Nautilus Environmental

Stormwater Toxicity Test Results for: Regional Water Quality Control Board San Diego, CA

February 14, 2008 Storm Event

Prepared for:

MACTEC Engineering & Consulting, Inc.
9177 Sky Park Court, Suite A
San Diego, CA 92123

Prepared by:

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

Submitted: May 19, 2008

Data Quality Assurance:

- Nautilus Environmental is a state-certified laboratory under the California Department of Health Services Environmental Laboratory Accreditation Program (ELAP), Certificate No. 1802.
- All test results included in this report have met internal Quality Assurance requirements, as well as all minimum EPA protocol acceptability criteria for test controls.
- All data have been reviewed and verified.

Verified by: _____ Date: 5/19/08

Enclosure (5)

INTRODUCTION

An acute screening level toxicity test using the mysid shrimp, *Americamysis bahia,* was performed to evaluate the quality of stormwater runoff at one location from the San Diego Regional Water Quality Control Board (RWQCB) parking lot. The sample was collected during a storm event that occurred on February 14th, 2008. Testing was conducted at Nautilus Environmental (Nautilus) in San Diego between February 15th and 19th, 2008.

MATERIALS AND METHODS

The study was performed in accordance with the U.S. EPA protocol "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA/821/R-02/012, October 2002).

TEST MATERIAL

Test material consisted of one stormwater grab sample collected from the RWQCB parking lot in San Diego, CA (Sample ID 7975). Sample collection was performed by MACTEC personnel. Test results are provided in Table 1 and Appendix A. The sample was collected in a 4-L high-density polyethylene cubitainer and delivered to Nautilus in an insulated ice chest containing wet ice on the day of sample collection.

Immediately upon arrival at Nautilus, a photograph was taken for descriptive purposes (Appendix C), and an aliquot of the sample was drawn for measurements of pH, dissolved oxygen (DO), conductivity, temperature, salinity, alkalinity, and hardness (Appendix B). Temperature, conductivity, and salinity were measured with an Orion 130 meter. The DO was measured using a YSI 55 meter, and an Orion 250A+ meter was used to measure pH. Alkalinity (Hach Method 8203) and hardness (Hach Method 8213) were checked using a Hach digital titrator (Model 16900). Artificial sea salts (Crystal Sea Marine Mix®) were added to the sample to raise the salinity to 30 ppt. Salt addition was necessary because stormwater is discharged to a marine environment, which requires use of a marine test species. The sample was received on the day of sample collection and stored at 4°C until they were used for testing the following day. Appropriate chain-of-custody (COC) procedures were followed during all phases of this study (Appendix E).

(2) swrcb.ca.gov

LABORATORY CONTROL WATER

Prior to test initiation, artificial saltwater (Crystal Sea Marine Mix® sea salts mixed into deionized lab water) was prepared and used as a salt control to ensure that any toxicity observed in the sample could not be attributed to the use of artificial sea salts. Consistent with EPA methods, all test results were statistically compared to the salt control, as this best mimics procedures performed on the samples themselves (EPA 2002). A natural seawater (lab) control was also tested for quality assurance purposes and as a measure of the overall organism health. The lab control seawater was obtained from the Scripps Institution of Oceanography intake system in La Jolla, CA. The seawater is held in a re-circulating system with an in-line 20-µm fiber filter and a chiller unit. The salinity of the lab control water was reduced from 34 to 30 ppt (using deionized water) to match the salinity of the test material and the salt control.

TEST ANIMALS

Mysid shrimp (*Americamysis bahia*) were purchased from Aquatic Biosystems of Fort Collins, Colorado. Animals were placed in plastic bags containing air-saturated saltwater, packed in an insulated container, and shipped to Nautilus by overnight delivery service. Upon receipt, each batch of test animals was acclimated to the proper test temperature (25 ± 1°C) and salinity (30 ppt) prior to test initiation. Test organisms were received the same day as testing and were allowed several hours to acclimate prior to test initiation. The organisms were 5 days old at test initiation.

