ilution factor)	1/1.13	= 100/
Desired Final De	ensity: 400	2				/ 112
Dronara the ambeu	o otool:		المحمد المالل المحمد الم		16 Ale a al 11 Al	factor in 0.05
100 ml of existing s	o stock accor	and 125 ml of dili	ated dilution to	actor. For example 25 parts)	, it the allution	on factor is 2.25, use
	(part)	2114 720 1111 01 011	ation water ().	20 parto).		
Percent Division Up	pon Inoculatio	on: 90	Time	e Zero Counts:		48-h QC: 93/100
	, , , , , , , , , , , , , , , , , , , ,					7700
	Inoculation 7	ime: 1645		-	/	Annual Control of the
				1		
				**************************************	***************************************	
Comments:						
	And de	_				CAX.
QC Check:	AH ZIOLOS			F	inal Review	1: 2/28/09

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Marine Chronic Bioassay

Water Quality Measurements

Client: Internal	Test Species: M. galloprovia	ncialis
Sample ID: CuCl ₂	Start Date/Time: 2/1/2005	1645
Test No.: 050201mgrt	End Date/Time: 2.3.65	1545

Concentrationµg/L	Salinity (ppt)			Т	empera (°C)	ture	Diss	Dissolved Oxygen (mg/L)			pH (pH units)		
	0 24 48			0	The state of the s		0 24 48			0 24 48			
Lab Control	33.7	33.8	33.4	14.0	14.1	13.1	8.8	8.4	3.1	8.25	8.04	3.07	
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 G	33.9	34.0	14.0	14.0	15-1	7.9	8.5	8.1	8.23	8.07	8.10	
20	33.6	33.8	34.0	14.6	14.1	15-1	8.9	8,5	9.0	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	

	0 24 48	
Technician Initials:	MC 9R Kly	
Animal Source/Date Receive	ved: field collected 1/28/05	
Comments: 0 hrs:		
24 hrs:		
48 hrs:		
QC Check: AH 2/16		
Nautilus Environmental, LLC. 55	550 Morehouse Drive, Suite 150. San Diego, CA 92121.	

CETIS Test Summary

27 Feb-05 6:51 PM Report Date:

Link: 11-4568-9952/050202mgrt

Bivalve Larval	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)											
Test No: Start Date: Ending Date: Setup Date:	08-0883-8162 02 Feb-05 03:3 04 Feb-05 02:1 02 Feb-05 03:3	15 PM	Test Type: Development Protocol: ASTM E724-9 Dil Water: Scripps Seaws Brine: Not Applicable		4-98 (1999) awater		Duration: Species: Source:	47h Mytilus galloprovincialis Field Collected				
Sample No: Sample Date: Receive Date: Sample Age:			Copper chloride 050202mgrt Reference Toxicant			Client: Project:	Internal					
Comparison S Analysis 09-0344-7778	Summary Endpoint Proportion Nor	mal	NOEL 2.5			ChV 3.536	MSDp 4.09%	Method Steel's Many-One Rank				
Point Estimate Analysis 02-8162-7236	e Summary Endpoint Proportion Nor	mal	% Effe 25 50	3.4	nc-µg/L 4108 0472	95% LCL 3.22899 4.12364	95% UCL 3.62729 4.47532	Method Linear Regression				
Proportion No	ormal Summary	1										
Conc-μg/L 0 2.5 5 10 20 40	Control Type Lab Control	Reps 5 5 5 5 5 5 5 5 5	Mean 0.95400 0.88600 0.32800 0.00000 0.00000 0.00000	Minimum 0.93000 0.84000 0.23000 0.00000 0.00000 0.00000	Maximur 0.98000 0.94000 0.47000 0.00000 0.00000 0.00000	n SE 0.00872 0.02040 0.04432 0.00000 0.00000	SD 0.01949 0.04561 0.09910 0.00000 0.00000	CV 2.04% 5.15% 30.21% 0.00% 0.00%				
Proportion No	ormal Detail											
Conc-μg/L 0 2.5 5 10 20 40	Control Type Lab Control	Rep 1 0.94000 0.92000 0.47000 0.00000 0.000000 0.000000	Rep 2 0.96000 0.89000 0.23000 0.00000 0.00000 0.00000	Rep 3 0.96000 0.94000 0.24000 0.00000 0.00000 0.00000	Rep 4 0.98000 0.84000 0.33000 0.00000 0.00000 0.00000	Rep 5 0.93000 0.84000 0.37000 0.00000 0.00000 0.00000						

CETIS Analysis Detail

Comparisons: Report Date: Page 1 of 1 27 Feb-05 6:51 PM

Analysis

09-0344-7778/050202mgrt

						Allalysis.	03-03-	44-7770703020202111grt			
Bivalve Larval Survival and Development Test Nautilus Environmental (CA)											
Endpoint	Analysis	Туре	Sample Link Control Link			Date Analyzed	Ve	ersion			
Proportion Normal	Compari	son	11-4568-9952 11-4		-4568-9952	27 Feb-05 6:51	PM C	ETISv1.025			
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	Assumi	ntions
	-	200113

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				

29

Group	Com	parisons
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9.43449758

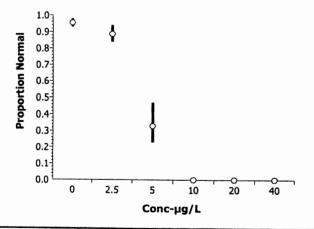
1.8748957

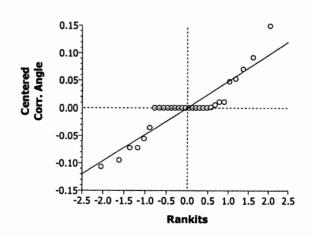
Total

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 Summa	ary			Origi	nal Data		Transformed Data			
Conc-µg/L	Control Type	Count	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







Analyst: A

_ Approval: TR 2/28/as

Page 1 of 2

Report Date:

27 Feb-05 6:51 PM

Analysis:

02-8162-7236/050202mgrt

Bivalve Larv	al Survival and	Develop	ment Test						Nautilu	s Environmental (CA)
Endpoint			alysis Type		Sample		trol Link	Date Anal		Version
Proportion No	ormal	Lin	ear Regressio	on	11-4568	-9952 11-4	568-9952	27 Feb-05	6:51 PM	CETISv1.025
Linear Regre	ession Options									
Model	Threshold	Option	Lower Thres	hold Thr	eshold Optim	ized Rew	eighted	Pooled Gr	oups H	eterogeneity Corr.
Log-Normal	Control Thr		0.046	Yes		Yes		No	N	
Regression	Parameters									
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Statistic	P Leve	l Deci	ision(0.05)
Threshold	0.05201	0.0095	5 0.03	329	0.07073	5.445	0.0121	6 Sign	ificant	
Slope	6.93554	0.43278	6.08	730	7.78378	16.026	0.0005	3 Sign	ificant	
Intercept	0.60324	0.29596	0.02	316	1.18333	2.038	0.1342	7 Not	Significant	
Regression	Summary									
Iters Lo	og Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Le	vel Dec	cision(0.0	5)
	229.20650	0.08698	0.14418	0.01496						nt Heterogeneity
Residual An	alvsis									
Attribute	Method		Statis	stic (Critical	P Level	Decisi	on(0.05)		
Variances	Modified	Levene	18.88			0.00000		al Variances		
Distribution	Shapiro-V		0.800			0.00012	•	rmal Distrib		
Point Estima	ates									
	Conc-µg/L	95% LCL	95% U	ICL						
25	3.44108	3.22899	3.6272	29						
50	4.30472	4.12364	4.4753	32						
Data Summa	ary			Calc	ulated Variate	e(A/B)				
Conc-µg/L	Control Type	Count	Mean	Minimum		SE	SD	- А	В	
	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	
		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500	
10		3	0.00000	0.00000	0.00000	0.00000	0.00000	•	500	
10 20		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	500	

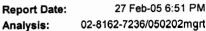
Analyst A

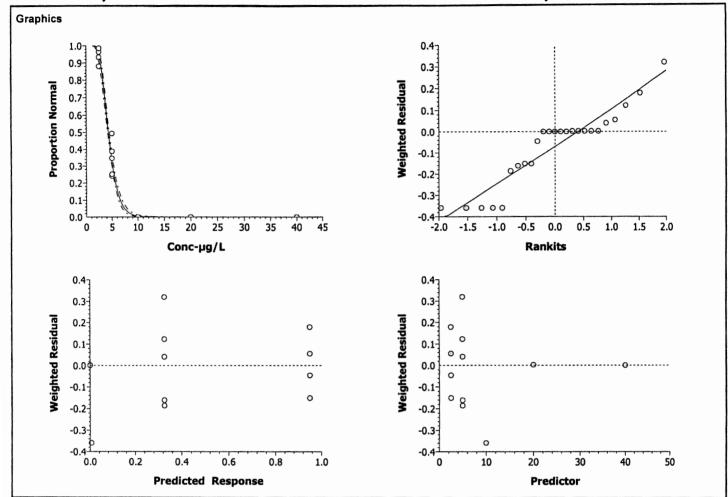
CETIS Analysis Detail

Linear Regression:

Page 2 of 2

02-8162-7236/050202mgrt





CETIS Data Worksheet

Report Date: 0

02 Feb-05 9:25 AM

Link: 11-4568-9952/050202mgrt

Bivalve Larva	al Sur	vival	and Dev	elopment Test				Nautilus Environmental (CA)
Start Date: Ending Date: Sample Date:		eb-0		Species: Protocol: Material:	Mytilus gallo ASTM E724 Copper chlo	-98 (1999)	Sample Code: Sample Source: Sample Station:	050202mgrt Reference Toxicant
Conc-µg/L	Code	Rep	Pos 1 2	# Counted	# Normal	AH	Note	\$
			3 4 5 6 7	100	8093		 	100 mm
		•	9 10 11 12 13		93		 	-
		1	14 15 16 17 18		034			
. ,,,,,,,			19 20		AH 93 4 37	17	 	
			21 22 23 24 25 26		0099000	: 1		
	Actorism man		28 29 30		98			

CETIS Data Worksheet

Report Date: 02 Feb-05 9:25 AM

Link: 11-4568-9952/050202mgrt

Jivaive Laiva	ii Sur	vival a	and De	velopment Test						Nautilus Environmental (C
Start Date: Ending Date: Sample Date:		eb-05		Species: Protocol: Material:	Mytilus gallopro ASTM E724-98 Copper chlorid	8 (199			Sample Code: Sample Source: Sample Station:	050202mgrt Reference Toxicant
Conc-µg/L	Code	Rep	Pos	# Counted	# Normal				Note	s
0		1	24	100	94	A	H	225/05		···· · · ·
0	LC	2	18		96					
0	rc	3	23	100	96 98	1				
0		4	27	100	48	. \				
0	LC	5	5	100	93	V	/		*	A SUISE PROVINCE COMM.
2.5		1	10			1				
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5		2	13				-			
5		4	16	;		1		-		
5		5	20							
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40		2	26							
40		3	7	4		•				
40		4	9	****						
	Account to the second									

acine

Marine Chronic Bioassay

Water Quality Measurements

Client: Internal	Test Species: U. gallar	municialis
Sample ID: (bC)2	Start Date/Time: 2/2705	1530
Test No.: 050202 mart	End Date/Time: 2-4-05	1415

Concentration	Salinity			Te	Temperature			olved Ox	/gen	рН		
11911		(ppt)			(°C)			(mg/L)		(pH units)		
J.	0	24	48	0	24	48	0	24	48	0	24	48
LL	33.5	242	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	\$.0	8.5	8.27	7.47	10.8
50	33.5	33.1	33.6		14.6	14.4	9.2	8.0	8,5	8.27	7.47	10.8
10	334	37.0	33.6		14.6	14.4	9.3	7.9	8,5	8 26	7.4.9	10.8
20	33.5	33.D	33.6		14.6	14.3	9.4	7.9	8.6	8.24	7.99	10.8
46	33.4	33.1	33.4	7	14.4	14.3	9.5	7.9	8.6	8.23	7.99	8.01
											ļ	ļ

	0	24 48	
Technician Initia	ls: mc	EG SH	
Animal Source/[Date Received:	Missim Bay Field collected	1/28/05
Comments:	0 hrs: 24 hrs:		
	48 hrs:		
QC Check:	AH allolus	Final Review	JR 2/28/05

Client: Test No.: Test Species: Animal Source: Date Received:	Catagad 1 M. gall Field (1/28/0	Buenaventu 52-048-06 oprovincials collected	52	Start Date/Time: End Date/Time: Technician Initials:	2-4-05	1530 1415
Test Chambers:	Sh	ell vials		Sample Volume:	DinL	
First Gamete Rele	ase Time: _	1200				
		S	pawn Informa			
Sex	Number			Condition		
Male	8	G00D				
Female	14	6000				
Egg Fertilization T						
Embryo Stock Der	nsity Calculation	on:				
Number Counted:	44 57 47 42 54 48.8	45 43 43	· ·	an: <u>46</u>		
Initial D Desired Final D	Density: 1,937		<u>1,932</u> er <u>4.83</u> (d			
Prepare the embry use 100 ml of exis	o stock according stock (1 p	ding to the calcu art) and 125 ml	lated dilution to of dilution wat	actor. For example, er (1.25 parts).	if the dilution fa	actor is 2.25,
Percent Division U	lpon Inoculatio	on: <u>90</u> +	Time	e Zero Counts:	48-1	1 QC: <u>93</u>
	Inoculation T	ime: <u>1530</u>	-			
Comments:						
QC Check	Ay HA	·~-		C:-	nal Paviour .T	R. Z/28/A

03 Mar-05 2:38 PM

Bivalve Larval Survival and Development Test Nautilus Environmental (CA) Test Type: Development Organism: Mytilus galloprovincialis (Bay Mussel Copper chloride Material: Protocol: ASTM E724-98 (1999) Reference Toxicant-REF **Endpoint:** Proportion Normal Source: 207 16 12-EC50 8 14 May-04-18 May-04 16 Sep-04 24 Nov-04 Mean: 8.11462 Count: 11 -1s Warning Limit: 4.98065 -2s Action Limit: 1.84669 Sigma: 3.13397 38.62% +1s Warning Limit: 11.2486 +2s Action Limit: 14.3826

Qualit	y Conti	ol 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

CETIS Test Summary

Report Date: 10 Feb-05 10:11 AM Link:

02-7445-0462/050201mprt

Macrocystis G	ermination and	Germ T	ube Growth	Test				Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	11-2901-1037 01 Feb-05 03 Feb-05 01 Feb-05 12:0	O AM	Test Type: Protocol: Dil Water: Brine:	Growth-Germination EPA/600/R-95/136 (1995) Laboratory Seawater Not Applicable		Duration: Species: Source:	48h Macrocystis pyrifera Field Collected	
Sample No: Sample Date: Receive Date: Sample Age:	e: 01 Feb-05		Material: Code: Source: Station:	050201mprt e: Reference Toxicant			Client: Project:	Internal
Comparison S	Summary							
Analysis 18-7920-7826 09-8731-7438	Endpoint Mean Length Proportion Ger	minated	100 180	18 32		ChV 134.164 240.000	MSDp 18.06% 18.08%	Method Dunnett's Multiple Comparison Dunnett's Multiple Comparison
Point Estimate Analysis 05-2437-1155	e Summary Endpoint Mean Length		% Effe		onc-µg/L 18.28950	95% LCL 95.23988	95% UCL 141.81110	Method Linear Interpolation
	Proportion Ger	minated	50 50		77.10530 64.12440	152.66830 254.73730	240.68720 273.85740	Trimmed Spearman-Karber
Test Acceptat	Endpoint		Attrib		Statistic	Acceptab	le Range	Decision
05-2437-1155 18-7920-7826 09-8731-7438 11-2737-3711 18-7920-7826	Mean Length Proportion Germinated Proportion Germinated		Control Response Control Response Control Response Control Response MSDp		e 10.35 e 0.69800 e 0.69800 0.18058	10 - N/A 10 - N/A 0.7 - N/A 0.7 - N/A N/A - 0.2	···	Passes acceptability criteria Passes acceptability criteria Fails acceptability criteria Fails acceptability criteria Passes acceptability criteria
09-8731-7438	Proportion Ger	minated	MSDp		0.18078	N/A - 0.2		Passes acceptability criteria
Mean Length Conc-µg/L	Summary Control Type	Reps	Mean	Minimum	Maximur	n SE	SD	cv
0 18 32 56 100 180 320	Lab Control	5 5 5 5 5 5 5 5	10.35 10 11.35 13 9.25 5.45 2.85	9.5 9.25 8.5 12 8.25 4 2.5	11.5 10.75 13.75 14.25 10.5 7.5 3.25	0.35 0.3162 1.0741 0.3953 0.4031 0.6295 0.1275	0.7826 0.7071 2.4018 0.8839 0.9014 1.4076 0.2850	7.56% 7.07% 21.16% 6.80% 9.74% 25.83% 10.00%
Proportion Ge	erminated Sumr	nary						
Conc-µg/L 0 18 32 56 100 180 320	Control Type Lab Control	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.69800 0.61600 0.71400 0.78000 0.70600 0.57800 0.23800	Minimum 0.61000 0.44000 0.56000 0.71000 0.66000 0.51000 0.17000	0.76000 0.79000 0.83000 0.87000 0.74000 0.66000 0.31000	n SE 0.02596 0.05555 0.05192 0.02793 0.01536 0.02728 0.02354	SD 0.05805 0.12422 0.11610 0.06245 0.03435 0.06099 0.05263	CV 8.32% 20.17% 16.26% 8.01% 4.87% 10.55% 22.11%

000-089-125-2

CETIS Test Summary

Report Date:

10 Feb-05 10:11 AM

Link:

02-7445-0462/050201mprt

Mean Lengtl	n 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 (Serminated Deta	il				
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

Comparisons:

Page 1 of 4 10 Feb-05 10:11 AM

Report Date: Analysis:

09-8731-7438/050201mprt

CETIS Analysis Detail

Macrocystis Germination and C	Serm Tube G	Frowth Test					N	lautilus Env	ironmental (CA)
Endpoint	Analysis	Туре	Sa	mple L	ink Cor	ntrol Link	Date Analyzed	Vers	ion
Proportion Germinated	Comparis	on	02	-7445-0	462 02-7	7445-0462	10 Feb-05 10:1	O AM CET	ISv1.025
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 Ra	nge	Decis	ion				
Control Response	0.69800	0.7 - N/A		Fails	acceptabili	ty criteria			
MSDp	0.18078	N/A - 0.2		Passe	s acceptal	bility criteria			
ANOVA Assumptions									
Attribute Test		Statistic Cri	tical	Р	Level	Decisi	on(0.01)		

