Appendix F1

Sampling and Analysis Report

Prepared for:
The Port of Los Angeles
San Pedro, California

Prepared By:
Ramboll Environ US Corporation
Irvine, California

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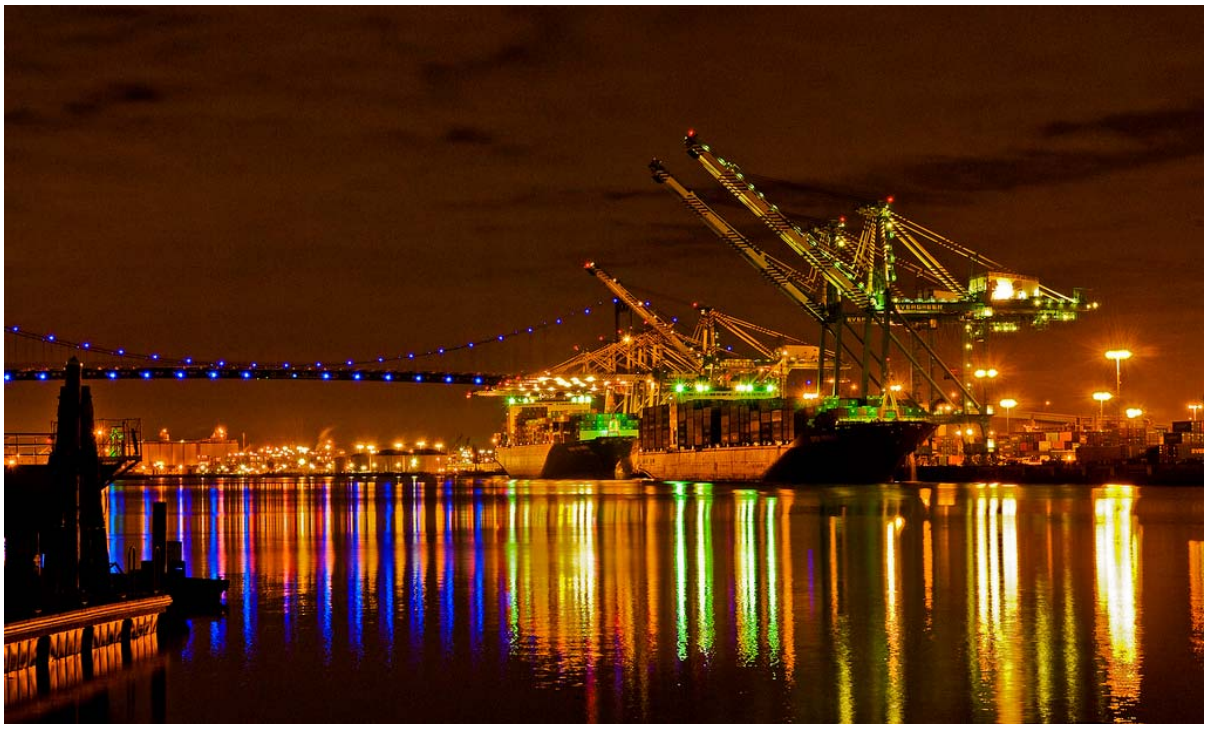
SAMPLING AND ANALYSIS REPORT FOR BERTHS 226-232 IN SUPPORT OF THE EVERPORT CONTAINER TERMINAL IMPROVEMENTS PROJECT, LOS ANGELES HARBOR



RAMBOLL ENVIRON

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
µg/kg	micrograms per kilogram
BP	bioaccumulation potential
CA	California
CCC	Criterion Continuous Concentration
CDF	confined disposal facility
cm	centimeters
COC	Chain of custody
cy	cubic yards
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DGPS	Differential Global Positioning System
DMMU	dredged material management unit
DO	dissolved oxygen
DRET	Dredging Elutriate Test
EC50	median effective concentration
ERED	Environmental Residue Effects Database
ERL	effects range low
ERM	effects range median
ETS	Everport Terminal Services Inc.
ft	feet
ITM	Inland Testing Manual
L	Liters
LAXT	Los Angeles Export Terminal
LC50	median lethal concentration
LPC	limiting permissible concentration
mL	milliliters
mg/L	milligrams per liter
MLLW	mean lower low water
MPRSA	Marine Protection, Research and Sanctuaries Act