ACUTE SCREENING BIOASSAYS

The test design consisted of six replicates with five organisms each, for a total of 30 organisms per sample. The sample was tested undiluted along with the associated laboratory and artificial salt control. Continuous light aeration was applied, which was required to ensure adequate dissolved oxygen levels to support the test organisms. Test chambers consisted of 350-ml plastic cups each containing 200 ml of test solution. Test solutions were acclimated to 25 ± 1°C, and five organisms were added to each test chamber. A second technician verified the counts and condition of the animals following initiation. Organisms were fed approximately ten *Artemia* nauplii per mysid twice per day. The test was conducted in an environmental chamber maintained at 25 ± 1°C over a period of 96 hours under static-renewal conditions; an eighty percent renewal of the test solutions was performed at 48 hours. The sample was arranged on a shelf rack within the environmental chamber. Observations were made at 48 hours to determine

the number of surviving organisms; dead mysids and excess food were removed from the test chambers to prevent any negative effects on water quality. The test was monitored daily for pH, DO, salinity, and temperature. Raw bench sheets containing mortality and water quality measurements are provided in Appendix B.

DATA ANALYSIS AND REPORTING

Sample 7975 was associated with a single salt control arranged on its same shelf, against which statistical comparisons were performed. The use of statistical comparisons to infer an effect relative to a control (hypothesis testing) is consistent with EPA whole effluent toxicity testing protocols and guidance (EPA 2002). This also provides a consistent methodology that takes into account control performance for a given test.

Survival data, expressed as a proportion, was arcsin square-root transformed prior to analysis to normalize the distribution of the data and satisfy statistical assumptions for analysis. Following transformation, homogeneity of variance was evaluated using the F test. An unpaired one-tailed Student's t-test was performed between the salt control and the sample. Due to unequal variance, the t-test was performed using Welch's correction (Zar 1984). Statistical analyses were performed using GraphPad Prism software, Version 4.02. The test were considered statistically significant if the p value was less than or equal to 0.05.

RESULTS

Mean survival and statistical differences from control are presented in Figure 1. Error bars display standard error of the mean (SEM). Numerical summaries are provided in Table 1 and Appendix A. Raw datasheets are located in Appendix B.

Mean survival was 73 percent, and was statistically reduced relative to its respective salt control with a mean of 100 percent survival.

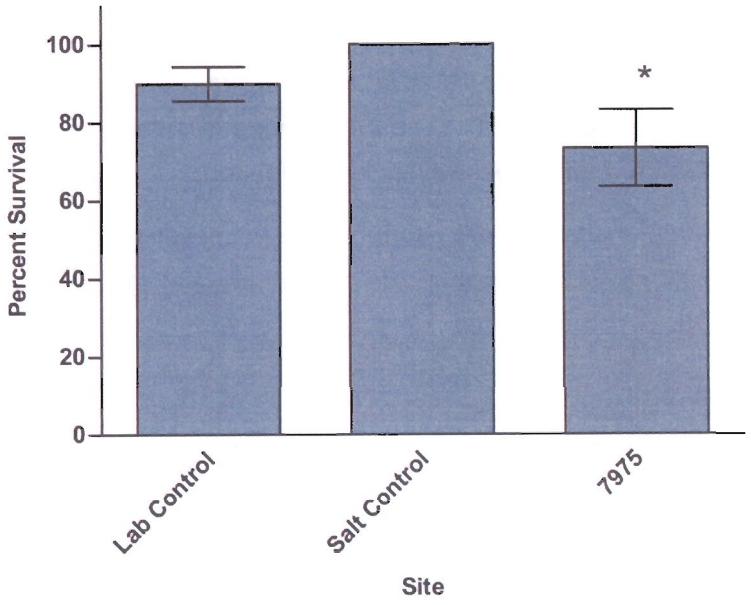


Figure 1. Summary of Acute Mysid Survival Results (Mean ± SEM).

* Asterisk indicates a statistically significant decrease compared to salt control (Student's one-tailed t-test, $p \leq 0.05$).

Table 1. Mean Survival Relative to Control and Statistical Summary of Results

Site Outfall # (Mactec ID)	Mean Percent Survival	% of Salt Control	p value	Statistically Reduced from Salt Control[a]
1 (7975)	73	73	0.017	Yes

[a] Student's one-tailed t-test, $p \leq 0.05$.

