Appendix D

A Toxicity and Bioaccumulation Evaluation of Peyton Slough Sediments

(Samples Collected October 18-22, 2001)

Prepared For:

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December 2001

PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

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A Toxicity and Bioaccumulation Evaluation of Peyton Slough Sediments
(Samples Collected October 18-22, 2001)

Appendices

APPENDIX A - Copy of the Sediment Sample Chain-of-Custody Records

APPENDIX B - Test Data and Summaries of Statistical Analyses for the Evaluation of Peyton Slough Sediment Elutriate Toxicity to the Bivalve *Mytilus sp.*

APPENDIX C - Test Data and Summary of Statistical Analyses for the Reference Toxicant Evaluation of the Bivalve *Mytilus sp.*

APPENDIX D - Test Data for the Performance of the Sediment Bioaccumulation Tests

A Toxicity and Bioaccumulation Evaluation of Peyton Slough Sediments

(Samples Collected October 18-22, 2001)

1.0 INTRODUCTION

Under contract to the URS Corporation (URS), Pacific EcoRisk (PER) performed toxicity and bioaccumulation evaluations of sediments from Peyton Slough, in northern San Francisco Bay, CA. These evaluations consisted of performing:

1. sediment elutriate toxicity tests with bivalve (*Mytilus sp.*) embryo/larval development as the test endpoint;
2. 28-day sediment bioaccumulation tests with polychaetes (*Nereis virens*).

In order to document that the toxicity test organisms were responding to chemical stress in a typical fashion, concurrent reference toxicant tests were also performed. This report describes the performance and results of these evaluations.

2.0 SEDIMENT EVALUATION PROCEDURES

The methods used in conducting these evaluations followed established guidelines:

- Short-term methods for estimating the chronic toxicity of effluents and receiving waters to West Coast marine and estuarine organisms (US EPA 1995);
- Testing Manual for the Evaluation of Dredged Material Discharged in Waters of the U.S. (Inland Testing Manual, U.S.EPA/ACOE, 1998);
- Guide for determination of the bioaccumulation of sediment-associated contaminants by benthic invertebrates (Standard E 1688-97a, ASTM).

2.1 RECEIPT AND HANDLING OF SEDIMENT SAMPLES

During the period of October 18-22, 2001, URS staff collected sediment samples for toxicity and bioaccumulation analyses from several stations in and around the Peyton Slough area (Table 1). At each station, sediment samples were collected and composited into HDPE containers which were sealed and labeled, and placed into ice chests. These sediment samples were kept on ice during collection, and were immediately transported, under chain-of-custody, to the PER testing laboratory in Martinez, CA. Upon receipt at the laboratory, each sample was logged in and placed within a sample storage refrigerator at 4°C. Copies of the Chain-of Custody records are attached as Appendix A.

Table 1. Peyton Slough sediment samples.		
Sample I.D.	Type of Test Performed	
	Toxicity Test	Bioaccumulation Test
RA 1		X
RA 1-2	X	
RA 2-0	X	
RA 2-2 *	X	
RA 3-0 *	X	
RA 3-2	X	
RA 2-2	X	
RA 4-2	X	
RA 6		X
RA 6-2	X	
RA 7-0 *	X	
RA 8-0 *	X	
RA 9-0 *	X	
RA 9-2	X	
RA 10 **		X
RA 10-2 *	X	
RA 11 **		X
RA 12 **		X
RA 12-2 *	X	

* - Sediments which were tested at "$pH_{ambient}$" and at $pH_{-7.5}$.

** - Sediments that were tested only after pH adjustment (no "$pH_{ambient}$" testing).

2.2 PREPARATION OF THE SEDIMENT ELUTRIATES

The sediment elutriates were prepared by mixing 150 mL of each site sediment with 600 mL of 0.45-µm-filtered 30 ppt seawater (seawater collected from the U.C. Santa Cruz Granite Canyon Marine Laboratory, diluted to a salinity of 30 ppt via addition of reverse-osmosis de-ionized water) on a magnetic stir plate for 30 minutes. After mixing, the sample was allowed to settle for one hour. After this one hour settling period, it was determined that the sediment particulates had not settled enough for the planned testing. In order to remove any suspended particulate matter that could interfere with the bivalve toxicity tests, each elutriate supernatant was transferred to centrifuge bottles and centrifuged at 2500g for 10 minutes. The resulting supernatant comprised the 100% elutriate test solution for each of the sediment treatments.

2.2.1 Preparation of Sediment Elutriates After Adjustment of Sediment pH

For several of the sediment samples (identified by a single asterisk in Table 1), it was observed that the sediment pH was acidic (pH < 6.5). As the low pH could potentially impair embryo development and/or survival in and of itself, it would then be virtually impossible to determine whether or not there was any sediment elutriate toxicity due to chemical contamination. As a result, additional aliquots of these 'acidic' sediments were used to prepare a second set of elutriates after adjusting the sediment pH to acceptable levels.

Immediately prior to elutriate preparation, each of the acidic sediments was adjusted up to $\geq pH_{7.5}$ via dropwise addition of ACS reagent 1 N NaOH, followed by vigorous homogenization within stainless steel bowls. Once the sediment pH was determined to be at pH~7.5 (±0.05 pH units) each pH-adjusted sediment sample was used to prepare a sediment elutriate, as described in Section 2.3.1. The testing of these pH-adjusted sediment elutriates was initiated and carried out as were the other sediment elutriate tests.

2.3 DETERMINATION OF SEDIMENT ELUTRIATE TOXICITY

2.3.1 Test Organisms

The adult *Mytilus sp.* used to provide the embryos used in these tests were obtained from a commercial supplier (Carlsbad Aquafarms, Carlsbad, CA). Upon receipt in the laboratory, the adult bivalves were maintained in small tanks of filtered 30 ppt seawater, at 12°C.

2.3.2 *Mytilus sp.* Embryo Development Toxicity Test Procedures

The short-term chronic bivalve toxicity test consists of a 48 hr bioassay in which embryos of the mussel, *Mytilus sp.,* are exposed to site sediment elutriates, and the effects on embryo normal development determined. The specific procedures used in these tests are described below.

The Lab Control water for this test consisted of 0.45-µm-filtered 30 ppt seawater (seawater collected from the U.C. Santa Cruz Granite Canyon Marine Laboratory [UC Lab], adjusted to a salinity of 30 ppt via addition of reverse-osmosis, de-ionized water). The Lab Control water and the 100% site sediments elutriate samples were then used to prepare additional test solutions at concentrations of 6.25, 12.5, 25, and 50% elutriate for each sediment. Initial routine "new" water quality characteristics (pH, D.O., and salinity) were measured for each treatment test solution prior to use in these tests.

Bivalve embryos were generated from gravid *Mytilus sp.*. Prior to spawning, the adult bivalves were held in filtered seawater at a temperature of 12°C. To induce spawning, the gravid adults were placed into clean 0.45 µm-filtered UC Lab seawater at 20°C. This increase in temperature induced the bivalves to release sperm and eggs. When an individual was observed to begin releasing sperm or eggs, it was transferred to a separate container for isolation and collection of gametes, which were examined microscopically to evaluate viability and quality. The gametes

exhibiting the best quality were used to prepare freshly-fertilized embryos by mixing a solution of sperm (at the appropriate concentration) with an aliquot of the best quality eggs. The resulting embryos were examined approximately one hr after fertilization to ensure viability, and were then used in the current tests.

There were four test replicates at each treatment, each replicate consisting of a 20 mL glass vial containing 10 mL of appropriate test solution. Additional replicates were established to verify the inoculation density, and additional Lab Control treatment "observation " vials were established for monitoring of successful embryo development (i.e., to allow monitoring of the test conditions without affecting actual test replicates). Finally, vials for analysis of test water quality characteristics (containing 20 mL of test solution at the same embryo density as the test vials) were also established for each treatment. To initiate the test, the embryos were loaded into the test containers at a density of approximately 150-300 embryos per replicate vial. These test and observation/monitoring vials were then placed into a temperature-controlled water bath at 18°C under a 16L:8D photoperiod.

After 48 hrs, the "observation" vials were examined to ensure that ≥ 90% of the surviving embryos achieved normal development to the "D-hinge" stage. Upon confirming adequate successful embryo development, the test was terminated with all of the test embryos being fixed by the addition of 5% glutaraldehyde. At test termination, the water from the "water quality" vials at each treatment was analyzed for salinity, D.O., and pH. The contents of each preserved test vial were subsequently examined microscopically to determine the percentage of embryos exhibiting normal development.

The resulting % normal development data at each treatment were compared to the Control treatment to determine any developmental impairment, or toxicity, caused by the sediment elutriates. All statistical analyses were made using the ToxCalc® statistical package (Version 5.0, TidePool Scientific, McKinleyville, CA).

2.3.3 Reference Toxicant Testing of the *Mytilus sp.* Embryos

In order to document that the test organisms were responding to toxic stress in a typical fashion, a reference toxicant test (with copper) was performed concurrently with the elutriate tests. The test conditions for the reference toxicant test followed US EPA guidelines. The reference toxicant test for *Mytilus sp.* consists of exposure to Cu at test concentrations of 2.5, 5, 10, 15, and 20 µg/L.

The reference toxicant test has one endpoint: % normal embryo development. The development data for this test were statistically analyzed to determine the EC50 (the test concentration that results in 50% normal development, relative to the Control); all statistical analyses were performed using the ToxCalc statistical package, and followed the U.S. EPA statistical flowchart. The results of this reference toxicant test were compared to our data base of performance by these organisms in previous reference toxicant tests to determine if the current

response was consistent with historical results (i.e., within the range established by the historical mean ± 2 S.D., as per EPA test guidelines).

2.4 SEDIMENT BIOACCUMULATION TESTING

The potential for contaminants in the Peyton Slough sediments to bioaccumulate was evaluated using sediment bioaccumulation tests with the polychaete *Nereis virens*. These tests were performed following ASTM guidelines (ASTM 1997).

2.4.1 Test Organisms

The *Nereis virens* used in these tests were provided by a commercial supplier (Aquatic Research Organisms, Hampton, NH), and were obtained from Booth Bay, ME.

2.4.2 Bioaccumulation Test Protocol

The Control treatment sediment for these tests consisted of "home" sediment from Tomales Bay, CA. There were five replicates established for the Control and each of the Peyton Slough sediment samples. Each replicate consisted of approximately 4 L of homogenized sediment placed into a 16 L HDPE tank. For sediments which exhibited a pH < 7.5, the sediment pH was adjusted up to $pH_{7.5}$ via addition of NaOH followed by vigorous homogenization and a 24-hr equilibration period.

