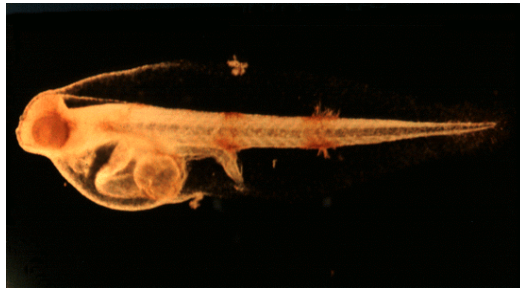


**Survey Data Report in Support of the Sediment Ecological Risk
Assessment at the Calcasieu Estuary, Louisiana:**

**Sediment Porewater Toxicity Tests and
Dissolved Organic Carbon Analysis of Pore Water**



Sciaenops ocellatus

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Abstract

This report summarizes the data generated from sediment porewater toxicity tests and dissolved organic carbon analyses of sediment pore water by the Marine Ecotoxicology Research Station (MERS) in support of a sediment quality triad (Triad) assessment at the Calcasieu estuary in Louisiana. The Triad approach is used to quantify risk associated with contaminated sediments by integrating information on sediment toxicity, sediment chemistry, and benthic community structure in a weight-of-evidence approach. Data summaries presented in the current report include: (1) porewater fertilization and embryological development tests with the sea urchin, *Arbacia punctulata*, (2) porewater toxicity tests with redbfish, *Sciaenops ocellatus*, embryos (3) porewater zoospore germination test with the macroalga, *Ulva fasciata*, and (4) dissolved organic carbon (DOC) analysis of porewater samples. Additional data reports developed by other investigators describe the results of: (1) 10-d whole-sediment toxicity tests with the amphipod, *Ampelisca abita* and 28-d sediment bioaccumulation tests with the polychaete, *Nereis virens*, (2) 10- and 28-day whole-sediment toxicity tests with the amphipod, *Hyalella azteca*, (3) toxicity identification evaluations, and (4) benthic community assessments.

A total of 100 sediment samples were collected from the Calcasieu estuary in November and December of 2000. Porewater toxicity tests were performed with 50 of these 100 samples. Pending statistical analyses will be used to establish significant statistical reductions in the various endpoints relative to the control and reference treatments. Pending sediment chemistry data (i.e., organic compounds) along with the metals data will be used to establish the appropriate reference locations in the Calcasieu estuary.

The current report provides only limited interpretation and no statistical analysis of the toxicity and DOC data. Additional reports will be developed which integrate data from the toxicity tests, the bioaccumulation tests, the chemical analyses of sediments, and the benthic community evaluations to assess the risks of contaminated sediments to organisms inhabiting the Calcasieu estuary.

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1.0 INTRODUCTION

This report summarizes the data generated from sediment porewater toxicity tests and the dissolved organic carbon (DOC) analysis of sediment pore water in support of a sediment quality triad (Triad) assessment at the Calcasieu estuary in Louisiana. The Triad approach is used to quantify risk associated with contaminated sediments by integrating information on sediment toxicity, chemistry, and benthic community structure in a weight-of-evidence approach (SETAC 1997).

The Marine Exotoxicology Research Station (MERS) of the U.S. Geological Survey, located in Corpus Christi, TX conducted toxicity tests and DOC analyses of sediment pore water on 50 sediment samples collected from the Calcasieu estuary in the fall of 2000 (CDM 2000). Specific tasks performed by MERS included: (1) measures of dissolved organic carbon in pore water, (2) conducting sea urchin, *Arbacia punctulata*, fertilization and embryological development porewater toxicity tests (3) conducting porewater toxicity test with embryolarval redfish, *Sciaenops ocellatus*, and (4) conducting algal zoospore, *Ulva fasciata*, germination and growth porewater toxicity tests. Additional data reports describe the results of: (1) 10-d whole-sediment toxicity tests with the amphipod, *Ampelisca abita* and 28-d sediment bioaccumulation tests with the polychaete, *Nereis virens* (Shortelle *et al.* 2001), (2) 10- and 28-d whole-sediment toxicity tests with the amphipod, *Hyalella azteca* (Ingersoll *et al.* 2001), (3) toxicity identification evaluations, and (4) benthic community assessments (CDM and Gaston 2001). The current report provides only minimal interpretation of the data generated by MERS. A separate report will be developed which describes the results and interpretation of the overall Triad assessment. A separate report will also be developed evaluating the risks associated with the bioaccumulation of contaminants by invertebrates, fish, and wildlife inhabiting the Calcasieu Estuary. A report will also be developed describing the results of a fish health assessment at the Calcasieu Estuary conducted by the U.S. Fish and Wildlife Service.

The Calcasieu Estuary is a highly industrialized area that has received a variety of anthropogenic contaminants over the past century. Recent surveys of the estuary indicate that levels of contaminants in sediments throughout the system often exceed chemical benchmarks established to identify potential toxic conditions. However, collaborating data establishing potential lethal or sublethal effects associated with exposure to these contaminated sediments are limited. Specifically, a need was identified for laboratory toxicity tests and benthic community data to document risks of contaminated sediments to aquatic biota of the estuary and to provide a basis for interpreting the sediment chemistry that have been collected at the site.

The Calcasieu Estuary is located between the cities of Westlake and Mossville, within the Calcasieu Parish, Louisiana. The headwaters of the Calcasieu River, Bayou Verdine, and Bayou d'Inde originate in the farmland north of Mossville and flow primarily south-southeast forming the Calcasieu River in the vicinity of Lake Charles, LA. Various portions of the Estuary support recreational hunting and fishing. The estuary contains several delineated wetlands. Health advisories warning of contaminated fish consumption have been in effect since 1987 for the Calcasieu Estuary. Although the estuary is not used as a drinking water source, the surface waters have been designated by the Louisiana Department of Environmental Quality (LDEQ) as supporting primary contact recreation, secondary contact recreation, and fish and wild life propagation. The Calcasieu Estuary has not been proposed for inclusion on the National Priorities List (NPL), but has been the subject of environmental studies dating back to the early 1970s.

The Sampling and Analysis Plan for the overall project outlines the procedures used to identify sampling stations and to collect sediment samples (CDM 2000). The sediment sampling strategy provided both broad geographic coverage of the areas of concern and the data necessary to evaluate the applicability of sediment quality guidelines (SQGs) in the Calcasieu Estuary. In total, more than 50 reaches within the study area were sampled, including the 10 areas of concern that have been identified by the Calcasieu Estuary study team. Importantly, the sampling program was designed by considering the distribution of sediment samples with various chemical characteristics (i.e., using data from the Phase I sampling program and evaluating the sediment chemistry data using mean ERM quotients: ERM-Q). As such, sediment samples collected in the Phase II sampling program for the current study to be used in the Triad assessment had a broad range of chemical characteristics. This broad distribution of sediment chemistry will be used to support logistic regression modeling of the matching sediment chemistry and sediment toxicity data, thereby facilitating comparison to the models that have been established for other areas in North America (Field *et al.* 1999; MacDonald *et al.* 2000a,b; USEPA 2000a). In addition, the sampling program was designed to ensure that these samples are relatively evenly distributed within four categories of sediment chemistry (i.e., mean ERM-Qs of < 0.1, 0.1 to < 0.5, 0.5 to 1.5, and > 1.5; n = >20 samples within each category). This targeted distribution of the sediment chemistry data will facilitate calculation of the incidence of toxicity within each category and subsequent comparison to the results that have been observed elsewhere in North America (Long and MacDonald 1998).

Chemical characterizations of whole-sediment and porewater samples from the estuary will be used in a subsequent report to evaluate the ability of SQGs to predict toxicity of

sediment samples. In this Triad assessment, chemical or physical characterizations completed on each whole-sediment sample included: total organic carbon (TOC), particle size, percent moisture, acid-volatile sulfide and simultaneously extracted metals and total recoverable metals (Ni, Cu, Zn, Ag, Cd, and Pb), methyl mercury, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCB: 38 congeners, arochlors), and organochlorine pesticides. A portion of the samples were also analyzed for dioxins/furans, (PCDDs/PCDFs). Chemical characterization completed on 50 porewater samples included: salinity, hardness, dissolved organic carbon, unfiltered and filtered metals, ammonia, pH, hydrogen sulfide, methyl mercury, PAHs, and PCBs. On the remaining 50 samples, only salinity, hardness, ammonia, pH, and hydrogen sulfide were measured in pore water. Results of the metal analyses of whole-sediment or porewater samples (other than mercury) and results of the particle size and TOC analyses are presented in Ingersoll *et al.* (2001). Results of the additional chemical or physical characterizations of the sediment samples are reported in Shortelle *et al.* (2001).

The Triad sampling program was designed to provide information for conducting the ecological risk assessment in the Calcasieu Estuary. Importantly, data generated in this sampling program will provide the information needed to develop site-specific linkages between sediment chemistry and biological effects in the study area. As such, results of the sampling program will be used to determine the probability of observing sediment toxicity and benthic invertebrate community alteration at the stations that were sampled in the Phase I program. Additionally, the Triad assessment provides a broad geographic coverage of the study area and, hence, provides data that will be used to directly assess the effects of contaminated sediments within the Calcasieu Estuary Cooperative Site.

Sediment is a major repository for many of the more persistent chemicals that are introduced into surface waters and provides habitat for many aquatic organisms. In the aquatic environment, most anthropogenic chemicals and waste materials including toxic organic and inorganic chemicals eventually accumulate in sediment. Mounting evidence exists of environmental degradation in areas where USEPA Water Quality Criteria are not exceeded, yet organisms in or near sediments are adversely affected (ASTM 2000, USEPA 2000b). Although certain chemicals are highly sorbed to sediment, these compounds may still be available to the biota. Contaminated sediments may be directly toxic to aquatic life or can be a source of contaminants for bioaccumulation in the food chain.

Concentrations of contaminants in sediment may be several orders of magnitude higher than in the overlying water. However, bulk sediment concentrations may not always

be strongly correlated to bioavailability. Because relationships between concentrations of contaminants in sediment and their bioavailability are poorly understood, determining effects of contaminants in sediment on aquatic organisms requires controlled toxicity and bioaccumulation tests and measures of effects on benthic communities inhabiting sediments (SETAC 1997).

While individual measurement tools for assessing sediment contamination each have an inherent level of uncertainty associated with their application, the uncertainty associated with an overall risk assessment of sediment contamination can be reduced by integrating these tools. For example, the use of sediment chemistry, sediment toxicity, and benthic community data together in a Triad assessment can be used to establish a weight-of-evidence linking contaminated sediments to adverse biological effects (Chapman *et al.* 1997). Similarly, Long *et al.* (1995), Ingersoll and MacDonald (1999), and Carr *et al.* (1996a, b, c, 2000) used sediment chemistry and toxicity data, in conjunction with sediment quality guidelines, to evaluate sediment quality and identify contaminants that were likely causing adverse biological effects. The integration of multiple tools using a weight-of-evidence approach has the potential to substantially reduce uncertainty associated with risk assessment of contaminated sediment and will improve management decisions (MacDonald and Ingersoll 2001). Results of biological assessments and contaminant measurements will be integrated with results of benthic community evaluations to determine if links exist between sediment contamination and adverse effects.

2.0 METHODS

2.1 Sample Collection and Handling

The location of the sampling stations was determined using a systematic-stratified random sampling design (Gilbert 1987). All sample locations were designated with Universal Transverse Mercator (UTM) coordinates before field sampling. A Trimble Navigation Limited® differential Global Positioning System receiver and base station was used to navigate to the predetermined sample stations (see Figures 1 through 6). Sediment samples were collected using an Eckman grab to a depth of about 10 cm at 100 stations from November 5 to December 2, 2000. Sediment samples were collected using a low-draft boat that was stabilized at a station by inserting poles into the sediment at opposite corners of the boat. Sediment was then collected around the perimeter of one end of the boat (about 15 meters by 15 meters). The grabs of sediment for the benthic community evaluations were first collected from a station (CDM and Gaston 2001) and then additional grabs were collected for use in the toxicity testing and for use in the physical or chemical characterizations of whole sediment or pore water.

The total volume of sediment collected from a station ranged from 13 to 35 liters (larger volumes of sediment were collected from the 12 stations where bioaccumulation tests were conducted (4 liters) or from the 50 stations where porewater toxicity tests and chemical analyses were conducted (23 liters)). Sampling equipment was cleaned between stations by scraping off excess sediment, rinsing the equipment with site water, followed by rinsing the equipment with methanol and deionized water. Sediments from each station were brought back to shore in high-density polypropylene containers and were then homogenized using a hand-held drill and stainless-steel auger (Kemble *et al.* 1994). Aliquots of sediment from each station were placed into smaller containers and transported at 4°C in the dark to the various laboratories for whole-sediment toxicity testing or bioaccumulation testing, physical characterization of whole sediment, metals and acid volatile sulfides analyses of whole sediment, or organic analyses of whole sediment. For the 50 stations where porewater toxicity tests were conducted, an additional aliquot of the sediment was transported to Corpus Christi, TX for isolation of pore water for toxicity testing. Subsamples of these porewater samples were then sent to CERC for metals analyses or to other analytical laboratories for analyses of organic compounds.

2.2 Sediment Sample Receipt and Tracking

2.2.1 Sediment samples

Surficial sediment samples were collected from 100 stations from the Calcasieu Estuary as described by Ingersol *et. al.* (2001). Fifty of the stations were selected for porewater toxicity evaluation and sediment subsamples from these were sent to the U.S. Geological Survey-Marine Ecotoxicology Research Station (USGS MERS) in Corpus Christi, Texas between November 6 and December 2, 2000. Homogenized samples were placed in pre-cleaned one-gallon high density polyethylene containers, chilled, and shipped in insulated coolers with ice. Samples were received by the USGS MERS in Corpus Christi, Texas, the day following shipment in good condition with incoming temperatures ranging from 1 to 6°C. Table 1 lists the stations, sample arrival temperatures, and holding times for each sample prior to porewater extraction. Sample tracking sheets accompanied each shipment. Upon receipt, samples were logged into a laboratory sample tracking system and either processed to extract pore water or stored under refrigeration at 4°C until extraction. Following extraction, both unused and processed sediment were shipped back to the study site for disposal with the exception of unused sediment from 4 stations which was shipped to the U.S. Environmental Protection Agency, Environmental Effects Laboratory, Narragansett, RI for a TIE analysis.

2.2.2 Porewater samples

Small subsamples of porewater from all 100 Calcasieu Estuary sediment samples and two control sediments (Texas and amphipod toxicity test references) were collected, preserved with Sulfide Antioxidant Buffer (SAOB II), and shipped to USGS MERS on ice for sulfide analysis. Samples were received in seven batches from December 7, 2000 to January 11, 2001 and held refrigerated at 4°C until measurements were made. In most cases, measurements were made within 24 hrs of receipt.

Additional subsamples of all 100 porewaters from Calcasieu estuary, one control sediment (Texas toxicity test reference) and one blank were received from the Columbia Environmental Research Center (CERC) for dissolved organic carbon (DOC) analysis. Samples had been preserved with 1 drop of 60% H₂SO₄ and were received on February 7, 2001. Temperature of the samples was warm (17-18°C) upon arrival due to a delay in delivery. Samples were held refrigerated at 4°C until measurements were made. Measurements of DOC were made from March 9 to March 24, 2001.

2.3 Porewater Preparation

2.3.1 Sediment porewater extraction

Pore water was extracted from the sediments using a pressurized pneumatic extraction device. This extractor is made of polyvinyl chloride (PVC) and uses a 5 µm polyester filter. It is the same device used in previous sediment quality assessment surveys (USFWS, 1992; Carr, 1993; NBS, 1993; 1994; 1995a, 1995b; USGS 1997a; 1997b, 1998; 1999a; 1999b; 2000a; 2000b; 2000c). All porewater samples were extracted within 27 days of field collection of sediment. A minimum of 3.4 liters of pore water was collected from each sediment sample following procedures outlined in USGS SOP F10.9 (Appendix 1). Pore water was held refrigerated until the entire volume had been collected and then was centrifuged at 1200 g for 20 minutes to remove fine particles. The resulting supernatant was consolidated and then subdivided for chemical analysis and toxicity testing. Porewater samples that contained an organic phase floating on the surface were pipetted from beneath the organic phase to minimize its inclusion in the final sample.

Two liters of pore water per station were bottled in pre-cleaned 500 ml bottles and were shipped to AATS laboratories for analysis of organics and pesticides. Samples were shipped chilled on ice in insulated ice chests with associated chain of custody sheets. In addition, a double volume of pore water (4 liters) was sent for three stations for duplicate analysis. A triple volume of pore water (6 liters) was sent for one station for

spiked matrix analysis. A procedure extraction blank was also sent to eliminate any question of cross contamination from the extraction equipment.

Subsamples for metals analyses underwent further preparation and preservation before shipment to CERC for analysis. A 40 ml subsample of centrifuged pore water was filtered through a 5 µm filter straw and then a 0.45 µm polypropylene syringe filter into a pre-cleaned HDPE bottle. All filtering equipment and syringes underwent a 5% HNO₃ rinse followed by a rinse with MilliQ[®] purified water just prior to use. A separate 40 ml subsample was not filtered and placed into a pre-cleaned HDPE bottle. Both filtered and unfiltered subsamples were preserved immediately with 20 drops of ULTREX[®] HNO₃ and held refrigerated until shipment to CERC. Quality assurance samples included at least one filtered and unfiltered reagent blank per shipment. In addition, an extraction procedure blank and duplicate samples for two stations were sent.

Pore water for toxicity testing was subdivided into 150 ml aliquots and placed in pre-cleaned glass bottles and frozen at -20°C until testing commenced.

2.3.2 Porewater water quality measurements

Two days before conducting a toxicity test, porewater samples were moved from the freezer to a refrigerator at 4°C. One day prior to testing, samples were completely thawed (if necessary) in a tepid water bath. Temperature of the samples was maintained at 20 ± 2°C. Sample salinity was measured and adjusted to 30 ± 1‰, if necessary, using purified deionized water or concentrated brine (see SOP F10.12, Appendix 2). Other water quality measurements (dissolved oxygen, pH, sulfide and ammonia concentrations) were made. Temperature and dissolved oxygen (DO) were measured with a YSI[®] meter; salinity was measured with a Reichert[®] refractometer; and pH, sulfide (as S²⁻), and total ammonia nitrogen (TAN) were measured with Orion[®] meters and their respective probes. Unionized ammonia nitrogen (UAN) was calculated for each sample using the respective salinity, temperature, pH, and TAN values. Any samples containing less than 80% DO were gently aerated by stirring the sample on a magnetic stir plate. Following water quality measurements and adjustments, the samples were stored overnight at 4°C but returned to 20 ± 1°C before the start of the toxicity tests.

Sulfide measurements of porewater samples sent to USGS MERS as well as those made on previously frozen samples were conducted with an Orion[®] meter model 290A with an attached silver/sulfide ion specific probe (model 94-16). A standard curve was produced using the millivolt function of the meter and 10 standards ranging from 0.01

to 100 mg/L plotted on 5 cycle semi-logarithmic graph paper. Millivolt readings were taken for each sample measured and compared back to the standard curve to determine the concentration of sulfide.

2.4 Porewater Toxicity Testing

2.4.1 Porewater toxicity testing with sea urchins

Toxicity of the sediment pore water was determined using the fertilization test and the embryological development test with the sea urchin *Arbacia punctulata* following the procedures outlined in SOP F10.6 and F10.7 (Appendices 3 and 4). The sea urchins used in this study were obtained from Gulf Specimen Company, Inc. (Panacea, Florida). Each of the 50 porewater samples was tested in a dilution series design. Concentrations included, at a minimum, 100, 50, and 25% of the salinity adjusted sample with 5 replicates per treatment. Dilutions were made with 0.45 μm filtered seawater. A reference porewater sample collected from Redfish Bay, Texas (LAR32), which had been handled identically to the test samples, was included with each toxicity test as a negative control. This site is far removed from any known sources of contamination and has been used previously as a reference site (Carr and Chapman, 1992; Carr, 1993; NBS, 1993; 1994; 1995a; 1995b; USGS, 1997a; 1997b; 1998; 1999a; 1999b; 2000a; 2000b; 2000c), as noted previously. In addition, dilution blanks of filtered seawater and a salinity adjustment blank (brine with purified deionized water) were also included. A dilution series test with sodium dodecyl sulfate (SDS) was included as a positive control.

2.4.2 Porewater toxicity testing with redfish embryos

A total of four assays were performed with redfish (*Scienops ocellatus*) embryos on the samples from Calcasieu Estuary. Redfish eggs were obtained from the CPL-GCCA Marine Development Center (Corpus Christi, Texas). Eggs were obtained on the morning of testing and brought to the USGS MERS laboratory and acclimated to 30 ppt salinity prior to stocking the test chambers. Table 5 describes the conditions for conducting the redfish assay. As with the sea urchin assay, samples were tested in a dilution series design. Concentrations included, at a minimum, 100, 50, and 25% of the salinity adjusted sample with 5 replicates per treatment. Most test treatments contained an additional concentration of 12.5%. Several treatments were repeated in subsequent tests with additional dilutions if mortality in the lowest concentration was high and prevented the calculation of an LC_{50} . Dilutions were made with 0.45 μm filtered seawater. The same controls and quality assurance blanks were included in each assay as were included in the sea urchin assays.

2.4.3 Porewater toxicity testing with algal zoospores

Algal zoospore toxicity tests were conducted simultaneously on all porewater samples from the Calcasieu Estuary. Sea lettuce, *Ulva fasciata*, thalli were collected from the south jetty in Port Aransas, Texas on April 26, 2001 and returned to the USGS MERS laboratory where they were rinsed with 0.45 μm filtered seawater and stored overnight. On the day of the test, April 27, zoospores that were released from the thalli were collected and used in the algal zoospore germination and germling growth test. The test was conducted in a dilution series design with a minimum of three concentrations: 100, 50 and 25% of the salinity adjusted sample. Dilutions were made with 0.45 μm filtered seawater with a 15% addition of Texas reference pore water to provide nutrients. Controls and quality assurance blanks were included as in the previously described assays. Percent germination of zoospores and measured gametophyte growth (*i.e.*, length and cell number) were the endpoints used to evaluate toxicity in the porewater samples.

The test was conducted as described in USGS SOP F10.23 (Appendix 5) with slight modifications. The test vessel was changed from a 25 ml beaker to a 14 ml snap cap glass vial. Sample volume was reduced from 10 to 5 mls to facilitate sample preparation in the smaller test chambers. Also, due to the large number of samples to be evaluated, it was necessary to preserve the test by adding 50 μl of a 2.5% glutaraldehyde solution to each sample chamber at the termination of the test.

2.5 Dissolved Organic Carbon Analysis

Dissolved organic carbon (DOC) was measured in the porewater samples using an OI Analytical Model 1010 Wet Oxidation Total Organic Carbon Analyzer following the model 1010 operators manual (OI Analytical, 1998). Samples were analyzed in the TOC mode with 400 : 1 of acid (5% phosphoric acid) and 4000 : 1 of oxidant (200 g/L sodium persulfate). Total inorganic carbon react and detect times were 2:00 (min:sec) and 1:35 (min:sec), respectively. Total organic carbon react and detect times were 8:30 (min:sec) and 2:00 (min:sec), respectively. At least one blank was run with each batch of samples. In addition, spiked matrix samples, duplicates and laboratory control samples were run for every 10 to 15 samples. Sample analysis was repeated with dilution of the sample if concentrations were found to be in excess of the highest concentration used to calculate the calibration curve (50 mg/L). Analysis was also repeated if the percent recovery of the laboratory control failed to meet the 90-110% level.

Samples received from CERC were analyzed in 11 batches. Due to the small sample volumes in five samples, duplicate measurements could not be performed. Two

replicate measurements were made on the remaining samples. Due to the long holding time that these samples had undergone, it was decided that measurements would also be made on the 50 porewater samples that had been frozen for toxicity testing. Frozen samples were thawed on the day of analysis and filtered through a 0.45 μ m polypropylene syringe filter prior to analysis. Due to the larger sample volumes available the samples were analyzed in one batch utilizing an autosampler.

3.0 RESULTS

3.1 Porewater Toxicity Testing with Sea Urchins

Water quality measurements for the sea urchin fertilization and embryological development tests are provided in Table 2. Salinity of the 50 samples ranged from 2 to 54 ‰. The DO was above 80% saturation for all samples. The unionized ammonia concentration ranged from 7.5 to 579.3 μ g/L. Sulfide concentration ranged from <0.01 to 0.063 mg/L with the level below detection limits in the majority of the samples.

The results of the sea urchin fertilization and embryological development tests are presented in Tables 3 and 4, respectively. Control normalized fertilization ranged from 1 to 101% and from 0 to 105.3% for normal development in the 100% water quality adjusted porewater samples. Pending statistical analyses will be used to establish significant statistical reductions in fertilization and normal development relative to the control treatment. In addition, changes in fertilization and normal development will be compared to the response in the reference pore water. Pending sediment chemistry data (i.e., organic compounds) along with the metals data will be used to establish the appropriate reference locations in the Calcasieu Estuary.

3.2 Porewater Toxicity Testing with Redfish Embryos

Water quality measurements for the toxicity tests with redfish embryos are provided in Table 6. Salinity of the 50 samples ranged from 2 to 54 ‰. The DO was above 80% saturation for all samples. The unionized ammonia concentration ranged from 8.2 to 1125.9 μ g/L. The raw data for hatching and survival at 24 and 48 hrs. is shown in Tables 7 and 8, respectively. The control normalized survival at 24 and 48 hrs. ranged from 0 to 97.8% and 0 to 100%, respectively in the 100% water quality adjusted porewater samples. Pending statistical analyses will be used to establish significant statistical reductions in survival relative to the control treatment. In addition, changes in survival will be compared to the response in the reference pore water. Pending

sediment chemistry data (i.e., organic compounds) along with the metals data will be used to establish the appropriate reference locations in the Calcasieu Estuary.

3.3 Porewater Toxicity Testing with Algal Zoospores

Water quality measurements for the algal zoospore germination and germling growth test are provided in Table 9. Salinity of the 50 samples ranged from 2 to 54 ‰. The DO was above 80% saturation for all samples. The unionized ammonia concentration ranged from 18.3 to 1130.5 µg/L. The raw data for germination success and germling length and germling cell number are shown in Tables 10-12, respectively. The control normalized germination success ranged from 0 to 104% in the 100% water quality adjusted porewater samples. The control normalized germling growth ranged from 0 to 315% in the 100% water quality adjusted porewater samples. The control normalized germling cell number ranged from 0 to 486% in the 100% water quality adjusted porewater samples. Pending statistical analyses will be used to establish significant statistical effects on germination and germling growth and cell number relative to the control treatment. In addition, changes in germination and germling growth and cell number will be compared to the response in the reference pore water. Pending sediment chemistry data (i.e., organic compounds) along with the metals data will be used to establish the appropriate reference locations in the Calcasieu Estuary.

3.4 Dissolved Organic Carbon Analysis

The results of the DOC analyses for the 100 samples from the Calcasieu study which had been stored acidified are given in Table 13. The mean DOC concentration ranged from 2.25 to 25.04 mg/L. The 50 samples used for porewater toxicity testing which had been stored frozen without acidification were analyzed separately (Table 14). The DOC for the frozen samples ranged from 5.82 to 21.54 mg/L. Quality control data for the DOC analyses is provided in Tables 15 and 16. Measurements of sulfide in pore water from the 100 samples used in solid-phase toxicity tests is shown in Table 17.

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Table 1. Sample history of Calcasieu sediments arriving at MERS for porewater extraction.

Original Station ID	CDM Station ID	Collection Date	Arrival Date	Arrival Temperature	Days held from collection to extraction
UBI1-2	00BI2-ST002-NSD-010	11/5/00	11/8/00	6	4
UBI14-2	00BI2-ST004-NSD-010	11/6/00	11/8/00	6	5
UBI1-1	00BI2-ST006-NSD-010	11/5/00	11/8/00	5	5
MBI3-1	00BI2-ST008-NSD-010	11/6/00	11/8/00	4.5	7
MBI3-3	00BI2-ST010-NSD-010	11/5/00	11/8/00	2	8
LBI1-2	00BI2-ST012-NSD-010	11/10/00	11/13/00	1.5	11
LBI1-4	00BI2-ST014-NSD-010	11/10/00	11/14/00	3	19
LBI3-2	00BI2-ST016-NSD-010	11/10/00	11/13/00	3	18
LBI6-1	00BI2-ST018-NSD-010	11/10/00	11/14/00	4.5	19
LBI6-3	00BI2-ST020-NSD-010	11/10/00	11/13/00	3.5	17
LBI9-2	00BI2-ST022-NSD-010	11/10/00	11/13/00	4	11
LBI3-1	00BI2-ST024-NSD-010	11/10/00	11/14/00	3.0-3.5	18
LBI3-3	00BI2-ST026-NSD-010	11/10/00	11/13/00	3.0-4.8	18
LPPG-2	00BI2-ST028-NSD-010	12/1/00	12/4/00	3	5
LPPG-4	00BI2-ST030-NSD-010	12/1/00	12/4/00	2	4
LBV-2	00BV2-ST002-NSD-010	11/11/00	11/14/00	3	13
LBV-4	00BV2-ST004-NSD-010	11/11/00	11/14/00	4	18
LBV-6	00BV2-ST006-NSD-010	11/11/00	11/14/00	4	18
UBV-2	00BV2-ST008-NSD-010	11/14/00	11/16/00	4	27
UBV-4	00BV2-ST010-NSD-010	11/29/00	12/1/00	3	7
PL-1	00LC2-ST001-NSD-010	11/29/00	12/1/00	4	6
PL-3	00LC2-ST003-NSD-010	11/4/00	11/8/00	4.5	5
MCR-1	00LC2-ST005-NSD-010	11/14/00	11/16/00	3.5	27
MCR-3	00LC2-ST007-NSD-010	11/14/00	11/16/00	4	24
BO-2	00LC2-ST009-NSD-010	11/13/00	11/15/00	4.8	18
BO-4	00LC2-ST011-NSD-010	11/30/00	12/2/00	4	4
ML-1	00LC2-ST013-NSD-010	11/13/00	11/15/00	3	18
ML-4	00LC2-ST027-NSD-010	11/12/00	11/15/00	4	18
WB-2	00SN2-ST002-NSD-010	12/2/00	12/6/00	3	6
JB-2	00SN2-ST004-NSD-010	12/2/00	12/5/00	3	5
BBC-1	00SN2-ST006-NSD-010	11/7/00	11/9/00	3	9
GB-1	00SN2-ST008-NSD-010	11/7/00	11/9/00	3.8	8
BC-2	00SN2-ST012-NSD-010	12/1/00	12/4/00	3	6
BC-4	00SN2-ST014-NSD-010	12/1/00	12/4/00	3	6
GB-5	00SN2-ST038-NSD-010	11/7/00	11/9/00	5.5	8
UCRA-1	00UC2-ST001-NSD-010	11/8/00	11/10/00	3	7
LC-1	00UC2-ST003-NSD-010	11/12/00	11/15/00	5	17
UCRB-1	00UC2-ST005-NSD-010	11/9/00	11/13/00	1.0-3.5	11
CIL-1	00UC2-ST007-NSD-010	11/9/01	11/13/2000**	4	8
CIB-1	00UC2-ST011-NSD-010	11/6/00	11/8/00	4	7
UCRC-1	00UC2-ST013-NSD-010	11/9/00	11/13/00	1.0-2.0	11
CBB-1	00UC2-ST015-NSD-010	11/3/00	11/8/00	3.7	6
CBB-3	00UC2-ST017-NSD-010	11/8/00	11/10/00	4.5	8
CBB-5	00UC2-ST019-NSD-010	11/9/00	11/13/00	2.0-3.5	6
CNE-1	00UC2-ST021-NSD-010	11/8/00	11/10/00	5	7
CNE-3	00UC2-ST023-NSD-010	11/9/00	11/13/00	4	11
CSW-2	00UC2-ST025-NSD-010	11/9/00	11/13/00	2.5-4.0	12
CSW-4	00UC2-ST027-NSD-010	11/9/00	11/13/00	1.5-2.0	8
CSW-6	00UC2-ST029-NSD-010	11/9/00	11/13/00	4.0-4.5	11
CIL-3	00UC2-ST037-NSD-010	12/1/00	12/4/00	3	5

** Samples arrived on two different days, 3 gallons arrived on 11/15/2000 at the same temperature.

Table 2. Water quality measurements of Calcasieu Estuary pore waters used in the sea urchin fertilization and embryological development assays.

Original Station ID	CDM Station ID	Test #	% Original Sample	Initial Salinity(‰)	DO (mg/L)	DO % sat	pH	TAN (mg/L)	UAN (mg/L)	Sulfide (mg/L)
LAR32	Control	1	93.75	32	8.47	101.8	8.23	0.64	33.1	<0.01
LAR32	Control	2	93.75	32	6.12	83.3	8.22	0.29	14.7	<0.01
RECON	Adjustment Blank	1	100.00	0	7.48	93.7	8.38	0.244	17.6	<0.01
RECON	Adjustment Blank	2	100.00	0	6.05	83.1	8.48	0	0.0	<0.01
UBI1-2	00BI2-ST002-NSD-010	2	84.74	16	6.56	88.8	7.93	11.2	300.2	0.017
UBI14-2	00BI2-ST004-NSD-010	2	86.70	18	6.18	83.5	7.94	7.48	205.0	0.020
UBI1-1	00BI2-ST006-NSD-010	1	84.74	16	7.89	96.8	7.92	6.71	175.9	<0.01
MBI3-1	00BI2-ST008-NSD-010	2	86.71	18	6.35	85.8	8.04	10.20	349.5	0.040
MBI3-3	00BI2-ST010-NSD-010	2	86.71	18	6.04	81.4	8.1	14.8	579.3	0.063
LBI1-2	00BI2-ST012-NSD-010	1	88.76	20	8.65	102.3	7.93	6.10	163.5	<0.01
LBI1-4	00BI2-ST014-NSD-010	1	89.28	20.5	8.21	101.3	7.80	7.48	149.7	0.03
LBI3-2	00BI2-ST016-NSD-010	1	90.63	22	8.04	98.9	7.84	9.07	198.6	0.05
LBI6-1	00BI2-ST018-NSD-010	1	87.20	18.5	7.67	93.1	7.68	6.79	103.6	0.016
LBI6-3	00BI2-ST020-NSD-010	2	87.72	19	6.52	88.2	7.98	10.70	320.7	0.040
LBI9-2	00BI2-ST022-NSD-010	2	87.72	19	6.65	90.1	8.01	8.57	274.7	0.012
LBI3-1	00BI2-ST024-NSD-010	2	86.71	18	6.65	90.6	7.96	9.35	268.0	<0.01
LBI3-3	00BI2-ST026-NSD-010	1	88.76	20	7.56	93.2	7.95	5.21	146.0	<0.01
LPPG-2	00BI2-ST028-NSD-010	1	84.74	16	8.29	102.6	8.02	2.74	89.8	<0.01
LPPG-4	00BI2-ST030-NSD-010	1	82.87	14	7.79	96.3	7.96	1.88	53.9	<0.01
LBV-2	00BV2-ST002-NSD-010	1	85.71	17	8.27	100.3	7.32	8.32	55.9	<0.01
LBV-4	00BV2-ST004-NSD-010	1	55.55	54	7.8	96.2	7.15	6.81	31.0	<0.01
LBV-6	00BV2-ST006-NSD-010	1	84.74	16	7.88	97.7	7.69	17.9	279.3	<0.01
UBV-2	00BV2-ST008-NSD-010	1	76.53	6	7.99	98.2	7.92	2.72	71.3	<0.01
UBV-4	00BV2-ST010-NSD-010	1	73.53	2	7.39	90.9	7.92	0.29	7.5	<0.01
PL-1	00LC2-ST001-NSD-010	1	83.80	15	8.28	100.8	7.74	1.81	31.6	<0.01
PL-3	00LC2-ST003-NSD-010	1	93.17	24	8.23	100.1	8.01	2.99	95.8	<0.01
MCR-1	00LC2-ST005-NSD-010	1	90.91	22	7.34	89.2	7.97	2.85	83.5	0.025
MCR-3	00LC2-ST007-NSD-010	2	86.71	18	6.11	83.0	8.02	8.13	266.5	0.015
BO-2	00LC2-ST009-NSD-010	1	89.28	20.5	8.18	99.4	7.85	7.37	165.1	<0.01
BO-4	00LC2-ST011-NSD-010	1	83.80	15	8.10	98.2	7.82	4.0	83.7	0.018
ML-1	00LC2-ST013-NSD-010	1	93.17	24	7.99	97.3	7.74	6.5	113.6	<0.01
ML-4	00LC2-ST027-NSD-010	2	93.17	24	6.32	85.6	8.01	5.73	183.7	<0.01
WB-2	00SN2-ST002-NSD-010	1	81.08	12	8.23	101.6	8.04	4.47	153.2	<0.01

Original Station ID	CDM Station ID	Test #	% Original Sample	Initial Salinity(‰)	DO (mg/L)	DO % sat	pH	TAN (mg/L)	UAN (mg/L)	Sulfide (mg/L)
JB-2	00SN2-ST004-NSD-010	1	79.79	10	8.21	101.2	7.91	1.6	41.0	<0.01
BBC-1	00SN2-ST006-NSD-010	1	89.82	21	7.98	99.3	7.89	7.17	175.7	<0.01
GB-1	00SN2-ST008-NSD-010	1	90.91	22	7.85	97.2	7.95	10.1	283.1	0.017
BC-2	00SN2-ST012-NSD-010	1	85.71	17	7.74	96	7.99	5.55	170.1	<0.01
BC-4	00SN2-ST014-NSD-010	1	84.74	16	7.71	95.2	7.98	2.03	60.9	<0.01
GB-5	00SN2-ST038-NSD-010	1	90.91	22	7.67	93.5	8.01	4.49	143.9	<0.01
UCRA-1	00UC2-ST001-NSD-010	1	86.70	18	7.98	99.2	7.95	1.82	51.0	<0.01
LC-1	00UC2-ST003-NSD-010	2	86.71	16	6.56	88.6	8.16	8.91	398.1	0.04
UCRB-1	00UC2-ST005-NSD-010	1	88.76	20	7.64	95.7	7.79	2.70	52.8	<0.01
CIL-1	00UC2-ST007-NSD-010	1	87.21	18.5	7.62	94.2	7.79	7.46	145.9	<0.01
CIB-1	00UC2-ST011-NSD-010	1	90.91	22	7.89	98.6	8.01	1.96	62.8	<0.01
UCRC-1	00UC2-ST013-NSD-010	1	87.72	19	7.19	89.9	7.76	5.32	97.3	<0.01
CBB-1	00UC2-ST015-NSD-010	1	90.91	22	7.13	87.5	7.72	7.68	128.2	<0.01
CBB-3	00UC2-ST017-NSD-010	2	84.74	16	6.44	86.8	7.97	8.36	245.1	0.052
CBB-5	00UC2-ST019-NSD-010	1	86.70	18	6.84	85.8	7.80	7.03	140.7	<0.01
CNE-1	00UC2-ST021-NSD-010	1	90.91	22	7.17	88.3	7.73	5.36	91.6	<0.01
CNE-3	00UC2-ST023-NSD-010	1	89.82	21	7.64	94.9	7.79	5.45	106.6	<0.01
CSW-2	00UC2-ST025-NSD-010	1	88.76	20	7.33	91.5	7.85	5.02	112.4	<0.01
CSW-4	00UC2-ST027-NSD-010	1	90.91	22	7.50	93.7	7.92	4.06	106.4	<0.01
CSW-6	00UC2-ST029-NSD-010	1	89.28	20.5	7.33	91.7	7.81	9.16	187.5	<0.01
CIL-3	00UC2-ST037-NSD-010	1	78.12	8	7.43	93.4	8.08	3.28	122.8	<0.01

Table 3. Sea urchin fertilization assay results with porewater samples from Calcasieu Estuary.

Original Station ID	CDM Staion ID	Conc. (%)	% Original Sample	% Fertilized Eggs **					MEAN	SD	% of Control
				Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
LAR32	Control	100	93.75	99/97	93/99	94/98	99/98	100/99	97.6	2.3	100
MFS	Dilution Blank	100	100	100/93	98/94	98/98	96/94	86/97	95.4	4.0	98
Recon	Adjustment Blank	100	100	97	97	95	96	98	96.6	1.1	99
UBI1-2	00BI2-ST002-NSD-010	100	84.74	34	46	34	49	26	37.8	9.5	39
UBI14-2	00BI2-ST004-NSD-010	100	86.70	15	20	37	26	19	23.4	8.6	24
UBI1-1	00BI2-ST006-NSD-010	100	84.74	87	87	86	80	78	83.6	4.3	86
MBI3-1	00BI2-ST008-NSD-010	100	86.71	46	25	48	20	12	30.2	16.0	31
MBI3-3	00BI2-ST010-NSD-010	100	86.71	0	2	1	1	3	1.4	1.1	1
LBI1-2	00BI2-ST012-NSD-010	100	88.76	69	65	64	65	67	66	2.0	68
LBI1-4	00BI2-ST014-NSD-010	100	89.28	22	14	43	39	29	29.4	11.9	30
LBI3-2	00BI2-ST016-NSD-010	100	90.63	9	7	14	1	13	8.8	5.2	9
LBI6-1	00BI2-ST018-NSD-010	100	87.20	72	75	73	70	66	71.2	3.4	73
LBI6-3	00BI2-ST020-NSD-010	100	87.72	36	16	27	25	51	31	13.2	32
LBI9-2	00BI2-ST022-NSD-010	100	87.72	29	43	24	31	50	35.4	10.7	36
LBI3-1	00BI2-ST024-NSD-010	100	86.71	91	20	66	31	52	52	28.2	53
LBI3-3	00BI2-ST026-NSD-010	100	88.76	96	96	95	92	94	94.6	1.7	97
LPPG-2	00BI2-ST028-NSD-010	100	84.74	66	91	85	85	87	82.8	9.7	85
LPPG-4	00BI2-ST030-NSD-010	100	82.87	64	72	80	63	72	70.2	6.9	72
LBV-2	00BV2-ST002-NSD-010	100	85.71	91	90	89	87	86	88.6	2.1	91
LBV-4	00BV2-ST004-NSD-010	100	55.55	1	2	3	2	1	1.8	0.8	2
LBV-6	00BV2-ST006-NSD-010	100	84.74	82	79	84	91	73	81.8	6.6	84
UBV-2	00BV2-ST008-NSD-010	100	76.53	82	91	93	89	92	89.4	4.4	92
UBV-4	00BV2-ST010-NSD-010	100	73.53	94	96	95	94	97	95.2	1.3	98
PL-1	00LC2-ST001-NSD-010	100	83.80	93	93	95	92	91	92.8	1.5	95
PL-3	00LC2-ST003-NSD-010	100	93.17	74	78	76	81	80	77.8	2.9	80
MCR-1	00LC2-ST005-NSD-010	100	90.91	0	0	0	0	0	0	0.0	0
MCR-3	00LC2-ST007-NSD-010	100	86.71	5	2	3	6	13	5.8	4.3	6
BO-2	00LC2-ST009-NSD-010	100	89.28	89	91	78	84	93	87	6.0	89
BO-4	00LC2-ST011-NSD-010	100	83.80	30	38	41	58	52	43.8	11.2	45
ML-1	00LC2-ST013-NSD-010	100	93.17	94	90	93	94	93	92.8	1.6	95
ML-4	00LC2-ST027-NSD-010	100	93.17	53	34	42	35	22	37.2	11.4	38
WB-2	00SN2-ST002-NSD-010	100	81.08	80	84	87	82	86	83.8	2.9	86
JB-2	00SN2-ST004-NSD-010	100	79.79	98	97	97	96	92	96	2.3	98
BBC-1	00SN2-ST006-NSD-010	100	89.82	40	32	29	43	36	36	5.7	37
GB-1	00SN2-ST008-NSD-010	100	90.91	72	50	47	51	73	58.6	12.8	60

Original Station ID	CDM Staion ID	Conc. (%)	% Original Sample	% Fertilized Eggs **					MEAN	SD	% of Control
				Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
BC-2	00SN2-ST012-NSD-010	100	85.71	69	45	52	44	82	58.4	16.6	60
BC-4	00SN2-ST014-NSD-010	100	84.74	89	87	97	91	89	90.6	3.8	93
GB-5	00SN2-ST038-NSD-010	100	90.91	87	96	90	96	92	92.2	3.9	94
UCRA-1	00UC2-ST001-NSD-010	100	86.70	93	96	98	97	95	95.8	1.9	98
LC-1	00UC2-ST003-NSD-010	100	86.71	0	1	2	2	1	1.2	0.8	1
UCRB-1	00UC2-ST005-NSD-010	100	88.76	90	94	94	95	94	93.4	1.9	96
CIL-1	00UC2-ST007-NSD-010	100	87.21	92	88	85	91	91	89.4	2.9	92
CIB-1	00UC2-ST011-NSD-010	100	90.91	79	85	89	94	94	88.2	6.4	90
UCRC-1	00UC2-ST013-NSD-010	100	87.72	96	87	86	96	92	91.4	4.8	94
CBB-1	00UC2-ST015-NSD-010	100	90.91	44	50	45	46	45	46	2.3	47
CBB-3	00UC2-ST017-NSD-010	100	84.74	17	12	19	32	12	18.4	8.2	19
CBB-5	00UC2-ST019-NSD-010	100	86.70	86	85	93	85	95	88.8	4.8	91
CNE-1	00UC2-ST021-NSD-010	100	96.97	39	34	62	48	36	43.8	11.5	45
CNE-3	00UC2-ST023-NSD-010	100	89.82	35	57	61	48	58	51.8	10.6	53
CSW-2	00UC2-ST025-NSD-010	100	88.76	72	85	87	90	80	82.8	7.0	85
CSW-4	00UC2-ST027-NSD-010	100	90.91	96	93	91	92	92	92.8	1.9	95
CSW-6	00UC2-ST029-NSD-010	100	89.28	81	70	81	80	77	77.8	4.7	80
CIL-3	00UC2-ST037-NSD-010	100	78.12	97	94	95	97	98	96.2	1.6	99
LAR32	Control	50	46.88	94/98	95/95	96/98	98/98	97/100	96.9	1.9	100
UBI1-2	00BI2-ST002-NSD-010	50	42.37	69	54	51	56	42	54.4	9.8	56
UBI14-2	00BI2-ST004-NSD-010	50	43.35	43	45	33	63	50	46.8	11.0	48
UBI1-1	00BI2-ST006-NSD-010	50	42.37	89	88	82	93	88	88	3.9	91
MBI3-1	00BI2-ST008-NSD-010	50	43.36	37	49	59	67	51	52.6	11.3	54
MBI3-3	00BI2-ST010-NSD-010	50	43.36	18	49	25	26	21	27.8	12.3	29
LBI1-2	00BI2-ST012-NSD-010	50	44.38	84	95	83	91	90	88.6	5.0	91
LBI1-4	00BI2-ST014-NSD-010	50	44.64	55	68	59	73	75	66	8.7	68
LBI3-2	00BI2-ST016-NSD-010	50	45.32	42	48	38	47	37	42.4	5.0	44
LBI6-1	00BI2-ST018-NSD-010	50	43.60	92	96	86	91	89	90.8	3.7	94
LBI6-3	00BI2-ST020-NSD-010	50	43.86	39	48	54	63	56	52	9.0	54
LBI9-2	00BI2-ST022-NSD-010	50	43.86	90	84	86	91	89	88	2.9	91
LBI3-1	00BI2-ST024-NSD-010	50	43.36	91	91	94	96	99	94.2	3.4	97
LBI3-3	00BI2-ST026-NSD-010	50	44.38	93	97	98	96	96	96	1.9	99
LPPG-2	00BI2-ST028-NSD-010	50	42.37	94	95	99	95	94	95.4	2.1	98
LPPG-4	00BI2-ST030-NSD-010	50	41.44	93	98	94	95	92	94.4	2.3	97
LBV-2	00BV2-ST002-NSD-010	50	42.86	97	96	98	98	97	97.2	0.8	100
LBV-4	00BV2-ST004-NSD-010	50	27.78	84	72	76	73	64	73.8	7.2	76

Original Station ID	CDM Staion ID	Conc. (%)	% Original Sample	% Fertilized Eggs **					MEAN	SD	% of Control
				Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
LBV-6	00BV2-ST006-NSD-010	50	42.37	90	92	94	95	97	93.6	2.7	97
UBV-2	00BV2-ST008-NSD-010	50	38.27	94	93	95	92	91	93	1.6	96
UBV-4	00BV2-ST010-NSD-010	50	36.77	98	92	95	96	94	95	2.2	98
PL-1	00LC2-ST001-NSD-010	50	41.90	96	98	96	97	97	96.8	0.8	100
PL-3	00LC2-ST003-NSD-010	50	46.59	98	96	95	98	99	97.2	1.6	100
MCR-1	00LC2-ST005-NSD-010	50	45.46	3	0	1	1	0	1	1.2	1
MCR-3	00LC2-ST007-NSD-010	50	43.36	47	42	51	37	34	42.2	7.0	44
BO-2	00LC2-ST009-NSD-010	50	44.64	96	95	99	97	94	96.2	1.9	99
BO-4	00LC2-ST011-NSD-010	50	41.90	84	80	71	81	75	78.2	5.2	81
ML-1	00LC2-ST013-NSD-010	50	46.58	92	96	95	93	95	94.2	1.6	97
ML-4	00LC2-ST027-NSD-010	50	46.58	93	95	93	92	86	91.8	3.4	95
WB-2	00SN2-ST002-NSD-010	50	40.54	95	90	95	95	95	94	2.2	97
JB-2	00SN2-ST004-NSD-010	50	39.90	99	95	93	96	92	95	2.7	98
BBC-1	00SN2-ST006-NSD-010	50	44.91	83	93	87	95	93	90.2	5.0	93
GB-1	00SN2-ST008-NSD-010	50	45.46	80	73	89	83	88	82.6	6.5	85
BC-2	00SN2-ST012-NSD-010	50	42.86	71	82	85	89	88	83	7.2	86
BC-4	00SN2-ST014-NSD-010	50	42.37	94	96	93	94	95	94.4	1.1	97
GB-5	00SN2-ST038-NSD-010	50	45.46	87	93	95	95	92	92.4	3.3	95
UCRA-1	00UC2-ST001-NSD-010	50	43.35	97	98	97	96	97	97	0.7	100
LC-1	00UC2-ST003-NSD-010	50	43.36	25	28	28	20	21	24.4	3.8	25
UCRB-1	00UC2-ST005-NSD-010	50	44.38	95	94	98	96	98	96.2	1.8	99
CIL-1	00UC2-ST007-NSD-010	50	43.61	96	94	96	96	97	95.8	1.1	99
CIB-1	00UC2-ST011-NSD-010	50	45.46	90	94	86	92	93	91	3.2	94
UCRC-1	00UC2-ST013-NSD-010	50	43.86	96	96	91	91	93	93.4	2.5	96
CBB-1	00UC2-ST015-NSD-010	50	45.46	87	88	82	73	85	83	6.0	86
CBB-3	00UC2-ST017-NSD-010	50	42.37	48	43	40	33	38	40.4	5.6	42
CBB-5	00UC2-ST019-NSD-010	50	43.35	99	97	98	97	99	98	1.0	101
CNE-1	00UC2-ST021-NSD-010	50	48.49	89	90	94	84	92	89.8	3.8	93
CNE-3	00UC2-ST023-NSD-010	50	44.91	85	92	88	85	89	87.8	2.9	91
CSW-2	00UC2-ST025-NSD-010	50	44.38	95	98	98	96	97	96.8	1.3	100
CSW-4	00UC2-ST027-NSD-010	50	45.46	99	92	97	95	95	95.6	2.6	99
CSW-6	00UC2-ST029-NSD-010	50	44.64	91	90	95	90	93	91.8	2.2	95
CIL-3	00UC2-ST037-NSD-010	50	39.06	99	100	100	98	98	99	1.0	102
LAR32	Control	25	23.44	91/100	97/93	99/99	95/100	99/97	97	3.1	100
UBI1-2	00BI2-ST002-NSD-010	25	21.18	94	86	87	92	78	87.4	6.2	90
UBI14-2	00BI2-ST004-NSD-010	25	21.68	60	76	76	77	69	71.6	7.2	74

Original Station ID	CDM Staion ID	Conc. (%)	% Original Sample	% Fertilized Eggs **					MEAN	SD	% of Control
				Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
UBI1-1	00BI2-ST006-NSD-010	25	21.18	98	95	91	95	95	94.8	2.5	98
MBI3-1	00BI2-ST008-NSD-010	25	21.68	90	78	91	91	82	86.4	6.0	89
MBI3-3	00BI2-ST010-NSD-010	25	21.68	30	47	50	48	64	47.8	12.1	49
LBI1-2	00BI2-ST012-NSD-010	25	22.19	98	93	92	96	89	93.6	3.5	96
LBI1-4	00BI2-ST014-NSD-010	25	22.32	87	92	94	88	93	90.8	3.1	94
LBI3-2	00BI2-ST016-NSD-010	25	22.66	79	69	56	78	73	71	9.3	73
LBI6-1	00BI2-ST018-NSD-010	25	21.80	99	97	96	94	96	96.4	1.8	99
LBI6-3	00BI2-ST020-NSD-010	25	21.93	70	81	65	54	67	67.4	9.7	69
LBI9-2	00BI2-ST022-NSD-010	25	21.93	97	97	96	99	94	96.6	1.8	100
LBI3-1	00BI2-ST024-NSD-010	25	21.68	97	94	97	95	95	95.6	1.3	99
LBI3-3	00BI2-ST026-NSD-010	25	22.19	98	98	97	95	96	96.8	1.3	100
LPPG-2	00BI2-ST028-NSD-010	25	21.19	92	90	94	98	99	94.6	3.8	98
LPPG-4	00BI2-ST030-NSD-010	25	20.72	98	94	97	96	95	96	1.6	99
LBV-2	00BV2-ST002-NSD-010	25	21.43	95	97	97	98	94	96.2	1.6	99
LBV-4	00BV2-ST004-NSD-010	25	13.89	92	90	91	96	95	92.8	2.6	96
LBV-6	00BV2-ST006-NSD-010	25	21.19	100	97	96	97	99	97.8	1.6	101
UBV-2	00BV2-ST008-NSD-010	25	19.13	90	89	93	85	86	88.6	3.2	91
UBV-4	00BV2-ST010-NSD-010	25	18.38	96	98	97	94	96	96.2	1.5	99
PL-1	00LC2-ST001-NSD-010	25	20.95	98	95	95	93	96	95.4	1.8	98
PL-3	00LC2-ST003-NSD-010	25	23.29	98	90	96	95	93	94.4	3.0	97
MCR-1	00LC2-ST005-NSD-010	25	22.70	4	3	5	6	7	5	1.6	5
MCR-3	00LC2-ST007-NSD-010	25	21.68	85	80	91	79	86	84.2	4.9	87
BO-2	00LC2-ST009-NSD-010	25	22.32	96	96	94	98	95	95.8	1.5	99
BO-4	00LC2-ST011-NSD-010	25	20.95	96	92	92	97	93	94	2.3	97
ML-1	00LC2-ST013-NSD-010	25	23.29	93	94	89	89	94	91.8	2.6	95
ML-4	00LC2-ST027-NSD-010	25	23.29	98	95	96	92	93	94.8	2.4	98
WB-2	00SN2-ST002-NSD-010	25	20.27	97	93	98	94	91	94.6	2.9	98
JB-2	00SN2-ST004-NSD-010	25	19.95	99	95	95	97	98	96.8	1.8	100
BBC-1	00SN2-ST006-NSD-010	25	22.46	95	91	96	94	92	93.6	2.1	96
GB-1	00SN2-ST008-NSD-010	25	22.73	94	97	98	97	97	96.6	1.5	100
BC-2	00SN2-ST012-NSD-010	25	21.43	96	94	98	92	97	95.4	2.4	98
BC-4	00SN2-ST014-NSD-010	25	21.19	95	92	96	96	96	95	1.7	98
GB-5	00SN2-ST038-NSD-010	25	22.70	97	94	96	95	95	95.4	1.1	98
UCRA-1	00UC2-ST001-NSD-010	25	21.68	100	98	96	96	97	97.4	1.7	100
LC-1	00UC2-ST003-NSD-010	25	21.68	53	40	22	39	52	41.2	12.6	42
UCRB-1	00UC2-ST005-NSD-010	25	22.19	94	98	98	96	96	96.4	1.7	99
CIL-1	00UC2-ST007-NSD-010	25	21.80	96	95	99	95	97	96.4	1.7	99

Original Station ID	CDM Staion ID	Conc. (%)	% Original Sample	% Fertilized Eggs **					MEAN	SD	% of Control
				Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
CIB-1	00UC2-ST011-NSD-010	25	22.73	91	90	96	91	94	92.4	2.5	95
UCRC-1	00UC2-ST013-NSD-010	25	21.93	97	100	94	98	95	96.8	2.4	100
CBB-1	00UC2-ST015-NSD-010	25	22.73	96	96	98	93	96	95.8	1.8	99
CBB-3	00UC2-ST017-NSD-010	25	21.18	44	45	59	60	52	52	7.5	54
CBB-5	00UC2-ST019-NSD-010	25	21.68	98	98	93	99	99	97.4	2.5	100
CNE-1	00UC2-ST021-NSD-010	25	24.24	96	95	91	97	92	94.2	2.6	97
CNE-3	00UC2-ST023-NSD-010	25	22.46	93	98	97	94	98	96	2.3	99
CSW-2	00UC2-ST025-NSD-010	25	22.19	100	97	100	95	99	98.2	2.2	101
CSW-4	00UC2-ST027-NSD-010	25	22.73	96	99	98	97	99	97.8	1.3	101
CSW-6	00UC2-ST029-NSD-010	25	22.32	97	94	94	98	98	96.2	2.0	99
CIL-3	00UC2-ST037-NSD-010	25	19.53	97	95	100	94	96	96.4	2.3	99
LBI1-4	00BI2-ST014-NSD-010	12.5	11.25	95	96	97	99	93	96	2.2	99
LBI3-2	00BI2-ST016-NSD-010	12.5	11.375	77	76	83	76	75	77.4	3.2	80
LBV-4	00BV2-ST004-NSD-010	12.5	6.94	100	97	98	97	99	98.2	1.3	104
MCR-1	00LC2-ST005-NSD-010	12.5	11.375	15	16	13	15	16	15	1.2	15
LBI3-2	00BI2-ST016-NSD-010	6.25	5.687	68	92	92	96	85	86.6	11.1	89
MCR-1	00LC2-ST005-NSD-010	6.25	5.687	59	46	36	45	40	45.2	8.7	47
MCR-1	00LC2-ST005-NSD-010	3.125	2.843	69	80	84	79	78	78.0	5.5	80
Concentration											
SDS	Reference Toxicant	20 mg/L	na	0	0	0	0	0	0	0.0	0
SDS	Reference Toxicant	10 mg/L	na	0	0	1	0	0	0.2	0.4	0
SDS	Reference Toxicant	5 mg/L	na	71	73	70	77	67	71.6	3.7	73
SDS	Reference Toxicant	2.5 mg/L	na	97	94	97	96	95	95.8	1.3	98
SDS	Reference Toxicant	1.25 mg/L	na	98	100	99	93	97	97.4	2.7	100

** Controls and some blanks have 10 replicates, the remaining samples have only 5

Table 4. Sea urchin embryological development assay results with porewater samples from Calcasieu Estuary.