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)	
ANOVA Table							
Distribution	Shapiro-Wilk W	0.98396	0.910	04 0.909	03	Normal Distribution	
Variances	Bartlett	8.41473	16.81	190 0.209	27	Equal Variances	

Alto IA Tubio						
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 Comp	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 Summa	ary			Origi	nal Data		Transformed Data				
Conc-µg/L	Conc-µg/L Control Type Count			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	

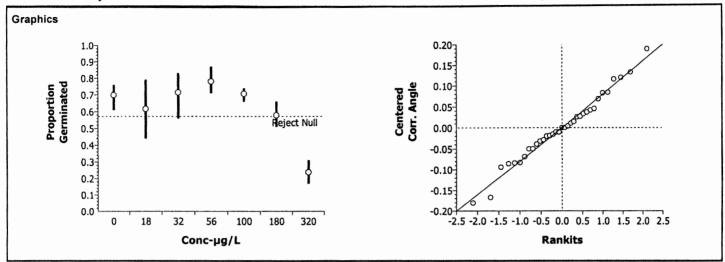
Data Detail											
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Control	0.69000	0.74000	0.69000	0.61000	0.76000					
18		0.79000	0.60000	0.62000	0.44000	0.63000					
32		0.72000	0.82000	0.83000	0.56000	0.64000					
56		0.71000	0.81000	0.74000	0.77000	0.87000					
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					

Comparisons:

Page 2 of 4 10 Feb-05 10:11 AM

Report Date: Analysis:

09-8731-7438/050201mprt



Page 1 of 1

Report Date:

10 Feb-05 10:11 AM

Analysis:

11-2737-3711/050201mprt

	Macrocystis	Germination	and	Germ	Tuhe	Growth	Tact
ı	Wacrocysus	Germmation	anu	Germ	inne	Growth	1621

CETIS Analysis Detail

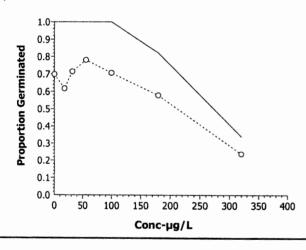
Nautilus	Environmental	(CA)
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Endpoint		sis Type				ol Link	Date Analyzed	Version
Proportion Germinate	Karber	02-7445-0462	02-7445-0462 10 Feb-05 10:11 AM CETISv1.02			CETISV1.025		
Spearman-Karber C	ptions		P	oint Estin	nates			
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	E	C50/LC50	95% LCL	95% UCL
Control Threshold	0.302	33.86%	2.421808	0.00785802	2	64.12440	254.73730	273.85740

Test Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	0.69800	0.7 - N/A	Fails acceptability criteria

Data Summ	ary		Calculated Variate(A/B)							
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	Α	В	
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	

Graphics



Analyst:

____ Approval: 3/3/05

Comparisons:

Page 3 of 4

Report Date:

10 Feb-05 10:11 AM

Analysis:

18-7920-7826/050201mprt

Macrocystis	Germination a	nd Germ	Tube Growtl	n Test					Na	utilus Enviro	nmental (CA
Endpoint		An	alysis Type		Sample	Link C	ontrol l	Link Date	e Analyzed	Version	n
Mean Length			mparison		02-7445		2-7445-	0462 10 F	eb-05 10:1	AM CETIS	/1.025
Method				Transform	n Z	NOEL	LC	EL To	xic Units	ChV	MSDp
Dunnett's Mu	Itiple Compariso	on C	> T Untr	ansformed		100	18	0 1.0	0	134.164	18.06%
Test Accepta	ability										
Attribute				Acceptable		ision					
Control Resp	onse			10 - N/A		ses accept	•				
MSDp		0.1	18058	N/A - 0.2	Pas	ses accept	tability o	criteria			
ANOVA Assu	umptions										
Attribute	Test		Stat	istic	Critical	P Level	ı	Decision(0.	01)		
Variances	Bartlett		16.7	0908	16.81190	0.01041	E	Equal Variar	nces		
Distribution	Shapiro-V	Vilk W	0.96	961	0.91004	0.50544	1	Normal Distr	ribution		
ANOVA Tabl	е										
Source	Sum o	f Squares	Mean Sq	uare D	F Stati	stic P I	Level		ision(0.05)		
Between	373.76	07	62.29345	6	41.38	0.0	00000	Sigr	nificant Effec	ot	
Error	42.15		1.505357	2	8						
Total	415.91	0713	63.79881	0 3	4						
Group Comp	parisons										
Control	vs Conc-µ	g/L	Statistic	Critical	P Level	MSD		Decisio	n(0.05)		
Lab Control	18		0.45104	2.40857	> 0.0500	1.869		Non-Sig	nificant Effe	ct	
	32		-1.2887	2.40857	> 0.0500	1.869		Non-Sig	nificant Effe	ct	
	56		-3.4150	2.40857	> 0.0500	1.869		Non-Sig	nificant Effe	ct	
	100		1.41757	2.40857	> 0.0500	1.869		Non-Sig	nificant Effe	ct	
	180		6.31461	2.40857	<= 0.0500	1.869		Significa	ant Effect		
	320		9.66522	2.40857	<= 0.0500	1.869		Significa	ant Effect		
Data Summa	ary			C	Priginal Data				Transf	ormed Data	
Conc-µg/L	Control Type	Count	Mean	Minim	um Maximu	m SD		Mean	Minimum	Maximum	SD
0	Lab Control	5	10.35	9.5	11.5	0.7826	6				
18		5	10	9.25	10.75	0.707	1				
32		5	11.35	8.5	13.75	2.4018	8				
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	0				
Data Detail											
Conc-µg/L	Control Type		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					

Analyst: AH

Approval: 3/3/05

CETIS Analysis Detail

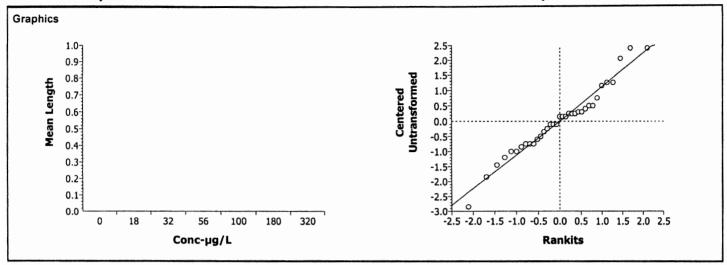
CETIS Analysis Detail

Comparisons:

Page 4 of 4 10 Feb-05 10:11 AM

Report Date: Analysis:

18-7920-7826/050201mprt



Analyst: A.H

Page 1 of 1

Report Date:

10 Feb-05 10:11 AM

Analysis:

05-2437-1155/050201mprt

- 1				
	Macrocystis Gern	nination and	Germ Tube	Growth Test

CETIS Analysis Detail

Nautilus Environmentai (C	Nautilus	Environmental	(CA
---------------------------	----------	---------------	-----

Endpoint		Analysis Typ	oe .	Sample Link	Control Link	Date Analyzed	Version
Mean Length		Linear Interp	olation	02-7445-0462	02-7445-0462	10 Feb-05 10:11 AM	CETISv1.025
Linear Interpol	ation Options						
X Transform	Y Transform	Seed	Resamples	Expanded CL	Method		
Linear	Linear	7090378	200	Yes	Two-Point Inte	erpolation	

Test Acceptability

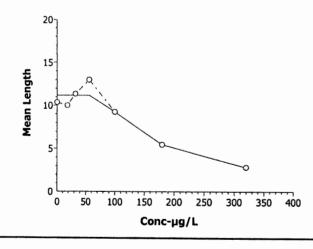
rest Acceptability			
Attribute	Statistic	Acceptable Range	Decision
Control Response	10.35	10 - N/A	Passes acceptability criteria

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 Summ	nary			Cal	culated Varia	te	
Conc-µg/L	Control Type	Count	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

Graphics



Analyst:_AH

Approval: A 13/05

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

3-Feb-05

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

Sample Source: Internal

Sampled:

Sample Station: CuCl₂

											- Cum	pie otation		
Random	Number	Number												
Number	Counted	Germinated				Tube Leng	th Measure	ments (mic	rometer uni	ts)			Calibration	Mean Tub
1	100	61	3	5	4	4	5	T 2	T	7			Factor	Length (μn
2	100	64	4	4	4	4	3	5	3	4	3	4	2.5	9.5
3	100	62	2	2	3	3	3		3	3	4	4	2.5	9.5
4	100	82	7	3	4	4	3	2	2	2	2	2	2.5	5.75
5	100	21	1	2	1 1	1 1	1	7	4	5	4	4	2.5	11.25
6	100	74	4	4	5	5	5	1	1	1	1 1	1	2.5	2.75
7	100	69	5	5	5	4		5	4	6	5	5	2.5	12
8	100	56	3	1	1 1	1 1	3	5	6	4	4	5	2.5	11.5
9	100	26	1	1	+ 1	1 1	1 1	2	1 1	2	3	1	2.5	4
10	100	24	<u> </u>	1	1 1	2	1 1	1 1	1 1	1 1	1	111	2.5	2.5
11	100	77	4	6	5	6	1 1	1 1	1	1	1	1	2.5	2.75
12	100	71	5	5	5	4	5	5	5	6	6	6	2.5	13.5
13	100	44	4	4	4	3	6	5	6	6	4	5	2.5	12.75
14	100	. 63	5	3	3	5	4	4	3	4	4	4	2.5	9.25
15	100	66	4	5	2	3	3	5	4	5	4	4	2.5	10.5
16	100	31	2	1	1	1	2	3	3	4	4	3	2.5	8.5
17	100	51	3	3	2	2	1	3	1 1	1	1	1	2.5	3
18	100	69	4	4	4	4	3	6	2	2	2	3	2.5	5.75
19	100	56	3	3	3	2	2	2	5	4	5	3	2.5	10.5
20	100	83	6	6	6	6	5	4	5	4	5	5	2.5	8.5
21	100	66	3	3	4	2	2	2	5	6	6	5	2.5	13.75
22	100	76	4	4	3	4	4	5	1 1	6	3	4	2.5	7.5
23	100	54	3	2	2	1	1	2	3	3	4	5	2.5	9.75
24	100	81	7	4	4	4	4	7	1	1 1	3	1	2.5	4.25
25	100	17	4	1	1	1	1	1	6	5	5	4	2.5	12.5
26	100	74	3	5	5	6	3		1	1 1	1	1	2.5	3.25
27	100	73	2	2	4	5	2	3	3	4	5	5	2.5	10.5
28	100	74	3	6	4	4	4	4	3	4	4	4	2.5	8.25
29	100	79	4	4	3	5	3	3	3	4	2	4	2.5	9.5
30	100	62	5	4	4	4	5	4	4	4	3	4	2.5	9.25
31	100	60	6	6	4	3	4	4	3 5	4	4	4	2.5	10.25
32	100	87	7	5	6	6	5	6	4	4	3	4	2.5	10.75
33	100	72	6	6	5	3	7	6	7	5	7	6	2.5	14.25
34	100	72	5	5	2	4	5	5	5	7	3	5	2.5	13.75
35	100	68	3	4	4	5	5	6	3	2	3	4	2.5	10.5
									٥		2	4	2.5	9.5

QC Check: 4H 247 05

Final Review: 3/3/05

Analyst:

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			-	Γube Lengtl	n Measuren	nents (micro	ometer units	5)			Calibration Factor	Mean Tube Length (μm)
1	100	61	3	5	н	4	5	3		4	3	4	2,5	#DIV/0!
2	100	64	4	7	4	4	3	5	3	3	<u> </u>	4	7.5	#DIV/0!
3	100	62	2	2	3	3	3	<u>5</u>	3	2	2	2		#DIV/0!
4	100	54 69 32	37	2 3	¥ 4	N 4	3 5	57	X 4	4 5	*4. 4	3 4		#DIV/0!
5	100	21	3 1	2	3.0	1	3 2	13.1	l	,	1	1		#DIV/0!
6	100	74	4	4	5	5	5	5	н	Ċ	5	5		#DIV/0!
7	100	69	5	5	5	ij	3	4	6	4	4	5		#DIV/0!
8	100	56	3	i	1	1	1	3	1	2	3	1		#DIV/0!
9	100	26	١	,	i	ì	i	1	,		1	1		#DIV/0!
10	100	24	1	1	1	2	<u> </u>	1	ī		1	1		#DIV/0!
11	100	77	4	6	5	-	S	5	5	6	6	6		#DIV/0!
12	100	71	5	5	5	4	6	5	6	(4	5		#DIV/0!
13	100	44	7	7	ч	3	3	4	3	ч	મ	4		#DIV/0!
14	100	63	5	3	3	5	4 .	5	ч	2	ч	н		#DIV/0!
15	100	66	4	5	2	3	્રુ	.3	W	lt	4	5,		#DIV/0!
16	100	3/	٨	1	l	l	2	l	l	\	\	1		#DIV/0!
17	100	51	3	3	2	2	1	3	2	2	3	3		#DIV/0!
18	100	69	Н	4	4	4	3	6	5	4	5	ર		#DIV/0!
19	100	56	3	3	3	2	2	2	5	14	5	5		#DIV/0!
20	100	\$3	6	6	6	6	5	4	5	6	6	5		#DIV/0!
21	100	66	3	3	ч		3	2	1	6	3	4		#DIV/0!
22	100	76	4	4	3	Ц	4	5	3	3	4	5		#DIV/0!
23	100	54	3	γ	2	\	ì	2	1	\	3	. 1		#DIV/0!
24	100	81	7	7	Ч	ч	ч	7	6	5	5	4		#DIV/0!
25	100	17	Ч			\	L		1		11	1		#DIV/0!
26	100	74	3	70	5	ی	3	3	3	4	5	5		#DIV/0!
27	100	73	2	Λ	ч	\$	2	3	3	Ц	4	4		#DIV/0!
28	100	74	3	J	ц	ц	4	4	3	4	2	4		#DIV/0!
29	100	79	4	7	્ર	5	3	3	4	4	3	14		#DIV/0!
30	100	62	5	H	ч	4	5	ч	3	4	4	4		#DIV/0!
31	100	60	6	6	4	3	4	4	5	4	3	4		#DIV/0!
32	100	87		5	6	G	5	6	4	5		6		#DIV/0!
33	100	72	٤	6	5	3		6	1	7	3	5	 	#DIV/0!
34	100	72	5	5	2	4	2	5	5	ч	3	4	<u> </u>	#DIV/0!
35	100	68	3	4	4	5	5	6	3	2	2	4	V	#DIV/0!

OC Check: AH 2/3/5

Final Review: 2/3/0

Analyst: _SH

Page 1 of 1

CETIS Data Worksheet

Report Date:

31 Jan-05 12:53 PM

02-7445-0462/050201mprt Link:

Nautilus	Environmental	(CA)

Macro	ystis (Germinatio	n and	Germ Tube	Growth T	est					Nautilus Environmen	ntal (CA)
Start D	ate:	01 Feb-05	5	Spec	cies: Ma	acrocy	ystis pyrifera		Sample Code	: 05	50201mprt	
Ending	Date:	03 Feb-05	5	Prot	ocol: EF	PA/600	0/R-95/136 (199	95)	Sample Sour	ce: Re	eference Toxicant	
Sample	Date:	01 Feb-05	5	Mate	erial: Co	pper	chloride		Sample Station	n:		
Conc-	μg/L	Code Rep	Pos	# Counted	# Germin	nated	Mean Length !	CalFactor			Notes	

Conc-µg/L	Code	Rep	Pos	# Counted	# Germinated	Mean Length	CalFactor	Notes
0	LC	1	7	100			1	
0	LC	2	26	100	,		1	4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
0	LC	3	18	100			1	
0	LC	4	1	100	!		1	Nilson *
C	LC	5	22	100			1	A STATE OF THE PROPERTY OF THE
18		1	29	100	•		1	Control of the Contro
18	j.	2	31	100			1	
18		3	30	100) - 	1	3 man, 100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
18		4	13	100			1	
18	ĺ	5	14	100			1	741378
32		1	33	100			1	
32	:	2	4	100	1		1	
32	İ	3	20	100			1	
32		4	19	100	_1		1	
32		5	2	100		2	1	
56		1	12	100			1	
56		2	24	100	•		1	The state of the s
56	ş	3	6	100	;		1	
56	1	4	11	100			1	
56		5	32	100	1		1	
100		1	35	100			1	
100)	2	34	100			1	
100)	3	15	100		1	1	
100		4	28	100		,	1	
100		5	27	100	!"		1	The second secon
180		1	3	100			1	
180);	2	17	100			1	
180		3	23	100		!	1	The second section and the second sec
180)	4	8	100	1		1	
180		5	21	100		i	1	
320		1	10	100	1		1	
320)	2	5	100			1	
320)	3	. 9	100	i		1	The second secon
320		4	25	100	1		1	
320)	5	16	100			1	The state of the s

QC-RG

Marine Chronic Bioassay

Water Quality Measurements

Client:

Internal

Test Species: Macrocystis pyrifera

Sample ID:

CuCl₂

Start Date/Time: 2/1/2005

1 (530

Test No:

050201mprt

End Date/Time: 2/3/2005

1 1200

Analyst:

RG

Test Type: Kelp Spore Germination and Growth

Concentration		Ini v al R	eadings			Final R	eadings	
(µg/L)	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	33,8	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. y	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 213/05

Einel Beview

2/3/05

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Client. Coty of Buenaventura, Internal	Start Date/Time: 2-(-05 / 1530
Test No. 0502-023-7026, 050201 mprt	End Date/Time: 2-3-05 / 1200
Tech. Initials. RG	Test Species: Macrocystis pyrifera
Anni Anni Anni Anni Anni Anni Anni Anni	
Date Collected: 2 11/05	
Keip Collector: Dave Gutoff	
Collection Location: La Jolla Cove	
Conditions (weather, etc.): Sunny, moderate to s	strong Swell - 4 'sets 3-4' vis. Scripps pier
Dilution Water Source (Client I:):	scripps pier
Dilution Water Source (Client II:):	
Dilution Water Source (Client III:):	
Dilution Water Source (Reference Toxicant):	Martin 4 (1986) 1 (19
Time of Initial Rinsing and Dessication :	10:15 (keep kelp from each collecting bag separated)
Time of Rinsing and Transfer to Release Beakers:	14/5 (keep kelp from each collecting bag separated)
Conditions of Zoospore Density and Motility (beaker 1):	Densily Low motility good
Time of Blade Removal From Release Beaker 1/Beaker 2 (if needed):	1515
·	Annual Control
Density Counts (target = 90): 14 17 13 23	19 Mean: 17.6
Mean 17.6 · 10,000 = 17 6000 spores per ml (Density of Spore	•
spores per fill (Defisity of Spore	e Release)
Calculate the volume of spore stock to add to each test container:	
(225,000 spores/container)/(density of spore release) = 1.25 ml stock/c	container
In cases of a spore release = 900,000 spores/ml, the volume is 0.25 ml.	
The cases of a spore release to so, oco sporessimi, the volume is 0.20 mil.	
If density > 900,000 spores/ml, calculate a dilution factor, x, and create a n	ew spore stock of 900,000 cells/ml and add 0.25 ml:
Density of spore release * 0.25 ml = 1 container	spores =(x) 225,000 spores
	223,000 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 and MBP required volume of no greater than 1% of the total test solution voml 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: (530) Amount inoculated	d: .5 mc 24-hour germination check: <u>647</u> 6
Comments:	