After all pH adjustments, approximately 6 L of 0.45-µm-filtered full-strength seawater was carefully poured into each tank so as to minimize disturbance of the sediment. The replicate tanks were then placed into a temperature controlled water bath at 15°C. Each of the test replicates was gently aerated.

After 24 hrs equilibration, routine water quality characteristics (temperature, pH, D.O., and salinity) were determined for each test replicate at each treatment. Then, 25 randomly-selected adult polychaetes were placed into each replicate container. Additional polychaetes were also collected at this time for determination of T_0 tissue concentrations (five replicates of 20 polychaetes each, placed inside HDPE bags which were sealed and labeled for identification, and then frozen for later analyses). Each day, for the next 28 days, the water quality characteristics of the overlying water were measured in one test replicate for each treatment; when observed, dead polychaetes were removed from the test replicates. Approximately 80% of the overlying water in each replicate was carefully replaced three times per week.

After 28 days exposure, the sediment from each replicate was sieved and the polychaetes collected. The number of surviving polychaetes was determined. The surviving organisms were rinsed with clean seawater and then placed inside pre-cleaned 500-mL glass jars which were sealed and labeled for identification. These polychaetes were then frozen. All of the frozen

polychaete samples were subsequently shipped, via overnight delivery and under chain-of-custody, to Columbia Analytical Services (Kelso, WA) for analysis of contaminants of concern.

3.0 SEDIMENT ELUTRIATE TOXICITY TEST RESULTS

3.1 Sediment RA 1-2 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 1-2 elutriate are summarized in Table 2. Briefly, there was 94.2% normal development in the Lab Water Control treatment test, indicating an acceptable response by the test organisms. There was not less than 92.0% normal development at any of the elutriate treatments up through the 50% elutriate concentration, none of which was significantly less than the Control. At the 100% elutriate concentration, normal development was reduced to 10.2%, which was significantly less than the Control. The NOEC was 50% elutriate and the LOEC was 100% elutriate. The EC25 and EC50 values were 66.8% and 77.0% sediment elutriate, respectively.

The test data and summaries of statistical analyses for this test are attached as Appendix B.

Table 2. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 1-2 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	93	97	97	96	95.8
12.5%	90	90	97	97	93.5
25%	96	89	95	97	94.2
50%	96	83	95	94	92.0
100% *	12	6	7	16	10.2 *
NOEC =			50% elutriate		
LOEC =			100% elutriate		
EC25 =			66.8% elutriate		
EC50 =			77.0% elutriate		

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

3.2 Sediment RA 2-0 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 2-0 elutriate are summarized in Table 3. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 3. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 2-0 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.3 Sediment RA 2-2 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 2-2 elutriate are summarized in Table 4a. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 value could not be determined.

The test data and summaries of statistical analyses for this test are attached as Appendix B.

Table 4a. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 2-2 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.3.1 Sediment RA 2-2 (pH-Adjusted) Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 2-2 elutriate, after adjustment of the sediment pH, are summarized in Table 4b. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summaries of statistical analyses for this test are attached as Appendix B.

Table 4b. Evaluation of Peyton Slough pH-adjusted Sediment RA 2-2 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.4 Sediment RA 3-0 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 3-0 elutriate are summarized in Table 5a. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summaries of statistical analyses for this test are attached as Appendix B.

Table 5a. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 3-0 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.4.1 Sediment RA 3-0 (pH-Adjusted) Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 3-0 elutriate, after adjustment of the sediment pH, are summarized in Table 5b. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 5b. Evaluation of Peyton Slough pH-adjusted Sediment RA 3-0 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.5 Sediment RA 3-2 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 3-2 elutriate are summarized in Table 6. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was not less than 94.2% normal development at any of the elutriate treatments up through the 25% elutriate concentration, none of which was significantly less than the Control. At the 50% elutriate concentration, normal development was reduced to 27.5%, which was significantly less than the Control. The NOEC was 25% elutriate and the LOEC was 50% elutriate. The EC25 value could not be determined due to the distribution of data; the EC50 value was 43.0% sediment elutriate.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 6. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 3-2 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	97	96	97	92	95.5
12.5%	97	91	97	96	95.2
25%	97	95	94	91	94.2
50% *	27	42	22	19	27.5 *
100% *	0	0	0	0	0 *
NOEC =			25% elutriate		
LOEC =			50% elutriate		
EC25 =			Could not be determined		
EC50 =			43.0% elutriate		

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

3.6 Sediment RA 4-2 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 4-2 elutriate are summarized in Table 7a. Briefly, there was 94.2% normal development in the Lab Water Control treatment. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 7a. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 4-2 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.6.1 Sediment RA 4-2 (pH-Adjusted) Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 4-2 elutriate, after adjustment of the sediment pH, are summarized in Table 7b. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summaries of statistical analyses for this test are attached as Appendix B.

Table 7b. Evaluation of Peyton Slough pH-adjusted Sediment RA 4-2 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50%	0	0	0	0	0 *
100%	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.7 Sediment RA 6-2 Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 6-2 elutriate are summarized in Table 8. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 8. Evaluation of Peyton Slough Sediment RA 6-2 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.8 Sediment RA 7-0 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 7-0 elutriate are summarized in Table 9a. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 9a. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 7-0 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.8.1 Sediment RA 7-0 (pH-Adjusted) Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 7-0 elutriate, after adjustment of the sediment pH, are summarized in Table 9b. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 9b. Evaluation of Peyton Slough pH-adjusted Sediment RA 7-0 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.9 Sediment RA 8-0 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 8-0 elutriate are summarized in Table 10a. Briefly, there was 94.2% normal development in the Lab Water Control treatment test,. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 10a. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 8-0 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.9.1 Sediment RA 8-0 (pH-Adjusted) Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 8-0 elutriate, after adjustment of the sediment pH, are summarized in Table 10b. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 10b. Evaluation of Peyton Slough pH-adjusted Sediment RA 8-0 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.10 Sediment RA 9-0 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 9-0 elutriate are summarized in Table 11a. Briefly, there was 94.2% normal development in the Lab Water Control treatment. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 11a. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 9-0 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.10.1 Sediment RA 9-0 (pH-Adjusted) Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 9-0 elutriate, after adjustment of the sediment pH, are summarized in Table 11b. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was a statically significant reduction to 61.5% normal development at the 6.25% elutriate treatment. There was complete abnormal embryo development at all of the remaining sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 value could not be determined; the EC50 value was 5.7% elutriate.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 11b. Evaluation of Peyton Slough pH-adjusted Sediment RA 9-0 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	78	74	16	78	61.5 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			5.7% elutriate		

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

3.11 Sediment RA 9-2 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 9-2 elutriate are summarized in Table 12. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 12. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 9-2 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			*Could not be determined*		
EC50 =			Could not be determined		

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

3.12 Sediment RA 10-2 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 10-2 elutriate are summarized in Table 13a. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 13a. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 10-2 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.12.1 Sediment RA 10-2 (pH-Adjusted) Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 10-2 elutriate, after adjustment of the sediment pH, are summarized in Table 13b. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was complete abnormal embryo development at all of the sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 and EC50 values could not be determined.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 13b. Evaluation of Peyton Slough pH-adjusted Sediment RA 10-2 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	0	0	0	0	0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			Could not be determined		

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

3.13 Sediment RA 12-2 Elutriate Toxicity to *Mytilus sp.* Embryo Development

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 12-2 elutriate are summarized in Table 14a. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was a statistically significant reduction to 87% normal development at the 6.25% elutriate treatment. There was complete abnormal embryo development at all of the remaining sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 value could not be determined; the EC50 was 8.2% elutriate.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 14a. *Mytilus sp.* embryo development in Peyton Slough Sediment RA 12-2 Elutriate.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	93.0	91	74	90	87.0 *
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			8.2% elutriate		

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

3.13.1 Sediment RA 12-2 (pH-Adjusted) Elutriate Toxicity to *Mytilus sp.*

The normal development results for *Mytilus sp.* embryos exposed to the Peyton Slough sediment RA 12-2 elutriate, after adjustment of the sediment pH, are summarized in Table 14b. Briefly, there was 94.2% normal development in the Lab Water Control treatment test. There was a statistically significant reduction to 91.2% normal development at the 6.25% elutriate treatment. There was complete abnormal embryo development at all of the remaining sediment elutriate concentrations. The NOEC was <6.25% elutriate and the LOEC was 6.25% elutriate. Due to the distribution of the data, the EC25 value could not be determined; the EC50 was 8.5% elutriate.

The test data and summary of statistical analyses for this test are attached as Appendix B.

Table 14b. Evaluation of Peyton Slough pH-adjusted Sediment RA 12-2 Elutriate Toxicity.

Sediment Elutriate Treatment	% Normal Embryo Development				Overall Mean
	Rep A	Rep B	Rep C	Rep D	
Lab Water Control	92.1	95.7	94.6	94.4	94.2
6.25%	89	89	92	95	91.2*
12.5%	0	0	0	0	0 *
25%	0	0	0	0	0 *
50% *	0	0	0	0	0 *
100% *	0	0	0	0	0 *
NOEC =			<6.25% elutriate		
LOEC =			6.25% elutriate		
EC25 =			Could not be determined		
EC50 =			8.5% elutriate		

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

3.14 Reference Toxicant Toxicity to *Mytilus sp.*

The embryo development data for *Mytilus sp.* exposed to copper, the reference toxicant, are summarized below in Table 15a. Briefly, there was 98.8% normal embryo development at the Control treatment. At the 2.5 µg/L Cu treatment, normal embryo development was reduced to 91.5% that was statistically less than the Control treatment. There was complete abnormal development at the 15 and 20 µg/L Cu treatments. The EC50 value was 6.37 µg/L Cu.

The test data & summary of statistical analyses for this test are attached as Appendix C.

Table 15a. Reference toxicity testing: Effects of Cu on *Mytilus sp.* embryo development.

Copper Treatment (µg/L)	% Normal Embryo Development				Overall Mean (%)
	Rep A	Rep B	Rep C	Rep D	
Control	96	100	100	99	98.8
2.5	91	93	90	92	91.5 *
5	76	82	74	85	79.2 *
10 *	7	1	2	4	3.5 *
15 *	0	0	0	0	0 *
20 *	0	0	0	0	0 *
EC50 = 6.37 µg/L Cu					

* - Statistically less than the Control treatment response at $p < 0.05$.

The results of the most recent independent reference toxicant tests that comprise the working database for this test are summarized below in Table 15b.

The current reference toxicant test EC50 of 6.37 µg/L is well within the "acceptability" range ("mean ± 2 S.D.") of 3.86-15.0 µg/L (Table 15b), indicating that these bivalve embryos were responding to toxicant stress in a consistent and typical fashion.