QA/QC

The sample was received within an appropriate temperature range and was initiated within 36-hours of sample collection. The natural seawater and artificial salt controls both met the minimum test acceptability criterion of 90 percent mean survival.

A few minor QA/QC deviations from EPA and internal protocols that took place during testing were noted. A thorough review of the data and test procedures did not identify any likely or foreseeable impacts on test results as a result of these deviations; therefore all data were deemed acceptable for reporting purposes. Explanations of specific QA/QC deviations are provided below.

- The sample temperature on the second day of testing, 23.7°C, fell just below the recommended range of 25 ± 1°C. The temperature was immediately adjusted to quickly bring this parameter back within protocol range.
- Due to heavy debris, accurate daily counts were not possible at 24 and 72 hours. Counts at 48 hours were possible due to the removal of solution during the renewal process.

Reference Toxicant Test

A concurrent reference toxicant test using copper chloride ($CuCl_2$) was conducted to assess the health of the test organisms and soundness of procedures. Mean control survival was 90 percent. A median lethal effect concentration (LC_{50}) of 229 micrograms per liter (µg/L) copper was determined using the Trimmed Spearman-Karber method. This LC_{50} value is within internal control chart limits of ± two standard deviations (Appendix D). This indicates that the test organism sensitivity was similar to that of organisms historically tested at Nautilus.

REFERENCES

EPA 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. EPA/821/R-02/012, October 2002.

GraphPad Software Inc. 1992-2004. GraphPad Prism, Version 4.02.

Zar 1984. Biostatistical Analysis, Second Edition. Prentice-Hall Inc., New Jersey. 718pp.

APPENDIX A

Survival Raw Data Summaries

MACTEC - Navy Stormwater Program - 2008
Toxicity Test Raw Data Summary

RWQCB San Diego

Sample Collected: 2/14/2008
Test Initiated: 2/15/2008

Mysid Shrimp *(Americamysis bahia)*
96-hour Acute Survival

Site Outfall # (Mactec ID)	Replicate	No. Alive	Percent Survival	Mean Percent Survival	% of Salt Control
Natural Seawater Control #3	A	5	100	90	90
	B	5	100		
	C	5	100		
	D	4	80		
	E	4	80		
	F	4	80		
Salt Control #1	A	5	100	100	NA
	B	5	100		
	C	5	100		
	D	5	100		
	E	5	100		
	F	5	100		
OF1 (7975)	A	3	60	73	73
	B	3	60		
	C	5	100		
	D	5	100		
	E	4	80		
	F	2	40		

APPENDIX B

Raw Data Sheets and Water Quality

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

Sample Check-In Information
Stormwater

Client: MACTEC – Navy Stormwater Tests Performed: Acute Mysid

Project: RWQCB Parkinglot Test ID No.(s): 0802-S078e

	1)	2)	3)	4)	5)	6)
Sample ID:	7975					
Log-in No. (08-xxxx):	08-0194					
Sample Collection Date & Time:	2/14/08 1250					
Sample Receipt Date & Time:	2/14/08 2100					
Check-in Temp (°C)	~~9.8~~ 11.4					
DO (mg/L)	~~6.24~~ 9.8					
pH (units)	6.24					
Conductivity (µS/cm)	111					
Salinity (ppt)	0.1					
Alkalinity (mg/L)*	13					
Hardness (mg/L)* *	21					
Total Chlorine (mg/L)	–					
Technician Initials	PA					

* = mg/L as $CaCO_3$, * = Measured for freshwater samples only, NA = Not Applicable

Sample Descriptions:

1)
2)
3)
4)
5)
6)

COC Complete? (Y) N

Filtration? Y (N)

Pore Size:

Organisms or Debris

Aeration? (Y) N Tests conducted with aeration

Length of Time:

Final DO:

Final pH:

pH Adjustment? Y (N)

Initial pH:

Final pH:

Cl_2 Adjustment? Y (N)

If yes, list free Cl_2 conc. and STS added.