QC Check: AH 2/3 05 Final Review: AH	410/05

Nautilus Environmental, LLC 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

Kelp Spore Germination & Growth Worksheet

Marine Chronic Bioassay

Report Date:

03 Mar-05 2:46 PM

Test Type: Protocol:	Growth-Germ EPA/600/R-95		-		ystis pyrifera (Giar ion Germinated	nt Kelp)	Material: Source:	Copper chlor Reference To	
	400								
	4007								-
	350 300								
	250						-		
	200		•						
c	1		/			/			/
בטצט	100						•		
	50-							-	
	20 Apr-04	4	4	4	4	4	4	4	2
	pr-0	04 May-04	Jun-04	20 Jul-04	Sep-04-	Sep-04-	Oct-04	Nov-04	Feb-05-
	0 V	Σ̈́	15 Jւ	20 J	14 SA	Ϋ́	02 0		01 Fe
	7	9		. •	Ä	78	0	02	Õ
	Mean:	175.366	Count: 9		-1s Warning L	imit: 86.5	6604 -2s	Action Limit:	-2.2454
	Sigma	: 88.8059	CV: 50.6	4%	+1s Warning L		.172 +2s	Action Limit:	352.978

Qualit	y Contr	ol 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

Report Date:

03 Mar-05 2:46 PM

Macrocystis Germination and Germ Tube Growth Test Nautilus Environmental (CA) Organism: Macrocystis pyrifera (Giant Kelp) Copper chloride Test Type: Growth-Germination Material: Protocol: EPA/600/R-95/136 (1995) Endpoint: Mean Length Source: Reference Toxicant-REF 400-350-300-250-200-150 100 50 14 Sep-04-05 Oct-04 15 Jun-04 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	y Contr	ol 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	148.0000	12.89970	0.19388			16-6144-9264	14-9178-8375
4		Jul	20	272.4359	137.3356	2.06416	(+)	(+)	16-4174-1254	13-3196-6978
5		Sep	14	158.8692	23.76890	0.35725			10-8312-4875	06-7384-9813
6			28	139.5062	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	101.0959	-34.0044	-0.51109			08-0075-9181	11-1943-7189
9	2005	Feb	1	177.1053	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

Calscience Work Order No.: Subject:

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

CA-ELAP ID: 1230

NELAP ID: 03220CA

CSDLAC ID: 10109

SCAQMD ID: 93LA0830

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL:(714) 895-5494 •

FAX: (714) 894-7501





Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: Units: 02/02/05 05-02-0122 EPA 3005A Filt. EPA 6020 ug/L

Project: SCRE

Page 1 of 2

Client Sample Number				ab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Ba	tch ID
SCRE A-2	· + ·	e on house	05-02-01	122-1	01/31/05	Aqueous	02/04/05	02/04/05	050204	L02
Parameter	Result	RL	DF	Qual	Parameter		Resu	lt 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	1 1 1 2 2	erija Sir.	05-02-01	122-2	01/31/05	Aqueous	02/04/05	02/04/05	050204	L02
<u>Parameter</u>	Result	RL	<u>DF</u>	Qual	Parameter		Resu	lt RL	DF	Qual
Copper	4.87	1.00	1		Selenium		4.26	1.00	1	
Vickel	6.10	1.00	1		Zinc		21.9	5.0	1	
SCRE B-3			05-02-01	122-3	01/31/05	Aqueous	02/04/05	02/04/05	050204	L02
<u>Parameter</u>	Result	RL	DF	Qual	Parameter		Resu	lt RL	<u>DF</u>	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		The second	05-02-01	122-4	01/31/05	Aqueous	02/04/05	02/04/05	050204	L02
<u>Parameter</u>	Result	<u>RL</u>	DF	Qual	Parameter		Resu	lt 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: Work Order No: Preparation: Method: Units: 02/02/05 05-02-0122 EPA 3020A Total EPA 6020 ug/L

Project: SCRE

Page 2 of 2

Client Sample Number				ab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Ba	atch ID
SCRE A-2			05-02-01	22-1	01/31/05	Aqueous	02/04/05	02/04/05	050204	4L02
<u>Parameter</u>	Result	RL	DF	Qual	<u>Parameter</u>		Resul	t RL	DF	Qual
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			05-02-01	22-2	01/31/05	Aqueous	02/04/05	02/04/05	050204	4L02
Parameter	Result	<u>RL</u>	DF	<u>Qual</u>	<u>Parameter</u>		Resul	t RL	DF	Qual
Copper	9.70	1.00	1		Selenium		4.48		1	
Nickel	6.60	1.00	1		Zinc		23.8	5.0	1	
SCRE B-3		X.	05-02-01	122-3	01/31/05	Aqueous	02/04/05	02/04/05	050204	\$L02
<u>Parameter</u>	Result	RL	DF	Qual	Parameter		Resul	t RL	DF	Qual
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	The state of the s	100	05-02-01	122-4	01/31/05	Aqueous	02/04/05	02/04/05	050204	\$L02
Parameter	Result	RL	DF	Qual	Parameter		Resul	t RL	DF	Qual
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	A CONTRACT OF THE PARTY OF THE	الله المعاملة	096-06-0	03-767	N/A	Aqueous	02/04/05	02/04/05	050204	L02
Parameter	Result	RL	<u>DF</u>	Qual	Parameter		Resul	t RL	DF	Qual
Copper	ND	1.00	1		Selenium		ND	1.00	1	
Nickel	ND	1.00	1		Zinc		ND	5.00	1	

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Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No:

02/02/05 05-02-0122

Project: SCRE

Page 1 of 2

Client Sample Number		Lab S	ample Nur	nber Da Colle		Matrix		
SCRE A-2	* TIME	05-0	2-0122-1	01/3	0/6/03/5-77/7/5	queous		
And the second s	ne de la companya de la companya de la companya de la companya de la companya de la companya de la companya de			<u> </u>			The second secon	More difference
arameter	Result	RL	<u>DF</u>	Qual	<u>Units</u>	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	238	1.0	1		mg/L	N/A	02/03/05	EPA 160.2
yanide, Total	ND	0.050	1		mg/L	N/A	02/09/05	EPA 335.2
arbon, Total Organic	5.9	0.5	1		mg/L	N/A	02/02/05	EPA 415.1
arbon, Dissolved Organic	6.5	0.5	1	В	mg/L	N/A	02/02/05	EPA 415.1
SCRE B-1		05-0	2-0122-2	01/3	1/05 A	queous	The second secon	
<u>Parameter</u>	Result	RL	<u>DF</u>	Qual	<u>Units</u>	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	4.0	1.0	1		mg/L	N/A	02/03/05	EPA 160.2
yanide, Total	ND	0.050	1		mg/L	N/A	02/09/05	EPA 335.2
arbon, Total Organic	11	0.50	1		mg/L	N/A	02/02/05	EPA 415.1
Carbon, Dissolved Organic	9.5	0.5	2-0122-3	B 01/3	mg/L	N/A	02/02/05	EPA 415.1
OORE B-0	Think	mark water	2-0122-3	Valletie, W. Ser.	1700	AUTOUS	Literate Policy appoils.	DON THE RESERVE
Parameter	Result	<u>RL</u>	DF	Qual	<u>Units</u>	Date Prepared	Date Analyzed	Method
Solids, Total Suspended	462	1.0	1		mg/L	N/A	02/03/05	EPA 160.2
yanide, Total	ND	0.050	1		mg/L	N/A	02/09/05	EPA 335.2
arbon, Total Organic	4.4	0.5	1		mg/L	N/A	02/02/05	EPA 415.1
arbon, Dissolved Organic	5.7	0.5	1	В	mg/L	N/A	02/02/05	EPA 415.1
SCRE C-1		06-0	2-0122-4	01/3	1/05 A	queous	Alice of the 22 Logical Association	
SCRE C-1	Result	06-0 <u>RL</u>	2-0122-4 DF	01/3	1/05 A	Queous Date Prepared	Date Analyzed	Method
arameter	Result 275	e electricistic de la contraction de la contract	· · · · · · · · · · · · · · · · · · ·			EL VEL PARTY NEED	Date Analyzed 02/03/05	Method EPA 160.2
To the second se		RL	<u>DF</u>		<u>Units</u>	Date Prepared		
arameter olids, Total Suspended	275	<u>RL</u> 1.0	DF 1		Units mg/L	Date Prepared	02/03/05	EPA 160.2

RL - Reporting L

DF - Dilution Factor ,

Qual - Qualifier





Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No:

02/02/05 05-02-0122

Project: SCRE

Page 2 of 2

Client Sample Number		Lab S	ample Num		ate ected	Matrix		
Method Blank	·	in a state of the state of the		N	A /	Aqueous	la Elecki	e de la companya del companya de la companya del companya de la co
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 Carbon, Total Organic Carbon, Dissolved Organic	ND ND 0.86	0.050 0.50 0.50	1 1 1		mg/L mg/L mg/L	N/A N/A N/A	02/09/05 02/02/05 02/02/05	EPA 335.2 EPA 415.1 EPA 415.1

Muhan_

RL - Reporting Limit , DF - Dilution Factor ,

Qual - Qualifiers

alscience nvironmental aboratories, Inc.

Quality Control - Spike/Spike Duplicate



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: 02/02/05 05-02-0122 EPA 3020A Total EPA 6020

Project SCRE

Quality Control Sample ID	Matrix	Instrument	Date Prepared	. t	Date Analyzed	MS/MSD Batch Number
05-02-0183-1	Aqueo	us ICP/MSA	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



Quality Control - PDS / PDSD



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received Work Order N Preparation: Method: 02/02/05 05-02-0122 EPA 3020A Total EPA 6020

Quality Control Sample ID	Matrix	Instrument	Date Prepared	C	ate Analyzed	PDS/PDSD Batch Number
05-02-0183-1	Aqueous	ICP/MS A	02/04/05		02/04/05	050204S02
<u>Parameter</u>	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	

alscience nvironmental aboratories, Inc.

Quality Control - Spike/Spike Duplicate



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No:

02/02/05 05-02-0122

Project: SCRE

	with the second
Matrix: Aqueous	

Parameter	Method	Quality Control Sample ID	<u>Date</u> <u>Analyzed</u>	<u>Date</u> Extracted	MS% REC	MSD % REC	%REC CL	<u>RPD</u>	RPD CL	Qualifiers
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	

MANA_

RPD - Relative Percent Difference , CL - Control Limit



Quality Control - Duplicate



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No:

02/02/05 05-02-0122

Project: SCRE

Parameter	Mathad	OC Sample ID	Data Applymed	Sample Cone	DUD Cone	PPD	BBD CI	Qualifiera	
Matrix: Aqueous							and and the second of	o Pri democratici Archillo	

Solids, Total Suspended EPA 160.2 05-02-0169-1 02/03/05 6500 6200 4 0-25

Muhan_

CL - Control Limi



Quality Control - LCS/LCS Duplicate



Nautilus Environmental

5550 Morehouse Drive, Suite 150

San Diego, CA 92121

Date Received:

Work Order No:

Preparation:

Method:

N/A 05-02-0122

EPA 3020A Total

EPA 6020

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyze	ed	LCS/LCSD Bato Number	h
096-06-003-767	Aqueous	ICP/MS A	02/04/05	02/04/0	5	050204L02	din .
Parameter	LCS %RE	C LCSD 9	<u>6REC</u> %R	EC CL	RPD	RPD CL	Qualifiers
Copper	89	90	86	0-120	2	0-20	
Nickel	87	89	8	0-120	2	0-20	
Selenium	85	88	86	0-120	3	0-20	
Zinc	89	88	86	0-120	0	0-20	



Quality Control - LCS/LCS Duplicate



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No:

N/A 05-02-0122

Matrix: Aqueous									and the state of t
<u>Parameter</u>	Method	Quality Control Sample ID	<u>Date</u> Extracted	<u>Date</u> <u>Analyzed</u>	LCS % REC	LCSD % REC	%REC CL		<u>PD</u> CL Qual
Cyanide, Total	EPA 335.2	099-05-061-1,584	N/A	02/09/05	108	100	80-120	9	0-20

alscience nvironmental Quality aboratories, Inc.

nvironmental Quality Control - Laboratory Control Sample



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No:

N/A 05-02-0122

Matrix: Aqueous	Part T							Land on the same	ار المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم ا المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم المسلم
Parameter	Method	Quality Control Sample ID	<u>Date</u> <u>Analyzed</u>	<u>Date</u> <u>Extracted</u>	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
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	



Glossary of Terms and Qualifiers



Work Order Number: 05-02-0122

Qualifier	<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.
Α	Result is the average of all dilutions, as defined by the method.
В	Analyte was present in the associated method blank.
С	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
Н	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
×	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.



WORK ORDER #:

05 - 0 2 - 0 1 2 2

Cooler _____ of ____

, SAMPLE REC	EIPT FORM
CLIENT: Mautilus	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.
TT O Temperatore starik.	milia.
CUSTODY SEAL INTACT: Sample(s): Cooler: No (Not Intact): Not Applicable (N/A): Initial:
SAMPLE CONDITION:	
Chain-Of-Custody document(s) received with samples	
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
Z C-1 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
	Surface	18.3	1.2	2160	7.89	9.3
B-1	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 W	/ater		
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



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	EC50 (µg/L total copper) ^{c, t}
A-2	NR	NR	NR	NR
	Lab Control Salt Control	ND NM	95 +/- 2 93 +/- 4	
	0 (Unspiked Sample) 12	9.70 NM	86 +/- 3 91 +/- 3	92.5
B-1	19 32	NM NM	92 +/- 2 88 +/- 6	(86.8-98.0)
	54 90 150	75.8 122 203	79 +/- 11 7.2 +/- 7 0.00 +/- 0.00	
	Lab Control Salt Control 0 (Unspiked Sample)	ND NM 3.23	95 +/- 2 93 +/- 2 86 +/- 5	
B-3	12 19	NM 21.5	92 +/- 2 86 +/- 7	31.6 (28.2-34.8)
	32 54 90	32.5 56.8 NM	42 +/- 23 1.8 +/- 2 0.00 +/- 0.00	(232 2 113)
	150 Lab Control	NM ND	0.00 +/- 0.00 95 +/- 2	
	Salt Control 0 (Unspiked Sample) 12	NM 3.11 NM	95 +/- 2 83 +/- 5 95 +/- 4	
C-1	19 32	21.9 39.8	89 +/- 5 1 5 +/- 14	31.7 (28.1-34.3)
	54 90 150	57.0 NM NM	0.00 +/- 0.00 0.00 +/- 0.00 0.00 +/- 0.00	
	0 (Lab Control) 1.8	ND NM	91 +/- 3 93 +/- 3	
_aboratory Polished Seawater (PSW)	3.0 5.0 8.4	NM NM 11.3	91 +/- 3 94 +/- 3 91 +/- 4	17.9 (17.5-18.2)
- January (1 ori)	14 23	17.4 28.2	48 +/- 38 0.00 +/- 0.00	(
	39 0 (Lab Control) 2.5	NM NM NM	0.00 +/- 0.00 95 +/- 2 89 +/- 5	
Copper Reference Toxicant Test	5.0 10	NM NM	33 +/- 10 0.00 +/- 0.00	4.30 (4.12-4.48)
	20 40	NM NM	0.00 +/- 0.00 0.00 +/- 0.00	

^a Nominal spiked concentrations do not include the background concentrations of copper in the field samples.

NM - Not Measured.

Values in bold indicate a significant decrease in normal development was observed in that test concentration relative to the control.

^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.

ND - Not Detected.