Table 15b. *Mytilus sp.* Reference Toxicant Test Results Database

Test ID Number	EC50 (µg/L Cu)
4624	14.2
4691	13.7
4730	10.4
4897	13.2
5047	8.1
5176	7.1
5362	8.9
5245	10.3
5299	11.0
5432	12.3
5489	6.0
5549	10.4
5648	8.9
5566	6.9
5594	8.2
5655	7.0
5768	11.8
5820	10.7
5901	5.3
6030	4.7
Test Acceptability Range (mean ± 2 S.D.) =	3.86 - 15.0

4.0 SEDIMENT BIOACCUMULATION TEST DATA

The sediment bioaccumulation tests were initiated on November 8, 2001, and were terminated on December 6. At test termination, the polychaetes were composited for each replicate, placed in labeled containers, which were frozen, and then sent, via overnight delivery and on dry ice, to the analytical laboratory (Columbia Analytical Services, Kelso, WA). The number of surviving polychaetes in each of the test replicates is summarized below in Table 16.

The test data for these tests are attached as Appendix D.

Table 16. Sediment bioaccumulation tests with *Nereis virens*.

Sample I.D.	Number of Surviving Bivalves				
	Rep A	Rep B	Rep C	Rep D	Rep E
"Home" Control	23	20	18	22	25
RA 1	22	24	22	20	23
RA 6	11	0	11	1	0
RA 10	0	0	16	12	18
RA 11	0	19	6	2	1
RA 12	1	1	2	13	

5.0 QA/QC SUMMARY

Negative Control - The test organism response at the Control treatment was within acceptable limits.

Positive Control - The results of the reference toxicant test that was performed concurrently with the sediment elutriate tests were consistent with the historical database of tests performed previously by this laboratory, indicating that these test organisms were responding to toxic stress in a typical fashion.

Water Quality – With the exception of the low pH of the acidic sediment elutriates (discussed earlier), all water quality characteristics were within acceptable limits for these test organisms.

APPENDIX A

Copy of the Sediment Sample Chain-of-Custody Records

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
835 Arnold Drive, Suite 104
Martinez, CA 94553
(925)313-8080 fax: (925)313-8089

RESULTS TO:
URS
500 12th St. Ste 200
Oakland 94607
Attn: Heather Cosa Tel: 510 893 3600

BILL TO:
Same

Attn: _____ Tel: _____

PROJECT: Rhodia 510007 000700

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/ COMP.	# CONTAINERS/TYPE	ANALYSES REQUESTED: Neanthes Bioassay	ANALYSES REQUESTED: Mytilus Elutriate	REMARKS
RA12	10/22/01		Soil		1 1 5 gal	✓		
RA12-0					1 1 4L.		✓	
RA12-2					1 1 4L.		✓	
					1			
					1			
					1			
					1			
					1			
					1			
					1			
					1			

METHOD OF SHIPMENT: FED X ____ UPS ____ HAND X OTHER ____

COMMENTS: Questions to Diane Mims 510 874 3284

CODES:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
Bl Copeland	10/22/01	1222	[signature]	10/22/01	1222	OF

White - Return w/sample

Yellow: - Keep for your records

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
835 Arnold Drive, Suite 104
Martinez, CA 94553
(925)313-8080 fax: (925)313-8089

RESULTS TO: Same

Attn: _____ Tel: _____

BILL TO: URS
500 12th St, Ste 200
Oakland 94607

Attn: Heather Loso Tel: 510 893 3600

PROJECT: Rhodia #5100070007 00

ANALYSES REQUESTED

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/ COMP.	# CONTAINERS/TYPE	Methane Estimate								REMARKS
RA1-0	10/18/01		Soil		1	4L.	✓							
RA1-2					1		✓							x
RA2-0					1		✓							y
RA2-2					1		✓							x
RA3-0					1		✓							x
RA3-2					1		✓							x
RA4-0					1		✓							y
RA4-2					1		✓							x
RA5-0					1		✓							x
RA5-2	↓		↓		1	↓	✓							y
					1									x

METHOD OF SHIPMENT: FED X ____ UPS ____ HAND X OTHER ____

COMMENTS: Questions to Diane Mims (510) 874 3284

CODES:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
Bill Copeland	10/18/01	1700	Stephen L. Clark	10/18/01	1704	OF

White - Return w/sample

Yellow: - Keep for your records

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
835 Arnold Drive, Suite 104
Martinez, CA 94553
(925)313-8080 fax: (925)313-8089

RESULTS TO:
URS
300 12th St. Ste 200
Oakland 94607
Attn: Heather Laso Tel: 510 874-3233600

BILL TO:
Same
Attn: Tel:

PROJECT: Rhodia S10007000700

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/ COMP.	# CONTAINERS/TYPE	ANALYSES REQUESTED: Neanthes Bioassay	ANALYSES REQUESTED: Mytilus Elutriate	REMARKS
RA7	10/19/01		Soil		1 1 5gal	✓		
RA6					1 1	✓		
RA9					1 1	✓		
RA10					1 1	✓		
RA11					1 1	✓		
					1			
RA11-0	10/19/01		Soil		1 1 4L		✓	
RA11-2	"		"		1 1 4L		✓	
					1			
					1			
					1			

METHOD OF SHIPMENT: FED X ____ UPS ____ HAND X OTHER ____

COMMENTS: Questions to Diane Mims (510)874-3284

CODES:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
BLafleur	10/19/01	1634	Ralph L. Clark	10/19/01	1600	OF

White - Return w/sample

Yellow: - Keep for your records

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
835 Arnold Drive, Suite 104
Martinez, CA 94553
(925)313-8080 fax: (925)313-8089

RESULTS TO:
URS
500 12th St, Ste 200
Oakland 94607
Attn: Heather Loso Tel: 510 893 3600

BILL TO:
Same

Attn: _____ Tel: _____

PROJECT: Rhodia 510007000700

ANALYSES REQUESTED

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/ COMP.	# CONTAINERS/TYPE	Mythlus Electrolyte								REMARKS
RA7-0	10/19/01		Soil		1 1 4L.	✓								
RA7-2					1 1	✓								
RA6-0					1	✓								
RA6-2					1	✓								
RA8-0					1	✓								
RA8-1.5					1	✓								
RA9-0					1	✓								
RA9-2					1	✓								
RA10-0					1	✓								
RA10-2					1	✓								
					1									

METHOD OF SHIPMENT: FED X ____ UPS ____ HAND X OTHER ____

COMMENTS: Questions to Diane Mims (510) 874-3284

CODES:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
Blueland	10/19/01	1638	Steph L. Ell	10/19/01	1640	OF

White - Return w/sample

Yellow: - Keep for your records

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
835 Arnold Drive, Suite 104
Martinez, CA 94553
(925)313-8080 fax: (925)313-8089

RESULTS TO: Same

Attn: _____ Tel: _____

BILL TO: URS
500 12th St, Ste 200
Oakland 94607
Attn: Heather Loso Tel: 510 893 3600

PROJECT: Rhodia Martinez #S1000700700

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/ COMP.	# CONTAINERS/TYPE	ANALYSES REQUESTED: Nitrates, Bi-Carbon	REMARKS
RA1	10/18/01		soil		1 1 5gal	✓	x
~~RA2~~							
RA3					1 1 5gal	✓	x
RA4					1 1 5gal	✓	x
RA5					1 1 5gal	✓	x

METHOD OF SHIPMENT: FED X ____ UPS ____ HAND X OTHER ____

COMMENTS: Questions to Diane Mims (510) 874-3284

CODES:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
Bill Copeland	10/18/01	1700	Stephen A. Clark	10/18/01	1700	OF

White - Return w/sample

Yellow: - Keep for your records

APPENDIX B

Test Data and Summaries of Statistical Analyses for the Evaluation of Peyton Slough Sediment Elutriate Toxicity to the Bivalve *Mytilus sp.*

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-03 00:00	Test ID:	6452	Sample ID:	URS
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	RA 1-2
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
D-Control	0.9206	0.9569	0.9461	0.9442
6.25	0.9300	0.9700	0.9700	0.9600
12.5	0.9000	0.9000	0.9700	0.9700
25	0.9600	0.8900	0.9500	0.9700
50	0.9600	0.8300	0.9500	0.9400
100	0.1200	0.0600	0.0700	0.1600

			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4				47	805
6.25	0.9575	1.0165	1.3665	1.3030	1.3967	3.235	4	-0.732	2.410	0.1238	17	400
12.5	0.9350	0.9926	1.3229	1.2490	1.3967	6.445	4	0.117	2.410	0.1238	26	400
25	0.9425	1.0006	1.3360	1.2327	1.3967	5.390	4	-0.139	2.410	0.1238	23	400
50	0.9200	0.9767	1.2960	1.1458	1.3694	7.860	4	0.642	2.410	0.1238	32	400
*100	0.1025	0.1088	0.3201	0.2475	0.4115	23.861	4	19.646	2.410	0.1238	359	400

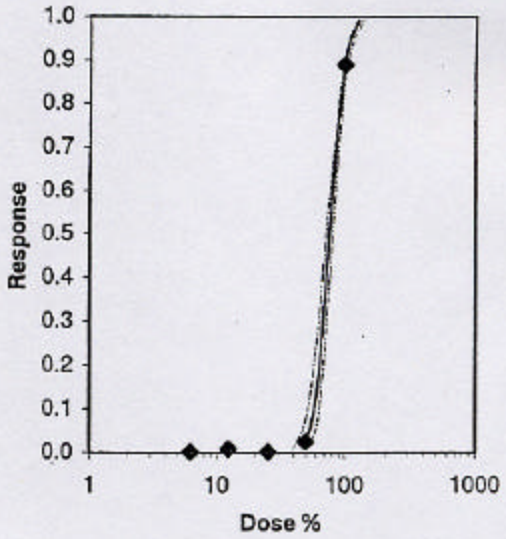
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9288	0.884	-0.6554	-0.3827
Bartlett's Test indicates equal variances (p = 0.53)	4.1179	15.086		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSB	MSE	F-Stat	F-Prob	df
Dunnett's Test	50	100	70.711	2	0.0705	0.682	0.0053	129.33	1.9E-13	5, 18

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	10.869	1.0699	8.7716	12.966	0.0584	0.1338	11.345	0.99	1.8867	0.092	8
Intercept	-15.506	2.1154	-19.652	-11.36							
TSCR	0.0606	0.0053	0.0502	0.071							

Point	Probits	%	95% Fiducial Limits	
EC01	2.674	47.062	39.578	52.987
EC05	3.355	54.372	47.28	59.868
EC10	3.718	58.722	51.969	63.91
EC15	3.964	61.852	55.385	66.8
EC20	4.158	64.458	58.252	69.198
EC25	4.326	66.781	60.823	71.331
EC40	4.747	73.014	67.773	77.051
EC50	5.000	77.04	72.282	80.767
EC60	5.253	81.288	77.024	84.734
EC75	5.674	88.874	85.32	92.072
EC80	5.842	92.077	88.695	95.328
EC85	6.036	95.956	92.643	99.436
EC90	6.282	101.07	97.596	105.14
EC95	6.645	109.16	104.95	114.73
EC99	7.326	126.11	119.31	136.21