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	Test #	% Normal Plutei **					MEAN	SD	% of Control
					Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
LAR32	Control	100	93.75	1	87/87	89/84	81/86	87/82	85/84	85.2	2.49	100
LAR32	Control	100	93.75	2	90/88	93/98	95/91	97/95	93/94	93.4	3.10	100
MFS	Dilution Blank	100	100	1	79/86	80/84	88/81	84/94	77/83	83.6	4.93	98
MFS	Dilution Blank	100	100	2	89	91	93	92	95	92	2.24	99
Recon	Adjustment Blank	100	100	1	82	85	84	78	78	81.4	3.29	96
Recon	Adjustment Blank	100	100	2	95	87	90	89	96	91.4	3.91	98
UBI1-2	00BI2-ST002-NSD-010	100	84.74	2	0	0	0	0	0	0.0	0.0	0.0
UBI14-2	00BI2-ST004-NSD-010	100	86.70	2	0	0	0	0	0	0.0	0.0	0.0
UBI1-1	00BI2-ST006-NSD-010	100	84.74	1	0	0	0	0	0	0.0	0.0	0.0
MBI3-1	00BI2-ST008-NSD-010	100	86.71	2	0	0	0	0	0	0.0	0.0	0.0
MBI3-3	00BI2-ST010-NSD-010	100	86.71	2	0	0	0	0	0	0.0	0.0	0.0
LBI1-2	00BI2-ST012-NSD-010	100	88.76	1	0	0	0	0	0	0.0	0.0	0.0
LBI1-4	00BI2-ST014-NSD-010	100	89.28	1	0	0	0	0	0	0.0	0.0	0.0
LBI3-2	00BI2-ST016-NSD-010	100	90.63	1	0	0	0	0	0	0.0	0.0	0.0
LBI6-1	00BI2-ST018-NSD-010	100	87.20	1	0	0	0	0	0	0.0	0.0	0.0
LBI6-3	00BI2-ST020-NSD-010	100	87.72	2	0	0	0	0	0	0.0	0.0	0.0
LBI9-2	00BI2-ST022-NSD-010	100	87.72	2	0	0	0	0	0	0.0	0.0	0.0
LBI3-1	00BI2-ST024-NSD-010	100	86.71	2	0	0	0	0	0	0.0	0.0	0.0
LBI3-3	00BI2-ST026-NSD-010	100	88.76	1	0	0	0	0	0	0.0	0.0	0.0
LPPG-2	00BI2-ST028-NSD-010	100	84.74	1	0	0	0	0	0	0.0	0.0	0.0
LPPG-4	00BI2-ST030-NSD-010	100	82.87	1	5	7	1	1	0	2.8	3.0	3.3
LBV-2	00BV2-ST002-NSD-010	100	85.71	1	0	0	0	0	0	0.0	0.0	0.0
LBV-4	00BV2-ST004-NSD-010	100	55.55	1	0	0	0	0	0	0.0	0.0	0.0
LBV-6	00BV2-ST006-NSD-010	100	84.74	1	0	0	0	0	0	0.0	0.0	0.0
UBV-2	00BV2-ST008-NSD-010	100	76.53	1	0	0	0	0	0	0.0	0.0	0.0
UBV-4	00BV2-ST010-NSD-010	100	73.53	1	86	74	72	82	67	76.2	7.7	89.4
PL-1	00LC2-ST001-NSD-010	100	83.80	1	0	0	34	48	4	17.2	22.3	20.2
PL-3	00LC2-ST003-NSD-010	100	93.17	1	0	0	0	0	0	0.0	0.0	0.0
MCR-1	00LC2-ST005-NSD-010	100	90.91	1	0	0	0	0	0	0.0	0.0	0.0
MCR-3	00LC2-ST007-NSD-010	100	86.71	2	0	0	0	0	0	0.0	0.0	0.0
BO-2	00LC2-ST009-NSD-010	100	89.28	1	0	0	0	0	0	0.0	0.0	0.0
BO-4	00LC2-ST011-NSD-010	100	83.80	1	0	0	0	0	0	0.0	0.0	0.0
ML-1	00LC2-ST013-NSD-010	100	93.17	1	0	0	0	0	0	0.0	0.0	0.0

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	Test #	% Normal Plutei **					MEAN	SD	% of Control
					Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
ML-4	00LC2-ST027-NSD-010	100	93.17	2	0	0	0	0	0	0.0	0.0	0.0
WB-2	00SN2-ST002-NSD-010	100	81.08	1	0	0	0	0	0	0.0	0.0	0.0
JB-2	00SN2-ST004-NSD-010	100	79.79	1	83	82	81	76	86	81.6	3.6	95.8
BBC-1	00SN2-ST006-NSD-010	100	89.82	1	0	0	0	0	0	0.0	0.0	0.0
GB-1	00SN2-ST008-NSD-010	100	90.91	1	0	0	0	0	0	0.0	0.0	0.0
BC-2	00SN2-ST012-NSD-010	100	85.71	1	0	0	0	0	0	0.0	0.0	0.0
BC-4	00SN2-ST014-NSD-010	100	84.74	1	2	49	37	6	0	18.8	22.6	22.1
GB-5	00SN2-ST038-NSD-010	100	90.91	1	0	0	0	0	0	0.0	0.0	0.0
UCRA-1	00UC2-ST001-NSD-010	100	86.70	1	65	53	19	64	50	50.2	18.6	58.9
LC-1	00UC2-ST003-NSD-010	100	86.71	2	0	0	0	0	0	0.0	0.0	0.0
UCRB-1	00UC2-ST005-NSD-010	100	88.76	1	91	72	82	90	87	84.4	7.8	99.1
CIL-1	00UC2-ST007-NSD-010	100	87.21	1	0	0	0	0	0	0.0	0.0	0.0
CIB-1	00UC2-ST011-NSD-010	100	90.91	1	91	83	82	87	84	85.4	3.6	100.2
UCRC-1	00UC2-ST013-NSD-010	100	87.72	1	0	0	0	0	0	0.0	0.0	0.0
CBB-1	00UC2-ST015-NSD-010	100	90.91	1	0	0	0	0	0	0.0	0.0	0.0
CBB-3	00UC2-ST017-NSD-010	100	84.74	2	0	0	0	0	0	0.0	0.0	0.0
CBB-5	00UC2-ST019-NSD-010	100	86.70	1	0	0	0	0	0	0.0	0.0	0.0
CNE-1	00UC2-ST021-NSD-010	100	96.97	1	0	0	0	0	0	0.0	0.0	0.0
CNE-3	00UC2-ST023-NSD-010	100	89.82	1	0	0	0	0	0	0.0	0.0	0.0
CSW-2	00UC2-ST025-NSD-010	100	88.76	1	0	0	0	0	0	0.0	0.0	0.0
CSW-4	00UC2-ST027-NSD-010	100	90.91	1	12	10	11	10	1	8.8	4.4	10.3
CSW-6	00UC2-ST029-NSD-010	100	89.28	1	0	0	0	0	0	0.0	0.0	0.0
CIL-3	00UC2-ST037-NSD-010	100	78.12	1	83	83	74	76	80	79.2	4.1	93.0
LAR32	Control	50	46.88	1	88/86	82/78	90/86	87/83	86/85	85.1	3.38	100
LAR32	Control	50	46.88	2	93/97	95/83	96/92	92/89	91/94	92.2	4.02	100
UBI1-2	00BI2-ST002-NSD-010	50	42.37	2	0	0	0	0	0	0.0	0.0	0.0
UBI14-2	00BI2-ST004-NSD-010	50	43.35	2	0	0	0	0	0	0.0	0.0	0.0
UBI1-1	00BI2-ST006-NSD-010	50	42.37	1	0	0	0	0	0	0.0	0.0	0.0
MBI3-1	00BI2-ST008-NSD-010	50	43.36	2	0	0	0	0	0	0.0	0.0	0.0
MBI3-3	00BI2-ST010-NSD-010	50	43.36	2	0	0	0	0	0	0.0	0.0	0.0
LBI1-2	00BI2-ST012-NSD-010	50	44.38	1	0	0	4	20	0	4.8	8.7	5.6
LBI1-4	00BI2-ST014-NSD-010	50	44.64	1	0	0	0	0	0	0.0	0.0	0.0
LBI3-2	00BI2-ST016-NSD-010	50	45.32	1	0	0	0	0	0	0.0	0.0	0.0
LBI6-1	00BI2-ST018-NSD-010	50	43.60	1	0	0	0	0	0	0.0	0.0	0.0

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	Test #	% Normal Plutei **					MEAN	SD	% of Control
					Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
LBI6-3	00BI2-ST020-NSD-010	50	43.86	2	0	0	0	0	0	0.0	0.0	0.0
LBI9-2	00BI2-ST022-NSD-010	50	43.86	2	0	0	0	0	0	0.0	0.0	0.0
LBI3-1	00BI2-ST024-NSD-010	50	43.36	2	0	0	0	0	0	0.0	0.0	0.0
LBI3-3	00BI2-ST026-NSD-010	50	44.38	1	0	0	0	0	0	0.0	0.0	0.0
LPPG-2	00BI2-ST028-NSD-010	50	42.37	1	90	89	86	84	84	86.6	2.8	101.8
LPPG-4	00BI2-ST030-NSD-010	50	41.44	1	87	84	87	92	79	85.8	4.8	100.8
LBV-2	00BV2-ST002-NSD-010	50	42.86	1	0	0	0	0	0	0.0	0.0	0.0
LBV-4	00BV2-ST004-NSD-010	50	27.78	1	0	0	0	0	0	0.0	0.0	0.0
LBV-6	00BV2-ST006-NSD-010	50	42.37	1	0	0	0	0	0	0.0	0.0	0.0
UBV-2	00BV2-ST008-NSD-010	50	38.27	1	87	77	85	84	79	82.4	4.2	96.8
UBV-4	00BV2-ST010-NSD-010	50	36.77	1	80	87	78	75	79	79.8	4.4	93.8
PL-1	00LC2-ST001-NSD-010	50	41.90	1	89	83	81	85	83	84.2	3.0	98.9
PL-3	00LC2-ST003-NSD-010	50	46.59	1	83	86	75	83	80	81.4	4.2	95.7
MCR-1	00LC2-ST005-NSD-010	50	45.46	1	72	80	72	68	68	72.0	4.9	84.6
MCR-3	00LC2-ST007-NSD-010	50	43.36	2	0	0	0	0	0	0.0	0.0	0.0
BO-2	00LC2-ST009-NSD-010	50	44.64	1	0	0	0	0	0	0.0	0.0	0.0
BO-4	00LC2-ST011-NSD-010	50	41.90	1	85	81	82	84	83	83.0	1.6	97.5
ML-1	00LC2-ST013-NSD-010	50	46.58	1	20	45	52	0	58	35.0	24.3	41.1
ML-4	00LC2-ST027-NSD-010	50	46.58	2	0	0	0	0	0	0.0	0.0	0.0
WB-2	00SN2-ST002-NSD-010	50	40.54	1	83	90	87	81	83	84.8	3.6	99.6
JB-2	00SN2-ST004-NSD-010	50	39.90	1	79	82	82	84	83	82.0	1.9	96.4
BBC-1	00SN2-ST006-NSD-010	50	44.91	1	86	80	83	84	85	83.6	2.3	98.2
GB-1	00SN2-ST008-NSD-010	50	45.46	1	5	0	0	0	6	2.2	3.0	2.6
BC-2	00SN2-ST012-NSD-010	50	42.86	1	0	0	0	0	0	0.0	0.0	0.0
BC-4	00SN2-ST014-NSD-010	50	42.37	1	81	86	86	86	85	84.8	2.2	99.6
GB-5	00SN2-ST038-NSD-010	50	45.46	1	3	8	9	4	0	4.8	3.7	5.6
UCRA-1	00UC2-ST001-NSD-010	50	43.35	1	89	94	88	85	82	87.6	4.5	102.9
LC-1	00UC2-ST003-NSD-010	50	43.36	2	0	0	0	0	0	0.0	0.0	0.0
UCRB-1	00UC2-ST005-NSD-010	50	44.38	1	91	82	83	80	85	84.2	4.2	98.9
CIL-1	00UC2-ST007-NSD-010	50	43.61	1	0	0	0	0	0	0.0	0.0	0.0
CIB-1	00UC2-ST011-NSD-010	50	45.46	1	86	83	85	92	86	86.4	3.4	101.5
UCRC-1	00UC2-ST013-NSD-010	50	43.86	1	30	16	12	7	3	13.6	10.4	16.0
CBB-1	00UC2-ST015-NSD-010	50	45.46	1	0	8	0	0	0	1.6	3.6	1.9
CBB-3	00UC2-ST017-NSD-010	50	42.37	2	0	0	0	0	0	0.0	0.0	0.0
CBB-5	00UC2-ST019-NSD-010	50	43.35	1	9	7	7	3	10	7.2	2.7	8.5

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	Test #	% Normal Plutei **					MEAN	SD	% of Control
					Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
CNE-1	00UC2-ST021-NSD-010	50	48.49	1	82	85	84	78	79	81.6	3.0	95.9
CNE-3	00UC2-ST023-NSD-010	50	44.91	1	89	85	83	84	86	85.4	2.3	100.4
CSW-2	00UC2-ST025-NSD-010	50	44.38	1	90	84	87	87	83	86.2	2.8	101.3
CSW-4	00UC2-ST027-NSD-010	50	45.46	1	87	83	90	88	89	87.4	2.7	102.7
CSW-6	00UC2-ST029-NSD-010	50	44.64	1	61	69	51	38	4	44.6	25.5	52.4
CIL-3	00UC2-ST037-NSD-010	50	39.06	1	87	90	83	86	80	85.2	3.8	100.1
LAR32	Control	25	23.44	1	86/86	85/89	82/84	83/82	87/89	85.3	2.58	100
LAR32	Control	25	23.44	2	93/97	90/90	94/96	89/95	94/93	93.1	2.69	100
UBI1-2	00BI2-ST002-NSD-010	25	21.18	2	0	0	0	0	0	0.0	0.0	0.0
UBI14-2	00BI2-ST004-NSD-010	25	21.68	2	3	2	3	6	3	3.4	1.5	3.7
UBI1-1	00BI2-ST006-NSD-010	25	21.18	1	84	86	81	79	89	83.8	4.0	98.2
MBI3-1	00BI2-ST008-NSD-010	25	21.68	2	0	0	0	0	0	0.0	0.0	0.0
MBI3-3	00BI2-ST010-NSD-010	25	21.68	2	0	0	0	0	0	0.0	0.0	0.0
LBI1-2	00BI2-ST012-NSD-010	25	22.19	1	84	80	88	87	82	84.2	3.3	98.7
LBI1-4	00BI2-ST014-NSD-010	25	22.32	1	85	85	80	81	74	81.0	4.5	95.0
LBI3-2	00BI2-ST016-NSD-010	25	22.66	1	40	59	48	32	24	40.6	13.6	47.6
LBI6-1	00BI2-ST018-NSD-010	25	21.80	1	69	71	75	66	77	71.6	4.4	83.9
LBI6-3	00BI2-ST020-NSD-010	25	21.93	2	0	0	0	0	0	0.0	0.0	0.0
LBI9-2	00BI2-ST022-NSD-010	25	21.93	2	0	5	17	34	0	11.2	14.5	12.0
LBI3-1	00BI2-ST024-NSD-010	25	21.68	2	0	0	33	30	0	12.6	17.3	13.5
LBI3-3	00BI2-ST026-NSD-010	25	22.19	1	90	88	84	86	85	86.6	2.4	101.5
LPPG-2	00BI2-ST028-NSD-010	25	21.19	1	91	85	80	93	84	86.6	5.3	101.5
LPPG-4	00BI2-ST030-NSD-010	25	20.72	1	84	88	77	88	82	83.8	4.6	98.2
LBV-2	00BV2-ST002-NSD-010	25	21.43	1	90	80	85	87	90	86.4	4.2	101.3
LBV-4	00BV2-ST004-NSD-010	25	13.89	1	79	68	67	80	79	74.6	6.5	87.5
LBV-6	00BV2-ST006-NSD-010	25	21.19	1	32	80	31	86	87	63.2	29.1	74.1
UBV-2	00BV2-ST008-NSD-010	25	19.13	1	90	89	83	85	81	85.6	3.8	100.4
UBV-4	00BV2-ST010-NSD-010	25	18.38	1	85	80	84	83	84	83.2	1.9	97.5
PL-1	00LC2-ST001-NSD-010	25	20.95	1	86	83	81	80	84	82.8	2.4	97.1
PL-3	00LC2-ST003-NSD-010	25	23.29	1	81	91	90	84	78	84.8	5.6	99.4
MCR-1	00LC2-ST005-NSD-010	25	22.70	1	83	86	67	83	88	81.4	8.3	95.4
MCR-3	00LC2-ST007-NSD-010	25	21.68	2	0	0	0	0	5	1.0	2.2	1.1
BO-2	00LC2-ST009-NSD-010	25	22.32	1	88	86	88	87	80	85.8	3.3	100.6
BO-4	00LC2-ST011-NSD-010	25	20.95	1	78	83	88	91	89	85.8	5.3	100.6

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	Test #	% Normal Plutei **					MEAN	SD	% of Control
					Rep1/Rep 6	Rep 2/Rep7	Rep3/Rep 8	Rep 4/Rep9	Rep5/Rep 10			
ML-1	00LC2-ST013-NSD-010	25	23.29	1	83	90	90	89	85	87.4	3.2	102.5
ML-4	00LC2-ST027-NSD-010	25	23.29	2	77	72	84	86	75	78.8	6.0	84.6
WB-2	00SN2-ST002-NSD-010	25	20.27	1	87	85	81	81	89	84.6	3.6	99.2
JB-2	00SN2-ST004-NSD-010	25	19.95	1	83	88	84	84	84	84.6	1.9	99.2
BBC-1	00SN2-ST006-NSD-010	25	22.46	1	88	85	75	88	83	83.8	5.4	98.2
GB-1	00SN2-ST008-NSD-010	25	22.73	1	79	91	78	89	86	84.6	5.9	99.2
BC-2	00SN2-ST012-NSD-010	25	21.43	1	83	82	83	84	85	83.4	1.1	97.8
BC-4	00SN2-ST014-NSD-010	25	21.19	1	80	88	83	84	78	82.6	3.8	96.8
GB-5	00SN2-ST038-NSD-010	25	22.70	1	90	88	82	87	90	87.4	3.3	102.5
UCRA-1	00UC2-ST001-NSD-010	25	21.68	1	93	84	88	89	94	89.6	4.0	105.0
LC-1	00UC2-ST003-NSD-010	25	21.68	2	0	0	0	0	0	0.0	0.0	0.0
UCRB-1	00UC2-ST005-NSD-010	25	22.19	1	86	88	84	88	89	87.0	2.0	102.0
CIL-1	00UC2-ST007-NSD-010	25	21.80	1	83	89	89	83	85	85.8	3.0	100.6
CIB-1	00UC2-ST011-NSD-010	25	22.73	1	86	83	83	89	87	85.6	2.6	100.4
UCRC-1	00UC2-ST013-NSD-010	25	21.93	1	87	77	86	84	79	82.6	4.4	96.8
CBB-1	00UC2-ST015-NSD-010	25	22.73	1	87	86	86	87	88	86.8	0.8	101.8
CBB-3	00UC2-ST017-NSD-010	25	21.18	2	1	0	0	0	0	0.2	0.4	0.2
CBB-5	00UC2-ST019-NSD-010	25	21.68	1	89	92	87	91	90	89.8	1.9	105.3
CNE-1	00UC2-ST021-NSD-010	25	24.24	1	82	85	91	80	90	85.6	4.8	100.4
CNE-3	00UC2-ST023-NSD-010	25	22.46	1	84	88	79	86	84	84.2	3.3	98.7
CSW-2	00UC2-ST025-NSD-010	25	22.19	1	89	91	84	82	83	85.8	4.0	100.6
CSW-4	00UC2-ST027-NSD-010	25	22.73	1	81	84	83	89	88	85.0	3.4	99.6
CSW-6	00UC2-ST029-NSD-010	25	22.32	1	91	89	86	92	80	87.6	4.8	102.7
CIL-3	00UC2-ST037-NSD-010	25	19.53	1	91	88	92	82	83	87.2	4.5	102.2
LAR32	Control	12.5	11.72	2	92/95	96/91	86/92	95/97	94/91	92.9	3.2	100.0
UBI1-2	00BI2-ST002-NSD-010	12.5	10.59	2	61	65	33	68	58	57.0	13.9	61.4
UBI14-2	00BI2-ST004-NSD-010	12.5	10.84	2	76	70	79	77	74	75.2	3.4	80.9
MBI3-1	00BI2-ST008-NSD-010	12.5	10.84	2	64	69	62	70	87	70.4	9.9	75.8
MBI3-3	00BI2-ST010-NSD-010	12.5	10.84	2	51	2	0	31	0	16.8	23.2	18.1
LBI3-2	00BI2-ST016-NSD-010	12.5	11.33	1	84	76	83	89	85	83.4	4.7	97.8
LBI6-1	00BI2-ST018-NSD-010	12.5	10.9	1	91	88	79	83	82	84.6	4.8	99.2
LBI6-3	00BI2-ST020-NSD-010	12.5	10.96	2	60	68	65	56	57	61.2	5.2	65.9
LBI9-2	00BI2-ST022-NSD-010	12.5	10.97	2	90	95	88	90	87	90.0	3.1	96.9
LBI3-1	00BI2-ST024-NSD-010	12.5	10.84	2	91	90	93	92	88	90.8	1.9	97.7

Table 5. Conditions for conducting the redfish embryo assay.

Parameter	Conditions
1. Test Type	Toxicity of pore water or spiked seawater
2. Temperature	25 ± 1.5°C
3. Light Quality	Cool White fluorescent
4. Photoperiod	12L and 12D
5. Test Chamber	25 ml stender dish with ground glass lid
6. Exposures	Pore water and dilutions: 10 ml volumes
7. Dilution Water	0.45 µm filtered seawater
8. Age of organism	< 12 hrs from spawn
9. Organisms/chamber	10
10. Number of replicates	5 replicates/dilution
11. Feeding	None
12. Aeration	None
13. Water Quality	Salinity, pH, dissolved oxygen, ammonia
14. Test Duration	48 hrs
15. Endpoints	24 hr hatch/survival, 48 hr survival
16. Test Acceptability	Mean control Survival > 80%

Table 6. Water quality measurements from Calcasieu Estuary pore water samples used in the redfish assays.

Original Station ID	CDM Station ID	Test #	% Original Sample	Initial Salinity(‰)	D.O. (mg/L)	D.O. (% sat.)	pH	TAN * (mg/L)	UAN (mg/L)
LAR32	Control Test 4	4	93.75	32	6.5	90.2	8.19	0.45	21.5
LAR32	Control Test 5	5	93.75	32	6.47	89.7	8.12	0.612	25.0
LAR32	Control Test 6	6	93.75	32	6.47	87.9	8.22	0.383	19.5
LAR32	Control Test 7	7	93.75	32	6.3	81.7	8.08	0.49	18.3
MFS	Dilution Blank Test 4	4	93.75	32	nm	nm	8.14	<0.1	<4.3
MFS	Dilution Blank Test 5	5	93.75	32	6.87	94.7	8.06	0.445	15.9
MFS	Dilution Blank Test 6	6	100	30	nm	nm	8.13	0.1	4.2
MFS	Dilution Blank Test 7	7	100	30	6.09	84.5	8.18	< 0.1	< 7.3
RECON	Adjustment Blank Test 4	4	100	0	6.53	88.6	8.55	< 0.1	<10.3
RECON	Adjustment Blank Test 5	5	100	0	7.2	97.9	8.46	0.442	37.7
RECON	Adjustment Blank Test 6	6	100	30	7.06	95.6	8.54	< 0.1	< 10.1
RECON	Adjustment Blank Test 7	7	100	30	6.01	83.4	8.59	< 0.1	< 11.2
UBI 1-2	00BI2-ST002-NSD-010	7	84.74	16	6.35	87.2	8.33	17.4	1125.9
UBI 4-2	00BI2-ST004-NSD-010	4	86.7	18	5.87	80.5	7.99	11.6	355.6
UBI 1-1	00BI2-ST006-NSD-010	5	84.74	16	6.74	92.3	7.78	6.54	125.1
UBI 1-1	00BI2-ST006-NSD-010	7	84.74	16	5.92	82.3	8.24	7.94	422.7
MBI 3-1	00BI2-ST008-NSD-010	7	86.71	18	6.07	84.7	8.02	13.9	455.6
MBI 3-3	00BI2-ST010-NSD-010	7	86.71	18	6.1	84.3	8.17	20	913.5
LBI 1-2	00BI2-ST012-NSD-010	5	88.76	20	7	95.2	8.02	7.04	230.7
LBI 1-4	00BI2-ST014-NSD-010	5	89.28	20.5	6.42	87.7	7.81	7.67	157.0
LBI 3-2	00BI2-ST016-NSD-010	4	90.63	22	6.07	82.9	8.03	10.7	358.6
LBI 6-1	00BI2-ST018-NSD-010	5	87.2	18.5	6.96	95	7.7	7.76	123.8
LBI 6-3	00BI2-ST020-NSD-010	7	87.72	19	6.29	86.6	8.06	13.7	490.8
LBI 9-2	00BI2-ST022-NSD-010	4	87.72	19	6.01	82.2	8.09	9.51	364.1
LBI 3-1	00BI2-ST024-NSD-010	4	86.71	18	5.92	80.5	7.98	9.96	298.6
LBI 3-3	00BI2-ST026-NSD-010	5	88.76	20	7.24	98.4	7.89	6.8	166.6
LPPG-2	00BI2-ST028-NSD-010	5	84.74	16	6.94	95.3	8.03	3.95	132.4
LPPG-4	00BI2-ST030-NSD-010	5	82.87	14	7.49	101.9	7.92	3.02	79.2
LBV-2	00BV2-ST002-NSD-010	7	85.71	17	6.08	81.2	7.06	7.11	26.3
LBV-4	00BV2-ST004-NSD-010	4	55.55	54	6.64	90	6.93	2.97	8.2
LBV-6	00BV2-ST006-NSD-010	4	84.74	16	6.13	83.5	7.12	8.17	34.7
UBV-2	00BV2-ST008-NSD-010	4	76.53	6	5.71	77.8	7.96	2.42	69.4
UBV-4	00BV2-ST010-NSD-010	4	73.53	2	5.97	81.3	8.34	0.166	11.0

Original Station ID	CDM Station ID	Test #	% Original Sample	Initial Salinity(‰)	D.O. (mg/L)	D.O. (% sat.)	pH	TAN * (mg/L)	UAN (mg/L)
PL-1	00LC2-ST001-NSD-010	5	83.8	15	6.59	91	7.98	2.52	75.5
PL-1	00LC2-ST001-NSD-010	7	83.8	15	6.11	84.8	8.22	2.38	121.3
PL-3	00LC2-ST003-NSD-010	5	93.17	24	6.31	86.7	7.98	2.9	86.9
MCR-1	00LC2-ST005-NSD-010	7	90.91	22	6.18	84.8	8.1	3.24	126.8
MCR-3	00LC2-ST007-NSD-010	7	86.71	18	6.16	85.3	8.02	11.4	373.6
BO-2	00LC2-ST009-NSD-010	5	89.28	20.5	6.4	87.8	7.81	5.3	108.5
BO-4	00LC2-ST011-NSD-010	5	83.8	15	6.86	93.4	7.79	3.68	72.0
ML-1	00LC2-ST013-NSD-010	7	93.17	24	6.18	86.8	8.13	5	209.1
ML-4	00LC2-ST027-NSD-010	7	93.17	24	6.17	84.9	8.08	8.89	332.9
WB-2	00SN2-ST002-NSD-010	4	81.08	12	6.17	83.8	8.1	2.24	87.7
JB-2	00SN2-ST004-NSD-010	4	79.79	10	6.01	81.8	8.07	0.677	24.8
BBC-1	00SN2-ST006-NSD-010	4	89.92	21	6.34	86.1	8.1	2.95	115.5
GB-1	00SN2-ST008-NSD-010	4	90.91	22	6.33	85.9	8.1	4.73	185.1
BC-2	00SN2-ST012-NSD-010	5	85.71	17	6.52	90	8.09	4.71	180.3
BC-4	00SN2-ST014-NSD-010	5	84.74	16	6.62	91.3	8.04	2.86	98.0
GB-5	00SN2-ST038-NSD-010	4	90.91	22	6.4	86.9	7.97	4.57	134.0
GB-5	00SN2-ST038-NSD-010	7	90.91	22	5.83	81.1	8.18	5.71	266.6
UCRA-1	00UC2-ST001-NSD-010	5	86.7	18	7.33	100.5	7.98	2.82	84.5
LC-1	00UC2-ST003-NSD-010	7	86.71	18	5.95	83.1	8.06	14.4	515.8
UCRB-1	00UC2-ST005-NSD-010	5	88.76	20	6.97	96	7.84	2.56	56.1
UCRB-1	00UC2-ST005-NSD-010	6	88.76	20	6.01	80.1	7.83	1.23	26.3
CIL-1	00UC2-ST007-NSD-010	6	87.21	18.5	6.82	84.3	7.95	3.96	111.0
CIB-1	00UC2-ST011-NSD-010	6	90.91	22	7.16	90.1	8.13	0.966	40.4
UCRC-1	00UC2-ST013-NSD-010	6	87.72	19	6.03	82.2	7.56	2.76	32.1
CBB-1	00UC2-ST015-NSD-010	6	90.91	22	6.5	88	8.08	4	149.8
CBB-3	00UC2-ST017-NSD-010	7	84.74	16	6.55	89.9	8.17	13.7	625.8
CBB-5	00UC2-ST019-NSD-010	6	86.7	18	6.09	82.4	8.12	3.75	153.4
CNE-1	00UC2-ST021-NSD-010	6	90.91	22	6.56	88.9	7.73	3.43	58.6
CNE-3	00UC2-ST023-NSD-010	6	89.82	21	6.64	89.9	7.9	2.99	74.9
CSW-2	00UC2-ST025-NSD-010	6	88.76	20	6.83	92.2	8.04	2.63	90.1
CSW-4	00UC2-ST027-NSD-010	6	90.91	22	6.7	90.5	8.05	2.31	80.9
CSW-6	00UC2-ST029-NSD-010	6	89.28	20.5	6.47	87.6	7.94	3.72	102.0
CIL-3	00UC2-ST037-NSD-010	6	78.12	8	6.51	88.4	8.21	1.27	63.3

* Measurement of Total ammonia made on test stocking day for test # 7 due to faulty probe

Original Station ID	CDM Station ID	Test #	% Original Sample	Initial Salinity(‰)	D.O. (mg/L)	D.O. (% sat.)	pH	TAN * (mg/L)	UAN (mg/L)
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nm= not measured, had not completed aeration.

Table 7. Raw data and means of redfish data at 24 h from four assays performed on Calcasieu Estuary porewater samples.

Original Station I	CDM Station ID	Conc. (%)	% Original Sample	Test #	24 hr % hatch/survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
LAR32	Control Test 4	100	93.75	4	100	90	90	90	90	92.0	4.5	100.0
LAR32	Control Test 5	100	93.75	5	80	100	90	90	80	88.0	8.4	100.0
LAR32	Control Test 6	100	93.75	6	80	90	70	80	80	80.0	7.1	100.0
LAR32	Control Test 7	100	93.75	7	100	90	90	90	70	88.0	11.0	100.0
MFS	Dilution Blank Test 4	100	100.00	4	100	100	90	90	100	96.0	5.5	104.3
MFS	Dilution Blank Test 5	100	100.00	5	100	90	100	100	80	94.0	8.9	106.8
MFS	Dilution Blank Test 6	100	100.00	6	90	100	90	100	100	96.0	5.5	120.0
MFS	Dilution Blank Test 7	100	100.00	7	100	100	70	90	100	92.0	13.0	104.5
RECON	Adjustment Blank Test 4	100	100.00	4	90	90	90	100	100	94.0	5.5	102.2
RECON	Adjustment Blank Test 5	100	100.00	5	90	100	90	100	100	96.0	5.5	109.1
RECON	Adjustment Blank Test 6	100	100.00	6	90	100*	100	100	100	98.0	4.5	122.5
RECON	Adjustment Blank Test 7	100	100.00	7	90	100*	90	100	100	96.0	5.5	109.1
UBI 1-2	00BI2-ST002-NSD-010	100	84.74	7	0	0	0	0	0	0.0	0.0	0.0
UBI 4-2	00BI2-ST004-NSD-010	100	86.70	4	0	0	0	0	0	0.0	0.0	0.0
UBI 1-1	00BI2-ST006-NSD-010	100	84.74	5	0	0	0	0	0	0.0	0.0	0.0
MBI 3-1	00BI2-ST008-NSD-010	100	86.71	7	0	0	0	0	0	0.0	0.0	0.0
MBI 3-3	00BI2-ST010-NSD-010	100	86.71	7	0	0	0	0	0	0.0	0.0	0.0
LBI 1-2	00BI2-ST012-NSD-010	100	88.76	5	0	0	0	0	0	0.0	0.0	0.0
LBI 1-4	00BI2-ST014-NSD-010	100	89.28	5	0	0	0	0	0	0.0	0.0	0.0
LBI 3-2	00BI2-ST016-NSD-010	100	90.63	4	0	0	0	0	0	0.0	0.0	0.0
LBI 6-1	00BI2-ST018-NSD-010	100	87.20	5	0	0	0	0	0	0.0	0.0	0.0
LBI 6-3	00BI2-ST020-NSD-010	100	87.72	7	0	0	0	0	0	0.0	0.0	0.0
LBI 9-2	00BI2-ST022-NSD-010	100	87.72	4	0	0	0	0	0	0.0	0.0	0.0
LBI 3-1	00BI2-ST024-NSD-010	100	86.71	4	0	0	0	0	0	0.0	0.0	0.0
LBI 3-3	00BI2-ST026-NSD-010	100	88.76	5	0	0	0	0	0	0.0	0.0	0.0
LPPG-2	00BI2-ST028-NSD-010	100	84.74	5	100	90	50	90	80	82.0	19.2	93.2
LPPG-4	00BI2-ST030-NSD-010	100	82.87	5	60	40	80	70	60	62.0	14.8	70.5
LBV-2	00BV2-ST002-NSD-010	100	85.71	7	0	0	0	0	0	0.0	0.0	0.0
LBV-4	00BV2-ST004-NSD-010	100	55.55	4	0	0	0	0	0	0.0	0.0	0.0
LBV-6	00BV2-ST006-NSD-010	100	84.74	4	0	0	0	0	0	0.0	0.0	0.0
UBV-2	00BV2-ST008-NSD-010	100	76.53	4	10	30	40	40	0	24.0	18.2	26.1
UBV-4	00BV2-ST010-NSD-010	100	73.53	4	100	90	100	80	80	90.0	10.0	97.8
PL-1	00LC2-ST001-NSD-010	100	83.80	5	0	0	0	0	0	0.0	0.0	0.0

Original Station I	CDM Station ID	Conc. (%)	% Original Sample	Test #	24 hr % hatch/survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
PL-3	00LC2-ST003-NSD-010	100	93.17	5	0	0	0	0	0	0.0	0.0	0.0
MCR-1	00LC2-ST005-NSD-010	100	90.91	7	0	0	0	0	0	0.0	0.0	0.0
MCR-3	00LC2-ST007-NSD-010	100	86.71	7	0	0	0	0	0	0.0	0.0	0.0
BO-2	00LC2-ST009-NSD-010	100	89.28	5	0	0	0	0	0	0.0	0.0	0.0
BO-4	00LC2-ST011-NSD-010	100	83.80	5	10	50	0	0	0	12.0	21.7	13.6
ML-1	00LC2-ST013-NSD-010	100	93.17	7	0	0	0	0	0	0.0	0.0	0.0
ML-4	00LC2-ST027-NSD-010	100	93.17	7	0	0	0	0	0	0.0	0.0	0.0
WB-2	00SN2-ST002-NSD-010	100	81.08	4	0	0	0	0	0	0.0	0.0	0.0
JB-2	00SN2-ST004-NSD-010	100	79.79	4	0	0	0	0	0	0.0	0.0	0.0
BBC-1	00SN2-ST006-NSD-010	100	89.82	4	50	0	10	10	0	14.0	20.7	15.2
GB-1	00SN2-ST008-NSD-010	100	90.91	4	0	0	0	0	0	0.0	0.0	0.0
BC-2	00SN2-ST012-NSD-010	100	85.71	5	0	0	0	0	0	0.0	0.0	0.0
BC-4	00SN2-ST014-NSD-010	100	84.74	5	0	0	0	0	0	0.0	0.0	0.0
GB-5	00SN2-ST038-NSD-010	100	90.91	4	0	0	0	0	0	0.0	0.0	0.0
UCRA-1	00UC2-ST001-NSD-010	100	86.70	5	0	0	0	40	0	8.0	17.9	9.1
LC-1	00UC2-ST003-NSD-010	100	86.71	7	0	0	0	0	0	0.0	0.0	0.0
UCRB-1	00UC2-ST005-NSD-010	100	88.76	5	0	0	0	0	0	0.0	0.0	0.0
CIL-1	00UC2-ST007-NSD-010	100	87.21	6	0	0	0	0	0	0.0	0.0	0.0
CIB-1	00UC2-ST011-NSD-010	100	90.91	6	0	0	0	0	0	0.0	0.0	0.0
UCRC-1	00UC2-ST013-NSD-010	100	87.72	6	0	0	0	0	0	0.0	0.0	0.0
CBB-1	00UC2-ST015-NSD-010	100	90.91	6	0	0	0	0	0	0.0	0.0	0.0
CBB-3	00UC2-ST017-NSD-010	100	84.74	7	0	0	0	0	0	0.0	0.0	0.0
CBB-5	00UC2-ST019-NSD-010	100	86.70	6	10	0	0	0	90	20.0	39.4	25.0
CNE-1	00UC2-ST021-NSD-010	100	90.91	6	0	0	0	0	10	2.0	4.5	2.5
CNE-3	00UC2-ST023-NSD-010	100	89.82	6	0	0	0	0	0	0.0	0.0	0.0
CSW-2	00UC2-ST025-NSD-010	100	88.76	6	0	10	0	0	0	2.0	4.5	2.5
CSW-4	00UC2-ST027-NSD-010	100	90.91	6	0	0	0	0	0	0.0	0.0	0.0
CSW-6	00UC2-ST029-NSD-010	100	89.28	6	90	10	70	40	100	62.0	37.0	77.5
CIL-3	00UC2-ST037-NSD-010	100	78.12	6	90	90	50	70	80	76.0	16.7	95.0
LAR32	Control Test 4	50	46.88	4	100	100	80	100	90	94.0	8.9	100.0
LAR32	Control Test 5	50	46.88	5	80	100*	80	90	70	84.0	11.4	100.0
LAR32	Control Test 6	50	46.88	6	90	100	90	100	80	92.0	8.4	100.0
LAR32	Control Test 7	50	46.88	7	90	90	80	100	100	92.0	8.4	100.0
UBI 1-2	00BI2-ST002-NSD-010	50	42.37	7	0	0	0	0	0	0.0	0.0	0.0

Original Station I	CDM Station ID	Conc. (%)	% Original Sample	Test #	24 hr % hatch/survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
UBI 4-2	00BI2-ST004-NSD-010	50	43.35	4	0	0	0	0	0	0.0	0.0	0.0
UBI 1-1	00BI2-ST006-NSD-010	50	42.37	7	0	0	0	0	0	0.0	0.0	0.0
MBI 3-1	00BI2-ST008-NSD-010	50	43.36	7	0	0	0	0	0	0.0	0.0	0.0
MBI 3-3	00BI2-ST010-NSD-010	50	43.36	7	0	0	0	0	0	0.0	0.0	0.0
LBI 1-2	00BI2-ST012-NSD-010	50	44.38	5	90	80	100	100	80	90.0	10.0	107.1
LBI 1-4	00BI2-ST014-NSD-010	50	44.64	5	100	60	100	100	90	90.0	17.3	107.1
LBI 3-2	00BI2-ST016-NSD-010	50	45.32	4	90	100	90	90	90	92.0	4.5	97.9
LBI 6-1	00BI2-ST018-NSD-010	50	43.60	5	100	70	90	90	70	84.0	13.4	100.0
LBI 6-3	00BI2-ST020-NSD-010	50	43.86	7	0	0	0	0	0	0.0	0.0	0.0
LBI 9-2	00BI2-ST022-NSD-010	50	43.86	4	0	0	0	0	0	0.0	0.0	0.0
LBI 3-1	00BI2-ST024-NSD-010	50	43.36	4	70	80	30	90	60	66.0	23.0	70.2
LBI 3-3	00BI2-ST026-NSD-010	50	44.38	5	10	70	0	80	10	34.0	37.8	40.5
LPPG-2	00BI2-ST028-NSD-010	50	42.37	5	100	100	100	90	90	96.0	5.5	114.3
LPPG-4	00BI2-ST030-NSD-010	50	41.44	5	90	100*	90	90	90	92.0	4.5	109.5
LBV-2	00BV2-ST002-NSD-010	50	42.86	7	80	90	90	80	60	80.0	12.2	87.0
LBV-4	00BV2-ST004-NSD-010	50	27.78	4	100	10	90	90	0	58.0	48.7	61.7
LBV-6	00BV2-ST006-NSD-010	50	42.37	4	0	50	30	50	50	36.0	21.9	38.3
UBV-2	00BV2-ST008-NSD-010	50	38.27	4	30	90	90	95*	70	75.0	26.9	79.8
UBV-4	00BV2-ST010-NSD-010	50	36.77	4	90	100	100	100	90	96.0	5.5	102.1
PL-1	00LC2-ST001-NSD-010	50	41.90	7	0	0	0	0	0	0.0	0.0	0.0
PL-3	00LC2-ST003-NSD-010	50	46.59	5	50	40	20	30	30	34.0	11.4	40.5
MCR-1	00LC2-ST005-NSD-010	50	45.46	7	10	30	50	80	50	44.0	26.1	47.8
MCR-3	00LC2-ST007-NSD-010	50	43.36	7	40	50	70	40	60	52.0	13.0	56.5
BO-2	00LC2-ST009-NSD-010	50	44.64	5	40	40	70	30	60	48.0	16.4	57.1
BO-4	00LC2-ST011-NSD-010	50	41.90	5	70	90	100	50	90	80.0	20.0	95.2
ML-1	00LC2-ST013-NSD-010	50	46.58	7	0	0	0	0	0	0.0	0.0	0.0
ML-4	00LC2-ST027-NSD-010	50	46.58	7	0	0	0	0	0	0.0	0.0	0.0
WB-2	00SN2-ST002-NSD-010	50	40.54	4	50	100	50	90	80	74.0	23.0	78.7
JB-2	00SN2-ST004-NSD-010	50	39.90	4	60	0	0	0	0	12.0	26.8	12.8
BBC-1	00SN2-ST006-NSD-010	50	44.91	4	0	0	90	0	70	32.0	44.4	34.0
GB-1	00SN2-ST008-NSD-010	50	45.46	4	0	0	0	0	0	0.0	0.0	0.0
BC-2	00SN2-ST012-NSD-010	50	42.86	5	0	0	0	0	0	0.0	0.0	0.0
BC-4	00SN2-ST014-NSD-010	50	42.37	5	100	0	0	0	0	20.0	44.7	23.8
GB-5	00SN2-ST038-NSD-010	50	45.46	7	0	0	0	0	0	0.0	0.0	0.0
UCRA-1	00UC2-ST001-NSD-010	50	43.35	5	0	0	0	90	20	22.0	39.0	26.2

Original Station I	CDM Station ID	Conc. (%)	% Original Sample	Test #	24 hr % hatch/survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
LC-1	00UC2-ST003-NSD-010	50	43.36	7	40	70	30	20	40	40.0	18.7	43.5
UCRB-1	00UC2-ST005-NSD-010	50	44.38	6	0	100	50	0	90	48.0	47.6	52.2
CIL-1	00UC2-ST007-NSD-010	50	43.61	6	0	0	0	0	0	0.0	0.0	0.0
CIB-1	00UC2-ST011-NSD-010	50	45.46	6	80	40	90	30	100	68.0	31.1	73.9
UCRC-1	00UC2-ST013-NSD-010	50	43.86	6	60	90	80	100	80	82.0	14.8	89.1
CBB-1	00UC2-ST015-NSD-010	50	45.46	6	0	10	0	10	30	10.0	12.2	10.9
CBB-3	00UC2-ST017-NSD-010	50	42.37	7	0	0	0	0	0	0.0	0.0	0.0
CBB-5	00UC2-ST019-NSD-010	50	43.35	6	90	90	70	70	90	82.0	11.0	89.1
CNE-1	00UC2-ST021-NSD-010	50	45.46	6	70	70	60	10	90	60.0	30.0	65.2
CNE-3	00UC2-ST023-NSD-010	50	44.91	6	0	0	0	10	0	2.0	4.5	2.2
CSW-2	00UC2-ST025-NSD-010	50	44.38	6	90	90	80	80	100	88.0	8.4	95.7
CSW-4	00UC2-ST027-NSD-010	50	45.46	6	70	80	0	0	0	30.0	41.2	32.6
CSW-6	00UC2-ST029-NSD-010	50	44.64	6	90	80	70	90	90	84.0	8.9	91.3
CIL-3	00UC2-ST037-NSD-010	50	39.06	6	100	90	80	90	90	90.0	7.1	97.8
LAR32	Control Test 4	25	23.44	4	90	100	90	90	90	92.0	4.5	100.0
LAR32	Control Test 5	25	23.44	5	80	100	90	90	90	90.0	7.1	100.0
LAR32	Control Test 6	25	23.44	6	80	90	90	90	80	86.0	5.5	100.0
LAR32	Control Test 7	25	23.44	7	90	90	70	80	90	84.0	8.9	100.0
UBI 1-2	00BI2-ST002-NSD-010	25	21.18	7	0	10	0	30	10	10.0	12.2	11.9
UBI 4-2	00BI2-ST004-NSD-010	25	21.68	4	10	10	60	30	30	28.0	20.5	30.4
UBI 1-1	00BI2-ST006-NSD-010	25	21.18	7	90	70	50	90	60	72.0	17.9	80.0
MBI 3-1	00BI2-ST008-NSD-010	25	21.68	7	80	90	80	90	60	80.0	12.2	95.2
MBI 3-3	00BI2-ST010-NSD-010	25	21.68	7	50	50	90	60	80	66.0	18.2	78.6
LBI 1-2	00BI2-ST012-NSD-010	25	22.19	5	90	80	100	100	70	88.0	13.0	97.8
LBI 1-4	00BI2-ST014-NSD-010	25	22.32	5	100	100	80	90	60	86.0	16.7	95.6
LBI 3-2	00BI2-ST016-NSD-010	25	22.66	4	90	90	90	90	90	90.0	0.0	97.8
LBI 6-1	00BI2-ST018-NSD-010	25	21.80	5	90	80	70	90	70	80.0	10.0	88.9
LBI 6-3	00BI2-ST020-NSD-010	25	21.93	7	80	90	80	80	90	84.0	5.5	100.0
LBI 9-2	00BI2-ST022-NSD-010	25	21.93	4	90	80	60	90	90	82.0	13.0	89.1
LBI 3-1	00BI2-ST024-NSD-010	25	21.68	4	60	90	50	70	80	70.0	15.8	76.1
LBI 3-3	00BI2-ST026-NSD-010	25	22.19	5	100	80	100	90	90	92.0	8.4	102.2
LPPG-2	00BI2-ST028-NSD-010	25	21.19	5	90	90	100	80	90	90.0	7.1	100.0
LPPG-4	00BI2-ST030-NSD-010	25	20.72	5	80	80	90	90	90	86.0	5.5	95.6
LBV-2	00BV2-ST002-NSD-010	25	21.43	7	50	90	90	100	90	84.0	19.5	100.0

Original Station I	CDM Station ID	Conc. (%)	% Original Sample	Test #	24 hr % hatch/survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
LAR32	Control Test 4	12.5	11.72	4	90	90	100	90	100	94.0	5.5	100.0
LAR32	Control Test 6	12.5	11.72	6	80	90	90	100	90	90.0	7.1	100.0
LAR32	Control Test 7	12.5	11.72	7	90	80	80	90	90	86.0	5.5	100.0
UBI 1-2	00BI2-ST002-NSD-010	12.5	10.59	7	90	80	90	90	80	86.0	5.5	100.0
UBI 4-2	00BI2-ST004-NSD-010	12.5	10.84	4	80	80	80	100	90	86.0	8.9	91.5
UBI 1-1	00BI2-ST006-NSD-010	12.5	10.59	7	80	90	90	80	60	80.0	12.2	88.9
MBI 3-1	00BI2-ST008-NSD-010	12.5	10.84	7	90	90	90	80	90	88.0	4.5	102.3
MBI 3-3	00BI2-ST010-NSD-010	12.5	10.84	7	80	90	90	70	90	84.0	8.9	97.7
LBI 3-2	00BI2-ST016-NSD-010	12.5	11.33	4	90	100	90	70	100	90.0	12.2	95.7
LBI 6-3	00BI2-ST020-NSD-010	12.5	10.96	7	90	80	90	80	90	86.0	5.5	100.0
LBI 9-2	00BI2-ST022-NSD-010	12.5	10.97	4	90	40	80	90	90	78.0	21.7	83.0
LBI 3-1	00BI2-ST024-NSD-010	12.5	10.84	4	90	100	100*	70	100	92.0	13.0	97.9
LBV-2	00BV2-ST002-NSD-010	12.5	10.71	7	40	100	100	100	90	86.0	26.1	100.0
PL-1	00LC2-ST001-NSD-010	12.5	10.48	7	90	50	90	90	100	84.0	19.5	97.7
MCR-3	00LC2-ST007-NSD-010	12.5	10.84	7	90	80	80	70	90	82.0	8.4	95.3
ML-1	00LC2-ST013-NSD-010	12.5	11.65	7	80	90	90	70	80	82.0	8.4	95.3
ML-4	00LC2-ST027-NSD-010	12.5	11.65	7	100*	70	90	80	80	84.0	11.4	97.7
GB-5	00SN2-ST038-NSD-010	12.5	11.35	7	60	90	90	70	80	78.0	13.0	90.7
LC-1	00UC2-ST003-NSD-010	12.5	10.84	7	70	90	70	90	70	78.0	11.0	90.7
UCRB-1	00UC2-ST005-NSD-010	12.5	11.10	6	90	100	90	70	90	88.0	11.0	97.8
CIL-1	00UC2-ST007-NSD-010	12.5	10.90	6	80	90	100	90	80	88.0	8.4	97.8
CIB-1	00UC2-ST011-NSD-010	12.5	11.36	6	70	90	80	100	90	86.0	11.4	95.6
UCRC-1	00UC2-ST013-NSD-010	12.5	10.97	6	90	100	100	90	100	96.0	5.5	106.7
CBB-1	00UC2-ST015-NSD-010	12.5	11.36	6	80	90	90	40	90	78.0	21.7	86.7
CBB-3	00UC2-ST017-NSD-010	12.5	10.59	7	80	90	100	80	90	88.0	8.4	102.3
CBB-5	00UC2-ST019-NSD-010	12.5	10.84	6	100	100	100	90	90	96.0	5.5	106.7
CNE-1	00UC2-ST021-NSD-010	12.5	11.36	6	90	100	90	100	90	94.0	5.5	104.4
CNE-3	00UC2-ST023-NSD-010	12.5	11.23	6	60	90	50	70	90	72.0	17.9	80.0
CSW-2	00UC2-ST025-NSD-010	12.5	11.10	6	90	90	100	100	90	94.0	5.5	104.4
CSW-4	00UC2-ST027-NSD-010	12.5	11.36	6	80	100	90	90	100*	92.0	8.4	102.2
CSW-6	00UC2-ST029-NSD-010	12.5	11.16	6	90	100	70	90	100	90.0	12.2	100.0
CIL-3	00UC2-ST037-NSD-010	12.5	9.77	6	90	100	80	100	90	92.0	8.4	102.2
LAR32	Control Test 7	6.25	5.86	7	90	80	90	90	90	88.0	4.5	100.0
UBI 1-2	00BI2-ST002-NSD-010	6.25	5.30	7	90	70	100	80	90	86.0	11.4	97.7

Original Station I	CDM Station ID	Conc. (%)	% Original Sample	Test #	24 hr % hatch/survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
UBI 1-1	00BI2-ST006-NSD-010	6.25	5.30	7	70	100	50	100	80	80.0	21.2	88.9
MBI 3-1	00BI2-ST008-NSD-010	6.25	5.42	7	80	100	80	80	100	88.0	11.0	100.0
MBI 3-3	00BI2-ST010-NSD-010	6.25	5.42	7	90	80	90	70	100	86.0	11.4	97.7
LBI 6-3	00BI2-ST020-NSD-010	6.25	5.48	7	90	100	90	80	90	90.0	7.1	102.3
PL-1	00LC2-ST001-NSD-010	6.25	5.24	7	100*	70	100	100	80	90.0	14.1	102.3
ML-4	00LC2-ST027-NSD-010	6.25	5.83	7	100	100	90	90	90	94.0	5.5	106.8
GB-5	00SN2-ST038-NSD-010	6.25	5.68	7	90	70	60	40	100	72.0	23.9	81.8
CBB-3	00UC2-ST017-NSD-010	6.25	5.30	7	90	90	80	90	90	88.0	4.5	100.0
		Concentration										
SDS	Reference Toxicant Test 4	0	20 mg/L	4	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 5	0	20 mg/L	5	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 6	0	20 mg/L	6	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 7	0	20 mg/L	7	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 4	0	10 mg/L	4	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 5	0	10 mg/L	5	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 6	0	10 mg/L	6	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 7	0	10 mg/L	7	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 4	0	5 mg/L	4	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 5	0	5 mg/L	5	60	90	0	0	100	50.0	48.0	56.8
SDS	Reference Toxicant Test 6	0	5 mg/L	6	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 7	0	5 mg/L	7	90	100	100	100	90	96.0	5.5	109.1
SDS	Reference Toxicant Test 4	0	2.5 mg/L	4	100	70	100	100	100	94.0	13.4	102.2
SDS	Reference Toxicant Test 5	0	2.5 mg/L	5	100	100	100	90	100	98.0	4.5	111.4
SDS	Reference Toxicant Test 6	0	2.5 mg/L	6	100	100	100	90	90	96.0	5.5	120.0
SDS	Reference Toxicant Test 7	0	2.5 mg/L	7	100	100	100	100	100	100.0	0.0	113.6
SDS	Reference Toxicant Test 4	0	1.25 mg/L	4	90	100	100	100	100	98.0	4.5	106.5
SDS	Reference Toxicant Test 5	0	1.25 mg/L	5	90	100	100	100	100	98.0	4.5	111.4
SDS	Reference Toxicant Test 6	0	1.25 mg/L	6	100	90	90	100	100	96.0	5.5	120.0
SDS	Reference Toxicant Test 7	0	1.25 mg/L	7	100	100	100	100	100	100.0	0.0	113.6

* Survival adjusted for overstocked replicate

Table 8. Raw data and means of redfish data at 48 h from four assays performed on Calcasieu Estuary porewater samples.