NELAP	National Environmental Laboratory Accreditation Program
NOEC	No Observed Effect Concentration
ODMDS	Ocean Dredged Material Disposal Site
OTM	Ocean Testing Manual
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
POLA	Port of Los Angeles
Project	Berths 226-232 Everport Container Terminal Improvements Project
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	Quality Assurance Plans
QC	quality control
SOP	Standard Operating Procedures
SP	solid phase
SPP	suspended particulate phase
STS	Seaside Transportation Services
TCLP	Toxicity Characterize Leaching Procedure
TTLC	total threshold limit concentration
U.S.	United States
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
UTM	Upland Testing Manual
WA	Washington State
WAAS	Wide Area Augmentation System
YTI	Yusen Terminals, Inc.

1. INTRODUCTION

Ramboll Environ US Corporation (Ramboll Environ, formerly ENVIRON International Corporation) has prepared this Draft Sampling and Analysis Report (SAR) for the dredged material assessment in support of the proposed Berths 226-236 Everport Container Terminal Improvements Project (Project). The proposed Project involves the construction and operation of terminal improvements within and adjacent to the Everport Container Terminal Berths 226-236 at the Port of Los Angeles (POLA) (Figure 1). Terminal improvements include performing dredging at Berths 226-232 (i.e., deepening at Berths 226–229 and Berths 230–232 and maintenance dredging at bulkhead area of Berth 229), installation of king and sheet piles along wharf face, installation of electrical infrastructure to accommodate three additional cranes, backlands improvements on a vacant parcel, and amending and extending the current lease.

Dredging for the Project requires a United States Army Corps of Engineers (USACE) dredging permit under Section 10 of the Rivers and Harbors Act. Transport and disposal of dredged material to LA-2, an established ocean disposal site, also requires USACE authorization under Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA). The proposed Project may also require a Section 404 permit under the Clean Water Act for dredge and fill activities, depending on disposal location. In addition, if disposal of dredged material occurs on land, a permit from the Los Angeles Regional Water Quality Control Board under the Waste Discharge Requirements Program is also required. A dredged material assessment is necessary for all required permits. The determination for suitability of ocean disposal or other alternative placement options will be coordinated through the Southern California Dredged Material Management Team Contaminated Sediment Task Force (CSTF) whose core members represent the USACE Los Angeles District, the United States Environmental Protection Agency (USEPA) Region 9, the Los Angeles Regional Water Quality Control Board, and the California Coastal Commission. Additional participating agencies include the California State Lands Commission, U.S. Fish and Wildlife Service, California Department of Fish and Game, and National Marine Fisheries Service.

This SAR details the results of sampling and analysis performed for the evaluation of dredged material using a phased approach to analyze chemistry, toxicity and bioaccumulation potential of representative sediment samples collected in October, 2014 and March, 2015. The goal of the evaluation is to establish the suitability of the material for the range of potential dredged material management/disposal options. To establish suitability for ocean disposal, samples were evaluated in accordance with procedures outlined in the USEPA and USACE (1991) Ocean Testing Manual (OTM) "*Evaluation of Dredged Material Proposed for Ocean Disposal*". To establish suitability under 404 CWA requirements (i.e., potential placement at the Berths 243-245 CDF or an upland disposal facility) analysis also included additional elements such as toxicity characteristic leaching procedure (TCLP) and elutriate testing conducted in accordance with procedures outlined in the USEPA and USACE (1998) Inland Testing Manual (ITM) "*Evaluation of Dredged Materials Proposed for Discharge in Waters of the U.S.*" and the Upland Testing Manual (UTM, USACE, 2003).