1)
2)
3)
4)
5)
6)

Sub-samples for additional chemistry:

Freshwater Tests:

Control/Dilution Water Source: 8:2 Culligan Other: _____ Alkalinity: _____ Hardness: _____

Additional Control? Y N = _____ Alkalinity: _____ Hardness: _____

Marine Tests:

Control/~~Dilution~~ Water Source: LAB SW (ART SW) Other: _____ Alkalinity: 124 Salinity: 30ppt

Additional Control? (Y) N = Lab Control Alkalinity: 100 Salinity: 30 ppt

Sample Salted w/ artificial salt? (Y) N If yes, what ppt? 30 ppt

Sample salted w/brine? Y (N) If yes, what ppt? _____

Comments: Temperature for sample must be 0-6°C if received >24 hours past collection time.

QC Check: QB 3/25/08

Final Review: KL 3/26/08

Marine Acute Bioassay
Static-Renewal Conditions

Water Quality Measurements
& Test Organism Survival

Client: Mactec
Sample ID: RWQCB Stormwater
Test No.: 0802-5078

Test Species: *A. bahia*
Start Date/Time: 2/15/08 1430
End Date/Time: 2/19/08 1530

Tech Initials	0	24	48	72	96
Counts:	ES	-	EG	-	KF
Readings:	JR	AL	EG	ES	KF

Concentration 100%	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	-	5	-	5	30.0	30.3	30.0	30.2	29.7	24.6	25.1	24.3	24.9	25.6	6.9	6.1	7.2	7.7	7.6	7.87	7.63	7.79	8.02	8.11
#3	B	5	-	5	-	5			30.3					25.1					6.5					8.11		
	C	5	-	5	-	5																				
	D	5	-	5	-	4																				
	E	5	-	4	-	4																				
	F	5	-	5	-	4								24.6												
Salt Control	A	5	-	5	-	5	30.0	30.3	30.0	30.3	29.9	24.5	24.8	25.0	24.4	24.6	7.6	6.4	6.8	8.0	7.4	8.13	7.82	8.09	7.93	7.94
#1	B	5	-	5	-	5			30.5					24.0					6.8					7.97		
	C	5	-	5	-	5																				
	D	5	-	5	-	5																				
	E	5	-	5	-	5																				
	F	5	-	5	-	5																				
7975	A	5	-	4	-	3	29.4	29.3	29.1	29.3	28.4	24.9	24.4	24.9	24.4	24.8	8.4	6.1	7.3	7.9	7.3	8.27	7.81	8.18	7.94	7.91
OF1	B	5	-	4	-	3			29.7					23.7 (A)					6.4					7.95		
	C	5	-	5	-	5																				
	D	5	-	5	-	5																				
	E	5	-	4	-	4																				
	F	5	-	2	-	2																				
	A								i					i					i					i		
	B								f					f					f					f		
	C																									
	D																									
	E																									
	F																									
	A								i					i					i					i		
	B								f					f					f					f		
	C																									
	D																									
	E																									
	F																									

Animal Source/Date Received: ABS 2/15/08
Age at Initiation: 5 days

Feeding Times	0	24	48	72	96
AM:	—	0915	0830	0845	0820
PM:	1500	1615	1515	1330	—

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal
(A) temp slightly below range, lamps turned on

QC Check: EG 3/26/08
Final Review: KL 3/26/08

APPENDIX C

Sample Photographs


7975
73%
survival

APPENDIX D

Reference Toxicant Results

CETIS Summary Report

Mysid 96-h Acute Survival Test — Nautilus Environmental (CA)

Test Run No:	10-0468-7179	Test Type:	Survival (96h)	Analyst:	
Start Date:	15 Feb-08 21:00	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Diluted Natural Seawater
Ending Date:	19 Feb-08 22:00	Species:	Americamysis bahia	Brine:	Not Applicable
Duration:	4d 1h	Source:	Aquatic Biosystems, CO	Age:	5d

Sample No:	06-4383-0514	Code:	080215myra	Client:	Internal
Sample Date:	15 Feb-08	Material:	Copper chloride	Project:	
Receive Date:	15 Feb-08	Source:	Reference Toxicant		
Sample Age:	21h	Station:	Copper Chloride		

Comparison Summary

Analysis No	Endpoint	NOEL	LOEL	TOEL	PMSD	Method
17-5294-1183	96h Survival Rate	100	200	141	23.4%	Dunnett's Multiple Comparison Test