Original Station	CDM Station ID	Conc. (%)	% Original Sample	Test #	48 hr % survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
LAR32	Control Test 4	100	93.75	4	90	90	80	90	90	88.0	4.5	100.0
LAR32	Control Test 5	100	93.75	5	70	100	90	90	80	86.0	11.4	100.0
LAR32	Control Test 6	100	93.75	6	80	90	50	80	80	76.0	15.2	100.0
LAR32	Control Test 7	100	93.75	7	80	80	90	90	20	72.0	29.5	100.0
MFS	Dilution Blank Test 4	100	100.00	4	90	100	100	90	100	96.0	5.5	109.1
MFS	Dilution Blank Test 5	100	100.00	5	70	90	100	100	40	80.0	25.5	93.0
MFS	Dilution Blank Test 6	100	100.00	6	80	90	80	100	60	82.0	14.8	107.9
MFS	Dilution Blank Test 7	100	100.00	7	20	80	70	80	80	66.0	26.1	91.7
RECON	Adjustment Blank Test 4	100	100.00	4	90	90	90	90	100	92.0	4.5	104.5
RECON	Adjustment Blank Test 5	100	100.00	5	70	80	70	60	90	74.0	11.4	86.0
RECON	Adjustment Blank Test 6	100	100.00	6	90	100*	80	100	90	92.0	8.4	121.1
RECON	Adjustment Blank Test 7	100	100.00	7	90	91*	90	100	90	92.2	4.4	128.1
UBI1-2	00BI2-ST002-NSD-010	100	84.74	7	0	0	0	0	0	0.0	0.0	0.0
UBI 4-2	00BI2-ST004-NSD-010	100	86.70	4	0	0	0	0	0	0.0	0.0	0.0
UBI 1-1	00BI2-ST006-NSD-010	100	84.74	5	0	0	0	0	0	0.0	0.0	0.0
MBI3-1	00BI2-ST008-NSD-010	100	86.71	7	0	0	0	0	0	0.0	0.0	0.0
MBI3-3	00BI2-ST010-NSD-010	100	86.71	7	0	0	0	0	0	0.0	0.0	0.0
LBI 1-2	00BI2-ST012-NSD-010	100	88.76	5	0	0	0	0	0	0.0	0.0	0.0
LBI 1-4	00BI2-ST014-NSD-010	100	89.28	5	0	0	0	0	0	0.0	0.0	0.0
LBI 3-2	00BI2-ST016-NSD-010	100	90.63	4	0	0	0	0	0	0.0	0.0	0.0
LBI 6-1	00BI2-ST018-NSD-010	100	87.20	5	0	0	0	0	0	0.0	0.0	0.0
LBI6-3	00BI2-ST020-NSD-010	100	87.72	7	0	0	0	0	0	0.0	0.0	0.0
LBI 9-2	00BI2-ST022-NSD-010	100	87.72	4	0	0	0	0	0	0.0	0.0	0.0
LBI 3-1	00BI2-ST024-NSD-010	100	86.71	4	0	0	0	0	0	0.0	0.0	0.0
LBI 3-3	00BI2-ST026-NSD-010	100	88.76	5	0	0	0	0	0	0.0	0.0	0.0
LPPG-2	00BI2-ST028-NSD-010	100	84.74	5	70	70	50	60	40	58.0	13.0	67.4
LPPG-4	00BI2-ST030-NSD-010	100	82.87	5	30	0	30	50	0	22.0	21.7	25.6
LBV-2	00BV2-ST002-NSD-010	100	85.71	7	0	0	0	0	0	0.0	0.0	0.0
LBV-4	00BV2-ST004-NSD-010	100	55.55	4	0	0	0	0	0	0.0	0.0	0.0
LBV-6	00BV2-ST006-NSD-010	100	84.74	4	0	0	0	0	0	0.0	0.0	0.0
UBV-2	00BV2-ST008-NSD-010	100	76.53	4	0	0	0	0	0	0.0	0.0	0.0
UBV-4	00BV2-ST010-NSD-010	100	73.53	4	100	90	100	80	70	88.0	13.0	100.0
PL-1	00LC2-ST001-NSD-010	100	83.80	5	0	0	0	0	0	0.0	0.0	0.0

Original Station	CDM Station ID	Conc. (%)	% Original Sample	Test #	48 hr % survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
PL-3	00LC2-ST003-NSD-010	100	93.17	5	0	0	0	0	0	0.0	0.0	0.0
MCR-1	00LC2-ST005-NSD-010	100	90.91	7	0	0	0	0	0	0.0	0.0	0.0
MCR-3	00LC2-ST007-NSD-010	100	86.71	7	0	0	0	0	0	0.0	0.0	0.0
BO-2	00LC2-ST009-NSD-010	100	89.28	5	0	0	0	0	0	0.0	0.0	0.0
BO-4	00LC2-ST011-NSD-010	100	83.80	5	0	0	0	0	0	0.0	0.0	0.0
ML-1	00LC2-ST013-NSD-010	100	93.17	7	0	0	0	0	0	0.0	0.0	0.0
ML-4	00LC2-ST027-NSD-010	100	93.17	7	0	0	0	0	0	0.0	0.0	0.0
WB-2	00SN2-ST002-NSD-010	100	81.08	4	0	0	0	0	0	0.0	0.0	0.0
JB-2	00SN2-ST004-NSD-010	100	79.79	4	0	0	0	0	0	0.0	0.0	0.0
BBC-1	00SN2-ST006-NSD-010	100	89.82	4	0	0	10	0	0	2.0	4.5	2.3
GB-1	00SN2-ST008-NSD-010	100	90.91	4	0	0	0	0	0	0.0	0.0	0.0
BC-2	00SN2-ST012-NSD-010	100	85.71	5	0	0	0	0	0	0.0	0.0	0.0
BC-4	00SN2-ST014-NSD-010	100	84.74	5	0	0	0	0	0	0.0	0.0	0.0
GB-5	00SN2-ST038-NSD-010	100	90.91	4	0	0	0	0	0	0.0	0.0	0.0
UCRA-1	00UC2-ST001-NSD-010	100	86.70	5	0	0	0	0	0	0.0	0.0	0.0
LC-1	00UC2-ST003-NSD-010	100	86.71	7	0	0	0	0	0	0.0	0.0	0.0
UCRB-1	00UC2-ST005-NSD-010	100	88.76	5	0	0	0	0	0	0.0	0.0	0.0
CIL-1	00UC2-ST007-NSD-010	100	87.21	6	0	0	0	0	0	0.0	0.0	0.0
CIB-1	00UC2-ST011-NSD-010	100	90.91	6	0	0	0	0	0	0.0	0.0	0.0
UCRC-1	00UC2-ST013-NSD-010	100	87.72	6	0	0	0	0	0	0.0	0.0	0.0
CBB-1	00UC2-ST015-NSD-010	100	90.91	6	0	0	0	0	0	0.0	0.0	0.0
CBB-3	00UC2-ST017-NSD-010	100	84.74	7	0	0	0	0	0	0.0	0.0	0.0
CBB-5	00UC2-ST019-NSD-010	100	86.70	6	0	0	0	0	0	0.0	0.0	0.0
CNE-1	00UC2-ST021-NSD-010	100	96.97	6	0	0	0	0	0	0.0	0.0	0.0
CNE-3	00UC2-ST023-NSD-010	100	89.82	6	0	0	0	0	0	0.0	0.0	0.0
CSW-2	00UC2-ST025-NSD-010	100	88.76	6	0	0	0	0	0	0.0	0.0	0.0
CSW-4	00UC2-ST027-NSD-010	100	90.91	6	0	0	0	0	0	0.0	0.0	0.0
CSW-6	00UC2-ST029-NSD-010	100	89.28	6	0	0	0	0	0	0.0	0.0	0.0
CIL-3	00UC2-ST037-NSD-010	100	78.12	6	20	60	10	30	60	36.0	23.0	47.4
LAR32	Control Test 4	50	46.88	4	90	90	90	100	90	92.0	4.5	100.0
LAR32	Control Test 5	50	46.88	5	80	100*	80	80	70	82.0	11.0	100.0
LAR32	Control Test 6	50	46.88	6	90	100	90	100	80	92.0	8.4	100.0
LAR32	Control Test 7	50	46.88	7	0	80	80	100	80	68.0	39.0	100.0
UBI1-2	00BI2-ST002-NSD-010	50	42.37	7	0	0	0	0	0	0.0	0.0	0.0

Original Station	CDM Station ID	Conc. (%)	% Original Sample	Test #	48 hr % survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
UBI 4-2	00BI2-ST004-NSD-010	50	43.35	4	0	0	0	0	0	0.0	0.0	0.0
UBI1-1	00BI2-ST006-NSD-010	50	42.37	7	0	0	0	0	0	0.0	0.0	0.0
MBI3-1	00BI2-ST008-NSD-010	50	43.36	7	0	0	0	0	0	0.0	0.0	0.0
MBI3-3	00BI2-ST010-NSD-010	50	43.36	7	0	0	0	0	0	0.0	0.0	0.0
LBI 1-2	00BI2-ST012-NSD-010	50	44.38	5	70	20	80	70	70	62.0	23.9	75.6
LBI 1-4	00BI2-ST014-NSD-010	50	44.64	5	10	40	30	60	50	38.0	19.2	46.3
LBI 3-2	00BI2-ST016-NSD-010	50	45.32	4	0	0	0	10	30	8.0	13.0	8.7
LBI 6-1	00BI2-ST018-NSD-010	50	43.60	5	50	50	70	20	30	44.0	19.5	53.7
LBI6-3	00BI2-ST020-NSD-010	50	43.86	7	0	0	0	0	0	0.0	0.0	0.0
LBI 9-2	00BI2-ST022-NSD-010	50	43.86	4	0	0	0	0	0	0.0	0.0	0.0
LBI 3-1	00BI2-ST024-NSD-010	50	43.36	4	0	0	0	0	0	0.0	0.0	0.0
LBI 3-3	00BI2-ST026-NSD-010	50	44.38	5	0	10	0	60	0	14.0	26.1	17.1
LPPG-2	00BI2-ST028-NSD-010	50	42.37	5	100	70	100	70	80	84.0	15.2	102.4
LPPG-4	00BI2-ST030-NSD-010	50	41.44	5	90	91*	90	80	70	84.2	9.1	102.7
LBV-2	00BV2-ST002-NSD-010	50	42.86	7	40	50	60	20	50	44.0	15.2	64.7
LBV-4	00BV2-ST004-NSD-010	50	27.78	4	40	0	50	50	0	28.0	25.9	30.4
LBV-6	00BV2-ST006-NSD-010	50	42.37	4	0	30	20	10	40	20.0	15.8	21.7
UBV-2	00BV2-ST008-NSD-010	50	38.27	4	30	90	90	70*	50	66.0	26.1	71.7
UBV-4	00BV2-ST010-NSD-010	50	36.77	4	90	100	100	100	90	96.0	5.5	104.3
PL-1	00LC2-ST001-NSD-010	50	41.90	7	0	0	0	0	0	0.0	0.0	0.0
PL-3	00LC2-ST003-NSD-010	50	46.59	5	10	10	0	0	0	4.0	5.5	4.9
MCR-1	00LC2-ST005-NSD-010	50	45.46	7	0	0	0	0	0	0.0	0.0	0.0
MCR-3	00LC2-ST007-NSD-010	50	43.36	7	0	0	0	0	0	0.0	0.0	0.0
BO-2	00LC2-ST009-NSD-010	50	44.64	5	10	0	0	0	10	4.0	5.5	4.9
BO-4	00LC2-ST011-NSD-010	50	41.90	5	50	80	70	40	70	62.0	16.4	75.6
ML-1	00LC2-ST013-NSD-010	50	46.58	7	0	0	0	0	0	0.0	0.0	0.0
ML-4	00LC2-ST027-NSD-010	50	46.58	7	0	0	0	0	0	0.0	0.0	0.0
WB-2	00SN2-ST002-NSD-010	50	40.54	4	50	30	20	90	70	52.0	28.6	56.5
JB-2	00SN2-ST004-NSD-010	50	39.90	4	30	0	0	0	0	6.0	13.4	6.5
BBC-1	00SN2-ST006-NSD-010	50	44.91	4	0	0	90	0	0	18.0	40.2	19.6
GB-1	00SN2-ST008-NSD-010	50	45.46	4	0	0	0	0	0	0.0	0.0	0.0
BC-2	00SN2-ST012-NSD-010	50	42.86	5	0	0	0	0	0	0.0	0.0	0.0
BC-4	00SN2-ST014-NSD-010	50	42.37	5	60	0	0	0	0	12.0	26.8	14.6
GB-5	00SN2-ST038-NSD-010	50	45.46	7	0	0	0	0	0	0.0	0.0	0.0
UCRA-1	00UC2-ST001-NSD-010	50	43.35	5	0	0	0	30	0	6.0	13.4	7.3

Original Station	CDM Station ID	Conc. (%)	% Original Sample	Test #	48 hr % survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
LC-1	00UC2-ST003-NSD-010	50	43.36	7	0	0	0	0	0	0.0	0.0	0.0
UCRB-1	00UC2-ST005-NSD-010	50	44.38	6	0	0	0	0	10	2.0	4.5	2.2
CIL-1	00UC2-ST007-NSD-010	50	43.61	6	0	0	0	0	0	0.0	0.0	0.0
CIB-1	00UC2-ST011-NSD-010	50	45.46	6	0	10	10	0	30	10.0	12.2	10.9
UCRC-1	00UC2-ST013-NSD-010	50	43.86	6	10	30	60	30	50	36.0	19.5	39.1
CBB-1	00UC2-ST015-NSD-010	50	45.46	6	0	0	0	0	0	0.0	0.0	0.0
CBB-3	00UC2-ST017-NSD-010	50	42.37	7	0	0	0	0	0	0.0	0.0	0.0
CBB-5	00UC2-ST019-NSD-010	50	43.35	6	50	20	60	20	0	30.0	24.5	32.6
CNE-1	00UC2-ST021-NSD-010	50	48.49	6	0	0	0	0	10	2.0	4.5	2.2
CNE-3	00UC2-ST023-NSD-010	50	44.91	6	0	0	0	0	0	0.0	0.0	0.0
CSW-2	00UC2-ST025-NSD-010	50	44.38	6	40	90	20	80	70	60.0	29.2	65.2
CSW-4	00UC2-ST027-NSD-010	50	45.46	6	40	10	0	0	0	10.0	17.3	10.9
CSW-6	00UC2-ST029-NSD-010	50	44.64	6	90	60	60	50	20	56.0	25.1	60.9
CIL-3	00UC2-ST037-NSD-010	50	39.06	6	70	60	80	90	0	60.0	35.4	65.2
LAR32	Control Test 4	25	23.44	4	90	100	90	90	80	90.0	7.1	100.0
LAR32	Control Test 5	25	23.44	5	80	90	90	80	80	84.0	5.5	100.0
LAR32	Control Test 6	25	23.44	6	80	80	90	90	60	80.0	12.2	100.0
LAR32	Control Test 7	25	23.44	7	30	90	70	90	90	74.0	26.1	100.0
UBI1-2	00BI2-ST002-NSD-010	25	21.18	7	0	0	0	0	0	0.0	0.0	0.0
UBI 4-2	00BI2-ST004-NSD-010	25	21.68	4	0	0	30	0	10	8.0	13.0	8.9
UBI1-1	00BI2-ST006-NSD-010	25	21.18	7	60	50	30	80	50	54.0	18.2	73.0
MBI3-1	00BI2-ST008-NSD-010	25	21.68	7	40	70	40	50	10	42.0	21.7	56.8
MBI3-3	00BI2-ST010-NSD-010	25	21.68	7	10	0	0	0	0	2.0	4.5	2.7
LBI 1-2	00BI2-ST012-NSD-010	25	22.19	5	90	70	80	70	70	76.0	8.9	90.5
LBI 1-4	00BI2-ST014-NSD-010	25	22.32	5	30	60	50	50	50	48.0	11.0	57.1
LBI 3-2	00BI2-ST016-NSD-010	25	22.66	4	90	90	90	80	90	88.0	4.5	97.8
LBI 6-1	00BI2-ST018-NSD-010	25	21.80	5	40	70	60	90	70	66.0	18.2	78.6
LBI6-3	00BI2-ST020-NSD-010	25	21.93	7	30	60	80	40	90	60.0	25.5	81.1
LBI 9-2	00BI2-ST022-NSD-010	25	21.93	4	90	80	40	80	90	76.0	20.7	84.4
LBI 3-1	00BI2-ST024-NSD-010	25	21.68	4	10	80	40	60	80	54.0	29.7	60.0
LBI 3-3	00BI2-ST026-NSD-010	25	22.19	5	80	60	90	60	70	72.0	13.0	85.7
LPPG-2	00BI2-ST028-NSD-010	25	21.19	5	90	50	100	40	90	74.0	27.0	88.1
LPPG-4	00BI2-ST030-NSD-010	25	20.72	5	80	70	80	70	90	78.0	8.4	92.9
LBV-2	00BV2-ST002-NSD-010	25	21.43	7	0	90	30	20	0	28.0	37.0	37.8

Original Station	CDM Station ID	Conc. (%)	% Original Sample	Test #	48 hr % survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
LAR32	Control Test 4	12.5	11.72	4	90	90	90	90	100	92.0	4.5	100.0
LAR32	Control Test 6	12.5	11.72	6	80	90	80	100	90	88.0	8.4	100.0
LAR32	Control Test 7	12.5	11.72	7	90	60	70	80	60	72.0	13.0	100.0
UBI1-2	00BI2-ST002-NSD-010	12.5	10.59	7	80	80	90	90	70	82.0	8.4	113.9
UBI 4-2	00BI2-ST004-NSD-010	12.5	10.84	4	80	80	80	100	90	86.0	8.9	93.5
UBI1-1	00BI2-ST006-NSD-010	12.5	10.59	7	70	90	90	80	50	76.0	16.7	105.6
MBI3-1	00BI2-ST008-NSD-010	12.5	10.84	7	90	90	70	80	90	84.0	8.9	116.7
MBI3-3	00BI2-ST010-NSD-010	12.5	10.84	7	90	90	70	90	90	86.0	8.9	119.4
LBI 3-2	00BI2-ST016-NSD-010	12.5	11.33	4	90	100	90	70	100	90.0	12.2	97.8
LBI6-3	00BI2-ST020-NSD-010	12.5	10.96	7	90	80	90	80	90	86.0	5.5	119.4
LBI 9-2	00BI2-ST022-NSD-010	12.5	10.97	4	90	40	80	90	90	78.0	21.7	84.8
LBI 3-1	00BI2-ST024-NSD-010	12.5	10.84	4	90	100	30	70	90	76.0	27.9	82.6
LBV-2	00BV2-ST002-NSD-010	12.5	10.71	7	0	100	90	100	90	76.0	42.8	105.6
PL-1	00LC2-ST001-NSD-010	12.5	10.48	7	90	50	90	90	100	84.0	19.5	116.7
MCR-3	00LC2-ST007-NSD-010	12.5	10.84	7	60	80	30	0	90	52.0	37.0	72.2
ML-1	00LC2-ST013-NSD-010	12.5	11.65	7	80	90	90	70	70	80.0	10.0	111.1
ML-4	00LC2-ST027-NSD-010	12.5	11.65	7	100*	20	90	80	50	68.0	32.7	94.4
GB-5	00SN2-ST038-NSD-010	12.5	11.35	7	60	90	90	70	60	74.0	15.2	102.8
LC-1	00UC2-ST003-NSD-010	12.5	10.84	7	70	90	70	90	70	78.0	11.0	108.3
UCRB-1	00UC2-ST005-NSD-010	12.5	11.10	6	50	90	90	70	40	68.0	22.8	77.3
CIL-1	00UC2-ST007-NSD-010	12.5	10.90	6	70	60	50	90	80	70.0	15.8	79.5
CIB-1	00UC2-ST011-NSD-010	12.5	11.36	6	90	70	90	90	90	86.0	8.9	97.7
UCRC-1	00UC2-ST013-NSD-010	12.5	10.97	6	70	60	100	70	90	78.0	16.4	88.6
CBB-1	00UC2-ST015-NSD-010	12.5	11.36	6	0	90	40	40	80	50.0	36.1	56.8
CBB-3	00UC2-ST017-NSD-010	12.5	10.59	7	80	90	90	80	90	86.0	5.5	119.4
CBB-5	00UC2-ST019-NSD-010	12.5	10.84	6	100	80	100	90	90	92.0	8.4	104.5
CNE-1	00UC2-ST021-NSD-010	12.5	12.12	6	80	90	60	60	80	74.0	13.4	84.1
CNE-3	00UC2-ST023-NSD-010	12.5	11.23	6	60	90	50	60	60	64.0	15.2	72.7
CSW-2	00UC2-ST025-NSD-010	12.5	11.10	6	90	90	90	90	70	86.0	8.9	97.7
CSW-4	00UC2-ST027-NSD-010	12.5	11.36	6	80	90	90	60	54*	74.8	16.9	85.0
CSW-6	00UC2-ST029-NSD-010	12.5	11.16	6	90	60	10	90	90	68.0	34.9	77.3
CIL-3	00UC2-ST037-NSD-010	12.5	9.77	6	60	100	80	50	20	62.0	30.3	70.5
LAR32	Control Test 7	6.25	5.86	7	30	70	70	90	90	70.0	24.5	100.0
UBI1-2	00BI2-ST002-NSD-010	6.25	5.30	7	90	70	100	70	90	84.0	13.4	120.0

Original Station	CDM Station ID	Conc. (%)	% Original Sample	Test #	48 hr % survival					Mean	SD	% of Control
					Rep 1	Rep 2	Rep 3	Rep 4	Rep 5			
UBI1-1	00BI2-ST006-NSD-010	6.25	5.30	7	70	100	50	100	70	78.0	21.7	111.4
MBI3-1	00BI2-ST008-NSD-010	6.25	5.42	7	70	100	80	80	100	86.0	13.4	122.9
MBI3-3	00BI2-ST010-NSD-010	6.25	5.42	7	90	80	90	70	100	86.0	11.4	122.9
LBI6-3	00BI2-ST020-NSD-010	6.25	5.48	7	90	100	90	70	90	88.0	11.0	125.7
PL-1	00LC2-ST001-NSD-010	6.25	5.24	7	91*	70	100	90	80	86.2	11.5	123.1
ML-4	00LC2-ST027-NSD-010	6.25	5.83	7	100	80	90	90	90	90.0	7.1	128.6
GB-5	00SN2-ST038-NSD-010	6.25	5.68	7	90	70	60	40	90	70.0	21.2	100.0
CBB-3	00UC2-ST017-NSD-010	6.25	5.30	7	90	90	80	90	90	88.0	4.5	125.7
			Concentration									
SDS	Reference Toxicant Test 4	0	20 mg/L	4	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 5	0	20 mg/L	5	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 6	0	20 mg/L	6	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 7	0	20 mg/L	7	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 4	0	10 mg/L	4	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 5	0	10 mg/L	5	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 6	0	10 mg/L	6	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 7	0	10 mg/L	7	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 4	0	5 mg/L	4	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 5	0	5 mg/L	5	60	90	0	0	90	48.0	45.5	55.8
SDS	Reference Toxicant Test 6	0	5 mg/L	6	0	0	0	0	0	0.0	0.0	0.0
SDS	Reference Toxicant Test 7	0	5 mg/L	7	30	100	50	90	90	72.0	30.3	100.0
SDS	Reference Toxicant Test 4	0	2.5 mg/L	4	80	10	100	100	100	78.0	39.0	88.6
SDS	Reference Toxicant Test 5	0	2.5 mg/L	5	100	80	100	20	100	80.0	34.6	93.0
SDS	Reference Toxicant Test 6	0	2.5 mg/L	6	50	90	90	60	20	62.0	29.5	81.6
SDS	Reference Toxicant Test 7	0	2.5 mg/L	7	100	100	100	100	100	100.0	0.0	138.9
SDS	Reference Toxicant Test 4	0	1.25 mg/L	4	50	100	100	100	100	90.0	22.4	102.3
SDS	Reference Toxicant Test 5	0	1.25 mg/L	5	90	80	100	100	100	94.0	8.9	109.3
SDS	Reference Toxicant Test 6	0	1.25 mg/L	6	40	20	30	20	80	38.0	24.9	50.0
SDS	Reference Toxicant Test 7	0	1.25 mg/L	7	100	70	100	100	100	94.0	13.4	130.6

* Survival adjusted for overstocked replicate

Table 9. Water quality measurements of Calcasieu Estuary pore waters evaluated in zoospore germination and germling growth assay.

Original Station ID	CDM Station ID	% Original Sample	Water Quality Parameters					
			Salinity	DO (mg/L)	DO (%sat)	pH	TAN (mg/L)	UAN (mg/L)
LAR32	Control	91.55	32	7.33	100.2	8.15	0.49	21.5
MFS	Dilution Blank	95.24	32	5.94	82.8	8.01	0.452	14.5
Recon	Adjustment Blank	72.12	0	6.1	83.7	7.85	0.0	0.0
UBI1-2	00BI2-ST002-NSD-010	85.53	16	6.67	92.2	8.15	22.1	966.0
UBI14-2	00BI2-ST004-NSD-010	86.67	18	6.65	91.8	8.24	14.6	777.3
UBI1-1	00BI2-ST006-NSD-010	83.87	16	6.63	91.7	8.12	16.50	675.1
MBI3-1	00BI2-ST008-NSD-010	86.09	18	6.82	93.7	8.14	24.10	1030.5
MBI3-3	00BI2-ST010-NSD-010	86.67	18	6.75	93.5	8.09	23.7	907.4
LBI1-2	00BI2-ST012-NSD-010	89.04	20	6.61	91.5	8.21	7.98	397.9
LBI1-4	00BI2-ST014-NSD-010	89.04	20.5	6.61	91.3	8.13	9.69	405.3
LBI3-2	00BI2-ST016-NSD-010	90.91	22	6.63	91.7	8.37	12.7	895.5
LBI6-1	00BI2-ST018-NSD-010	84.51	18.5	6.78	93.7	8.18	10.2	476.2
LBI6-3	00BI2-ST020-NSD-010	87.84	19	6.39	90	8.02	17.00	557.2
LBI9-2	00BI2-ST022-NSD-010	87.84	19	6.54	91	8.07	12.1	443.2
LBI3-1	00BI2-ST024-NSD-010	86.67	18	6.69	92.8	8.08	12.4	464.4
LBI3-3	00BI2-ST026-NSD-010	89.04	20	6.69	92.3	7.94	8.17	224.0
LPPG-2	00BI2-ST028-NSD-010	84.97	16	6.77	93.3	8.17	4.31	196.9
LPPG-4	00BI2-ST030-NSD-010	82.80	14	6.64	91.2	8.13	3.38	141.4
LBV-2	00BV2-ST002-NSD-010	86.67	17	7.02	95.9	7.52	7.53	79.8
LBV-4	00BV2-ST004-NSD-010	53.94	54	7.09	96.7	7.22	3.43	18.3
LBV-6	00BV2-ST006-NSD-010	85.53	16	7.1	96.7	7.61	10.6	137.9
UBV-2	00BV2-ST008-NSD-010	78.79	6	7.03	96	8.25	3.21	174.7
UBV-4	00BV2-ST010-NSD-010	73.86	2	7.35	100.2	8.19	0.48	22.7
PL-1	00LC2-ST001-NSD-010	84.97	15	7.30	99.5	8.19	2.79	133.2
PL-3	00LC2-ST003-NSD-010	92.86	24	7.08	96.7	8.16	4.38	195.7
MCR-1	00LC2-ST005-NSD-010	90.90	22	7.22	98.5	8.22	4.14	211.0
MCR-3	00LC2-ST007-NSD-010	86.7	18	7.17	97.9	8.21	14.7	733.0
BO-2	00LC2-ST009-NSD-010	87.84	20.5	7.01	96.2	8.10	7.95	311.2
BO-4	00LC2-ST011-NSD-010	83.87	15	7.14	97.8	8.12	4.71	192.7
ML-1	00LC2-ST013-NSD-010	93.22	24	7.22	98.8	8.11	6.19	247.7
ML-4	00LC2-ST027-NSD-010	92.86	24	6.99	96	8.11	11.6	464.2
WB-2	00SN2-ST002-NSD-010	81.76	12	6.91	95.1	8.24	3.42	182.1
JB-2	00SN2-ST004-NSD-010	80.74	10	6.95	95.4	8.03	1.00	33.5
BBC-1	00SN2-ST006-NSD-010	89.66	21	6.94	95.0	8.06	4.11	147.2
GB-1	00SN2-ST008-NSD-010	90.91	22	6.76	93.1	8.13	6.64	277.7
BC-2	00SN2-ST012-NSD-010	85.94	17	6.71	92.4	8.18	7.1	331.5
BC-4	00SN2-ST014-NSD-010	85.53	16	6.97	95.9	8.11	3.11	124.5
GB-5	00SN2-ST038-NSD-010	89.66	22	6.80	95	8.3	5.66	343.3

Original Station ID	CDM Station ID	% Original Sample	Water Quality Parameters					
			Salinity	DO (mg/L)	DO (%sat)	pH	TAN (mg/L)	UAN (mg/L)
UCRA-1	00UC2-ST001-NSD-010	86.67	18	6.53	90.2	8.09	2.98	114.1
LC-1	00UC2-ST003-NSD-010	86.67	18	6.64	91.6	8.21	15.80	787.8
UCRB-1	00UC2-ST005-NSD-010	89.04	20	6.75	92.8	7.92	2.44	64.0
CIL-1	00UC2-ST007-NSD-010	87.25	18.5	6.56	90.7	7.93	6.27	168.1
CIB-1	00UC2-ST011-NSD-010	90.91	22	7.1	95.4	7.97	1.83	53.6
UCRC-1	00UC2-ST013-NSD-010	87.84	19	6.7	91.5	7.88	4.43	106.1
CBB-1	00UC2-ST015-NSD-010	90.91	22	6.81	93.7	7.97	6.31	185.0
CBB-3	00UC2-ST017-NSD-010	84.97	16	6.69	91.9	8.16	12.4	554.1
CBB-5	00UC2-ST019-NSD-010	87.25	18	6.58	90.7	7.99	6.22	190.7
CNE-1	00UC2-ST021-NSD-010	90.91	22	6.49	90.4	7.88	4.71	112.8
CNE-3	00UC2-ST023-NSD-010	89.55	21	6.23	86.4	7.94	4.13	113.2
CSW-2	00UC2-ST025-NSD-010	89.04	20	6.36	88.5	8.01	3.91	125.3
CSW-4	00UC2-ST027-NSD-010	90.91	22	6.45	89.7	8.04	3.2	109.6
CSW-6	00UC2-ST029-NSD-010	89.04	20.5	6.5	90.2	8.06	4.86	174.1
CIL-3	00UC2-ST037-NSD-010	78.31	8	6.27	87.1	8.24	1.99	105.9

Table 10. Algal zoospore germination results from Calcasieu Estuary porewater samples.

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	% Zoospore Germination					MEAN	SD	% of Control
				REP1	REP2	REP3	REP4	REP5			
LAR32	Control	100	91.55	88	90	97	94	98	93.4	4.34	100
MFS	Dilution Blank	100	95.24	93	91	94	91	87	91.2	2.68	98
Recon	Adjustment Blank	100	72.12	69	63	39	57	53	56.2	11.37	60
UBI1-2	00BI2-ST002-NSD-010	100	85.53	37	54	52	48	66	51.4	10.48	55
UBI14-2	00BI2-ST004-NSD-010	100	86.67	75	76	76	79	77	76.6	1.52	82
UBI1-1	00BI2-ST006-NSD-010	100	83.87	96	97	97	92	96	95.6	2.07	102
MBI3-1	00BI2-ST008-NSD-010	100	86.09	79	83	86	83	85	83.2	2.68	89
MBI3-3	00BI2-ST010-NSD-010	100	86.67	45	23	32	46	58	40.8	13.55	44
LBI1-2	00BI2-ST012-NSD-010	100	89.04	92	96	95	95	97	95	1.87	102
LBI1-4	00BI2-ST014-NSD-010	100	89.04	79	82	75	84	81	80.2	3.42	86
LBI3-2	00BI2-ST016-NSD-010	100	90.91	47	16	22	23	31	27.8	11.99	30
LBI6-1	00BI2-ST018-NSD-010	100	84.51	76	91	83	90	88	85.6	6.19	92
LBI6-3	00BI2-ST020-NSD-010	100	87.84	30	42	39	34	46	38.2	6.34	41
LBI9-2	00BI2-ST022-NSD-010	100	87.84	64	72	73	60	78	69.4	7.27	74
LBI3-1	00BI2-ST024-NSD-010	100	86.67	74	89	92	91	91	87.4	7.57	94
LBI3-3	00BI2-ST026-NSD-010	100	89.04	89	81	88	93	91	88.4	4.56	95
LPPG-2	00BI2-ST028-NSD-010	100	84.97	88	97	93	93	92	92.6	3.21	99
LPPG-4	00BI2-ST030-NSD-010	100	82.80	85	76	76	83	77	79.4	4.28	85
LBV-2	00BV2-ST002-NSD-010	100	86.67	94	99	95	94	98	96	2.35	103
LBV-4	00BV2-ST004-NSD-010	100	53.94	84	74	80	77	78	78.6	3.71	84
LBV-6	00BV2-ST006-NSD-010	100	85.53	92	98	98	94	92	94.8	3.03	101
UBV-2	00BV2-ST008-NSD-010	100	78.79	96	99	95	98	97	97	1.58	104
UBV-4	00BV2-ST010-NSD-010	100	73.86	90	95	96	95	93	93.8	2.39	100
PL-1	00LC2-ST001-NSD-010	100	84.97	94	98	98	97	96	96.6	1.67	103
PL-3	00LC2-ST003-NSD-010	100	92.86	97	98	96	98	96	97	1.00	104
MCR-1	00LC2-ST005-NSD-010	100	90.90	0	0	0	0	0	0	0.00	0
MCR-3	00LC2-ST007-NSD-010	100	86.7	74	69	73	61	64	68.2	5.63	73
BO-2	00LC2-ST009-NSD-010	100	87.84	97	96	97	98	94	96.4	1.52	103
BO-4	00LC2-ST011-NSD-010	100	83.87	93	93	97	92	94	93.8	1.92	100
ML-1	00LC2-ST013-NSD-010	100	93.22	94	97	96	91	96	94.8	2.39	101
ML-4	00LC2-ST027-NSD-010	100	92.86	91	94	92	93	94	92.8	1.30	99
WB-2	00SN2-ST002-NSD-010	100	81.76	88	93	95	95	97	93.6	3.44	100
JB-2	00SN2-ST004-NSD-010	100	80.74	75	70	65	73	79	72.4	5.27	78
BBC-1	00SN2-ST006-NSD-010	100	89.66	83	88	86	87	89	86.6	2.30	93
GB-1	00SN2-ST008-NSD-010	100	90.91	86	90	84	89	96	89	4.58	95

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	% Zoospore Germination					MEAN	SD	% of Control
				REP1	REP2	REP3	REP4	REP5			
BC-2	00SN2-ST012-NSD-010	100	85.94	94	91	92	88	96	92.2	3.03	99
BC-4	00SN2-ST014-NSD-010	100	85.53	94	93	93	97	94	94.2	1.64	101
GB-5	00SN2-ST038-NSD-010	100	89.66	90	92	86	96	96	92	4.24	99
UCRA-1	00UC2-ST001-NSD-010	100	86.67	80	92	89	92	90	88.6	4.98	95
LC-1	00UC2-ST003-NSD-010	100	86.67	45	44	36	52	42	43.8	5.76	47
UCRB-1	00UC2-ST005-NSD-010	100	89.04	85	92	89	88	92	89.2	2.95	96
CIL-1	00UC2-ST007-NSD-010	100	87.25	92	86	88	90	89	89	2.24	95
CIB-1	00UC2-ST011-NSD-010	100	90.91	86	87	90	92	92	89.4	2.79	96
UCRC-1	00UC2-ST013-NSD-010	100	87.84	95	92	98	93	92	94	2.55	101
CBB-1	00UC2-ST015-NSD-010	100	90.91	85	90	90	94	92	90.2	3.35	97
CBB-3	00UC2-ST017-NSD-010	100	84.97	55	56	49	57	36	50.6	8.73	54
CBB-5	00UC2-ST019-NSD-010	100	87.25	91	96	92	94	91	92.8	2.17	99
CNE-1	00UC2-ST021-NSD-010	100	90.91	54	48	43	52	47	48.8	4.32	52
CNE-3	00UC2-ST023-NSD-010	100	89.55	98	94	89	93	91	93	3.39	100
CSW-2	00UC2-ST025-NSD-010	100	89.04	74	88	94	83	87	85.2	7.40	91
CSW-4	00UC2-ST027-NSD-010	100	90.91	89	95	87	94	93	91.6	3.44	98
CSW-6	00UC2-ST029-NSD-010	100	89.04	88	90	90	82	88	87.6	3.29	94
CIL-3	00UC2-ST037-NSD-010	100	78.31	92	86	91	97	93	91.8	3.96	98
LAR32	Control	50	45.78	98	94	97	93	95	95.4	2.07	100
UBI1-2	00BI2-ST002-NSD-010	50	42.77	91	96	98	95	96	95.2	2.59	100
UBI14-2	00BI2-ST004-NSD-010	50	43.34	92	93	97	95	93	94	2.00	99
UBI1-1	00BI2-ST006-NSD-010	50	41.94	96	98	97	97	95	96.6	1.14	101
MBI3-1	00BI2-ST008-NSD-010	50	43.05	92	95	95	92	94	93.6	1.52	98
MBI3-3	00BI2-ST010-NSD-010	50	43.34	91	92	93	94	91	92.2	1.30	97
LBI1-2	00BI2-ST012-NSD-010	50	44.52	91	96	98	95	94	94.8	2.59	99
LBI1-4	00BI2-ST014-NSD-010	50	44.52	83	87	84	83	87	84.8	2.05	89
LBI3-2	00BI2-ST016-NSD-010	50	45.46	78	79	81	79	86	80.6	3.21	84
LBI6-1	00BI2-ST018-NSD-010	50	42.26	85	93	92	89	96	91	4.18	95
LBI6-3	00BI2-ST020-NSD-010	50	43.92	86	83	88	81	86	84.8	2.77	89
LBI9-2	00BI2-ST022-NSD-010	50	43.92	86	93	88	94	87	89.6	3.65	94
LBI3-1	00BI2-ST024-NSD-010	50	43.34	88	94	96	90	94	92.4	3.29	97
LBI3-3	00BI2-ST026-NSD-010	50	44.52	96	93	97	92	98	95.2	2.59	100
LPPG-2	00BI2-ST028-NSD-010	50	42.49	94	95	95	94	87	93	3.39	97
LPPG-4	00BI2-ST030-NSD-010	50	41.40	92	88	90	88	93	90.2	2.28	95
LBV-2	00BV2-ST002-NSD-010	50	43.34	96	98	93	93	98	95.6	2.51	100
LBV-4	00BV2-ST004-NSD-010	50	26.97	91	85	92	91	91	90	2.83	94

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	% Zoospore Germination					MEAN	SD	% of Control
				REP1	REP2	REP3	REP4	REP5			
LBV-6	00BV2-ST006-NSD-010	50	42.77	97	94	95	99	97	96.4	1.95	101
UBV-2	00BV2-ST008-NSD-010	50	39.40	98	96	100	99	97	98	1.58	103
UBV-4	00BV2-ST010-NSD-010	50	36.93	93	95	98	99	96	96.2	2.39	101
PL-1	00LC2-ST001-NSD-010	50	42.49	97	97	96	99	98	97.4	1.14	102
PL-3	00LC2-ST003-NSD-010	50	46.43	97	100	94	96	95	96.4	2.30	101
MCR-1	00LC2-ST005-NSD-010	50	45.45	50	42	29	37	16	34.8	12.99	36
MCR-3	00LC2-ST007-NSD-010	50	43.34	87	88	93	94	94	91.2	3.42	96
BO-2	00LC2-ST009-NSD-010	50	43.92	99	97	94	93	97	96	2.45	101
BO-4	00LC2-ST011-NSD-010	50	41.94	94	94	95	93	95	94.2	0.84	99
ML-1	00LC2-ST013-NSD-010	50	46.61	93	97	98	91	97	95.2	3.03	100
ML-4	00LC2-ST027-NSD-010	50	46.43	95	91	97	97	96	95.2	2.49	100
WB-2	00SN2-ST002-NSD-010	50	40.88	92	94	94	93	95	93.6	1.14	98
JB-2	00SN2-ST004-NSD-010	50	40.37	91	94	90	93	93	92.2	1.64	97
BBC-1	00SN2-ST006-NSD-010	50	44.83	87	95	91	95	96	92.8	3.77	97
GB-1	00SN2-ST008-NSD-010	50	45.46	87	95	92	92	96	92.4	3.51	97
BC-2	00SN2-ST012-NSD-010	50	42.97	94	96	97	91	95	94.6	2.30	99
BC-4	00SN2-ST014-NSD-010	50	42.77	97	98	94	95	97	96.2	1.64	101
GB-5	00SN2-ST038-NSD-010	50	44.83	96	98	97	95	93	95.8	1.92	100
UCRA-1	00UC2-ST001-NSD-010	50	43.34	89	88	96	94	96	92.6	3.85	97
LC-1	00UC2-ST003-NSD-010	50	43.34	82	91	87	89	83	86.4	3.85	91
UCRB-1	00UC2-ST005-NSD-010	50	44.52	96	94	89	95	92	93.2	2.77	98
CIL-1	00UC2-ST007-NSD-010	50	43.63	91	95	93	93	92	92.8	1.48	97
CIB-1	00UC2-ST011-NSD-010	50	45.46	89	99	91	93	94	93.2	3.77	98
UCRC-1	00UC2-ST013-NSD-010	50	43.92	91	92	97	94	98	94.4	3.05	99
CBB-1	00UC2-ST015-NSD-010	50	45.46	96	97	97	93	97	96	1.73	101
CBB-3	00UC2-ST017-NSD-010	50	42.49	90	88	77	87	80	84.4	5.59	88
CBB-5	00UC2-ST019-NSD-010	50	43.63	97	94	94	94	99	95.6	2.30	100
CNE-1	00UC2-ST021-NSD-010	50	45.46	86	86	68	85	81	81.2	7.66	85
CNE-3	00UC2-ST023-NSD-010	50	44.78	93	94	96	93	98	94.8	2.17	99
CSW-2	00UC2-ST025-NSD-010	50	44.52	88	86	92	97	90	90.6	4.22	95
CSW-4	00UC2-ST027-NSD-010	50	45.46	93	87	89	96	92	91.4	3.51	96
CSW-6	00UC2-ST029-NSD-010	50	44.52	90	90	89	88	84	88.2	2.49	92
CIL-3	00UC2-ST037-NSD-010	50	39.16	96	95	94	97	94	95.2	1.30	100
LAR32	Control	25	22.89	94	96	94	91	91	93.2	2.17	100
UBI1-2	00BI2-ST002-NSD-010	25	21.38	97	95	97	98	97	96.8	1.10	104
UBI14-2	00BI2-ST004-NSD-010	25	21.67	97	95	94	93	97	95.2	1.79	102

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	% Zoospore Germination					MEAN	SD	% of Control
				REP1	REP2	REP3	REP4	REP5			
UBI1-1	00BI2-ST006-NSD-010	25	20.97	94	96	96	95	95	95.2	0.84	102
MBI3-1	00BI2-ST008-NSD-010	25	21.52	90	93	94	89	97	92.6	3.21	99
MBI3-3	00BI2-ST010-NSD-010	25	21.67	93	92	95	95	91	93.2	1.79	100
LBI1-2	00BI2-ST012-NSD-010	25	22.26	93	95	91	97	92	93.6	2.41	100
LBI1-4	00BI2-ST014-NSD-010	25	22.26	86	88	88	89	84	87	2.00	93
LBI3-2	00BI2-ST016-NSD-010	25	22.73	88	85	90	91	86	88	2.55	94
LBI6-1	00BI2-ST018-NSD-010	25	21.13	92	95	93	96	92	93.6	1.82	100
LBI6-3	00BI2-ST020-NSD-010	25	21.96	90	91	94	92	95	92.4	2.07	99
LBI9-2	00BI2-ST022-NSD-010	25	21.96	94	93	95	91	94	93.4	1.52	100
LBI3-1	00BI2-ST024-NSD-010	25	21.67	89	95	92	91	89	91.2	2.49	98
LBI3-3	00BI2-ST026-NSD-010	25	22.26	96	87	93	93	87	91.2	4.02	98
LPPG-2	00BI2-ST028-NSD-010	25	21.24	97	88	94	92	91	92.4	3.36	99
LPPG-4	00BI2-ST030-NSD-010	25	20.70	91	92	88	91	87	89.8	2.17	96
LBV-2	00BV2-ST002-NSD-010	25	21.67	93	96	97	96	99	96.2	2.17	103
LBV-4	00BV2-ST004-NSD-010	25	13.49	95	93	93	94	97	94.4	1.67	101
LBV-6	00BV2-ST006-NSD-010	25	21.38	96	95	96	97	96	96	0.71	103
UBV-2	00BV2-ST008-NSD-010	25	19.70	92	95	94	98	99	95.6	2.88	103
UBV-4	00BV2-ST010-NSD-010	25	18.47	96	97	97	98	96	96.8	0.84	104
PL-1	00LC2-ST001-NSD-010	25	21.24	93	96	95	94	98	95.2	1.92	102
PL-3	00LC2-ST003-NSD-010	25	23.22	97	96	97	98	99	97.4	1.14	105
MCR-1	00LC2-ST005-NSD-010	25	22.73	73	70	81	71	72	73.4	4.39	79
MCR-3	00LC2-ST007-NSD-010	25	21.67	93	95	91	95	96	94	2.00	101
BO-2	00LC2-ST009-NSD-010	25	21.96	93	98	96	98	96	96.2	2.05	103
BO-4	00LC2-ST011-NSD-010	25	20.97	94	96	96	92	96	94.8	1.79	102
ML-1	00LC2-ST013-NSD-010	25	23.31	93	96	99	98	96	96.4	2.30	103
ML-4	00LC2-ST027-NSD-010	25	23.22	98	97	98	96	97	97.2	0.84	104
WB-2	00SN2-ST002-NSD-010	25	20.44	93	96	91	97	95	94.4	2.41	101
JB-2	00SN2-ST004-NSD-010	25	20.19	96	97	97	95	95	96	1.00	103
BBC-1	00SN2-ST006-NSD-010	25	22.42	92	90	92	96	95	93	2.45	100
GB-1	00SN2-ST008-NSD-010	25	22.73	93	97	92	95	89	93.2	3.03	100
BC-2	00SN2-ST012-NSD-010	25	21.49	94	94	94	96	98	95.2	1.79	102
BC-4	00SN2-ST014-NSD-010	25	21.38	97	95	93	99	98	96.4	2.41	103
GB-5	00SN2-ST038-NSD-010	25	22.42	92	97	94	91	96	94	2.55	101
UCRA-1	00UC2-ST001-NSD-010	25	21.67	91	92	91	95	94	92.6	1.82	99
LC-1	00UC2-ST003-NSD-010	25	21.67	91	92	95	96	95	93.8	2.17	101
UCRB-1	00UC2-ST005-NSD-010	25	22.26	89	92	94	95	90	92	2.55	99
CIL-1	00UC2-ST007-NSD-010	25	21.81	95	91	96	92	94	93.6	2.07	100

Original Station ID	CDM Station ID	Conc. (%)	% Original Sample	% Zoospore Germination					MEAN	SD	% of Control
				REP1	REP2	REP3	REP4	REP5			
CIB-1	00UC2-ST011-NSD-010	25	22.73	93	97	92	95	96	94.6	2.07	102
UCRC-1	00UC2-ST013-NSD-010	25	21.96	97	96	96	96	95	96	0.71	103
CBB-1	00UC2-ST015-NSD-010	25	22.73	97	96	96	97	94	96	1.22	103
CBB-3	00UC2-ST017-NSD-010	25	21.24	94	96	91	93	85	91.8	4.21	98
CBB-5	00UC2-ST019-NSD-010	25	21.81	88	94	94	94	97	93.4	3.29	100
CNE-1	00UC2-ST021-NSD-010	25	22.73	91	92	89	93	91	91.2	1.48	98
CNE-3	00UC2-ST023-NSD-010	25	22.39	96	98	96	95	93	95.6	1.82	103
CSW-2	00UC2-ST025-NSD-010	25	22.26	90	92	90	89	82	88.6	3.85	95
CSW-4	00UC2-ST027-NSD-010	25	22.73	92	94	92	97	94	93.8	2.05	101
CSW-6	00UC2-ST029-NSD-010	25	22.26	90	87	97	96	94	92.8	4.21	100
CIL-3	00UC2-ST037-NSD-010	25	19.58	91	95	95	93	95	93.8	1.79	101
LAR32	Control	12.5	11.44	96	97	97	92	96	95.6	2.07	100
MCR-1	00LC2-ST005-NSD-010	12.5	11.36	89	91	81	85	78	84.8	5.40	89
MCR-3	00LC2-ST007-NSD-010	12.5	10.84	91	92	94	98	96	94.2	2.86	99
LAR32	Control	6.25	5.72	92	93	93	97	91	93.2	2.28	100
MCR-1	00LC2-ST005-NSD-010	6.25	5.68	87	84	84	77	92	84.8	5.45	91
LAR32	Control	3.125	2.86	94	87	90	96	92	91.8	3.49	100
MCR-1	00LC2-ST005-NSD-010	3.125	2.84	96	98	91	90	95	94.0	3.39	102
		Concentration									
SDS	Reference Toxicant	10 mg/L	na	17	11	13	18	3	12.4	5.98	13
SDS	Reference Toxicant	5 mg/L	na	23	30	30	17	25	25	5.43	27
SDS	Reference Toxicant	2.5 mg/L	na	71	67	66	53	67	64.8	6.87	69
SDS	Reference Toxicant	1.25 mg/L	na	90	91	82	87	83	86.6	4.04	93

Table 11. Algal germling length measurements (μm) following 96 h exposure to porewater samples from Calcasieu Estuary.

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LAR32	Control	100	91.55	1	20.28	30.42	25.35	30.42	25.35	30.42	25.35	25.35	25.35	35.49	27.38	4.28	25.91	5.03	100
				2	25.35	35.49	25.35	25.35	32.955	20.28	20.28	30.42	35.49	25.35	27.63	5.66			
				3	30.42	20.28	25.35	20.28	20.28	20.28	20.28	25.35	30.42	23.32	4.28				
				4	30.42	20.28	17.745	25.35	20.28	20.28	30.42	20.28	25.35	23.07	4.54				
				5	20.28	25.35	32.955	35.49	25.35	30.42	25.35	25.35	30.42	30.42	28.14	4.54			
MFS	Dilution Blank	100	95.24	1	45.63	45.63	30.42	50.7	45.63	45.63	35.49	45.63	30.42	40.56	41.57	7.09	45.17	8.13	174
				2	40.56	45.63	53.235	50.7	45.63	55.77	45.63	30.42	45.63	40.56	45.38	7.21			
				3	60.84	45.63	50.7	40.56	45.63	55.77	40.56	40.56	35.49	40.56	45.63	7.93			
				4	50.7	35.49	50.7	45.63	45.63	55.77	55.77	45.63	40.56	55.77	48.17	6.86			
				5	35.49	50.7	50.7	65.91	45.63	50.7	30.42	40.56	30.42	50.7	45.12	11.07			
Recon	Adjustment Blank	100	72.12	1	10.14	10.14	20.28	5.07	10.14	5.07	5.07	10.14	5.07	10.14	9.13	4.66	9.08	4.23	35
				2	10.14	10.14	5.07	5.07	5.07	5.07	7.605	5.07	10.14	25.35	8.87	6.24			
				3	10.14	10.14	10.14	10.14	15.21	5.07	5.07	5.07	10.14	5.07	8.62	3.42			
				4	15.21	5.07	5.07	10.14	10.14	10.14	10.14	10.14	5.07	10.14	9.13	3.21			
				5	10.14	10.14	15.21	5.07	10.14	5.07	10.14	5.07	15.21	10.14	9.63	3.74			
UBI1-2	00BI2-ST002-NSD-010	100	85.53	1	10.14	10.14	10.14	15.21	10.14	10.14	10.14	10.14	10.14	10.65	1.60	12.73	3.92	49	
				2	10.14	15.21	15.21	10.14	10.14	10.14	20.28	15.21	20.28	20.28	14.70				4.44
				3	10.14	10.14	10.14	10.14	7.605	10.14	20.28	10.14	10.14	15.21	11.41				3.63
				4	10.14	15.21	10.14	10.14	15.21	10.14	10.14	15.21	15.21	10.14	12.17				2.62
				5	15.21	10.14	10.14	25.35	15.21	10.14	20.28	10.14	15.21	15.21	14.70				5.04
UBI14-2	00BI2-ST004-NSD-010	100	86.67	1	35.49	45.63	55.77	35.49	45.63	50.7	45.63	20.28	35.49	30.42	40.05	10.54	32.90	11.73	127
				2	20.28	25.35	25.35	30.42	25.35	40.56	20.28	40.56	30.42	15.21	27.38	8.35			
				3	40.56	40.56	55.77	60.84	45.63	50.7	25.35	35.49	55.77	35.49	44.62	11.16			
				4	30.42	15.21	30.42	30.42	30.42	35.49	25.35	30.42	20.28	35.49	28.39	6.41			
				5	25.35	35.49	25.35	25.35	20.28	35.49	15.21	20.28	15.21	22.815	24.08	7.09			
UBI1-1	00BI2-ST006-NSD-010	100	83.87	1	60.84	60.84	55.77	60.84	40.56	65.91	55.77	60.84	50.7	50.7	56.28	7.35	52.98	8.00	204
				2	60.84	50.7	55.77	63.375	60.84	65.91	35.49	60.84	60.84	60.84	57.54	8.79			
				3	50.7	35.49	40.56	40.56	50.7	45.63	55.77	50.7	35.49	55.77	46.14	7.73			
				4	45.63	55.77	50.7	50.7	60.84	55.77	50.7	50.7	50.7	60.84	53.24	4.93			
				5	60.84	40.56	60.84	50.7	55.77	55.77	50.7	45.63	45.63	50.7	51.71	6.67			
MBI3-1	00BI2-ST008-NSD-010	100	86.09	1	50.7	30.42	50.7	35.49	40.56	55.77	60.84	45.63	55.77	25.35	45.12	11.82	46.24	12.06	178
				2	30.42	20.28	35.49	50.7	35.49	45.63	45.63	50.7	45.63	35.49	39.55	9.80			
				3	50.7	55.77	60.84	60.84	20.28	60.84	45.63	55.77	55.77	65.91	53.24	12.93			
				4	50.7	45.63	45.63	50.7	55.77	55.77	40.56	55.77	60.84	55.77	51.71	6.23			
				5	25.35	70.98	30.42	55.77	35.49	45.63	40.56	30.42	45.63	35.49	41.57	13.69			
MBI3-3	00BI2-ST010-NSD-010	100	86.67	1	10.14	10.14	10.14	7.605	10.14	10.14	15.21	10.14	30.42	10.14	12.42	6.59	13.08	5.89	50
				2	15.21	10.14	10.14	15.21	10.14	10.14	15.21	10.14	15.21	10.14	12.17	2.62			
				3	7.605	10.14	10.14	10.14	20.28	10.14	10.14	7.605	10.14	10.14	10.65	3.54			
				4	15.21	10.14	10.14	10.14	12.675	10.14	15.21	10.14	10.14	10.14	11.41	2.15			
				5	25.35	10.14	35.49	15.21	10.14	15.21	10.14	15.21	25.35	25.35	18.76	8.63			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LBI1-2	00BI2-ST012-NSD-010	100	89.04	1	45.63	50.7	40.56	35.49	40.56	45.63	60.84	55.77	65.91	55.77	49.69	9.80	55.36	12.66	214
				2	50.7	65.91	60.84	70.98	55.77	65.91	65.91	35.49	65.91	76.05	61.35	11.57			
				3	55.77	55.77	35.49	81.12	35.49	76.05	76.05	50.7	50.7	55.77	57.29	16.04			
				4	25.35	35.49	65.91	50.7	76.05	45.63	60.84	50.7	55.77	60.84	52.73	14.77			
				5	40.56	45.63	55.77	60.84	65.91	50.7	65.91	55.77	50.7	65.91	55.77	8.94			
LBI1-4	00BI2-ST014-NSD-010	100	89.04	1	55.77	55.77	60.84	40.56	35.49	50.7	45.63	55.77	35.49	40.56	47.66	9.32	57.49	11.20	222
				2	50.7	55.77	60.84	60.84	55.77	70.98	60.84	50.7	60.84	55.77	58.31	5.98			
				3	60.84	50.7	30.42	50.7	76.05	50.7	70.98	76.05	60.84	65.91	59.32	14.15			
				4	50.7	60.84	65.91	40.56	81.12	50.7	60.84	50.7	65.91	65.91	59.32	11.47			
				5	65.91	55.77	50.7	70.98	76.05	55.77	70.98	55.77	55.77	70.98	62.87	9.01			
LBI3-2	00BI2-ST016-NSD-010	100	90.91	1	10.14	10.14	20.28	10.14	35.49	25.35	40.56	20.28	35.49	24.34	11.90	32.45	15.93	125	
				2	20.28	10.14	15.21	76.05	35.49	50.7	45.63	40.56	10.14	15.21	31.94				21.65
				3	40.56	45.63	10.14	30.42	25.35	35.49	35.49	50.7	20.28	35.49	32.96				12.01
				4	25.35	20.28	60.84	40.56	55.77	30.42	81.12	35.49	45.63	10.14	40.56				21.11
				5	25.35	30.42	30.42	35.49	30.42	35.49	30.42	45.63	35.49	25.35	32.45				5.95
LBI6-1	00BI2-ST018-NSD-010	100	84.51	1	40.56	60.84	55.77	25.35	50.7	40.56	50.7	60.84	70.98	55.77	51.21	12.97	59.83	12.75	231
				2	65.91	76.05	45.63	55.77	81.12	45.63	50.7	76.05	76.05	76.05	64.90	14.10			
				3	65.91	60.84	70.98	55.77	55.77	45.63	76.05	60.84	50.7	50.7	59.32	9.58			
				4	55.77	70.98	60.84	65.91	60.84	70.98	55.77	76.05	60.84	60.84	63.88	6.84			
				5	65.91	60.84	50.7	70.98	60.84	65.91	20.28	70.98	55.77	76.05	59.83	15.82			
LBI6-3	00BI2-ST020-NSD-010	100	87.84	1	10.14	20.28	10.14	10.14	15.21	10.14	15.21	10.14	15.21	10.14	12.68	3.59	22.31	12.03	86
				2	15.21	35.49	35.49	10.14	35.49	25.35	10.14	35.49	45.63	50.7	29.91	14.23			
				3	10.14	10.14	20.28	10.14	20.28	25.35	10.14	10.14	30.42	20.28	16.73	7.58			
				4	25.35	35.49	20.28	10.14	10.14	25.35	30.42	25.35	25.35	50.7	25.86	11.82			
				5	35.49	25.35	15.21	25.35	15.21	25.35	50.7	25.35	10.14	35.49	26.36	11.90			
LBI9-2	00BI2-ST022-NSD-010	100	87.84	1	35.49	35.49	40.56	45.63	25.35	30.42	30.42	35.49	40.56	35.49	35.49	5.85	38.03	12.60	147
				2	35.49	30.42	30.42	35.49	35.49	10.14	35.49	35.49	20.28	50.7	31.94	10.70			
				3	45.63	45.63	40.56	35.49	40.56	45.63	50.7	25.35	40.56	50.7	42.08	7.58			
				4	30.42	35.49	30.42	30.42	30.42	35.49	30.42	25.35	35.49	40.56	32.45	4.28			
				5	76.05	20.28	60.84	15.21	45.63	35.49	76.05	50.7	45.63	55.77	48.17	20.59			
LBI3-1	00BI2-ST024-NSD-010	100	86.67	1	50.7	65.91	50.7	45.63	60.84	50.7	35.49	45.63	35.49	40.56	48.17	9.93	53.64	9.83	207
				2	50.7	45.63	60.84	65.91	40.56	50.7	60.84	35.49	55.77	50.7	51.71	9.50			
				3	65.91	60.84	60.84	40.56	40.56	50.7	60.84	50.7	60.84	30.42	52.22	11.72			
				4	50.7	76.05	55.77	55.77	55.77	50.7	65.91	60.84	60.84	45.63	57.80	8.68			
				5	60.84	45.63	55.77	65.91	65.91	55.77	60.84	60.84	60.84	50.7	58.31	6.44			
LBI3-3	00BI2-ST026-NSD-010	100	89.04	1	60.84	60.84	76.05	70.98	60.84	55.77	45.63	60.84	55.77	60.84	60.84	8.28	60.84	10.60	235
				2	65.91	65.91	55.77	60.84	60.84	81.12	60.84	70.98	55.77	60.84	63.88	7.63			
				3	55.77	70.98	35.49	50.7	15.21	60.84	70.98	45.63	55.77	70.98	53.24	17.77			
				4	60.84	70.98	70.98	50.7	60.84	65.91	65.91	60.84	70.98	60.84	63.88	6.41			
				5	60.84	65.91	70.98	55.77	60.84	60.84	70.98	50.7	65.91	60.84	62.36	6.35			
LPPG-2	00BI2-ST028-NSD-010	100	84.97	1	76.05	81.12	81.12	81.12	81.12	86.19	81.12	86.19	65.91	81.12	80.11	5.76	81.53	11.85	315
				2	70.98	91.26	86.19	86.19	91.26	65.91	81.12	86.19	86.19	91.26	83.66	8.70			
				3	60.84	81.12	81.12	101.4	86.19	81.12	65.91	76.05	65.91	81.12	78.08	11.76			
				4	60.84	81.12	96.33	86.19	91.26	60.84	86.19	86.19	81.12	101.4	83.15	13.35			
				5	35.49	76.05	81.12	91.26	86.19	86.19	91.26	96.33	96.33	86.19	82.64	17.73			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control	
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD		
LPPG-4	00BI2-ST030-NSD-010	100	82.8	1	10.14	30.42	25.35	15.21	20.28	25.35	30.42	10.14	30.42	20.28	21.80	7.94	20.38	7.77	79	
				2	30.42	30.42	15.21	15.21	15.21	10.14	20.28	15.21	10.14	20.28	18.25	7.25				
				3	20.28	15.21	30.42	20.28	15.21	30.42	20.28	20.28	10.14	35.49	21.80	7.94				
				4	10.14	30.42	10.14	10.14	20.28	20.28	20.28	20.28	10.14	21.80	17.24	6.84				
				5	25.35	25.35	40.56	20.28	15.21	25.35	10.14	15.21	30.42	20.28	22.82	8.70				
LBV-2	00BV2-ST002-NSD-010	100	86.67	1	60.84	55.77	76.05	55.77	60.84	65.91	55.77	45.63	55.77	65.91	59.83	8.21	59.27	10.92	229	
				2	50.7	65.91	65.91	81.12	60.84	76.05	65.91	53.235	50.7	60.84	63.12	10.17				
				3	55.77	65.91	70.98	65.91	60.84	50.7	65.91	70.98	40.56	50.7	59.83	10.08				
				4	60.84	76.05	50.7	50.7	65.91	55.77	65.91	50.7	35.49	55.77	56.78	11.16				
				5	55.77	50.7	45.63	70.98	60.84	81.12	55.77	60.84	25.35	60.84	56.78	14.89				
LBV-4	00BV2-ST004-NSD-010	100	53.94	1	30.42	35.49	25.35	35.49	30.42	35.49	35.49	35.49	30.42	30.42	32.45	3.54	29.00	6.64	112	
				2	25.35	30.42	15.21	35.49	25.35	30.42	20.28	30.42	30.42	15.21	25.86	6.95				
				3	25.35	25.35	25.35	30.42	35.49	25.35	25.35	25.35	25.35	30.42	27.38	3.54				
				4	10.14	25.35	20.28	30.42	25.35	20.28	35.49	25.35	30.42	40.56	26.36	8.55				
				5	30.42	25.35	35.49	40.56	30.42	30.42	35.49	45.63	30.42	25.35	32.96	6.44				
LBV-6	00BV2-ST006-NSD-010	100	85.53	1	60.84	50.7	60.84	70.98	45.63	70.98	55.77	70.98	81.12	50.7	61.85	11.41	63.22	9.31	244	
				2	70.98	65.91	60.84	70.98	60.84	50.7	45.63	55.77	60.84	65.91	60.84	8.28				
				3	60.84	60.84	55.77	60.84	81.12	55.77	55.77	70.98	76.05	55.77	63.38	9.33				
				4	70.98	45.63	70.98	45.63	68.445	76.05	65.91	65.91	55.77	70.98	63.63	10.85				
				5	70.98	70.98	65.91	60.84	76.05	70.98	55.77	70.98	65.91	55.77	66.42	6.95				
UBV-2	00BV2-ST008-NSD-010	100	78.79	1	45.63	45.63	55.77	76.05	65.91	55.77	55.77	55.77	60.84	45.63	56.28	9.69	59.52	11.21	230	
				2	60.84	70.98	55.77	45.63	70.98	60.84	60.84	65.91	55.77	55.77	60.33	7.73				
				3	50.7	60.84	65.91	55.77	50.7	45.63	50.7	45.63	70.98	40.56	53.74	9.62				
				4	50.7	65.91	60.84	45.63	65.91	55.77	70.98	65.91	81.12	55.77	61.85	10.36				
				5	65.91	65.91	60.84	45.63	70.98	65.91	81.12	86.19	76.05	35.49	65.40	15.39				
UBV-4	00BV2-ST010-NSD-010	100	73.86	1	35.49	40.56	30.42	40.56	30.42	40.56	35.49	25.35	25.35	20.28	32.45	7.25	34.88	8.17	135	
				2	35.49	35.49	25.35	30.42	35.49	35.49	25.35	20.28	30.42	35.49	30.93	5.58				
				3	40.56	20.28	35.49	60.84	45.63	55.77	40.56	35.49	40.56	35.49	41.07	11.32				
				4	30.42	20.28	35.49	45.63	30.42	30.42	35.49	30.42	45.63	35.49	33.97	7.58				
				5	45.63	30.42	30.42	35.49	40.56	35.49	40.56	30.42	35.49	35.49	36.00	5.04				
PL-1	00LC2-ST001-NSD-010	100	84.97	1	50.7	45.63	55.77	40.56	50.7	40.56	45.63	40.56	65.91	55.77	49.18	8.30	54.60	11.56	211	
				2	53.235	50.7	50.7	45.63	60.84	60.84	55.77	50.7	50.7	60.84	54.00	5.35				
				3	55.77	50.7	55.77	50.7	60.84	45.63	50.7	55.77	50.7	55.77	53.24	4.31				
				4	45.63	45.63	50.7	55.77	40.56	91.26	30.42	50.7	50.7	60.84	52.22	16.04				
				5	35.49	55.77	70.98	60.84	65.91	81.12	81.12	65.91	50.7	76.05	64.39	14.35				
PL-3	00LC2-ST003-NSD-010	100	92.86	1	55.77	60.84	65.91	60.84	50.7	50.7	60.84	50.7	76.05	35.49	56.78	10.90	64.85	12.08	250	
				2	55.77	81.12	60.84	76.05	76.05	70.98	76.05	70.98	76.05	76.05	71.99	7.85				
				3	70.98	50.7	50.7	45.63	65.91	50.7	55.77	70.98	60.84	60.84	58.31	9.02				
				4	65.91	55.77	63.375	65.91	65.91	40.56	76.05	76.05	60.84	65.91	63.63	10.17				
				5	81.12	76.05	60.84	86.19	81.12	86.19	50.7	60.84	86.19	65.91	73.52	12.93				
MCR-1	00LC2-ST005-NSD-010	100	90.9	1	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0	
				2	0	0	0	0	0	0	0	0	0	0	0	0.00				0.00
				3	0	0	0	0	0	0	0	0	0	0	0	0.00				0.00
				4	0	0	0	0	0	0	0	0	0	0	0	0.00				0.00
				5	0	0	0	0	0	0	0	0	0	0	0	0.00				0.00