Reviewed by: CA

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: PA 1-2
Test ID #: 1452
Investigator: KW

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-18-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.06
	B	200	9	209	95.69
	C	158	9	167	94.61
	D	203	12	215	94.42
6.25%	A	93	7	100	93
	B	97	3	100	97
	C	97	3	100	97
	D	96	4	100	96
12.5%	A	90	10	100	90
	B	90	10	100	90
	C	97	3	100	97
	D	97	3	100	97
25%	A	96	4	100	96
	B	89	11	100	89
	C	95 83KW	5	100	95
	D	97	3	100	97
50%	A	96	4	100	96
	B	83	17	100	83
	C	95	5	100	95
	D	94	6	100	94
100%	A	12	88	100	12
	B	6	94	100	6
	C	7	93	100	7
	E	16	84	100	16

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6452

Sample: RA 1-2

Test Start Date: 11-1-01 Time: 1710 Investigator: KW

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.63	8.4	29.0
12.5	7.68	8.4	29.4
25	7.66	8.3	29.2
50	7.52	7.8	29.0
100	7.28	6.9	28.5

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			
6.25	7.73	7.1	29.2
12.5	7.81	7.2	29.5
25	7.84	6.9	29.4
50	7.85	6.8	29.0
100	7.84	7.4	28.7

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6453
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk
Sample Date:		Protocol:	EPAW-EPA West Coast
Comments:			

Sample ID:	RA 2-0			
Sample Type:	EL-Elutriate			
Test Species:	ME-Mytilus edulis			

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Reviewed by:

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA 20
Test ID #: 6453
Investigator: [illegible]

Species: *M. edulis*
Test Start Date: 11-1-07
Test End Date: 11-3-07
Enumeration Date: 11-13-07 [illegible]

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6453

Sample: RA 2-0

Test Start Date: 11-1-01 Time: 1710 Investigator: KE

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.52	8.3	29.4
12.5	7.40	8.4	29.4
25	7.35	8.5	29.4
50	7.15	8.3	29.0
100	6.80	8.6	29.1

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			
6.25	7.83	6.4	29.4
12.5	7.78	6.3	29.5
25	7.60	6.6	29.5
50	7.32	7.0	29.0
100	7.11	7.1	29.0

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6454	Sample ID:	RA 2-2
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA2-2
Test ID #: 6454
Investigator: MC

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-24-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	83	83	0
	B	0	69	69	0
	C	0	71	71	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6454

Sample: RA 2-2

Test Start Date: 11-1-01 Time: 1710 Investigator: lc

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.28	8.3	29.0
12.5	7.33	8.4	29.4
25	7.27	8.5	29.2
50	6.91	8.4	28.8
100	4.72	8.8	28.0

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			
6.25	7.82	7.0	29.2
12.5	7.85	7.2	29.7
25	7.81	7.2	29.5
50	7.53	7.2	29.1
100	4.74	7.2	28.3

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6455
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk
Sample Date:		Protocol:	EPAW-EPA West Coast
Comments:			
Sample ID:	RA 2-2 pH adjusted		
Sample Type:	EL-Elutriate		
Test Species:	ME-Mytilus edulis		

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: DA 2-2 pH adjusted
Test ID #: 6455
Investigator: KW

Species: *M. edulis*
Test Start Date: 11-1-07
Test End Date: 11-3-07
Enumeration Date: 11-24-07

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: UES Project #: 6455

Sample: RA 2-2 pH adjusted

Test Start Date: 11-1-01 Time: 1710 Investigator: kc

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.52	8.3	29.0
12.5	7.59	8.1	29.3
25	7.67	8.3	29.2
50	7.74	8.2	29.0
100	7.78	8.4	28.3

Day 1 Temperature (°C) 17.9 kc

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			
6.25	7.84	6.8	28.8
12.5	7.85	7.0	29.3
25	7.86	6.9	29.2
50	7.86	6.6	29.1
100	7.65	6.7	28.5

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6456	Sample ID:	RA 3-0
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: QA 3-0
Test ID #: 10456
Investigator: VL

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-27-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6456

Sample: RA 3-0

Test Start Date: 11-1-01 Time: 1710 Investigator: kc

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.64	8.1	28.7
12.5	7.63	8.1	29.4
25	7.55	8.2	29.4
50	7.33	8.0	29.4
100	5.68	8.1	29.2

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			
6.25	7.86	6.7	28.4
12.5	7.86	6.5	29.2
25	7.73	6.2	29.2
50	7.54	6.6	29.3
100	5.65	6.5	29.3

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6457
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk
Sample Date:		Protocol:	EPAW-EPA West Coast
Comments:			
Sample ID:	RA 3-0 pH adjusted		
Sample Type:	EL-Elutriate		
Test Species:	ME-Mytilus edulis		

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Reviewed by:

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA 3-0 pH adjusted
Test ID #: 044587
Investigator: VL

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-19-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6457

Sample: BA 30 pH adjusted

Test Start Date: 11-1-01 Time: 1710 Investigator: ke

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.80	8.4	29.0
12.5	7.77	8.3	29.4
25	7.73	8.4	29.4
50	7.61	8.1	29.2
100	7.52	8.3	29.0

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			
6.25	7.88	7.1	29.3
12.5	7.88	7.3	29.7
25	7.85	6.8	29.7
50	7.69	6.9	29.5
100	7.45	6.8	29.3

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-03 00:00	Test ID:	6458	Sample ID:	URS
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	RA 3-2
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
D-Control	0.9206	0.9569	0.9461	0.9442
6.25	0.9700	0.9600	0.9700	0.9200
12.5	0.9700	0.9100	0.9700	0.9600
25	0.9700	0.9500	0.9400	0.9100
50	0.2700	0.4200	0.2200	0.1900
100	0.0000	0.0000	0.0000	0.0000

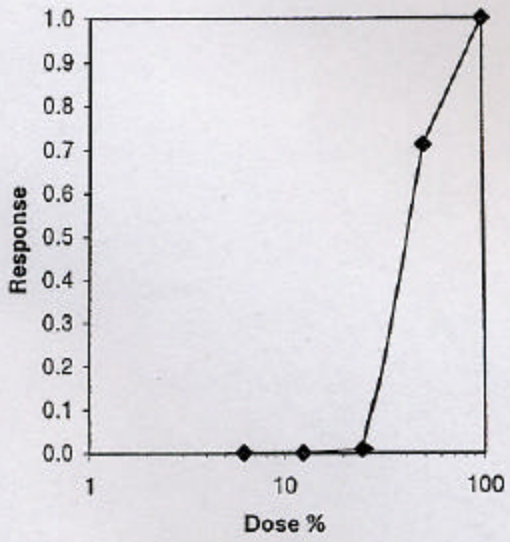
			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4				47	805
6.25	0.9550	1.0139	1.3617	1.2840	1.3967	3.919	4	-0.681	2.360	0.1137	18	400
12.5	0.9525	1.0112	1.3572	1.2661	1.3967	4.576	4	-0.588	2.360	0.1137	19	400
25	0.9425	1.0006	1.3329	1.2661	1.3967	4.059	4	-0.082	2.360	0.1137	23	400
*50	0.2750	0.2919	0.5477	0.4510	0.7051	20.454	4	16.218	2.360	0.1137	290	400
100	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				400	400

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.929	0.868	0.4446	1.1319
Bartlett's Test indicates equal variances (p = 0.36)	4.3715	13.277		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSB	MSE	F-Stat	F-Prob	df
Dunnett's Test	25	50	35.355	4	0.0638	0.5097	0.0046	109.82	6.4E-11	4, 15

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	42.987	41.633	44.385
5.0%	42.494	41.049	43.990
10.0%	41.934	40.395	43.532
20.0%	41.013	39.329	42.770
Auto-0.0%	42.987	41.633	44.385



Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: EA 3-2
Test ID #: 6458
Investigator: VL

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-18-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	1	214	92.06
	B	200	9	209	95.69
	C	158	9	167	94.61
	D	203	12	215	94.42
6.25%	A	97	3	100	97
	B	96	4	100	96
	C	97	3	100	97
	D	92	8	100	92
12.5%	A	97	3	100	97
	B	91	9	100	91
	C	97	3	100	97
	D	96	4	100	96
25%	A	97	3	100	97
	B	95	5	100	95
	C	94	6	100	94
	D	91	9	100	91
50%	A	27	73	100	27
	B	42	58	100	42
	C	22	78	100	22
	D	19	81	100	19
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6459	Sample ID:	RA 4-2
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA4-2
Test ID #: 64159
Investigator: [illegible]

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-18-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	6	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6459

Sample: RA 4-2

Test Start Date: 11-1-01 Time: 1710 Investigator: kc

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.28	7.9	29.0
12.5	7.26	7.8	29.3
25	7.16	7.8	29.1
50	6.90	8.1	28.6
100	4.43	8.2	28.0

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			
6.25	7.88	6.3	27.8
12.5	7.83	6.5	29.2
25	7.66	6.4	29.0
50	6.01	6.8	28.6
100	4.52	6.9	27.7

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6460	Sample ID:	RA 4-2 pH adjusted
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RM4-2 pH adjusted
Test ID #: 4460
Investigator: kw

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-18-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	70	70	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6460

Sample: ~~PA~~ 4-2 pH adj

Test Start Date: 11-1-01 Time: 1710 Investigator: KE

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.80	7.2	29.5
12.5	7.82	7.0	29.6
25	7.84	7.1	29.0
50	7.80	7.1	28.7
100	7.54	6.4	28.0

Day 1 Temperature (°C) 17.8

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	7.72	Spilled	Spilled
12.5	7.74	↓	↓
25	7.76	↓	↓
50	7.76	↓	↓
100	7.59	↓	↓

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6463	Sample ID:	RA 6-2
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

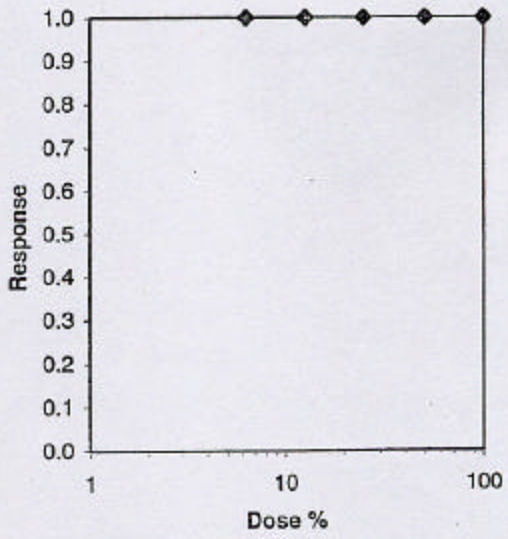
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4			47	805
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	4	4
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	6	6
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	5	5
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	5	5
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4624	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Graphical Method