Point Estimate Summary

Analysis No	Endpoint	Effect-%	Conc-µg/L	95% LCL	95% UCL	Method
01-7966-3647	96h Survival Rate	50	229	199	264	Trimmed Spearman-Kärber

96h Survival Rate Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Control	4	0.9	0.857	0.943	0.8	1	0.0211	0.115	12.8%	0.0%
50		4	0.95	0.913	0.987	0.8	1	0.0183	0.1	10.5%	-5.56%
100		4	0.95	0.913	0.987	0.8	1	0.0183	0.1	10.5%	-5.56%
200		4	0.65	0.556	0.744	0.4	1	0.0459	0.252	38.7%	27.8%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	0.8	0.8	1	1
50		1	1	1	0.8
100		1	1	1	0.8
200		0.4	0.6	0.6	1
400		0	0	0	0
800		0	0	0	0

Mysid 96-h Acute Survival Test — Nautilus Environmental (CA)

Analysis No: 17-5294-1183 | Endpoint: 96h Survival Rate | CETIS Version: CETISv1.6.3
Analyzed: 26 Mar-08 11:50 | Analysis: Parametric-Control vs Treatments | Official Results: Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	200	141	1	23.4%

Dunnett's Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	P-Value	Decision(5%)
Lab Control		50	-0.582	2.41	0.246	0.9500	Non-Significant Effect
		100	-0.582	2.41	0.246	0.9500	Non-Significant Effect
		200*	2.7	2.41	0.246	0.0286	Significant Effect
		400*	9.78	2.41	0.246	0.0000	Significant Effect
		800*	9.78	2.41	0.246	0.0000	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	5.238903	1.047781	5	50.1	0.0000	Significant Effect
Error	0.3765633	0.0209202	18			
Total	5.615467	1.068701	23			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Varianc	1.36	4.25	0.2860	Equal Variances
Distribution	Shapiro-Wilk Normality	0.893		0.0153	Normal Distribution

96h Survival Rate Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Control	4	0.9	0.856	0.944	0.8	1	0.0214	0.115	12.8%	0.0%
50		4	0.95	0.912	0.988	0.8	1	0.0186	0.1	10.5%	-5.56%
100		4	0.95	0.912	0.988	0.8	1	0.0186	0.1	10.5%	-5.56%
200		4	0.65	0.554	0.746	0.4	1	0.0467	0.252	38.7%	27.8%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%