1.1 Project Location and Background

The Project site is located at 389 Terminal Way on Terminal Island in the Port of Los Angeles, Los Angeles Harbor, and within the Port of Los Angeles Community Plan area of the City and County of Los Angeles, California (Figure 1). The Project site is near the communities of San Pedro and Wilmington and is approximately 20 miles from downtown Los Angeles. Coordinates of the approximate geographic center of the dredge footprint for the Project are 33.744836 degrees north, -118.272377 degrees west in the North American Datum of 1983 (NAD83). The Project site is generally bounded on the west and northwest by the Main Channel; to the north by State Route 47 and the Yusen Terminals, Inc. (YTI) Container Terminal at Berths 212-213 and Berths 221-224; to the east by Los Angeles Export Terminal (LAXT) and ExxonMobil SA Inland Tanks facility; and to the south by the ExxonMobil liquid bulk terminal at Berths 238-240, Terminal Way, San Pedro Forklift, TriMarine Seafood, vacant land, and the former Canner's Steam Company plant. Land uses in the vicinity of the Project site support a variety of cargo handling operations (including container, liquid bulk, dry bulk) commercial fishing, seafood processing, maritime support, and ship repair. The existing 216-acre container terminal at the Project site (Berths 226-236) is on Terminal Island and is operated by Seaside Transportation Services (STS). Everport Terminal Services Inc. (ETS) (a wholly owned subsidiary of Evergreen Marine Corporation) is the permit holder under a lease agreement (Permit No. 888, as amended) between Los Angeles Harbor Department and ETS. The main terminal under the current lease agreement totals approximately 160 acres. The lease also includes approximately 31 acres associated with the existing on-dock rail yard behind the YTI Container Terminal (Berths 217-220), known as the Terminal Island Container Transfer Facility. In addition, ETS has an existing space assignment for 25 acres of backland area behind Berths 232-236.

The 1.5-acre parcel (located adjacent to the 25-acre space assignment and ExxonMobil tank storage yard) that is being proposed for development is vacant and adjacent to the existing terminal, but separated by a chain-link fence. The total terminal acreage under the proposed Project would be approximately 217.5 acres. The current lease expires in 2028.

1.2 Dredging Project Description

The Project involves dredging associated with the construction and operation of terminal improvements within and adjacent to the Everport Container Terminal.

- The proposed improvements at Berths 230-232 would include dredging to increase the depth from the existing design depth of -45 to -47 ft mean lower low water (MLLW) plus a 2-ft overdepth tolerance (for a maximum depth of -49 ft MLLW).
- The proposed Project also includes maintenance dredging at the bulkhead area of Berth 229 to restore the existing design depth of -45 ft MLLW plus a 2-ft overdepth tolerance (for a maximum depth of -47 ft MLLW).
- The proposed improvements to Berths 226-228 include dredging to increase water depth from the existing depth of -45 feet (ft) MLLW to a depth of -53 ft MLLW, plus a 2-ft overdepth tolerance (for a maximum depth of -55 ft MLLW).

Management of the dredged material could potentially include disposal at an approved upland facility or CDF (such as the Port's, agency-approved, CDF located at Berths 243-245), the LA-2 Ocean Dredged Material Disposal Site (ODMDS), beneficial use (including potential reuse as fill on-site within the 1.5-acre parcel proposed for backlands improvements), or a combination of the above.

1.3 Previous Studies

Prior dredged material evaluations conducted in the vicinity of the project have resulted in varying determinations regarding suitability for ocean disposal:

- A single composite sample from Berths 229-232 was evaluated in 1993. Results showed slightly elevated levels of dichlorodiphenyldichloroethylene (DDE), no toxicity in solid phase (SP) and suspended particulate phase (SPP) toxicity tests, with some uptake of selected metals and DDE in bioaccumulation tests, however the resulting tissue residues were determined not be significant and the material was determined to be suitable for ocean disposal at LA-2 (Kinnetic Laboratories/ ToxScan, Inc. 2003).
- A 1997 dredged material evaluation of material from Berths 233-236, located adjacent to the current project site, analyzed two composites. Chemical analysis showed elevated total dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). Results of toxicity tests showed significant toxicity to amphipods and bioaccumulation tests showed significant bioaccumulation of DDTs and pyrene in the tissue of clams and significant bioaccumulation of DDTs, PCBs, and copper in the tissue of worms (Kinnetic Laboratories/ToxScan, Inc. 2003). On the basis of these results the material was determined to be unsuitable for ocean disposal and was managed upland.
- In 2003, dredged material from Berths 226-231 was evaluated as three separate composite samples (A, B, and C; 5 core samples in each composite; depths of mudline to -48 ft MLLW) in support of planned maintenance dredging. Reference sediments evaluated included the LA-2 reference site as well as sediments collected from the Outer Harbor near Pier 400 to represent a potential in-harbor disposal area. Details are presented below:
  - Results of chemical analysis showed copper, lead, mercury, and nickel exceeding effects range low (ERL) in composite A and copper and mercury in composite C. No metals exceeded the effects range median (ERM) values. ERL's were exceeded for DDE (composite B), and total DDTs (B & C), Aroclor 1254 (A &C), and fluorine (A, B, & C). The only exceedances of an ERM value were for DDE (A & C) and total DDT (A). Total speciated butyltins ranged from 36 to 132 micrograms per kilogram (µg/kg, Kinnetic Laboratories/ToxScan, Inc. 2003). Elutriate chemistry analysis found concentration of metals below chronic Criterion Continuous Concentration (CCC) screening criteria in all three composite samples. Tributyltin concentrations slightly exceeded the CCC criterion in composites A and B and background water sample. No organic compounds were detected in composite elutriate or background samples. No toxicity was observed in SP (*Nephtys* and *Ampelisca*) toxicity tests. Similarly SPP toxicity tests showed