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

STATISTICAL ANALYSIS SUMMARIES & RAW BENCH DATASHEETS

CETIS Test Summary

Report Date:

01 Mar-05 2:59 PM

06-8984-4527/0502-049a Link:

Bivalve Larval	Survival and I	Developm	ent Test					Nautilus Environmental (CA
Test No:	19-5018-1302		Test Type:	Developme	ent		Duration:	47h
Start Date:	02 Feb-05 03:	30 PM	Protocol:	ASTM E72	4-98 (1999)		Species:	Mytilus galloprovincialis
Ending Date:	04 Feb-05 02:	15 PM	Dil Water:	Scripps Se	awater		Source:	Mission Bay
Setup Date:	02 Feb-05 03:	30 PM	Brine:	Forty Fatho	oms			
Comments:	EC50 calculati	ons are ba	ased on meas	ured copper	concentrat	ions.		
Sample No:	18-3718-3930		Material:	Estuarine N	Monitoring S	ample	Client:	City of Buenaventura
Sample Date:	31 Jan-05 02:3	30 PM	Code:	0502-049a			Project:	
Receive Date:	31 Jan-05 10:	10 PM	Source:	City of Bue	naventura			
Sample Age:	49h		Station:	WER (B-1)				
Comparison S	ummary							
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
16-3103-0847	Proportion No	mal	< 75.8	75.	8	N/A	9.67%	Steel's Many-One Rank
Point Estimate	Summary							
Analysis	Endpoint		% Effe	ect Coi	nc-µg/L	95% LCL	95% UCL	Method
09-2876-6153	Proportion No	mal	25	81.	18239	74.50291	86.56600	Linear Regression
			50	92.	52814	86.79805	97.97511	
Proportion No	rmal Summary	1						
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximur	n 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 No	rmal Detail							
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
	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

Comparisons:

Page 1 of 1 01 Mar-05 2:59 PM

Report Date:

Analy	sis:	16-3	103-0	847/05	02-049a
					11011

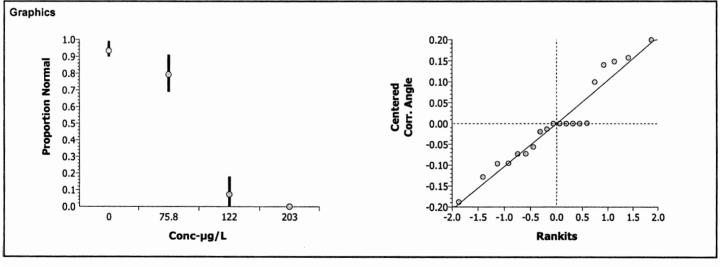
Bivaive Larvai Survivai and D	Sivalve Larvai Survival and Development Test Naudius Environmental (CA)										
Endpoint	Analysis	Туре	Sample Li	nk Co	ntrol Link	Date Analyzed	V	ersion			
Proportion Normal	Comparis	Comparison		4527 06-8984-4527		01 Mar-05 2:58 PM		ETISv1.025			
Method	Alt H	Data Transform	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 Assumpt	ions				
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 Comp	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 Summa	ary		Original Data				Transformed Data				
Conc-µg/L	Control Type	Count	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	



Linear Regression:

Page 1 of 2

CETIS /	Analysis D	etail							Repor Analys	t Date: sis:	01 Mar-05 2:59 PN 09-2876-6153/0502-049
Bivalve La	rval Survival and	d Develop	ment Tes	st							ilus Environmental (CA)
Endpoint		An	alysis Ty	/pe	Sa	mple Link	Contr	ol Link	Date Ana	alyzed	Version
Proportion I	Normal	Lir	ear Regr	ession	06	-8984-4527	06-89	84-4527	01 Mar-0	5 2:58 PM	M CETISv1.025
Linear Reg	ression Options										
Model	Threshold	Option	Lower 1	hreshold	Threshold C	ptimized	Rewei	ighted	Pooled G	roups	Heterogeneity Corr.
Log-Norma	Control Th	reshold	0.066		Yes		Yes		No		Yes
Regression	n Parameters										
Parameter	Estimate	Std Er	ror	95% LCL	95% UC	L t St	atistic	P Leve	el De	cision(0.0	05)
Threshold	0.06602	0.0236	2	0.01498	0.11706	2.79	95	0.2187	6 No	t Significa	nt
Slope	11.87230	1.2765	8	9.11441	14.6302	9.30	00	0.0681	9 No	t Significa	nt
Intercept	-18.34420	2.5307	9	-23.81165	-12.8767	5 -7.2	48	0.0872	8 No	t Significa	nt
Regression	n Summary										
•	Log Likelihood	Mu	Sign	na G	Stat Chi	-Sq (Critical	P Le	vel De	ecision(0.	.05)
4	-180.20160	-1.54513					22.36203	0.000	000 Si	gnificant h	Heterogeneity
Residual A	nalysis										
Attribute	Method		;	Statistic	Critical	P Lev	el	Decisi	on(0.05)		
Variances	Modified	Levene		2.49744	3.58743	0.113	91	Equal '	Variances		
Distribution	Shapiro-	Wilk W	().85458	0.88071	0.019	87	Non-no	ormal Distri	ibution	
Point Estin	nates										
% Effect	Conc-µg/L	95% LCL	. 9	5% UCL							
25	81.18239	74.50291	8	6.56600	VI. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.						
50	92.52814	86.79805	9	7.97511							
Data Sumn	nary				Calculated V	ariate(A/B)					
Conc-µg/L	Control Type	Count	Mean	Minir				SD	- А	В	
0		5	0.9340			00 00	0716	0.03507	467	500	
	Salt Control	5	0.9340	0.900	0.330	0.0					
75.8	Salt Control	5	0.7920					0.10474	396	500	
75.8 122	Sait Control			0.690	00 0.910	0.0	2138				

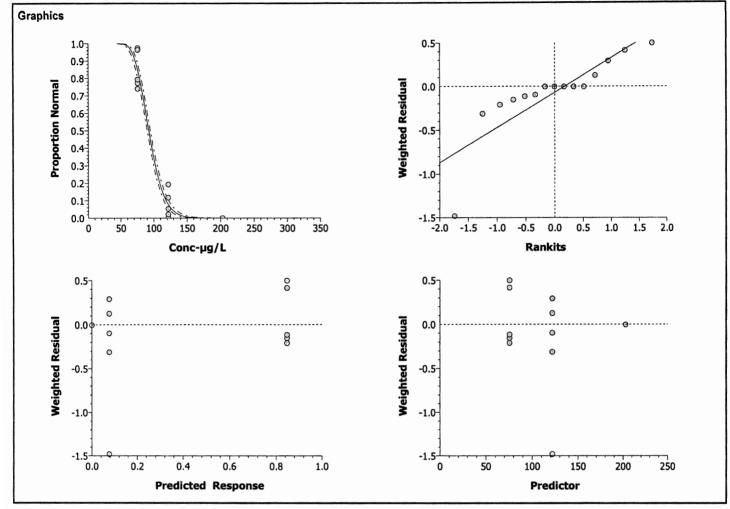
CETIS Analysis Detail

Linear Regression: Report Date:

Page 2 of 2 01 Mar-05 2:59 PM

Analysis:

09-2876-6153/0502-049a



CETIS Test Summary

Report Date:

28 Feb-05 10:50 AM

Link:

08-9338-0328/0502-049

Bivalve Larva	Survival and I	Developm	ent Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date: Comments:	09-7535-1799 02 Feb-05 03:: 04 Feb-05 02:: 02 Feb-05 03:: Full-strength s	15 PM 30 PM	Protocol: Dil Water: Brine:	Developme ASTM E724 Scripps Ser Forty Fathor	4-98 (1999) awater oms		Duration: Species: Source:	47h Mytilus galloprovincialis Mission Bay sed on nominal concentrations.
Sample No: Sample Date: Receive Date: Sample Age:	07-3377-3694 31 Jan-05 02:3 31 Jan-05 10:	30 PM	Material: Code: Source: Station:	Estuarine M 0502-049 City of Bue WER (B-1)	Monitoring S		Client: Project:	City of Buenaventura
Comparison S Analysis 12-0234-7102	Endpoint	mal	NOEL 54	LOI	EL	ChV 69.714	MSDp 8.78%	Method Steel's Many-One Rank
Point Estimat Analysis 08-7108-2602	e Summary Endpoint Proportion Nor	mal	% Effe 25 50	58.9	nc-µg/L 99115 61506	95% LCL 55.06904 64.16940	95% UCL 62.30937 70.93740	Method Linear Regression
Proportion No	ormal Summary	1						
Conc-μg/L 0 12 19 32 54 90 150	Control Type Lab Control Salt Control	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.95400 0.93400 0.91200 0.92400 0.88400 0.79200 0.07200 0.00000	Minimum 0.93000 0.90000 0.86000 0.91000 0.82000 0.69000 0.00000	Maximur 0.98000 0.99000 0.94000 0.95000 0.97000 0.91000 0.18000 0.00000	n SE 0.00872 0.01568 0.01393 0.00748 0.02619 0.04684 0.03277 0.00000	\$D 0.01949 0.03507 0.03114 0.01673 0.05857 0.10474 0.07328 0.00000	CV 2.04% 3.75% 3.42% 1.81% 6.63% 13.22% 101.78 0.00%
Proportion No	ormal Detail							
Conc-μg/L 0 0 12 19 32 54 90 150	Control Type Lab Control Salt Control	Rep 1 0.93000 0.91000 0.91000 0.95000 0.90000 0.91000 0.18000 0.00000	Rep 2 0.96000 0.99000 0.94000 0.93000 0.97000 0.90000 0.11000 0.00000	Rep 3 0.94000 0.90000 0.86000 0.92000 0.89000 0.72000 0.00000	Rep 4 0.96000 0.93000 0.92000 0.91000 0.82000 0.69000 0.05000 0.00000	Rep 5 0.98000 0.94000 0.93000 0.91000 0.84000 0.74000 0.02000 0.00000		

Analyst: Att Approval: The 2/25/65

Page 1 of 1

Report Date:

28 Feb-05 11:00 AM

Analysis:

12-0234-7102/0502-049

CETIS Analysis Detail

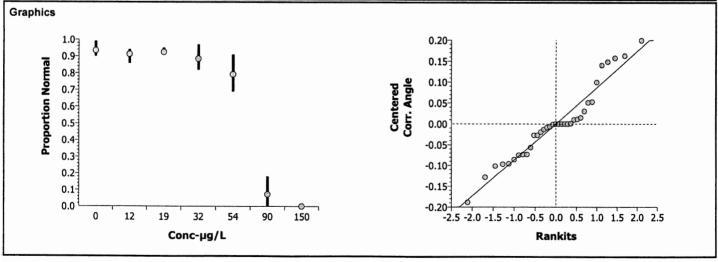
Bivalve Larval Survival and	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)										
Endpoint Analysis Type Sample Link Control Link Date Analyzed Version											
Proportion Normal	Compar	Comparison		-0328 08-9338-0328		25 Feb-05 12:55 PM		CETISv1.025			
Method	Alt H	Data 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		Andrew Committee									

ANOVARSSUN	paono					
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 Comp	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 Summa	ıry		Original Data				Transformed Data				
Conc-µg/L	Control Type	Count	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	



Page 1 of 2

Report Date:

28 Feb-05 11:00 AM

Analysis:

08-7108-2602/0502-049

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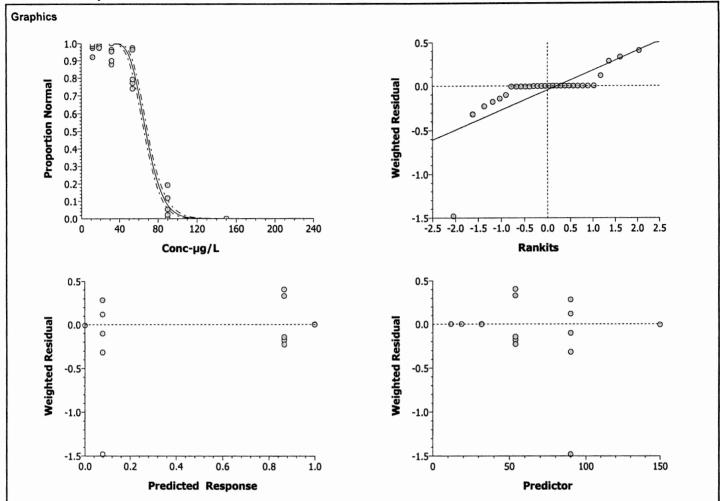
<u> </u>	, triary oro B									Ana	ysis:		6-7 106-2002/0502-04
Bivalve La	rval Survival an	d Developr	nent Test								Nau	tilus	Environmental (CA)
Endpoint			alysis Type			Sample	Link	Contro	l Link	Date A	nalyzed		Version
Proportion	Normal	Lin	ear Regressi	on		08-9338	-0328	08-933	8-0328	25 Feb	-05 12:55 F	PM	CETISv1.025
Linear Reg	ression Options	5											
Model	Threshold	d Option	Lower Thre	shold	Threst	old Optim	ized	Reweig	hted	Pooled	Groups	Hete	erogeneity Corr.
Log-Norma	l Control Th	reshold	0.066		Yes			Yes		No		Yes	
Regression	n Parameters												
Parameter	Estimate	Std Err	or 95%	LCL	95	% UCL	t Sta	tistic	P Leve	el E	ecision(0.	.05)	
Threshold	0.08645	0.0112	5 0.06	341	0.1	0950	7.684		0.0015	4 5	ignificant		
Slope	11.38252	1.03146	9.26	967	13	.49537	11.03	5	0.0003	8 8	ignificant		
Intercept	-15.83051	1.91328	3 -19.	74969	-11	1.91133	-8.274	l	0.0011	6 5	Significant		
Regression	n Summary												
Iters	Log Likelihood	Mu	Sigma	G S	tat	Chi-Sq	Cr	itical	P Le	vel	Decision(0	.05)	
8	-202.66560	-1.39077	0.08785	0.0	3446	89.5909	9 41	.33714	0.000	000	Significant	Hete	rogeneity
Residual A	nalysis												
Attribute	Method		Stati	stic	Crit	tical	P Leve	1	Decisi	on(0.05)			
Variances	Modified	Levene	3.90	717	2.5	2766	0.00777	,	Unequ	al Varian	ces		
Distribution	Shapiro-	Wilk W	0.662	266	0.92	2671	0.00000)	Non-no	ormal Dis	tribution		
Point Estir	nates												
% Effect	Conc-µg/L	95% LCL	95% (JCL									
25	58.99115	55.06904	62.30	937									
50	67.61506	64.16940	70.93	740									
Data Sumr	nary			(Calcula	ted Variat	e(A/B)			_			
Conc-µg/L	Control Type	Count	Mean	Minim	um	Maximum	SE	S	D	_ A	В		
0	Salt Control	5	0.93400	0.9000	00	0.99000	0.007	'16 O	.03507	467	500		
12		5	0.91200	0.8600	00	0.94000	0.006	36 0	.03114	456	500		
19		5	0.92400	0.910	00	0.95000	0.003	342 0	.01673	462	500		
32		5	0.88400	0.8200	00	0.97000	0.011	95 0	.05857	442	500		
54		5	0.79200	0.6900	00	0.91000	0.021	38 0	.10474	396	500		
90		5	0.07200	0.0000	00	0.18000	0.014	96 0	.07328	36	500		
90													

Linear Regression: Report Date:

Page 2 of 2 28 Feb-05 11:00 AM

Analysis:

08-7108-2602/0502-049



Report Date:

0502-049

01 Feb-05 4:08 PM

Link:

08-9338-0328/0502-049

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

02 Feb-05 Ending Date: 04 Feb-05

Species: Mytilus galloprovincialis Protocol: ASTM E724-98 (1999)

Sample Code:

Sample Source: City of Buenaventura

Conc-%	Code		Pos	# Counted	Estuarine Moni # Normal	itoring Sample Sample Station: WER (B-1) Notes
COIIC- /6	Code	Keb	41	100	//	MC
	-		42	100	0	
	-		43			AH
			44 .	100	8	MC 1/20/22
				700	0 95 0	JR /10/93
			45	100	95	MC
	-		46	100	0	AH
			47	(00		AH 100/96
	-		48	≯ 100	93	AH 100/96
			49	100	93	AL
	١.,		50	100	93	Mc
		******	51	100	93	Mc AH
			52		94	AH
			53	.100	0	MC
			54	100	97	M.C.
SC			55	100	91	JR
			56	-100	3	AH 100/96
			57	100	92	14
			58	120	0	100/94
		1	59	100	91	(V
	1 :		60	100	91	MC
12			61	(00	94	TR
			62	107)	A	AΔ
			63	100		AH
			64	100	69	4
			65	100	0	The second of the second secon
			66		- 4	10498
			67	4	65	100 10
			68		10	MC
	-		69	100	18	
	-		70	100	30	AH
	+		71		12	
	-		72		2	
			73		91	AND A COMMENT AND ADDRESS OF THE PARTY OF TH
	-				X4	
			74	W	2 91 84 90	¥2
5 C			75	100	79	TR
			76	100	90	MC
			77	100	74	IAH
12			78	100	91	JR.
			79	100	91 89	MC
			80	100	89	AH

Share LC W/reftex; possible LC cop contamination.

CETIS Data Worksheet

Report Date:

01 Feb-05 4:07 PM

Link:

08-9338-0328/0502-049

Bivalve Larva	l Survival and De	velopment 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

ample Date: 31	Jan-05 02:30 PM	Material:	Estuarine Monitoring Sample	Sample Station:	WER (B-1)
----------------	-----------------	-----------	-----------------------------	-----------------	----------	---

Ending Date Sample Date					ASTM E724-98 Estuarine Monit		Sample Source: City of Buenaventura Sample Station: WER (B-1)
Conc-%	Code	Rep	Pos	# Counted	# Normal		Notes
have 1	LC	1	44	100	Ø	uc	
control (25	2	47	100	Φ	44	
W/reftex	0 LC	3	58				
,	o LC	4	56			E 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
(D LC	5	98				
(o sc	1	55	100	91	IK NIC	
(sc	2	. 75	100	97	HC 90	7 TK
	o sc	3	74				
	o sc	4	48				A 1 1 Market Control of the Control
	o sc	5	52				A CONTROL OF THE PARTY OF THE P
1:	1	1	78	100	89 75	uc 9/ J.	R 194 JR
1:		2	61	83	15	MC 1001	194 JR
1:	.4	3	49				The state of the second
1:		4	57				
1:		5	51				
19	.1	1	45	100	95	uc	
1!		2	50	100	93	uc	
11		3	67				
		5	72			-	
3:			59 76	106	0.		
		1	54		90	МС	
3:		3	80	100	97	nic	
3:		1	69				THE RESIDENCE OF THE PROPERTY
3:	.1	5	73				
5.	1	1	79				THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO I
5.		2	60	100	90	M.C.	
5-	1	3	70		70	мс	
5.	1	4	64				
5.		5	77				
9		1	68	:00	18	11.	
9		2	41	100	11	MC	
9	4	3	42	100		uc	THE RESIDENCE OF THE PROPERTY
9		4	63				
9	1	5	71	*******			A CONTRACTOR OF COMPANY AND DESCRIPTION OF THE PROPERTY OF THE
15	i	1 1	53	100	\	116	A STATE OF THE PERSON OF THE P
15	1	2	43	100	Ø	uc_	
15	4.	i 3	62	100	P	uc .	
15		4	46				
150	i	5	65				THE RESIDENCE OF THE PROPERTY
10		A.V.					