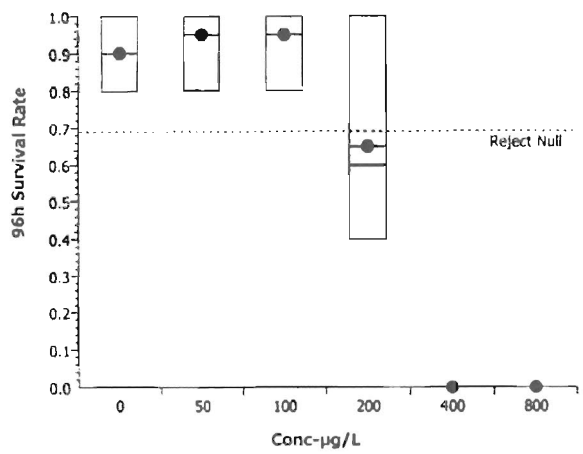
Angular (Corrected) Transformed Summary

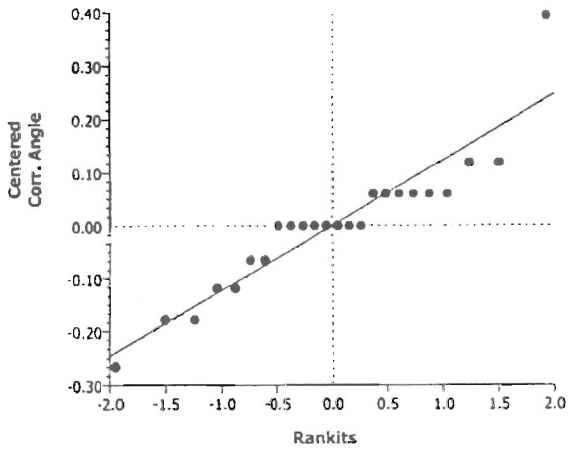
Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Control	4	1.23	1.17	1.28	1.11	1.35	0.0255	0.137	11.2%	0.0%
50		4	1.29	1.24	1.33	1.11	1.35	0.0221	0.119	9.26%	-4.86%
100		4	1.29	1.24	1.33	1.11	1.35	0.0221	0.119	9.26%	-4.86%
200		4	0.951	0.844	1.06	0.685	1.35	0.0519	0.28	29.4%	22.5%
400		4	0.226	0.226	0.226	0.226	0.226	0	0	0.0%	81.6%
800		4	0.226	0.226	0.226	0.226	0.226	0	0	0.0%	81.6%

Analyst: EG QA: 4/30/08

Mysid 96-h Acute Survival Test					Nautilus Environmental (CA)
Analysis No:	17-5294-1183	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.6.3
Analyzed:	26 Mar-08 11:50	Analysis:	Parametric-Control vs Treatments	Official Results:	Yes

Graphics





CETIS Analytical Report

Mysid 96-h Acute Survival Test — Nautilus Environmental (CA)

Analysis No: 01-7966-3647 | Endpoint: 96h Survival Rate | CETIS Version: CETISv1.6.3
Analyzed: 26 Mar-08 11:50 | Analysis: Trimmed Spearman-Kärber | Official Results: Yes

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC/LC50	95% LCL	95% UCL
Control Threshold	0.1	0.00%	2.36	0.031	229	199	264

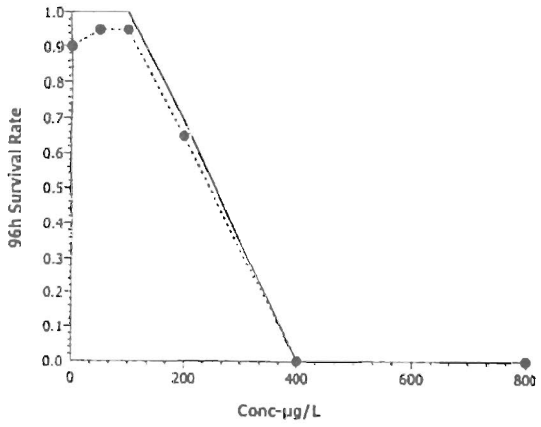
96h Survival Rate Summary

			Calculated Variate(A/B)							
Conc-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	B
0	Lab Control	4	0.9	0.8	1	0.0211	0.115	12.8%	0.0%	18	20
50		4	0.95	0.8	1	0.0183	0.1	10.5%	-5.56%	19	20
100		4	0.95	0.8	1	0.0183	0.1	10.5%	-5.56%	19	20
200		4	0.65	0.4	1	0.0459	0.252	38.7%	27.8%	13	20
400		4	0	0	0	0	0		100.0%	0	20
800		4	0	0	0	0	0		100.0%	0	20

96h Survival Rate Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	0.8	0.8	1	1
50		1	1	1	0.8
100		1	1	1	0.8
200		0.4	0.6	0.6	1
400		0	0	0	0
800		0	0	0	0