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
MCR-3	00LC2-ST007-NSD-010	100	86.7	1	35.49	25.35	25.35	25.35	35.49	25.35	35.49	25.35	20.28	20.28	27.38	5.95	31.03	8.91	120
				2	40.56	25.35	35.49	45.63	45.63	40.56	40.56	40.56	50.7	25.35	39.04	8.30			
				3	35.49	40.56	35.49	25.35	40.56	30.42	25.35	35.49	25.35	20.28	31.43	7.09			
				4	25.35	25.35	35.49	40.56	25.35	25.35	30.42	15.21	20.28	30.42	27.38	7.25			
				5	10.14	40.56	20.28	30.42	40.56	35.49	30.42	20.28	45.63	25.35	29.91	11.07			
BO-2	00LC2-ST009-NSD-010	100	87.84	1	45.63	60.84	70.98	60.84	60.84	65.91	60.84	55.77	65.91	65.91	61.35	6.95	63.58	10.56	245
				2	76.05	81.12	76.05	60.84	81.12	65.91	70.98	55.77	70.98	76.05	71.49	8.43			
				3	50.7	55.77	60.84	60.84	60.84	65.91	60.84	45.63	55.77	60.84	57.80	5.95			
				4	60.84	60.84	65.91	70.98	70.98	45.63	76.05	65.91	70.98	60.84	64.90	8.55			
				5	55.77	55.77	55.77	45.63	45.63	70.98	76.05	45.63	86.19	86.19	62.36	16.22			
BO-4	00LC2-ST011-NSD-010	100	83.87	1	60.84	70.98	70.98	65.91	86.19	55.77	50.7	70.98	70.98	65.91	66.92	9.80	66.32	18.38	256
				2	60.84	76.05	20.28	76.05	60.84	70.98	81.12	86.19	50.7	20.28	60.33	23.59			
				3	81.12	25.35	86.19	91.26	30.42	70.98	81.12	70.98	65.91	86.19	68.95	23.07			
				4	76.05	65.91	81.12	86.19	45.63	76.05	70.98	76.05	91.26	60.84	73.01	13.13			
				5	76.05	76.05	30.42	45.63	81.12	45.63	50.7	65.91	60.84	91.26	62.36	19.13			
ML-1	00LC2-ST013-NSD-010	100	93.22	1	45.63	50.7	65.91	70.98	65.91	60.84	55.77	45.63	76.05	50.7	58.81	10.74	67.74	11.71	261
				2	76.05	65.91	101.4	65.91	70.98	76.05	70.98	55.77	65.91	70.98	71.99	11.90			
				3	55.77	50.7	76.05	70.98	76.05	70.98	70.98	50.7	60.84	60.84	64.39	9.87			
				4	70.98	60.84	65.91	60.84	70.98	70.98	65.91	65.91	60.84	65.91	65.91	4.14			
				5	96.33	81.12	86.19	65.91	70.98	96.33	65.91	70.98	76.05	65.91	77.57	11.96			
ML-4	00LC2-ST027-NSD-010	100	92.86	1	55.77	50.7	45.63	65.91	55.77	60.84	65.91	60.84	50.7	70.98	58.31	8.02	55.97	11.03	216
				2	76.05	60.84	35.49	55.77	45.63	30.42	55.77	55.77	60.84	55.77	53.24	13.15			
				3	65.91	65.91	30.42	55.77	55.77	55.77	65.91	45.63	35.49	70.98	54.76	13.69			
				4	55.77	50.7	60.84	50.7	70.98	50.7	60.84	50.7	25.35	65.91	54.25	12.43			
				5	60.84	55.77	65.91	50.7	65.91	45.63	60.84	65.91	55.77	65.91	59.32	7.19			
WB-2	00SN2-ST002-NSD-010	100	81.76	1	40.56	50.7	60.84	50.7	40.56	55.77	65.91	60.84	45.63	60.84	53.24	9.02	57.70	12.24	223
				2	50.7	60.84	91.26	91.26	70.98	45.63	55.77	55.77	40.56	60.84	62.36	17.41			
				3	35.49	60.84	35.49	35.49	65.91	55.77	55.77	50.7	65.91	55.77	51.71	12.14			
				4	76.05	50.7	65.91	45.63	65.91	65.91	65.91	60.84	70.98	76.05	64.39	9.87			
				5	50.7	50.7	55.77	60.84	55.77	45.63	60.84	70.98	55.77	60.84	56.78	7.09			
JB-2	00SN2-ST004-NSD-010	100	80.74	1	10.14	10.14	30.42	10.14	20.28	10.14	5.07	10.14	20.28	5.07	13.18	8.00	14.50	6.72	56
				2	15.21	20.28	5.07	10.14	30.42	20.28	20.28	20.28	20.28	10.14	17.24	7.25			
				3	20.28	15.21	10.14	10.14	10.14	15.21	5.07	20.28	25.35	10.14	14.20	6.23			
				4	20.28	5.07	20.28	20.28	15.21	10.14	5.07	5.07	10.14	25.35	13.69	7.58			
				5	15.21	10.14	20.28	10.14	10.14	10.14	20.28	15.21	20.28	10.14	14.20	4.66			
BBC-1	00SN2-ST006-NSD-010	100	89.66	1	30.42	30.42	50.7	55.77	30.42	35.49	30.42	60.84	50.7	50.7	42.59	12.23	44.92	13.04	173
				2	30.42	50.7	60.84	55.77	60.84	45.63	45.63	30.42	50.7	55.77	48.67	11.00			
				3	45.63	50.7	40.56	20.28	15.21	35.49	25.35	35.49	40.56	35.49	34.48	11.16			
				4	40.56	60.84	60.84	55.77	45.63	50.7	50.7	30.42	55.77	60.84	51.21	9.98			
				5	45.63	35.49	55.77	35.49	70.98	60.84	25.35	60.84	55.77	30.42	47.66	15.34			
GB-1	00SN2-ST008-NSD-010	100	90.91	1	50.7	45.63	60.84	50.7	40.56	55.77	55.77	60.84	45.63	50.7	51.71	6.67	56.38	13.99	218
				2	50.7	40.56	50.7	55.77	55.77	65.91	50.7	50.7	50.7	76.05	54.76	9.80			
				3	30.42	65.91	45.63	45.63	45.63	55.77	25.35	20.28	50.7	76.05	46.14	17.47			
				4	35.49	65.91	70.98	91.26	70.98	45.63	55.77	65.91	65.91	60.84	62.87	15.15			
				5	70.98	65.91	60.84	65.91	76.05	76.05	76.05	65.91	45.63	60.84	66.42	9.39			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
BC-2	00SN2-ST012-NSD-010	100	85.94	1	50.7	60.84	50.7	60.84	70.98	65.91	60.84	65.91	55.77	65.91	60.84	6.76	62.06	9.53	240
				2	50.7	60.84	40.56	65.91	70.98	45.63	60.84	70.98	65.91	60.84	59.32	10.43			
				3	55.77	70.98	65.91	65.91	65.91	70.98	81.12	70.98	65.91	65.91	67.94	6.41			
				4	70.98	65.91	60.84	60.84	55.77	40.56	60.84	60.84	60.84	65.91	60.33	8.09			
				5	30.42	65.91	60.84	70.98	65.91	55.77	81.12	60.84	70.98	55.77	61.85	13.48			
BC-4	00SN2-ST014-NSD-010	100	85.53	1	60.84	65.91	76.05	70.98	60.84	70.98	65.91	65.91	76.05	76.05	68.95	5.95	65.91	12.67	254
				2	40.56	60.84	81.12	65.91	40.56	60.84	45.63	70.98	60.84	65.91	59.32	13.32			
				3	65.91	60.84	101.4	55.77	70.98	86.19	55.77	76.05	60.84	60.84	69.46	14.74			
				4	81.12	35.49	60.84	70.98	65.91	76.05	50.7	81.12	76.05	70.98	66.92	14.50			
				5	65.91	50.7	70.98	35.49	76.05	70.98	70.98	65.91	76.05	65.91	64.90	12.60			
GB-5	00SN2-ST038-NSD-010	100	89.66	1	70.98	76.05	60.84	50.7	50.7	40.56	76.05	65.91	60.84	50.7	60.33	12.06	64.69	10.92	250
				2	65.91	60.84	55.77	35.49	70.98	70.98	65.91	55.77	65.91	50.7	59.83	10.90			
				3	55.77	60.84	70.98	55.77	70.98	55.77	70.98	60.84	45.63	70.98	61.85	8.88			
				4	60.84	70.98	70.98	65.91	81.12	55.77	70.98	81.12	81.12	86.19	72.50	9.87			
				5	76.05	70.98	81.12	70.98	76.05	65.91	55.77	70.98	60.84	60.84	68.95	8.00			
UCRA-1	00UC2-ST001-NSD-010	100	86.67	1	86.19	91.26	76.05	65.91	91.26	81.12	76.05	35.49	55.77	70.98	73.01	17.27	77.47	15.77	299
				2	126.75	81.12	91.26	70.98	60.84	81.12	86.19	81.12	86.19	81.12	84.67	17.08			
				3	86.19	76.05	86.19	86.19	86.19	96.33	55.77	76.05	81.12	81.12	81.12	10.69			
				4	35.49	81.12	70.98	65.91	81.12	76.05	60.84	86.19	55.77	81.12	69.46	15.50			
				5	91.26	60.84	101.4	81.12	96.33	81.12	50.7	70.98	76.05	81.12	79.09	15.53			
LC-1	00UC2-ST003-NSD-010	100	86.67	1	15.21	20.28	15.21	15.21	10.14	10.14	15.21	10.14	15.21	15.21	14.20	3.21	15.31	5.07	59
				2	10.14	25.35	30.42	10.14	10.14	15.21	20.28	20.28	15.21	20.28	17.75	6.86			
				3	15.21	15.21	15.21	15.21	15.21	10.14	10.14	15.21	20.28	25.35	15.72	4.44			
				4	15.21	25.35	10.14	10.14	20.28	25.35	20.28	15.21	10.14	10.14	16.22	6.23			
				5	15.21	10.14	10.14	10.14	15.21	10.14	10.14	15.21	15.21	15.21	12.68	2.67			
UCRB-1	00UC2-ST005-NSD-010	100	89.04	1	55.77	76.05	65.91	65.91	76.05	76.05	76.05	50.7	96.33	35.49	67.43	16.91	75.75	13.68	292
				2	55.77	70.98	65.91	81.12	86.19	86.19	70.98	81.12	81.12	65.91	74.53	10.15			
				3	70.98	81.12	65.91	81.12	65.91	91.26	76.05	96.33	76.05	76.05	78.08	9.91			
				4	81.12	70.98	70.98	81.12	76.05	70.98	76.05	101.4	91.26	86.19	80.61	9.98			
				5	35.49	101.4	76.05	76.05	81.12	96.33	86.19	70.98	76.05	81.12	78.08	17.76			
CIL-1	00UC2-ST007-NSD-010	100	87.25	1	50.7	35.49	60.84	50.7	76.05	65.91	70.98	60.84	60.84	76.05	60.84	12.65	63.88	12.92	247
				2	101.4	70.98	60.84	50.7	65.91	81.12	60.84	86.19	81.12	70.98	73.01	14.77			
				3	60.84	76.05	40.56	65.91	35.49	60.84	65.91	60.84	70.98	70.98	60.84	13.09			
				4	65.91	65.91	60.84	65.91	70.98	40.56	60.84	40.56	60.84	70.98	60.33	11.07			
				5	65.91	65.91	55.77	50.7	86.19	65.91	60.84	60.84	55.77	76.05	64.39	10.43			
CIB-1	00UC2-ST011-NSD-010	100	90.91	1	50.7	60.84	35.49	40.56	60.84	55.77	35.49	50.7	35.49	55.77	48.17	10.49	44.82	13.53	173
				2	30.42	30.42	40.56	35.49	25.35	35.49	30.42	25.35	40.56	35.49	32.96	5.48			
				3	65.91	60.84	50.7	30.42	55.77	30.42	65.91	50.7	70.98	30.42	51.21	15.75			
				4	45.63	25.35	40.56	40.56	45.63	35.49	60.84	30.42	60.84	50.7	43.60	11.76			
				5	25.35	35.49	76.05	40.56	35.49	60.84	65.91	45.63	45.63	50.7	48.17	15.54			
UCRC-1	00UC2-ST013-NSD-010	100	87.84	1	45.63	76.05	50.7	76.05	81.12	81.12	60.84	81.12	76.05	86.19	71.49	14.03	70.47	11.91	272
				2	65.91	76.05	60.84	76.05	35.49	65.91	50.7	70.98	81.12	76.05	65.91	13.94			
				3	76.05	76.05	86.19	60.84	55.77	76.05	70.98	81.12	81.12	65.91	73.01	9.62			
				4	65.91	81.12	45.63	70.98	70.98	55.77	65.91	70.98	81.12	76.05	68.45	11.02			
				5	70.98	70.98	60.84	81.12	50.7	81.12	70.98	81.12	81.12	86.19	73.52	11.02			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
CBB-1	00UC2-ST015-NSD-010	100	90.91	1	40.56	70.98	60.84	65.91	65.91	60.84	70.98	50.7	60.84	76.05	62.36	10.43	66.21	11.74	256
				2	65.91	50.7	76.05	65.91	55.77	35.49	60.84	50.7	86.19	81.12	62.87	15.53			
				3	45.63	70.98	81.12	76.05	70.98	65.91	86.19	76.05	76.05	60.84	70.98	11.46			
				4	50.7	65.91	76.05	76.05	76.05	50.7	65.91	76.05	50.7	70.98	65.91	11.21			
				5	76.05	65.91	70.98	50.7	76.05	76.05	76.05	70.98	70.98	55.77	68.95	9.01			
CBB-3	00UC2-ST017-NSD-010	100	84.97	1	25.35	10.14	15.21	15.21	25.35	35.49	20.28	30.42	25.35	15.21	21.80	7.94	32.14	12.23	124
				2	35.49	30.42	50.7	55.77	20.28	25.35	45.63	40.56	30.42	20.28	35.49	12.42			
				3	30.42	35.49	35.49	30.42	10.14	30.42	20.28	25.35	45.63	35.49	29.91	9.69			
				4	45.63	45.63	55.77	35.49	25.35	50.7	40.56	50.7	50.7	40.56	44.11	8.96			
				5	25.35	30.42	10.14	25.35	20.28	35.49	30.42	45.63	45.63	25.35	29.41	10.90			
CBB-5	00UC2-ST019-NSD-010	100	87.25	1	76.05	86.19	76.05	91.26	76.05	86.19	111.54	81.12	81.12	76.05	84.16	11.00	77.27	14.40	298
				2	81.12	50.7	60.84	50.7	76.05	50.7	65.91	101.4	76.05	65.91	67.94	16.25			
				3	76.05	70.98	70.98	101.4	76.05	86.19	76.05	70.98	91.26	81.12	80.11	10.08			
				4	116.61	76.05	76.05	86.19	70.98	76.05	86.19	86.19	76.05	86.19	83.66	12.93			
				5	40.56	76.05	55.77	76.05	76.05	60.84	91.26	70.98	86.19	70.98	70.47	14.82			
CNE-1	00UC2-ST021-NSD-010	100	90.91	1	10.14	10.14	7.605	10.14	10.14	10.14	10.14	12.675	10.14	10.14	10.14	1.20	9.38	2.13	36
				2	10.14	10.14	10.14	5.07	10.14	10.14	10.14	10.14	10.14	10.14	9.63	1.60			
				3	10.14	5.07	10.14	10.14	10.14	10.14	10.14	10.14	10.14	10.14	9.63	1.60			
				4	10.14	5.07	5.07	10.14	5.07	10.14	7.605	5.07	5.07	10.14	7.35	2.52			
				5	10.14	10.14	5.07	10.14	15.21	10.14	10.14	10.14	10.14	10.14	10.14	2.39			
CNE-3	00UC2-ST023-NSD-010	100	89.55	1	50.7	60.84	76.05	86.19	55.77	50.7	55.77	60.84	60.84	35.49	59.32	13.95	70.02	16.90	270
				2	60.84	55.77	45.63	63.375	76.05	76.05	50.7	81.12	55.77	65.91	63.12	11.74			
				3	15.21	86.19	86.19	76.05	86.19	76.05	65.91	70.98	55.77	101.4	71.99	23.64			
				4	50.7	76.05	91.26	81.12	76.05	86.19	81.12	76.05	70.98	70.98	76.05	10.95			
				5	76.05	76.05	101.4	60.84	96.33	65.91	70.98	76.05	70.98	101.4	79.60	14.74			
CSW-2	00UC2-ST025-NSD-010	100	89.04	1	65.91	45.63	55.77	30.42	65.91	40.56	50.7	70.98	76.05	65.91	56.78	14.69	58.81	10.89	227
				2	50.7	76.05	60.84	60.84	60.84	65.91	30.42	50.7	55.77	60.84	57.29	11.96			
				3	60.84	45.63	60.84	65.91	60.84	60.84	50.7	65.91	60.84	65.91	59.83	6.67			
				4	50.7	30.42	65.91	55.77	60.84	55.77	60.84	45.63	70.98	55.77	55.26	11.32			
				5	70.98	65.91	60.84	60.84	70.98	50.7	65.91	60.84	65.91	76.05	64.90	7.09			
CSW-4	00UC2-ST027-NSD-010	100	90.91	1	65.91	35.49	50.7	70.98	60.84	76.05	60.84	60.84	70.98	55.77	60.84	11.71	64.79	13.52	250
				2	60.84	70.98	35.49	76.05	60.84	70.98	76.05	65.91	65.91	65.91	64.90	11.66			
				3	70.98	30.42	35.49	45.63	55.77	76.05	76.05	70.98	45.63	81.12	58.81	18.54			
				4	76.05	76.05	60.84	70.98	65.91	70.98	60.84	76.05	60.84	55.77	67.43	7.58			
				5	81.12	70.98	50.7	96.33	50.7	81.12	81.12	70.98	70.98	65.91	71.99	14.10			
CSW-6	00UC2-ST029-NSD-010	100	89.04	1	76.05	20.28	76.05	50.7	40.56	35.49	55.77	50.7	76.05	60.84	54.25	18.83	65.71	17.56	254
				2	35.49	81.12	76.05	70.98	81.12	86.19	60.84	50.7	60.84	86.19	68.95	16.76			
				3	86.19	76.05	76.05	45.63	81.12	86.19	70.98	65.91	86.19	86.19	76.05	12.87			
				4	70.98	45.63	55.77	70.98	60.84	55.77	45.63	86.19	65.91	86.19	64.39	14.55			
				5	30.42	40.56	86.19	81.12	76.05	65.91	55.77	76.05	50.7	86.19	64.90	19.68			
CIL-3	00UC2-ST037-NSD-010	100	78.31	1	60.84	76.05	86.19	106.47	76.05	76.05	76.05	70.98	86.19	81.12	79.60	11.96	76.15	13.53	294
				2	91.26	60.84	91.26	50.7	81.12	70.98	60.84	101.4	86.19	76.05	77.06	16.17			
				3	60.84	86.19	81.12	86.19	70.98	96.33	76.05	101.4	60.84	76.05	79.60	13.53			
				4	60.84	65.91	76.05	65.91	81.12	60.84	70.98	50.7	81.12	70.98	68.45	9.63			
				5	101.4	76.05	81.12	65.91	81.12	76.05	70.98	45.63	91.26	70.98	76.05	14.93			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LAR32	Control	50	45.78	1	40.56	35.49	40.56	50.7	35.49	35.49	30.42	40.56	30.42	35.49	37.52	5.95	33.87	5.37	100
				2	30.42	35.49	30.42	30.42	30.42	25.35	35.49	40.56	40.56	30.42	32.96	4.93			
				3	35.49	30.42	25.35	35.49	30.42	35.49	30.42	25.35	30.42	40.56	31.94	4.81			
				4	30.42	40.56	35.49	25.35	25.35	30.42	35.49	30.42	30.42	35.49	31.94	4.81			
				5	30.42	30.42	40.56	40.56	30.42	35.49	30.42	40.56	40.56	30.42	34.98	5.04			
UBI1-2	00BI2-ST002-NSD-010	50	42.77	1	30.42	35.49	35.49	35.49	40.56	30.42	35.49	30.42	45.63	35.49	35.49	4.78	47.35	10.77	140
				2	60.84	55.77	45.63	40.56	30.42	55.77	55.77	50.7	40.56	45.63	48.17	9.33			
				3	35.49	40.56	45.63	40.56	45.63	60.84	65.91	50.7	65.91	60.84	51.21	11.32			
				4	55.77	45.63	40.56	70.98	60.84	45.63	50.7	40.56	35.49	65.91	51.21	11.82			
				5	40.56	50.7	40.56	50.7	60.84	55.77	50.7	60.84	45.63	50.7	50.70	7.17			
UBI14-2	00BI2-ST004-NSD-010	50	43.34	1	35.49	55.77	55.77	65.91	65.91	60.84	50.7	55.77	40.56	65.91	55.26	10.54	57.29	7.40	169
				2	65.91	70.98	60.84	55.77	60.84	60.84	60.84	65.91	45.63	60.84	6.76				
				3	65.91	60.84	55.77	65.91	55.77	50.7	60.84	50.7	50.7	60.84	57.80	5.95			
				4	60.84	55.77	50.7	55.77	50.7	55.77	50.7	55.77	55.77	55.77	54.76	3.21			
				5	60.84	60.84	45.63	45.63	55.77	60.84	50.7	70.98	65.91	60.84	57.80	8.35			
UBI1-1	00BI2-ST006-NSD-010	50	41.94	1	86.19	70.98	76.05	81.12	70.98	70.98	40.56	65.91	70.98	50.7	68.45	13.57	67.43	11.42	199
				2	55.77	70.98	60.84	55.77	60.84	70.98	55.77	65.91	76.05	65.91	63.88	7.25			
				3	65.91	70.98	76.05	60.84	76.05	55.77	60.84	70.98	65.91	70.98	67.43	6.78			
				4	70.98	55.77	70.98	70.98	40.56	70.98	55.77	45.63	81.12	76.05	63.88	13.56			
				5	76.05	101.4	55.77	60.84	76.05	70.98	76.05	86.19	65.91	65.91	73.52	13.15			
MBI3-1	00BI2-ST008-NSD-010	50	43.05	1	76.05	55.77	60.84	50.7	60.84	60.84	55.77	76.05	60.84	65.91	62.36	8.30	65.20	9.93	193
				2	55.77	55.77	70.98	60.84	86.19	81.12	76.05	50.7	81.12	76.05	69.46	12.66			
				3	70.98	50.7	50.7	76.05	60.84	60.84	55.77	50.7	55.77	60.84	59.32	8.63			
				4	55.77	70.98	60.84	76.05	55.77	60.84	86.19	65.91	60.84	70.98	66.42	9.69			
				5	60.84	76.05	65.91	76.05	60.84	76.05	55.77	76.05	70.98	65.91	68.45	7.65			
MBI3-3	00BI2-ST010-NSD-010	50	43.34	1	65.91	35.49	45.63	65.91	45.63	50.7	65.91	50.7	55.77	35.49	51.71	11.66	55.36	10.93	163
				2	35.49	45.63	55.77	40.56	65.91	50.7	65.91	55.77	55.77	40.56	51.21	10.54			
				3	65.91	50.7	55.77	60.84	60.84	65.91	50.7	55.77	60.84	55.77	58.31	5.48			
				4	50.7	50.7	55.77	55.77	50.7	76.05	60.84	50.7	91.26	55.77	59.83	13.48			
				5	35.49	50.7	45.63	55.77	65.91	55.77	76.05	50.7	60.84	60.84	55.77	11.21			
LBI1-2	00BI2-ST012-NSD-010	50	44.52	1	60.84	65.91	45.63	50.7	50.7	55.77	81.12	60.84	50.7	20.28	54.25	15.68	61.55	12.55	182
				2	55.77	50.7	55.77	50.7	65.91	60.84	70.98	60.84	60.84	70.98	60.33	7.35			
				3	50.7	55.77	60.84	60.84	70.98	60.84	55.77	70.98	60.84	70.98	61.85	7.09			
				4	60.84	81.12	65.91	60.84	60.84	60.84	40.56	65.91	70.98	65.91	63.38	10.21			
				5	70.98	76.05	30.42	55.77	76.05	76.05	81.12	76.05	86.19	50.7	67.94	17.10			
LBI1-4	00BI2-ST014-NSD-010	50	44.52	1	45.63	50.7	55.77	50.7	60.84	70.98	50.7	50.7	60.84	65.91	56.28	8.09	68.34	13.68	202
				2	65.91	60.84	76.05	65.91	70.98	60.84	76.05	76.05	65.91	76.05	69.46	6.35			
				3	65.91	55.77	86.19	60.84	55.77	70.98	91.26	101.4	81.12	76.05	74.53	15.50			
				4	96.33	35.49	60.84	70.98	65.91	45.63	65.91	86.19	76.05	86.19	68.95	18.70			
				5	65.91	76.05	65.91	76.05	81.12	76.05	81.12	55.77	60.84	86.19	72.50	9.87			
LBI3-2	00BI2-ST016-NSD-010	50	45.46	1	50.7	65.91	70.98	60.84	86.19	76.05	81.12	65.91	76.05	76.05	70.98	10.42	73.01	14.84	216
				2	65.91	65.91	86.19	81.12	70.98	86.19	96.33	60.84	65.91	81.12	76.05	11.71			
				3	76.05	81.12	30.42	60.84	70.98	50.7	76.05	65.91	60.84	86.19	65.91	16.39			
				4	86.19	55.77	86.19	70.98	86.19	86.19	76.05	70.98	35.49	81.12	73.52	16.60			

Original	CDM	Conc.	% Original	Length (mm)										Replicate		Grand		% of	
Station ID	Designation	(%)	Sample	REP	1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	Control
				5	86.19	81.12	86.19	35.49	91.26	86.19	70.98	91.26	65.91	91.26	78.59	17.44			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control		
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD			
LBI6-1	00BI2-ST018-NSD-010	50	42.26	1	60.84	70.98	55.77	86.19	81.12	76.05	60.84	60.84	76.05	81.12	70.98	10.69	71.39	15.80	211		
				2	81.12	35.49	76.05	81.12	65.91	86.19	70.98	55.77	96.33	65.91	71.49	17.14					
				3	81.12	45.63	86.19	30.42	76.05	50.7	35.49	101.4	70.98	76.05	65.40	23.47					
				4	76.05	86.19	86.19	76.05	45.63	86.19	86.19	65.91	81.12	75.54	13.19						
				5	60.84	50.7	81.12	70.98	86.19	86.19	81.12	86.19	60.84	70.98	73.52	12.70					
LBI6-3	00BI2-ST020-NSD-010	50	43.92	1	50.7	81.12	76.05	70.98	81.12	70.98	25.35	111.54	65.91	35.49	66.92	24.70	66.52	15.99	196		
				2	60.84	55.77	65.91	65.91	70.98	55.77	50.7	40.56	70.98	55.77	59.32	9.58					
				3	40.56	76.05	76.05	65.91	60.84	76.05	86.19	70.98	81.12	76.05	70.98	12.87					
				4	65.91	70.98	65.91	101.4	55.77	65.91	60.84	76.05	50.7	76.05	68.95	13.98					
				5	65.91	81.12	81.12	76.05	81.12	35.49	70.98	60.84	45.63	65.91	66.42	15.57					
LBI9-2	00BI2-ST022-NSD-010	50	43.92	1	65.91	35.49	76.05	40.56	55.77	65.91	76.05	86.19	55.77	55.77	61.35	15.93	66.62	12.71	197		
				2	55.77	60.84	70.98	81.12	70.98	70.98	65.91	76.05	50.7	70.98	67.43	9.27					
				3	55.77	60.84	70.98	65.91	81.12	65.91	65.91	60.84	70.98	65.91	66.42	6.95					
				4	60.84	50.7	65.91	60.84	70.98	60.84	86.19	50.7	76.05	81.12	66.42	12.06					
				5	65.91	40.56	65.91	50.7	91.26	91.26	86.19	65.91	76.05	81.12	71.49	16.98					
LBI3-1	00BI2-ST024-NSD-010	50	43.34	1	76.05	50.7	50.7	65.91	76.05	65.91	45.63	81.12	50.7	55.77	61.85	12.83	65.91	10.98	195		
				2	50.7	60.84	65.91	55.77	55.77	70.98	60.84	60.84	50.7	60.84	59.32	6.35					
				3	70.98	81.12	81.12	70.98	76.05	65.91	55.77	76.05	70.98	60.84	70.98	8.28					
				4	70.98	65.91	81.12	50.7	65.91	86.19	65.91	70.98	65.91	76.05	69.97	9.80					
				5	60.84	70.98	70.98	70.98	60.84	70.98	81.12	35.49	70.98	81.12	67.43	13.10					
LBI3-3	00BI2-ST026-NSD-010	50	44.52	1	55.77	76.05	65.91	76.05	55.77	60.84	70.98	76.05	50.7	81.12	66.92	10.63	67.23	12.70	198		
				2	65.91	81.12	35.49	50.7	40.56	60.84	86.19	81.12	60.84	40.56	60.33	18.43					
				3	70.98	60.84	76.05	70.98	60.84	86.19	70.98	55.77	70.98	65.91	68.95	8.68					
				4	86.19	65.91	65.91	76.05	76.05	65.91	81.12	45.63	70.98	45.63	67.94	13.56					
				5	55.77	76.05	65.91	70.98	76.05	70.98	76.05	70.98	91.26	65.91	71.99	9.19					
LPPG-2	00BI2-ST028-NSD-010	50	42.59	1	65.91	70.98	91.26	91.26	40.56	81.12	65.91	86.19	91.26	70.98	75.54	16.11	73.62	18.22	217		
				2	81.12	91.26	55.77	55.77	81.12	81.12	40.56	60.84	126.75	81.12	75.54	24.07					
				3	81.12	76.05	50.7	70.98	65.91	40.56	70.98	65.91	60.84	35.49	61.85	15.08					
				4	76.05	55.77	76.05	91.26	65.91	76.05	91.26	86.19	55.77	55.77	73.01	14.18					
				5	81.12	76.05	111.54	81.12	70.98	65.91	76.05	111.54	86.19	60.84	82.13	17.20					
LPPG-4	00BI2-ST030-NSD-010	50	41.4	1	40.56	35.49	30.42	35.49	25.35	15.21	35.49	40.56	30.42	25.35	31.43	7.85	30.07	9.50	89		
				2	25.35	35.49	30.42	15.21	30.42	35.49	25.35	40.56	25.35	20.28	28.39	7.63					
				3	30.42	35.49	25.35	30.42	32.955	10.14	35.49	30.42	35.49	20.28	28.65	8.11					
				4	30.42	20.28	10.14	35.49	40.56	25.35	25.35	35.49	30.42	35.49	28.90	8.96					
				5	45.63	35.49	10.14	15.21	25.35	40.56	45.63	55.77	25.35	30.42	32.96	14.39					
LBV-2	00BV2-ST002-NSD-010	50	43.34	1	70.98	55.77	76.05	60.84	60.84	35.49	60.84	35.49	60.84	55.77	30.42	65.91	57.29	14.35	64.85	12.16	191
				2	70.98	65.91	50.7	35.49	65.91	63.375	76.05	55.77	86.19	60.84	63.12	13.96					
				3	81.12	81.12	65.91	50.7	86.19	70.98	76.05	65.91	81.12	70.98	73.01	10.47					
				4	65.91	60.84	40.56	60.84	70.98	65.91	70.98	65.91	70.98	65.91	63.88	9.01					
				5	55.77	60.84	60.84	76.05	81.12	70.98	70.98	70.98	60.84	60.84	66.92	8.21					
LBV-4	00BV2-ST004-NSD-010	50	26.97	1	35.49	30.42	50.7	50.7	50.7	45.63	50.7	40.56	25.35	35.49	41.57	9.50	37.42	9.27	110		
				2	25.35	60.84	35.49	40.56	35.49	45.63	25.35	50.7	50.7	25.35	39.55	12.37					
				3	45.63	40.56	30.42	35.49	45.63	25.35	30.42	30.42	25.35	40.56	34.98	7.73					
				4	40.56	35.49	30.42	45.63	30.42	40.56	40.56	45.63	40.56	30.42	38.03	5.98					
				5	25.35	35.49	40.56	30.42	50.7	35.49	25.35	30.42	20.28	35.49	32.96	8.70					

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LBV-6	00BV2-ST006-NSD-010	50	42.77	1	55.77	50.7	55.77	50.7	55.77	76.05	65.91	70.98	65.91	76.05	62.36	9.87	62.26	9.28	184
				2	76.05	60.84	65.91	60.84	70.98	70.98	65.91	70.98	60.84	55.77	65.91	6.32			
				3	55.77	55.77	50.7	60.84	45.63	60.84	55.77	45.63	60.84	60.84	55.26	6.07			
				4	91.26	60.84	60.84	65.91	55.77	55.77	76.05	55.77	60.84	60.84	63.88	11.51			
				5	50.7	65.91	65.91	50.7	81.12	70.98	60.84	70.98	60.84	60.84	63.88	9.32			
UBV-2	00BV2-ST008-NSD-010	50	39.4	1	55.77	55.77	45.63	50.7	65.91	50.7	50.7	50.7	65.91	40.56	53.24	8.02	54.65	9.89	161
				2	50.7	35.49	55.77	60.84	60.84	65.91	45.63	65.91	50.7	60.84	55.26	9.69			
				3	55.77	55.77	40.56	60.84	50.7	50.7	40.56	60.84	50.7	45.63	51.21	7.35			
				4	45.63	60.84	60.84	50.7	65.91	50.7	45.63	30.42	60.84	60.84	53.24	10.76			
				5	76.05	70.98	50.7	35.49	70.98	65.91	50.7	60.84	55.77	65.91	60.33	12.29			
UBV-4	00BV2-ST010-NSD-010	50	36.93	1	30.42	30.42	35.49	40.56	40.56	35.49	30.42	35.49	35.49	25.35	33.97	4.81	32.65	6.49	96
				2	25.35	25.35	20.28	40.56	35.49	40.56	30.42	35.49	35.49	25.35	31.43	7.09			
				3	35.49	35.49	35.49	45.63	40.56	35.49	35.49	30.42	25.35	40.56	36.00	5.58			
				4	25.35	25.35	25.35	35.49	35.49	40.56	25.35	30.42	45.63	35.49	32.45	7.25			
				5	25.35	20.28	25.35	35.49	25.35	40.56	25.35	35.49	35.49	25.35	29.41	6.67			
PL-1	00LC2-ST001-NSD-010	50	42.49	1	40.56	40.56	45.63	50.7	40.56	45.63	50.7	76.05	55.77	45.63	49.18	10.70	57.90	9.56	171
				2	55.77	55.77	55.77	60.84	55.77	65.91	50.7	50.7	65.91	65.91	58.31	5.98			
				3	45.63	50.7	60.84	55.77	55.77	55.77	60.84	60.84	60.84	50.7	55.77	5.34			
				4	65.91	55.77	76.05	70.98	65.91	60.84	65.91	60.84	60.84	65.91	64.90	5.76			
				5	60.84	55.77	40.56	60.84	55.77	65.91	81.12	55.77	76.05	60.84	61.35	11.32			
PL-3	00LC2-ST003-NSD-010	50	46.43	1	76.05	65.91	65.91	60.84	76.05	50.7	60.84	30.42	65.91	70.98	62.36	13.53	69.46	13.87	205
				2	55.77	50.7	70.98	60.84	60.84	60.84	60.84	60.84	76.05	70.98	62.87	7.63			
				3	86.19	70.98	60.84	60.84	86.19	60.84	50.7	76.05	70.98	70.98	69.46	11.47			
				4	60.84	70.98	70.98	70.98	60.84	70.98	45.63	76.05	86.19	76.05	68.95	11.00			
				5	111.54	76.05	81.12	70.98	101.4	96.33	65.91	70.98	86.19	76.05	83.66	14.97			
MCR-1	00LC2-ST005-NSD-010	50	45.45	1	40.56	40.56	50.7	30.42	50.7	40.56	25.35	35.49	50.7	40.56	40.56	8.62	44.41	12.27	131
				2	55.77	50.7	35.49	50.7	35.49	25.35	60.84	35.49	50.7	20.28	42.08	13.53			
				3	50.7	30.42	50.7	50.7	50.7	35.49	45.63	45.63	60.84	55.77	47.66	9.01			
				4	60.84	15.21	35.49	25.35	35.49	55.77	55.77	40.56	35.49	45.63	40.56	14.34			
				5	45.63	60.84	65.91	55.77	40.56	70.98	45.63	50.7	50.7	25.35	51.21	13.19			
MCR-3	00LC2-ST007-NSD-010	50	43.34	1	50.7	45.63	55.77	60.84	60.84	50.7	50.7	55.77	30.42	55.77	51.71	8.88	55.87	10.27	165
				2	60.84	76.05	35.49	60.84	60.84	55.77	55.77	50.7	50.7	60.84	56.78	10.36			
				3	50.7	65.91	60.84	60.84	45.63	76.05	55.77	65.91	55.77	60.84	59.83	8.55			
				4	55.77	60.84	60.84	76.05	60.84	60.84	50.7	60.84	45.63	76.05	60.84	9.56			
				5	60.84	55.77	60.84	50.7	30.42	60.84	35.49	40.56	50.7	55.77	50.19	11.07			
BO-2	00LC2-ST009-NSD-010	50	43.92	1	76.05	55.77	76.05	50.7	60.84	76.05	30.42	86.19	65.91	45.63	62.36	17.08	67.94	12.16	201
				2	50.7	65.91	70.98	91.26	76.05	55.77	55.77	50.7	45.63	60.84	62.36	13.95			
				3	60.84	65.91	65.91	81.12	81.12	81.12	65.91	70.98	55.77	76.05	70.47	9.09			
				4	65.91	70.98	70.98	76.05	76.05	65.91	76.05	76.05	70.98	55.77	70.47	6.52			
				5	81.12	86.19	76.05	70.98	81.12	60.84	70.98	81.12	65.91	65.91	74.02	8.35			
BO-4	00LC2-ST011-NSD-010	50	41.94	1	76.05	81.12	50.7	60.84	60.84	70.98	96.33	81.12	60.84	65.91	70.47	13.40	71.89	13.92	212
				2	76.05	86.19	76.05	70.98	45.63	35.49	86.19	76.05	70.98	65.91	68.95	16.42			
				3	60.84	60.84	91.26	76.05	76.05	70.98	70.98	81.12	55.77	45.63	68.95	13.35			
				4	65.91	86.19	91.26	70.98	76.05	76.05	86.19	70.98	76.05	86.19	78.59	8.37			
				5	70.98	76.05	35.49	50.7	81.12	81.12	86.19	86.19	86.19	70.98	72.50	16.91			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control	
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD		
ML-1	00LC2-ST013-NSD-010	50	46.61	1	60.84	60.84	55.77	65.91	81.12	81.12	76.05	81.12	25.35	65.91	65.40	16.98	70.57	15.63	208	
				2	91.26	81.12	91.26	55.77	76.05	55.77	40.56	86.19	60.84	50.7	68.95	18.39				
				3	86.19	81.12	81.12	86.19	50.7	91.26	76.05	81.12	65.91	55.77	75.54	13.61				
				4	91.26	70.98	55.77	70.98	35.49	76.05	50.7	60.84	70.98	81.12	66.42	16.11				
				5	86.19	55.77	81.12	96.33	70.98	81.12	60.84	76.05	81.12	76.05	76.56	11.82				
ML-4	00LC2-ST027-NSD-010	50	46.43	1	20.28	70.98	60.84	81.12	76.05	55.77	76.05	55.77	70.98	65.91	63.38	17.44	68.24	13.01	201	
				2	76.05	65.91	76.05	76.05	35.49	60.84	86.19	86.19	65.91	76.05	70.47	14.82				
				3	70.98	76.05	65.91	70.98	76.05	50.7	65.91	70.98	70.98	76.05	69.46	7.58				
				4	60.84	76.05	86.19	65.91	55.77	50.7	65.91	70.98	76.05	81.12	68.95	11.26				
				5	81.12	86.19	70.98	76.05	50.7	60.84	60.84	50.7	86.19	65.91	68.95	13.35				
WB-2	00SN2-ST002-NSD-010	50	40.88	1	50.7	45.63	25.35	55.77	60.84	40.56	55.77	76.05	45.63	60.84	51.71	13.69	55.26	12.09	163	
				2	70.98	50.7	55.77	50.7	70.98	55.77	60.84	65.91	50.7	60.84	59.32	7.94				
				3	50.7	60.84	40.56	55.77	45.63	55.77	76.05	55.77	50.7	70.98	56.28	10.81				
				4	60.84	65.91	55.77	65.91	40.56	30.42	20.28	50.7	55.77	70.98	51.71	16.52				
				5	55.77	45.63	76.05	65.91	70.98	55.77	50.7	50.7	50.7	50.7	57.29	10.15				
JB-2	00SN2-ST004-NSD-010	50	40.37	1	25.35	20.28	20.28	25.35	30.42	15.21	50.7	30.42	25.35	25.35	26.87	9.58	21.50	8.36	63	
				2	15.21	30.42	10.14	15.21	10.14	10.14	25.35	25.35	20.28	10.14	17.24	7.63				
				3	15.21	25.35	10.14	15.21	15.21	30.42	25.35	25.35	15.21	25.35	20.28	6.76				
				4	20.28	10.14	35.49	30.42	35.49	15.21	25.35	20.28	20.28	15.21	22.82	8.70				
				5	35.49	15.21	20.28	25.35	10.14	15.21	15.21	25.35	20.28	20.28	20.28	7.17				
BBC-1	00SN2-ST006-NSD-010	50	44.83	1	45.63	30.42	55.77	35.49	25.35	35.49	55.77	35.49	25.35	40.56	38.53	11.00	47.25	14.65	140	
				2	30.42	40.56	35.49	65.91	50.7	45.63	25.35	30.42	35.49	40.56	40.05	11.82				
				3	35.49	30.42	30.42	55.77	30.42	40.56	45.63	25.35	65.91	25.35	38.53	13.56				
				4	60.84	55.77	60.84	60.84	65.91	65.91	60.84	60.84	60.84	50.7	60.33	4.44				
				5	45.63	60.84	65.91	60.84	76.05	45.63	45.63	50.7	60.84	76.05	58.81	11.76				
GB-1	00SN2-ST008-NSD-010	50	45.46	1	76.05	40.56	60.84	65.91	70.98	70.98	50.7	60.84	76.05	65.91	63.88	11.26	67.13	14.72	198	
				2	60.84	70.98	35.49	86.19	76.05	35.49	81.12	50.7	70.98	76.05	64.39	18.21				
				3	35.49	81.12	81.12	76.05	76.05	55.77	40.56	45.63	55.77	76.05	62.36	17.73				
				4	76.05	70.98	65.91	76.05	55.77	60.84	81.12	70.98	45.63	76.05	67.94	11.00				
				5	65.91	76.05	60.84	76.05	70.98	91.26	91.26	91.26	65.91	81.12	77.06	11.41				
BC-2	00SN2-ST012-NSD-010	50	42.97	1	55.77	45.63	45.63	70.98	60.84	70.98	55.77	70.98	65.91	76.05	61.85	10.90	71.89	13.38	212	
				2	76.05	91.26	40.56	86.19	60.84	81.12	86.19	70.98	55.77	81.12	73.01	16.07				
				3	70.98	81.12	81.12	65.91	60.84	86.19	55.77	76.05	81.12	76.05	73.52	9.93				
				4	96.33	81.12	81.12	70.98	86.19	81.12	86.19	86.19	60.84	76.05	80.61	9.69				
				5	35.49	81.12	86.19	81.12	70.98	76.05	70.98	70.98	60.84	70.98	70.47	14.23				
BC-4	00SN2-ST014-NSD-010	50	42.77	1	60.84	50.7	65.91	76.05	70.98	60.84	65.91	70.98	76.05	76.05	67.43	8.30	70.47	11.87	208	
				2	86.19	60.84	70.98	96.33	76.05	76.05	60.84	55.77	86.19	65.91	76.05	73.52				13.15
				3	65.91	50.7	70.98	76.05	76.05	40.56	76.05	55.77	76.05	81.12	66.92	13.48				
				4	86.19	76.05	65.91	55.77	81.12	81.12	70.98	55.77	70.98	70.98	71.49	10.27				
				5	50.7	70.98	81.12	81.12	101.4	70.98	55.77	70.98	70.98	76.05	73.01	13.98				
GB-5	00SN2-ST038-NSD-010	50	44.83	1	65.91	76.05	65.91	65.91	60.84	70.98	60.84	76.05	30.42	81.12	65.40	14.03	68.45	11.82	202	
				2	76.05	55.77	65.91	55.77	76.05	60.84	65.91	76.05	81.12	76.05	68.95	9.32				
				3	65.91	40.56	70.98	65.91	65.91	65.91	65.91	60.84	70.98	76.05	64.90	9.50				
				4	55.77	60.84	70.98	76.05	50.7	76.05	81.12	55.77	81.12	70.98	67.94	11.26				
				5	50.7	70.98	76.05	76.05	101.4	70.98	76.05	60.84	81.12	86.19	75.04	13.69				

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control	
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD		
UCRA-1	00UC2-ST001-NSD-010	50	43.34	1	81.12	81.12	81.12	65.91	76.05	91.26	76.05	81.12	86.19	76.05	79.60	6.78	76.56	11.14	226	
				2	86.19	60.84	76.05	86.19	55.77	65.91	96.33	70.98	55.77	70.98	72.50	13.74				
				3	55.77	70.98	81.12	96.33	81.12	76.05	86.19	86.19	81.12	91.26	80.61	11.32				
				4	76.05	81.12	70.98	91.26	70.98	60.84	76.05	86.19	45.63	70.98	73.01	12.91				
				5	76.05	76.05	76.05	86.19	76.05	76.05	81.12	91.26	55.77	76.05	77.06	9.19				
LC-1	00UC2-ST003-NSD-010	50	433.34	1	50.7	55.77	55.77	60.84	70.98	65.91	60.84	55.77	60.84	76.05	61.35	7.73	60.94	14.17	180	
				2	45.63	65.91	65.91	65.91	50.7	50.7	70.98	40.56	50.7	55.77	56.28	10.27				
				3	70.98	70.98	50.7	65.91	60.84	30.42	76.05	25.35	60.84	60.84	57.29	17.08				
				4	70.98	65.91	70.98	20.28	60.84	76.05	40.56	45.63	55.77	86.19	59.32	19.42				
				5	65.91	91.26	70.98	70.98	50.7	65.91	76.05	65.91	65.91	81.12	70.47	10.81				
UCRB-1	00UC2-ST005-NSD-010	50	44.52	1	76.05	25.35	81.12	70.98	70.98	81.12	65.91	81.12	65.91	40.56	55.77	63.88	18.23	70.68	12.77	209
				2	76.05	91.26	76.05	81.12	65.91	81.12	76.05	81.12	81.12	60.84	77.06	8.55				
				3	81.12	65.91	65.91	50.7	65.91	60.84	86.19	65.91	86.19	60.84	68.95	11.76				
				4	50.7	86.19	91.26	70.98	86.19	76.05	55.77	76.05	65.91	70.98	73.01	13.13				
				5	76.05	81.12	65.91	76.05	76.05	60.84	70.98	65.91	76.05	55.77	70.47	8.09				
CIL-1	00UC2-ST007-NSD-010	50	43.63	1	65.91	70.98	65.91	70.98	45.63	60.84	50.7	65.91	40.56	70.98	60.84	11.21	63.98	10.54	189	
				2	76.05	81.12	81.12	65.91	50.7	55.77	65.91	70.98	76.05	65.91	68.95	10.20				
				3	60.84	45.63	60.84	76.05	55.77	55.77	76.05	65.91	76.05	70.98	64.39	10.43				
				4	65.91	55.77	55.77	55.77	60.84	55.77	76.05	40.56	55.77	65.91	58.81	9.32				
				5	60.84	70.98	76.05	76.05	76.05	70.98	45.63	65.91	55.77	70.98	66.92	10.08				
CIB-1	00UC2-ST011-NSD-010	50	45.46	1	50.7	35.49	30.42	40.56	50.7	45.63	20.28	25.35	50.7	40.56	39.04	10.97	41.98	11.36	124	
				2	30.42	50.7	35.49	40.56	60.84	60.84	40.56	30.42	45.63	35.49	43.10	11.27				
				3	40.56	40.56	45.63	35.49	25.35	30.42	50.7	50.7	35.49	30.42	38.53	8.68				
				4	35.49	45.63	30.42	50.7	60.84	25.35	35.49	25.35	50.7	50.7	41.07	12.29				
				5	70.98	35.49	65.91	35.49	45.63	45.63	55.77	35.49	40.56	50.7	48.17	12.70				
UCRC-1	00UC2-ST013-NSD-010	50	43.92	1	76.05	60.84	25.35	60.84	30.42	55.77	65.91	70.98	76.05	70.98	59.32	17.89	68.55	13.44	202	
				2	60.84	91.26	60.84	70.98	65.91	45.63	70.98	50.7	65.91	70.98	65.40	12.52				
				3	70.98	60.84	60.84	70.98	76.05	65.91	81.12	76.05	65.91	65.91	69.46	6.78				
				4	76.05	76.05	86.19	76.05	76.05	70.98	76.05	76.05	65.91	86.19	76.56	6.07				
				5	70.98	81.12	65.91	76.05	81.12	76.05	65.91	45.63	55.77	101.4	71.99	15.27				
CBB-1	00UC2-ST015-NSD-010	50	45.46	1	70.98	81.12	76.05	65.91	55.77	60.84	76.05	65.91	91.26	76.05	71.99	10.36	73.52	12.76	217	
				2	60.84	81.12	81.12	60.84	65.91	50.7	76.05	70.98	76.05	55.77	67.94	10.74				
				3	76.05	60.84	86.19	60.84	60.84	65.91	60.84	76.05	81.12	81.12	70.98	10.14				
				4	70.98	65.91	101.4	81.12	116.61	81.12	76.05	81.12	65.91	76.05	81.63	15.93				
				5	76.05	76.05	65.91	45.63	86.19	70.98	86.19	91.26	86.19	65.91	75.04	13.69				
CBB-3	00UC2-ST017-NSD-010	50	42.49	1	50.7	30.42	81.12	45.63	60.84	60.84	65.91	76.05	70.98	81.12	62.36	16.39	75.04	20.23	222	
				2	70.98	86.19	81.12	126.75	70.98	76.05	70.98	45.63	55.77	86.19	77.06	21.62				
				3	50.7	86.19	76.05	91.26	91.26	81.12	76.05	45.63	86.19	86.19	77.06	16.17				
				4	91.26	136.89	86.19	91.26	91.26	76.05	91.26	76.05	101.4	81.12	92.27	17.53				
				5	50.7	70.98	81.12	25.35	76.05	76.05	60.84	76.05	86.19	60.84	66.42	17.96				
CBB-5	00UC2-ST019-NSD-010	50	43.63	1	40.56	65.91	45.63	81.12	86.19	81.12	91.26	76.05	86.19	86.19	74.02	17.76	80.92	14.95	239	
				2	86.19	101.4	86.19	76.05	76.05	76.05	76.05	86.19	96.33	60.84	82.13	11.66				
				3	96.33	81.12	81.12	91.26	86.19	60.84	91.26	101.4	76.05	81.12	84.67	11.47				
				4	86.19	86.19	45.63	65.91	91.26	91.26	86.19	76.05	65.91	96.33	79.09	15.71				
				5	40.56	81.12	96.33	91.26	96.33	101.4	86.19	76.05	86.19	91.26	84.67	17.24				

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control	
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD		
CNE-1	00UC2-ST021-NSD-010	50	45.46	1	30.42	25.35	20.28	20.28	30.42	25.35	25.35	30.42	20.28	25.35	25.35	4.14	18.66	7.83	55	
				2	25.35	45.63	15.21	15.21	15.21	30.42	15.21	20.28	25.35	20.28	22.82	9.63				
				3	20.28	10.14	20.28	20.28	10.14	10.14	10.14	20.28	10.14	14.20	5.24					
				4	20.28	10.14	10.14	10.14	30.42	10.14	10.14	25.35	20.28	20.28	16.73	7.58				
				5	10.14	10.14	15.21	15.21	10.14	15.21	15.21	10.14	25.35	15.21	14.20	4.66				
CNE-3	00UC2-ST023-NSD-010	50	44.78	1	81.12	50.7	50.7	60.84	76.05	60.84	91.26	50.7	70.98	40.56	63.38	16.08	72.15	12.35	213	
				2	70.98	65.91	76.05	65.91	76.05	76.05	81.12	76.05	65.91	81.12	73.52	5.98				
				3	65.91	76.05	70.98	91.26	60.84	55.77	86.19	86.19	73.515	76.05	74.28	11.47				
				4	50.7	76.05	65.91	81.12	50.7	96.33	65.91	81.12	65.91	70.98	70.47	14.03				
				5	81.12	86.19	76.05	76.05	76.05	65.91	86.19	81.12	91.26	70.98	79.09	7.63				
CSW-2	00UC2-ST025-NSD-010	50	44.52	1	35.49	40.56	50.7	60.84	45.63	45.63	50.7	60.84	50.7	65.91	60.84	51.21	9.69	60.43	14.98	178
				2	45.63	76.05	40.56	65.91	50.7	50.7	60.84	50.7	65.91	55.77	56.28	10.81				
				3	30.42	76.05	76.05	55.77	25.35	65.91	65.91	55.77	96.33	50.7	59.83	21.35				
				4	81.12	70.98	86.19	60.84	35.49	55.77	60.84	86.19	55.77	70.98	66.42	15.93				
				5	65.91	70.98	55.77	65.91	81.12	65.91	76.05	60.84	60.84	81.12	68.45	8.70				
CSW-4	00UC2-ST027-NSD-010	50	45.46	1	70.98	76.05	65.91	60.84	45.63	60.84	60.84	60.84	55.77	76.05	63.38	9.33	68.85	12.92	203	
				2	81.12	76.05	60.84	91.26	65.91	86.19	86.19	76.05	76.05	91.26	79.09	10.20				
				3	60.84	81.12	86.19	81.12	70.98	35.49	65.91	65.91	65.91	76.05	68.95	14.38				
				4	60.84	50.7	70.98	55.77	55.77	81.12	35.49	76.05	70.98	70.98	62.87	13.77				
				5	65.91	65.91	60.84	50.7	76.05	76.05	65.91	91.26	81.12	65.91	69.97	11.41				
CSW-6	00UC2-ST029-NSD-010	50	44.52	1	50.7	60.84	76.05	76.05	70.98	65.91	70.98	76.05	86.19	60.84	69.46	10.15	73.72	13.28	218	
				2	96.33	86.19	86.19	81.12	30.42	91.26	86.19	81.12	70.98	76.05	78.59	18.40				
				3	76.05	96.33	86.19	70.98	81.12	86.19	76.05	76.05	81.12	70.98	80.11	7.85				
				4	86.19	76.05	60.84	65.91	50.7	81.12	50.7	70.98	60.84	76.05	67.94	12.23				
				5	86.19	91.26	65.91	60.84	45.63	76.05	65.91	76.05	76.05	81.12	72.50	13.32				
CIL-3	00UC2-ST037-NSD-010	50	39.16	1	86.19	91.26	76.05	86.19	45.63	76.05	81.12	81.12	60.84	76.05	76.05	13.52	79.29	12.74	234	
				2	91.26	96.33	86.19	91.26	96.33	70.98	96.33	86.19	86.19	70.98	87.20	9.50				
				3	60.84	81.12	121.68	76.05	60.84	70.98	70.98	70.98	86.19	76.05	77.57	17.41				
				4	96.33	81.12	60.84	81.12	81.12	76.05	70.98	86.19	76.05	81.12	79.09	9.32				
				5	60.84	70.98	86.19	81.12	76.05	55.77	81.12	86.19	91.26	76.05	76.56	11.32				
LAR32	Control	25	22.89	1	25.35	45.63	35.49	35.49	45.63	30.42	35.49	35.49	30.42	35.49	35.49	6.32	39.44	7.75	100	
				2	45.63	50.7	50.7	45.63	50.7	50.7	45.63	50.7	45.63	45.63	48.17	2.67				
				3	35.49	30.42	45.63	35.49	35.49	45.63	45.63	30.42	30.42	40.56	37.52	6.41				
				4	25.35	35.49	45.63	35.49	40.56	55.77	35.49	40.56	40.56	35.49	39.04	7.94				
				5	35.49	25.35	45.63	30.42	45.63	50.7	35.49	35.49	30.42	35.49	37.01	7.94				
UBI1-2	00BI2-ST002-NSD-010	25	21.38	1	50.7	70.98	70.98	70.98	65.91	60.84	60.84	60.84	60.84	50.7	62.36	7.58	66.06	12.21	168	
				2	55.77	50.7	65.91	55.77	55.77	55.77	70.98	60.84	60.84	55.77	81.12	60.84				9.26
				3	45.63	50.7	70.98	65.91	50.7	70.98	81.12	76.05	70.98	76.05	65.91	12.42				
				4	60.84	65.91	91.26	70.98	35.49	60.84	70.98	65.91	81.12	63.375	66.67	14.54				
				5	81.12	106.47	70.98	76.05	65.91	55.77	76.05	65.91	70.98	76.05	74.53	13.32				
UBI14-2	00BI2-ST004-NSD-010	25	21.67	1	50.7	55.77	60.84	55.77	45.63	55.77	50.7	60.84	70.98	40.56	54.76	8.55	57.29	9.68	145	
				2	50.7	45.63	55.77	60.84	70.98	60.84	55.77	60.84	55.77	45.63	56.28	7.73				
				3	55.77	60.84	60.84	60.84	65.91	50.7	60.84	55.77	76.05	50.7	59.83	7.48				
				4	55.77	50.7	45.63	50.7	50.7	40.56	50.7	86.19	60.84	60.84	55.26	12.52				