Trim Level	EC50
0.0%	2.5000



ToxCalc v5.0

Reviewed by:

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA 6-2
Test ID #: 16463
Investigator: KE

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-18-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.06
	B	200	9	209	95.69
	C	158	9	167	94.61
	D	203	12	215	94.42
6.25%	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	0	0	0
12.5%	A	0	0	0	0
	B	0	0	0	0
	C	0	2	2	0
	D	0	2	2	0
25%	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	2	2	0
50%	A	0	0	0	0
	B	0	0	0	0
	C	0	2	2	0
	D	0	0	0	0
100%	A	0 ~~0~~ KE	10~~11~~ 0	0	0
	B	0	0	0	0
	C	0	0	0	0
	E	0	0	0	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6463

Sample: RA 6-2

Test Start Date: 11-1-01 Time: 1710 Investigator: KE

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.71	7.8 ~~8.4~~	29.3
12.5	7.70	7.8	29.1
25	7.61	7.7	29.4
50	7.39	7.8	29.1
100	6.85	7.6	28.6

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	7.68	6.6	28.4
12.5	7.71	6.5	28.7
25	7.72	6.9	29.1
50	7.69	7.6	29.0
100	7.51	7.8	28.7

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6461	Sample ID:	RA 7-0
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: T-0
Test ID #: 4461
Investigator: KW

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-30-01
Enumeration Date: 11-18-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	156	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	42	42	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	58	58	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6461

Sample: RA 7-0

Test Start Date: 11-1-01 Time: 1710 Investigator: ke

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.40	8.1	28.9
12.5	7.33	7.6	29.2
25	7.17	7.6	29.2
50	6.67	7.7	29.0
100	4.33	8.0	28.9

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			~~28.0~~ RN
6.25	7.69 16 7.74	6.4	28.6
12.5	7.78	6.4	29.0
25	7.76	6.7	29.2
50	7.49	7.0	29.2
100	~~7.53~~ 16 4.57	7.0	29.1

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6462	Sample ID:	RA 7-0 pH adjusted
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Pacific EcoRisk

Environmental Consulting and Testing

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: 97-0 pH adjusted
Test ID #: 6462
Investigator: [illegible]

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-18-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6462

Sample: PA 7-0 pH adjusted

Test Start Date: 11-1-01 Time: 1710 Investigator: IC

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.59	7.8	29.0
12.5	7.61	8.0	29.4
25	7.61	7.9	29.6
50	7.52	7.8	29.6
100	7.44	7.9	29.6

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control			
6.25	7.84	7.0	29.4
12.5	7.85	6.4	30.0
25	7.84	7.5	29.8
50	7.73	6.9	29.8
100	7.40	6.8	29.8

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6464	Sample ID:	RA 8-0
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

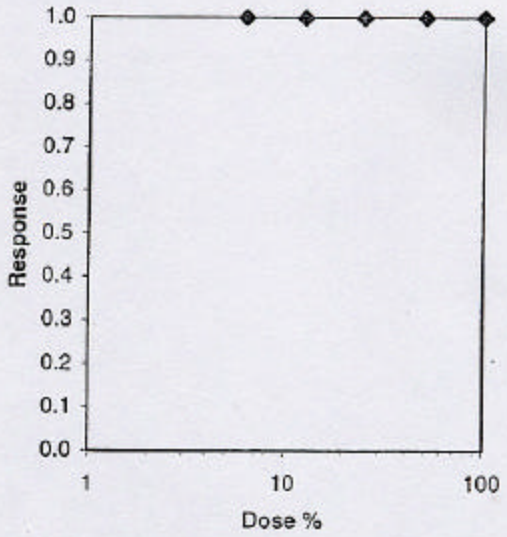
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4			47	805
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	321	321
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	313	313
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	344	344
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Graphical Method

Trim Level	EC50
0.0%	2.5000



Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: 2A 9-0
Test ID #: 64604
Investigator: KW

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-19-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	84	84	0
	B	0	100	100	0
	C	0	64	64	0
	D	0	73	73	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	49	49 ~~100~~	0
	D	0	64	64 ~~100~~	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	64	~~100~~ 64	0
	D	0	80	80	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D ~~Rep~~	0	~~X~~ 100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6464

Sample: RA 8-0

Test Start Date: 11-1-01 Time: 1710 Investigator: kc

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.52	7.6	28.8
12.5	7.46	7.6	29.3
25	7.30	7.7	29.3
50	6.78	7.6	29.0
100	4.71	8.0	28.4

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	7.80	~~6.8~~ 7.5	28.5
12.5	7.81	7.4	29.1
25	7.78	7.6	29.2
50	7.12	7.6	29.0
100	4.58	7.6	28.3

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6465	Sample ID:	RA 8-0 pH adjusted
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4624	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA8-0 pH adjusted
Test ID #: 6465
Investigator: KW

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-19-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	8	8	0
	B	0	10	10	0
	C	0	15	15	0
	E	0	47	47	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6465

Sample: RA 8-0 pH adjusted

Test Start Date: 11-1-01 Time: 1710 Investigator: kw

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.54	7.6	28.9
12.5	7.62	7.7	29.4
25	7.59	78	29.3
50	7.48	7.7	29.0
100	7.47	79	28.5

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	7.62	7.0	28.2
12.5	7.62	6.4	29.2
25	7.62	6.5	29.1
50	7.58	69	28.8
100	7.29	73	28.4

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6466
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk
Sample Date:		Protocol:	EPAW-EPA West Coast
Comments:			
Sample ID:	RA 9-0		
Sample Type:	EL-Elutriate		
Test Species:	ME-Mytilus edulis		

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4624	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RM 9-0
Test ID #: 14466
Investigator: W

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-27-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6466

Sample: BA9-0

Test Start Date: 11-1-01 Time: 1710 Investigator: ku

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	6.69	7.6	28.9
12.5	6.70	7.5	~~28.4~~ ku 29.4
25	6.70	7.6	29.4
50	5.24	7.7	~~29.3~~ ku 28.9
100	4.27	8.0	28.1

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	788	7.0	28.2
12.5	786	7.0	29.6
25	7.53	7.1	29.4
50	489	7.2	29.0
100	4.20	7.2	28.3

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6467	Sample ID:	RA 9-0 pH adjusted
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.7800	0.7400	0.1600	0.7800
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

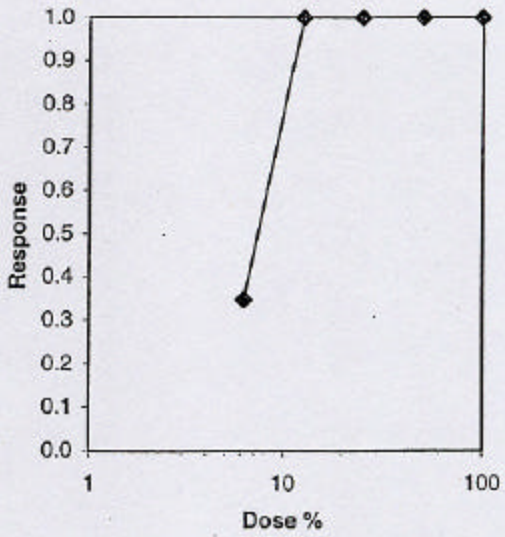
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4			47	805
*6.25	0.6150	0.6529	0.9031	0.4115	1.0826	36.371	4	10.00	10.00	154	400
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.5233	0.884	-2.9398	13.572
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	5.7037	5.3709	6.0570
5.0%	5.9798	5.5884	6.3985
10.0%	6.2606	5.7840	6.7765
20.0%	6.8156	6.0342	7.6981
Auto-0.0%	5.7037	5.3709	6.0570



ToxCalc v5.0

Reviewed by:

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: EA 9-0 pH adjusted
Test ID #: 6467
Investigator: kw

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-27-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	78	22	100	78
	B	74	26	100	74
	C	16	84	100	7016
	D	78	22	100	78
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D kw	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6467

Sample: PA 9-0 pH adjustment

Test Start Date: 11-1-01 Time: 1710 Investigator: kc

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.46	7.6	29.0
12.5	7.51	7.4	29.5
25	7.54	7.6	29.4
50	7.55	7.5	29.2
100	7.46	7.8	28.8

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	7.73	6.6	28.3 ~~HA~~ spilled
12.5	7.74	6.5	~~29.5~~ 2
25	7.75	6.4	28.7 ~~29.5~~
50	7.76	6.5	28.1 ~~29.2~~
100	7.63	6.8	28.3 MM

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6468
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk
Sample Date:		Protocol:	EPAW-EPA West Coast
Comments:			

Sample ID:	RA 9-2		
Sample Type:	EL-Elutriate		
Test Species:	ME-Mytilus edulis		

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

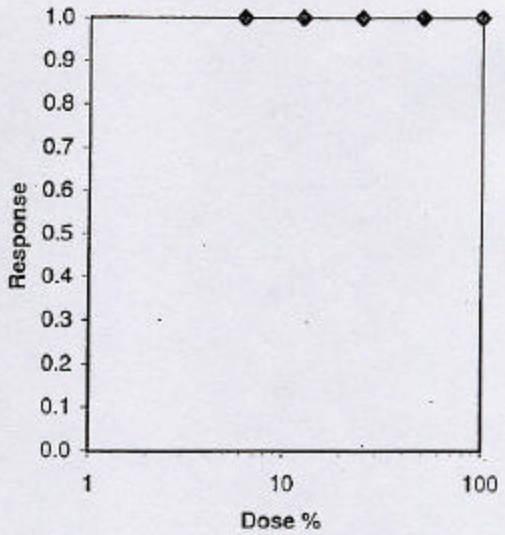
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4			47	805
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4623	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Graphical Method

Trim Level	EC50
0.0%	2.5000



ToxCalc v5.0

Reviewed by:

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA 9-2
Test ID #: 64168
Investigator: kc

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-18-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: UES Project #: 6468

Sample: BAG-2

Test Start Date: 11-1-01 Time: 1710 Investigator: lcw

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.39	7.4	29.1
12.5	7.42	7.5	29.1
25	7.42	7.6	29.2
50	7.23	7.5	28.0
100	7.27	7.9	28.2

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72	6.7	29.3
6.25	7.73	5.8	28.8
12.5	7.73	6.8	29.3
25	7.74	6.9	28.7
50	7.75	7.1	27.9
100	7.69	10.9	28.2