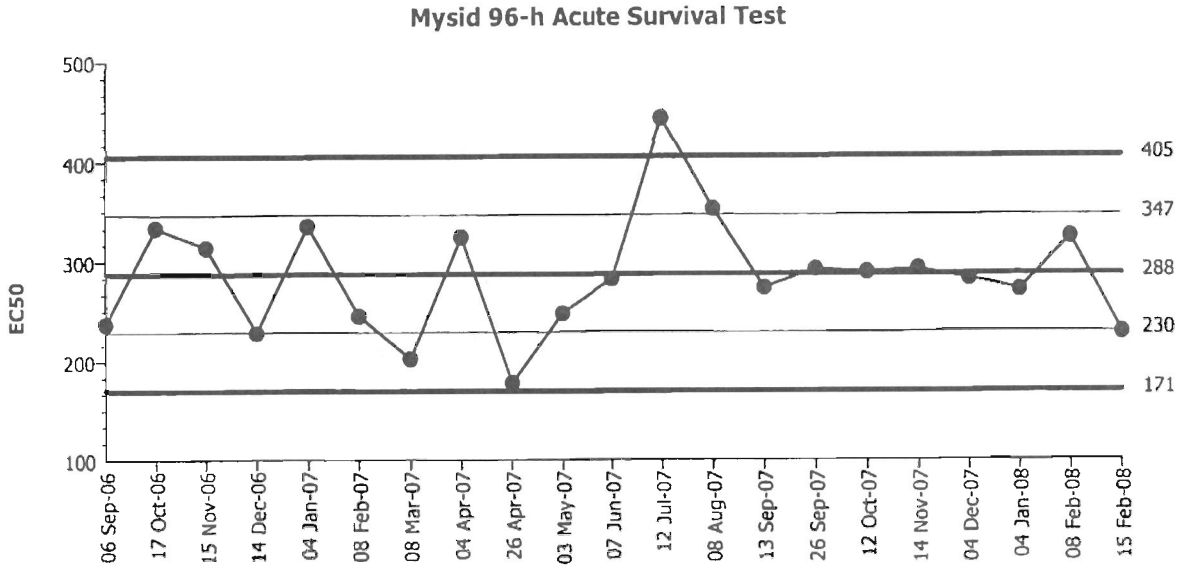
Graphics



Analyst: EG QA: 4/30/08

Mysid 96-h Acute Survival Test — Nautilus Environmental (CA)

Test Type:	Survival (96h)	Organism:	Americamysis bahia (Opossum Shri	Material:	Copper chloride
Protocol:	EPA/821/R-02-012 (2002)	Endpoint:	96h Survival Rate	Source:	Reference Toxicant-REF



Mean:	288.2	Count:	20	-1s Warning Limit:	229.7	-2s Action Limit:	171.1
Sigma:	58.54	CV:	20.30%	+1s Warning Limit:	346.7	+2s Action Limit:	405.3

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Link No	Analysis No
1	2006	Sep	6	238.1	-50.07	-0.8554			10-7601-4711	07-9688-3591
2		Oct	17	334.4	46.15	0.7884			03-8653-6688	07-4968-0172
3		Nov	15	314.7	26.47	0.4522			17-1105-8528	08-4548-2558
4		Dec	14	229.7	-58.46	-0.9986			19-6835-8485	06-1310-3313
5	2007	Jan	4	336.4	48.16	0.8227			07-8571-0243	08-0025-8153
6		Feb	8	246.2	-41.97	-0.717			00-6682-2702	04-7122-7536
7		Mar	8	203.7	-84.52	-1.444	(-)		03-8099-5618	15-0422-2541
8		Apr	4	324.9	36.7	0.6269			07-2249-3404	04-5480-1590
9			26	179.4	-108.8	-1.859	(-)		13-0264-0673	13-6748-2170
10		May	3	248.6	-39.65	-0.6772			11-0913-6772	15-8109-4996
11		Jun	7	282.8	-5.357	-0.09152			17-7607-2134	18-3456-9207
12		Jul	12	443.8	155.6	2.658	(+)	(+)	11-8980-4154	20-4540-7224
13		Aug	8	353.2	64.96	1.11	(+)		21-4360-0746	04-5371-7203
14		Sep	13	273.8	-14.4	-0.246			19-0570-1682	20-6165-5813
15			26	292.8	4.617	0.07887			05-2902-0147	04-6896-2913
16		Oct	12	289.9	1.672	0.02856			06-6710-9548	05-8627-2723
17		Nov	14	293.1	4.877	0.08332			16-4362-8020	12-3241-5879
18		Dec	4	282.8	-5.357	-0.09152			21-3723-5303	10-0331-7759
19	2008	Jan	4	271.5	-16.66	-0.2846			17-3829-5557	01-4160-5576
20		Feb	8	324.9	36.7	0.6269			17-6573-0671	11-0587-1515
21			15	229.2	-59.03	-1.008	(-)		18-0802-2158	01-7966-3647

Marine Acute Bioassay
Static-Renewal Conditions

Water Quality Measurements
& Test Organism Survival

Client: Internal
Sample ID: $CuCl_2$
Test No.: 080215myra
NA

Test Species: *A. bahia*
Start Date/Time: 2/15/2008 0100
End Date/Time: 2/19/2008 2200