Share control wheet tox

Marine Chronic Bioassay

Water Quality Measurements

Client:	City of Buenaventura
Sample ID:	WER-Site B-1
Test No.:	1567-149

Test Species: U. gallaprouncialis
Start Date/Time: 2/2/05 1530
End Date/Time: 2-4-05 1415

Concentration		Salinity (ppt)		To	empera (°C)	ture	Diss	olved Ox (mg/L)	ygen	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	201	7.93	7,95
SC	29.1	29.0	29.3	14.2	14.5	151	7.5	8-1	8,4	7.97	3.01	8-07
12	329.7	29.1	29,1	14.2	14.9	148	7.8	8-1	8.4	8.35	6.34	834
19	298	2% .2	29.2		150	14,9	8.0	6.0	84	£35	6.36	8,34
32 54	298	29.2	29.3		14-12	14.9	8.0	6.0	8'3	8.35	8.34	8.34
	29.8	29.1	29.3		14.7	14.9	8.0	3.1	8,4	8.35	8.34	28.8
96	29.4	28,9	29.1	1	14.9	149	80	3.1	8.3	8.36	8.34	4.34
150	9-29.5	259	29.1	1	14.9	15.0	8.0	7-9	8.2	8.36	9.36	8.34

	U	24	40		
Technician Initia	als: SD	RU	SH		
Animal Source/	Date Received:	Missu	on Bay collected	1/28/05	
Comments:	0 hrs: 24 hrs: 48 hrs:				
QC Check:	AH 2/10/05		Final Re	view:	2/28/05

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

CETIS Test Summary

Report Date:

01 Mar-05 3:02 PM

Link:

10-9751-9495/0502-050a

Bivalve Larval	Survival and [Developm	ent Test					Nautilus Environmental (CA
Test No: Start Date: Ending Date: Setup Date:	09-7535-1799 02 Feb-05 03:3 04 Feb-05 02:7 02 Feb-05 03:3	15 PM	Test Type: Protocol: Dil Water: Brine:		4-98 (1999) awater		Duration: Species: Source:	47h Mytilus galloprovincialis Mission Bay
	09-7409-8095 31 Jan-05 12:1 31 Jan-05 10:1 51h EC50 calculati	0 PM	Material: Code: Source: Station:	0502-050a City of Bue WER (B-3)			Client: Project:	City of Buenaventura
				died coppe	Concontiati			
Comparison S Analysis 12-2171-4325	Endpoint Proportion Nor	mal	NOEL 21.5	LO 32.		ChV 26.434	MSDp 13.87%	Method Steel's Many-One Rank
Point Estimate	e Summary							
Analysis 08-4360-2680	Endpoint Proportion Nor	mal	% Effe 25 50	26.	nc-μg/L 21885 59857	95% LCL 21.98126 28.21879	95% UCL 29.18851 34.81617	Method Linear Regression
Proportion No	ormal Summary	,						
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximun	n SE	SD	cv
0 21.5 32.5 56.8	Salt Control	5 5 5 5	0.93000 0.86200 0.42000 0.01800	0.91000 0.75000 0.17000 0.00000	0.95000 0.95000 0.69000 0.05000	0.00837 0.03216 0.10218 0.00970	0.01871 0.07190 0.22847 0.02168	2.01% 8.34% 54.40% 120.44
Proportion No	rmal Detail							
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0 21.5 32.5	Salt Control	0.91000 0.95000 0.21000	0.94000 0.87000 0.17000	0.94000 0.75000 0.69000	0.91000 0.86000 0.44000	0.95000 0.88000 0.59000		
56.8		0.00000	0.00000	0.05000	0.03000	0.01000		

Report Date:

01 Mar-05 3:02 PM

Analysis:

12-2171-4325/0502-050a

CETIS Analysis Detail

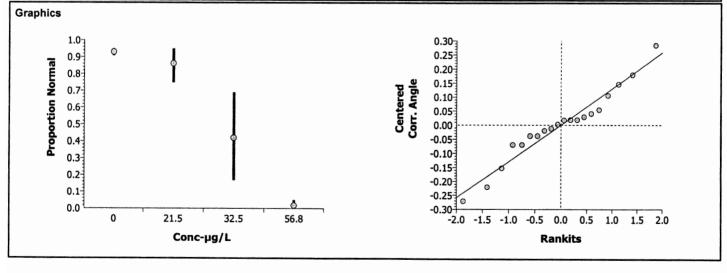
Bivalve Larval Survival and Development Test Nautilus Environmental (CA)												
Endpoint	Analysi	s Type	Sample Link Control Link			Date Analyzed Version						
Proportion Normal	Compar	ison	10-9751-	9495 10-	9751-9495	01 Mar-05 3:02	Sv1.025					
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp				
Steel's Many-One Rank	C > T	Angular (Corrected)		21.5	32.5	4.65	26.434	13.87%				
ANOVA Assumptions												

ANOVA Assumpti	Olis				
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 Comp	ariso	ns					
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 Summa	ary			Origi	nal 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		
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		



Linear Regression:

Page 1 of 2

Report Date:

01 Mar-05 3:02 PM

Analysis:

08-4360-2680/0502-050a

Bivalve La	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)											
Endpoint		An	alysis Type		Sample	Link C	ontrol	Link	Date Analyz	ed	Version	
Proportion	Normal	Lin	ear Regressi	on	10-9751-9495 10-9751		0-9751	-9495	01 Mar-05 3	:02 PM	CETISv1.025	
Linear Reg	ression Options	3										
Model	Threshold	Option	Lower Thres	shold Thre	eshold Optimi	zed R	eweigh	ted P	ooled Grou	ıps He	eterogeneity Corr.	
Log-Norma	l Control Th	reshold	0.07	Yes		Υe	es	١	10	Υe	es	
Regressio	n Parameters											
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Statis	tic	P Level	Decisi	on(0.05)	
Threshold	0.06787	0.03212	2 -0.00	0152	0.13726	2.113		0.28140	Not Si	gnificant		
Slope	8.32149	1.35639	5.39	118	11.25181	6.135		0.10286	Not Si	gnificant		
Intercept	-7.47947	2.04900	-11.9	90606	-3.05289	-3.650		0.17023	Not Si	gnificant		
Regressio	n Summary											
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Criti	cal	P Leve	l Decis	sion(0.05	5)	
4	-271.52530	-0.89881	0.12017	0.12400	114.4995	0 22.3	6203	0.0000	0 Signif	icant He	terogeneity	
Residual A	nalysis											
Attribute	Method		Stati	stic (Critical	P Level		Decision	n(0.05)			
Variances	Modified	Levene	1.639	31 3	3.58743	0.23693		Equal Va	ariances			
Distribution	Shapiro-	Wilk W	0.928	339 (0.88071	0.25802		Normal [Distribution			
Point Esti	nates											
% Effect	Conc-µg/L	95% LCL	95% l	JCL								
25	26.21885	21.98126	29.18	351								
50	31.59857	28.21879	34.81	617								
Data Sumi	nary			Calc	ulated Variate	e(A/B)						
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SE		Α	В		
0	Salt Control	5	0.93000	0.91000	0.95000	0.00382	2 0.0	1871	465	500		
21.5		5	0.86200	0.75000	0.95000	0.01468	8 0.0	7190	431	500		
32.5		5	0.42000	0.17000	0.69000	0.04664	4 0.2	22847	210	500		
56.8		5	0.01800	0.00000	0.05000	0.00443	3 0.0	2168	9	500		

CETIS Analysis Detail

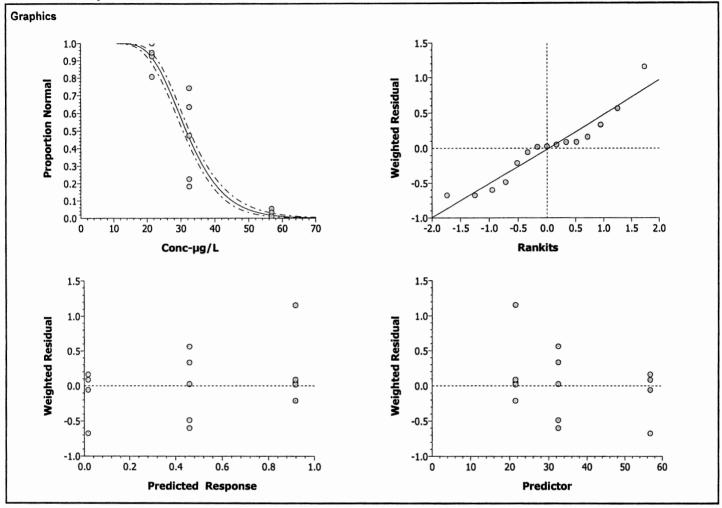
CETIS Analysis Detail

Linear Regression: **Report Date:**

Page 2 of 2 01 Mar-05 3:02 PM

Analysis:

08-4360-2680/0502-050a



CETIS Test Summary

Report Date:

28 Feb-05 10:52 AM

Link:

09-6988-7052/0502-050

Bivalve Larva	Survival and	Developm	ent Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date: Comments:	09-7535-1799 02 Feb-05 03: 04 Feb-05 02: 02 Feb-05 03: Full-strength s	30 PM 15 PM 30 PM	Protocol: Dil Water: Brine:	Scripps Se Forty Fathe	24-98 (1999) eawater oms		Duration: Species: Source: culations are bas	47h Mytilus galloprovincialis Mission Bay sed on nominal concentrations.
•	06-3827-9277 31 Jan-05 12: 31 Jan-05 10: 51h		Material: Code: Source: Station:	Estuarine Monitoring Sample 0502-050 City of Buenaventura WER (B-3)			Client: Project:	City of Buenaventura
Comparison S Analysis 02-0943-4098	Summary Endpoint Proportion No	rmal	NOEL 19	LO 32	EL	ChV 24.658	MSDp 10.92%	Method Steel's Many-One Rank
Point Estimat Analysis 01-4656-7974	e Summary Endpoint Proportion Nor	rmal	% Effe 25 50	ect Conc-µg/L 25.29449 30.58405		95% LCL 22.38222 28.28372	95% UCL 27.47275 32.63980	Method Linear Regression
Proportion No	ormal Summary	1						
Conc-μg/L 0 12 19 32 54 90 150	Control Type Lab Control Salt Control	Reps 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.95400 0.93000 0.92400 0.86200 0.42000 0.01764 0.00000 0.00000	Minimum 0.93000 0.91000 0.90000 0.75000 0.17000 0.00000 0.00000	Maximut 0.98000 0.95000 0.94000 0.95000 0.69000 0.05085 0.00000	0.00872 0.00837 0.00678 0.03216 0.10218 0.00966 0.00000 0.00000	SD 0.01949 0.01871 0.01517 0.07190 0.22847 0.02160 0.00000 0.00000	CV 2.04% 2.01% 1.64% 8.34% 54.40% 122.49 0.00%
Proportion No								
Conc-μg/L 0 12 19 32 54 90 150	Control Type Lab Control Salt Control	Rep 1 0.96000 0.91000 0.90000 0.95000 0.21000 0.00000 0.00000	Rep 2 0.93000 0.94000 0.93000 0.87000 0.17000 0.00000 0.00000	Rep 3 0.98000 0.94000 0.94000 0.75000 0.69000 0.05085 0.00000 0.00000	Rep 4 0.96000 0.91000 0.92000 0.86000 0.44000 0.02703 0.00000 0.00000	Rep 5 0.94000 0.95000 0.93000 0.88000 0.59000 0.01031 0.00000 0.00000		

Comparisons:

Page 1 of 1

Report Date:

28 Feb-05 11:00 AM

Analysis:

02-0943-4098/0502-050

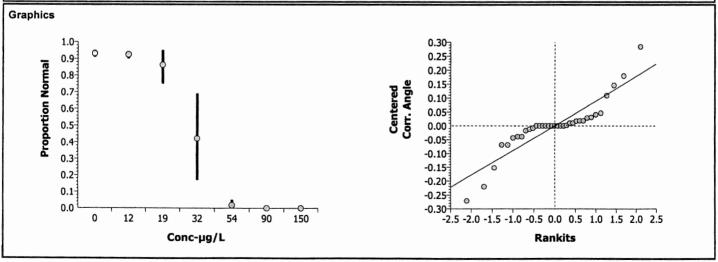
CETIS Analysis Detail

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)												
Endpoint		Analys	is Type	Sa	mple L	ink Coi	ntrol Link	Date Analyzed	Vers	ion		
Proportion Nor	mal	Compa	rison	ison 09-6988-7052 09-69			6988-7052	25 Feb-05 12:4	9 PM CETI	Sv1.025		
Method		Alt H	Data Transf	orm	Z	NOEL	LOEL	Toxic Units	ChV	MSDp		
Steel's Many-C	ne Rank	C > T	Angular (Co	rrected)		19	32	5.26	24.658	10.92%		
ANOVA Assur	nptions											
Attribute	Test		Statistic	Critical	Р	Level	Decisi	on(0.01)				
Variances	Modified Leve	ene	23.55158	3.52756	0.	00000	Unequ	al Variances				
Distribution	Shapiro-Wilk	W	0.85363	0.91004	0.	00026	Non-no	ormal Distribution				
ANOVA Table												
Source	Sum of So	nuares N	lean Square	DF F	Statisti	c PLe	vel	Decision(0.05)	1			

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 Summa	ıry			Origi	nal 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	



Linear Regression:

Page 1 of 2

Report Date:

28 Feb-05 11:00 AM

Analysis:

01-4656-7974/0502-050

Bivalve La	rval Survival and	d Developr	nent Test						-	Nau	tilus Environme	ental (CA)
Endpoint		An	alysis Type		Sample	Link	Contro	ol Link	Date Ana	lyzed	Version	
Proportion I	Vormal	Lin	ear Regressio	n	09-6988	3-7052	09-698	8-7052	25 Feb-05	12:50 F	PM CETISv1.02	25
Linear Reg	ression Options	<u> </u>										
Model	Threshold	Option	Lower Thres	hold Th	reshold Optim	ized	Reweig	hted	Pooled Gr	oups	Heterogeneity	Corr.
Log-Normal	Control Th	reshold	0.07	Ye			Yes		No		Yes	
Regression	n Parameters											
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Sta	tistic	P Leve	el Dec	ision(0.	.05)	
Threshold	0.07703	0.01660	0.043	303	0.11103	4.641		0.0097		nificant		
Slope	8.17870	1.02103	6.087	722	10.27017	8.010		0.0013	2 Sigr	nificant		
Intercept	-7.14941	1.55062	-10.3	2571	-3.97311	-4.61	1	0.0099	_	nificant		
Regression	n Summary											
Iters	Log Likelihood	Mu	Sigma	G Sta	t Chi-Sq	Cı	itical	P Le	vel De	cision(0).05)	
8	-256.31420	-0.87415	0.12227	0.065			.33714	0.000			Heterogeneity	
Residual A	nalysis											
Attribute	Method		Statis	tic	Critical	P Leve	ı	Decisi	on(0.05)			
Variances	Modified	Levene	7.075	91	2.52766	0.0002	3		al Variances	S		
Distribution	Shapiro-	Wilk W	0.885	21	0.92671	0.0042	5		ormal Distrib			
Point Estin	nates											
% Effect	Conc-µg/L	95% LCL	95% U	CL								
25	25.29449	22.38222	27.472									
50	30.58405	28.28372	32.639	80								
Data Sumn	nary			Ca	Iculated Variat	e(A/B)						
Conc-µg/L	Control Type	Count	Mean	Minimu		· ·	9	D	- А	В		
0	Salt Control	5	0.93000	0.91000		0.003		.01871	465	500		
12		5	0.92400	0.90000		0.003		.01517	462	500		
19		5	0.86200	0.75000		0.014		.07190	422	488		
32		5	0.42000	0.17000	0.69000	0.046	664 0	.22847	210	500		
54		5	0.01764	0.00000	0.05085	0.004	141 0	.02160	6	430		
90		5	0.00000	0.00000	0.00000	0.000	000 0	.00000	0	500		
150		5	0.00000	0.00000	0.00000	0.000	000 0	.00000	0	500		

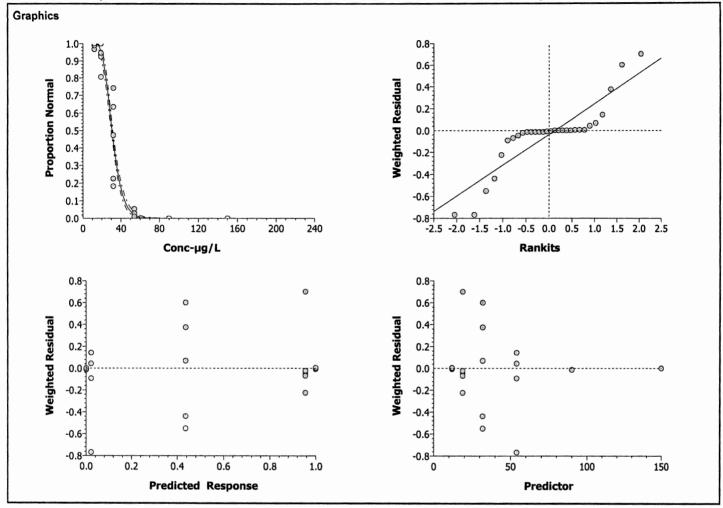
CETIS Analysis Detail

Linear Regression: Report Date:

Page 2 of 2 28 Feb-05 11:00 AM

Analysis:

01-4656-7974/0502-050



CETIS Data Worksheet

Report Date:

01 Feb-05 4:10 PM

Link:

09-6988-7052/0502-050

Bivalve Larva	l Sur	vival a	and Do	evelopment Test					Nautilus Environmental (CA)
Start Date:	02 F	eb-05		Species:	Mytilus galloprovi	ncialis		Sample Code:	0502-050
Ending Date:	04 F	eb-05	i	Protocol:	ASTM E724-98 (1999)	;	Sample Source:	City of Buenaventura
Sample Date:	31 .	Jan-05	12:10	PM Material:	Estuarine Monito	ring Sampl	e :	Sample Station:	WER (B-3)
		Rep	Pos	# Counted	# Normal			Note	es
Share ?	YC "	1	95	100	Ø	mit A	H 100/	96	
	rÇ/	2	87	100	Ø	W '	100/	93	
LC with	LC	3	109	PO	0	SD	160/		
restox o	LC	4	90	100	\$0	SD	100/		
0	LC	5	104	1000	0	SDU			
0	SC	1	115	w	91	uc			Experimental Control of the Control
0	SC	2	86	100	94	MC			The state of the s
0	SC	3	119	100	94	SD			
0	SC	4	114	100	91	So			
0	sc	5	89	100	95	37			
12		1 1	83	100	90	MC	1200	The state of the s	
12		2	97	100	93	uc.	Market Market Market Commission	And the second of the second o	
12		3	112	100	94	30	The state of the s	THE RESERVE TO A STREET TO STREET	
12		4	106	100	92	5D			
12		5	99	100	93	55			
19		1	94	100	95	uc			a a second secon
19		2	101		,81	ac .			
19	-	3	118	100	Leco	50		***************************************	
19		4	111	100	810	SD			The state of the s
19		5	105	100	8C, 88	as a			The second secon
32	***************************************	1	113	100	21	uc			
32		. 2	100	100	îi	MC	THE CASE OF THE PARTY	to a section for the second of	
32		3	92	100	169				VICTORIAL CONTROL OF THE PARTY
32		4	91	100	34 44	20 20			
32		5		001	m 59	\$55			
54		1	93	100	271	T			
54		2	116		$-\frac{\varphi}{1}$	MC			
54		3	84	166 59	$- \varphi_2$	SD			
54		4	117	97.74	2	2D			
54		5	85	97	1	20			
90		1	82	1 (1		مالم ا	221	
90		2	96		φ	ALC -		sed	
90		3	88		φ	W	cells lye	ea	
90		4	108		<u>Q</u>	SD			
90		5	81		0	200	(.01)		
150		- 1 -	98		0	20	wells l	ysed	
150		2	110		ø	mc -	wis was	<u>eq</u>	
150		3	103	· · · · ·	ø	SD (elle lys	ca	
150			120		Ø	20	Ψ		
150		4			Ö	6			
150		5	107		\mathcal{U}	V	· ·		

C:Me

Share Lab control W refrox, possible LC 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) 0502-050 Start Date: 02 Feb-05 Species: Mytilus galloprovincialis Sample Code: Protocol: ASTM E724-98 (1999) Sample Source: City of Buenaventura Ending Date: 04 Feb-05 Sample Station: WER (B-3) Sample Date: 31 Jan-05 12:10 PM Material: Estuarine Monitoring Sample # Normal Notes # Counted Conc-% Code Rep Pos 0 100 81 82 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 Brenaventurg