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6469	Sample ID:	RA 10-2
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4		
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4624	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA 10-2
Test ID #: [illegible] 4469
Investigator: KW

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-24-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	73	73	0
	B	0	69	69	0
	C	0	76	76	0
	D	0	76	76	0
12.5%	A	0	77	77	0
	B	0	79	79	0
	C	0	66	66	0
	D	0	61	61	0
25%	A*	0	21	21	0
	B	0	51	51	0
	C	0	38	38	0
	D	0	27	27	0
50%	A*	0	21	21	0
	B	0	71	71	0
	C	0	59	59	0
	D	0	70	70	0
100%	A*	0	49	49	0
	B*	0	57	57	0
	C*	0	64	64	0
	D*	0	33	33	0

* Lots of debris in vials - very difficult to see embryos

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6468

Sample: PA 10-2

Test Start Date: 11-1-01 Time: 1710 Investigator: KW

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	6.82	7.0	28.9
12.5	6.79	6.9	29.3
25	6.65	6.7	28.8
50	6.26	6.5	28.0
100	4.82	7.3	28.2

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	7.79	6.4	~~29.4~~ ~~28.3~~
12.5	7.56	6.6	~~29.6~~ 29.2
25	5.52	6.6	~~29.4~~ 28.7
50	4.39	6.7	~~28.7~~ 28.2
100	3.91	7.1	~~27.9~~ ~~28.7~~

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6470	Sample ID:	RA 10-2 (pH-adjusted)
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.0000	0.0000	0.0000	0.0000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

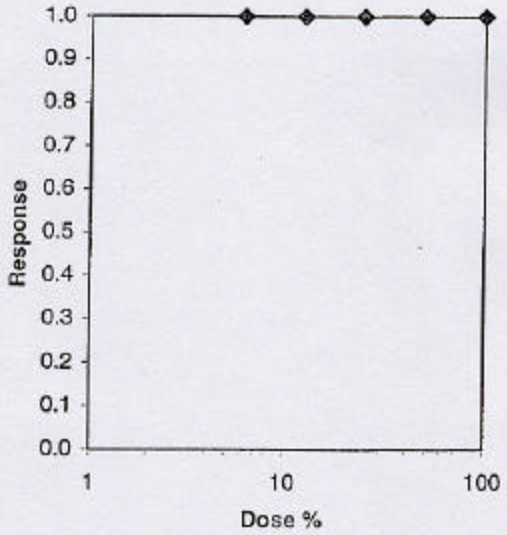
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4			47	805
*6.25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	5	5
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	4	4
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	4	4
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	4	4
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	4	4

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.4624	0.884	-1.4854	11.969
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<6.25	6.25		

Graphical Method

Trim Level	EC50
0.0%	2.5000



Reviewed by: [signature]

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: EPA 10-2 pH adjusted
Test ID #: 6470
Investigator: KE

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-24-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	0	2	2	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	0	0	0
12.5%	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	0	0	0
25%	A	0	6	6	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	1	1	0
50%	A	0	7	7	0
	B	0	2	2	0
	C	0	1	1	0
	D	0	2	2	0
100%	A	0	16	16	0
	B	0	20	20	0
	C	0	30	30	0
	E	0	24	24	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6470

Sample: PA 10-2 pH adjusted

Test Start Date: 11-1-01 Time: 1710 Investigator: KL

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.57	8.5	29.4
12.5	7.60	8.4	29.4
25	7.65	8.0	28.7
50	7.68	7.8	28.3
100	7.68	7.5	29.4

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	~~7.79~~ 7.81	7.0	~~28.3~~ 29.0
12.5	~~7.78~~ 7.89	7.2	~~29.2~~ 29.4
25	~~7.84~~ 7.89	6.8	~~28.7~~ 28.7
50	~~7.85~~ 7.84	7.0	~~28.1~~ 28.3
100	~~7.78~~ 7.70	6.9	mm ~~28.3~~ 29.3

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6471	Sample ID:	RA 12-2
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.9296	0.9100	0.7400	0.9000
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

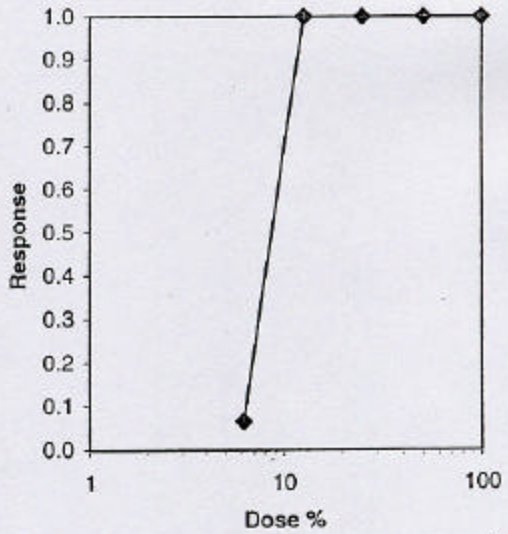
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4			47	805
6.25	0.8699	0.9235	1.2133	1.0357	1.3023	9.928	4	11.00	10.00	59	499
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.6042	0.884	-2.4703	11.306
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	6.25	12.5	8.8388	16

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	8.1571	7.9351	8.3852
5.0%	8.6086	8.2348	8.9993
10.0%	8.6333	8.5591	8.7082
20.0%	8.6333	8.5591	8.7082
Auto-0.0%	8.1571	7.9351	8.3852



Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA 12-2
Test ID #: 6471
Investigator: [illegible]

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-27-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	185	14	199	92.7
	B	91	9	100	91
	C	74	26	100	74
	D	90	10	100	90
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: URS Project #: 6471

Sample: RA 12-2

Test Start Date: 11-1-01 Time: 1710 Investigator: ke

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.55	7.3	29.0
12.5	7.57	7.4	29.6
25	7.56	7.5	29.9
50	7.48	7.5	30.2
100	6.77	7.8	30.8

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	7.88	6.6	27.9
12.5	7.88	6.7	29.8
25	7.76	6.6	30.1
50	6.55	5.8	30.2
100	5.66	6.4	30.6

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-01 00:00	Test ID:	6472	Sample ID:	RA 12-2 pH adjusted
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	EL-Elutriate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-%	1	2	3	4
Control	0.9206	0.9569	0.9461	0.9442
6.25	0.8900	0.8900	0.9200	0.9500
12.5	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

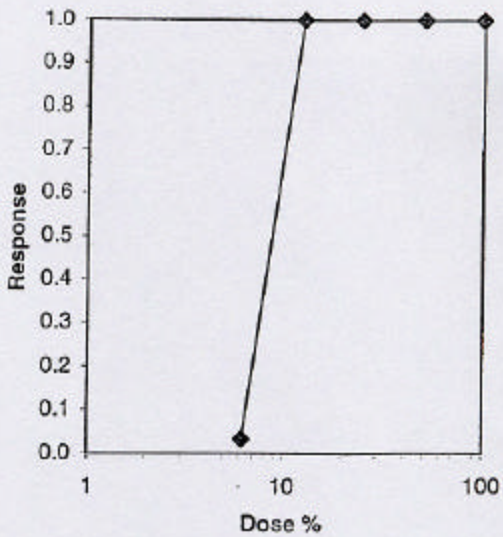
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
Control	0.9419	1.0000	1.3289	1.2851	1.3618	2.407	4			47	805
6.25	0.9125	0.9687	1.2737	1.2327	1.3453	4.201	4	13.00	10.00	35	400
*12.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*25	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*50	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400
*100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	10.00	10.00	400	400

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.6959	0.884	0.7572	4.6455
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	6.25	12.5	8.8388	16

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	8.5003	8.3165	8.6882
5.0%	8.7416	8.6860	8.7977
10.0%	8.7416	8.6860	8.7977
20.0%	8.7416	8.6860	8.7977
Auto-0.0%	8.5003	8.3165	8.6882



Reviewed by:

Bivalve Toxicity Test Data Sheet

Client: URS
Test Material: RA 12-2 pH adjusted
Test ID #: LWW
Investigator: W

Species: *M. edulis*
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-27-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	197	7	214	92.1
	B	200	9	209	95.7
	C	158	9	167	94.6
	D	203	12	215	94.4
6.25%	A	89	11	106	89
	B	89	11	100	89
	C	92	8	100	92
	D	95	5	100	95
12.5%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
25%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
50%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	D	0	100	100	0
100%	A	0	100	100	0
	B	0	100	100	0
	C	0	100	100	0
	E	0	100	100	0

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: UPS Project #: 6472

Sample: RA 12-2 pH adjusted

Test Start Date: 11-1-01 Time: 1710 Investigator: ke

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 0 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
6.25	7.51	7.3	29.3
12.5	7.55	7.4	29.8
25	7.58	7.5	29.8
50	7.59	7.4	30.4
100	7.56	7.5	30.8

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (%)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.72		
6.25	7.74	6.4	29.0
12.5	7.78	6.6	29.8
25	7.84	6.5	29.9
50	7.85	5.7	30.2
100	7.78	6.7	30.9

APPENDIX C

Test Data and Summary of Statistical Analyses for the Reference Toxicant Evaluation of the Bivalve *Mytilus sp.*

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date:	01 Nov-03 00:00	Test ID:	6473	Sample ID:	REF-Ref Toxicant
End Date:	03 Nov-01 00:00	Lab ID:	CAPER-Pacific EcoRisk	Sample Type:	CUSO-Copper sulfate
Sample Date:		Protocol:	EPAW-EPA West Coast	Test Species:	ME-Mytilus edulis
Comments:					

Conc-ug/L	1	2	3	4
D-Control	0.9600	1.0000	1.0000	0.9900
2.5	0.9100	0.9300	0.9000	0.9200
5	0.7600	0.8200	0.7400	0.8500
10	0.0700	0.0100	0.0200	0.0400
15	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000

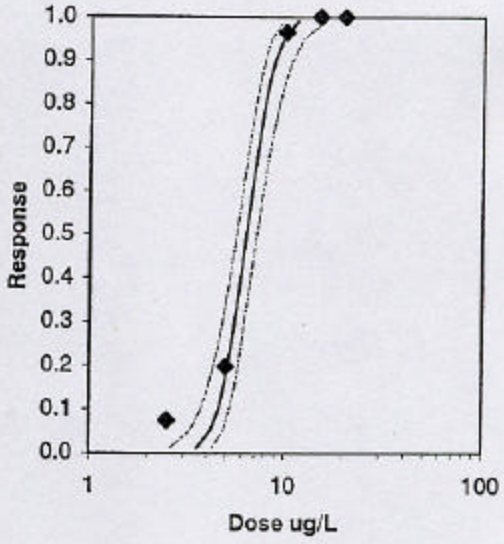
			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	0.9875	1.0000	1.4704	1.3694	1.5208	4.852	4				5	400
*2.5	0.9150	0.9266	1.2756	1.2490	1.3030	1.821	4	4.495	2.290	0.0993	34	400
*5	0.7925	0.8025	1.1001	1.0357	1.1731	5.805	4	8.544	2.290	0.0993	83	400
*10	0.0350	0.0354	0.1778	0.1002	0.2678	41.029	4	29.822	2.290	0.0993	386	400
15	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				400	400
20	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				400	400