Original	CDM	Conc.	% Original	Length (mm)										Replicate		Grand		% of	
Station ID	Designation	(%)	Sample	REP	1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	Control
				5	76.05	60.84	55.77	76.05	40.56	60.84	65.91	65.91	55.77	45.63	60.33	11.57			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control	
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD		
UBI1-1	00BI2-ST006-NSD-010	25	20.97	1	70.98	35.49	86.19	70.98	55.77	65.91	70.98	60.84	91.26	45.63	65.40	16.98	70.47	14.09	179	
				2	86.19	70.98	35.49	70.98	60.84	45.63	70.98	60.84	81.12	76.05	65.91	15.67				
				3	55.77	65.91	76.05	70.98	40.56	96.33	76.05	65.91	70.98	76.05	69.46	14.55				
				4	86.19	65.91	65.91	81.12	81.12	76.05	96.33	81.12	60.84	86.19	78.08	11.00				
				5	76.05	81.12	65.91	76.05	60.84	60.84	81.12	65.91	81.12	86.19	73.52	9.33				
MBI3-1	00BI2-ST008-NSD-010	25	21.52	1	60.84	81.12	76.05	76.05	60.84	70.98	30.42	70.98	76.05	60.84	66.42	14.63	67.03	10.56	170	
				2	65.91	50.7	65.91	60.84	50.7	60.84	70.98	70.98	86.19	55.77	63.88	10.74				
				3	60.84	76.05	81.12	65.91	60.84	76.05	70.98	60.84	76.05	76.05	70.47	7.73				
				4	65.91	60.84	60.84	65.91	76.05	55.77	70.98	40.56	65.91	65.91	62.87	9.62				
				5	60.84	81.12	81.12	76.05	60.84	70.98	76.05	65.91	65.91	76.05	71.49	7.73				
MBI3-3	00BI2-ST010-NSD-010	25	21.67	1	30.42	65.91	76.05	55.77	55.77	50.7	65.91	55.77	70.98	60.84	58.81	12.69	60.03	11.74	152	
				2	50.7	40.56	70.98	30.42	60.84	70.98	65.91	55.77	70.98	60.84	57.80	13.77				
				3	55.77	60.84	60.84	55.77	60.84	50.7	45.63	60.84	81.12	70.98	60.33	9.98				
				4	60.84	60.84	60.84	55.77	50.7	25.35	60.84	70.98	55.77	55.77	55.77	11.95				
				5	55.77	70.98	81.12	60.84	60.84	81.12	65.91	65.91	65.91	65.91	67.43	8.30				
LBI1-2	00BI2-ST012-NSD-010	25	22.26	1	50.7	25.35	50.7	50.7	50.7	60.84	45.63	60.84	35.49	50.7	48.17	10.76	58.71	11.77	149	
				2	55.77	50.7	65.91	60.84	40.56	60.84	55.77	50.7	50.7	60.84	55.26	7.35				
				3	50.7	55.77	86.19	70.98	60.84	70.98	50.7	70.98	70.98	45.63	63.38	12.70				
				4	55.77	60.84	65.91	76.05	60.84	60.84	65.91	60.84	50.7	60.84	61.85	6.67				
				5	45.63	60.84	60.84	65.91	50.7	60.84	76.05	60.84	81.12	86.19	64.90	12.83				
LBI1-4	00BI2-ST014-NSD-010	25	22.26	1	76.05	81.12	70.98	76.05	60.84	76.05	70.98	81.12	55.77	86.19	73.52	9.33	72.91	12.71	185	
				2	76.05	65.91	81.12	70.98	76.05	50.7	96.33	60.84	65.91	76.05	71.99	12.37				
				3	70.98	81.12	45.63	76.05	76.05	60.84	60.84	76.05	101.4	70.98	71.99	14.69				
				4	76.05	70.98	76.05	55.77	65.91	86.19	76.05	81.12	70.98	86.19	74.53	9.27				
				5	76.05	86.19	91.26	86.19	50.7	86.19	40.56	81.12	76.05	50.7	72.50	18.21				
LBI3-2	00BI2-ST016-NSD-010	25	22.73	1	81.12	81.12	76.05	50.7	86.19	86.19	70.98	40.56	86.19	30.42	68.95	20.73	75.04	18.75	190	
				2	76.05	91.26	81.12	81.12	30.42	40.56	86.19	55.77	65.91	76.05	68.45	20.17				
				3	91.26	45.63	106.47	86.19	96.33	81.12	60.84	45.63	55.77	96.33	76.56	22.60				
				4	40.56	70.98	96.33	96.33	91.26	86.19	86.19	60.84	86.19	70.98	78.59	17.77				
				5	101.4	81.12	76.05	81.12	86.19	81.12	86.19	81.12	65.91	86.19	82.64	8.96				
LBI6-1	00BI2-ST018-NSD-010	25	21.13	1	70.98	86.19	101.4	96.33	76.05	60.84	50.7	70.98	65.91	81.12	76.05	15.67	74.12	14.98	188	
				2	81.12	65.91	91.26	55.77	45.63	86.19	50.7	86.19	76.05	76.05	71.49	16.11				
				3	81.12	101.4	86.19	76.05	86.19	76.05	76.05	81.12	60.84	86.19	81.12	10.42				
				4	70.98	50.7	81.12	55.77	70.98	25.35	55.77	70.98	70.98	65.91	61.85	15.82				
				5	60.84	81.12	96.33	86.19	76.05	76.05	81.12	76.05	86.19	81.12	80.11	9.19				
LBI6-3	00BI2-ST020-NSD-010	25	21.96	1	81.12	81.12	65.91	60.84	60.84	81.12	70.98	50.7	65.91	65.91	68.45	10.21	74.43	13.99	189	
				2	65.91	76.05	60.84	70.98	76.05	81.12	55.77	70.98	86.19	45.63	81.12	69.46				12.66
				3	65.91	25.35	76.05	70.98	76.05	81.12	86.19	60.84	91.26	76.05	70.98	18.36				
				4	70.98	65.91	76.05	101.4	81.12	65.91	81.12	81.12	86.19	76.05	78.59	10.49				
				5	106.47	86.19	81.12	91.26	76.05	91.26	86.19	81.12	60.84	86.19	84.67	11.72				
LBI9-2	00BI2-ST022-NSD-010	25	21.96	1	70.98	76.05	86.19	76.05	81.12	50.7	76.05	76.05	76.05	65.91	73.52	9.63	70.78	12.67	179	
				2	76.05	70.98	81.12	101.4	50.7	50.7	65.91	60.84	81.12	70.98	70.98	15.30				
				3	60.84	65.91	70.98	65.91	55.77	60.84	70.98	70.98	76.05	60.84	65.91	6.32				
				4	76.05	40.56	86.19	50.7	76.05	50.7	55.77	81.12	81.12	65.91	66.42	15.93				
				5	76.05	81.12	60.84	86.19	70.98	81.12	96.33	60.84	91.26	65.91	77.06	12.37				

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LBI3-1	00BI2-ST024-NSD-010	25	21.67	1	60.84	76.05	60.84	76.05	50.7	70.98	65.91	76.05	60.84	55.77	65.40	9.09	67.63	13.61	171
				2	76.05	60.84	55.77	45.63	60.84	60.84	65.91	60.84	70.98	50.7	60.84	8.94			
				3	76.05	70.98	70.98	81.12	55.77	65.91	101.4	35.49	70.98	81.12	70.98	17.23			
				4	91.26	76.05	76.05	40.56	45.63	70.98	81.12	70.98	70.98	76.05	69.97	15.45			
				5	70.98	81.12	60.84	76.05	81.12	70.98	91.26	55.77	40.56	81.12	70.98	14.93			
LBI3-3	00BI2-ST026-NSD-010	25	22.26	1	76.05	60.84	76.05	55.77	76.05	65.91	81.12	70.98	76.05	76.05	71.49	8.09	67.63	11.16	171
				2	70.98	76.05	65.91	70.98	70.98	60.84	86.19	70.98	65.91	50.7	68.95	9.32			
				3	81.12	60.84	70.98	76.05	30.42	76.05	76.05	70.98	65.91	70.98	67.94	14.38			
				4	60.84	65.91	70.98	65.91	60.84	76.05	50.7	55.77	70.98	60.84	63.88	7.63			
				5	35.49	65.91	76.05	70.98	65.91	86.19	45.63	70.98	65.91	76.05	65.91	14.93			
LPPG-2	00BI2-ST028-NSD-010	25	21.24	1	15.21	30.42	40.56	50.7	35.49	30.42	45.63	45.63	25.35	30.42	34.98	10.81	39.55	10.98	100
				2	35.49	25.35	35.49	30.42	40.56	15.21	40.56	40.56	35.49	30.42	32.96	8.02			
				3	40.56	40.56	35.49	35.49	45.63	30.42	30.42	35.49	30.42	40.56	36.50	5.24			
				4	60.84	50.7	60.84	45.63	65.91	45.63	50.7	55.77	35.49	65.91	53.74	9.91			
				5	40.56	35.49	30.42	50.7	50.7	35.49	35.49	40.56	40.56	35.49	39.55	6.67			
LPPG-4	00BI2-ST030-NSD-010	25	20.70	1	55.77	35.49	40.56	35.49	25.35	30.42	40.56	25.35	25.35	40.56	35.49	9.56	30.32	9.36	77
				2	40.56	30.42	25.35	40.56	20.28	35.49	30.42	25.35	35.49	20.28	30.42	7.56			
				3	35.49	20.28	30.42	25.35	20.28	10.14	10.14	30.42	20.28	25.35	22.82	8.37			
				4	35.49	40.56	35.49	35.49	40.56	30.42	15.21	25.35	35.49	35.49	32.96	7.65			
				5	30.42	30.42	40.56	25.35	45.63	10.14	20.28	30.42	30.42	35.49	29.91	9.98			
LBV-2	00BV2-ST002-NSD-010	25	21.67	1	40.56	60.84	70.98	70.98	50.7	70.98	45.63	70.98	70.98	65.91	61.85	11.90	63.98	10.64	162
				2	60.84	45.63	70.98	65.91	35.49	76.05	55.77	60.84	65.91	70.98	60.84	12.42			
				3	65.91	50.7	60.84	60.84	60.84	65.91	65.91	60.84	81.12	65.91	63.88	7.63			
				4	70.98	76.05	55.77	65.91	76.05	45.63	76.05	60.84	60.84	70.98	65.91	10.14			
				5	86.19	70.98	65.91	81.12	60.84	60.84	55.77	50.7	65.91	76.05	67.43	11.22			
LBV-4	00BV2-ST004-NSD-010	25	13.49	1	35.49	40.56	35.49	35.49	35.49	25.35	30.42	40.56	35.49	35.49	34.98	4.44	37.47	7.37	95
				2	40.56	35.49	35.49	45.63	40.56	35.49	35.49	55.77	45.63	50.7	42.08	7.19			
				3	35.49	25.35	45.63	35.49	35.49	30.42	30.42	38.025	25.35	45.63	34.73	7.18			
				4	50.7	20.28	45.63	35.49	30.42	45.63	30.42	45.63	30.42	40.56	37.52	9.62			
				5	30.42	45.63	45.63	30.42	35.49	30.42	45.63	40.56	35.49	40.56	38.03	6.44			
LBV-6	00BV2-ST006-NSD-010	25	21.38	1	50.7	65.91	45.63	35.49	45.63	55.77	45.63	65.91	55.77	50.7	51.71	9.50	56.18	11.17	142
				2	30.42	60.84	55.77	60.84	45.63	50.7	65.91	76.05	60.84	60.84	56.78	12.37			
				3	45.63	60.84	76.05	60.84	50.7	60.84	65.91	55.77	50.7	35.49	56.28	11.32			
				4	30.42	60.84	45.63	60.84	81.12	55.77	60.84	60.84	65.91	50.7	57.29	13.32			
				5	55.77	60.84	70.98	50.7	35.49	60.84	65.91	60.84	65.91	60.84	58.81	9.91			
UBV-2	00BV2-ST008-NSD-010	25	19.70	1	45.63	40.56	50.7	45.63	20.28	50.7	45.63	35.49	20.28	45.63	40.05	11.32	48.67	11.17	123
				2	50.7	55.77	55.77	40.56	45.63	35.49	50.7	60.84	50.7	50.7	49.69	7.48			
				3	40.56	40.56	40.56	45.63	50.7	50.7	30.42	50.7	55.77	50.7	45.63	7.56			
				4	55.77	30.42	60.84	70.98	60.84	45.63	55.77	30.42	70.98	50.7	53.24	14.39			
				5	65.91	60.84	50.7	55.77	60.84	50.7	50.7	35.49	55.77	60.84	54.76	8.55			
UBV-4	00BV2-ST010-NSD-010	25	18.47	1	30.42	20.28	35.49	35.49	45.63	35.49	20.28	35.49	40.56	25.35	32.45	8.35	30.52	8.54	77
				2	25.35	20.28	25.35	25.35	40.56	40.56	35.49	20.28	40.56	30.42	30.42	8.28			
				3	30.42	15.21	25.35	30.42	20.28	30.42	30.42	35.49	20.28	25.35	26.36	6.23			
				4	30.42	25.35	45.63	30.42	35.49	35.49	40.56	30.42	60.84	35.49	37.01	10.15			
				5	20.28	25.35	35.49	25.35	30.42	20.28	25.35	30.42	30.42	20.28	26.36	5.24			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
PL-1	00LC2-ST001-NSD-010	25	21.24	1	50.7	45.63	55.77	30.42	50.7	50.7	45.63	50.7	60.84	50.7	49.18	7.94	54.25	9.40	138
				2	55.77	45.63	50.7	60.84	50.7	70.98	65.91	65.91	65.91	55.77	58.81	8.35			
				3	55.77	45.63	55.77	35.49	55.77	76.05	40.56	55.77	45.63	45.63	51.21	11.32			
				4	55.77	50.7	55.77	50.7	60.84	50.7	60.84	65.91	70.98	50.7	57.29	7.19			
				5	50.7	50.7	50.7	60.84	55.77	35.49	50.7	65.91	70.98	55.77	54.76	9.80			
PL-3	00LC2-ST003-NSD-010	25	23.22	1	65.91	81.12	50.7	86.19	65.91	70.98	45.63	60.84	60.84	65.91	65.40	12.29	70.37	11.71	178
				2	70.98	60.84	60.84	60.84	76.05	65.91	65.91	91.26	65.91	70.98	68.95	9.32			
				3	65.91	81.12	60.84	60.84	50.7	70.98	65.91	65.91	65.91	101.4	68.95	13.77			
				4	65.91	81.12	60.84	70.98	60.84	81.12	70.98	55.77	60.84	60.84	66.92	8.88			
				5	91.26	76.05	76.05	70.98	81.12	81.12	81.12	81.12	81.12	96.33	81.63	7.35			
MCR-1	00LC2-ST005-NSD-010	25	22.73	1	35.49	40.56	50.7	40.56	40.56	35.49	50.7	30.42	55.77	55.77	43.60	9.01	47.25	10.72	120
				2	35.49	40.56	60.84	65.91	45.63	60.84	60.84	25.35	55.77	40.56	49.18	13.53			
				3	45.63	40.56	45.63	60.84	55.77	50.7	60.84	40.56	35.49	50.7	48.67	8.68			
				4	55.77	45.63	35.49	25.35	60.84	45.63	60.84	60.84	50.7	55.77	49.69	11.90			
				5	25.35	45.63	50.7	35.49	35.49	60.84	55.77	50.7	45.63	45.63	45.12	10.54			
MCR-3	00LC2-ST007-NSD-010	25	21.67	1	35.49	60.84	65.91	81.12	50.7	60.84	55.77	81.12	35.49	50.7	57.80	15.89	61.45	13.10	156
				2	55.77	35.49	55.77	65.91	55.77	60.84	55.77	65.91	70.98	86.19	60.84	13.09			
				3	55.77	76.05	60.84	60.84	60.84	50.7	35.49	70.98	45.63	70.98	58.81	12.46			
				4	55.77	50.7	55.77	76.05	55.77	60.84	60.84	101.4	76.05	70.98	66.42	15.20			
				5	50.7	70.98	55.77	65.91	70.98	70.98	65.91	70.98	60.84	50.7	63.38	8.37			
BO-2	00LC2-ST009-NSD-010	25	21.96	1	35.49	45.63	50.7	60.84	60.84	60.84	70.98	50.7	50.7	55.77	54.25	9.87	62.67	12.74	159
				2	50.7	70.98	60.84	65.91	50.7	55.77	65.91	65.91	76.05	65.91	62.87	8.35			
				3	35.49	55.77	35.49	50.7	70.98	76.05	60.84	50.7	70.98	96.33	60.33	18.89			
				4	65.91	60.84	65.91	65.91	55.77	65.91	50.7	70.98	65.91	70.98	63.88	6.41			
				5	76.05	60.84	70.98	60.84	60.84	91.26	65.91	76.05	65.91	91.26	71.99	11.66			
BO-4	00LC2-ST011-NSD-010	25	20.97	1	65.91	86.19	76.05	86.19	76.05	76.05	50.7	60.84	70.98	76.05	72.50	10.97	74.02	15.02	188
				2	70.98	55.77	70.98	76.05	81.12	86.19	91.26	65.91	65.91	35.49	69.97	16.00			
				3	86.19	86.19	81.12	81.12	86.19	70.98	101.4	45.63	60.84	91.26	79.09	16.07			
				4	65.91	101.4	55.77	70.98	76.05	30.42	81.12	70.98	81.12	70.98	70.47	18.43			
				5	86.19	86.19	70.98	81.12	96.33	76.05	50.7	70.98	91.26	70.98	78.08	13.13			
ML-1	00LC2-ST013-NSD-010	25	23.31	1	81.12	60.84	76.05	81.12	86.19	101.4	70.98	76.05	81.12	70.98	78.59	10.76	79.19	16.09	201
				2	60.84	35.49	91.26	70.98	106.47	60.84	81.12	76.05	81.12	81.12	74.53	19.28			
				3	101.4	76.05	91.26	65.91	96.33	106.47	81.12	86.19	86.19	60.84	85.18	14.69			
				4	55.77	96.33	86.19	76.05	50.7	76.05	81.12	81.12	65.91	101.4	77.06	16.17			
				5	91.26	86.19	101.4	50.7	70.98	91.26	101.4	45.63	86.19	81.12	80.61	19.34			
ML-4	00LC2-ST027-NSD-010	25	23.22	1	45.63	60.84	50.7	101.4	65.91	60.84	65.91	86.19	65.91	50.7	65.40	16.98	70.68	13.87	179
				2	76.05	86.19	60.84	86.19	76.05	65.91	81.12	76.05	91.26	91.26	79.09	10.20			
				3	96.33	70.98	70.98	60.84	35.49	81.12	55.77	70.98	70.98	76.05	68.95	16.07			
				4	86.19	50.7	55.77	60.84	91.26	55.77	81.12	70.98	60.84	70.98	68.45	13.99			
				5	65.91	81.12	60.84	70.98	65.91	81.12	60.84	76.05	86.19	65.91	71.49	9.09			
WB-2	00SN2-ST002-NSD-010	25	20.44	1	50.7	60.84	50.7	65.91	60.84	50.7	55.77	30.42	55.77	65.91	54.76	10.36	52.12	10.60	132
				2	70.98	50.7	55.77	50.7	55.77	76.05	70.98	55.77	50.7	50.7	58.81	9.91			
				3	50.7	45.63	50.7	45.63	35.49	65.91	35.49	40.56	50.7	55.77	47.66	9.32			
				4	60.84	50.7	40.56	35.49	50.7	40.56	50.7	60.84	76.05	55.77	52.22	11.96			
				5	55.77	50.7	30.42	50.7	50.7	35.49	45.63	45.63	50.7	55.77	47.15	8.30			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
JB-2	00SN2-ST004-NSD-010	25	20.19	1	40.56	25.35	20.28	40.56	35.49	40.56	35.49	35.49	50.7	50.7	37.52	9.62	34.48	12.08	87
				2	35.49	25.35	55.77	35.49	40.56	60.84	45.63	35.49	35.49	45.63	41.57	10.63			
				3	20.28	25.35	25.35	45.63	25.35	15.21	20.28	45.63	15.21	20.28	25.86	11.07			
				4	40.56	10.14	40.56	35.49	15.21	25.35	15.21	40.56	20.28	40.56	28.39	12.46			
				5	50.7	25.35	40.56	40.56	55.77	40.56	30.42	40.56	40.56	25.35	39.04	9.87			
BBC-1	00SN2-ST006-NSD-010	25	22.42	1	30.42	25.35	45.63	40.56	55.77	50.7	30.42	40.56	35.49	35.49	39.04	9.58	50.40	12.52	128
				2	40.56	65.91	30.42	45.63	50.7	45.63	60.84	50.7	65.91	55.77	51.21	11.32			
				3	55.77	45.63	45.63	60.84	45.63	65.91	45.63	60.84	55.77	50.7	53.24	7.65			
				4	35.49	50.7	40.56	30.42	45.63	76.05	55.77	60.84	50.7	50.7	49.69	13.05			
				5	55.77	45.63	70.98	76.05	35.49	50.7	55.77	60.84	60.84	76.05	58.81	13.13			
GB-1	00SN2-ST008-NSD-010	25	22.73	1	70.98	76.05	76.05	70.98	60.84	55.77	60.84	60.84	76.05	76.05	68.45	8.02	69.46	12.39	176
				2	35.49	81.12	76.05	60.84	65.91	50.7	81.12	76.05	65.91	60.84	65.40	14.43			
				3	96.33	81.12	70.98	60.84	60.84	76.05	70.98	81.12	55.77	70.98	72.50	11.96			
				4	76.05	70.98	70.98	35.49	86.19	65.91	60.84	96.33	60.84	76.05	69.97	16.35			
				5	55.77	55.77	70.98	76.05	86.19	60.84	70.98	70.98	76.05	86.19	70.98	10.95			
BC-2	00SN2-ST012-NSD-010	25	21.49	1	55.77	60.84	76.05	65.91	55.77	76.05	55.77	81.12	81.12	60.84	66.92	10.63	73.41	15.74	186
				2	55.77	55.77	81.12	76.05	96.33	86.19	55.77	76.05	81.12	81.12	74.53	14.15			
				3	65.91	65.91	91.26	60.84	70.98	91.26	86.19	60.84	91.26	86.19	77.06	13.26			
				4	81.12	60.84	35.49	70.98	70.98	50.7	60.84	60.84	76.05	70.98	63.88	13.35			
				5	76.05	70.98	76.05	81.12	86.19	70.98	106.47	91.26	126.75	60.84	84.67	19.42			
BC-4	00SN2-ST014-NSD-010	25	21.38	1	70.98	76.05	65.91	60.84	60.84	40.56	50.7	45.63	81.12	86.19	63.88	15.15	64.59	15.39	164
				2	76.05	55.77	65.91	40.56	50.7	60.84	50.7	50.7	70.98	70.98	59.32	11.47			
				3	50.7	65.91	70.98	25.35	60.84	35.49	50.7	55.77	35.49	50.7	50.19	14.43			
				4	70.98	76.05	50.7	76.05	76.05	81.12	65.91	60.84	60.84	86.19	70.47	10.81			
				5	76.05	86.19	76.05	70.98	91.26	86.19	70.98	86.19	81.12	65.91	79.09	8.35			
GB-5	00SN2-ST038-NSD-010	25	22.42	1	55.77	65.91	55.77	55.77	65.91	50.7	45.63	45.63	55.77	45.63	54.25	7.58	63.88	10.64	162
				2	55.77	70.98	65.91	65.91	50.7	50.7	65.91	60.84	60.84	60.84	60.84	6.76			
				3	70.98	76.05	70.98	50.7	70.98	60.84	60.84	60.84	50.7	60.84	63.38	8.70			
				4	65.91	60.84	76.05	76.05	81.12	65.91	76.05	55.77	76.05	91.26	72.50	10.43			
				5	70.98	70.98	50.7	60.84	76.05	76.05	76.05	76.05	50.7	76.05	68.45	10.49			
UCRA-1	00UC2-ST001-NSD-010	25	21.67	1	76.05	81.12	60.84	76.05	50.7	70.98	86.19	60.84	60.84	70.98	69.46	10.97	68.55	12.97	174
				2	76.05	86.19	60.84	86.19	81.12	30.42	70.98	70.98	70.98	60.84	69.46	16.39			
				3	60.84	30.42	60.84	60.84	96.33	70.98	81.12	70.98	65.91	60.84	65.91	16.90			
				4	70.98	60.84	65.91	70.98	60.84	81.12	65.91	65.91	70.98	81.12	69.46	7.19			
				5	50.7	70.98	70.98	55.77	76.05	45.63	86.19	76.05	81.12	70.98	68.45	13.36			
LC-1	00UC2-ST003-NSD-010	25	21.67	1	50.7	25.35	45.63	65.91	65.91	76.05	50.7	70.98	45.63	70.98	56.78	15.82	67.43	15.30	171
				2	76.05	86.19	76.05	70.98	60.84	50.7	30.42	76.05	60.84	50.7	63.88	16.59			
				3	81.12	60.84	65.91	86.19	81.12	65.91	65.91	60.84	65.91	76.05	70.98	9.26			
				4	55.77	65.91	70.98	65.91	76.05	65.91	70.98	65.91	40.56	76.05	65.40	10.54			
				5	76.05	76.05	76.05	70.98	76.05	55.77	76.05	86.19	101.4	106.47	80.11	14.69			
UCRB-1	00UC2-ST005-NSD-010	25	22.26	1	40.56	55.77	55.77	35.49	60.84	55.77	55.77	60.84	65.91	50.7	53.74	9.32	69.36	16.43	176
				2	65.91	65.91	55.77	76.05	50.7	70.98	50.7	30.42	65.91	55.77	58.81	13.13			
				3	96.33	50.7	65.91	70.98	65.91	70.98	81.12	76.05	76.05	96.33	75.04	13.90			
				4	50.7	91.26	81.12	91.26	101.4	76.05	76.05	81.12	86.19	76.05	81.12	13.52			
				5	65.91	60.84	70.98	70.98	91.26	76.05	81.12	70.98	101.4	91.26	78.08	12.91			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
CIL-1	00UC2-ST007-NSD-010	25	21.81	1	55.77	76.05	70.98	30.42	60.84	55.77	40.56	60.84	30.42	25.35	50.70	17.89	58.61	15.23	149
				2	50.7	50.7	55.77	55.77	30.42	76.05	55.77	50.7	70.98	76.05	57.29	13.95			
				3	60.84	111.54	60.84	50.7	60.84	50.7	60.84	55.77	50.7	60.84	62.36	17.89			
				4	60.84	55.77	70.98	50.7	60.84	60.84	55.77	81.12	50.7	55.77	60.33	9.39			
				5	60.84	35.49	76.05	35.49	60.84	65.91	76.05	70.98	76.05	65.91	62.36	15.31			
CIB-1	00UC2-ST011-NSD-010	25	22.73	1	55.77	60.84	25.35	40.56	25.35	30.42	40.56	45.63	30.42	30.42	38.53	12.46	36.91	9.11	94
				2	35.49	35.49	40.56	35.49	35.49	45.63	45.63	35.49	40.56	40.56	39.04	4.17			
				3	55.77	50.7	35.49	30.42	35.49	35.49	30.42	40.56	30.42	40.56	38.53	8.68			
				4	20.28	45.63	25.35	35.49	35.49	35.49	25.35	35.49	35.49	45.63	33.97	8.30			
				5	25.35	30.42	25.35	30.42	50.7	25.35	50.7	30.42	30.42	45.63	34.48	10.36			
UCRC-1	00UC2-ST013-NSD-010	25	21.96	1	60.84	65.91	65.91	86.19	76.05	65.91	70.98	60.84	50.7	76.05	67.94	9.91	67.13	13.26	170
				2	45.63	65.91	65.91	60.84	65.91	81.12	65.91	25.35	81.12	60.84	61.85	16.35			
				3	55.77	65.91	60.84	81.12	60.84	76.05	50.7	76.05	81.12	60.84	66.92	10.90			
				4	76.05	30.42	76.05	76.05	60.84	50.7	76.05	70.98	76.05	50.7	64.39	15.86			
				5	76.05	70.98	81.12	81.12	70.98	81.12	50.7	65.91	91.26	76.05	74.53	10.97			
CBB-1	00UC2-ST015-NSD-010	25	22.73	1	81.12	65.91	55.77	65.91	60.84	60.84	55.77	70.98	70.98	70.98	65.91	7.93	69.66	12.07	177
				2	60.84	60.84	60.84	50.7	55.77	50.7	55.77	65.91	60.84	50.7	57.29	5.37			
				3	55.77	76.05	81.12	81.12	70.98	96.33	76.05	65.91	86.19	70.98	76.05	11.21			
				4	91.26	65.91	65.91	76.05	70.98	81.12	65.91	101.4	76.05	60.84	75.54	12.75			
				5	81.12	70.98	60.84	50.7	91.26	76.05	76.05	70.98	76.05	81.12	73.52	11.27			
CBB-3	00UC2-ST017-NSD-010	25	21.24	1	76.05	30.42	76.05	76.05	126.75	55.77	101.4	76.05	70.98	76.05	76.56	25.23	80.11	17.02	203
				2	76.05	96.33	81.12	70.98	86.19	101.4	96.33	81.12	86.19	91.26	86.70	9.69			
				3	91.26	76.05	106.47	101.4	76.05	86.19	65.91	65.91	81.12	91.26	84.16	13.77			
				4	96.33	86.19	91.26	40.56	55.77	55.77	76.05	91.26	86.19	65.91	74.53	18.98			
				5	81.12	101.4	81.12	76.05	91.26	65.91	65.91	81.12	86.19	55.77	78.59	13.36			
CBB-5	00UC2-ST019-NSD-010	25	21.81	1	70.98	76.05	106.47	70.98	76.05	86.19	86.19	81.12	86.19	60.84	80.11	12.37	83.45	11.95	212
				2	101.4	81.12	86.19	91.26	86.19	86.19	65.91	96.33	76.05	86.19	85.68	9.98			
				3	86.19	101.4	76.05	81.12	86.19	91.26	76.05	76.05	111.54	81.12	86.70	11.82			
				4	101.4	101.4	50.7	70.98	86.19	86.19	81.12	76.05	76.05	86.19	81.63	14.82			
				5	55.77	86.19	76.05	91.26	81.12	91.26	91.26	91.26	91.26	76.05	83.15	11.51			
CNE-1	00UC2-ST021-NSD-010	25	22.73	1	30.42	25.35	25.35	20.28	15.21	30.42	20.28	15.21	25.35	15.21	22.31	5.95	20.99	6.56	53
				2	25.35	10.14	25.35	25.35	20.28	25.35	20.28	25.35	10.14	25.35	21.29	6.23			
				3	10.14	25.35	15.21	20.28	25.35	20.28	10.14	10.14	20.28	30.42	18.76	7.19			
				4	10.14	25.35	30.42	20.28	30.42	10.14	25.35	25.35	25.35	15.21	21.80	7.58			
				5	25.35	20.28	10.14	25.35	10.14	15.21	25.35	25.35	25.35	25.35	20.79	6.52			
CNE-3	00UC2-ST023-NSD-010	25	22.39	1	70.98	60.84	35.49	50.7	60.84	60.84	76.05	70.98	76.05	70.98	63.38	12.70	71.69	12.88	182
				2	70.98	70.98	76.05	65.91	60.84	81.12	76.05	55.77	76.05	65.91	69.97	7.85			
				3	86.19	86.19	60.84	76.05	76.05	60.84	70.98	76.05	81.12	76.05	75.04	8.88			
				4	86.19	60.84	86.19	76.05	70.98	81.12	76.05	121.68	60.84	70.98	79.09	17.43			
				5	81.12	50.7	55.77	70.98	70.98	70.98	81.12	60.84	86.19	81.12	70.98	11.95			
CSW-2	00UC2-ST025-NSD-010	25	22.26	1	50.7	35.49	60.84	65.91	30.42	55.77	45.63	45.63	50.7	60.84	50.19	11.32	57.29	10.66	145
				2	50.7	55.77	55.77	65.91	45.63	55.77	50.7	60.84	55.77	70.98	56.78	7.48			
				3	76.05	45.63	81.12	55.77	65.91	45.63	55.77	60.84	70.98	50.7	60.84	12.42			
				4	30.42	50.7	55.77	70.98	60.84	65.91	60.84	55.77	76.05	55.77	58.31	12.48			
				5	55.77	55.77	55.77	55.77	65.91	60.84	70.98	50.7	65.91	65.91	60.33	6.52			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
CSW-4	00UC2-ST027-NSD-010	25	22.73	1	30.42	70.98	60.84	76.05	70.98	81.12	35.49	81.12	81.12	65.91	65.40	18.43	68.65	13.52	174
				2	70.98	81.12	65.91	86.19	55.77	55.77	60.84	70.98	70.98	55.77	67.43	10.70			
				3	60.84	70.98	55.77	55.77	76.05	81.12	76.05	81.12	76.05	81.12	71.49	10.27			
				4	60.84	65.91	70.98	86.19	76.05	55.77	70.98	55.77	76.05	86.19	70.47	11.07			
				5	55.77	45.63	40.56	76.05	60.84	70.98	81.12	91.26	81.12	81.12	68.45	16.94			
CSW-6	00UC2-ST029-NSD-010	25	22.26	1	91.26	76.05	81.12	76.05	50.7	50.7	86.19	55.77	81.12	55.77	70.47	15.57	76.96	13.14	195
				2	81.12	91.26	86.19	86.19	81.12	86.19	81.12	60.84	76.05	70.98	80.11	8.88			
				3	86.19	111.54	81.12	76.05	76.05	65.91	81.12	96.33	65.91	86.19	82.64	13.74			
				4	86.19	81.12	55.77	86.19	81.12	65.91	86.19	76.05	96.33	50.7	76.56	14.63			
				5	81.12	81.12	76.05	70.98	50.7	86.19	65.91	70.98	81.12	86.19	75.04	10.90			
CIL-3	00UC2-ST037-NSD-010	25	19.58	1	60.84	65.91	50.7	55.77	76.05	70.98	76.05	40.56	65.91	55.77	61.85	11.41	66.52	13.84	169
				2	60.84	50.7	60.84	76.05	81.12	101.4	86.19	76.05	60.84	60.84	71.49	15.39			
				3	81.12	25.35	81.12	60.84	76.05	60.84	70.98	35.49	76.05	86.19	65.40	20.34			
				4	70.98	65.91	70.98	60.84	81.12	70.98	60.84	70.98	45.63	65.91	66.42	9.39			
				5	86.19	60.84	50.7	65.91	76.05	60.84	65.91	55.77	76.05	76.05	67.43	10.97			
LAR32	Control	12.5	11.44	1	30.42	35.49	50.7	30.42	45.63	45.63	30.42	35.49	40.56	25.35	37.01	8.30	40.86	7.83	100
				2	55.77	45.63	40.56	40.56	40.56	55.77	30.42	45.63	35.49	40.56	43.10	8.02			
				3	35.49	45.63	40.56	40.56	30.42	50.7	45.63	35.49	40.56	45.63	41.07	6.07			
				4	35.49	35.49	50.7	50.7	45.63	35.49	30.42	45.63	40.56	45.63	41.57	7.09			
				5	35.49	50.7	50.7	35.49	25.35	35.49	55.77	45.63	35.49	45.63	41.57	9.50			
MCR-1	00LC2-ST005-NSD-010	12.5	11.36	1	25.35	35.49	45.63	35.49	50.7	30.42	50.7	50.7	40.56	30.42	39.55	9.50	52.93	13.48	130
				2	55.77	60.84	65.91	65.91	55.77	60.84	55.77	60.84	60.84	55.77	59.83	4.00			
				3	70.98	40.56	60.84	35.49	35.49	50.7	55.77	55.77	60.84	55.77	52.22	11.72			
				4	50.7	60.84	70.98	45.63	35.49	20.28	50.7	60.84	70.98	60.84	52.73	15.89			
				5	76.05	50.7	70.98	76.05	50.7	50.7	60.84	35.49	70.98	60.84	60.33	13.40			
LAR32	Control	6.25	6.72	1	35.49	40.56	40.56	45.63	40.56	45.63	30.42	35.49	30.42	45.63	39.04	5.88	40.05	7.82	100
				2	25.35	50.7	45.63	45.63	40.56	55.77	35.49	40.56	45.63	25.35	41.07	9.98			
				3	35.49	50.7	40.56	40.56	40.56	40.56	40.56	45.63	35.49	40.56	41.07	4.44			
				4	35.49	30.42	45.63	55.77	50.7	30.42	30.42	40.56	35.49	20.28	37.52	10.74			
				5	35.49	45.63	30.42	45.63	50.7	45.63	50.7	35.49	35.49	40.56	41.57	7.09			
MCR-1	00LC2-ST005-NSD-010	6.25	5.68	1	45.63	35.49	25.35	35.49	30.42	25.35	40.56	20.28	30.42	30.42	31.94	7.58	34.17	7.44	85
				2	25.35	25.35	35.49	25.35	30.42	30.42	35.49	30.42	35.49	35.49	30.93	4.44			
				3	30.42	25.35	30.42	30.42	35.49	45.63	35.49	45.63	35.49	35.49	34.98	6.52			
				4	25.35	30.42	35.49	50.7	20.28	40.56	50.7	35.49	50.7	35.49	37.52	10.74			
				5	30.42	25.35	35.49	35.49	35.49	30.42	40.56	40.56	45.63	35.49	35.49	5.85			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Length (mm)										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
Concentration																			
SDS	Reference Toxicant	10 mg/L	na	1	20.28	20.28	15.21	15.21	15.21	15.21	20.28	10.14	15.21	10.14	15.72	3.74	18.25	3.69	70
				2	25.35	20.28	20.28	20.28	20.28	15.21	20.28	15.21	20.28	10.14	18.76	4.17			
				3	20.28	20.28	20.28	20.28	25.35	20.28	20.28	25.35	15.21	20.28	20.79	2.88			
				4	20.28	20.28	15.21	20.28	20.28	20.28	15.21	10.14	20.28	20.28	18.25	3.54			
				5	20.28	15.21	15.21	20.28	20.28	20.28	15.21	20.28	15.21	15.21	17.75	2.67			
SDS	Reference Toxicant	5 mg/L	na	1	10.14	35.49	25.35	10.14	20.28	35.49	15.21	15.21	30.42	10.14	20.79	10.27	23.22	7.81	90
				2	15.21	25.35	20.28	20.28	25.35	15.21	25.35	20.28	25.35	25.35	21.80	4.17			
				3	20.28	25.35	30.42	30.42	15.21	30.42	20.28	30.42	15.21	40.56	25.86	8.09			
				4	30.42	25.35	15.21	20.28	30.42	35.49	25.35	10.14	30.42	25.35	24.84	7.73			
				5	10.14	15.21	10.14	25.35	25.35	25.35	30.42	30.42	25.35	30.42	22.82	8.02			
SDS	Reference Toxicant	2.5 mg/L	na	1	40.56	30.42	25.35	35.49	40.56	45.63	25.35	40.56	35.49	40.56	36.00	6.95	31.74	9.04	122
				2	25.35	20.28	20.28	20.28	15.21	35.49	10.14	15.21	40.56	30.42	23.32	9.62			
				3	35.49	20.28	35.49	30.42	35.49	35.49	35.49	40.56	35.49	25.35	32.96	5.98			
				4	35.49	35.49	35.49	15.21	30.42	25.35	50.7	20.28	40.56	25.35	31.43	10.36			
				5	35.49	40.56	25.35	30.42	45.63	30.42	35.49	25.35	40.56	40.56	34.98	6.95			
SDS	Reference Toxicant	1.25 mg/L	na	1	30.42	40.56	20.28	35.49	20.28	40.56	35.49	30.42	45.63	50.7	34.98	9.98	34.68	9.07	134
				2	35.49	25.35	50.7	30.42	40.56	35.49	35.49	40.56	30.42	30.42	35.49	7.17			
				3	25.35	50.7	45.63	20.28	40.56	30.42	30.42	40.56	25.35	25.35	33.46	10.20			
				4	30.42	15.21	50.7	25.35	45.63	30.42	35.49	35.49	35.49	30.42	33.46	9.91			
				5	30.42	35.49	15.21	35.49	40.56	45.63	35.49	50.7	35.49	35.49	36.00	9.39			

Table 12. Algal germling cell number following 96 h exposure to porewater samples from Calcasieu Estuary.

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LAR32	Control	100	91.55	1	2	3	2	2	2	3	2	2	3	3	2.40	0.52	2.58	0.64	100
				2	3	3	2	2	3	3	2	3	4	2	2.70	0.67			
				3	4	2	2	2	3	2	2	2	3	4	2.60	0.84			
				4	3	2	2	2	2	2	2	3	2	3	2.30	0.48			
				5	2	3	4	3	3	3	2	3	3	3	2.90	0.57			
MFS	Dilution Blank	100	95.24	1	4	4	3	4	3	4	3	3	3	3.40	0.52	3.88	0.72	150	
				2	4	4	5	4	4	4	4	2	4	4	3.90				0.74
				3	5	4	5	4	5	5	4	4	4	4	4.40				0.52
				4	4	3	4	4	4	4	4	4	3	4	3.80				0.42
				5	2	4	5	5	4	4	4	3	3	5	3.90				0.99
Recon	Adjustment Blank	100	72.12	1	1	1	2	1	1	1	1	1	1	1.10	0.32	1.12	0.39	43	
				2	1	1	1	1	1	1	1	1	1	3	1.20				0.63
				3	1	1	1	1	2	1	1	1	1	1	1.10				0.32
				4	2	1	1	1	1	1	1	1	1	1	1.10				0.32
				5	1	1	1	1	1	1	1	1	2	1	1.10				0.32
UBI1-2	00BI2-ST002-NSD-010	100	85.53	1	1	1	1	2	1	1	1	1	1	1.10	0.32	1.44	0.61	56	
				2	2	2	2	1	1	1	2	2	2	3	1.80				0.63
				3	1	1	1	1	1	2	2	1	1	2	1.30				0.48
				4	1	2	1	1	2	1	1	2	1	1	1.30				0.48
				5	1	1	1	3	2	1	3	1	2	2	1.70				0.82
UBI14-2	00BI2-ST004-NSD-010	100	86.67	1	4	5	6	4	6	8	6	2	3	5	4.90	1.73	4.26	1.68	165
				2	2	4	4	5	3	6	2	5	5	3	3.90	1.37			
				3	6	5	7	7	7	7	3	3	7	5	5.70	1.64			
				4	4	2	4	4	4	5	3	4	3	6	3.90	1.10			
				5	4	4	4	3	3	4	1	2	1	3	2.90	1.20			
UBI1-1	00BI2-ST006-NSD-010	100	83.87	1	9	10	7	9	6	7	8	10	7	11	8.40	1.65	8.06	1.68	312
				2	11	7	11	10	7	9	6	7	9	7	8.40	1.84			
				3	8	4	6	7	8	9	7	8	6	7	7.00	1.41			
				4	6	8	8	8	11	10	10	8	8	9	8.60	1.43			
				5	10	5	9	10	7	8	10	8	6	6	7.90	1.85			
MBI3-1	00BI2-ST008-NSD-010	100	86.09	1	5	4	6	6	5	7	7	7	7	3	5.70	1.42	6.14	1.68	238
				2	4	3	4	5	6	7	7	7	7	6	5.60	1.51			
				3	7	7	8	8	5	8	6	9	7	10	7.50	1.43			
				4	5	8	6	9	6	6	5	5	8	8	6.60	1.51			
				5	3	8	3	8	4	6	6	5	5	5	5.30	1.77			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control	
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD		
MBI3-3	00BI2-ST010-NSD-010	100	86.67	1	1	1	1	1	1	1	1	1	1	3	1	1.20	0.63	1.40	0.67	54
				2	2	1	1	1	1	1	2	1	2	1	1.30	0.48				
				3	1	1	1	1	2	1	1	1	2	1	1.20	0.42				
				4	1	1	1	1	1	2	2	1	1	1	1.20	0.42				
				5	3	1	3	2	1	2	1	2	3	3	2.10	0.88				
LBI1-2	00BI2-ST012-NSD-010	100	89.04	1	6	7	4	6	7	7	6	6	10	7	6.60	1.51	6.96	1.93	270	
				2	6	10	8	7	5	9	10	4	7	10	7.60	2.17				
				3	5	5	6	12	4	8	10	6	7	6	6.90	2.47				
				4	3	5	8	7	8	7	7	7	6	8	6.60	1.58				
				5	6	5	6	9	11	5	9	7	6	7	7.10	1.97				
LBI1-4	00BI2-ST014-NSD-010	100	89.04	1	7	10	10	7	4	7	6	8	5	5	6.90	2.02	8.70	2.33	337	
				2	8	9	9	9	10	10	11	7	11	7	9.10	1.45				
				3	9	10	3	10	13	8	9	13	8	10	9.30	2.83				
				4	6	9	11	7	13	6	9	5	11	11	8.80	2.70				
				5	11	7	7	9	13	11	9	9	9	9	9.40	1.84				
LBI3-2	00BI2-ST016-NSD-010	100	90.91	1	1	1	2	1	5	3	5	2	5	5	3.00	1.83	3.92	2.78	152	
				2	2	1	1	15	4	9	5	5	1	1	4.40	4.55				
				3	4	5	1	3	2	3	4	7	2	4	3.50	1.72				
				4	4	3	9	6	7	3	11	3	5	1	5.20	3.08				
				5	2	3	3	3	3	4	3	7	5	2	3.50	1.51				
LBI6-1	00BI2-ST018-NSD-010	100	84.51	1	6	9	10	4	7	6	9	11	11	9	8.20	2.35	9.30	2.38	360	
				2	13	11	7	8	14	6	10	11	12	13	10.50	2.72				
				3	12	11	9	10	9	6	13	10	8	6	9.40	2.32				
				4	7	12	10	11	10	10	7	12	10	8	9.70	1.83				
				5	9	10	7	9	10	8	3	12	10	9	8.70	2.41				
LBI6-3	00BI2-ST020-NSD-010	100	87.84	1	1	2	1	1	2	1	2	1	2	1	1.40	0.52	2.70	1.87	105	
				2	2	4	3	1	4	2	1	5	6	6	3.40	1.90				
				3	1	1	2	1	2	2	1	1	4	3	1.80	1.03				
				4	3	5	3	1	2	3	3	3	3	7	3.30	1.64				
				5	7	4	1	2	2	3	9	3	1	4	3.60	2.59				
LBI9-2	00BI2-ST022-NSD-010	100	87.84	1	5	4	5	5	2	5	5	5	6	5	4.70	1.06	5.00	1.91	194	
				2	5	2	4	4	3	1	6	5	2	7	3.90	1.91				
				3	6	7	6	5	5	7	9	4	5	7	6.10	1.45				
				4	4	5	4	5	4	4	4	3	6	5	4.40	0.84				
				5	8	2	9	2	7	3	10	6	5	7	5.90	2.85				
LBI3-1	00BI2-ST024-NSD-010	100	86.67	1	6	6	5	5	7	6	5	7	4	6	5.70	0.95	6.92	1.75	268	
				2	6	6	8	9	6	7	7	5	7	6	6.70	1.16				
				3	7	8	9	4	5	7	7	6	9	3	6.50	2.01				
				4	4	7	7	10	10	7	8	7	10	7	7.70	1.89				
				5	10	5	7	7	10	10	7	7	9	8	8.00	1.70				

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LBI3-3	00BI2-ST026-NSD-010	100	89.04	1	12	10	11	12	9	6	6	7	10	10	9.30	2.26	9.08	2.26	352
				2	9	9	7	8	8	12	7	13	9	11	9.30	2.06			
				3	7	12	6	8	2	6	10	6	9	13	7.90	3.25			
				4	7	11	7	9	9	12	12	10	11	10	9.80	1.81			
				5	8	12	10	7	9	9	10	7	9	10	9.10	1.52			
LPPG-2	00BI2-ST028-NSD-010	100	84.97	1	13	13	13	10	13	12	14	13	7	11	11.90	2.08	12.54	2.72	486
				2	10	12	14	16	14	8	13	15	12	14	12.80	2.39			
				3	8	12	13	14	13	13	11	13	8	13	11.80	2.15			
				4	7	11	16	13	18	7	16	16	13	15	13.20	3.82			
				5	5	13	15	13	13	13	15	14	16	13	13.00	3.02			
LPPG-4	00BI2-ST030-NSD-010	100	82.8	1	1	3	3	2	2	3	3	1	3	2	2.30	0.82	2.10	0.76	81
				2	3	3	2	2	2	1	2	2	1	2	2.00	0.67			
				3	2	1	3	3	1	3	3	2	1	3	2.20	0.92			
				4	1	3	1	1	2	2	2	2	2	1	1.70	0.67			
				5	3	2	3	2	2	3	1	2	3	2	2.30	0.67			
LBV-2	00BV2-ST002-NSD-010	100	86.67	1	7	6	8	7	8	8	7	6	7	8	7.20	0.79	7.94	2.02	308
				2	6	9	7	8	7	10	7	6	9	7	7.60	1.35			
				3	6	8	10	10	10	6	9	11	6	5	8.10	2.18			
				4	10	11	8	7	6	10	12	7	6	7	8.40	2.17			
				5	9	7	6	12	11	13	7	9	3	7	8.40	3.03			
LBV-4	00BV2-ST004-NSD-010	100	53.94	1	2	3	2	3	3	4	4	3	3	4	3.10	0.74	2.92	0.63	113
				2	3	3	2	3	2	3	3	3	3	2	2.70	0.48			
				3	2	3	3	3	3	3	2	3	3	3	2.80	0.42			
				4	1	3	2	3	2	3	4	3	3	4	2.80	0.92			
				5	3	3	3	3	3	3	3	4	3	4	3.20	0.42			
LBV-6	00BV2-ST006-NSD-010	100	85.53	1	6	6	7	9	5	8	7	8	13	7	7.60	2.22	8.26	1.75	320
				2	8	7	7	10	9	7	7	7	8	8	7.80	1.03			
				3	8	9	10	9	10	9	6	7	10	7	8.50	1.43			
				4	8	7	7	7	11	11	7	12	6	9	8.50	2.12			
				5	9	11	9	7	11	9	7	11	8	7	8.90	1.66			
UBV-2	00BV2-ST008-NSD-010	100	78.79	1	4	5	6	7	7	6	6	6	6	6	5.90	0.88	6.66	1.66	258
				2	6	9	6	5	6	6	6	7	6	7	6.40	1.07			
				3	6	7	10	6	6	6	6	5	7	5	6.40	1.43			
				4	6	9	6	5	6	6	8	7	10	6	6.90	1.60			
				5	9	7	9	5	11	6	7	12	7	4	7.70	2.54			
UBV-4	00BV2-ST010-NSD-010	100	73.86	1	3	3	3	3	3	3	3	2	3	2	2.80	0.42	3.08	0.57	119
				2	3	3	2	3	3	3	3	3	3	4	3.00	0.47			
				3	3	3	3	4	4	5	4	3	3	3	3.50	0.71			
				4	3	2	3	4	3	3	3	3	4	3	3.10	0.57			
				5	4	2	3	3	3	3	3	3	3	3	3.00	0.47			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
PL-1	00LC2-ST001-NSD-010	100	84.97	1	6	5	6	5	6	5	5	4	6	6	5.40	0.70	6.04	1.54	234
				2	6	7	6	6	6	6	6	6	5	6.00	0.47				
				3	6	6	6	5	8	5	4	6	6	7	5.90	1.10			
				4	5	6	6	6	4	11	4	6	6	7	6.10	1.97			
				5	3	6	7	6	6	10	11	7	4	8	6.80	2.44			
PL-3	00LC2-ST003-NSD-010	100	92.86	1	6	7	8	11	11	6	11	6	9	4	7.90	2.51	9.28	2.59	360
				2	8	13	7	13	11	10	13	9	13	11	10.80	2.25			
				3	10	7	7	5	9	7	6	12	7	7	7.70	2.06			
				4	11	11	10	9	12	6	13	9	8	9	9.80	2.04			
				5	13	11	9	13	13	13	6	10	7	7	10.20	2.82			
MCR-1	00LC2-ST005-NSD-010	100	90.9	1	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0
				2	0	0	0	0	0	0	0	0	0	0	0.00	0.00			
				3	0	0	0	0	0	0	0	0	0	0	0.00	0.00			
				4	0	0	0	0	0	0	0	0	0	0	0.00	0.00			
				5	0	0	0	0	0	0	0	0	0	0	0.00	0.00			
MCR-3	00LC2-ST007-NSD-010	100	86.7	1	4	3	3	3	4	3	5	2	3	2	3.20	0.92	4.02	1.35	156
				2	7	4	5	6	6	6	4	4	6	3	5.10	1.29			
				3	5	6	5	3	6	4	3	3	4	2	4.10	1.37			
				4	3	4	5	6	4	3	4	3	3	3	3.80	1.03			
				5	1	6	3	4	6	5	4	3	4	3	3.90	1.52			
BO-2	00LC2-ST009-NSD-010	100	87.84	1	4	8	11	8	12	8	7	7	8	6	7.90	2.28	8.62	2.21	334
				2	12	12	12	7	12	7	6	7	12	10	9.70	2.63			
				3	7	7	9	10	7	7	8	7	8	7	7.70	1.06			
				4	7	8	8	12	11	6	10	10	11	10	9.30	1.95			
				5	7	7	9	6	6	9	11	6	11	13	8.50	2.51			
BO-4	00LC2-ST011-NSD-010	100	83.87	1	11	10	12	11	12	9	6	10	11	9	10.10	1.79	10.06	3.34	390
				2	10	12	3	13	12	10	14	14	8	3	9.90	4.09			
				3	12	4	15	9	4	12	12	10	13	14	10.50	3.84			
				4	12	13	12	14	8	12	9	12	15	11	11.80	2.10			
				5	10	3	3	5	12	6	7	12	10	12	8.00	3.65			
ML-1	00LC2-ST013-NSD-010	100	93.22	1	10	8	10	11	9	9	6	6	10	6	8.50	1.90	9.84	2.06	381
				2	8	7	15	9	10	12	12	9	10	11	10.30	2.31			
				3	8	12	11	13	10	7	8	6	11	9	9.50	2.27			
				4	10	12	12	8	8	10	10	9	9	10	9.80	1.40			
				5	14	10	12	10	10	13	10	9	13	10	11.10	1.73			
ML-4	00LC2-ST027-NSD-010	100	92.86	1	6	5	5	9	7	7	11	8	6	9	7.30	1.95	7.74	2.12	300
				2	10	10	6	10	7	4	9	10	10	6	8.20	2.25			
				3	11	9	3	6	6	9	10	7	4	8	7.30	2.58			
				4	8	6	8	8	9	6	6	9	3	8	7.10	1.85			
				5	11	8	7	9	11	6	10	9	7	10	8.80	1.75			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
WB-2	00SN2-ST002-NSD-010	100	81.76	1	6	7	7	5	4	6	7	7	6	6	6.10	0.99	6.22	1.33	241
				2	6	6	9	7	7	5	6	6	4	8	6.40	1.43			
				3	3	7	5	5	6	4	6	5	7	6	5.40	1.26			
				4	8	4	9	5	6	7	6	7	7	10	6.90	1.79			
				5	6	5	7	7	7	6	6	6	7	6	6.30	0.67			
JB-2	00SN2-ST004-NSD-010	100	80.74	1	1	1	3	1	2	1	1	1	2	1	1.40	0.70	1.54	0.58	60
				2	1	2	1	1	3	2	2	2	2	1	1.70	0.67			
				3	2	2	1	1	1	2	1	2	2	1	1.50	0.53			
				4	2	1	2	2	2	1	1	1	1	2	1.50	0.53			
				5	2	1	2	2	1	1	2	2	2	1	1.60	0.52			
BBC-1	00SN2-ST006-NSD-010	100	89.66	1	3	3	6	6	4	3	4	5	6	7	4.70	1.49	4.94	1.78	191
				2	3	5	6	6	6	5	5	3	5	6	5.00	1.15			
				3	5	6	5	2	2	5	2	5	5	3	4.00	1.56			
				4	3	6	7	6	5	6	6	3	6	6	5.40	1.35			
				5	6	3	7	3	10	7	2	9	6	3	5.60	2.76			
GB-1	00SN2-ST008-NSD-010	100	90.91	1	7	7	9	7	6	6	7	8	6	6	6.90	0.99	7.42	2.52	288
				2	6	6	5	6	6	9	7	5	7	12	6.90	2.13			
				3	4	7	5	6	5	7	3	2	6	10	5.50	2.27			
				4	5	9	12	14	9	6	7	7	6	7	8.20	2.86			
				5	7	10	10	10	11	13	12	10	6	7	9.60	2.27			
BC-2	00SN2-ST012-NSD-010	100	85.94	1	6	9	6	8	11	9	8	8	8	10	8.30	1.57	8.96	1.95	347
				2	6	8	6	7	10	9	11	11	10	9	8.70	1.89			
				3	10	12	11	10	10	9	12	9	9	9	10.10	1.20			
				4	12	8	10	8	7	4	8	9	9	8	8.30	2.06			
				5	5	13	9	8	10	7	12	8	12	10	9.40	2.50			
BC-4	00SN2-ST014-NSD-010	100	85.53	1	10	11	12	10	11	11	10	7	9	11	10.20	1.40	10.30	2.47	399
				2	5	11	13	10	4	11	6	11	8	11	9.00	3.06			
				3	8	12	16	9	12	14	8	12	12	9	11.20	2.66			
				4	10	5	13	13	10	10	8	11	12	13	10.50	2.55			
				5	10	7	13	6	12	11	12	11	12	12	10.60	2.32			
GB-5	00SN2-ST038-NSD-010	100	89.66	1	11	9	7	6	5	7	8	8	6	6	7.30	1.77	8.34	1.88	323
				2	10	8	8	5	9	11	10	7	7	6	8.10	1.91			
				3	7	7	9	8	9	10	7	7	6	7	7.70	1.25			
				4	8	7	10	11	10	6	8	11	11	11	9.30	1.89			
				5	11	10	9	8	9	12	7	12	7	8	9.30	1.89			
UCRA-1	00UC2-ST001-NSD-010	100	86.67	1	10	13	13	7	13	14	9	4	9	13	10.50	3.27	11.34	2.75	440
				2	18	13	13	9	9	11	13	13	12	11	12.20	2.57			
				3	12	12	13	12	13	14	7	12	13	13	12.10	1.91			
				4	4	13	13	12	12	9	7	13	7	13	10.30	3.30			
				5	14	7	13	12	14	12	9	11	10	14	11.60	2.37			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LC-1	00UC2-ST003-NSD-010	100	86.67	1	1	2	2	1	1	1	2	1	2	2	1.50	0.53	1.66	0.75	64
				2	1	3	4	1	1	2	3	2	2	2	2.10	0.99			
				3	2	2	1	1	1	1	1	2	2	2	1.50	0.53			
				4	1	3	1	1	2	3	3	1	1	1	1.70	0.95			
				5	2	1	1	1	2	1	1	2	2	2	1.50	0.53			
UCRB-1	00UC2-ST005-NSD-010	100	89.04	1	8	13	7	10	12	12	12	7	14	4	9.90	3.25	12.26	3.25	475
				2	8	8	8	10	16	13	10	13	13	10	10.90	2.73			
				3	10	13	11	16	10	15	12	15	13	14	12.90	2.13			
				4	13	11	11	16	12	13	12	13	16	16	13.30	2.00			
				5	6	18	12	14	13	17	21	13	13	16	14.30	4.06			
CIL-1	00UC2-ST007-NSD-010	100	87.25	1	7	5	11	6	11	10	11	10	12	7	9.00	2.49	9.30	2.50	360
				2	15	9	9	9	13	7	11	13	11	12	10.90	2.42			
				3	10	12	7	9	5	9	11	6	9	9	8.70	2.16			
				4	11	7	8	13	9	5	8	5	7	7	8.00	2.49			
				5	13	11	10	7	13	11	7	11	7	9	9.90	2.33			
CIB-1	00UC2-ST011-NSD-010	100	90.91	1	5	7	4	5	7	7	4	7	5	8	5.90	1.45	5.32	1.88	206
				2	3	3	4	3	3	4	3	2	4	3	3.20	0.63			
				3	8	7	7	3	7	3	7	6	7	4	5.90	1.85			
				4	6	3	6	6	6	6	7	4	7	6	5.70	1.25			
				5	2	3	7	6	4	7	10	7	7	6	5.90	2.33			
UCRC-1	00UC2-ST013-NSD-010	100	87.84	1	7	9	6	12	11	9	9	12	7	13	9.50	2.42	10.48	2.35	406
				2	9	11	8	13	6	9	8	12	12	11	9.90	2.23			
				3	8	11	13	8	8	12	7	12	13	12	10.40	2.37			
				4	10	11	6	9	12	8	12	13	13	13	10.70	2.41			
				5	12	13	9	13	8	12	11	13	14	14	11.90	2.02			
CBB-1	00UC2-ST015-NSD-010	100	90.91	1	6	11	8	10	7	9	9	7	10	11	8.80	1.75	9.46	2.36	367
				2	10	7	9	6	6	3	11	6	13	12	8.30	3.20			
				3	8	11	13	11	13	9	13	9	9	9	10.50	1.96			
				4	7	11	11	11	9	7	11	10	6	9	9.20	1.93			
				5	12	8	10	6	12	11	13	13	10	10	10.50	2.22			
CBB-3	00UC2-ST017-NSD-010	100	84.97	1	2	1	1	2	3	4	3	4	2	1	2.30	1.16	3.96	1.92	153
				2	6	3	8	6	2	4	6	5	4	2	4.60	1.96			
				3	3	4	6	3	1	3	2	3	5	5	3.50	1.51			
				4	7	6	7	5	2	5	4	6	9	6	5.70	1.89			
				5	3	3	1	4	3	4	4	6	5	4	3.70	1.34			
CBB-5	00UC2-ST019-NSD-010	100	87.25	1	10	13	10	14	13	13	20	11	12	11	12.70	2.91	11.64	2.87	451
				2	10	8	5	7	12	7	13	17	10	10	9.90	3.48			
				3	13	9	10	14	12	13	12	11	16	11	12.10	2.02			
				4	17	11	13	13	10	12	13	12	12	14	12.70	1.89			
				5	5	13	8	13	13	12	13	7	14	10	10.80	3.12			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control	
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD		
CNE-1	00UC2-ST021-NSD-010	100	90.91	1	1	1	1	1	1	1	1	1	1	1	1	1.00	0.00	1.02	0.14	40
				2	1	1	1	1	1	1	1	1	1	1	1	1.00	0.00			
				3	1	1	1	1	1	1	1	1	1	1	1	1.00	0.00			
				4	1	1	1	1	1	1	1	1	1	1	1	1.00	0.00			
				5	1	1	1	1	2	1	1	1	1	1	1	1.10	0.32			
CNE-3	00UC2-ST023-NSD-010	100	89.55	1	5	7	13	14	7	7	7	10	11	5	8.60	3.20	10.26	3.04	398	
				2	12	11	5	12	11	8	7	11	6	7	9.00	2.67				
				3	2	14	13	8	12	11	12	10	9	14	10.50	3.60				
				4	5	12	12	14	10	12	13	12	11	10	11.10	2.47				
				5	11	11	15	9	15	11	11	12	11	15	12.10	2.13				
CSW-2	00UC2-ST025-NSD-010	100	89.04	1	7	6	6	3	7	6	7	7	10	7	6.60	1.71	7.22	1.75	280	
				2	6	12	7	7	8	8	4	6	8	7	7.30	2.06				
				3	6	6	7	8	7	8	6	9	6	10	7.30	1.42				
				4	6	3	6	7	7	7	7	5	8	7	6.30	1.42				
				5	7	8	11	7	9	8	10	7	9	10	8.60	1.43				
CSW-4	00UC2-ST027-NSD-010	100	90.91	1	7	6	5	9	7	9	9	7	11	7	7.70	1.77	8.76	2.40	340	
				2	10	6	7	10	12	9	12	10	9	7	9.20	2.04				
				3	7	3	6	6	6	12	9	13	7	12	8.10	3.28				
				4	12	7	9	11	8	7	7	13	7	8	8.90	2.28				
				5	12	10	9	14	6	9	11	9	9	10	9.90	2.13				
CSW-6	00UC2-ST029-NSD-010	100	89.04	1	12	3	12	7	5	4	7	8	11	9	7.80	3.22	9.78	3.39	379	
				2	6	12	10	10	10	14	7	6	7	12	9.40	2.80				
				3	13	14	11	7	13	15	11	11	15	13	12.30	2.41				
				4	11	5	6	13	10	7	5	13	12	11	9.30	3.23				
				5	3	4	14	13	11	12	11	12	7	14	10.10	4.01				
CIL-3	00UC2-ST037-NSD-010	100	78.31	1	7	12	15	16	13	12	13	9	14	12	12.30	2.67	11.74	2.76	455	
				2	13	9	16	7	13	13	7	13	14	9	11.40	3.13				
				3	7	12	14	13	14	15	11	15	7	13	12.10	2.96				
				4	8	11	14	11	13	11	10	7	12	13	11.00	2.21				
				5	17	12	13	7	15	13	12	7	11	12	11.90	3.11				
LAR32	Control	50	45.78	1	4	3	3	4	4	4	2	4	4	4	3.60	0.70	3.20	0.70	100	
				2	3	4	4	4	2	2	3	3	4	3	3.20	0.79				
				3	3	2	3	3	4	3	3	2	3	4	3.00	0.67				
				4	3	4	4	3	2	3	3	3	2	3	3.00	0.67				
				5	2	3	4	4	3	3	3	4	3	3	3.20	0.63				
UBI1-2	00BI2-ST002-NSD-010	50	42.77	1	3	4	5	4	5	5	5	4	6	4	4.50	0.85	6.60	2.09	206	
				2	7	9	6	5	4	6	6	7	5	6	6.10	1.37				
				3	5	8	7	5	7	8	9	11	7	10	7.70	1.95				
				4	5	6	6	8	11	6	6	7	5	10	7.00	2.05				
				5	6	8	6	7	10	8	7	13	6	6	7.70	2.26				