Sample ID: WEZ-Site B-3

Test No.: 0502-050

Test Species: M. galloprovincialis
Start Date/Time: 2/2/05 1538
End Date/Time: 2-4-05 1415

Concentration	T	Salinity		T	empera	ture	Diss	olved Ox	ygen		рН		
-1.		(ppt)		(°C)			(mg/L)			(pH units)			
	0	24	48	0	24	48	0	24	48	0	24	48	
LC	29.6	21.2	29.2	14.2	14.7	15.1	7.8	7.9	8.4	801	7.93	7.95	
SC	29.1	29.0	29.3	14.2	14.5	151	7.5	b, i	8.4	7.97	8.00	507	
12	30,2	24.5	29.6	14.2	146	149	7.8	7.9	8,5	8-44	839	85.8	
19	30.2	24.5	29.6		14.7	14.9	80	7.9	8,4	8.41	8.41	8.36	
32	299	29.6	29.5		14.7	149	8.0	7.9	8,4	8.41	8.42	8.37	
	30.0	29.6	29,5		147	15.0	8.0	80	8'3	8.43	8.41	8.39	
90	29.9	24.5	29,4		14.7	15.0	8.)	81	8.3	843	8.41	8.40	
150	29.8	24.5	29.2		14.7	15.1	81	8.0	₹.3	843	8.41	8.41	

	0	24 48		
Technician Initial:	s: SD	RU 5H]	
Animal Source/D	ate Received:	Mission Bass Field collecte	1/28/05	-
Comments:	0 hrs: 24 hrs:			-
	48 hrs:			_
QC Check:	AH NIOJOS	_ Final F	Review: JR Z/Z8/0	ŗ

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

CETIS Test Summary

Report Date:

01 Mar-05 3:01 PM

Link: 07-2205-2712/0502-051a

Bivalve Larva	Survival and	Developm	ent Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	09-7535-1799 02 Feb-05 03: 04 Feb-05 02: 02 Feb-05 03:	15 PM	Test Type: Protocol: Dil Water: Brine:	Development ASTM E724-98 (1999) Scripps Seawater Forty Fathoms			Duration: Species: Source:	47h Mytilus galloprovincialis Mission Bay
•	06-1625-0359 31 Jan-05 08:4 31 Jan-05 10: 55h EC50 calculati	10 PM	Material: Code: Source: Station:	0502-051a City of Bue WER (C-1)	enaventura		Client: Project:	City of Buenaventura
Comparison S	Summary							
Analysis	Endpoint		NOEL	LO	EL	ChV	MSDp	Method
09-9790-1107	Proportion No	mal	21.9	39.	8	29.523	8.20%	Steel's Many-One Rank
Point Estimate	e Summary							
Analysis	Endpoint		% Effe	ect Co	nc-µg/L	95% LCL	95% UCL	Method
07-0209-6211	Proportion No	mal	25 50		24657 66179	22.87085 28.07135	30.21243 34.33063	Linear Regression
Proportion No	ormal Summary	1						
Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximur	n 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 No	rmal 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		

Analysis:

09-9790-1107/0502-051a

CETIS Analysis Detail

6.26412366

Total

Bivalve Larval	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)												
Endpoint Proportion Norr							ntrol Link 2205-2712	Date Analyzed 01 Mar-05 3:00		sion FISv1.025			
			Alt H Data Transform C > T Angular (Corrected)				1.9	LOEL 39.8	Toxic Units 4.57	ChV 29.523	MSDp 8.20%		
ANOVA Assun													
		Statistic 5.80379	5.29221		0.00			on(0.01) al Variances					

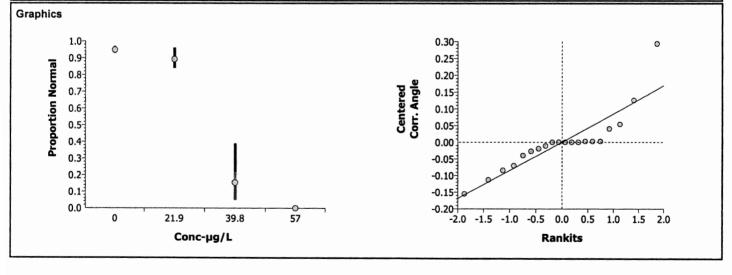
Distribution	Shapiro-Wilk W	0.82718	0.868	326 0.001	166	Non-normal Distribution	
ANOVA Table							
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)	
Between	6.10569	2.03523	3	205.54	0.00000	Significant Effect	
Error	0.1584337	0.000002	16				

19

2.0451320

Group Comp	ariso	ns						
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 Summa	ary			Origi	nal 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		
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		



Linear Regression:

Page 1 of 2

01 Mar-05 3:01 PM

CETIS	Analysis D	etail								•	ort Date: ysis:	07-02	01 Mar-05 3:01 Pt 209-6211/0502-051
Bivalve La	rval Survival an	d Developi	nent Te	est								tilus E	nvironmental (CA)
Endpoint		An	alysis 1	Гуре		Sample	Link	Contro	ol Link	Date A	nalyzed	Ve	ersion
Proportion I	Normal	Lin	ear Reg	ression		07-2205	-2712	07-220	5-2712	01 Mar	-05 3:00 PM	N CE	ETISv1.025
Linear Reg	ression Options	3											
Model	Threshold	Option	Lower	Threshold	Thres	hold Optim	ized	Rewei	ghted	Pooled	Groups	Hetero	geneity Corr.
Log-Norma	Control Th	reshold	0.052		Yes		,	⁄es		No		Yes	
Regression	n Parameters												
Parameter	Estimate	Std Er	or	95% LCL	95	% UCL	t Stat	istic	P Leve	1 0	ecision(0.	05)	
Threshold	0.05516	0.0240	2	0.00326	0.	10706	2.296		0.2614	B N	lot Significa	ant	
Slope	10.34118	1.4916	6	7.11865	13	.56372	6.933		0.0912	0 1	lot Significa	ant	
Intercept	-10.51731	2.3340	3	-15.55968	-5	.47495	-4.506		0.1390	3 1	lot Significa	ant	
Regression Summary													
Iters	Log Likelihood	Mu	Sig	ma G	Stat	Chi-Sq	Cri	tical	P Lev	/el	Decision(0	.05)	
	-155.51810	-1.01703			09711	74.59520	22.	36203	0.000	00	Significant	Hetero	geneity
Residual A	nalysis												
Attribute	Method			Statistic	Cri	tical	P Level		Decisio	on(0.05)			
Variances	Modified	Levene		1.95800	3.5	8743	0.17886		Equal \	/ariance	S		
Distribution	Shapiro-	Wilk W		0.78988	0.8	8071	0.00196		Non-no	rmal Dis	tribution		
Point Estin	nates												
% Effect	Conc-µg/L	95% LCL	9	95% UCL									
25	27.24657	22.87085		30.21243									
50	31.66179	28.07135	;	34.33063									
Data Sumn	nary				Calcul	ated Variate	e(A/B)						
Conc-µg/L	Control Type	Count	Mean	Mini	mum	Maximum	SE	5	SD	- A	В		
0	Salt Control	5	0.9480	0.93	000	0.97000	0.003	03 0	0.01483	474	500		
21.9		5	0.8920	0.84	000	0.96000	0.010	14 0	0.04970	446	500		
39.8		5	0.1540	0.05	000	0.39000	0.027	94 0	.13686	77	500		
57		5	0.0000	0.00	000	0.00000	0.000	00 0	0.00000	0	500		

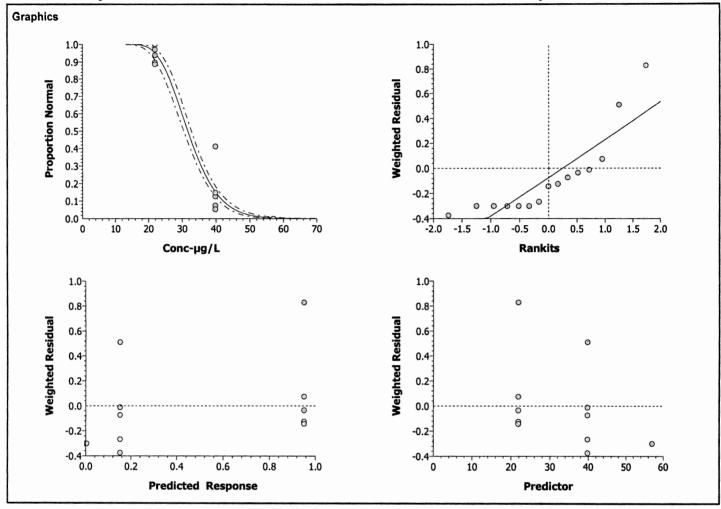
CETIS Analysis Detail

Linear Regression: Report Date:

Page 2 of 2 01 Mar-05 3:01 PM

Analysis:

07-0209-6211/0502-051a



CETIS Test Summary

Report Date: 28 Feb-05 10:52 AM

15-2703-7396/0502-051 Link:

Bivalve Larval Survival and Development Test Nautilus Environmental (CA)											
Test No: Start Date: Ending Date: Setup Date: Comments:	09-7535-1799 02 Feb-05 03:3 04 Feb-05 02:1 02 Feb-05 03:3 Full-strength s	15 PM 30 PM	Protocol: Dil Water: Brine:	Scripps Se Forty Fath	24-98 (1999) eawater oms		Duration: Species: Source: culations are bas	47h Mytilus galloprovincialis Mission Bay sed on nominal concentrations.			
l '	03-1067-9554 31 Jan-05 08:4 31 Jan-05 10:1 55h		Material: Code: Source: Station:	0502-051 City of Bue	Estuarine Monitoring Sample 0502-051 City of Buenaventura WER (C-1)			City of Buenaventura			
Comparison Summary Analysis Endpoint NOEL LOEL 02-8271-3405 Proportion Normal 19 32						ChV 24.658	MSDp 7.30%	Method Steel's Many-One Rank			
Point Estimat Analysis 08-3143-8751	e Summary Endpoint Proportion Nor	mal	% Effe 25 50	22.	nc-µg/L 82769 18271	95% LCL 21.05909 24.75949	95% UCL 24.21026 27.42503	Method Linear Regression			
Proportion No Conc-µg/L	ormal Summary Control Type	Reps	Mean	Minimum	Maximu	m SE	SD	CV			
0 0 12 19 32 54 90 150	Lab Control Salt Control	5 5 5 5 5 5 5 5 5 5	0.95400 0.94800 0.94600 0.89200 0.15400 0.00000 0.00000	0.93000 0.93000 0.90000 0.84000 0.05000 0.00000 0.00000	0.98000 0.97000 0.99000 0.96000 0.39000 0.00000 0.00000	0.00872 0.00663 0.01806 0.02223 0.06120 0.00000 0.00000	0.01949 0.01483 0.04037 0.04970 0.13686 0.00000 0.00000	2.04% 1.56% 4.27% 5.57% 88.87% 0.00% 0.00%			
Proportion No	ormal Detail										
Conc-μg/L 0 0 12 19 32 54 90	Control Type Lab Control Salt Control	Rep 1 0.93000 0.93000 0.99000 0.85000 0.07000 0.00000	Rep 2 0.96000 0.97000 0.98000 0.92000 0.12000 0.00000 0.00000	Rep 3 0.94000 0.94000 0.91000 0.96000 0.05000 0.00000	Rep 4 0.96000 0.95000 0.90000 0.84000 0.39000 0.00000	Rep 5 0.98000 0.95000 0.95000 0.89000 0.14000 0.00000 0.00000					
150		0.00000	0.00000	0.00000	0.00000	0.00000					

Analyst: At Approval: JR 2/28/as

Page 1 of 1

Report Date:

28 Feb-05 11:01 AM

Analysis:

02-8271-3405/0502-051

CETIS Analysis Detail

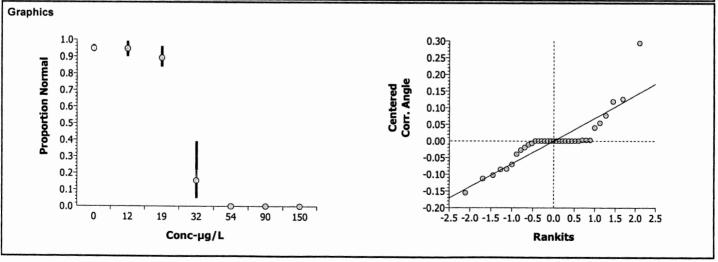
Bivalve Larval Survival and	Bivalve Larval Survival and Development Test Nautilus Environmental (CA)												
Endpoint Analysis Type Sample Link Control Link Date Analyzed Version													
Proportion Normal	Compari	Comparison		396 1	5-2703-7396	703-7396 25 Feb-05 1:02		Sv1.025					
Method	Alt 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 Assump	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 Summa	ıry			Origi	nal 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	



Linear Regression:

Page 1 of 2

CETIC	Analysis D	otail							Repor		28 Feb-05 11:01 AM
r									Analys		08-3143-8751/0502-051
Bivalve La	val Survival an	d Developr	nent lest							Nau	tilus Environmental (CA)
Endpoint		An	alysis Type		Sample	Link	Contro	l Link	Date Ana	alyzed	Version
Proportion I	Normal	Lin	ear Regressio	n	15-2703	3-7396	15-270	3-7396	25 Feb-0	5 1:03 P	M CETISv1.025
Linear Reg	ression Options	s									
Model	Threshold	d Option	Lower Thres	hold Thre	eshold Optim	ized	Reweig	hted	Pooled G	roups	Heterogeneity Corr.
Log-Norma	Control Th	reshold	0.052	Yes		,	⁄es		No		Yes
Regression	Parameters										
Parameter	Estimate	Std Err	or 95%	LCL	95% UCL	t Stat	istic	P Leve	l De	cision(0	.05)
Threshold	0.05310	0.01207	7 0.028	37	0.07782	4.398		0.0117	1 Sig	nificant	
Slope	11.32595	1.14584	8.978	81	13.67310	9.884		0.0005	9 Sig	nificant	
Intercept	-11.06037	1.67011	-14.4	8143	-7.63930	-6.623		0.0027	0 Sig	nificant	
Regression	Summary										
Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Cri	tical	P Le	/el De	cision((0.05)
6	-161.50600	-0.97655	0.08829	0.04295		3 41.	33714	0.000			Heterogeneity
Residual A	nalysis										
Attribute	Method		Statis	tic (Critical	P Level		Decisi	on(0.05)		
Variances	Modified	Levene	3.090	03 2	2.52766	0.02281		Unequ	al Variance	s	
Distribution	Shapiro-	Wilk W	0.625	75 (0.92671	0.00000		Non-no	rmal Distri	bution	
Point Estin	nates										
% Effect	Conc-µg/L	95% LCL	95% U	CL							
25	22.82769	21.05909	24.210	26							
50	26.18271	24.75949	27.425	03							
Data Sumn	nary			Calc	ulated Variat	e(A/B)					
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	S	D	- A	В	
0	Salt Control	5	0.94800	0.93000	0.97000	0.003	03 0	.01483	474	500	
12		5	0.94600	0.90000	0.99000	0.008	24 0	.04037	473	500	
19		5	0.89200	0.84000	0.96000	0.010	14 0	.04970	446	500	
32		5	0.15400	0.05000	0.39000	0.027	94 0	.13686	77	500	
54		5	0.00000	0.00000	0.00000	0.000	00 0	.00000	0	500	
90		5	0.00000	0.00000	0.00000	0.000	00 0	.00000	0	500	
150		5	0.00000	0.00000	0.00000	0.000	00 0	.00000	0	500	

Linear Regression:

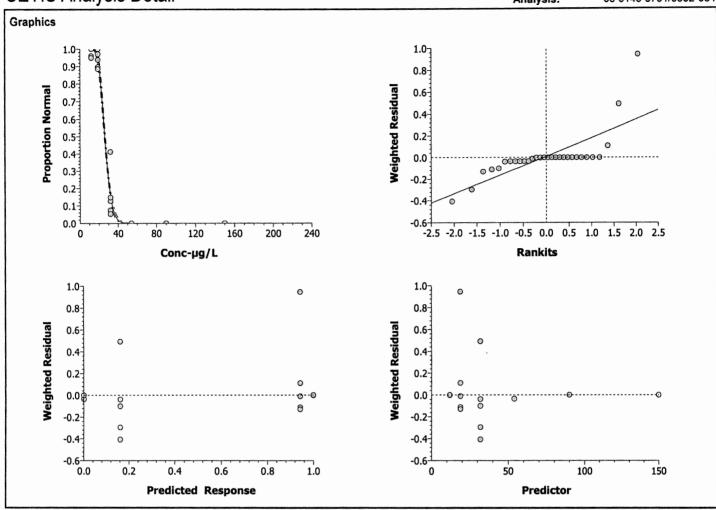
Page 2 of 2

Report Date:

28 Feb-05 11:01 AM

Analysis:

08-3143-8751/0502-051



Report Date:

01 Feb-05 4:13 PM

Link:

15-2703-7396/0502-051

Bivalve Larva	I Survival a	nd Develop	ment Test				Nautilus Environmental (CA
Start Date:	02 Feb-05		Species:	Mytilus gallopro	vincialis	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 Monit	oring Sample	Sample Station:	WER (C-1)
Conc-%	Code Rep	Pos #	Counted	# Normal		Note	es
	1 1	121	∞	\Q	MC	THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	
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		123		94	SH		
	i	124		7	MC	and the same of th	
		125		5	SH		
		126	,00	- Ø		00/93 AH	
		127	1	95	SH		
		128		96	5H		
	, ;	129		92	MC	AP-1801-1-1-1 Marie 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	
		130		95	SH	The second secon	
		131		Ø	MC - cells	lysed	
		132			- 84 1	00/96 AH	
0		133		b	SH		ALLE STATE OF THE
		134		85	MC		
		135	V	Ø	Mc - cells	lysed	
	. !		100	#	-MC	100/96 AH	100
	1 ,	137		Q	Sh - cell-	s lysed	and the second s
	1	138		99	MC		
	, 4	139		<u> </u>	Stt	THE IS NOT THE PERSON OF THE P	-
		140		Ø	MC		
		141		- Ø	SH - cells	lysed	
		142		95	≥H		
		143		Q	str - cells	lysed	
	;	144		Q	301		
	-	145	1	Ø	Mc - cells	s lysed	
		146		b	SH	100/94 All	
The same of the sa		147	1	40	SH		100112
		149		98	MC		
		150		<u>`</u>	SIT		
		151			SH		
		152	-	14	SIT		
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		154			MC		
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	.	156		Q1	SH 10	10/98 AH	
	L. i	157		84	SIH	The second state of the se	
	† †	158		93	MC	Mark Control Management (Management) Management	
		159		<u> </u>	Stt - cells	lysed	
	:	160	1,	12 97	MC	The second secon	

Share Lab Control with reftex; possible Le cup contamination.