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.9803		0.844		-0.2114	-0.7174
Bartlett's Test indicates equal variances (p = 0.36)					3.1791		11.345			
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSB**	**MSE**	**F-Stat**	**F-Prob**	**df**
Dunnett's Test	<2.5	2.5			0.0293	1.3108	0.0038	348.87	6.2E-12	3, 12

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	9.1834	0.9453	6.1752	12.192	0.0125	11.457	11.345	9.5E-03	0.8042	0.1089	6
Intercept	-2.3855	0.7711	-4.8394	0.0684							
TSCR	0.0487	0.0149	0.0013	0.0961							

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	3.5555	2.5845	4.2417
EC05	3.355	4.218	3.2992	4.8727
EC10	3.718	4.6203	3.7473	5.2613
EC15	3.964	4.9132	4.0764	5.5505
EC20	4.158	5.1591	4.3524	5.7996
EC25	4.326	5.3799	4.5986	6.0295
EC40	4.747	5.9791	5.2485	6.6929
EC50	5.000	6.3712	5.6522	7.1654
EC60	5.253	6.789	6.0593	7.7062
EC75	5.674	7.5451	6.7385	8.7789
EC80	5.842	7.868	7.0097	9.2701
EC85	6.036	8.2619	7.3283	9.8924
EC90	6.282	8.7856	7.7354	10.755
EC95	6.645	9.6235	8.357	12.209
EC99	7.326	11.417	9.606	15.576



Bivalve Toxicity Test Data Sheet

Client: NPS
Test Material: CuSO4
Test ID #: 6473
Investigator: KL

Species: M. edulis
Test Start Date: 11-1-01
Test End Date: 11-3-01
Enumeration Date: 11-19-01

Concentration & Replicate		Number of Normal Larvae	Number of Abnormal Larvae	Total # Larvae	Percent Normal Development
Control	A	96	4	100	96
	B	100	0	100	100
	C	100	0	100	100
	D	99	1	100	99
2.5 µg/L	A	91	9	100	91
	B	93	7	100	93
	C	90	10	100	90
	D	92	8	100	92
5 µg/L	A	76	24	100	76
	B	82	18	100	82
	C	74	26	100	74
	D	85	15	100	85
10 µg/L	A	7	93	100	7
	B	1	99	100	1
	C	2	98 ~~57~~ KL	100	2
	D	4	96	100	4
15 µg/L	A	0	15	15	0
	B	0	22	22	0
	C	0	29	29	0
	D	0	25	25	0
20 µg/L	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	E	0	0	0	0

Pacific EcoRisk Environmental Consulting and Testing

DEVELOPMENT TOXICITY TEST WATER CHEMISTRIES

Client: Reference Toxicant Project #: 6473

Sample: Copper Sulfate

Test Start Date: 11-1-01 Time: 1710 Investigator: KS

Test End Date: 11-3-01 Time: 1530 Species: *Mytilus edulis*

Day 1 Temperature (°C) 17.9

Concentration (µgCu/L)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.75	8.2	29.7
1.25	7.76	7.9	30.2
2.5	7.77	7.6	29.8
5	7.78	7.6	30.0
10	7.79	7.6	30.0
15	7.80	7.7	29.9
20	7.82	7.8	29.8

Day 1 Temperature (°C) 17.1

Day 2 Temperature (°C) 17.9

Concentration (µgCu/L)	pH	D.O. (mg/L)	Salinity (ppt)
Control	7.77	6.5	29.5
1.25	7.78	6.1	29.9
2.5	7.79	6.1	30.2
5	7.80	6.2	30.2
10	7.80	6.2	30.3
15	7.81	6.2	30.2
20	7.82	6.4	30.0

APPENDIX D

Test Data for the Peyton Slough Sediment Bioaccumulation Tests with the Polychaete *Nereis virens*

Pacific EcoRisk Environmental Consulting and Testing

28-day *Neries* Bioaccumulation Test Water Quality Data

Client: URS Date (T_o): 11-8-01 Project #: 6531

Day	Test I.D.: Control				Test I.D.: RA10				Sign-Off Date Initials
	Temp.	pH	D.O.	Salinity	Temp	pH	D.O.	Salinity	
0	15.2	7.40	8.0	32.7	15.2	7.64	8.9	31.3	11-8-01 mm
1	14.9	7.76	8.2	33.4	14.9	7.23	7.3	31.0	11-9-01 [illegible]
2	15.1	7.69	7.7	33.6	15.0	7.17	6.9	31.1	11-10-01 KE
3	15.2	7.62	10.8	33.7	15.0	7.22	6.4	30.6	11-11-01 mm
4	15.1	7.78	7.3	34.0	15.0	6.79	6.6	30.5	11-12-01 mm
5	15.0	7.71	7.4	33.7	15.1	7.15	7.0	31.5	11-13-01 mm
6	15.1	7.69	7.3	34.0	15.1	7.16	7.6	32.5	11-14-01 mm
7	15.0	7.62	7.2	33.9	15.0	7.20	7.0	32.3	11-15-01 RG
8	15.0	7.58	7.3	33.7	15.0	7.19	6.8	31.7	11-16-01 mm
9	15.0	7.71	7.8	33.7	15.1	~~7.63~~	7.2	32.5	11-17-01 KE
10	15.1	7.75	7.5	33.4	15.1	7.30	6.8	32.7	11-18-01 mm
11	15.0	7.64	7.8	33.5	15.0	7.31	7.0	32.3	11-19-01 mm
12	15.0	7.73	7.3	32.0	15.0	7.29	6.2	32.8	11-20-01 mm
13	15.0	7.68	6.4	33.7	15.1	7.27	6.0	23.0	11-21-01 mm
14	15.1	7.64	8.4	23.5	15.1	7.48	7.7	33.2	11-22-01 MN JB
15	15.1	~~7.60~~	7.0	33.60	~~15.1~~	7.60	7.0	33.60	11.23.01 ABE
16	~~14.8~~ 15.2	~~7.98~~	~~7.8~~	~~33.6~~ 33.6	~~15.30~~ 14.8	~~7.68~~ 7.43	~~7.28~~	~~33.70~~ 33.0	ABE 11-24-01 wrong ent
17	~~14.9~~ 15.4	~~7.73~~ 7.47	~~7.1~~ 7.1	~~33.1~~ 33.1	~~15.5~~ 14.9	~~7.56~~ 7.23	~~6.5~~ 6.5	~~33.9~~ 33.3	ABE wrong entr
18	14.8	7.71	7.3	33.8	14.7	7.39	6.4	32.6	11-26-01 mm
19	14.9	7.76	7.7	33.8	14.8	7.24	6.2	33.7	11-27-01 mm
20	14.5	7.89	7.8	33.7	14.6	7.54	7.0	33.7	11-28-01 KE
21	14.7	7.83	8.3	33.8	14.7	7.48	8.0	33.7	11-29-01 mm
22	14.6	7.82	8.0	32.9	14.6	7.40	7.6	32.6	11-30-01 ABE
23	14.9	7.87	7.9	32.2	14.7	7.52	7.2	32.2	12-1-01 KE
24	14.7	7.86	8.9	32.7	14.7	7.45	8.2	32.6	12/2/01 ABE
25	14.6	7.82	7.9	32.8	14.6	7.64	7.8	32.8	12-3-01 mm
26	14.7	7.60	8.1	31.6	14.7	7.56	8.2	32.3	12-4-01 mm
27	14.9	7.66	7.7	32.8	14.9	7.63	8.0	32.8	12-5-01 mm
28	14.8	7.84	8.7	31.6	14.8	7.63	8.3	32.2	12-6-01 mm
# of Clams	Rep A: 23 Rep B: 20 Rep C: 18 Rep D: 22 Rep E: 25				Rep A: 0 Rep B: 0 Rep C: 16 Rep D: 12 Rep E: 18				

* Cont pH = 7.74 11-24-01

28-day *Neries* Bioaccumulation Test Water Quality Data

Client: UPS Date (T_0): 11-8-01 Project #: 6531

Initial (Day 0) Water Quality Characteristics:

Rep.	Test I.D.: Control				Test I.D.: PA 10				Sign-Off
	Temp.	pH	D.O.	Salinity	Temp.	pH	D.O.	Salinity	Date Initials
A	15.2	7.90	8.0	32.7	15.2	7.64	8.9	31.3	11-8-01 mc
B	15.2	8.00	8.2	33.3	15.2	7.64	8.9	31.2	
C	15.2	7.98	8.6	32.4	15.2	7.65	8.9	31.4	
D	15.2	8.00	8.8	32.2	15.2	7.64	7.64 8.9	31.3	
E	15.2	8.00	8.8	32.8	15.2	7.64	8.9	31.3	↓
Final (Day 28) Water Quality Characteristics:									
A	14.8	7.84	8.7	31.6	14.8	7.63	8.3	32.2	12-6-01 mc
B	14.8	7.85	8.2	32.1	14.8	7.71	8.3	32.1	
C	14.8	7.85	8.3	32.2	14.8	7.51	7.9	32.2	
D	14.8	7.84	8.3	32.4	14.8	7.55	8.0	32.2	
E	14.8	7.81	8.3	32.3	14.8	7.53	8.10	32.2	↓

Overlying Water Ammonia Concentrations

Day	Total Ammonia	Sign-Off	Total Ammonia	Sign-Off
0	0.819	aa	2.82	aa
7	1.91	aa	5.34	aa
14	0.974	aa	4.64	aa
21	0.905	aa	4.70	aa
28	0.210	aa	7.40	aa