no significant toxicity to *Americamysis*, *Menidia*, or *Mytilus*, with the exception of composite A which showed slight toxicity to *Mytilus*. Bioaccumulation potential (BP) tests conducted with *Nereis virens* showed no significant uptake of contaminants. BP tests conducted with *Macoma nasuta* showed elevated tissue concentrations of copper and zinc (composites A&C) and DDE, Aroclor 1254, benzo(b)fluoranthene, benzo(a)pyrene, pyrene, and total PAHs (all three composites) relative to LA-2 and Pier 400 reference samples (Kinnetic Laboratories/ToxScan, Inc. 2003). Dredged material was determined suitable for ocean disposal but ultimately placed at Anchorage Road.

2. SAMPLING AND ANALYSIS DESIGN

Representative dredged material samples for this Project were characterized as two composites to establish suitability for ocean disposal or other potential management alternatives. As previously indicated, all samples were tested in accordance with applicable procedures outlined in the OTM (USEPA and USACE 1991), ITM (USEPA and USACE 1998) and UTM (USACE 2003).

Based on results of prior evaluations conducted in the project vicinity a phased approach was used to characterize the dredged material. This phased approach included an initial expedited analysis of sediment chemistry to establish whether additional Tier III biological testing was warranted. If sediment chemistry results suggested additional testing was warranted (i.e., low to moderate levels of contaminants in the project sediments) then sediment toxicity tests with a sensitive marine amphipod species were conducted. If results of the 10-day amphipod tests showed no significant toxicity then the remaining Tier III sediment toxicity tests (marine worm), elutriate toxicity tests (fish, bivalve, and crustacean) and bioaccumulation potential tests (bivalve and worm) were conducted in accordance with the OTM (USEPA/USACE, 1991).

Based on results of the chemical analysis, a determination was made, in conjunction with POLA staff, to continue with additional Tier III sediment toxicity testing to establish suitability for ocean disposal. Chemical elutriate analysis was also performed to establish potential water quality compliance at the Project site during dredging operations. Should the material be deemed suitable for ocean disposal, it will be placed at the LA-2 ODMDS (Figure 1). If the material is determined to be unsuitable for ocean disposal, it will undergo additional total threshold limit concentration (TTLC) analysis and managed in an upland setting. As noted above, based on initial results of chemistry it was decided to determine suitability for ocean disposal, and TTLC analysis has not yet been deemed necessary.

In addition to the dredged material samples, samples of z-layer material (i.e., material just beyond the proposed Project depth plus overdredge allowance) intended to be representative of the post-dredge sediment surface were collected from each sampling location and archived frozen for subsequent analysis should it be required.

2.1 Overview of Field Sampling Design

2.1.1 Project Areas and Sampling Locations

Two dredging areas (Berths 226-228 and 230-232) and one maintenance dredging area (Berth 229) are located at the Everport Terminal (Figure 2). The northernmost dredging area (Berths 226-228) begins at the northern edge of Berth 226 and extends south 1,400 ft to the maintenance dredging area (Project depth of -53 ft MLLW). The maintenance dredge area (Berth 229) extends south 280 ft in length and will be maintained to -45 ft in depth. The southernmost dredging area (Berths 230-232) extends 1,400 ft in length from the maintenance dredging area with a Project depth of -47 ft. All three dredge areas extend 50 ft from the bulkhead line.