Tech Initials	0	24	48	72	96
Counts:	NH	AW	SC	ES	~~KF~~ NA
Readings:	AC	NH	SC	ES	KF

Concentration (µg/L)	Rep	Number of ~~Live~~ Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	5	4	30.1	30.0	31.9	29.0	28.5	24.6	24.8	25.4	24.9	25.2	7.0	6.3	7.8	7.0	7.0	7.72	7.75	7.75	7.71	7.80
	B	5	5	4	4	4			30.0	--	--			24.9					6.4					7.66		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
50	A	5	5	5	5	5	29.8	29.6	30.4	29.0	28.7	24.3	25.0	25.2	24.9	25.2	7.2	6.2	7.8	7.1	7.4	7.74	7.75	7.79	7.74	7.83
	B	5	5	5	5	5			29.8					25.2					4.7					7.62		
	C	5	5	5	5	5																				
	D	5	5	4	4	4																				
100	A	5	5	5	5	5	29.8	29.6	31.8	29.0	28.5	24.5	25.0	25.5	25.0	25.2	7.0	6.3	7.7	7.2	7.6	7.73	7.76	7.80	7.76	7.80
	B	5	5	5	5	5			29.6					25.3					4.7					7.65		
	C	5	5	5	5	5																				
	D	5	5	4	4	4																				
200	A	5	5	4	3	2	29.4	29.2	29.6	29.0	28.3	24.5	25.0	25.4	25.0	25.2	7.1	6.3	7.8	7.4	7.5	7.74	7.76	7.80	7.76	7.85
	B	5	4	3	3	3			29.4					25.3					4.9					7.66		
	C	5	5	3	3	3																				
	D	5	5	5	5	5																				
400	A	5	3	0	-	-	28.8	28.7	31.1	29.0	-	24.5	25.0	25.7	25.0	-	7.3	6.4	7.8	7.2	-	7.73	7.76	7.78	7.77	-
	B	5	4	0	-	-			28.9					25.3					5.3					7.75		
	C	5	4	1	0	-																				
	D	5	2	0	-	-																				
800	A	5	3	0	-	-	27.8	27.7	28.1	—		25.1	25.1	25.6	—		7.3	6.5	7.7	—		7.69	7.76	7.76	—	
	B	5	2	0	-	-			27.8					25.4					5.6					7.73		
	C	5	2	0	-	-																				
	D	5	0	0	-	-																				

Animal Source/Date Received: ABS 2/15/08
Age at Initiation: 5 days

Feeding Times	0	24	48	72	96
AM:	—	0915	830	805	0820
PM:	2400	1615	1815	1330	1630

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal
* animals fed prior to ~~uptake~~ DF initiation

QC Check: DF 3/19/08
Final Review: MA 4/29/08

APPENDIX E

Chain-of-Custody Forms

MACTEC

MACTEC Engineering and Consulting, Inc.
• 9177 Sky Park Court, Suite A • San Diego, CA 92123 • Phone: (858) 278-3600 • FAX: (858) 278-5300

CHAIN OF CUSTODY

Project Information		Sampling Information	
Laboratory: Nautilus		Description: Storm Water Sampling	Team Number: 1
Name of Facility: RWQCB Parking Lot		Sample Matrix: Water	Team Leader's Initials: JEW

Sample ID	Outfall	Sample Date	Sample Time	Analysis Required	Container Type	Preservative	
7975	1	2/14/2008	12:50	Acute Toxicity	HDPE 4-L cube	None	11.4

Relinquished by:	Relinquished by:	Relinquished by:
Name: Jerome Welch Signature:	Name: SAQIB SHIRAZI Signature:	Name: Signature:
Date: 2/14/08 Time: 2000	Date: 2/14/08 Time: 2100	Date: Time:
Received by:	**Received by:**	**Received by:**
Name: SAQIB SHIRAZI Signature:	Name: Chris Stransky Signature:	Name: Signature:
Date: 2/14/08 Time: 2000	Date: 2-14-08 Time: 2100	Date: Time:

Comments