Pacific EcoRisk Environmental Consulting and Testing

28-day *Neries* Bioaccumulation Test Water Quality Data

Client: URS Date (T_0): 11-8-01 Project #: RAL6(6530)/RA1(65

Day	Test I.D.: nc ~~Control~~ RA 6				Test I.D.: nc ~~RA 10~~ RA 1				Sign-Off
	Temp.	pH	D.O.	Salinity	Temp	pH	D.O.	Salinity	Date Initials
0	~~15.2~~ 15.5	~~7.80~~ 7.83	~~8.2~~ 8.7	~~32.7~~ 32.4	~~15.2~~ 15.5	~~7.80~~ 7.81	~~8.2~~ 8.4	~~31.2~~ 32.4	11-8-01 nc
1	14.8	7.39	~~8.2~~ 7.3	39.4	15.5	7.74	7.5	32.0	11-9-01 KL
2	14.1	7.35	7.1	34.3	15.7	7.54	7.2	32.4	11-10-01 KL
3	15.6	7.53	6.10	34.8	15.6	7.61	6.7	32.1	11-11-01 mm
4	15.7	7.67	7.1	34.0	15.6	7.65	7.1	32.2	11-12-01 nc
5	15.5	7.72	7.5	34.5	15.4	7.67	7.4	32.5	11-13-01 nc
6	15.5	7.75	7.4	34.7	15.5	7.64	7.3	33.1	11-14-01 nc
7	15.2	7.71	7.2	34.0	15.2	7.66	7.4	33.3	11-14-01 RG
8	15.5	7.64	7.4	34.1	15.5	7.61	7.5	33.1	11-16-01 nc
9	15.4	781	7.7	34.0	15.7	7.32	7.4	334	11-17-01 KL
10	15.3	7.81	7.10	33.7	15.7	7.56	7.0	32.4	11-18-01 mm
11	15.1	7.76	8.0	33.8	15.6	7.52	7.6	33.1	11-19-01 nc
12	15.5	7.64	7.2	33.4	15.5	7.54	7.1	33.2	11-20-01 mm
13	15.4	7.78	6.7	33.4	15.5	7.58	6.3	33.5	11-21-01 nc
14	15.3	7.68	8.0	33.6	15.3	7.66	7.9	33.5	11-22 DI NN
15	15.30	7.68	7.20	33.6	15.2	7.54	7.1	33.6	11-23-01 ABE
16	15.0	7.54	7.2	333	15.0	7.62	7.3	332	11-24-01 KL
17	15.1	7.81	7.4	33.9	15.1	7.73	7.5	33.7	11-25-01 mm
18	14.9	7.80	7.3	34.2	15.0	7.67	7.2	33.9	11-26-01 nc
19	15.0	7.77	7.5	34.1	15.0	7.75	7.5	33.8	11-27-01 mm
20	14.7	~~7.75~~	7.5	33.9	14.6	7.74	7.5	33.7	11-28-01 nc
21	14.8	7.80	8.1	33.9	14.8	7.73	8.0	33.9	11-29-01 mm
22	14.7	7.83	7.5	32.8	14.7	7.72	8.4	32.8	11-30-01 ABE
23	15.1	7.66	7.	32.3	14.7	7.73	7.7	322	12-1-01 KL
24	14.9	7.65	7.3	32.7	14.9	7.83	8.4	32.7	12-2-01 ABE
25	14.6	7.78	7.7	32.9	14.7	7.85	7.2	32.8	12-3-01 nc
26	14.6	7.58	7.6	32.2	14.5	7.58	7.7	32.4	12-4-01 mm
27	14.8	7.75	7.8	33.0	14.8	7.73	7.5	32.7	12-5-01 nc
28	15.0	7.78	8.1	32.4	15.0	7.77	7.8	~~33.0~~ 32.2	12-6-01 nc
# of Clams	Rep A: 11 Rep B: 0 Rep C: 11 Rep D: 1 Rep E: 0				Rep A: 22 Rep B: ~~25~~ 24 Rep C: 22 Rep D: 20 Rep E: 23				

28-day *Neries* Bioaccumulation Test Water Quality Data

Client: URS Date (T_o): 11-8-01 Project #: 6530(RA6)/6529(RA1

Initial (Day 0) Water Quality Characteristics:

Rep.	Test I.D.: RA 6				Test I.D.: RA 1				Sign-Off
	Temp.	pH	D.O.	Salinity	Temp.	pH	D.O.	Salinity	Date Initials
A	15.5	7.95	8.7	35.4 32.4	15.5	8.01	8.6	32.9	11-8-01 mc
B	15.5	7.95	8.6	35.5 32.5	15.5	8.14	8.6	33.0	
C	15.5	8.00	8.7	35.4 32.4	15.5	8.00	8.7	32.9	
D	15.5	7.98	8.6	35.2 32.2	15.5	8.05	8.6	32.9	
E	15.5	7.95	8.7	35.4 32.4	15.5	8.06	8.1	32.8	
Final (Day 28) Water Quality Characteristics:									
A	15.0	7.78	8.1	32.4	15.0	7.77	7.8	32.2	12-6-01 mc
B	15.0	7.87	8.1	32.7	15.0	7.94	7.8	32.4	
C	15.0	7.78	8.1	32.3	15.0	7.82	7.6	32.4	
D	15.0	7.72	7.9	32.3	15.0	7.95	7.7	32.6	
E	15.0	7.79	8.0	32.4	15.0	7.97	7.9	32.4	

Overlying Water Ammonia Concentrations

Day	Total Ammonia	Sign-Off	Total Ammonia	Sign-Off
0	0.366	ag	0.000	ag
7	2.79	ag	2.18	ag
14	3.77	ag	0.757	ag
21	3.46	ag	0.0760	ag
28	0.0542	ag	10.1	ag

Pacific EcoRisk Environmental Consulting and Testing

28-day *Neries* Bioaccumulation Test Water Quality Data

Client: URS Date (T_0): 11-8-01 Project #: RA12 (6533) / RA11 (6532)

Day	Test I.D.: RA. 12				Test I.D.: RA 11				Sign-Off Date Initials
	Temp.	pH	D.O.	Salinity	Temp	pH	D.O.	Salinity	
0	15.2	7.61	8.6	32.0	15.0	7.67	8.9	34.6	11-8-01 mc
1	16.5	7.75	7.8	32.4	14.7	7.32	8.0	33.5	11-9-01
2	15.7	7.70	7.7	34.6	14.8	7.25	7.6	338	11-10-01
3	15.4	7.20	10.4	37.5	15.0	7.15	15.5	33.7	11-11-01 mm
4	15.4	7.12	6.3	32.8	15.4	6.99	15.4 23 mc	33.6	11-12-01 mc
5	15.2	7.40	6.4	32.7	15.4	7.38	7.7	33.7	11-13-01 mc
6	15.4	7.36	6.1	32.5	15.4	7.28	7.5	34.0	11-14-01 mc
7	15.4 15.2 mc	7.42 7.42	6.2 7.0	35.5 32.9 mc RA	15.2	7.09	7.4	34.0	11-15-01 RA
8	15.4	7.47	6.7	35.5	15.4	6.85	6.1	36.9	11-16-01 mc
9	15.4	7.45	6.7	34.5	15.4	7.46	7.7	33.7	11-17-01
10	15.3	7.50	10.10	34.2	15.3	7.30	7.2	33.3	11-18-01 mm
11	15.2	7.43	7.0	34.4	15.2	7.06	7.0	33.6	11-19-01 mc
12	15.5	7.44	6.5	33.3	15.5	7.40	6.4	33.3	11-20 dmm
13	15.5	7.53	6.8	34.1	15.6	7.27	6.2	33.7	11-21-01 mc
14	15.5	7.54	8.3	33.6	15.5	7.38	8.0	33.6	11-22-01 MN
15	15.5	7.56	6.5	33.90	15.40	7.47	7.10	33.10	11/23.01 ABE
16	15.2	7.52	6.7	33.4	15.3	7.56	6.3	33.3	11-24-01
17	15.3	7.55	6.7	33.9	15.3	7.29	5.4	33.7	11-25-01 mm
18	15.3	7.53	6.8	34.0	15.3	7.24	6.10	33.4	11-26-01 mc
19	15.1	7.41	6.1	34.1	15.2	7.35	6.1	33.9	11-27-01 mm
20	14.5	7.36	5.5	34.0	14.6	7.36	6.5	33.8	11-28-01 mc
21	14.6	7.3	6.3	34.1	14.7	7.54	7.5	33.8	11-29-01 mm
22	14.8	7.53	6.6	33.1	14.8	7.51	7.1	32.7	11-30-01 ABE
23	15.0	7.59	6.8	32.4	15.1	7.77	8.0	32.3	12-1-01 mc
24	15.1	7.59	6.6	33.1	15.1	7.51	7.2	32.7	12-2-01 ABE
25	14.6	7.71	6.9	33.3	14.6	7.79	7.7	33.2	12-3-01 mc
26	14.7	7.40	6.8	32.4	14.7	7.41	6.3	32.2	12-4-01 mm
27	14.5	7.63	7.0	33.1	14.5	7.54	7.5	32.8	12-5-01 mc
28	15.2 mc	7.78	8.2	32.6	15.2	7.78	8.2	32.5	12-6-01 mc
# of Clams	Rep A: 1 Rep B: 1 Rep C: 2 Rep D: 13 Rep E: 2				Rep A: 0 Rep B: 19 Rep C: 6 Rep D: 2 Rep E: 1				

28-day *Neries* Bioaccumulation Test Water Quality Data

Client: URS Date (T_0): 11-8-01 Project #: 6533(RA 12)/6532(RA

Initial (Day 0) Water Quality Characteristics:

Rep.	Test I.D.: RA 12				Test I.D.: RA 11				Sign-Off
	Temp.	pH	D.O.	Salinity	Temp.	pH	D.O.	Salinity	Date Initials
A	15.2	7.58	8.5	38.6 32.1	15.0	7.28	8.8	32.4	11-8-01 mc
B	15.2	7.66	8.5	37.3 33.0	15.0	7.74	8.8	32.9	
C	15.0	7.66	8.6	37.[illegible] 33.[illegible]	15.0	7.61	8.8	33.3	
D	15.2	7.74	8.8	32.[illegible] 33.[illegible]	15.0	7.63	8.9	33.4	
E	15.2	7.61	8.6	32.[illegible] 33.[illegible]	15.0	7.67	8.9	34.6	
Final (Day 28) Water Quality Characteristics:									
A	15.2	7.78	8.2	36.6 32.6 mc	15.2	7.78	8.2	32.5 36.6 mc	12-6-01 mc
B	15.2	7.57	6.7	32.2	15.2	7.63	7.7	32.5	
C	15.2	7.85	8.0	32.7	15.2	7.78	8.2	32.5	
D	15.2	7.81	7.7	32.5	15.2	7.69	7.1	32.4	
E	15.2	7.72	7.5	32.9	15.2	7.64	7.0	32.2	

Overlying Water Ammonia Concentrations

Day	Total Ammonia	Sign-Off	Total Ammonia	Sign-Off
0	4.64	ay	0.000	ay
7	8.09	ay	3.60	ay
14	5.39	ay	5.65	ay
21	7.60	ay	7.56	ay
28	14.2	ay	11.0	ay