CETIS Data Worksheet

Report Date: 01 Feb-05 4:13 PM

Link: 15-2703-7396/0502-051

Nautilus Environmental (CA)

								Lir	nk: 15-2703-7396/0502-051
Bivalve Larva	l Sur	vival a	and D	evelopment Test					Nautilus Environmental (CA)
Start Date: Ending Date: Sample Date:	04 F		;		Mytilus gallopro ASTM E724-98 Estuarine Monit	(1999)	-	ce:	0502-051 City of Buenaventura WER (C-1)
	Code		Pos	# Counted	# Normal			lote	
~ ~	\LC	1	126	# Counted		-	P. C. C. C. C. C. C. C. C. C. C. C. C. C.	· OLE	3
Share o	18	2	136		<i>f</i>	uc	Markette Co. of Control Commence and Control Company of the	Marie de Rodre	
LCW/ 0	LC	3	146		Φ	uc			
rectoro	LC	4	132	***			The same of the sa	1 All Constitution	
0	LC	5	136			- P. P. C	and the second s		-
0	SC	1	157	100	93	W	A STATE OF THE PARTY OF THE PAR		
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0	SC	4	130						
0	sc	5	127		-				
12	- 1	1	138	100	99	uc			
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12	(3	122				Vi Andrews de Miller		
12		4	147						
12		5	142				Market Committee		
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32	!	5	151			†	THE MALE AND ADDRESS OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF T		
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54		4	139						
54		5	149						
90		1	135	100	ø	MC-	ail lysed		
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90		3	158						
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150		3	137				a		
150		4	143				Name and the second supplementary and the second of the second		
150		5	141						

DC.VC

Marine Chronic Bioassay

Water Quality Measurements

Client: City of Brenaventura	Test Species: M. gallopraincalis
Sample ID: WER - Site C1	Start Date/Time: 2/2/05 1530
Test No.: 6507 - 65	End Date/Time: 2-4-05 1415

Concentration		Salinity			empera	ture	Diss	olved Ox	ygen		pН		
_'/	<u>(</u> ppt)				(°C)			(mg/L)			(pH units)		
	0	24	48	0	24	48	0	24	48	0.	24	48	
LC	29.6	332	29.2	14.2	14.7	15.1	7.8	1.9	8.4	8.01	7.93	7,95	
SC	29.)	24.0	29.3		14.5	15.1	79.5	8.1	8,4	7.97	8.01	8.07	
12	30.2	294	29.5		15.1	15.3	840	7.4	8.2	7.88.40	8.34	8:38	
19	30.2	29.4	29,9		15.1	14.9	7.8	7.8	8.4	8,40		€'38	
32	302	29.5	29.7		14-9	३५, व	8.0	7-9	8.3	8.40	8.39	8.29	
54	30,2		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	29.3	29-3	1-	14.9	15.1	8.0	7.9	8,4	14,8	839	8,40	

	U	24	40		
Technician Initia	ls: SD	ple	5#		
Animal Source/E	Date Received:	MISSIC Field	n Bay collected	1/28/05	
Comments:	0 hrs: 24 hrs:				
	48 hrs:				
QC Check:	AH 2/10/05		Final Re	view: TK Z/	s/or

Nautilus Environmental, LLC. 5550 Morehouse Drive, Suite 150. San Diego, CA 92121.

CETIS Test Summary

Report Date:

28 Feb-05 11:13 AM

Link:

04-3005-7063/0502-052a

Bivalve Larval	Survival and D	evelopm	ent Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date: Comments:	08-6647-1051 02 Feb-05 03:3 04 Feb-05 02:1 02 Feb-05 03:3 EC50 calculation	5 PM 80 PM	Test Type: Protocol: Dil Water: Brine:	ASTM E72 Scripps Se Forty Fath	24-98 (1999) eawater oms	ions	Duration: Species: Source:	47h Mytilus galloprovincialis Mission Bay
Sample No: Sample Date: Receive Date: Sample Age:	18-1876-8008 02 Feb-05 02 Feb-05		Material: Code: Source: Station:	Copper ch 0502-052a INTERNAI Polished S	loride		Client: Project:	Internal
Comparison S Analysis 05-8489-6226	Summary Endpoint Proportion Nor	mal	NOEL 11.3	LC 17	EL 4	ChV 14.022	MSDp 27.40%	Method Steel's Many-One Rank
Analysis 06-4918-8506	Endpoint	mal	% Eff€		nc-µg/L .87435	95% LCL 17.51323	95% UCL 18.24292	Method Trimmed Spearman-Karber
Proportion No Conc-μg/L 0 11.3 17.4 28.2	ormal Summary Control Type Lab Control	Reps 5 5 5 5	Mean 0.90800 0.90800 0.48200 0.00000	Minimum 0.87000 0.87000 0.05000 0.00000	Maximur 0.96000 0.97000 0.88000 0.00000	n SE 0.01463 0.01744 0.16995 0.00000	SD 0.03271 0.03899 0.38003 0.00000	CV 3.60% 4.29% 78.84% 0.00%
Proportion No Conc-μg/L 0 11.3 17.4 28.2	ormal Detail Control Type Lab Control	Rep 1 0.87000 0.89000 0.88000 0.00000	Rep 2 0.90000 0.97000 0.70000 0.00000	Rep 3 0.96000 0.89000 0.10000 0.00000	Rep 4 0.90000 0.92000 0.68000 0.00000	Rep 5 0.91000 0.87000 0.05000 0.00000		

Comparisons:

Page 1 of 1

Report Date:

28 Feb-05 11:13 AM

Analysis:

05-8489-6226/0502-052a

CETIS	Analysis	Detail

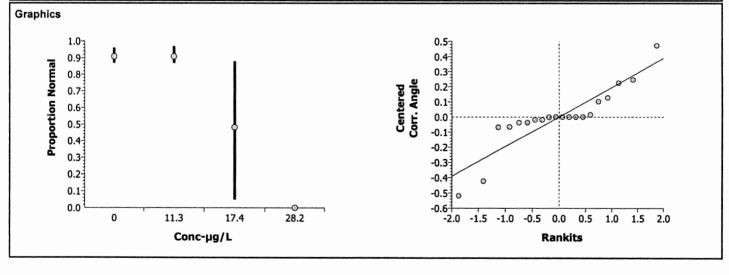
Bivalve Larval Survival and	Development	Test				N	autilus Envi	ronmental (CA)
Endpoint	Analysis	з Туре	Sample L	ink C	ontrol Link	Date Analyzed	l Versi	ion
Proportion Normal	Compari	son	04-3005-7	063 0	4-3005-7063	28 Feb-05 11:1	3 AM CETI	Sv1.025
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	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 Comp	ariso	ns					
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 Summa	iry			Origi	nal Data			Transfo	rmed Data	
Conc-µg/L	Control Type	Count	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



Spearman-Karber:

Page 1 of 1

Report Date:

28 Feb-05 11:13 AM

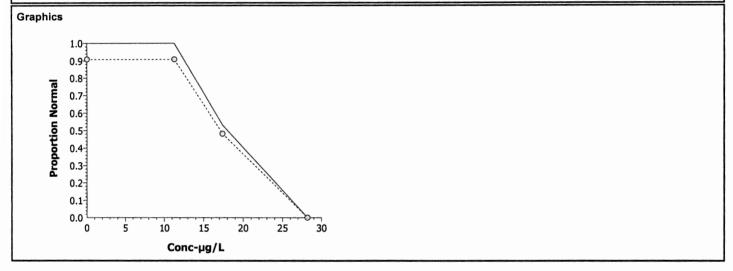
Analysis:

06-4918-8506/0502-052a

CETIS Analysis Detail

Bivalve Larval Surv	rival and Developmer	nt Test					Nautilus	s Environmental (CA)
Endpoint	Analys	sis Type		Sample Link	Co	ntrol Link	Date Analyzed	Version
Proportion Normal	Trimm	ed Spearman-	Karber	04-3005-7063	04-	3005-7063	28 Feb-05 11:13 AM	CETISv1.025
Spearman-Karber C	Options		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Point Estin	nates	
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma		EC50/LC50	95% LCL	95% UCL
Control Threshold	0.092	0.00%	1.25223	0.0044320	5	17.87435	17.51323	18.24292

Data Summ	nary	Calculated Variate(A/B)								
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	Α	В	
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

12-1300-6143/0502-052 Link:

Bivalve Larval	Survival and D	Developm	ent Test					Nautilus Environmental (CA)
Test No: Start Date: Ending Date: Setup Date:	02 Feb-05 03:30 PM Protocol:		Protocol: Dil Water: Brine:	ASTM E72 Scripps Se Forty Fatho	Development ASTM E724-98 (1999) Scripps Seawater Forty Fathoms			47h Mytilus galloprovincialis Mission Bay
Comments:	Full-strength sa	ample was	s spiked with	o concentrat	ions of cop	per. EC50 calc	culations are bas	sed on nominal concentrations.
Sample No: Sample Date: Receive Date: Sample Age:	02 Feb-05		Material: Code: Source: Station:	Copper chlo 0502-052 INTERNAL Polished Se			Client: Project:	Internal
Comparison S	ummary							
Analysis 12-5746-4573	Endpoint Proportion Nor	mal	NOEL 8.4	LO!	EL	ChV 10.844	MSDp 20.69%	Method Steel's Many-One Rank
Point Estimate Analysis 00-1832-4423	Summary Endpoint Proportion Non	mal	% Effe		n c-µg/L 99071	95% LCL 13.66938	95% UCL 14.31960	Method Trimmed Spearman-Karber
			50	15.	99071	13.00930	14.51900	Trimined Spearman-Narber
	rmal Summary						0.0	0.4
	Control Type Lab Control	5 5 5 5 5 5 5 5 5 5 5	Mean 0.90800 0.93150 0.91400 0.93800 0.90800 0.48200 0.00000 0.00000	Minimum 0.87000 0.89000 0.90000 0.87000 0.05000 0.00000 0.00000	0.96000 0.97000 0.95000 0.98000 0.97000 0.88000 0.00000	n SE 0.01463 0.01312 0.01288 0.01281 0.01744 0.16995 0.00000 0.000000	SD 0.03271 0.02935 0.02881 0.02864 0.03899 0.38003 0.00000	CV 3.60% 3.15% 3.15% 3.05% 4.29% 78.84% 0.00%
Proportion No	rmal Detail							
Conc-μg/L 0 1.8 3 5 8.4 14 23 39	Control Type Lab Control	Rep 1 0.87000 0.93750 0.95000 0.98000 0.89000 0.88000 0.00000 0.00000	Rep 2 0.90000 0.97000 0.92000 0.94000 0.97000 0.70000 0.00000	Rep 3 0.96000 0.94000 0.91000 0.93000 0.89000 0.10000 0.00000	Rep 4 0.90000 0.92000 0.92000 0.90000 0.92000 0.68000 0.00000 0.00000	Rep 5 0.91000 0.89000 0.87000 0.94000 0.87000 0.05000 0.00000 0.00000		

CETIS Analysis Detail

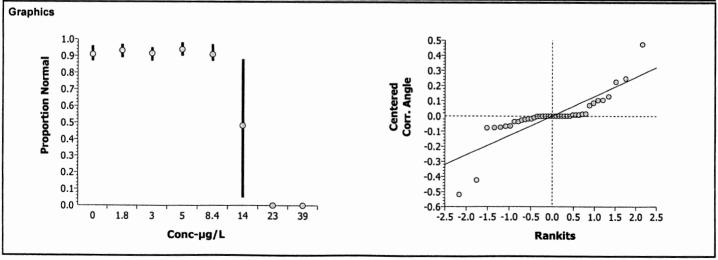
Bivalve Larval Survival and Development Test Nautilus Environmental (C									
Endpoint	Analysis	Туре	Sample L	ink (Control Link	Date Analyzed	l Vers	ion	
Proportion Normal	Compari	son	12-1300-6	143	12-1300-6143	25 Feb-05 11:0	1 AM CET	ISv1.025	
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Steel's Many-One Rank	C > T	Angular (Corrected)		8.4	14	11.90	10.844	20.69%	

ANOVA ASSUM	iptions					
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 Comp	ariso	ns					
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 Summa	ıry			Origi	nal Data		Transformed Data			
Conc-µg/L	Control Type	Count	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



Spearman-Karber:

Page 1 of 1

Report Date:

28 Feb-05 10:59 AM

Analysis:

00-1832-4423/0502-052

Rivalve	l arval Surviv	al and Deve	lopment Test

CETIS Analysis Detail

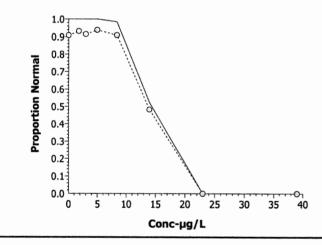
Nautilue	Envi	ironmental	(CA)
Nauliius	CIIV	HUIIIIIENIAI	IUMI

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Normal	Trimmed Spearman-Karber	12-1300-6143	12-1300-6143	25 Feb-05 11:02 AM	CETISv1.025

Spearman-Karber O	ptions	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 Summ	ary		Calculated Variate(A/B)							
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	Α	В	
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	

Graphics



CETIS Data Worksheet

Report Date:

01 Feb-05 4:22 PM

Link: 12

12-1300-6143/0502-052

Bivalve Larva	al Sur	vival a	nd De	velopment Test				Nautilus Environmental (CA
Start Date: Ending Date: Sample Date:	04 F			Species: Protocol: AM Material:	Mytilus gallopro ASTM E724-98 Estuarine Monit	(1999)	Sample Code: Sample Source: Sample Station:	0502-052 City of Buenaventura WER (PSW)
Conc-%	Code	Rep	Pos	# Counted	# Normal	,	Note	es
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			191	100	87			
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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)

Start Date: 02 Feb-05 Ending Date: 04 Feb-05

Species: Mytilus galloprovincialis Protocol: ASTM E724-98 (1999)

Sample Code:

0502-052 Sample Source: City of Buenaventura

Ending Date:					ASTIVIE / 24-90		Sample Source: City of Buenaventura
Sample Date:					Estuarine Moni	toring Sample	Sample Station: WER (PSW)
Conc-%		Rep	Pos	# Counted	# Normal		Notes
0		1	198	160	&7	MC	
0	LC	2	196	loo	90	MC	The second secon
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	uz	
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1.8		5	165				A 40 - 100 MILES -
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3		2	174	100	92	MC	
3		3	182				THE RESIDENCE OF THE PROPERTY
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5		2	164	100	94	IUC	
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14	-	2	183 177	100	10	ис	
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14		5	188				
23		1	170	LAX	<u></u>	116	
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OC. ME

Marine Chronic Bioassay

Water Quality Measurements

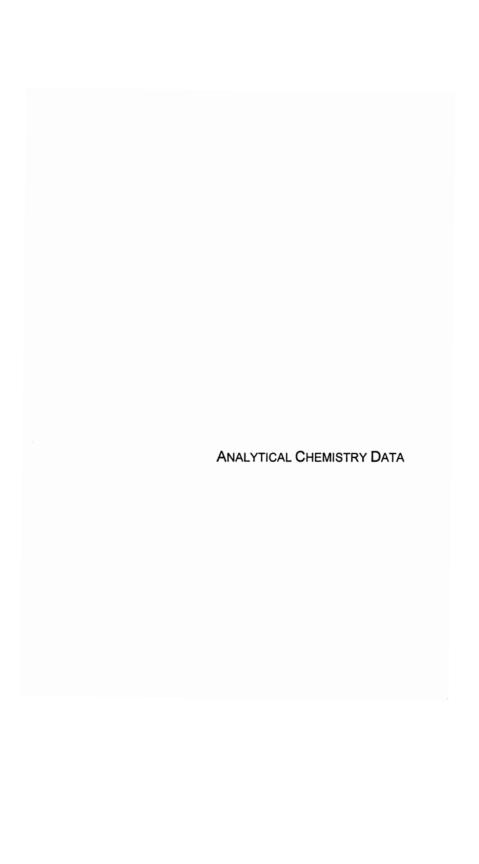
Client:	City of Buenaventura
Sample ID:	WER- Polished SW
Test No ·	1512 152

Test Species: M. gallopybuncialis
Start Date/Time: 1/2/05 1536
End Date/Time: 2-4-05 1415

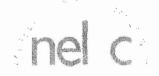
Concentration		Salinity		T	етрега	ture	Diss	olved Ox	ygen	T	pН	
<u>'/.</u>	44 808-4-2 POST 94	(ppt)	10.200		(°C)			(mg/L)	_		(pH units	s)
	0	24	48	0	24	48	0	24	48	0	24	48
LL	300	30.0	30.5	14.2	104.7	14. 8	7.6	79	8.4	7.90	7.91	7,92
1.8	30.3	29.9	30.5		14.6	14.7	7.7	8.1	3,4	7.93	7.92	
3	30.3	30.0	30.5		14.5	W7	7.6	8.0	8,4	7.13	7.92	794
5	30.2	29.9	30,5		14.5	14.7	7.6	7.9	द्रभ	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	303	300	305		14.6	14.7	7.4	8.1	8,5	7.95	791	794
23	3D.3	30.1	30.6		141	14.6	7.6	8.1	87	7.95	7.91	7.95
39	30.3	29.0	7.08		14.7	14.6	7.6	82	8,4	795	7.90	
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-												
							~					

Technician Initia	0 In:	24	48	
recimician milia	is. (5)	> Ry	134	
Animal Source/D	Date Received:	Field	collected	1/28/05
Comments:	0 hrs:			
	24 hrs:			
QC Check:	AH Zholas	·	Final Revi	iew: TR z/z8/a
Nautilus Environme	ntal, LLC. 5550 M	orehouse Di	ive, Suite 150.	San Diego, CA 92121.

Client: Test No.: Test Species: Animal Source: Date Received:		Buenaventur 02-048-7 CE laprovincialis collected 5	19-WER 52	Start Date/Time: End Date/Time: Technician Initials:	2-4-05	1530 1415
Test Chambers:	Sh	iell vials	and the second	Sample Volume:	DML	
First Gamete Relea	se Time:	1200				
		Sį	pawn Informa	ation		
Sex	Number			Condition		
Male	8	G00D				
Female	14	6000				
Egg Fertilization Tir	me: <u>13</u>	30				
Embryo Stock Dens	sity Calculati	on:				
Number Counted:	44 57 47 42 54 48.8	42 48 43 43	Me	an: <u>4(e</u>		
1	Mean 4(x 42 =	1,932 er	mbryos/ml		
Desired Final De	stock accor	rding to the calcul		actor. For example,	if the dilution fa	actor is 2.25,
Percent Division Up	on Inoculati	on: <u>90</u> +	Time	e Zero Counts:	48-h	QC: <u>93</u>
	Inoculation ⁻	Time: <u>1530</u>				95
Comments:			- And Million County and the processor			
QC Check:	AH 2/10	los		Fii	nal Review: J	12 2/28/05







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.