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
UBI14-2	00BI2-ST004-NSD-010	50	43.34	1	4	7	7	11	11	9	8	6	6	12	8.10	2.60	8.58	1.91	268
				2	11	11	11	9	8	9	8	8	10	7	9.20	1.48			
				3	9	10	9	10	6	8	8	7	9	10	8.60	1.35			
				4	9	7	6	10	6	9	6	7	10	10	8.00	1.76			
				5	9	9	6	6	8	9	8	12	12	11	9.00	2.16			
UBI1-1	00BI2-ST006-NSD-010	50	41.94	1	12	12	9	11	12	13	5	13	10	7	10.40	2.67	10.68	2.20	334
				2	10	12	11	12	10	11	9	9	13	12	10.90	1.37			
				3	9	13	12	11	12	7	11	13	12	11	11.10	1.85			
				4	13	6	12	10	6	10	9	6	14	13	9.90	3.11			
				5	11	13	9	10	13	11	10	14	11	9	11.10	1.73			
MBI3-1	00BI2-ST008-NSD-010	50	43.05	1	13	6	10	6	10	11	7	10	8	12	9.30	2.45	9.56	2.17	299
				2	9	8	9	11	10	13	11	8	12	11	10.20	1.69			
				3	6	9	8	12	9	10	7	5	7	7	8.00	2.05			
				4	7	11	10	13	7	9	12	9	8	11	9.70	2.06			
				5	8	9	12	14	11	10	9	13	11	9	10.60	1.96			
MBI3-3	00BI2-ST010-NSD-010	50	43.34	1	7	5	6	7	7	5	7	7	6	5	6.20	0.92	7.28	1.69	228
				2	4	7	9	6	7	6	8	7	7	5	6.60	1.43			
				3	7	7	7	10	9	10	7	7	7	9	8.00	1.33			
				4	8	5	6	8	5	9	7	9	12	7	7.60	2.12			
				5	6	10	6	9	7	11	10	7	7	7	8.00	1.83			
LBI1-2	00BI2-ST012-NSD-010	50	44.52	1	6	7	6	6	6	5	10	7	6	3	6.20	1.75	7.32	2.07	229
				2	5	7	5	7	7	7	6	7	8	7	6.60	0.97			
				3	6	6	7	7	10	8	6	10	7	9	7.60	1.58			
				4	6	8	8	7	6	7	6	7	7	8	7.00	0.82			
				5	7	9	3	8	11	11	12	13	12	6	9.20	3.19			
LBI1-4	00BI2-ST014-NSD-010	50	44.52	1	5	8	8	7	11	11	8	6	7	12	8.30	2.31	10.08	2.91	315
				2	10	9	13	7	13	10	11	10	9	9	10.10	1.85			
				3	9	6	13	8	7	8	13	15	14	11	10.40	3.20			
				4	16	4	9	12	13	5	11	11	13	14	10.80	3.82			
				5	6	13	11	12	13	12	13	8	7	13	10.80	2.74			
LBI3-2	00BI2-ST016-NSD-010	50	45.46	1	5	9	10	7	13	11	12	8	13	11	9.90	2.64	11.00	2.91	344
				2	12	12	13	12	12	13	15	9	12	14	12.40	1.58			
				3	10	10	4	11	11	7	12	10	7	14	9.60	2.88			
				4	14	8	13	13	12	12	13	13	6	7	11.10	2.92			
				5	14	12	13	4	14	15	11	10	10	17	12.00	3.59			
LBI6-1	00BI2-ST018-NSD-010	50	42.26	1	8	13	6	13	14	13	8	7	12	13	10.70	3.06	11.28	3.36	353
				2	13	5	13	13	12	12	9	7	13	11	10.80	2.86			
				3	14	7	13	5	13	7	5	16	13	12	10.50	4.06			
				4	10	16	15	10	5	15	15	12	13	15	12.60	3.44			
				5	8	6	13	13	16	15	13	14	7	13	11.80	3.49			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LBI6-3	00BI2-ST020-NSD-010	50	43.92	1	7	11	8	7	14	9	4	17	11	7	9.50	3.84	9.96	3.00	311
				2	9	8	11	10	11	8	6	5	10	11	8.90	2.13			
				3	5	9	12	9	8	11	13	9	13	11	10.00	2.49			
				4	11	13	12	17	8	8	8	12	10	16	11.50	3.21			
				5	9	13	13	11	9	5	13	10	5	11	9.90	3.00			
LBI9-2	00BI2-ST022-NSD-010	50	43.92	1	8	4	10	4	7	9	12	11	8	7	8.00	2.67	9.00	2.53	281
				2	8	7	10	9	8	10	10	13	6	11	9.20	2.04			
				3	6	8	9	7	12	11	8	9	11	10	9.10	1.91			
				4	9	7	6	7	7	9	11	7	11	11	8.50	1.96			
				5	7	4	10	7	15	13	13	8	11	14	10.20	3.61			
LBI3-1	00BI2-ST024-NSD-010	50	43.34	1	13	6	7	9	10	10	7	9	6	8	8.50	2.17	9.82	2.38	307
				2	7	11	10	7	6	10	11	10	6	10	8.80	2.04			
				3	13	11	10	10	12	9	7	11	12	7	10.20	2.04			
				4	10	11	15	7	9	13	11	13	7	11	10.70	2.58			
				5	11	11	13	13	10	12	13	5	10	11	10.90	2.38			
LBI3-3	00BI2-ST026-NSD-010	50	44.52	1	10	11	11	10	9	10	12	13	7	12	10.50	1.72	9.86	2.61	308
				2	10	13	5	7	5	9	13	12	13	6	9.30	3.37			
				3	9	7	10	7	9	15	9	7	10	5	8.80	2.70			
				4	13	9	10	11	13	11	13	7	12	6	10.50	2.51			
				5	6	10	6	10	12	12	13	9	13	11	10.20	2.57			
LPPG-2	00BI2-ST028-NSD-010	50	42.59	1	9	9	12	13	6	14	10	13	13	13	11.20	2.57	10.82	3.84	338
				2	13	17	9	7	13	15	6	7	22	13	12.20	5.07			
				3	6	9	4	8	12	6	10	10	8	3	7.60	2.84			
				4	9	6	11	15	10	12	14	10	7	11	10.50	2.80			
				5	13	13	21	15	10	9	13	14	11	7	12.60	3.84			
LPPG-4	00BI2-ST030-NSD-010	50	41.4	1	4	4	3	4	3	1	3	3	3	2	3.00	0.94	2.92	1.01	91
				2	2	3	3	2	3	3	3	3	3	2	2.70	0.48			
				3	3	3	2	3	3	1	3	3	4	2	2.70	0.82			
				4	3	2	1	3	4	3	3	3	3	4	2.90	0.88			
				5	5	2	1	2	3	4	5	6	2	3	3.30	1.64			
LBV-2	00BV2-ST002-NSD-010	50	43.34	1	9	8	11	10	11	7	10	11	4	11	9.20	2.30	10.04	2.39	314
				2	11	11	7	4	7	12	12	7	13	9	9.30	2.95			
				3	12	13	12	8	14	11	10	8	14	10	11.20	2.20			
				4	10	11	6	10	8	9	10	11	13	13	10.10	2.13			
				5	8	8	13	12	9	7	12	11	12	12	10.40	2.17			
LBV-4	00BV2-ST004-NSD-010	50	26.97	1	3	2	3	4	3	4	4	3	3	3	3.20	0.63	2.98	0.65	93
				2	2	5	3	3	2	3	2	3	4	3	3.00	0.94			
				3	3	3	3	3	3	2	3	2	3	3	2.80	0.42			
				4	4	3	3	4	3	3	3	3	3	3	3.20	0.42			
				5	2	3	3	2	4	3	2	3	2	3	2.70	0.67			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LBV-6	00BV2-ST006-NSD-010	50	42.77	1	6	7	7	7	7	12	9	8	7	9	7.90	1.73	8.14	1.84	254
				2	10	7	7	7	9	7	10	10	7	7	8.10	1.45			
				3	7	10	5	8	7	8	7	6	7	8	7.30	1.34			
				4	7	10	9	9	6	8	9	7	7	11	8.30	1.57			
				5	6	11	11	6	13	10	9	12	7	6	9.10	2.69			
UBV-2	00BV2-ST008-NSD-010	50	39.4	1	5	6	6	5	7	7	6	6	7	4	5.90	0.99	5.94	1.00	186
				2	6	4	6	6	6	7	5	7	6	6	5.90	0.88			
				3	5	6	4	7	6	8	5	7	6	5	5.90	1.20			
				4	5	6	6	5	6	6	6	4	6	7	5.70	0.82			
				5	6	7	6	4	6	8	6	6	6	8	6.30	1.16			
UBV-4	00BV2-ST010-NSD-010	50	36.93	1	3	3	3	3	4	3	3	3	3	2	3.00	0.47	2.94	0.51	92
				2	3	2	2	4	3	4	3	3	3	3	3.00	0.67			
				3	3	3	3	3	3	3	3	3	2	3	2.90	0.32			
				4	2	3	3	3	4	3	3	3	4	3	3.10	0.57			
				5	2	2	3	3	3	3	3	3	3	2	2.70	0.48			
PL-1	00LC2-ST001-NSD-010	50	42.49	1	4	5	5	6	4	5	4	7	6	5	5.10	0.99	6.26	1.23	196
				2	7	6	7	7	7	7	4	7	6	6.50	0.97				
				3	5	6	6	6	6	5	7	7	7	7	6.20	0.79			
				4	7	6	7	7	7	7	7	7	7	7	6.90	0.32			
				5	7	7	4	7	7	6	11	5	6	6	6.60	1.84			
PL-3	00LC2-ST003-NSD-010	50	46.43	1	10	7	7	7	11	5	7	3	7	10	7.40	2.41	9.42	2.81	294
				2	6	5	12	12	8	7	8	9	12	13	9.20	2.86			
				3	12	10	8	10	13	6	7	13	8	8	9.50	2.51			
				4	7	12	7	9	7	11	5	12	10	10	9.00	2.40			
				5	13	10	13	10	15	16	11	12	10	10	12.00	2.21			
MCR-1	00LC2-ST005-NSD-010	50	45.45	1	5	5	9	5	6	6	3	6	6	7	5.80	1.55	6.46	2.82	202
				2	6	6	6	6	6	2	9	6	6	2	5.50	2.07			
				3	6	3	7	11	6	5	8	5	11	7	6.90	2.56			
				4	14	2	6	3	4	7	6	7	4	6	5.90	3.31			
				5	6	14	12	7	6	14	6	7	6	4	8.20	3.68			
MCR-3	00LC2-ST007-NSD-010	50	43.34	1	6	6	8	10	9	6	6	7	5	10	7.30	1.83	8.24	2.12	258
				2	11	12	7	8	10	8	9	8	8	9	9.00	1.56			
				3	8	9	10	9	6	12	10	11	10	6	9.10	1.97			
				4	6	9	6	13	7	7	7	8	6	12	8.10	2.51			
				5	8	9	12	7	6	10	4	5	7	9	7.70	2.41			
BO-2	00LC2-ST009-NSD-010	50	43.92	1	10	9	8	6	8	10	4	12	9	7	8.30	2.26	8.74	2.02	273
				2	9	7	9	11	11	10	6	6	7	7	8.30	1.95			
				3	7	9	12	8	9	10	8	9	5	7	8.40	1.90			
				4	12	11	7	8	10	8	11	9	9	9	9.40	1.58			
				5	8	12	7	7	12	7	10	13	7	10	9.30	2.41			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
BO-4	00LC2-ST011-NSD-010	50	41.94	1	11	13	7	8	8	10	15	12	8	12	10.40	2.63	10.46	2.80	327
				2	13	12	12	10	5	4	12	11	12	13	10.40	3.24			
				3	9	9	13	10	10	13	8	10	7	5	9.40	2.46			
				4	7	13	13	7	12	8	14	10	11	13	10.80	2.66			
				5	12	12	5	6	14	13	12	14	12	13	11.30	3.16			
ML-1	00LC2-ST013-NSD-010	50	46.61	1	12	10	11	10	13	12	12	13	3	11	10.70	2.91	10.82	2.70	338
				2	12	10	14	7	9	11	7	11	10	7	9.80	2.35			
				3	13	14	11	15	7	15	13	11	11	8	11.80	2.74			
				4	13	13	7	13	5	11	7	10	13	13	10.50	3.10			
				5	12	6	10	15	11	12	10	12	14	11	11.30	2.45			
ML-4	00LC2-ST027-NSD-010	50	46.43	1	2	11	10	11	10	10	7	6	10	10	8.70	2.87	10.16	2.61	318
				2	14	9	10	12	4	7	14	12	8	13	10.30	3.30			
				3	11	13	12	12	13	6	10	10	13	11	11.10	2.13			
				4	11	13	10	11	7	8	11	12	12	11	10.60	1.84			
				5	12	12	9	12	7	9	11	6	14	9	10.10	2.51			
WB-2	00SN2-ST002-NSD-010	50	40.88	1	5	5	3	6	6	4	6	7	5	6	5.30	1.16	5.86	1.25	183
				2	7	6	7	6	9	7	7	7	5	7	6.80	1.03			
				3	4	7	6	6	5	5	6	5	6	7	5.70	0.95			
				4	7	7	7	6	6	3	2	6	6	7	5.70	1.77			
				5	6	5	7	6	7	6	5	5	5	6	5.80	0.79			
JB-2	00SN2-ST004-NSD-010	50	40.37	1	2	1	1	2	2	1	3	2	2	2	1.80	0.63	1.74	0.63	54
				2	1	3	1	1	1	1	2	2	2	1	1.50	0.71			
				3	2	2	1	2	2	3	2	2	1	2	1.90	0.57			
				4	2	1	3	2	3	1	2	2	2	1	1.90	0.74			
				5	2	1	2	2	1	1	1	2	2	2	1.60	0.52			
BBC-1	00SN2-ST006-NSD-010	50	44.83	1	6	3	5	4	3	4	6	4	3	3	4.10	1.20	4.74	1.51	148
				2	3	3	3	7	5	5	3	3	4	4	4.00	1.33			
				3	4	3	3	6	3	5	3	2	7	3	3.90	1.60			
				4	6	6	5	7	6	5	5	7	3	5	5.50	1.18			
				5	5	6	7	6	6	6	6	7	6	7	6.20	0.63			
GB-1	00SN2-ST008-NSD-010	50	45.46	1	7	7	8	8	7	8	6	7	9	9	7.60	0.97	9.38	3.02	293
				2	7	12	4	12	12	3	12	7	9	14	9.20	3.79			
				3	5	13	12	15	11	11	5	4	10	13	9.90	3.87			
				4	13	7	10	10	7	7	12	12	7	12	9.70	2.50			
				5	9	13	6	11	10	13	14	13	7	9	10.50	2.76			
BC-2	00SN2-ST012-NSD-010	50	42.97	1	6	7	6	9	7	10	7	12	7	13	8.40	2.50	10.28	2.70	321
				2	13	13	6	13	7	12	15	11	7	10	10.70	3.09			
				3	12	13	12	12	9	11	9	10	13	13	11.40	1.58			
				4	15	10	10	10	11	13	13	10	7	13	11.20	2.30			
				5	3	13	13	12	11	11	7	9	9	9	9.70	3.06			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
BC-4	00SN2-ST014-NSD-010	50	42.77	1	10	8	9	9	9	10	7	11	12	8	9.30	1.49	10.40	2.54	325
				2	16	11	12	14	10	8	8	13	11	13	11.60	2.55			
				3	10	5	9	11	11	5	13	9	13	13	9.90	3.00			
				4	12	13	10	9	9	14	13	8	9	12	10.90	2.13			
				5	7	9	14	12	14	9	6	13	7	12	10.30	3.06			
GB-5	00SN2-ST038-NSD-010	50	44.83	1	7	7	7	7	7	7	7	8	3	8	6.80	1.40	8.06	2.44	252
				2	9	7	6	7	7	6	9	7	6	10	7.40	1.43			
				3	7	4	9	7	8	8	7	5	9	12	7.60	2.22			
				4	6	6	11	8	4	7	10	8	12	10	8.20	2.53			
				5	6	7	12	12	15	9	12	7	10	13	10.30	2.98			
UCRA-1	00UC2-ST001-NSD-010	50	43.34	1	11	13	11	8	10	15	12	13	12	13	11.80	1.93	10.88	2.25	340
				2	14	8	10	13	11	10	16	12	8	11	11.30	2.54			
				3	7	12	9	14	13	11	13	12	11	14	11.60	2.22			
				4	11	13	8	13	10	8	11	9	7	9	9.90	2.08			
				5	11	9	10	10	10	7	10	14	7	10	9.80	1.99			
LC-1	00UC2-ST003-NSD-010	50	433.34	1	6	7	7	7	8	7	8	6	8	8	7.20	0.79	8.32	2.57	260
				2	7	7	9	9	8	7	9	5	7	7	7.50	1.27			
				3	11	11	6	11	9	4	11	3	9	8	8.30	3.02			
				4	9	7	11	2	9	12	6	6	8	12	8.20	3.12			
				5	8	13	7	12	6	13	12	10	9	14	10.40	2.80			
UCRB-1	00UC2-ST005-NSD-010	50	44.52	1	14	3	13	12	12	13	10	11	6	7	10.10	3.60	11.18	2.62	349
				2	10	12	12	13	9	14	11	11	12	13	11.70	1.49			
				3	15	10	10	7	11	11	7	12	13	10	10.60	2.46			
				4	11	15	13	12	15	13	6	10	8	10	11.30	2.91			
				5	11	13	12	13	13	12	15	13	13	7	12.20	2.10			
CIL-1	00UC2-ST007-NSD-010	50	43.63	1	11	12	9	7	7	7	6	7	5	8	7.90	2.18	9.04	2.44	283
				2	12	13	7	11	7	9	7	9	12	11	9.80	2.30			
				3	7	7	8	11	7	7	10	9	13	13	9.20	2.44			
				4	12	7	6	8	11	7	10	6	8	10	8.50	2.12			
				5	10	12	12	12	7	12	4	9	7	13	9.80	2.97			
CIB-1	00UC2-ST011-NSD-010	50	45.46	1	5	4	4	3	6	6	2	3	6	4	4.30	1.42	4.88	1.69	153
				2	4	6	3	6	6	7	7	3	5	3	5.00	1.63			
				3	4	4	5	3	3	3	6	6	3	4	4.10	1.20			
				4	3	6	3	7	7	3	5	3	7	7	5.10	1.91			
				5	10	4	7	4	6	6	6	4	5	7	5.90	1.85			
UCRC-1	00UC2-ST013-NSD-010	50	43.92	1	8	7	3	8	5	7	8	8	8	9	7.10	1.79	9.12	2.30	285
				2	7	11	6	10	7	7	9	6	9	8	8.00	1.70			
				3	12	8	6	11	11	10	12	12	10	9	10.10	1.97			
				4	11	10	13	8	11	11	11	11	8	12	10.60	1.58			
				5	8	12	7	11	11	13	8	6	9	13	9.80	2.53			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
CBB-1	00UC2-ST015-NSD-010	50	45.46	1	7	11	11	7	6	10	11	10	11	11	9.50	2.01	9.64	2.45	301
				2	6	11	11	7	7	5	9	7	13	6	8.20	2.66			
				3	11	9	11	8	7	8	9	9	12	8	9.20	1.62			
				4	11	7	12	10	15	10	12	13	8	12	11.00	2.36			
				5	13	10	12	6	13	7	12	14	8	8	10.30	2.87			
CBB-3	00UC2-ST017-NSD-010	50	42.49	1	7	5	9	7	7	9	9	10	12	12	8.70	2.26	10.84	3.16	339
				2	10	14	13	16	11	11	9	7	8	13	11.20	2.82			
				3	8	11	13	15	11	11	14	6	13	12	11.40	2.72			
				4	14	21	13	12	15	10	13	10	13	11	13.20	3.19			
				5	7	11	13	3	12	11	10	12	12	6	9.70	3.27			
CBB-5	00UC2-ST019-NSD-010	50	43.63	1	6	9	6	13	12	13	13	10	14	13	10.90	3.00	11.98	2.57	374
				2	13	14	13	14	12	11	13	13	13	10	12.60	1.26			
				3	13	14	13	14	13	11	13	13	10	13	12.70	1.25			
				4	8	13	6	9	16	16	14	10	11	12	11.50	3.34			
				5	7	8	15	16	14	15	13	9	12	13	12.20	3.16			
CNE-1	00UC2-ST021-NSD-010	50	45.46	1	3	2	2	2	3	3	2	3	2	3	2.50	0.53	1.90	0.74	59
				2	3	4	2	2	2	3	2	2	2	2	2.40	0.70			
				3	2	1	2	2	1	1	1	1	2	1	1.40	0.52			
				4	2	1	1	1	3	1	1	2	2	2	1.60	0.70			
				5	1	1	2	2	1	2	2	1	2	2	1.60	0.52			
CNE-3	00UC2-ST023-NSD-010	50	44.78	1	12	6	6	7	9	7	13	7	9	5	8.10	2.64	10.38	2.67	324
				2	8	9	11	7	11	10	11	13	9	12	10.10	1.85			
				3	13	12	13	14	8	8	15	14	12	11	12.00	2.40			
				4	7	11	9	12	7	16	12	11	9	7	10.10	2.88			
				5	13	14	12	9	12	10	13	12	13	8	11.60	1.96			
CSW-2	00UC2-ST025-NSD-010	50	44.52	1	4	6	7	7	6	7	7	6	8	7	6.50	1.08	7.34	2.21	229
				2	5	7	4	7	6	6	7	6	6	7	6.10	0.99			
				3	3	9	11	7	3	10	8	6	13	6	7.60	3.27			
				4	9	11	11	7	5	7	7	10	6	13	8.60	2.59			
				5	7	10	7	8	11	8	8	6	7	7	7.90	1.52			
CSW-4	00UC2-ST027-NSD-010	50	45.46	1	10	10	9	9	6	7	7	7	7	10	8.20	1.55	9.58	2.66	299
				2	10	12	6	15	7	9	12	10	11	13	10.50	2.72			
				3	11	13	15	9	9	4	8	9	8	11	9.70	3.02			
				4	8	7	9	7	7	13	5	12	13	11	9.20	2.86			
				5	9	8	7	7	12	13	8	14	12	13	10.30	2.75			
CSW-6	00UC2-ST029-NSD-010	50	44.52	1	6	7	13	13	12	10	10	14	12	7	10.40	2.88	11.44	2.70	358
				2	13	13	13	10	4	14	11	14	8	13	11.30	3.20			
				3	12	14	13	11	13	15	13	13	13	12	12.90	1.10			
				4	14	12	7	11	7	13	7	9	11	13	10.40	2.72			
				5	15	15	12	12	7	13	8	13	14	13	12.20	2.70			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
CIL-3	00UC2-ST037-NSD-010	50	39.16	1	11	13	12	9	6	12	12	10	9	9	10.30	2.11	11.10	2.18	347
				2	13	14	12	13	13	10	14	12	11	11	12.30	1.34			
				3	7	12	12	9	7	9	9	12	11	10	9.80	1.93			
				4	14	9	7	13	14	11	8	12	12	11	11.10	2.42			
				5	12	12	14	13	12	6	13	13	12	13	12.00	2.21			
Control	Control	25	22.89	1	2	3	4	3	4	2	3	3	3	3	3.00	0.67	3.42	0.73	100
				2	4	4	4	4	3	4	3	4	4	3	3.70	0.48			
				3	4	3	4	4	4	4	4	3	3	4	3.70	0.48			
				4	2	3	4	2	4	4	2	4	4	3	3.20	0.92			
				5	3	2	4	3	4	4	3	5	3	4	3.50	0.85			
UBI1-2	00BI2-ST002-NSD-010	25	21.38	1	6	8	10	8	10	10	10	11	8	6	8.70	1.77	9.40	2.63	275
				2	6	6	9	7	8	6	7	10	7	13	7.90	2.23			
				3	7	6	11	11	7	9	13	13	12	11	10.00	2.58			
				4	8	9	13	8	3	6	13	10	11	10	9.10	3.07			
				5	10	15	12	10	13	6	10	12	12	13	11.30	2.45			
UBI14-2	00BI2-ST004-NSD-010	25	21.67	1	6	7	7	6	6	7	6	7	8	4	6.40	1.07	6.98	1.53	204
				2	6	6	6	6	9	7	6	7	6	6	6.50	0.97			
				3	6	6	6	7	10	8	8	6	8	6	7.10	1.37			
				4	8	6	6	6	7	6	6	11	7	6	6.90	1.60			
				5	11	6	8	10	6	9	11	7	6	6	8.00	2.11			
UBI1-1	00BI2-ST006-NSD-010	25	20.97	1	12	6	15	11	10	11	13	9	16	6	10.90	3.35	11.16	2.77	326
				2	13	5	4	13	9	8	12	10	10	12	9.60	3.17			
				3	6	11	12	10	5	13	12	12	10	12	10.30	2.71			
				4	15	11	11	14	14	12	15	13	11	15	13.10	1.73			
				5	10	12	10	11	12	13	14	12	13	12	11.90	1.29			
MBI3-1	00BI2-ST008-NSD-010	25	21.52	1	7	11	7	10	7	11	3	7	7	6	7.60	2.46	7.66	1.77	224
				2	7	5	7	6	6	6	7	7	10	7	6.80	1.32			
				3	6	9	10	7	9	9	6	9	7	8	8.00	1.41			
				4	6	8	9	6	11	7	8	6	8	7	7.60	1.58			
				5	7	12	11	7	7	7	8	7	8	9	8.30	1.83			
MBI3-3	00BI2-ST010-NSD-010	25	21.67	1	3	7	11	6	7	6	8	7	6	7	6.80	1.99	7.36	1.95	215
				2	7	6	11	4	7	9	6	6	10	7	7.30	2.11			
				3	7	8	7	6	7	7	7	6	7	7	6.90	0.57			
				4	7	7	8	7	5	3	10	10	6	7	7.00	2.11			
				5	6	10	10	9	9	12	6	10	10	6	8.80	2.10			
LBI1-2	00BI2-ST012-NSD-010	25	22.26	1	6	4	6	6	6	7	6	6	5	6	5.80	0.79	6.66	1.38	195
				2	6	6	7	7	5	6	6	6	6	7	6.20	0.63			
				3	6	6	12	7	7	7	6	7	9	6	7.30	1.89			
				4	7	7	6	7	6	6	7	7	5	7	6.50	0.71			
				5	4	7	8	7	6	10	9	7	9	8	7.50	1.72			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LBI1-4	00BI2-ST014-NSD-010	25	22.26	1	12	11	9	11	6	14	12	13	7	14	10.90	2.77	10.66	2.84	312
				2	12	9	13	9	12	6	14	7	11	13	10.60	2.72			
				3	9	13	7	7	9	8	6	11	14	7	9.10	2.73			
				4	13	13	13	7	12	12	10	12	11	15	11.80	2.15			
				5	13	14	13	14	7	13	4	12	12	7	10.90	3.54			
LBI3-2	00BI2-ST016-NSD-010	25	22.73	1	13	12	12	7	14	14	7	6	13	3	10.10	3.96	11.32	3.26	331
				2	12	13	13	11	3	5	13	8	11	12	10.10	3.57			
				3	13	6	15	15	16	12	13	7	12	14	12.30	3.33			
				4	5	11	14	15	13	12	11	7	13	12	11.30	3.09			
				5	13	13	11	13	14	13	15	13	10	13	12.80	1.40			
LBI6-1	00BI2-ST018-NSD-010	25	21.13	1	9	13	17	15	14	7	7	13	10	13	11.80	3.39	11.80	2.76	345
				2	13	13	13	7	8	13	7	13	11	9	10.70	2.67			
				3	12	16	14	12	13	13	14	14	7	13	12.80	2.35			
				4	12	10	13	11	13	3	9	12	12	11	10.60	2.95			
				5	10	14	16	14	12	13	13	12	14	13	13.10	1.60			
LBI6-3	00BI2-ST020-NSD-010	25	21.96	1	12	11	7	7	8	10	12	4	6	9	8.60	2.67	10.54	2.61	308
				2	10	13	7	8	13	7	8	13	6	12	9.70	2.83			
				3	11	6	13	9	12	11	15	7	14	12	11.00	2.91			
				4	10	12	12	13	13	9	10	10	13	13	11.50	1.58			
				5	13	11	13	13	9	13	12	13	9	13	11.90	1.66			
LBI9-2	00BI2-ST022-NSD-010	25	21.96	1	9	10	9	10	9	7	8	10	11	7	9.00	1.33	8.88	2.16	260
				2	11	6	12	11	6	7	7	7	13	10	9.00	2.67			
				3	9	7	6	7	6	9	7	8	10	9	7.80	1.40			
				4	9	5	11	7	9	6	6	12	13	8	8.60	2.72			
				5	10	11	9	11	7	9	14	7	11	11	10.00	2.11			
LBI3-1	00BI2-ST024-NSD-010	25	21.67	1	8	9	7	9	7	7	10	7	8	7	7.90	1.10	9.40	2.91	275
				2	11	7	7	6	10	7	10	10	11	5	8.40	2.22			
				3	12	9	11	13	7	6	16	5	11	13	10.30	3.50			
				4	14	13	13	4	6	8	13	11	11	7	10.00	3.50			
				5	13	15	8	8	11	7	13	10	6	13	10.40	3.06			
LBI3-3	00BI2-ST026-NSD-010	25	22.26	1	6	7	11	6	8	6	12	9	7	11	8.30	2.31	7.88	1.93	230
				2	9	7	6	9	8	7	9	11	8	6	8.00	1.56			
				3	10	5	8	9	3	7	7	9	11	10	7.90	2.47			
				4	6	8	9	7	7	11	7	6	8	6	7.50	1.58			
				5	5	7	9	9	8	11	5	7	7	9	7.70	1.89			
LPPG-2	00BI2-ST028-NSD-010	25	21.24	1	2	3	4	3	3	3	3	4	3	3	3.10	0.57	3.80	1.16	111
				2	3	3	3	3	3	2	3	3	3	3	2.90	0.32			
				3	5	4	2	3	5	3	3	4	3	4	3.60	0.97			
				4	5	6	5	5	6	5	3	7	4	7	5.30	1.25			
				5	5	3	4	4	4	4	4	4	5	4	4	4.10			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
LPPG-4	00BI2-ST030-NSD-010	25	20.70	1	4	3	3	3	3	3	3	2	3	3	3.00	0.47	2.78	0.68	81
				2	3	3	2	3	2	3	3	3	2	2.70	0.48				
				3	3	3	3	3	2	1	1	3	2	3	2.40	0.84			
				4	3	3	3	3	4	3	1	3	3	3	2.90	0.74			
				5	3	3	3	3	4	1	3	3	3	3	2.90	0.74			
LBV-2	00BV2-ST002-NSD-010	25	21.67	1	5	10	10	11	11	8	6	10	10	12	9.30	2.26	9.42	2.22	275
				2	10	6	9	9	6	10	9	8	7	8	8.20	1.48			
				3	7	5	10	10	10	8	7	10	12	12	9.10	2.28			
				4	10	12	7	11	10	6	11	7	8	11	9.30	2.11			
				5	14	13	10	13	12	11	8	8	10	13	11.20	2.15			
LBV-4	00BV2-ST004-NSD-010	25	13.49	1	3	3	3	3	3	2	3	4	3	3	3.00	0.47	3.12	0.48	91
				2	3	3	3	4	3	3	3	4	4	4	3.40	0.52			
				3	3	3	4	3	3	3	3	3	2	4	3.10	0.57			
				4	4	3	3	3	3	3	3	3	3	3	3.10	0.32			
				5	3	4	3	3	3	2	3	3	3	3	3.00	0.47			
LBV-6	00BV2-ST006-NSD-010	25	21.38	1	6	6	5	5	6	6	6	7	6	7	6.00	0.67	6.42	1.42	188
				2	3	8	7	6	6	6	9	6	6	6	6.30	1.57			
				3	6	7	10	6	6	5	8	6	6	4	6.40	1.65			
				4	4	7	5	7	7	7	6	6	7	7	6.30	1.06			
				5	5	6	8	6	5	7	7	7	11	9	7.10	1.85			
UBV-2	00BV2-ST008-NSD-010	25	19.70	1	5	5	6	5	3	6	6	6	3	5	5.00	1.15	5.50	1.53	161
				2	7	7	5	3	5	3	6	6	5	6	5.30	1.42			
				3	5	4	3	5	6	6	3	6	6	5	4.90	1.20			
				4	6	4	7	9	6	6	7	3	11	7	6.60	2.27			
				5	6	6	6	5	5	6	6	4	6	7	5.70	0.82			
UBV-4	00BV2-ST010-NSD-010	25	18.47	1	3	2	3	3	3	3	2	3	3	3	2.80	0.42	2.78	0.62	81
				2	2	2	2	2	3	4	3	2	3	3	2.60	0.70			
				3	4	2	3	3	2	3	3	3	2	3	2.80	0.63			
				4	3	3	3	3	3	3	3	2	5	3	3.10	0.74			
				5	2	3	3	3	3	2	2	3	3	2	2.60	0.52			
PL-1	00LC2-ST001-NSD-010	25	21.24	1	5	6	7	5	6	6	4	5	6	6	5.60	0.84	5.78	1.43	169
				2	5	4	6	7	5	10	7	7	8	6	6.50	1.72			
				3	6	5	6	4	5	7	4	6	4	6	5.30	1.06			
				4	5	4	5	5	5	4	6	11	8	4	5.70	2.21			
				5	6	5	5	6	7	5	5	6	7	6	5.80	0.79			
PL-3	00LC2-ST003-NSD-010	25	23.22	1	7	7	6	8	6	9	5	7	7	7	6.90	1.10	8.88	2.48	260
				2	9	6	7	7	12	11	8	13	8	10	9.10	2.33			
				3	8	12	10	6	7	11	9	6	8	12	8.90	2.28			
				4	8	12	6	9	6	10	12	7	6	7	8.30	2.36			
				5	14	11	10	12	13	7	11	13	8	13	11.20	2.30			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
MCR-1	00LC2-ST005-NSD-010	25	22.73	1	5	6	8	5	6	4	7	5	12	6	6.40	2.27	6.82	2.14	199
				2	5	5	8	10	5	11	8	3	8	6	6.90	2.51			
				3	6	6	7	12	7	6	12	7	5	6	7.40	2.50			
				4	9	6	4	4	11	6	9	7	6	8	7.00	2.26			
				5	4	7	7	5	7	7	8	7	6	6	6.40	1.17			
MCR-3	00LC2-ST007-NSD-010	25	21.67	1	5	6	8	11	7	7	7	11	5	6	7.30	2.16	8.38	2.51	245
				2	5	5	8	11	7	10	6	11	7	14	8.40	2.99			
				3	6	12	7	6	10	7	5	12	6	12	8.30	2.87			
				4	6	6	7	12	7	10	8	12	12	12	9.20	2.66			
				5	6	10	7	9	10	12	10	8	8	7	8.70	1.83			
BO-2	00LC2-ST009-NSD-010	25	21.96	1	3	7	6	7	7	6	7	6	5	6	6.00	1.25	7.04	1.76	206
				2	6	7	6	8	6	7	6	8	10	9	7.30	1.42			
				3	4	6	3	6	9	7	6	6	7	7	6.10	1.66			
				4	7	6	6	7	9	11	6	9	6	6	7.30	1.77			
				5	7	7	7	8	7	8	10	11	9	11	8.50	1.65			
BO-4	00LC2-ST011-NSD-010	25	20.97	1	9	13	13	13	11	10	6	7	9	12	10.30	2.54	10.10	2.76	295
				2	11	6	10	9	11	12	12	9	9	5	9.40	2.37			
				3	11	15	14	11	12	7	13	4	6	12	10.50	3.63			
				4	12	13	7	9	8	3	12	12	11	10	9.70	3.06			
				5	12	14	9	8	14	9	7	10	12	11	10.60	2.41			
ML-1	00LC2-ST013-NSD-010	25	23.31	1	13	12	13	10	13	15	10	11	13	13	12.30	1.57	11.38	2.63	333
				2	9	5	13	12	15	8	12	13	11	11	10.90	2.88			
				3	13	13	15	9	13	15	11	13	14	7	12.30	2.58			
				4	9	14	11	12	5	12	9	10	11	11	10.40	2.41			
				5	12	13	13	6	10	13	13	4	13	13	11.00	3.33			
ML-4	00LC2-ST027-NSD-010	25	23.22	1	6	8	7	16	9	11	12	13	13	6	10.10	3.41	10.54	2.70	308
				2	13	11	7	13	13	9	12	12	14	14	11.80	2.25			
				3	15	9	11	8	5	13	6	10	12	12	10.10	3.14			
				4	13	8	11	6	11	8	12	12	7	11	9.90	2.42			
				5	10	11	11	10	11	10	10	15	13	7	10.80	2.10			
WB-2	00SN2-ST002-NSD-010	25	20.44	1	6	7	5	7	6	6	6	3	6	8	6.00	1.33	5.72	1.23	167
				2	6	5	6	6	7	9	8	7	5	6	6.50	1.27			
				3	6	6	6	5	4	6	3	4	5	6	5.10	1.10			
				4	7	6	6	5	6	5	6	6	7	7	6.10	0.74			
				5	6	5	3	5	5	4	6	5	4	6	4.90	0.99			
JB-2	00SN2-ST004-NSD-010	25	20.19	1	4	2	2	3	2	3	3	3	4	4	3.00	0.82	2.78	0.93	81
				2	3	2	4	3	3	4	3	3	3	4	3.20	0.63			
				3	2	2	2	3	2	2	2	4	1	2	2.20	0.79			
				4	3	1	3	3	1	2	1	3	2	3	2.20	0.92			
				5	4	3	4	3	5	3	2	3	4	2	3.30	0.95			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
BBC-1	00SN2-ST006-NSD-010	25	22.42	1	4	3	5	5	7	4	4	4	3	3	4.20	1.23	5.22	1.43	153
				2	4	7	3	4	5	4	6	5	6	6	5.00	1.25			
				3	6	3	5	6	5	7	5	7	7	6	5.70	1.25			
				4	3	6	3	3	5	8	5	6	5	6	5.00	1.63			
				5	7	5	6	7	4	5	7	7	7	7	6.20	1.14			
GB-1	00SN2-ST008-NSD-010	25	22.73	1	7	7	7	9	9	7	6	7	8	9	7.60	1.07	7.92	1.95	232
				2	3	13	9	8	7	6	9	10	8	7	8.00	2.62			
				3	7	10	7	6	6	8	6	12	6	8	7.60	2.01			
				4	9	7	8	5	11	6	6	10	9	7	7.80	1.93			
				5	6	7	7	9	9	6	11	11	11	9	8.60	2.01			
BC-2	00SN2-ST012-NSD-010	25	21.49	1	6	7	7	9	6	9	8	13	12	9	8.60	2.37	10.64	3.35	311
				2	7	8	13	12	16	15	6	13	12	11	11.30	3.33			
				3	10	9	16	10	11	15	13	7	17	13	12.10	3.25			
				4	15	10	3	9	10	7	10	8	10	11	9.30	3.06			
				5	12	8	12	8	13	11	18	13	17	7	11.90	3.67			
BC-4	00SN2-ST014-NSD-010	25	21.38	1	8	9	8	7	7	5	7	6	13	13	8.30	2.71	7.70	2.24	225
				2	7	5	9	6	6	7	9	7	6	7	6.90	1.29			
				3	6	7	7	3	5	5	5	7	4	5	5.40	1.35			
				4	8	10	6	7	10	8	6	7	8	9	7.90	1.45			
				5	8	11	8	10	11	11	10	11	11	9	10.00	1.25			
GB-5	00SN2-ST038-NSD-010	25	22.42	1	6	6	7	6	7	7	4	5	7	6	6.10	0.99	6.70	1.15	196
				2	6	7	7	5	6	5	7	6	9	6	6.40	1.17			
				3	7	7	7	5	7	7	7	7	6	6	6.60	0.70			
				4	8	6	8	8	11	6	7	6	7	8	7.50	1.51			
				5	7	8	5	7	7	7	7	8	6	7	6.90	0.88			
UCRA-1	00UC2-ST001-NSD-010	25	21.67	1	13	11	7	11	6	7	13	7	7	10	9.20	2.70	8.16	2.31	239
				2	8	11	9	9	8	3	8	6	7	6	7.50	2.17			
				3	6	5	6	6	7	7	9	7	6	6	6.50	1.08			
				4	11	9	6	10	7	10	9	6	11	13	9.20	2.30			
				5	7	6	7	7	9	6	10	12	11	9	8.40	2.12			
LC-1	00UC2-ST003-NSD-010	25	21.67	1	6	6	5	11	13	13	7	11	6	13	9.10	3.38	10.10	2.66	295
				2	11	13	11	11	7	8	5	12	9	8	9.50	2.51			
				3	13	8	12	12	14	10	9	9	8	9	10.40	2.17			
				4	10	10	13	7	11	12	10	10	5	10	9.80	2.30			
				5	10	12	14	12	10	7	11	11	15	15	11.70	2.50			
UCRB-1	00UC2-ST005-NSD-010	25	22.26	1	6	7	7	4	9	4	9	7	8	7	6.80	1.75	10.22	3.23	299
				2	10	7	7	9	6	13	9	4	9	8	8.20	2.44			
				3	14	7	11	10	13	13	12	14	12	15	12.10	2.33			
				4	6	12	15	11	15	14	12	13	13	11	12.20	2.62			
				5	10	7	9	12	14	11	13	12	16	14	11.80	2.66			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
CIL-1	00UC2-ST007-NSD-010	25	21.81	1	7	8	9	3	7	6	4	6	3	3	5.60	2.22	6.62	2.02	194
				2	5	6	7	6	3	10	6	6	9	8	6.60	2.01			
				3	7	14	9	5	6	5	7	6	6	7	7.20	2.66			
				4	7	5	7	6	6	7	5	7	7	7	6.40	0.84			
				5	10	5	9	4	7	9	7	7	7	8	7.30	1.83			
CIB-1	00UC2-ST011-NSD-010	25	22.73	1	7	6	3	4	3	3	4	4	3	3	4.00	1.41	3.70	1.04	108
				2	5	3	4	5	3	4	4	3	4	4	3.90	0.74			
				3	6	4	3	3	3	3	3	4	3	4	3.60	0.97			
				4	3	5	3	3	3	3	3	3	3	4	3.30	0.67			
				5	2	3	3	3	5	3	5	4	3	6	3.70	1.25			
UCRC-1	00UC2-ST013-NSD-010	25	21.96	1	7	7	7	9	11	7	7	6	6	10	7.70	1.70	7.36	1.92	215
				2	5	7	7	6	6	7	6	3	8	7	6.20	1.40			
				3	7	7	6	11	5	7	5	7	8	7	7.00	1.70			
				4	9	3	7	10	7	7	7	7	8	7	7.20	1.81			
				5	10	8	14	9	7	10	6	7	9	7	8.70	2.31			
CBB-1	00UC2-ST015-NSD-010	25	22.73	1	7	6	6	7	7	7	5	7	7	7	6.60	0.70	7.48	1.40	219
				2	7	6	6	6	7	7	6	8	6	6	6.50	0.71			
				3	6	10	10	9	10	10	9	7	7	7	8.50	1.58			
				4	10	7	7	8	9	8	7	6	7	7	7.60	1.17			
				5	8	9	7	7	11	10	9	7	7	7	8.20	1.48			
CBB-3	00UC2-ST017-NSD-010	25	21.24	1	13	3	12	13	16	7	14	12	10	11	11.10	3.73	11.28	2.47	330
				2	10	13	11	11	11	15	11	11	13	13	11.90	1.52			
				3	12	10	13	14	12	9	12	11	12	13	11.80	1.48			
				4	13	13	12	6	7	7	12	11	10	8	9.90	2.69			
				5	13	15	12	12	13	8	9	12	13	10	11.70	2.11			
CBB-5	00UC2-ST019-NSD-010	25	21.81	1	7	10	15	7	11	15	13	11	13	7	10.90	3.14	11.88	2.22	347
				2	13	11	12	14	13	14	7	14	8	9	11.50	2.64			
				3	12	14	12	13	13	13	9	12	13	14	12.50	1.43			
				4	13	15	8	13	15	12	12	13	11	13	12.50	2.01			
				5	9	13	12	13	11	12	11	13	13	13	12.00	1.33			
CNE-1	00UC2-ST021-NSD-010	25	22.73	1	3	3	3	2	2	3	2	2	3	2	2.50	0.53	2.22	0.74	65
				2	2	1	3	2	2	3	2	3	1	3	2.20	0.79			
				3	1	3	2	2	3	2	1	1	2	3	2.00	0.82			
				4	1	3	3	2	3	1	3	2	2	2	2.20	0.79			
				5	3	2	1	3	1	2	2	3	2	3	2.20	0.79			
CNE-3	00UC2-ST023-NSD-010	25	22.39	1	11	8	6	6	9	6	11	12	8	9	8.60	2.22	10.18	2.72	298
				2	10	8	13	11	11	12	6	7	11	7	9.60	2.41			
				3	11	11	8	12	9	10	11	12	13	13	11.00	1.63			
				4	12	6	14	12	13	12	11	17	11	8	11.60	3.03			
				5	13	4	7	13	11	9	13	6	13	12	10.10	3.38			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
CSW-2	00UC2-ST025-NSD-010	25	22.26	1	6	3	7	7	3	6	5	6	5	6	5.40	1.43	6.20	1.23	181
				2	6	6	7	7	4	6	5	7	7	7	6.20	1.03			
				3	7	4	7	8	7	4	7	7	8	6	6.50	1.43			
				4	4	7	6	7	9	7	6	6	7	6	6.50	1.27			
				5	6	6	6	5	7	7	7	6	7	7	6.40	0.70			
CSW-4	00UC2-ST027-NSD-010	25	22.73	1	3	9	6	10	9	9	4	9	8	7	7.40	2.37	8.48	2.42	248
				2	9	8	7	14	6	7	9	8	8	7	8.30	2.21			
				3	8	8	5	6	12	12	13	13	8	9	9.40	2.91			
				4	9	7	8	7	10	7	10	6	11	12	8.70	2.00			
				5	6	7	4	10	8	10	9	12	8	12	8.60	2.55			
CSW-6	00UC2-ST029-NSD-010	25	22.26	1	13	11	11	11	7	7	12	7	11	7	9.70	2.41	11.32	2.44	331
				2	12	12	13	12	13	14	14	9	12	7	11.80	2.20			
				3	15	16	12	12	10	11	12	12	13	12	12.50	1.78			
				4	14	12	7	13	13	9	13	13	15	7	11.60	2.88			
				5	12	12	8	10	7	13	9	12	13	14	11.00	2.36			
CIL-3	00UC2-ST037-NSD-010	25	19.58	1	7	8	5	7	8	8	7	6	7	7	7.00	0.94	7.74	2.00	226
				2	7	8	8	12	9	9	11	9	8	9	9.00	1.49			
				3	12	3	7	8	8	8	11	4	7	11	7.90	2.92			
				4	7	6	10	8	7	9	8	6	4	6	7.10	1.73			
				5	12	6	6	8	10	7	7	6	6	9	7.70	2.06			
LAR32	Control	12.5	11.44	1	3	4	4	3	4	4	3	3	4	2	3.40	0.70	3.54	0.65	100
				2	5	4	3	3	4	3	3	4	3	4	3.60	0.70			
				3	3	4	4	4	3	4	4	3	3	3	3.50	0.53			
				4	4	3	4	5	4	4	3	4	4	4	3.90	0.57			
				5	3	4	4	4	2	3	3	3	3	4	3.30	0.67			
MCR-1	00LC2-ST005-NSD-010	12.5	11.36	1	3	4	6	3	5	4	7	5	6	4	4.70	1.34	5.80	1.34	164
				2	6	6	7	7	7	7	6	7	6	6	6.50	0.53			
				3	7	5	6	4	4	6	8	7	6	6	5.90	1.29			
				4	4	6	6	4	6	2	6	6	7	6	5.30	1.49			
				5	7	7	7	9	6	6	6	6	6	6	6.60	0.97			
LAR32	Control	6.25	6.72	1	3	4	3	5	3	4	3	2	3	4	3.40	0.84	3.66	0.66	100
				2	3	4	4	4	4	5	4	4	4	3	3.90	0.57			
				3	3	4	4	3	4	4	4	4	3	4	3.70	0.48			
				4	3	3	4	4	4	3	3	4	5	2	3.50	0.85			
				5	3	4	4	4	4	4	4	4	3	4	3.80	0.42			
MCR-1	00LC2-ST005-NSD-010	6.25	5.68	1	3	3	2	3	3	2	4	3	2	3	2.80	0.63	3.06	0.59	84
				2	2	3	4	3	3	3	3	3	3	3	3.00	0.47			
				3	3	3	4	3	3	4	3	4	3	3	3.30	0.48			
				4	2	3	3	4	2	3	3	3	4	4	3.10	0.74			
				5	4	2	3	3	3	3	3	3	4	3	3.10	0.57			

Original Station ID	CDM Designation	Conc. (%)	% Original Sample	REP	Cell Number										Replicate		Grand		% of Control
					1	2	3	4	5	6	7	8	9	10	Mean	SD	MEAN	SD	
Concentration																			
SDS	Reference Toxicant	10 mg/L	na	1	2	2	2	1	2	2	2	1	2	1	1.70	0.48	1.78	0.42	69
				2	2	2	2	2	2	1	2	2	1	1.80	0.42				
				3	2	2	2	2	2	2	2	2	2	2	2.00	0.00			
				4	2	2	1	2	2	2	1	1	2	2	1.70	0.48			
				5	2	1	1	2	2	2	2	2	1	2	1.70	0.48			
SDS	Reference Toxicant	5mg/L	na	1	1	4	3	1	2	3	2	2	2	1	2.10	0.99	2.32	0.74	90
				2	2	3	2	3	2	2	2	2	2	2	2.20	0.42			
				3	2	3	3	3	2	4	2	3	2	3	2.70	0.67			
				4	3	2	2	3	3	3	2	1	3	3	2.50	0.71			
				5	1	2	1	2	3	2	3	3	2	2	2.10	0.74			
SDS	Reference Toxicant	2.5 mg/L	na	1	3	2	2	3	4	4	2	3	2	3	2.80	0.79	2.74	0.72	106
				2	2	2	2	3	1	3	2	2	3	3	2.30	0.67			
				3	3	2	2	2	4	4	3	3	3	2	2.80	0.79			
				4	3	3	3	2	3	2	4	2	3	2	2.70	0.67			
				5	3	3	3	3	4	3	3	2	3	4	3.10	0.57			
SDS	Reference Toxicant	1.25 mg/L	na	1	3	4	2	4	2	3	3	2	4	4	3.10	0.88	3.08	0.72	119
				2	3	2	4	3	3	3	3	4	3	3	3.10	0.57			
				3	2	3	4	2	4	2	3	3	2	3	2.80	0.79			
				4	2	2	4	3	4	3	3	4	3	3	3.10	0.74			
				5	4	4	2	4	3	3	3	4	3	3	3.30	0.67			

Table 13. Dissolved organic carbon concentrations (mg/L) of acidified porewater samples measured between March 9 and March 24, 2001.

Original Site ID	CDM Site ID	CERC ID	Date analyzed	Run #	Batch #	Rep 1	Rep 2	Mean DOC	%RSD ¹	Comments
Ampelisca Ref	Amphipod Ref	101	24-Mar-01	9	11	3.07	3.02	3.04	1.22	
LAR32	Porewater Control site	102	24-Mar-01	10	11	5.45	5.47	5.46	0.14	
UBI1-1	00BI2-ST001-NSD-010	8	9-Mar-01	10	1	18.65	18.13	18.39	1.93	
UBI1-2	00BI2-ST002-NSD-010	9	9-Mar-01	11	1	18.25	18.51	18.38	0.96	
UBI1-3	00BI2-ST003-NSD-010	10	9-Mar-01	12	1	13.91	13.92	13.91	0.07	
UB14-2	00BI2-ST004-NSD-010	4	9-Mar-01	6	1	10.55	11.19	10.87	3.97	
UBI5-4	00BI2-ST005-NSD-010	11	12-Mar-01	3	2	8.73	8.64	8.69	0.67	
MBI1-1	00BI2-ST006-NSD-010	12	12-Mar-01	4	2	23.01	23.16	23.09	0.46	
MBI1-2	00BI2-ST007-NSD-010	96	24-Mar-01	2	11	2.49	2.55	2.52	1.57	
MB13-1	00BI2-ST008-NSD-010	2	9-Mar-01	4	1	19.60	19.69	19.64	0.31	
MBI3-3	00BI2-ST010-NSD-010	13	12-Mar-01	5	2	9.00	10.49	9.75	10.37	
LBI1-1	00BI2-ST011-NSD-010	23	13-Mar-01	4	3	9.07	9.25	9.16	1.33	
LBI1-2	00BI2-ST012-NSD-010	24	13-Mar-01	5	3	11.31	11.54	11.43	1.37	
LBI1-3	00BI2-ST013-NSD-010	46	19-Mar-01	9	6	9.12	9.14	9.13	0.12	
LBI1-4	00BI2-ST014-NSD-010	58	20-Mar-01	11	7	9.26	9.36	9.31	0.76	
LBI3-1	00BI2-ST015-NSD-010	47	19-Mar-01	10	6	13.85	14.11	13.98	1.28	
LBI3-2	00BI2-ST016-NSD-010	25	13-Mar-01	6	3	8.75	8.98	8.86	1.70	
LBI3-3	00BI2-ST017-NSD-010	26	13-Mar-01	7	3	11.49	11.62	11.55	0.77	
LBI6-1	00BI2-ST018-NSD-010	27	13-Mar-01	8	3	13.14	13.15	13.14	0.08	
LBI6-2	00BI2-ST019-NSD-010	28	13-Mar-01	9	3	13.85	13.83	13.84	0.11	
LBI6-3	00BI2-ST020-NSD-010	48	19-Mar-01	11	6	8.52	8.43	8.47	0.65	
LBI9-1	00BI2-ST021-NSD-010	29	13-Mar-01	10	3	16.61	16.65	16.63	0.15	
LBI9-2	00BI2-ST022-NSD-010	40	15-Mar-01	6	5	8.41	8.46	8.43	0.38	
LBI9-3	00BI2-ST023-NSD-010	49	19-Mar-01	12	6	10.73	10.99	10.86	1.60	
LBI13-1	00BI2-ST024-NSD-010	50	19-Mar-01	13	6	21.04	21.48	21.26	1.42	
LBI13-2	00BI2-ST025-NSD-010	6	9-Mar-01	8	1	9.85	9.99	9.92	1.00	
LBI13-3	00BI2-ST026-NSD-010	39	15-Mar-01	4	5	12.92	12.80	12.86	0.64	
LPPG-1	00BI2-ST027-NSD-010	41	19-Mar-01	3	6	3.33	3.33	3.33	0.14	
LPPG-2	00BI2-ST028-NSD-010	89	23-Mar-01	11	10	2.49	na ²	2.49	na	n=1 insufficient sample
LPPG-3	00BI2-ST029-NSD-010	90	23-Mar-01	12	10	3.15	na	3.15	na	n=1 insufficient sample
LPPG-4	00BI2-ST030-NSD-010	91	23-Mar-01	2	10	2.30	2.33	2.31	0.83	
LPPG-5	00BI2-ST031-NSD-010	92	23-Mar-01	3	10	2.26	2.25	2.26	0.31	
MB13-4	00BI2-ST041-NSD-010	1	9-Mar-01	3	1	16.69	16.72	16.70	0.11	
LBV-1	00BV2-ST001-NSD-010	73	22-Mar-01	8	9	2.91	2.91	2.91	0.16	

Original Site ID	CDM Site ID	CERC ID	Date analyzed	Run #	Batch #	Rep 1	Rep 2	Mean DOC	%RSD ¹	Comments
LBV-2	00BV2-ST002-NSD-010	59	20-Mar-01	12	7	4.15	4.28	4.22	1.91	
LBV-3	00BV2-ST003-NSD-010	67	22-Mar-01	2	9	5.37	5.28	5.33	1.13	
LBV-4	00BV2-ST004-NSD-010	60	20-Mar-01	13	7	2.73	2.91	2.82	4.07	
LBV-5	00BV2-ST005-NSD-010	78	22-Mar-01	15	9	3.70	3.66	3.68	0.82	
LBV-6	00BV2-ST006-NSD-010	61	21-Mar-01	2	8	3.29	3.70	3.50	7.37	
UBV-1	00BV2-ST007-NSD-010	79	22-Mar-01	16	9	1.60	1.60	1.60	0.15	
UBV-2	00BV2-ST008-NSD-010	68	22-Mar-01	3	9	2.96	3.00	2.98	0.75	
UBV-3	00BV2-ST009-NSD-010	80	22-Mar-01	17	9	2.29	2.20	2.24	2.34	
UBV-4	00BV2-ST010-NSD-010	81	23-Mar-01	2	10	2.18	2.20	2.19	0.44	
PL-1	00LC2-ST001-NSD-010	75	22-Mar-01	10	9	3.06	3.04	3.05	0.32	
PL-2	00LC2-ST002-NSD-010	42	19-Mar-01	4	6	5.25	5.35	5.30	1.24	
PL-3	00LC2-ST003-NSD-010	14	12-Mar-01	6	2	24.91	25.18	25.04	0.76	
PL-4	00LC2-ST004-NSD-010	43	19-Mar-01	5	6	4.06	4.15	4.11	1.33	
MCR-1	00LC2-ST005-NSD-010	100	24-Mar-01	6	11	3.37	na	3.37	na	n=1 insufficient sample
MCR-2	00LC2-ST006-NSD-010	69	22-Mar-01	4	9	4.79	4.84	4.82	0.64	
MCR-3	00LC2-ST007-NSD-010	71	22-Mar-01	6	9	5.11	5.20	5.15	1.14	
BO-1	00LC2-ST008-NSD-010	93	23-Mar-01	4	10	4.44	4.30	4.37	2.13	
BO-2	00LC2-ST009-NSD-010	62	21-Mar-01	3	8	11.83	11.93	11.88	0.57	
BO-3	00LC2-ST010-NSD-010	82	23-Mar-01	3	10	4.44	4.36	4.40	1.14	
BO-4	00LC2-ST011-NSD-010	83	23-Mar-01	4	10	3.47	3.52	3.49	0.85	
BO-5	00LC2-ST012-NSD-010	84	23-Mar-01	5	10	7.51	7.42	7.47	0.79	
ML-1	00LC2-ST013-NSD-010	63	21-Mar-01	4	8	3.57	3.64	3.60	1.17	
ML-2	00LC2-ST014-NSD-010	64	21-Mar-01	5	8	3.13	3.03	3.08	2.01	
ML-4	00LC2-ST027-NSD-010	72	22-Mar-01	7	9	5.13	5.01	5.07	1.48	
WB-1	00SN2-ST001-NSD-010	51	20-Mar-01	2	7	3.93	na	3.93	na	n=1 insufficient sample
WB-2	00SN2-ST002-NSD-010	66	21-Mar-01	8	8	5.68	5.43	5.56	2.95	
JB-1	00SN2-ST003-NSD-010	97	24-Mar-01	3	11	3.47	na	3.47	na	n=1 insufficient sample
JB-2	00SN2-ST004-NSD-010	98	24-Mar-01	4	11	3.35	3.30	3.32	1.10	
JB-3	00SN2-ST005-NSD-010	99	24-Mar-01	5	11	2.28	2.30	2.29	0.42	
BBC-1	00SN2-ST006-NSD-010	17	12-Mar-01	12	2	13.60	13.44	13.52	0.80	
GB-1	00SN2-ST008-NSD-010	18	12-Mar-01	13	2	11.11	11.09	11.10	0.12	
GB-2	00SN2-ST009-NSD-010	19	12-Mar-01	14	2	4.34	4.38	4.36	0.67	
BC-1	00SN2-ST011-NSD-010	85	23-Mar-01	6	10	3.10	3.02	3.06	1.56	
BC-2	00SN2-ST012-NSD-010	94	23-Mar-01	5	10	3.50	2.99	3.24	10.01	
BC-3	00SN2-ST013-NSD-010	86	23-Mar-01	8	10	3.81	3.84	3.83	0.41	
BC-4	00SN2-ST014-NSD-010	88	23-Mar-01	10	10	2.30	2.29	2.30	0.17	

Original Site ID	CDM Site ID	CERC ID	Date analyzed	Run #	Batch #	Rep 1	Rep 2	Mean DOC	%RSD ¹	Comments
BC-5	00SN2-ST015-NSD-010	87	23-Mar-01	9	10	2.62	na	2.62	na	n=1 insufficient sample
BBC-3	00SN2-ST035-NSD-010	20	12-Mar-01	15	2	4.38	4.46	4.42	1.25	
GB-5	00SN2-ST038-NSD-010	21	13-Mar-01	2	3	4.64	4.68	4.66	0.57	
CNE-1	00UC2-ST001-NSD-010	37	15-Mar-01	2	5	13.72	13.66	13.69	0.29	
CSW-1	00UC2-ST003-NSD-010	56	20-Mar-01	9	7	15.37	15.64	15.51	1.22	
UCRA-1	00UC2-ST004-NSD-010	22	13-Mar-01	3	3	12.04	11.96	12.00	0.45	
LC-1	00UC2-ST005-NSD-010	74	22-Mar-01	9	9	3.56	3.59	3.58	0.56	
LC-2	00UC2-ST007-NSD-010	44	19-Mar-01	6	6	10.00	10.09	10.05	0.64	
UCRB-1	00UC2-ST008-NSD-010	30	13-Mar-01	11	3	12.14	11.96	12.05	1.03	
CIL-1	00UC2-ST010-NSD-010	31	14-Mar-01	3	4	6.42	6.52	6.47	1.00	
CIL-2	00UC2-ST011-NSD-010	15	12-Mar-01	7	2	21.91	21.42	21.66	1.57	
CIL-4	00UC2-ST012-NSD-010	7	9-Mar-01	9	1	9.75	9.64	9.69	0.82	
CIB-1	00UC2-ST013-NSD-010	5	9-Mar-01	7	1	7.57	7.49	7.53	0.71	
CIB-2	00UC2-ST014-NSD-010	3	9-Mar-01	5	1	14.29	14.31	14.30	0.08	
UCRC-1	00UC2-ST015-NSD-010	32	14-Mar-01	4	4	15.31	15.28	15.29	0.13	
UCRC-2	00UC2-ST016-NSD-010	70	22-Mar-01	5	9	7.92	7.97	7.95	0.38	
CBB-2	00UC2-ST017-NSD-010	52	20-Mar-01	3	7	23.91	24.33	24.12	1.21	
CBB-3	00UC2-ST018-NSD-010	35	14-Mar-01	7	4	6.62	6.70	6.66	0.77	
CBB-4	00UC2-ST019-NSD-010	36	14-Mar-01	8	4	10.31	10.47	10.39	1.07	
CBB-5	00UC2-ST020-NSD-010	53	20-Mar-01	4	7	16.43	16.47	16.45	0.16	
CBB-6	00UC2-ST021-NSD-010	33	14-Mar-01	5	4	2.66	2.56	2.61	2.29	
CNE-2	00UC2-ST022-NSD-010	54	20-Mar-01	5	7	12.50	12.33	12.41	0.92	
CNE-3	00UC2-ST023-NSD-010	55	20-Mar-01	6	7	12.09	12.27	12.18	1.01	
CSW-2	00UC2-ST024-NSD-010	45	19-Mar-01	7	6	15.25	15.35	15.30	0.44	
CSW-3	00UC2-ST025-NSD-010	38	15-Mar-01	3	5	13.01	12.92	12.97	0.45	
CSW-4	00UC2-ST026-NSD-010	57	20-Mar-01	10	7	16.87	16.91	16.89	0.15	
CSW-5	00UC2-ST027-NSD-010	65	21-Mar-01	6	8	2.47	2.49	2.48	0.50	
CSW-6	00UC2-ST028-NSD-010	34	14-Mar-01	6	4	18.89	18.81	18.85	0.29	
UCRA-4	00UC2-ST029-NSD-010	76	22-Mar-01	13	9	2.18	2.14	2.16	1.08	
LC-3	00UC2-ST030-NSD-010	77	22-Mar-01	14	9	2.64	2.57	2.61	1.73	
CIL-7	00UC2-ST031-NSD-010	95	23-Mar-01	6	10	3.11	2.94	3.03	3.41	
CBB-1	00UC2-ST037-NSD-010	16	12-Mar-01	11	2	13.19	13.76	13.48	2.93	

¹ %RSD = % relative standard deviation; ² na= not available

Table 14. Dissolved organic carbon concentrations (mg/L) of frozen porewater samples used in porewater toxicity tests.

Original Site ID	CDM Site ID	Date analyzed	Run #	Batch #	Rep 1	Rep 2	Mean DOC	%RSD ¹
UBI1-2	00BI2-ST002-NSD-010	10-Apr-01	27	1	15.93	16.00	15.96	0.34
UBI4-2	00BI2-ST004-NSD-010	10-Apr-01	28	1	9.97	9.87	9.92	0.66
MBI1-1	00BI2-ST006-NSD-010	10-Apr-01	29	1	17.55	17.57	17.56	0.06
MBI3-1	00BI2-ST008-NSD-010	10-Apr-01	30	1	15.59	15.40	15.49	0.86
MBI3-3	00BI2-ST010-NSD-010	10-Apr-01	31	1	21.66	21.47	21.54	0.61
LBI1-2	00BI2-ST012-NSD-010	10-Apr-01	32	1	11.50	11.81	11.66	1.83
LBI1-4	00BI2-ST014-NSD-010	10-Apr-01	33	1	13.74	14.55	14.14	3.98
LBI3-2	00BI2-ST016-NSD-010	10-Apr-01	34	1	9.74	9.77	9.76	0.2
LBI6-1	00BI2-ST018-NSD-010	10-Apr-01	35	1	9.51	9.53	9.52	0.19
LBI6-3	00BI2-ST020-NSD-010	10-Apr-01	37	1	11.17	11.01	11.09	1.02
LBI9-2	00BI2-ST022-NSD-010	10-Apr-01	38	1	14.82	14.73	14.78	0.44
LBI13-1	00BI2-ST024-NSD-010	10-Apr-01	39	1	15.78	15.67	15.72	0.49
LBI13-3	00BI2-ST026-NSD-010	10-Apr-01	40	1	14.98	15.52	15.25	2.48
LPPG-2	00BI2-ST028-NSD-010	10-Apr-01	41	1	8.27	8.65	8.46	3.1
LPPG-4	00BI2-ST030-NSD-010	10-Apr-01	42	1	8.79	9.04	8.92	1.86
LBV-2	00BV2-ST002-NSD-010	9-Apr-01	4	1	7.47	7.62	7.55	1.32
LBV-4	00BV2-ST004-NSD-010	9-Apr-01	5	1	6.35	6.01	6.18	3.62
LBV-6	00BV2-ST006-NSD-010	9-Apr-01	6	1	8.48	8.66	8.57	1.41
UBV-2	00BV2-ST008-NSD-010	9-Apr-01	7	1	5.82	5.83	5.82	0.06
UBV-4	00BV2-ST010-NSD-010	9-Apr-01	8	1	8.06	8.01	8.03	0.46
PL-1	00LC2-ST001-NSD-010	9-Apr-01	9	1	7.89	7.85	7.87	0.34
PL-3	00LC2-ST003-NSD-010	9-Apr-01	10	1	10.99	10.73	10.86	1.68
MCR-1	00LC2-ST005-NSD-010	9-Apr-01	11	1	20.76	20.59	20.68	0.57
MCR-3	00LC2-ST007-NSD-010	9-Apr-01	13	1	20.97	20.79	20.88	0.61
BO-2	00LC2-ST009-NSD-010	9-Apr-01	14	1	15.07	14.85	14.96	1.02
BO-4	00LC2-ST011-NSD-010	9-Apr-01	15	1	10.82	11.48	11.15	4.07
ML-1	00LC2-ST013-NSD-010	9-Apr-01	16	1	6.95	6.89	6.92	0.57
ML-2	00LC2-ST027-NSD-010	9-Apr-01	18	1	8.61	8.52	8.56	0.68
WB-2	00SN2-ST002-NSD-010	9-Apr-01	19	1	14.16	15.24	14.70	5.07
JB-2	00SN2-ST004-NSD-010	9-Apr-01	20	1	8.94	8.88	8.91	0.5
BBC-1	00SN2-ST006-NSD-010	9-Apr-01	21	1	11.03	10.80	10.92	1.47
GB-1	00SN2-ST008-NSD-010	10-Apr-01	22	1	13.77	13.80	13.78	0.13
BC-2	00SN2-ST012-NSD-010	10-Apr-01	23	1	9.57	9.75	9.66	1.32
BC-4	00SN2-ST014-NSD-010	10-Apr-01	25	1	6.97	7.15	7.06	1.68

Original Site ID	CDM Site ID	Date analyzed	Run #	Batch #	Rep 1	Rep 2	Mean DOC	%RSD ¹
GB-5	00SN2-ST038-NSD-010	10-Apr-01	26	1	11.43	11.30	11.37	0.79
UCRA-1	00UC2-ST001-NSD-010	10-Apr-01	43	1	9.03	8.88	8.95	1.13
LC-1	00UC2-ST003-NSD-010	10-Apr-01	44	1	11.25	11.74	11.49	2.95
UCRB-1	00UC2-ST005-NSD-010	10-Apr-01	45	1	14.93	14.92	14.92	0.04
CIL-1	00UC2-ST007-NSD-010	10-Apr-01	46	1	16.17	16.38	16.27	0.87
CIB-1	00UC2-ST011-NSD-010	10-Apr-01	47	1	7.66	7.44	7.55	1.99
UCRC-1	00UC2-ST013-NSD-010	10-Apr-01	48	1	14.23	14.38	14.31	0.74
CBB-1	00UC2-ST015-NSD-010	10-Apr-01	49	1	8.47	8.71	8.59	1.96
CBB-3	00UC2-ST017-NSD-010	10-Apr-01	50	1	11.45	11.73	11.59	1.67
CBB-5	00UC2-ST019-NSD-010	10-Apr-01	51	1	12.83	12.82	12.82	0.08
CNE-1	00UC2-ST021-NSD-010	10-Apr-01	52	1	8.75	8.72	8.73	0.29
CNE-3	00UC2-ST023-NSD-010	10-Apr-01	53	1	11.52	11.39	11.46	0.79
CSW-2	00UC2-ST025-NSD-010	10-Apr-01	55	1	14.44	15.45	14.95	4.69
CSW-4	00UC2-ST027-NSD-010	10-Apr-01	56	1	11.60	11.81	11.70	1.27
CSW-6	00UC2-ST029-NSD-010	10-Apr-01	57	1	10.57	10.42	10.49	1.02
CSW-4	00UC2-ST037-NSD-010	10-Apr-01	58	1	8.62	8.89	8.75	2.11

¹%RSD = % relative standard deviation

Table 15. Quality control samples for DOC analyses run in conjunction with acidified Calcasieu Estuary porewater samples measured between March 9 and March 24, 2001.

QA/QC Sample type	Date analyzed	Batch #	Rep 1	Rep 2	Mean DOC (mg/L)	%RSD ¹	Comments
Blank	9-Mar-01	1	0.0157	na ²	0.0157		
Blank	12-Mar-01	2	0.02721	na	0.02721		
Blank	13-Mar-01	3	0.0052	na	0.0052		
Blank	14-Mar-01	4	0.2585	na	0.2585		
Blank	15-Mar-01	5	0.3412	na	0.3412		
Blank	19-Mar-01	6	0.2031	0.1476	0.1753	7.52	
Blank	20-Mar-01	7	0.1832	0.1853	0.1842	0.29	
Blank	21-Mar-01	8	0.2167	na	0.2167		
Blank	22-Mar-01	9	0.1172	na	0.1172		
Blank	23-Mar-01	10	0.0659	na	0.0659		
Blank	24-Mar-01	11	0	na	0		
Lab Control Duplicate	9-Mar-01	1	4.0068	na	4.0068		%RD 15.38
Lab Control Duplicate	12-Mar-01	2	4.3857	na	4.3857		%RD 4.27
00UC2-ST005-NSD-010 Duplicate	13-Mar-01	3	12.1126	12.0592	12.0859	0.3	%RD 0.28
00BV2-ST004-NSD-010 Duplicate	20-Mar-01	7	2.8931	na	2.8931		%RD 2.54
00BV2-ST009-NSD-010 Duplicate	22-Mar-01	9	2.1929	na	2.1929		%RD 2.22
check standard 5ppm	9-Mar-01	1	4.7257	na	4.7257		94.5% recovery
check standard 5ppm	12-Mar-01	2	5.0921	na	5.0921		101.8% recovery
check standard 5ppm	13-Mar-01	3	4.9246	na	4.9246		98.5% recovery
check standard 5ppm	14-Mar-01	4	4.8932	na	4.8932		97.9% recovery
check standard 5ppm	19-Mar-01	6	4.9581	5.045	5.0015	1.12	100% recovery
check standard 5ppm	21-Mar-01	8	5.1036	na	5.1036		102% recovery
check standard 5ppm	23-Mar-01	10	5.2428	na	5.2428		104.8% recovery
Matrix spiked	12-Mar-01	2	9.0258	na	9.0258		96.2% recovery
Matrix spiked	20-Mar-01	7	8.6793	na	8.6793		95.0% recovery
Matrix spiked	22-Mar-01	9	9.2948	na	9.2948		99.0% recovery
Matrix spiked	24-Mar-01	11	9.5188	na	9.5188		101.4% recovery

¹ %RSD = % relative standard deviation; ² na= not available

Table 16. Quality control samples for DOC analyses run in conjunction with frozen Calcasieu Estuary porewater samples measured between March 9 and April 10, 2001.

QA/QC Sample type	Date analyzed	Batch #	Rep 1	Rep 2	Mean DOC (mg/L)	%RSD ¹	Comments
Blank	9-Apr-01	1	0.29	0.31	0.30	2.69	
Blank	9-Apr-01	1	0.32	0.29	0.31	3.72	
00LC2-ST005-NSD-010 Duplicate	9-Apr-01	1	22.96	na ²	22.96	na ²	%RD 11.1 n=1
00SN2-ST012-NSD-010 Duplicate	9-Apr-01	1	8.95	na	8.95	na	%RD 7.36 n=1
00UC2-ST023-NSD-010 Duplicate	10-Apr-01	1	11.06	na	11.06	na	%RD 3.44 n=1
00LC2-ST013-NSD-010 Spiked Duplicate	9-Apr-01	1	11.16	na	11.16		93.62%recovery n=1
00BI2-ST018-NSD-010 Spiked Duplicate	10-Apr-01	1	15.45	15.53	15.49	0.38	106.69%recovery
Check Standard@10ppm	10-Apr-01	1	9.58	10.02	9.80	3.05	98.01%recovery

¹ %RSD = % relative standard deviation; ² na= not available

Table 17. Porewater sulfide measurements from Calcasieu Estuary samples.

STATION	CDM Station ID	Date Measured	Time	mv reading	Concentration mg/L S
LAR32	Porewater Reference Site	12/21/00	14:16	-688.3	0.0125
<i>Ampelisca</i> Ref	Amphipod Reference Site	1/12/01	15:25	-682.3	<0.01
UBI1-1	00BI2-ST001-NPW-010	12/8/00	11:42	-708.9	0.034
UBI1-2	00BI2-ST002-NPW-010	12/8/00	11:40	-717.8	0.058
UBI1-3	00BI2-ST003-NPW-010	12/8/00	11:41	-719.7	0.068
UBI4-2	00BI2-ST004-NPW-010	12/8/00	11:44	-712.0	0.04
UBI5-4	00BI2-ST005-NPW-010	12/8/00	11:47	-701.5	0.025
MBI1-1	00BI2-ST006-NPW-010	12/8/00	11:48	-701.0	0.025
MBI1-2	00BI2-ST007-NPW-010	12/21/00	14:58	-723.4	0.082
MBI3-1	00BI2-ST008-NPW-010	12/8/00	11:51	-698.2	0.021
MBI3-3	00BI2-ST010-NPW-010	12/8/00	11:54	-713.2	0.027
LBI1-1	00BI2-ST011-NPW-010	12/8/00	11:55	-691.1	0.014
LBI1-2	00BI2-ST012-NPW-010	12/8/00	11:57	-681.0	<0.01
LBI1-3	00BI2-ST013-NPW-010	12/8/00	11:59	-708.2	0.033
LBI1-4	00BI2-ST014-NPW-010	12/8/00	12:01	-700.0	0.023
LBI3-1	00BI2-ST015-NPW-010	12/8/00	12:03	-705.2	0.028
LBI3-2	00BI2-ST016-NPW-010	12/8/00	12:04	-710.2	0.036
LBI3-3	00BI2-ST017-NPW-010	12/8/00	12:06	-709.1	0.034
LBI6-1	00BI2-ST018-NPW-010	12/8/00	12:07	-711.1	0.038
LBI6-2	00BI2-ST019-NPW-010	12/8/00	12:07	-697.7	0.02
LBI6-3	00BI2-ST020-NPW-010	12/8/00	12:12	-696.0	0.018
LBI9-1	00BI2-ST021-NPW-010	12/8/00	12:14	-714.8	0.047
LBI9-2	00BI2-ST022-NPW-010	12/8/00	12:17	-693.7	0.016
LBI9-3	00BI2-ST023-NPW-010	12/8/00	12:18	-724.4	0.09
LBI13-1	00BI2-ST024-NPW-010	12/8/00	12:19	-703.2	0.026
LBI13-2	00BI2-ST025-NPW-010	12/8/00	12:21	-699.7	0.023
LBI13-3	00BI2-ST026-NPW-010	12/8/00	12:23	-713.0	0.043
LPPG-1	00BI2-ST027-NPW-010	12/23/00	6:22	-711.1	0.038
LPPG-2	00BI2-ST028-NPW-010	12/21/00	14:59	-720.1	0.07
LPPG-3	00BI2-ST029-NPW-010	12/21/00	15:00	-711.1	0.038
LPPG-4	00BI2-ST030-NPW-010	12/21/00	15:02	-718.0	0.058
LPPG-5	00BI2-ST031-NPW-010	12/21/00	15:04	-711.5	0.04
MBI3-4	00BI2-ST041-NPW-010	12/8/00	12:25	-713.0	0.043
LBV-1	00BV2-ST001-NPW-010	12/21/00	13:58	-716.4	0.05
LBV-2	00BV2-ST002-NPW-010	12/21/00	13:59	-711.0	0.037
LBV-3	00BV2-ST003-NPW-010	12/21/00	14:02	-733.8	0.18
LBV-4	00BV2-ST004-NPW-010	12/21/00	14:04	-712.9	0.043
LBV-5	00BV2-ST005-NPW-010	12/21/00	14:05	-723.9	0.09
LBV-6	00BV2-ST006-NPW-010	12/21/00	14:07	-713.9	0.045
UBV-1	00BV2-ST007-NPW-010	12/21/00	14:09	-692.8	0.015
UBV-2	00BV2-ST008-NPW-010	12/21/00	14:11	-709.0	0.035
UBV-3	00BV2-ST009-NPW-010	12/21/00	14:13	-713.4	0.044
UBV-4	00BV2-ST010-NPW-010	12/21/00	14:14	-698.5	0.021
PL-1	00LC2-ST001-NPW-010	12/23/00	6:01	-699.8	0.022
PL-2	00LC2-ST002-NPW-010	12/23/00	6:05	-717.4	0.054
PL-3	00LC2-ST003-NPW-010	12/8/00	12:32	-704.6	0.028
PL-4	00LC2-ST004-NPW-010	12/21/00	15:05	-716.0	0.03
MCR-1	00LC2-ST005-NPW-010	12/21/00	15:06	-721.3	0.075
MCR-2	00LC2-ST006-NPW-010	12/21/00	15:07	-721.8	0.076
MCR-3	00LC2-ST007-NPW-010	12/21/00	15:09	-716.3	0.05
BO-1	00LC2-ST008-NPW-010	12/23/00	6:09	-696.9	0.019
BO-2	00LC2-ST009-NPW-010	12/8/00	12:34	-701.1	0.025

STATION	CDM Station ID	Date Measured	Time	Concentration	
				mv reading	mg/L S
BO-3	00LC2-ST010-NPW-010	12/23/00	6:10	-700.7	0.024
BO-4	00LC2-ST011-NPW-010	12/21/00	15:11	-701.0	0.024
BO-5	00LC2-ST012-NPW-010	12/23/00	6:12	-699.8	0.022
ML-1	00LC2-ST013-NPW-010	1/3/01	14:17	-709.2	0.034
ML-2	00LC2-ST014-NPW-010	1/3/01	14:19	-734.1	0.18
ML-4	00LC2-ST027-NPW-010	1/3/01	14:22	-716.5	0.051
WB-1	00SN2-ST001-NPW-010	12/21/00	14:18	-703.0	0.026
WB-2	00SN2-ST002-NPW-010	12/23/00	6:13	-699.1	0.021
JB-1	00SN2-ST003-NPW-010	12/21/00	14:22	-686.9	0.012
JB-2	00SN2-ST004-NPW-010	12/21/00	14:25	-689.1	0.013
JB-3	00SN2-ST005-NPW-010	12/21/00	14:27	-683.5	0.01
BBC-1	00SN2-ST006-NPW-010	12/8/00	12:26	-696.0	0.018
GB-1	00SN2-ST008-NPW-010	12/8/00	12:34	-694.0	0.016
GB-2	00SN2-ST009-NPW-010	12/21/00	14:29	-722.2	0.079
BC-1	00SN2-ST011-NPW-010	12/23/00	6:15	-699.9	0.022
BC-2	00SN2-ST012-NPW-010	12/21/00	14:31	-704.2	0.028
BC-3	00SN2-ST013-NPW-010	12/23/00	6:16	-705.3	0.029
BC-4	00SN2-ST014-NPW-010	12/21/00	14:33	-696.9	0.019
BC-5	00SN2-ST015-NPW-010	12/21/00	14:35	-690.6	0.014
BBC-3	00SN2-ST035NPW-010	12/21/00	14:38	-705.8	0.03
GB-5	00SN2-ST038-NPW-010	12/21/00	14:40	-703.0	0.027
UCRA-1	00UC2-ST001-NPW-010	12/8/00	12:40	-696.9	0.019
LC-1	00UC2-ST003-NPW-010	12/21/00	14:42	-711.2	0.037
LC-2	00UC2-ST004-NPW-010	12/8/00	12:43	-701.9	0.027
UCRB-1	00UC2-ST005-NPW-010	12/8/00	12:58	-693.1	0.0155
CIL-1	00UC2-ST007-NPW-010	12/8/00	13:12	-712.8	0.042
CIL-2	00UC2-ST008-NPW-010	12/8/00	13:00	-697.4	0.02
CIL-4	00UC2-ST010-NPW-010	12/8/00	13:02	-697.0	0.02
CIB-1	00UC2-ST011-NPW-010	12/8/00	13:06	-696.2	0.018
CIB-2	00UC2-ST012-NPW-010	12/8/00	13:09	-703.9	0.026
UCRC-1	00UC2-ST013-NPW-010	12/8/00	13:10	-716.7	0.054
UCRC-2	00UC2-ST014-NPW-010	12/23/00	6:17	-701.9	0.026
CBB-1	00UC2-ST015-NPW-010	12/8/00	13:14	-706.6	0.03
CBB-2	00UC2-ST016-NPW-010	12/8/00	13:16	-670.0	<0.01
CBB-3	00UC2-ST017-NPW-010	12/8/00	13:19	-704.6	0.028
CBB-4	00UC2-ST018-NPW-010	12/8/00	13:20	-698.3	0.021
CBB-5	00UC2-ST019-NPW-010	12/8/00	13:22	-702.6	0.026
CBB-6	00UC2-ST020-NPW-010	12/21/00	14:44	-704.4	0.027
CNE-1	00UC2-ST021-NPW-010	12/8/00	13:23	-713.0	0.042
CNE-2	00UC2-ST022-NPW-010	12/21/00	14:45	-749.8	0.6
CNE-3	00UC2-ST023-NPW-010	12/8/00	13:25	-737.7	0.23
CSW-1	00UC2-ST024-NPW-010	12/8/00	13:28	-692.0	0.015
CSW-2	00UC2-ST025-NPW-010	12/8/00	13:29	-700.1	0.023
CSW-3	00UC2-ST026-NPW-010	12/8/00	13:30	-705.1	0.028
CSW-4	00UC2-ST027-NPW-010	12/8/00	13:32	-707.3	0.031
CSW-5	00UC2-ST028-NPW-010	12/23/00	6:20	-713.5	0.042
UCRA-3	00UC2-ST029-NPW-010	12/8/00	13:34	-719.5	0.064
UCRA-4	00UC2-ST030-NPW-010	12/21/00	14:48	-686.5	0.012
LC-3	00UC2-ST031-NPW-010	12/21/00	14:55	-698.4	0.02
CIL-7	00UC2-ST037-NPW-010	12/21/00	14:57	-719.9	0.07

Date Prepared: May 5, 1990

Date Revised: June 10, 1994

EXTRACTION AND STORAGE OF POREWATER SAMPLES

1.0 OBJECTIVE

This protocol describes a procedure for extracting and storing porewater samples from marine, estuarine, or freshwater sediments for use in toxicity testing. A pressurized extraction device is used to force the pore water from sediment samples. This procedure may be performed in the laboratory or it may be performed at or near the site of sample collection since the sampling apparatus is portable.

2.0 PREPARATION

2.1 Description of the Porewater Extraction System

In earlier studies (Carr et al., 1989; Carr and Chapman, 1992) pore water was extracted from sediments using a device constructed of Teflon®. Since then, the design has been improved (Carr and Chapman, 1994). The polyvinyl chloride (PVC) extractors in current use are less costly to construct and easier to operate. This device has been used in numerous sediment quality assessment surveys (Carr, 1993; NBS, 1993; NBS, 1994a; NBS, 1994b; USFWS, 1992).

The extractor is constructed from a PVC compression coupling for 4" I.D. schedule 40 PVC pipe. These commercially-available couplings (Lascotite®) consist of a cylinder (25 cm height and 13 cm diameter) with threaded ends and threaded open compression nuts (Figure 1). The coupling is fitted with end plates cut from 7/16" thick PVC sheeting that are held in place by the threaded end nuts. The gaskets provided with the coupling are discarded and silicon O-rings are used to seal the top and bottom connections. The top end plate is fitted with a quick-release fitting where the pressurized air is supplied, and a safety pressure relief valve. Like the original Teflon® extractor, the bottom end plate (Figure 1) has several interconnected concentric grooves to facilitate flow of the pore water to the central exit port. A 5 µm polyester filter is situated between the bottom end plate and the silicon O-ring. Before a sediment sample is loaded, the bottom end nut is tightened in place by using the stationary bottom wrench (Figure 1) and a standard strap wrench.

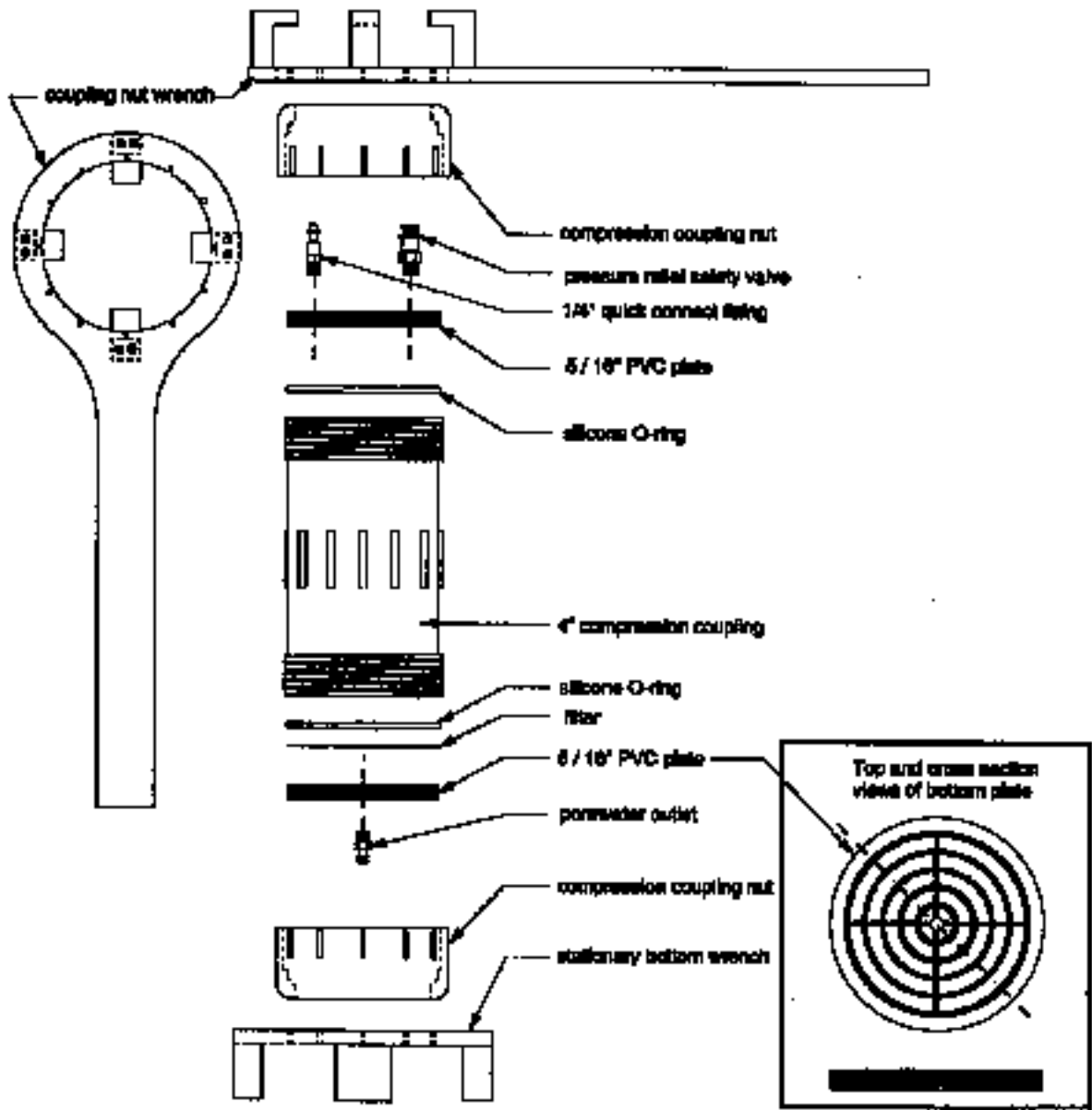


Figure 1. Sediment pore water squeeze extraction device (Carr, 1998).

The extractors are pressurized with air supplied from a standard SCUBA cylinder via a SCUBA first stage regulator which delivers air to a manifold with a valving system (Figure 2). With this system, multiple cylinders can be pressurized simultaneously, using the same SCUBA cylinder.

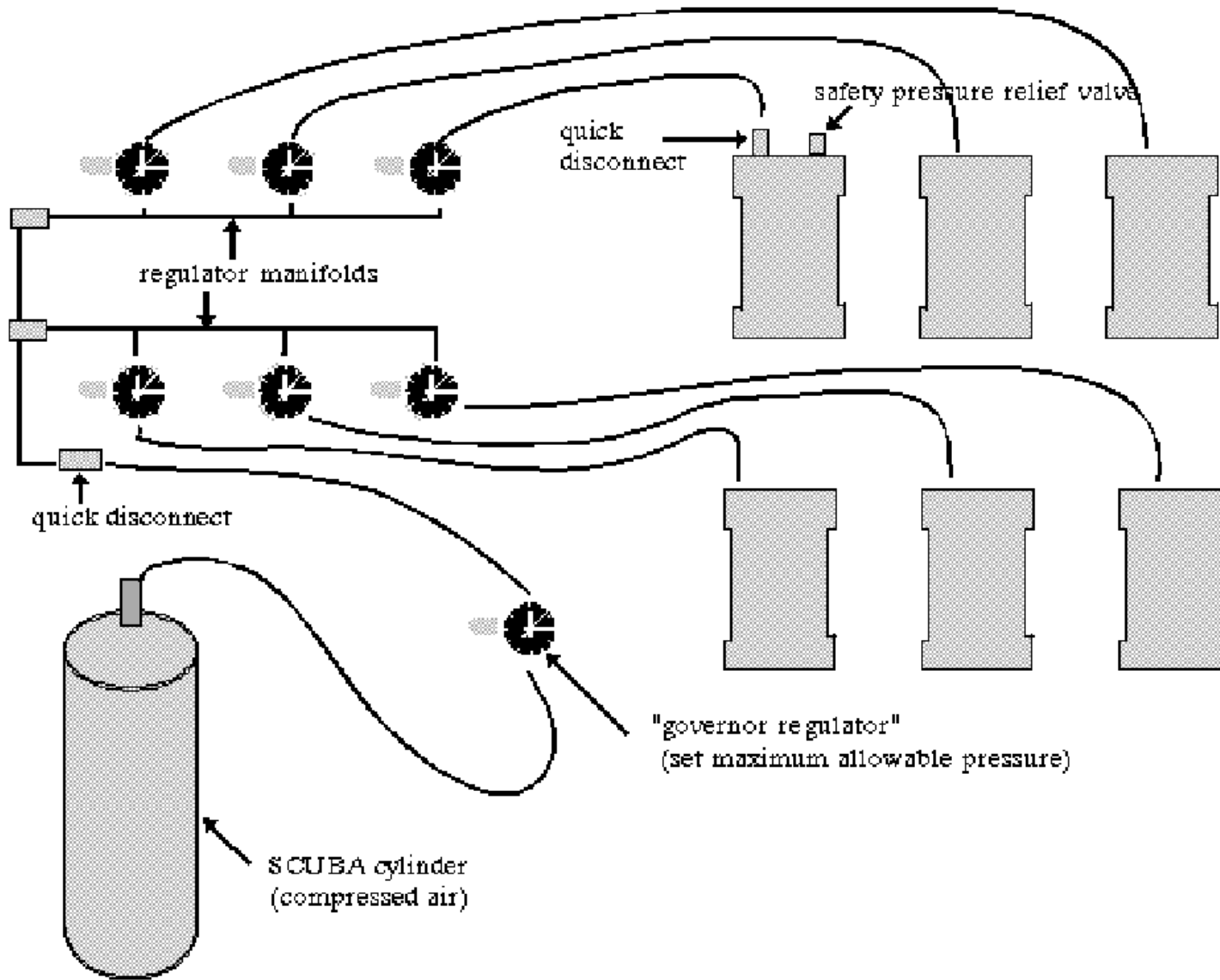


Figure 2. Schematic of sediment porewater pressure extraction system (Carr, 1998).

2.2 Equipment List

Supplies and equipment needed are listed in Attachment 1.

3.0 PROCEDURE

3.1 Sediment Collection and Storage Considerations

Generally, surficial sediment samples are collected for porewater extraction. A homogenate of the upper 2-10 cm sediment may be collected by multiple cores or grabs at a particular sampling station. (Further details of sediment sampling procedures are not within the scope of this SOP.) One liter of sediment will typically provide 100-200 mL pore water. However, a larger volume of coarse sand sediments may be required since they contain less water, and a larger volume of fine clay sediments may be required since they are difficult to extract. The sample composites are kept in suitable containers (e.g., clean high density polyethylene containers or Zip-Lock[®] bags), labelled, and stored on ice, in a cooler, or in a refrigerator until the samples are delivered and processed. Pore water should be extracted from the samples as soon as possible because the toxicity of sediments in storage may change over time. A sample tracking system should be maintained for each sediment sample collected and porewater sample extracted. All manipulations made on samples are recorded on the Sample History Data Form (Attachment 2).

3.2 Load Extraction Cylinder

1. Assemble all parts of extraction cylinder except the top end compression coupling nut, top end plate and O-ring. Make sure filter is snugly in place beneath bottom O-ring (both over- and under-tightening will result in an improper seal). Place the extractor cylinder on the stand and position an appropriately labelled porewater sample container (usually an I-Chem[®] amber 250 mL or 125 mL glass jar cleaned to EPA standards, with Teflon[®] lid liner) underneath the outlet.
2. Ensure that the sediment sample is homogenized, by shaking, stirring with a clean Teflon[®] or plastic spatula or spoon, or by both.
3. Transfer sediment from the sample container/bag to the extractor by pouring and/or using a clean Teflon[®] or plastic spatula or spoon. If necessary, particularly when extracting pore water from sandy or shelly sediments, the spatula may be used to compress the sample in the cylinder to eliminate channelization. The amount of sediment to be transferred will depend on the texture of the sample. The cylinder may be filled nearly full with a sandy sediment. However, when extracting pore water from a clay sediment, a relatively impermeable layer of compressed clay will eventually form on the filter, so that extraction of a large volume of clay sediment at once would take an extremely long time. When extracting pore water from extremely fine grained sediments, the cylinder should be less than one-third filled. If additional pore water is needed, this process can be repeated by removing the sediment including removing or "peeling" the impermeable layer, and reintroducing more of the original sediment sample.

4. After sediment is loaded, the top end plate within the top compression coupling nut is installed. To tighten the top nut, the strap wrench and the coupling nut wrench (Figure 1) are used.

3.3 Porewater Extraction

After the extractor is sealed, a high-pressure hose is attached to the quick disconnect fitting on the top end plate, and the extractor is pressurized with air from a SCUBA tank. Pressure is controlled with a first-stage regulator on the SCUBA tank, an intermediate "governor" regulator, and final second stage regulators attached to a manifold that services multiple extractors (Figure 2).

1. Turn the SCUBA valve counter clockwise, pressurizing the first stage regulator and the intermediate-pressure hose (approximately 150 psi). An additional "governor" pressure regulator between the SCUBA tanks and the final second stage regulators which control pressure to the individual extractors should be set at maximum extractor pressure (40 psi).
2. Ensure that all final pressure regulators are set to zero. Attach the hose from one of the pressure regulators on the pressure regulator manifold to the air inlet, using the quick disconnect fitting.
3. Slowly open the corresponding pressure regulator to a pressure of 5-10 psi. Check the first drops of porewater passing from the outlet for cloudiness. Occasionally, a small amount of sediment will pass through the porewater outlet, presumably around the filter. If this happens, wait until the pore water clears, discard the initial pore water collected, and continue.
4. Check the cylinder for leaks and if necessary tighten clamping nuts slightly.
5. As the flow of pore water decreases, pressure may be increased gradually to a maximum of 35-40 psi. When flow is less than or slows to less than 1-3 drops per minute, increase the pressure in 5-10 psi increments to maintain the flow. Allow the extraction to continue until sufficient pore water has been collected.
6. Disassemble the extractor, discard sediment, and rinse and wash appropriately all parts contacting sediment before placing a different sediment sample into the extractor.
7. Repeat these procedures until all available extractors are in use or until all sediment samples have been processed.

3.4 Centrifugation of Porewater Samples

Porewater samples extracted at this field station are usually stored frozen until tested. Under most circumstances, the porewater samples are centrifuged after they are collected and before they are frozen.

1. After collection, keep the porewater samples refrigerated or chilled on ice until they are centrifuged.
2. Transfer the pore water from the glass sample jar to an appropriate centrifuge bottle (e.g., polycarbonate). Centrifuge at 1200 g for 20 minutes. Return the centrifuged sample to a rinsed and labelled glass jar, taking care not to disturb any material that may have settled on the bottom/sides of the centrifuge bottle.
3. If multiple jars of pore water were collected from a single sediment sample, they should be composited after centrifugation and redistributed to the glass jars before testing or storage.

3.5 Storage of Porewater Samples

If the porewater samples are not to be used on the day of collection, they should be frozen for storage. Sufficient room for freeze expansion should be left in the jars (for example, 200 mL maximum sample in a 250 mL jar). If the volume needed for testing is known in advance, it is prudent to allocate only that specific volume plus a little excess (10 mL) to each jar in order to conserve pore water (once thawed, the pore water cannot be refrozen and reused), and to simplify the volume measurements required for Water Quality Adjustment of Samples (SOP F10.12) performed the day prior to testing. Frozen porewater samples may be shipped with dry ice.

4.0 QUALITY CONTROL

A sample tracking system is maintained for each sediment sample collected and porewater sample extracted. All actions taken with that respective sample are recorded on the Sample History Data Form (Attachment 2). This information includes, but not exclusively: a) the date of collection or receipt, b) the date of porewater extraction, c) the volume or number of jars (I-Chem[®] amber glass jars) of pore water collected, d) centrifugation information, if performed, e) date frozen and location (freezer n^o), and e) date and jar n^o thawed and used in which test. The Sample History Forms are kept in a three-ring binder at the same location where the samples are stored.

5.0 TRAINING

Persons who will perform this procedure should first read this SOP and then operate under the supervision of an experienced individual for at least one series of extractions.

6.0 SAFETY

The sediment and porewater samples handled may contain contaminants. Care should be taken to avoid contact with the samples. Protective gloves, glasses and clothing may be worn. Waste sediment should be properly disposed. SCUBA cylinders should be securely mounted before, during, and after use. The pressure limit (40 psi) of the extraction cylinders should not be exceeded. Before disconnecting any pressure hoses, ensure that the pressure has been released or that the controlling regulator has been closed.

7.0 ATTACHMENTS

Attachment 1. Required Equipment and Materials
Attachment 2. Sample History Form

8.0 REFERENCES

- Carr, R.S. 1993. Sediment quality assessment survey of the Galveston Bay System. Galveston Bay National Estuary Program report, GBNEP-30, 101 pp.
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- Carr, R.S. and D.C. Chapman. 1992. Comparison of solid-phase and pore-water approaches for assessing the quality of marine and estuarine sediments. Chem. Ecol. 7:19-30.
- Carr, R.S. and Chapman. 1994. Improved device for extracting sediment pore water. National Biological Survey, Research Information Bulletin No. 38.
- Carr, R.S. 1998. Sediment porewater testing. In: Standard Methods for the Examination of Water and Wastewater, section 8080, 20th Edition, Clesceri, L.S., A.E. Greenberg, and A.D. Eaton (eds.), American Public Health Association, Washington, DC., p. 8-37 to 8-41.
- National Biological Survey (NBS). 1993. Toxicity testing of sediments from Charleston Harbor, South Carolina and vicinity. Report submitted by the National Biological Survey to the National Oceanic and Atmospheric Administration, Ocean Assessment Division, Seattle, WA, 7 pp. + 16 tables and 4 attachments.

National Biological Survey (NBS). 1994a. Survey of sediment toxicity in Pensacola Bay and St. Andrew Bay, Florida. Report submitted by the National Biological Survey to the National Oceanic and Atmospheric Administration, Ocean Assessment Division, Seattle, WA, 12 pp. + 24 tables and 5 attachments.

National Biological Survey (NBS). 1994b. Toxicity testing of sediments from Boston Harbor, Massachusetts. Final report submitted to National Oceanic and Atmospheric Administration, 6 pp. + 10 tables and 4 attachments.

US Fish and Wildlife Service (USFWS) 1992. Amphipod solid-phase and sea urchin porewater toxicity tests with Tampa Bay, Florida sediments. Final report submitted to National Oceanic and Atmospheric Administration, 9 pp. + 16 tables and 3 attachments.

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Attachment 1

REQUIRED EQUIPMENT AND MATERIALS

To construct a sediment pore water extraction device:

- 1-PVC cylinder (center portion of 4" compression coupling)
- 2-PVC end nuts (ends of 4" compression fitting)
- 1-PVC top end plate (7/16" width)
- 1-PVC bottom end plate (7/16" width)
- 1-Quick disconnect brass air fitting
- 1-Pressure relief valve
- 1-Teflon[®] 1/8" npt male connector for exit port

To use a pore water extraction device:

- 1-Filter, polyester material, 5 µm pore size
- 1-Wooden stand (1 stand per 3 cylinders)
- 1-Custom wrench for 4" compression coupling end nuts
- 1-Custom wrench head attached to table
- 1-Plastic or Teflon[®] spatula or spoon
- 1-SCUBA cylinder
- 1-SCUBA regulator with high pressure gauge
- 1-SCUBA intermediate pressure hose (10 ft length)
with governor pressure gauge set to 40 psi
- 1-Air pressure control manifold that includes:
 - Final pressure regulator valves (several per manifold)
 - Pressure gauges (1 per valve)
 - Low pressure hose, 6' length (1 per manifold)

Other required supplies/equipment:

- Sediment sample containers or bags
- Pore water sample jars
- Sample labels or labeling tape
- Beakers
- Deionized water (DI)
- Wash bottles, 500 ml
- Protective gloves, glasses, clothing
- Pens, pencils, markers
- Centrifuge and centrifugation materials
- Refrigerator
- Freezer

Attachment 2

SAMPLE HISTORY DATA FORM

Sample Designation: _____ Study Protocol: _____ Initials: _____ Date of
acquisition: _____ Sample type: _____ How acquired
(refer to sample site data sheet number, if appropriate):

Initials

Date

Action Taken

Date Prepared: March 14, 1991

Date Revised: May 17, 1994

WATER QUALITY ADJUSTMENT OF SAMPLES

1.0 OBJECTIVE

In order to perform toxicity tests with saline samples, all test and reference samples should be similar in salinity so that salinity is not a factor in survival of test organisms. Additionally, dissolved oxygen (DO) concentrations should be sufficiently high to ensure that low DO is not a source of stress to the test organisms. At the Corpus Christi field station, toxicity tests are performed using a variety of marine and estuarine organisms, including the sea urchin *Arbacia punctulata*, the polychaete *Dinophilus gyrociliatus*, the harpacticoid copepod *Longipedia* sp., and the red drum *Sciaenops ocellatus*. The aqueous samples tested may be pore water, different kinds of discharges and effluents, surface microlayer, or subsurface water samples that may range in salinity from 0-36‰. Although from test to test salinities used in the different toxicity tests may vary, the individual toxicity tests performed on a particular day are run at a single target salinity. Since initial salinities of the porewater or water samples to be tested commonly vary, they will require salinity adjustment to within 1‰ of the target salinity. Additionally, DO should normally be 80% saturation in all samples tested.

2.0 PREPARATION

2.1 Equipment and Labware

The supplies and equipment needed are listed in Attachment 1.

2.2 Source of Dilution Water

For samples lower in salinity than target salinity, concentrated brine (~100‰) is added to increase salinity. Concentrated brine is prepared by heating (to 35-40°C) and gently aerating filtered natural seawater (1 m) to concentrate the salts by evaporation. For samples higher in salinity than target salinity, HPLC ultrapure sterile water (J.T. Baker® Cat. #JT4218-2) is added to decrease salinity.

3.0 PROCEDURES

The following describes the procedures required for the adjustment and determination of specific water quality parameters of a sample.

3.1 Preparation for Salinity Adjustment

1. Although fresh samples are routinely tested at the Corpus Christi field station, most of the samples tested are stored frozen in amber I-Chem® jars. If frozen, remove samples from freezer and allow them to thaw at room temperature or immerse them in a tepid water bath to thaw, ensuring that sample temperature does not exceed 25°C. The samples may be thawed the day of water quality adjustment (WQA) or may be transferred from the freezer to a refrigerator (4°C) the day before WQA and then completely thawed the following day. After thawing, allow the samples to come to room temperature. Generally, the samples should be maintained at the same temperature required for the toxicity test that will be conducted. The temperature requirement for most toxicity tests performed at this field station is 20±1°C, and room temperature should be maintained accordingly.
2. Turn bottled sample end over end a few times to mix thoroughly before measuring salinity. Using a salinity refractometer, measure salinity and record on Water Quality Adjustment Data Form (Attachment 2).
3. In order to make calculations for the salinity adjustment, the volume of the sample must be known. When porewater or other water samples are collected and transferred to amber jars for storage, they are commonly measured to an approximate volume (110 mL, for example) prior to freezing. On the day of WQA, this volume should be recorded on the WQA data form for the respective samples. If the volume is unknown at this point, it should be measured using a graduated cylinder of appropriate size, and recorded on the data sheet.

3.2 Salinity Adjustment

3.2.1 Reducing the salinity of aqueous samples

Refer to the formulas below to calculate the volume of HPLC water needed to reduce the initial sample salinity to the target salinity. Add the volume calculated, mix the bottle thoroughly, check the salinity with a refractometer, and record the volume of HPLC water added as well as the final salinity.

- (i) $(\text{target } \text{‰} \div \text{sample } \text{‰}) \times \text{sample vol. in mL} = A$
- (ii) $\text{sample vol.} \div A = B$
- (iii) $\text{sample vol.} \div A = C$
- (iv) $B \times C = \text{volume of HPLC water to add}$

3.2.2 Increasing the salinity of aqueous samples

Refer to the formula below to calculate the volume of concentrated brine needed to increase the initial sample salinity to the target salinity. Add the volume

calculated, mix the bottle thoroughly, check the salinity with a refractometer, and record the volume of brine added as well as the final salinity.

(i) $((\text{target } \text{‰} - \text{sample } \text{‰}) \times \text{sample vol. in mL}) \div (\text{brine } \text{‰} - \text{target } \text{‰}) = \text{vol. of brine to add}$

3.3 Dissolved Oxygen Adjustment

Measure and record DO and percent DO saturation of sample (SOP F10.13). Occasionally, a sample will have DO of less than 80% saturation. Any such samples should be gently stirred on a magnetic stirrer to increase the DO level above 80%. Record initial DO, the elapsed mixing time, and final DO in the comments section of the Water Quality Adjustment Data Form. (On the following day, DO should be rechecked and brought to >80% by stirring again if necessary before the toxicity test is performed.)

3.4 Other Water Quality Determinations

1. Measure pH (SOP F10.21) and record on the Water Quality Adjustment Data Form.
2. Measure and record ammonia concentration (SOP F10.4).
3. Measure and record sulfide concentration if required.

4.0 DATA COLLECTION

All raw data are entered on one standardized form, the Water Quality Adjustment Data Form (see Attachment 2) at the time the determinations or adjustments are made.

5.0 QUALITY CONTROL

A data form (Attachment 2) will be used to document all sample handling procedures for each sample. The person(s) recording data on the sheet will initial each sheet. Original data forms after completion will be stored in a three-ring file in the possession of the field station leader. Copies will be kept in the lab.

6.0 TRAINING

Personnel who will perform this task should first read this protocol and then operate under supervision during the preparation of at least two samples.

7.0 SAFETY

The NaOH solution used in the ammonia determination procedure is a highly caustic liquid. Care should be taken to avoid its contact with skin or clothing. Should such contact occur, quickly flush affected with water. A sink is present along the west wall of the dry lab, another is present along the east wall of the wet lab, and an eye flushing station is present in the northwest corner of the wet lab near the entrance door. The samples handled may be pore water, effluent, discharges, or other water samples that may contain contaminants. Care should be taken to avoid contact with the samples.

8.0 ATTACHMENTS

Attachment 1. Equipment List for Water Quality Adjustment

Attachment 2. Water Quality Adjustment Data Form

Prepared by: _____

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ATTACHMENT 1

EQUIPMENT LIST FOR WATER QUALITY ADJUSTMENT

Graduated cylinders

Pipetters

Latex gloves

Magnetic stirrer and stir bars

10 M NaOH

Concentrated brine (See section 2.2 for preparation)

HPLC ultrapure sterile water (J.T. Baker® #JT4218-2)

Salinity refractometer

Dissolved oxygen meter

pH electrode, buffer solutions, and meter

Ammonia electrode, standard solutions, and meter

Sulfide electrode, standard solutions, and meter

Data sheets

Hand calculator

ATTACHMENT 2

WATER QUALITY ADJUSTMENT DATA FORM

STUDY PROTOCOL _____ INITIALS

SAMPLE DESIGNATION _____ DATE

A. Salinity Adjustment:

Initial volume (mL)

Initial salinity (‰)

Vol. Baker® HPLC water added (mL)

Vol. ____‰ brine added (mL)

% of original sample

(initial vol./final vol. x 100)

B. Character of Sample (after salinity adjustment):

Final Volume (mL)

Final Salinity (‰)

pH _____

Dissolved oxygen (mg/L) _____

DO saturation (%)

Total ammonia (mg/L)

Sulfide (mg/L) _____

COMMENTS

Date Prepared : April 10, 1990

Date Revised: March 10, 1995

SEA URCHIN FERTILIZATION TOXICITY TEST

1.0 OBJECTIVE

The purpose of the fertilization toxicity test with the sea urchin, *Arbacia punctulata*, is to determine if a sea water, pore water, sea surface microlayer, or other sample reduces fertilization of exposed gametes relative to that of gametes exposed to a reference sample. The test may also be used to determine the concentration of a test substance which reduces fertilization. Test results are reported as treatment (or concentration) which produces statistically significant reduced fertilization or as concentration of test substance which reduces fertilization by 50 percent (EC₅₀). This test can be performed concurrently with Sea Urchin Embryological Development Toxicity Test (SOP 10.7) and/or Sea Urchin Genotoxicity/Teratogenicity Test (SOP 10.8), using the same pretest and sperm and egg collection.

2.0 TEST PREPARATION

2.1 Test Animals

Gametes from the sea urchin, *Arbacia punctulata* are used in the sea urchin fertilization toxicity test. Animals can be collected in the field or obtained from a commercial supplier. *Arbacia punctulata* can be differentiated from other species of urchins which are found in Texas by the five plates surrounding the anal opening, and by round sharp spines on the dorsal surface of the test and flattened spines surrounding the Aristotle's lantern. Urchins can be maintained easily in aquaria or other tanks with running seawater or an aquarium filter. Urchins will eat a wide variety of marine vegetation. A good diet may be provided by placing rocks from jetties (which have been colonized by diatoms and macroalgae) into the tank with the urchins or romaine lettuce may be provided as a substitute. Temperature manipulations of the cultures will prolong the useful life of the urchins. Cultures are maintained at 16 °C when gametes are not required. Temperature is gradually increased to 19 °C at least one week prior to gamete collection and subsequently decreased if no further tests are planned. Photoperiod is maintained at 16 hours of light per day. Water quality parameters should be monitored weekly and salinity maintained at 30 ± 3 ‰. Males and females should be kept in separate tanks.