Calscience Environmental Laboratories, Inc.

Robert Stearns Project Manager

CA-ELAP ID: 1230

NELAP ID: 03220CA

CSDLAC ID: 10109

SCAQMD ID: 93LA0830

FAX: (714) 894-7501

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL:(714) 895-5494 •



Analytical Report



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: 02/16/05 05-02-0937 EPA 3010A Total 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	<u>Units</u>		
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
<u>Parameter</u>	Result	RL	DE	Qual	<u>Units</u>		
Copper	122	5	1		ug/L		
B-1-150		05-02-0937-3	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
<u>Parameter</u>	Result	<u>RL</u>	DF	Qual	<u>Units</u>		
Copper	203	5	1		ug/L		
B-3-19		05-02-0937-4	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
<u>Parameter</u>	Result	RL	DF	Qual	<u>Units</u>		
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
<u>Parameter</u>	Result	<u>RL</u>	DF	Qual	<u>Units</u>		
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
<u>Parameter</u>	Result	RL	DF	Qual	<u>Units</u>		
Copper	56.8	5.0	1		ug/L		



DF - Dilution Factor ,

Qual - Qualifiers



Analytical Report



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: 02/16/05 05-02-0937 EPA 3010A Total 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
<u>Parameter</u>	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
<u>Parameter</u>	Result	RL	<u>DF</u>	Qual	<u>Units</u>		
Copper	39.8	5.0	1		ug/L		
C-1-54		05-02-0937-9	02/02/05	Aqueous	02/16/03	02/17/05	050216L09
Parameter	Result	<u>RL</u>	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	<u>Units</u>		
Copper	ND	5.00	1		ug/L		

RL - Reporting Limit ,

DF - Dilution Factor

Qual - Qualifiers



Quality Control - Spike/Spike Duplicate



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: 02/16/05 05-02-0937 EPA 3010A Total 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	050216509
<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Copper	133	133	80-120	0	0-20	3

AMM AM

RPD - Relative Percent Difference , CL - Control Limit

alscience nvironme

nvironmental Quality Control - Laboratory Control Sample



aboratories, Inc.

Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: N/A 05-02-0937 EPA 3010A Total 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	050216-1	09	050216L09
<u>Parameter</u>		Conc Added	Conc Recovered	LCS %Rec	%Rec C	L Qualifiers
Copper		1.00	0.993	99	80-120	

A h. 41



Glossary of Terms and Qualifiers



Work Order Number: 05-02-0937

Qualifier	<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.
Α	Result is the average of all dilutions, as defined by the method.
В	Analyte was present in the associated method blank.
С	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
Н	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
Χ	% 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 _____ of ____

SAMPLE RECEIPT FORM

CLIENT: Nautilus	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.	LABORATORY (Other than Calscience Courier): ° C Temperature blank. ° C IR thermometer. Ambient temperature.
CUSTODY SEAL INTACT:	
Sample(s): Cooler: No (Not Intact	Not Applicable (N/A): Initial:
CAMPI E COMPIEION	
SAMPLE CONDITION: Chain-Of-Custody document(s) received with samples	
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

> **Buenaventura/WER** Client Reference:

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,

Calscience Environmental

Laboratories, Inc.

Robert Stearns **Project Manager**

CA-ELAP ID: 1230

NELAP ID: 03220CA

CSDLAC ID: 10109

SCAQMD ID: 93LA0830



Analytical Report

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Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: 02/16/05 05-02-0938 EPA 3010A Total EPA 6010B

Project: Buenaventura/WER

Page 1 of 2

	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
,	05-02-0938-1	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
Result	RL	<u>DF</u>	Qual	<u>Units</u>		
ND	5.00	1		ug/L		
The second second second	05-02-0938-2	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
Result	RL	DF	Qual	<u>Units</u>		
11.3	5.0	1		ug/L		
	05-02-0938-3	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
Result	<u>RL</u>	DF	Qual	<u>Units</u>		
17.4	5.0	1		ug/L		
and the second	05-02-0938-4	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
Result	RL	DF	Qual	<u>Units</u>		
28.2	5.0	1		ug/L		
	05-02-0938-5	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
Result	<u>RL</u>	DF	Qual	<u>Units</u>		
16.9	5.0	1		ug/L		
	05-02-0938-6	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
Result	RL	<u>DF</u>	Qual	<u>Units</u>		
20.0	5.0	1		ug/L		
	Result 11.3 Result 17.4 Result 28.2 Result 16.9	Number 05-02-0938-1	Number Collected 05-02-0938-1 02/02/05 Result RL DE ND 5.00 1 05-02-0938-2 02/02/05 Result RL DE 11.3 5.0 1 05-02-0938-3 02/02/05 Result RL DE 17.4 5.0 1 05-02-0938-4 02/02/05 Result RL DE 28.2 5.0 1 05-02-0938-5 02/02/05 Result RL DE 16.9 5.0 1 05-02-0938-6 02/02/05 Result RL DE 16.9 5.0 1 05-02-0938-6 02/02/05	Number Collected Matrix	Number Collected Matrix Prepared	Number Collected Matrix Prepared Analyzed

RL - Reporting Limit

DF - Dilution Factor ,

Qual - Qualifiers



Analytical Report



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: 02/16/05 05-02-0938 EPA 3010A Total 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	· cardi	05-02-0938-7	02/02/05	Aqueous	02/16/05	02/17/05	050216L09
<u>Parameter</u>	Result	RL	DF	Qual	<u>Units</u>		
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
<u>Parameter</u>	Result	RL	<u>DF</u>	Qual	<u>Units</u>		
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
<u>Parameter</u>	Result	RL	DF	Qual	<u>Units</u>		
Copper	ND	5.00	1		ug/L		
Method Blank		097-01-003-4,589	N/A	Aqueous	02/16/05	02/17/05	050216L09
<u>Parameter</u>	Result	<u>RL</u>	DF	Qual	<u>Units</u>		
Copper	ND	5.00	1		ug/L		

RL - Reporting Limit

DF - Dilution Factor ,

Qual - Qualifiers



Quality Control - Spike/Spike Duplicate



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: 02/16/05 05-02-0938 EPA 3010A Total 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	050216609
<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Copper	133	133	80-120	0	0-20	3

RPU - Relati

Calscience nvironm

nvironmental Quality Control - Laboratory Control Sample aboratories, Inc.



Nautilus Environmental 5550 Morehouse Drive, Suite 150 San Diego, CA 92121 Date Received: Work Order No: Preparation: Method: N/A 05-02-0938 EPA 3010A Total EPA 6010B

Project: Buenaventura/ WER

Quality Control Sample ID Matrix		Instrument	Date Analyzed	Lab File ID	LC	S Batch Number
097-01-003-4,589	Aqueous	ICP 3300	02/17/05	050216-I-09	in the discourt of the second	050216L09
Parameter		Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Copper		1.00	0.993	99	80-120	

RPD - Rela



Glossary of Terms and Qualifiers



Work Order Number: 05-02-0938

Qualifier	<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.
Α	Result is the average of all dilutions, as defined by the method.
В	Analyte was present in the associated method blank.
С	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
Н	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

APPENDIX G
CHAIN-OF-CUSTODY FORMS

Client: City of Buenaver	hura	Tes	st Initiation Date:	2-1-05
Sample ID:	_		Test No.(s):	0502-031 to 042
		Те		Ceriodophia/Father Selenastrum
		Sample (A, B, C, R	ecelving Water, etc.)
	A-2_	3-1	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)	ما ١٥٠	10.7	11.6	12.0
pH (units)	8.23	7.83	8.36	8.31
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)	-	-	-	_
Sample Description: A-2.8-3. B-1. Dilution Water Source: 8:2	no color, clear, r Culligan Other:			Hardness:
Additional Control? Y N				
Sample Manipulations Required? Y N	-			
Filtration? Y N	_ Filter Pore Size: _	Oi	rganisms 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:				A-1

Client: City of Buenavent	ira	Tes	st Initiation Date:	2-1-05
Sample ID:				0502-015 to 03
	•	Te		Kelp/Topsmelt/Mys
		Sample (A, B, C, R	eceiving Water, etc.	
	A-2	B-1	B-3	C-1.:
Alkalinity (mg/L)*	222	185	213	212
Hardness (mg/L)* *	586	542	498	507
Check-in Temp (°C)				
DO (mg/L)	ی. ۱۵	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	2286	1198	1267
Total Chlorine (mg/L)	6.62	0.01	0.01	0.01
Free Chlorine (mg/L)			_	_
STS added (g)		_	_	_
Final Free Chlorine (mg/L)	_	_	-	-
Dilution Water Source: LAB SW	ART SW Oth	er:	Alkalinity:	Salinity:
	ART SW Oth	er:	Alkalinity:	Salinity:
	-		Allea II milea es	Calininu
Additional Condon			Alkalinity:	Salinity:
			Alkalinity:	Salinity:
Sample Manipulations Required? Y N Sample Salted w/ artificial salt? Y N	_		Alkalinity:	Salinity:
Sample Manipulations Required? Y N	- _ If yes, what ppt?		Alkalinity:	Salinity:
Sample Manipulations Required? Y N Sample Salted w/ artificial salt? Y N	- _ If yes, what ppt? _ If yes, what ppt?		·	Salinity:
Sample Manipulations Required? Y N Sample Salted w/ artificial salt? Y N Sample salted w/brine? Y N	If yes, what ppt? If yes, what ppt? Filter Pore Size:		Organisms Debris	
Sample Manipulations Required? Y N Sample Salted w/ artificial salt? Y N Sample salted w/brine? Y N Filtration? Y N	If yes, what ppt? If yes, what ppt? Filter Pore Size: Length of Time:		Organisms Debris Final DO:	Post-check:
Sample Manipulations Required? Y N Sample Salted w/ artificial salt? Y N Sample salted w/brine? Y N Filtration? Y N Aeration? Y N pH Adjustment? Y N	If yes, what ppt? If yes, what ppt? Filter Pore Size: Length of Time: Initial pH:		Organisms Debris Final DO: Final pH:	Post-check: Final pH:
Sample Manipulations Required? Y N Sample Salted w/ artificial salt? Y N Sample salted w/brine? Y N Filtration? Y N Aeration? Y N pH Adjustment? Y N bsamples Collected for Additional	If yes, what ppt? If yes, what ppt? Filter Pore Size: Length of Time: Initial pH: Sample Type(s):		Organisms Debris Final DO: Final pH:	Post-check: Final pH:
Sample Manipulations Required? Y N Sample Salted w/ artificial salt? Y N Sample salted w/brine? Y N Filtration? Y N Aeration? Y N pH Adjustment? Y N bsamples Collected for Additional Chemistry? Y N	If yes, what ppt? If yes, what ppt? Filter Pore Size: Length of Time: Initial pH: Sample Type(s):		Organisms Debris Final DO: Final pH:	Post-check: Final pH:



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/~ Page 1 of 2

Sample Colle	ection by:	Joh.	Rudo	lph -	t Chr	is Str	nsky				AN	ALYS	ES RE	QUIR	ED			
Report to: Company Address City Contact		Stat	e	Zip	(C	nvoice to: Company Address Dity Contact	StateZip	Topsmelt Chronic	aid Chanic			Ke/p	Fatherd Chronic	eriodashnia - C	lenastrum,	1 + Dissolved	c, DOC, TSS	RECEIPT TEMPERATURE (°C
SAMF	PLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	100	- Ly	E,	Bir	Te	Th	S	Sel	10tg	5	RE
SCRE	A-1	1/31/0	1405	Hzo	b. Hle	ĺ												
SCRE	A-Z		1520			8		X	X	X	X	X	X	X	X	X	X	
SCRE	A-3		1615															
SCRE	B-1		1430			8		X	X	X	X	Х	X	X	X	X	X	
SCRE	13-2		1145			1												
SCRE	B-3		1210			8		X	X	×	X	X	X	×	×	X	X	
SCRE	B-4		1225															
SCRE	C-1		0845			8		X	×	X	×	X	X	X	X	X	X	
SCRE	C-3	V	0905	V	1													
PRO. CLIENT	JECT INFORMAT	TION			IPLE RECE		RELINQUISHED BY (CLIENT)	2210		RELIN	NQUISI	HED B	Y (COL	JRIER)				
			TOTA	L NO. OF C	CONTAINER	3S	(Signature) John Rukolph	1/31/	(Time)	(Signa	iture)							(Time)
P.O. NO.			REC'I	GOOD C	ONDITION		(Printed Name)		(Date)	((Date)	
SHIPPED VIA:			MATC	HES TEST	SCHEDUL	E	(Company) Navtilus Env.			(Comp	ved t	51e 71 6	CINDA	TOOK				
SPECIAL INS	TRUCTIONS/CO	UCTIONS/COMMENTS:								دلا	en		0.0000000000000000000000000000000000000	000000000000000000000000000000000000000	.			210
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							(Printed Name)		(Date)		id Nami		ntal I e	n.in N-				(Date)
						San Intropess	(Company)			i Naum	na EIJA	II OTTITIVE	antai LU	A.111 140	•			



X CALIFORNIA

5550 Morehouse Drive • Suite 150 San Diego, Colifornia 92121 Phone 858.597.7333 WASHINGTON

5009 Pacific Highway East - Suire 2 Tocoma, Wushington 98424 Phone 253,922,4296 **Chain of Custody**

							Phone 858,587,7333 Fax 858,587,3961	Home 253.922.4 Fox 253.922.58			Date	31/0	≶_ Page _	•	f
Sample Collection by:	BCS ,	TR								AN	ALYSES R	EQUIR	ED		
Sample Collection by: Report to: Company Nandal Address City Contact Phone No.				9	Address City Contact		State 2	Zip	dubia chronic						SEPT TEMPERATURE (*C
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS		COMMENTS		ن						PEG
SCRE B-1	1/31/05	1430	AQ	4-L	ı				X		Lawi	#	05-0	57	47
SCRE B-3		1210			1				4		Logi	#	05-0	58	7.0
SCRE A-2		1520	2.			_					Logi	#	05-0	59	48
SCRE C-1	4	CRY	4	1	1				V		Login	井	0\$-0	50	4.8
PROJECT INFORMATI	ON			PLE REGE			RELINQUISHED BY (CLIENT)			RELINGUISH	ED BY (CO	URIER)			
BULAQUENTOR			NO OF C		S	4	(Signature) Win Ki		1700	(Signature)					(Time)
P.O. NO.		AEC'C	6000 CC	NOTTON		7	(Printed Name)	why 1		(Printed Name)				(Date)
SHIPPED VIA:		MATC	WES TEST	SCHEDUU		N	(company) Naufilus			(Company)		*********			
SPECIAL INSTRUCTIONS/COL							RECEIVED BY (COURIER)			RECEIVED B			100		
autal	r Kale	ding T	me		12		(Signature)		(Time)	(Signatura)	Eno To	Mar.	i	৭)40	(Time)
							(Printed Name)		(Date)	(Printed Name	FRIC	Tolt	FFSON	7)7	/@S (Date)
		orders of	X 8 3 5 7 12				(Company)			Nautilus Envi	(carpen all	op in No.	AC OC	5-15-	•

CALSCIENCE ENVIRONMENTAL LABORATORIES, INC.

7440 LINCOLN WAY GARDEN GROVE, CA 92841-1427 TEL: (714) 895-5494 • FAX: (714) 894-7501

CHAIN OF	CUSTODY	RECORD
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Date	2/2/0	<u> </u>		
	7			
Page	ŧ	of	ı	

	ABORATORY CLIENT: Navtilus Environmental ADDRESS: STATE CA STATE											CLIENT PROJECT NAME / NUMBER:								P.O. NO.:					
ADDRES	S: J	tro Mor	ehouse Dr. STATE	A			ZIP	PR	DJECT	CON	TACT	ram	s k	.,				LAB	USE 2	ONL)		12		
	San Dieg	0	STATE C	<u>σ</u>		92	121	SA	VP)E	(S)/S	igiy	TURE		COE	TLOG	COD	E			REC		-	•		
TEL:	18-187-7	JJJ FAX:		E-MAIL:						Na								TEN	1P =			<u> </u>	°C		
TURNAF	OUND TIME:		17			1	RI	EQI	UES.	ΓED	A	IAN	.YS	ES											
] 24 HR	一		$\overline{\Box}$	\neg		-		T			T		Т										
		(ADDITIONAL COS		89	- 1			- 1					l												
	WQCB REPORTI	ING FURMS I	1		(8260B)						CAC, T22 METALS (6010B)		15)	9			4								
										(8021B) or	(8260B)		<u>a.</u>			(60	PNAs (8310) or (8270C)	VOCs (TO-14A) or (TO-15)	TPH(G) (TO-3M)	<u>3</u> 2		75			
								1					PREP	1		ALS	(82	o (=	3	, '				
										(8	SS	靈	씵	(C) (A		/ET) or	14A)	<u>중</u>	34	, 3	DOC			
									ō	138	¥.	260	8	827	082	22 N	331(ė	E	+ 3	`~				
LAB			FIELD POINT NAME	SAME	LING		NO. OF	TPH (G)	TPH (D)	втехимтве	OXYGENATES	VOCs (8260B)	5035 ENCORE	SVOCs (8270C) PEST (8081A)	PCBs (8082)	C,	As (Cs (9	37	+	Ž			
USE	SAMP	PLE ID	(FOR COELT EDF)	DATE	TIME	MATRIX		直	판	BTE	8	9	୍ବି ଅ	S S	5	ర	M	8	프	Total + Custon	Total	Toc ,			
ONLY	SCRE	A-Z		1/31/05	150	the	14	T												X	X	X			
2	SCRE	B-1			1430		4													X	X	X			
3	SCRE	B-3			1210		4													×	X	×			
4	SCRE	C-1		V	0845	V	14						\perp							X	X	X			
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5550 Morehouse Drive - Suite 150 San Diego, California 92121 Phone 858.587.7333 Fax 858.587.3961 ☐ WASHINGTON

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Sample Collection by:	οhn	Ri	sdapl								ANALYSES REQUIRED										
Report to: Company	S	tate _		Zip		. C	ddress ity ontact	y	State Zip	.	tal Copper										RECEIPT TEMPERATURE "C)
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SPECIAL INSTRUCTIONS/CO	MMEN	ITS:						1	RECEIVED BY (COURIER)					Z	44	1n	ŊĻ				(Time)
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									(Company)												



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Sample Collection by:	John	₽,	odolph								ANALYSES REQUIRED									
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SPECIAL INSTRUCTIONS/COMMENTS:							RECEIVED BY (COURIER)		RECEIVED BY (PABORATORY)											
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