2.2 Dilution Water

HPLC reagent grade purified water or concentrated seawater brine is used to adjust samples to 30 ‰ as described in Water Quality Adjustment of Samples (SOP 10.12). Concentrated seawater brine (90-110 ‰) is made in large batches by heating seawater to 40°C or less in large tanks with aeration for 3-4 weeks. Brine quality will remain constant over long periods with no refrigeration. At the time of salinity adjustment, pH, ammonia, and dissolved oxygen are also measured. Salinity adjustment and water quality data are recorded on prepared data forms.

Filtered (0.45 µm) seawater adjusted to 30 ‰ is used to wash eggs and is also used for sperm and egg dilutions. The acronym MFS (for Millipore[®] filtered seawater) is used for this filtered and salinity adjusted seawater.

2.3 Test System: Equipment

When testing samples for potential toxicity, five replicates per treatment are recommended. One replicate is a 5 mL volume of sample in a disposable glass scintillation vial. When conducting a dilution series test, fifty percent serial dilutions may be made in the test vials, using MFS as the diluent.

2.3.1 Equipment

A list of equipment necessary for conducting this test is given in Attachment 1 (Equipment List for Fertilization Toxicity Test).

2.3.2 Solutions

10% Buffered Formalin:

1,620 mL sea water
620 mL formaldehyde
6.48 g NaH₂PO₄ or KH₂PO₄ (mono)
10.5 g Na₂HPO₄ or K₂HPO₄ (dibasic)

1 mL needed for each replicate. Fill the dispenser.

2.4 Collection and Preparation of Gametes

Quality gametes must first be collected, and then diluted to the appropriate concentration for addition to the test vials.

2.4.1 Selection of Urchins to be Used in Toxicity Test.

1. Take two or three females and place in shallow bowl, barely covering tests with seawater.
2. Stimulate release of eggs from gonopores of a female by touching test with electrodes from a 12V transformer.
3. Collect a few eggs from between spines using a 10 mL disposable syringe with a large gauge blunt-tipped needle attached. Discard the first small quantity of eggs expelled from each gonopore and continue collecting. Place a 2 to 5 drops of eggs into a scintillation vial containing 10ml of filtered seawater. Rinse syringe and repeat for each female.
4. Select females which have round, well developed eggs, and which do not release clumps of eggs or undeveloped ovarian tissue.
5. Place 2-4 males in shallow bowl(s) with a small amount of seawater, leaving the upper $\frac{1}{2}$ to $\frac{1}{3}$ of the animals uncovered.
6. Stimulate release of sperm from gonopores by touching test with electrodes from 12V transformer (about 30 seconds each time). If sperm is watery, reject the animal and choose another. Sperm should be the consistency of condensed milk. Collect sperm using a Pasteur pipette with a rubber bulb attached.

Generally, a gamete check is performed in order to ensure that both the male and the female urchins used in the test have gametes with a high degree of viability. If the gamete check is performed, two to five females (depending on confidence in the proportion of urchins in the holding facility in good reproductive status) and at least two males should be selected using the above procedures. The check is performed by adding 5 to 7 drops of a concentrated dilution of sperm to the eggs in the scintillation vials (collected as described above) and observing the eggs under the microscope after 10 minutes. The concentrated dilution of sperm is usually made by diluting 20-50 μ l of sperm in 10 ml of filtered seawater. If the proportion of eggs fertilized is high (95-100%), that female and male may be used in the pretest and test. Sperm from a number of males or females may be combined in the beginning if the gamete check reveals a number of high quality animals or the confidence is high in the quality of the gametes. Once a good male and female are selected a pretest can be conducted to determine the correct dilution of sperm to use in the test (Attachment 2).

2.4.2 Obtain Eggs

1. Place selected female in large Carolina dish and add enough water to cover the urchin's test with approximately 1 cm of seawater. Stimulate release of eggs from female with 12V transformer.

2. Collect eggs as above using the 10 mL syringe. Remove needle before dispensing eggs into a disposable shell vial or other clean container capable of holding 25-50 mL. Collect enough eggs for pretest and test. If female stops giving eggs readily or starts giving chunky material, cease stimulation and collection of eggs from that female.
3. Add MFS to fill shell vials, gently mixing eggs. Allow eggs to settle to bottom of vial. Remove water with a pipette. Replace water, again gently mixing the eggs.
4. Repeat washing procedure.

2.4.3 Prepare Appropriate Egg Concentration

1. Put approximately 100 mL of 30 μ MFS in a 250 mL beaker, and add enough washed eggs to bring the egg density to approximately 10,000 per mL. If more than 400 total replicates (27 treatments) are to be tested, a larger amount of water and a correspondingly larger amount of eggs should be used. Two hundred μ L of this egg solution will be used per replicate, and it is easier to maintain proper mixing and uniform egg density if there is an excess of at least 50%.
2. Check egg density and adjust to within approximately 9000 to 11,000 eggs per mL, as follows. Gently swirl egg solution until evenly mixed. Using a pipette, add 1 mL of the solution to a vial containing nine mL seawater. Mix and transfer 1 mL of this diluted solution to a second vial containing 4 mL of seawater. Again, mix and transfer 1 mL of this diluted solution to a counting slide such as a Sedgewick-Rafter slide.
3. Using a microscope (either a compound microscope with a 10x objective or a dissecting scope may be used here), count the number of eggs on the slide. If the number is not between 180 and 220, then adjust by adding eggs or water. If egg count is > 220 use the following formula to calculate the amount of water to add:

$$(\text{"egg count"} - 200/200) \times \text{Current Volume of Eggs} = \text{Volume seawater to add to stock mLs}$$

If egg count < 200 add a small amount of eggs. Since it is less arbitrary and more likely to arrive at an acceptable count when using the water addition formula, it is better to originally overestimate the amount of eggs to add to the 100 mL of water.

4. Repeat steps 2 and 3 until an acceptable egg count (between 180 and 220) is obtained.

2.4.4 Obtain Sperm

Place selected male urchin in a large Carolina dish containing 1-2 cm of water. About half of test should be above water level. Stimulate male with 12V transformer, and collect about 0.5 mL of unwetted sperm from between spines using a Pasteur pipette.

Place sperm into a plastic microcentrifuge tube. Keep on ice until used. Be careful not to add any water or sperm which has contacted water to the vials. High quality sperm collected dry and kept on ice will last at least eight hours without measurable decline in viability.

2.4.5 Prepare Appropriate Sperm Dilution

It is desirable for control fertilization to be within 60-90%. Although controls outside these bounds do not automatically disqualify a test, particularly if a valuable dose response is generated, the sensitivity of the test is reduced by fertilization rates greater than 90% and good dose responses may be difficult to obtain with less than 60% fertilization in controls. Density of sperm in the sperm solution should be determined with this goal in mind. Condition of the animals and length of acclimation to the aquarium may effect the chosen sperm density. The pretest (Attachment 2) may be used to calculate an appropriate sperm dilution. Generally, a dilution of between 1:10,000 and 1:2500 will result in desirable fertilization rates, if the animals are in good condition.

For example, if a sperm dilution of 1:5000 is required (as determined from the pretest), add 20 μ L sperm to 10 mL MFS. Mix thoroughly, then add 1 mL of this solution to 9 mL MFS. Sperm should not be wetted until just before starting the test. Sperm wetted more than 30 minutes before the test has begun, including sperm dilutions used in any pretest, should be discarded and a new dilution made from sperm kept on ice.

3.0 TEST PROCEDURES

1. Add 50 μ L appropriately diluted sperm to each vial. Record time of sperm addition. Sperm should be used within 30 minutes of wetting.
2. Incubate all test vials at 20 " 2°C for 30 minutes. At this point it is useful to set a timer for five to ten minutes prior to the end of the incubation period. This will notify the worker early enough to be ready to start the next step exactly on time.
3. While gently swirling the egg solution to maintain even mixing of eggs, use a 200 μ L pipetter to add 200 μ L diluted egg suspension to each vial. Pipette tips are cut back using a clean razor blade to prevent crushing the eggs during pipetting. Record time of egg addition.

4. Incubate for 30 minutes at 20 " 2°C. The timer may be used again at this point.
5. Using the dispenser, add 1 mL of 10% buffered formalin to each sample.
6. Vials may now be capped and stored overnight or for several days until evaluated. Fertilization membranes are easiest to see while eggs are fairly fresh, so evaluation within two to three days may decrease the time required for evaluation.
7. If it is not possible to make the evaluations within several days or the membranes are difficult to discern, an optional technique may be employed. Prepare a 200 □ NaCl solution (pickling salt) and add 2 to 4 drops of the solution to a 1 mL egg sample on a microscope slide. This solution causes the egg, but not the membrane, to shrink briefly thereby making the membrane easier to see. The effect only lasts for a short time (~5 min.) so the observations must be made immediately after the NaCl solution is added. If this optional technique is employed, it must be used on all samples in that test series.

4.0 DATA COLLECTION AND TABULATION

1. Transfer approximately 1 mL eggs and water from bottom of test vials to counting slide. Observe eggs using compound microscope under 100X magnification. Dark field viewing is useful here in identifying fertilization membranes.
2. Count 100 eggs/sample using hand counter with multiple keys (such as a blood cell counter), using one key to indicate fertilized eggs and another to indicate unfertilized eggs. Fertilization is defined by the presence of fertilization membrane surrounding egg.
3. Calculate fertilization percentage for each replicate test:

$$\frac{\text{Total No. Eggs} - \text{No. Eggs Unfertilized}}{\text{Total No. Eggs}} \times 100 = \text{Percent Eggs Fertilized}$$

5.0 DATA ANALYSIS

Data are recorded on standardized data sheets (See Attachments 3-7). Normally, percent fertilization in each treatment is compared to an appropriate reference treatment (seawater, pore water or sea surface microlayer from an uncontaminated environment). Statistical comparisons are made using analysis of variance (ANOVA) and Dunnett's *t*-test (Sokal and Rohlf 1981) on the arc sine square root transformed data. For multiple comparisons among treatments, Ryan's Q test (Day and Quinn 1989) with the arc sine square root transformed data is recommended. The trimmed Spearman-Kärber method with Abbott's correction is recommended to calculate EC₅₀ values for dilution series tests (Hamilton et al. 1977)

6.0 QUALITY CONTROL

Quality control tests may be run using both positive and negative controls with multiple replicates (as many as desired). Typically, a reference toxicant dilution series (sodium dodecyl sulfate) is tested with each test to evaluate the effectiveness of the sperm dilution chosen. Negative controls may include a reference porewater, filtered seawater, and/or a reconstituted brine.

7.0 TRAINING

A trainee will conduct the test with supervision initially. Determining egg concentrations and fertilization counts are test specific activities. These functions can be performed independently after a trainee has demonstrated he or she can accurately reproduce the test.

8.0 SAFETY

The sea urchin fertilization toxicity test poses little risk to those performing it. Care should be taken when making and dispensing the 10% buffered formalin solution; use a hood if available, but make sure the test area is well ventilated. Protective gloves can be worn when pipetting or dispensing formalin or potentially toxic samples.

Care should be taken when collecting or otherwise handling sea urchins. Urchin spines are sharp and fragile and may puncture the skin and break off if handled roughly. First aid similar to treatment of wood splinters is effective in this case (removal of spine and treatment with antiseptic). Collection of sea urchins by snorkeling should not be done alone.

9.0 ATTACHMENTS

- Attachment 1. Equipment List for Fertilization Toxicity Test
- Attachment 2. Pretest to Insure Selection of Quality Gametes
- Attachment 3. Water Quality Adjustment Data Form
- Attachment 4. Sea Urchin Pretest Data Sheet
- Attachment 5. Sea Urchin Pretest Continuation Data Sheet
- Attachment 6. Sea Urchin Fertilization/Embryological Development Toxicity Test Gamete Data Sheet
- Attachment 7. Sea Urchin Fertilization Toxicity Test Fertilization Data Sheet

10.0 REFERENCES

Day, R.W. and G.P. Quinn. 1989. Comparisons of treatments after an analysis of variance in ecology. *Ecol. Monogr.* 59:433-463.

Hamilton, M.A., R.C. Russo, and R.V. Thurston. 1977. Trimmed Spearman-Kärber method for estimating median lethal concentrations in toxicity bioassays. *Environ. Sci. Technol.* 11(7):714-719; Correction 12(4):417 (1978)

Sokal, R.R., and F.J. Rohlf. 1981. *Biometry*. 2nd edition. W.H. Freeman and Company, San Francisco, CA 859 pp.

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Joseph B. Hunn
Quality Assurance Officer

Attachment 1

EQUIPMENT LIST FOR FERTILIZATION TOXICITY TEST

Large Carolina dishes (at least 2)
20 mL KIMBLE scintillation vials (These should be type shipped with caps off, and without cap liners. If other brand or type is used, the vials should be tested for toxicity prior to use.)
400 mL beaker or wide-mouthed thermos for holding vials of sperm
250 mL beakers (4)
Pasteur pipettes and latex bulbs
plastic microcentrifuge tubes
25 mL shell vials or equivalent
Test tube rack (to hold shell vials)
12V transformer with pencil type electrodes
Styrofoam (or something to hold electrode tips)
10 cc syringe with large diameter blunt ended needle (make by grinding sharp point off the needle with a grinding stone)
Marking pens
Ice
10-100 μ L pipetter
50-200 μ L pipetter
5 mL pipettors (2)
Counting slide such as Sedgewick-Rafter chamber
Compound microscope with 10X objective and dark field capability
Hand tally counter
Calculator
Timer for exposure / incubation periods
Buffered formalin and dispenser
Filtered (0.45 μ m) seawater, adjusted to 30 ‰
Data sheets
Baker reagent grade water
Approximately 100 ‰ concentrated brine

Attachment 2
PRETEST TO INSURE SELECTION OF QUALITY GAMETES

1. Using the procedure in section 2.4.1, select 2 to 5 females and at least 2 male urchins to be used in the pretest.
2. Fill pretest vials with five mL of **reference** water. There should be at least two vials for each combination of male, female, and pretest sperm concentration (step 4 below). For example, in a pretest with two females, one male, and six pretest sperm concentrations, 24 vials (2 X 2 X 6) would be needed. Arrange and mark vials accordingly in a rack.
3. Perform steps 2.4.2 (egg collection) and 2.4.3 (egg dilution) for each female urchin. Make enough volume of the egg suspension to perform the pretest and the test.
4. Perform step 2.4.4 (sperm collection) for each male urchin or male combination. Prepare a dilution series of sperm concentrations which will bracket the 60-90% fertilization rate in the test. Sperm dilution will depend on the health and reproductive status of the male urchin, but in most cases the following "standard dilution" should be used:

1:250 (20 μ L dry sperm added to 5 mL MFS. This concentration is used only as stock solution to make up the rest of the dilution series and is not used full strength in the pretest.)

1: 1250 (1 mL of 1:250 and 4 mL MFS)

1: 2500 (1 mL of 1:250 and 9 mL MFS)

1: 5000 (2 mL of 1:2500 and 2 mL MFS)

1: 7500 (2 mL of 1:2500 and 4 mL MFS)

1:10000 (3 mL of 1:7500 and 1 mL MFS)

1:12500 (1 mL of 1:2500 and 4 mL MFS)

Sperm must be used within 30 minutes of dilution. Leave undiluted sperm on ice and detain, because a new sperm dilution of the concentration determined in this pretest will be needed for the toxicity test. **Sperm diluted for use in the pretest may not be used in the toxicity test, because the time elapsed since the addition of water is too great.**

5. As in section 3.0 add 50 μ L of the diluted sperm to each pretest vial. Incubate for 30 minutes at approximately 20°C, and add 200 μ L of the egg suspension. Incubate for another 30 minutes, then fix with 1 mL of the buffered formalin solution.
6. As in section 4.0, obtain a fertilization rate for the vials. There is no need to count all vials, enough vials should be counted to determine a good male/female combination, and an appropriate sperm dilution factor. If more than one male/female combination is acceptable, this is a good opportunity to choose a female which exhibits easily visible fertilization membranes or in cases where there are many samples, to combine eggs from different females. The appearance of the fertilization membranes may vary among female urchins, and presence of easily visible membranes facilitates counting.

Attachment 3

WATER QUALITY ADJUSTMENT DATA FORM

STUDY PROTOCOL _____ INITIALS _____

SAMPLE DESIGNATION _____ DATE _____

A. Salinity Adjustment:

Initial volume (mL) _____

Initial salinity (‰) _____

Vol. Milli-Q water added (mL) _____

Vol. ___‰ brine added (mL) _____

% of original sample
(initial vol./final vol. x 100) _____

B. Character of Sample (after salinity adjustment):

Volume (mL) _____

Salinity (‰) _____

pH _____

Dissolved oxygen (mg/L) _____

DO saturation (%) _____

Total ammonia (mg/L) _____

Sulfide (mg/L) _____

COMMENTS _____

Attachment 4

SEA URCHIN PRETEST DATA SHEET

TEST ID _____ INITIALS _____
 STUDY PROTOCOL _____ DATE _____

EGGS

Female number: _____
 Collection time: _____
 Count: _____

SPERM

Male number: _____
 Collection time: _____
 Dilution start time: _____

TEST TIMES

Sperm in: _____ Eggs in: _____ Formalin in: _____

SPERM DILUTION _____

COMMENTS _____

% FERTILIZATION Reference sample designation: _____

	<u>Female #</u>		<u>Male #</u>	
<u>Sperm Dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____

% FERTILIZATION Reference sample designation: _____

	<u>Female #</u>		<u>Male #</u>	
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____

Attachment 5

SEA URCHIN PRETEST CONTINUATION DATA SHEET

TEST ID _____ INITIALS _____

STUDY PROTOCOL _____ DATE _____

% FERTILIZATION Reference sample designation:

	Female # _____	Male # _____		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____

% FERTILIZATION Reference sample designation:

	Female # _____	Male # _____		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____

% FERTILIZATION Reference sample designation:

	Female # _____	Male # _____		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____

% FERTILIZATION Reference sample designation:

	Female # _____	Male # _____		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____
=====	_____	_____	_____	_____

Attachment 6

**SEA URCHIN FERTILIZATION/EMBRYOLOGICAL DEVELOPMENT
TOXICITY TEST GAMETE DATA SHEET**

TEST ID _____ INITIALS

STUDY PROTOCOL _____ DATE

EGGS

Collection time:

Initial count/volume:

Final count:

SPERM

Collection time: _____ Dilution start time:

Sperm dilution:

Test start temperature:

TEST TIMES

<u>Box #</u>	<u>Sperm in:</u>	<u>Eggs in:</u>	<u>Formalin in:</u>
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	

COMMENTS

Attachment 7

**SEA URCHIN FERTILIZATION TOXICITY TEST
FERTILIZATION DATA SHEET**

TEST ID _____ INITIALS _____

STUDY PROTOCOL _____ DATE _____

PERCENT FERTILIZED

	Replicate						
<u>Treatment</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>Mean" SD</u>	<u>Unfert.</u>

COMMENTS _____

Date Prepared : April 10, 1990

Date Revised: August 15, 1995

SEA URCHIN EMBRYOLOGICAL DEVELOPMENT TOXICITY TEST

1.0 OBJECTIVE

The purpose of the embryological development toxicity test with the sea urchin, *Arbacia punctulata*, is to determine if a sea water, pore water, sea surface microlayer, or other sample affects development of exposed embryos (development arrested at an early stage or a developmental abnormality) relative to that of embryos exposed to a reference sample. The test may also be used to determine the concentration of a test substance which affects development. Test results are reported as treatment (or concentration) which produces statistically significant developmental effect. This test can be performed concurrently with Sea Urchin Fertilization Toxicity Test (SOP 10.6) and/or Sea Urchin Genotoxicity/Teratogenicity Test (SOP 10.8), using the same pretest and sperm and egg collection.

2.0 TEST PREPARATION

2.1 Test Animals

Gametes from the sea urchin, *Arbacia punctulata* are used in the sea urchin embryological development toxicity test. Animals can be collected in the field or obtained from a commercial supplier. *A. punctulata* can be differentiated from other species of urchins which are found in Texas by the five plates surrounding the anal opening, and by round sharp spines on the dorsal surface of the test and flattened spines surrounding the Aristotle's lantern. Urchins can be maintained easily in aquaria or other tanks with running seawater or an aquarium filter. Urchins will eat a wide variety of marine vegetation. A good diet may be provided by placing rocks from jetties (which have been colonized by diatoms and macroalgae) into the tank with the urchins or romaine lettuce may be provided as a substitute. Temperature manipulations of the cultures will prolong the useful life of the urchins. Cultures are maintained at 16 °C when gametes are not required. Temperature is gradually increased to 19 °C at least one week prior to gamete collection and subsequently decreased if no further tests are planned. Photoperiod is maintained at 16 hours of light per day. Water quality parameters should be monitored weekly and salinity maintained at 30 ± 3 ‰. Males and females should be kept in separate tanks.

2.2 Dilution Water

HPLC reagent grade purified water or concentrated seawater brine is used to adjust samples to 30 ‰ as described in Water Quality Adjustment of Samples (SOP 10.12). Concentrated seawater brine (90-110 ‰) is made in large batches by heating seawater to 40°C or less in large tanks with aeration for 3-4 weeks. Brine quality will remain constant over long periods with no refrigeration. At the time of salinity adjustment, pH, ammonia, and dissolved oxygen are also measured. Salinity adjustment and water quality data are recorded on prepared data forms.

Filtered (0.45 µm) seawater adjusted to 30 ‰ is used to wash eggs and is also used for sperm and egg dilutions. The acronym MFS (for Millipore® filtered seawater) is used for this filtered and salinity adjusted seawater.

2.3 Test System: Equipment

When testing samples for potential toxicity, five replicates per treatment are recommended. One replicate is a 5 mL volume of sample in a disposable glass scintillation vial. When conducting a dilution series test, fifty percent serial dilutions may be made in the test vials, using MFS as the diluent.

2.3.1 Equipment

A list of equipment necessary for conducting this test is given in Attachment 1 (Equipment List for Embryological Development Toxicity Test).

2.3.2 Solutions

10% Buffered Formalin:

1,620 mL sea water
620 mL formaldehyde
6.48 g NaH₂PO₄ or KH₂PO₄ (mono)
10.5 g Na₂HPO₄ or K₂HPO₄ (dibasic)
0.6 mL needed for each replicate. Fill the dispenser.

2.4 Collection and Preparation of Gametes

Quality gametes must first be collected, and then diluted to the appropriate concentration for addition to the test vials.

2.4.1 Selection of Urchins to be Used in Toxicity Test.

1. Take two or three females and place in shallow bowl, barely covering tests with seawater.

2. Stimulate release of eggs from gonopores of a female by touching test with electrodes from a 12V transformer.
3. Collect a few eggs from between spines using a 10 mL disposable syringe with a large gauge blunt-tipped needle attached. Discard the first small quantity of eggs expelled from each gonopore and continue collecting. Place a 2 to 5 drops of eggs onto a scintillation vial containing 10mL of filtered seawater. Rinse syringe and repeat for each female.
4. Select females which have round, well developed eggs, and which do not release clumps of eggs or undeveloped ovarian tissue.
5. Place 2-4 males in shallow bowl(s) with a small amount of seawater, leaving the upper $\frac{1}{2}$ to $\frac{1}{3}$ of the animals uncovered.
6. Stimulate release of sperm from gonopores by touching test with electrodes from 12V transformer (about 30 seconds each time). If sperm is watery, reject the animal and choose another. Sperm should be the consistency of condensed milk. Collect sperm using a pastuer pipette with a rubber bulb attached.

Generally, a gamete check is performed in order to ensure that both the male and the female urchins used in the test have gametes with a high degree of viability. If the gamete check is performed, two to five females and at least two males should be selected using the above procedures. The check is performed by adding 5 to 7 drops of a concentrated dilution of sperm to the eggs in the scintillation vials (collected as described above) and observing the eggs under the microscope after 10 minutes. The concentrated dilution of sperm is usually made by diluting 20-50 μ L of sperm in 10 mL of filtered seawater. If the proportion of eggs fertilized is high (95-100%), that female and male may be used in the pretest and test. Sperm from a number of males or eggs of females may be combined if the gamete check reveals a number of high quality animals or the confidence is high in the quality of the gametes. Once a good male and female are selected a pretest can be conducted to determine the correct dilution of sperm to use in the test (Attachment 2).

2.4.2 Obtain Eggs

1. Place selected female in large Carolina dish and add enough water to cover the urchin's test with approximately 1 cm of seawater. Stimulate release of eggs from female with 12V transformer.
2. Collect eggs as above using the 10 mL syringe. Remove needle before dispensing eggs into a disposable shell vial or other clean container capable of holding 25-50 mL. Collect enough eggs for pretest and test. If female stops giving eggs readily or starts giving chunky material, cease stimulation and collection of eggs from that female.

3. Add MFS to fill shell vials, gently mixing eggs. Allow eggs to settle to bottom of vial. Remove water with a pipette. Replace water, again gently mixing the eggs.
4. Repeat washing procedure.

2.4.3 Prepare Appropriate Egg Concentration

1. Put approximately 100 mL of 30 ‰ MFS in a 250 mL beaker, and add enough washed eggs to bring the egg density to approximately 10,000 per mL. If more than 400 total replicates (27 treatments) are to be tested, a larger amount of water and a correspondingly larger amount of eggs should be used. Two hundred µL of this egg solution will be used per replicate, and it is easier to maintain proper mixing and uniform egg density if there is an excess of at least 50%.
2. Check egg density and adjust to within approximately 9000 to 11,000 eggs per mL, as follows. Gently swirl egg solution until evenly mixed. Using a pipette, add 1 mL of the solution to a vial containing nine mL seawater. Mix and transfer 1 mL of this diluted solution to a second vial containing 4 mL of seawater. Again, mix and transfer 1 mL of this diluted solution to a counting slide such as a Sedgewick-Rafter slide.
3. Using a microscope (either a compound microscope with a 10x objective or a dissecting scope may be used here), count the number of eggs on the slide. If the number is not between 180 and 220, then adjust by adding eggs or water. If egg count is > 220 use the following formula to calculate the amount of water to add:

("egg count" - 200/200) x Current Volume of Eggs = Volume seawater to add to stock in mL). If egg count < 200 add a small amount of eggs. Since it is less arbitrary and more likely to arrive at an acceptable count when using the water addition formula, it is better to originally overestimate the amount of eggs to add to the 100 mL of water.
4. Repeat steps 2 and 3 until an acceptable egg count (between 180 and 220) is obtained.
5. Just before the eggs are to be used, add 2 mL of a penicillin-G stock solution (5000 units/mL) per 100 mL of eggs in the egg suspension. The addition of penicillin to the embryological development test has been shown to be beneficial in evaluation of the stages of development by inhibiting bacterial growth which can cause the embryos to disintegrate before the test is terminated.

The penicillin stock solution is prepared by diluting 296 mg of Penicillin-G sodium salt (1690 units/mg) in 100 mL of MFS and mixing until dissolved. The addition of 2 mL/100 mL of eggs will result in a final concentration of 4 units/mL in each replicate. The number of units of penicillin per mg of penicillin-G sodium salt is variable with each lot. Thus, the quantity added to the stock will change in order to keep the final concentration at 4 units/mL.

2.4.4 Obtain Sperm

Place selected male urchin in a large Carolina dish containing 1-2 cm of water. About half of test should be above water level. Stimulate male with 12V transformer, and collect about 0.5 mL of unwetted sperm from between spines using a pasteur pipette. Place sperm into a plastic microcentrifuge tube. Keep on ice until used. Be careful not to add any water or sperm which has contacted water to the vials. High quality sperm collected dry and kept on ice will last at least eight hours without measurable decline in viability.

2.4.5 Prepare Appropriate Sperm Dilution

As in the Sea Urchin Fertilization Test, it is desirable for control fertilization to be within 60-90%. Although controls outside these bounds do not automatically disqualify a test, particularly if a valuable dose response is generated, the chance of inducing polyspermy is increased with increased concentrations of sperm, and good dose responses may be difficult to obtain with less than 60% fertilization in controls. Density of sperm in the sperm solution should be determined with this goal in mind. Condition of the animals and length of acclimation to the aquarium may effect the chosen sperm density. The pretest (Attachment 2) may be used to calculate an appropriate sperm dilution. Generally, a dilution of between 1:10,000 and 1:2500 will result in desirable fertilization rates, if the animals are in good condition.

For example, if a sperm dilution of 1:5000 is required (as determined from the pretest), add 20 μ L sperm to 10 mL MFS. Mix thoroughly, then add 1 mL of this solution to 9 mL MFS. Sperm should not be wetted until just before starting the test. Sperm wetted more than 30 minutes before the test has begun, including sperm dilutions used in any pretest, should be discarded and a new dilution made from sperm kept on ice.

3.0 TEST PROCEDURES

1. While gently swirling the egg solution to maintain even mixing of eggs, use a 200 μ L pipetter to add 200 μ L diluted egg suspension to each vial. Record time of egg addition.
2. Add 50 μ L appropriately diluted sperm to each vial. Record time of sperm addition. Sperm should be used within 30 minutes of wetting.
3. Incubate all test vials at 20 " 1°C for 48 hours.
4. Using the dispenser, add 1 mL 10% buffered formalin to each vial.
5. Vials may now be capped and stored overnight or for several days until evaluated.

4.0 DATA COLLECTION AND TABULATION

1. Transfer approximately 1 mL embryos and water from bottom of test vials to counting slide. Observe embryos using a compound microscope under 100X magnification.
2. Count 100 embryos/sample using hand counter with multiple keys (such as a blood cell counter), using one key to indicate normally developed pluteus larvae and others to indicate unfertilized eggs, embryos arrested in earlier developmental stages, and other abnormalities. Attachment 3 has a list of developmental stages and drawings of each.
3. Calculate the proportion of normal plutei for each replicate test:

$$\frac{\text{Number normal plutei} \times 100}{\text{Total no. eggs/embryos}} = \text{Percent normal plutei}$$

5.0 DATA ANALYSIS

Data are recorded on standardized data sheets (See Attachments 4-9). Normally, percent normal development (normal plutei) in each treatment is compared to an appropriate reference treatment (seawater, pore water or sea surface microlayer from an uncontaminated environment). Statistical comparisons are made using analysis of variance (ANOVA) and Dunnett's *t*-test (Sokal and Rohlf 1981) on the arc sine square root transformed data. For multiple comparisons among treatments, Ryan's Q test (Day and Quinn 1989) with the arc sine square root transformed data is recommended. The trimmed Spearman-Kärber method with Abbott's correction is recommended to calculate EC₅₀ values for dilution series tests (Hamilton et al. 1977)

6.0 QUALITY CONTROL

Quality control tests may be run using both positive and negative controls with multiple replicates (as many as desired). Typically, a reference toxicant dilution series (sodium dodecyl sulfate) is tested with each test to evaluate the effectiveness of the sperm dilution chosen. Negative controls may include a reference porewater, filtered seawater, and/or a reconstituted brine.

7.0 TRAINING

A trainee will conduct the test with supervision initially. Determining egg concentrations, embryological stages and counts are test specific activities. These functions can be performed independently after a trainee has demonstrated he or she can accurately reproduce the test.

8.0 SAFETY

The sea urchin embryological development toxicity test poses little risk to those performing it. Care should be taken when making and dispensing the 10% buffered formalin solution; use a hood if available, but make sure the test area is well ventilated. Protective gloves can be worn when pipetting or dispensing formalin or potentially toxic samples.

Care should be taken when collecting or otherwise handling sea urchins. Urchin spines are sharp and fragile and may puncture the skin and break off if handled roughly. First aid similar to treatment of wood splinters is effective in this case (removal of spine and treatment with antiseptic). Collection of sea urchins by snorkeling should not be done alone.

9.0 ATTACHMENTS

- Attachment 1. Equipment List for Embryological Development Toxicity Test
- Attachment 2. Pretest to Insure Selection of Quality Gametes
- Attachment 3. Development of Sea Urchin Eggs to Pluteus Larvae
- Attachment 4. Water Quality Adjustment Data Form
- Attachment 5. Sea Urchin Pretest Data Sheet
- Attachment 6. Sea Urchin Pretest Continuation Data Sheet
- Attachment 7. Sea Urchin Fertilization/Embryological Development Toxicity Test Gamete Data Sheet
- Attachment 8. Sea Urchin Embryological Development Test Data Sheet
- Attachment 9. Sea Urchin Embryological Development Test Continuation Data Sheet

10.0 REFERENCES

Day, R.W. and G.P. Quinn. 1989. Comparisons of treatments after an analysis of variance in ecology. *Ecol. Monogr.* 59:433-463.

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Joseph B. Hunn
Quality Assurance Officer

Attachment 1

EQUIPMENT LIST FOR EMBRYOLOGICAL DEVELOPMENT TOXICITY TEST

1. Large Carolina dishes (at least 2)
2. 20 mL KIMBLE scintillation vials (These should be type shipped with caps off, and without cap liners. If other brand or type is used, the vials should be tested for toxicity prior to use.)
3. 400 mL beaker or wide-mouthed thermos for holding vials of sperm
4. 250 mL beakers (4)
5. Pasteur pipettes and latex bulbs
6. plastic microcentrifuge tubes
7. 25 mL shell vials or equivalent
8. Test tube rack (to hold shell vials)
9. 12V transformer with pencil type electrodes
10. Styrofoam (or something to hold electrode tips)
11. 10 cc syringe with large diameter blunt ended needle (make by grinding sharp point off the needle with a grinding stone)
12. Marking pens
13. Ice
14. 10-100 μ L pipetter
15. 50-200 μ L pipetter
16. 5 mL pipetters (2)
17. Counting slide such as Sedgewick-Rafter chamber
18. Compound microscope with 10x objective and dark field capability
19. Hand tally counter
20. Calculator
21. Timer for exposure / incubation periods
22. Buffered formalin and dispenser
23. Filtered (0.45 μ m) seawater, adjusted to 30 ‰
24. Data sheets
25. Baker reagent grade water
26. Approximately 100 ‰ concentrated brine

Attachment 2
PRETEST TO INSURE SELECTION OF QUALITY GAMETES

1. Using the procedure in section 2.4.1, select 2 to 5 females and at least 2 male urchins to be used in the pretest.
2. Fill pretest vials with five mL of **reference** water. There should be at least two vials for each combination of male, female, and pretest sperm concentration (step 4 below). For example, in a pretest with two females, one male, and six pretest sperm concentrations, 24 vials (2 X 2 X 6) would be needed. Arrange and mark vials accordingly in a rack.
3. Perform steps 2.4.2 (egg collection) and 2.4.3 (egg dilution) for each female urchin. Make enough volume of the egg suspension to perform the pretest and the test.
4. Perform step 2.4.4 (sperm collection) for each male urchin or male combination. Prepare a dilution series of sperm concentrations which will bracket the 60-90% fertilization rate in the test. Sperm dilution will depend on the health and reproductive status of the male urchin, but in most cases the following "standard dilution" should be used:

- 1:250 (20 μ L dry sperm added to 5 mL MFS. This concentration is used only as stock solution to make up the rest of the dilution series and is not used full strength in the pretest.)
- 1: 1250 (1 mL of 1:250 and 4 mL MFS)
- 1: 2500 (1 mL of 1:250 and 9 mL MFS)
- 1: 5000 (2 mL of 1:2500 and 2 mL MFS)
- 1: 7500 (2 mL of 1:2500 and 4 mL MFS)
- 1:10000 (3 mL of 1:7500 and 1 mL MFS)
- 1:12500 (1 mL of 1:2500 and 4 mL MFS)

Sperm must be used within 30 minutes of dilution. Leave undiluted sperm on ice and retain, because a new sperm dilution of the concentration determined in this pretest will be needed for the toxicity test. **Sperm diluted for use in the pretest may not be used in the toxicity test, because the time elapsed since the addition of water is too great.**

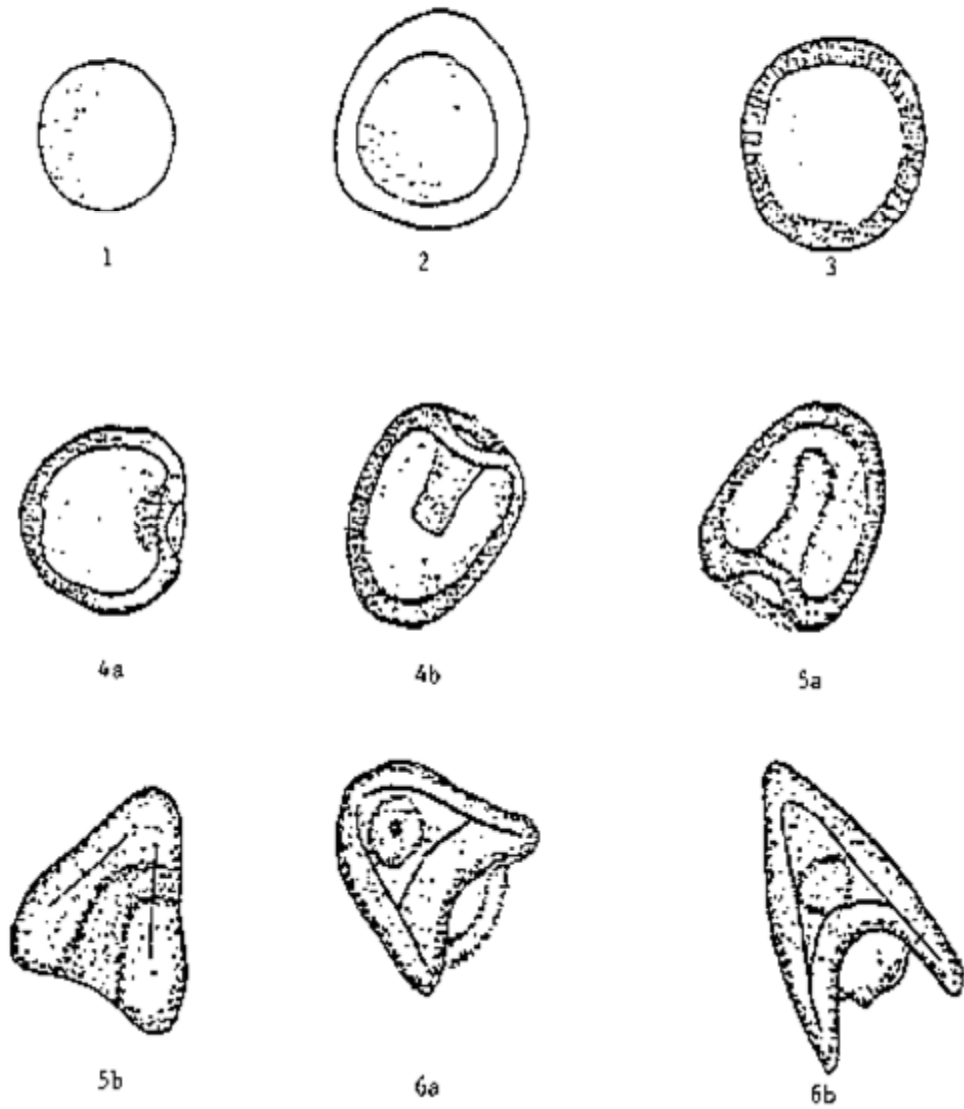
5. As in section 3.0 add 50 μ L of the diluted sperm to each pretest vial. Incubate for 30 minutes at approximately 20°C, and add 200 μ L of the egg suspension. Incubate for another 30 minutes, then fix with 1 mL of the buffered formalin solution.
6. As in section 4.0, obtain a fertilization rate for the vials. There is no need to count all vials, enough vials should be counted to determine a good male/female combination, and an appropriate sperm dilution factor. If more than one male/female combination is acceptable, this is a good opportunity to choose a female which exhibits easily visible fertilization membranes or in cases where there are many samples, to combine eggs from different females. The appearance of the fertilization membranes may vary among female urchins, and presence of easily visible membranes facilitates counting.

DEVELOPMENT OF SEA URCHIN EGGS TO PLUTEUS LARVAE

The development of sea urchin eggs from fertilization to pluteus larvae normally occurs in approximately 48 hours. Although development is a continuous process of mitosis and cellular differentiation, developmental biology defines distinct stages of development by gross morphological characteristics. For the purpose of the Sea Urchin Embryological Development Test, six stages are defined and used in the characterization of embryos (Drawings on following page).

1. Unfertilized egg - single cell which appears dense and lacks a fertilization membrane.
2. Fertilized egg - egg with a distinct fertilization membrane which appears as a thin band lying slightly away from the central egg. The early stages of cell division are included in this group.
3. Blastula - spherical, "hollow-ball" stage which is ciliated and becomes free-swimming by breaking out of the fertilization membrane.
4. Early gastrula - beginnings of invagination of the blastula wall are evident. Cells move inward (invaginate) to form a central cavity (archenteron). Early gastrula includes embryos with the earliest stages of invagination and continues until the archenteron reaches approximately two-thirds of the diameter of the embryo.
5. Late gastrula - gastrula in which archenteron has developed in length to two-thirds of the embryo diameter and has begun to differentiate and bend towards and break through the embryo wall. Included are the later stages (prism) with primitive gut (complete digestive system), early skeletal rod development, and beginnings of deltoid shape formation.
6. Pluteus - deltoid-shaped larval stage with complete digestive system, skeletal rods, and growth of projecting arms.

Attachment 3 Continued



Stages in development of sea urchin, from unfertilized egg to pluteus larvae. Numbers relate to descriptions on previous page.

Attachment 4

WATER QUALITY ADJUSTMENT DATA FORM

STUDY PROTOCOL_____ INITIALS

SAMPLE DESIGNATION_____ DATE

A. Salinity Adjustment:

Initial volume (mL)

Initial salinity (‰)

Vol. Milli-Q water added (mL)

Vol. ___‰ brine added (mL)

% of original sample
(initial vol./final vol. x 100)

B. Character of Sample (after salinity adjustment):

Volume (mL)

Salinity (‰)

pH

Dissolved oxygen (mg/L)

DO saturation (%)

Total ammonia (mg/L)

Sulfide (mg/L)

COMMENTS

Attachment 5

SEA URCHIN PRETEST DATA SHEET

TEST ID _____ INITIALS _____

STUDY PROTOCOL _____ DATE _____

EGGS

Female number: _____

Collection time: _____

Count: _____

SPERM

Male number: _____

Collection time: _____

Dilution start time: _____

TEST TIMES

Sperm in: _____ Eggs in: _____ Formalin in: _____

SPERM DILUTION

COMMENTS

% FERTILIZATION Reference sample designation:

	Female #		Male #		
<u>Sperm Dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	

% FERTILIZATION Reference sample designation:

	Female #		Male #		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	

Attachment 6

SEA URCHIN PRETEST CONTINUATION DATA SHEET

TEST ID _____ INITIALS _____

STUDY PROTOCOL _____ DATE _____

% FERTILIZATION Reference sample designation:

	Female # _____		Male # _____		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	

% FERTILIZATION Reference sample designation:

	Female # _____		Male # _____		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	

% FERTILIZATION Reference sample designation:

	Female # _____		Male # _____		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	

% FERTILIZATION Reference sample designation:

	Female # _____		Male # _____		
<u>Sperm dilution</u>	<u>REP 1</u>	<u>REP 2</u>	<u>REP 3</u>	<u>REP 4</u>	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	
=====	_____	_____	_____	_____	

Attachment 7

**SEA URCHIN FERTILIZATION/EMBRYOLOGICAL DEVELOPMENT
TOXICITY TEST GAMETE DATA SHEET**

TEST ID _____ INITIALS

STUDY PROTOCOL _____ DATE

EGGS

Collection time:

Initial count/volume:

Final count:

SPERM

Collection time: _____ Dilution start time:

Sperm dilution:

Test start temperature:

TEST TIMES

<u>Box #</u>	<u>Sperm in:</u>	<u>Eggs in:</u>	<u>Formalin in:</u>
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	

COMMENTS

Attachment 8

SEA URCHIN EMBRYOLOGICAL DEVELOPMENT TEST DATA SHEET

TEST ID _____ INITIALS _____

STUDY PROTOCOL _____ DATE _____

Test Start (date & hour) _____ Test stopped (date & hour) _____

<u>Treatment</u>	<u>Rep.</u>	<u>Eggs</u>	<u>Blastula</u>	Early	Late	<u>Pluteus</u>	% Normal	%Non-
				<u>Gastrula</u>	<u>Gastrula</u>		<u>Development</u>	<u>Norm</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

COMMENTS

Attachment 9

EMBRYOLOGICAL DEVELOPMENT TEST CONTINUATION DATA SHEET

Test Id _____ Initials _____

Study protocol _____ Date _____

<u>Treatment</u>	<u>Rep.</u>	<u>Eggs</u>	<u>Blastula</u>	Early <u>Gastrula</u>	Late <u>Gastrula</u>	<u>Pluteus</u>	% Normal <u>Development</u>	%Non- <u>Norm</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

COMMENTS

Date Prepared: November 4, 1996

ALGAL ZOOSPORE GERMINATION AND GERMLING GROWTH TOXICITY TEST PROTOCOL

1.0 OBJECTIVE

The purpose of the algal germination and germling growth toxicity test using *Ulva fasciata* and *U. lactuca* zoospores is to determine if sea water, pore water, or other aqueous samples inhibit germination and/or suppress growth of exposed algal zoospores and developing germlings relative to the response of zoospores and germlings exposed to a reference sample.

In this procedure, motile, quadriflagellate zoospores are exposed to test solutions for 96 hours, during which time they settle on glass cover slides in the test chambers. Each slide is examined microscopically to determine the percentage of zoospores that failed to germinate. Also, the length and cell number of ten randomly selected germlings are measured and counted, respectively, for each replicate. Test results are reported as the treatment (or concentration) that produces a statistically significant reduction in germination and growth or as the concentration that reduces germination by 50 percent (EC_{50}).

2.0 TEST SYSTEM

2.1 Equipment

A complete list of equipment necessary to conduct an algal zoospore test is provided in Attachment 1.

2.2 Dilution Water

Ultra-pure or concentrated seawater brine is used to adjust samples and filtered sea water to 30‰ as described in Water Quality Adjustment of Samples (SOP 10.12).

Filtered (0.45: m) seawater adjusted to 30‰ is used to rinse algal samples after collection and rewet thalli to initiate the release of reproductive bodies. It is also used to prepare zoospores stock solutions.

Filtered (0.45: m) seawater adjusted to 30‰ and diluted 10-15% with pore water (also adjusted to 30‰) is used as sample dilution water (DPW). The pore water, which is

extracted from sediment collected from a site known to be free of contamination, provides nutrients necessary for normal algal growth. The amount of pore water added to dilute filtered seawater is pre-determined with a pore water dilution test.

2.3 Test Chambers

Porewater samples may be tested in 20 mL glass beakers (*other containers may be suitable e.g., Stender dishes*). For tests with metal toxicants, 25 mL *polyethylene* beakers are preferred, however, glass beakers may be used. Place circular (20 mm diameter), glass cover slides flat on the bottom of the test chambers to provide a settling substrate. Five replicates per treatment are recommended. One treatment consists of 10 mL of test solution in a test chamber. When conducting dilution series tests, fifty percent serial dilutions may be made in the test chambers using DPW as the diluent.

3.0 TEST ORGANISMS

3.1 Life History

The test organisms for this protocol are the zoospores of *Ulva fasciata* Delile and *U. lactuca* Linnaeus, two marine, macrophytic Chlorophytes commonly known as sea lettuce. *Ulva* provides food and habitat to vertebrate and invertebrate species.

Ulva fasciata and *U. lactuca* have an alternation of isomorphic gametophytic and sporophytic generations. Motile gametes and zoospores are the primary dispersal mechanism for *Ulva* and are particularly sensitive stages in the life cycle. Each cell in gametophyte and sporophyte blades has the potential to produce 8 to 16 and 4 to 8 reproductive cells, respectively. Gametes and zoospores are differentiated by the number of flagella they possess. Gametes are biflagellate and zoospores are quadriflagellate. Mature sporophytes (2n) release zoospores which settle, germinate and develop into gametophytes (n). Gametophytes reach maturity within six weeks and release gametes which unite and develop into sporophytes, completing the life cycle (Kapraun 1970).

3.2 Species Identification

Both *Ulva fasciata* and *U. lactuca* occur in the intertidal zone. They are common on jetties, bulkheads and other hard substrates and may be found attached to rocks and shells. The two species may be distinguished by thallus morphology. *Ulva fasciata* thalli are divided into narrow, linear segments usually less than 1.5 cm wide but may range from 0.5-5.0 cm wide. *Ulva lactuca* have simple broad thalli with irregular lobes. Consult Kapraun (1970) for more information on *Ulva* sp. in the vicinity of Port Aransas, TX.

3.3 Collection of Algae

Because *Ulva* sp. gametophytes and sporophytes are isomorphic, it is not possible to distinguish one from the other in the field. Positive identification can be made only after reproductive cells have been released.

1. Collect algae at low tide on the evening before a test is to be conducted. During low tide, *Ulva* is exposed to air and becomes slightly desiccated, which is a necessary stage in the zoospore release process. Collect entire plants including the holdfast. The plants collected should be damp; do not collect dry, brittle algae. Place algae in a plastic bucket for transport to the laboratory.
2. Collect at least 20 individual plants from several locations along the jetty. Collections should be made in areas free of pollution to minimize the possibility of genetic or physiological adaptation to pollutants. Samples are collected from several different areas to increase the probability of having several sporophytes among the samples collected.
3. Only collect algae whose thalli are uniform in color or have slightly darker green margins. Algae whose thalli have clear margins should not be collected. Clear margins indicate that reproductive bodies have been released.

3.4 Storage of Algae

1. After collection, rinse samples with filtered (0.45: m) seawater and gently wipe with cheese cloth to remove debris, epiphytes and other associated organisms. Special attention should be given to cleaning the holdfast. The rinsing process should be done as quickly as possible as over-washing may stimulate the algae to release their reproductive bodies prematurely.
2. Discard any small thalli pieces not attached to a holdfast.
3. Layer washed samples (lasagna style, without overlap) between paper towels dampened with filtered (0.45 : m) seawater, place into a box with a lid and keep in the dark at 20⁰C overnight. Samples should be used within 18 hours of collection.

3.5 Collection of Zoospores

To induce zoospore/gamete release, thalli must be subjected to mild desiccation in the dark, followed by rewetting and a sudden change in light intensity (Reed *et al.* 1991,

Anderson and Hunt 1993). Test solutions may be prepared while reproductive bodies are being released.

3.5.1 Zoospore Release

1. Remove several (5-10) clean plants from the dark box. If possible, select plants with dark green or olive colored thalli margins.
2. Place thalli from single plants into 150 or 250 -mL beakers (1 plant/beaker) containing approximately 100 mL of filtered (0.45: m) seawater at 20⁰C and illuminate with ambient room light (cool white fluorescent).

If thalli from a chosen plant have particularly wide, darkened edges, indicating that a large number of reproductive bodies are available for release, then only two or three thalli and not the entire plant are needed for the release procedure. Place the unused portion of the plant between damp paper towels in a labeled box. If that particular plant is identified as a sporophyte and more zoospores are required for a test, the unused portion will be available. Reproductive bodies should not be collected from plants whose thalli margins have turned tan, brown or golden brown.

3.5.2 Zoospore Identification/Motility Check

Either the formation of a green ring at the water-air interface along the inside of the beaker, or a green cloudiness in the water indicates that reproductive bodies have been released.

1. Examine a sample of the released organisms microscopically (200X) to identify them as zoospores or gametes. Preferably, zoospores from three or four plants should be examined.
2. Once zoospores from several plants have been identified, they should be examined to determine motility. If zoospores from a particular plant are inactive immediately after release, they should not be used in a test and spores from a separate plant should be evaluated. If zoospores are active, they may be accepted as potential test organisms.

3.6 Zoospore Concentration

3.6.1 Concentration Determination

1. Remove thalli from release beaker.

2. Thoroughly mix zoospore solution by stirring and pipet 4.5 mL of the solution into a scintillation vial. Add 0.5 mL of buffered formalin to the scintillation vial.
3. Determine the concentration of the zoospore stock solution subsample microscopically with an Improved Neubauer hemacytometer at 100X.
4. Use the formula and worksheet (Attachment 2) modified from Anderson and Hunt (1993) to calculate the zoospore concentration and the volume of stock solution to add to each test chamber to achieve a 12,750 zoospores/ml concentration. To prevent over-dilution of the test solution, the volume of zoospores added to each test chamber should be between 0.05 and 1% of the test solution volume (i.e., 50 to 100 : 1).
5. If the zoospore concentration of the release beaker falls within the specified range to produce 12,750 zoospores/mL of sample, then the release beaker may be used to stock test chambers.

3.6.2 Concentration Adjustments

The concentration of the zoospore stock solution may be adjusted if it is too concentrated or diluted to meet the specified volume range that may be introduced into test solutions.

1. If the zoospore stock solution is too concentrated, dilute it with filtered seawater and recalculate the zoospore concentration.
2. If the stock solution is too dilute, allow zoospores to accumulate at the water-air interface in the release beaker and pipet them into a small beaker. If necessary, water from the bottom of the prepared stock solution may be removed after allowing the zoospores to accumulate at the water's surface. Recalculate the zoospore concentration.

4.0 TOXICITY TEST PROCEDURE

4.1 Exposure to Test Solutions

1. Observe a sample of zoospores from the stock solution before adding them to the test chambers to verify that they are swimming.
2. Pipet the calculated volume of zoospore stock solution into each test chamber.

3. Record the time zoospores are introduced into test chambers on the Algal Test Data Form (Attachment 2).

4.2 Incubation

1. Cover stocked test chambers with clear plastic Petri dish halves (50 mm diameter).
2. Incubate test for 96 h on a 12 h light-12 h dark photoperiod at 20°C.
3. Record the time test chambers are placed into incubators on the Algal Test Data Form (Attachment 2). Zoospores begin to germinate within 48 h. The additional 48 hours allows germling length and cell number to be included as sublethal endpoints.

4.3 Data Collection

The test is terminated after 96 hours. The endpoints for this test are percent germination, germling blade length and germling blade cell number. Salinity from at least five test chambers should be measured and recorded to insure it remained constant throughout the test.

4.3.1 Germination

A zoospore is considered germinated if it has divided into at least two cells; one cell being the initial rhizoid cell which produces a uniseriate filament or germ tube, and the other being the frond or blade cell which will give rise to the thallus (Kapraun 1970). However, at 96 hours, germinated zoospores have generally developed into germlings with at least a three or four blade cells. Settled zoospores that have not germinated are usually spherical, between 7 and 10 : m in diameter, and appear light green. Germlings 96 h old are easily differentiated from ciliates or other protists which may be in water samples or may be introduced with the algal zoospores. If an object cannot be identified definitively as a germinated or non-germinated zoospore, it should not be counted.

1. Remove the slide from the test solution and hold it vertically for a moment to allow any test solution to drip off.
2. Invert the cover slide and, using a paper wipe, lightly press it onto a standard microscope slide. Care should be taken when pressing the cover slide onto the microscope slide. If it is pressed too hard, germlings may be destroyed to the point that germling length and cell number data may be impossible to obtain.

3. If necessary, blot around the edge of the cover slide to prevent it from sliding on the microscope slide.
4. Observe the slide microscopically (200X) and record the developmental progress of the first 100 settled zoospores encountered. Record all data on a standardized data sheet (Attachment 3).

4.3.2 Growth measurements

Growth of germlings is determined by measuring the length and counting the number of cells in ten randomly selected germling blades per replicate of each treatment.

1. Randomly select germlings (10) by moving the slide to a new field of view without looking through the eyepiece.
2. With the ocular micrometer, measure the germling lying closest to the micrometer in each field of view and count its cell number. Do not include the rhizoid in germling length measurements. Germling length is initially recorded in ocular units and must be converted to micrometers. (For our Zeiss compound microscope using the 20X objective, the conversion factor is 2.57.)

$$\text{Ocular Units} * 2.57 = \text{germling length } (: \text{ m})$$

3. If germination is significantly inhibited and fewer than 30% of the zoospores germinate, the first ten germinated zoospores encountered should be measured and counted (Anderson and Hunt, 1993). Record all data on a standardized data sheet (Attachment 3).

4.4 Preservation of Tests

Tests may be preserved by adding 1 mL of 10% buffered formalin to each test chamber. (Preliminary results indicate that there is no significant difference for germling length and cell number between chambers evaluated immediately after test termination and those preserved with formalin and evaluated one week after test termination. The use of glutaraldehyde will be evaluated in the future)

5.0 DATA ANALYSIS

5.1 Statistical Analysis

Percent germination, germling length and germling cell number for each treatment are compared to an appropriate reference.

5.1.1 Germination Data

Statistical comparisons are made using one-way analysis of variance (ANOVA) and Dunnett's *t*-test on arcsine transformed germination data (SAS Institute, Inc 1989). Prior to analysis, transformed data sets should be screened for outliers (SAS Institute, Inc 1992). After removing outliers, data sets should be tested for normality and homogeneity of variance with Levene's test (SAS Institute, Inc 1992).

The trimmed Spearman-Kärber method (Hamilton *et al.* 1977) with Abbott's correction (Morgan 1992) is used on germination data to determine the Median Effective Concentration (EC₅₀).

5.1.2 Growth Data

ANOVA and Dunnett's *t*-test are used to determine significant differences of germling length and cell number between test and control treatments. Data sets should be screened for outliers and tested for normality and homogeneity of variance. Appropriate transformations should be applied to germling length and cell number data when assumptions of equal variance are violated.

6.0 QUALITY CONTROL

Quality control tests may be conducted using both positive and negative controls with multiple replicates. Typically, a reference toxicant dilution series (sodium dodecyl sulfate) is included with each test to evaluate the sensitivity of the zoospores chosen. Negative controls may include a reference pore water, dilution water and/or a reconstituted brine.

7.0 TRAINING

A trainee will conduct the test with supervision initially. Determining the zoospore stock solution concentration is a test specific activity. This function can be performed independently after a trainee has demonstrated the ability to accurately reproduce the test.

8.0 SAFETY

The algal zoospore germination and germling growth test poses little risk to those conducting it. Protective gloves may be worn when pipetting potentially toxic samples.

Care should be taken when collecting algae on the jetties. Protective footwear with soles that provide good traction should be worn to protect feet from barnacle cuts and slipping on algal mats. Preferably, collections should not be made alone.

9.0 ATTACHMENTS

- Attachment 1. Equipment list for Algal Zoospore Germination and Germling Growth Toxicity Test
- Attachment 2. Water Quality Adjustment Data Form
- Attachment 3. Zoospore Release Data Form
- Attachment 4. Algal Toxicity Test Data Sheet

10.0 REFERENCES

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Attachment 1

EQUIPMENT LIST FOR ALGAL TOXICITY TEST

20 mL glass beakers or 25 mL plastic beakers for use as test chambers
22 mm diameter circular microscope cover slides and standard microscope slides
50 mm diameter Petri dish halves (or equivalent)
150 or 250 mL glass beakers to conduct zoospore release procedure
1000 mL glass beaker for dilution water preparation
25 mL and 100 mL graduated cylinder
Pasteur pipets and latex bulbs
Improved Neubauer Hemocytometer
Compound microscope with ocular micrometer and 10X and 20X objectives
Thermometer
Refractometer
Writing pens
50-100 : 1 pipetter
5 mL pipetter
Hand tally counter
Standard, glass microscope slides
Calculator
Plastic bucket to collect algae from the jetties
Filtered sea water (0.45: m), adjusted to 30‰
Filtered sea water (0.45: m), adjusted to 30‰ with pore water added
Concentrated brine
Ultra-pure water
Algae Test Data Form
Test data sheets
Incubator with controlled lighting

Attachment 2

Algae Test Data Form

Date:

Study Identification:

Investigator:

Condition of thalli used: poor fair good

Time blades placed in release beaker: _____

Time spores removed from release beaker: _____

Temperature of spore solution: _____

Spore motility check: _____

Zoospore Concentration Check

Determine concentration with 5 counts:

1. _____

2. _____

3. _____

4. _____

5. _____

Mean: _____ S.D.: _____

Mean *10,000*1.11= _____ spores/ml. This is the concentration of the zoospore release.

To determine volume of spores to deliver to test chamber:

12,750 spores/ml x _____ ml test solution/chamber = _____ spores per test container.

_____ spores/chamber ÷ spore concentration _____ spores/ml = _____ ml/test container

_____ : l/test container

Temperature of spore solution: _____

Temperature of test containers: _____

Salinity of test containers (before/after): _____

Time test containers stocked: _____

Incubation start time: _____

Test termination time: _____

Comments: _____