For purposes of this evaluation, the Project has been subdivided into two separate dredged material management units (DMMUs), as shown in Figure 2. DMMU-1 extends from Berth 229 to 232 and has a proposed Project depth of -47 ft MLLW. The maintenance dredging area (Berth 229) has been grouped with Berths 230-232 as part of DMMU-1 to simplify the Project design. The portion of DMMU-1 within the maintenance dredging area has a Project depth of -45 ft MLLLW. DMMU-2 includes that portion of the Project fronting Berths 226-228 with a proposed Project depth of -53 ft MLLW. An estimated total volume of approximately 33,300 cubic yards (cy) of sediment are to be removed as part of the proposed Project, including a 2-foot overdredge allowance. This amount consists of 25,000 cy, 7,000 cy, and 1,300 cy of dredged material from dredging areas at Berths 226-228, Berths 230-232, and Berth 229, respectively. Storm drains are also shown in Figure 2.

Details on sampling and analysis methods can be found in ENVIRON (2014) Sampling and Analysis Plan (SAP) for Berths 226-232 in Support of the Everport Container Terminal Improvements Project, Los Angeles Harbor. In brief, three sediment samples were obtained for the evaluation, two composite samples from the Project area, and one from a reference area:

- Sampling locations (Table 1, Figure 2) were located with a Furuno Wide Area Augmentation System (WAAS) enabled Differential Global Positioning System (DGPS) GP-37 which uses US Coast Guard differential correction data and has 10-foot accuracy.
- One composite sediment sample was obtained from each of the two DMMUs (composite samples IDs DMMU-1 and DMMU-2). Each composite sample contained material obtained from five stations within each DMMU (A1-A5 for DMMU-1, B1-B5 for DMMU-2). The ten stations are shown in Figure 2. Sediment cores from Stations B1-B5 were collected October 28 & 29, 2014. Sediment cores from Stations A1-A5 were collected March 26th and 27th 2015. Initially, the project plans included sampling both DMMUs in October of 2014, however the presence of vessels in Berths 229 to 232 prevented sampling of DMMU-1 from occurring until March, 2015. Due to long time period between sampling events, two samples of reference sediment from the dedicated LA-2 reference location were taken. Results from each DMMU will be compared to the reference sediment sample taken at the time of DMMU sampling.
- An electric vibracore operated by Aquatic Blue Environmental was used to collect sediment core samples. Vessel support was provided by SeaVentures. Sediment cores were collected to Project depth plus two ft unless refusal was encountered. Refusal is defined as less than 6 inches of penetration over a 5 minute interval. Samples collected within DMMU-1 (e.g., composite ID DMMU-1) required four sediment cores and/or locations while samples collected within DMMU-2 (e.g., composite ID DMMU-2) required two sediment cores to meet the required sample composite volume of approximately 107 to 117 liters (L). No stratification was present in core samples. Bathymetry was confirmed with a lead line at each individual station.
- One composite sample was obtained via pipe dredge from the LA-2 designated reference station (33 degrees 33.02 minutes north, 118 degrees 10.08 minutes west, Figure 1) along the 620 foot depth contour on October 27, 2014 for

comparison to DMMU-2 results. A second composite sample was taken on March 25, 2015 for comparison to DMMU-1 results.

- In addition to sediment, 40L of site water was collected from one location within each of the two Everport Project areas (DMMU-1 and DMMU-2) for elutriate testing.

2.1.2 Archive Samples

A subsample of each composite as well as homogenized material from each individual sampling location was archived frozen should additional analysis be required (e.g. for purposes of spatial delineation).

Additionally, samples of z-layer material (material just beyond the proposed Project depth plus overdredge tolerance) from each sampling location was collected when sufficient penetration was achieved and composited for each sampling location and DMMU and then archived frozen for subsequent analysis should it be required to establish quality of the post-dredged sediment surface. These z-layer samples were collected from 0.5 ft below the overdredge depth.

2.2 Phased Approach for Sample Analysis

A phased approach was recommended for establishing suitability of the dredged material for ocean disposal or upland placement to avoid unnecessary testing and/or expenditure of resources. The phased approach is described in detail in ENVIRON (2014).

2.3 Bioassay Testing Design and Methodology

The material under consideration for ocean disposal was tested using criteria outlined in ENVIRON (2014) and in accordance with the Ocean Testing Manual (OTM; USEPA/USACE 1991), and the Inland Testing Manual (ITM; USEPA/USACE 1998). Biological analysis with reference sediments was performed concurrently with the test sediment evaluations (when appropriate). All testing was conducted at Ramboll Environ's Port Gamble Laboratory (Port Gamble, WA) and followed the quality control objectives consistent with the National Environmental Laboratory Accreditation Program (NELAP, accreditation number 05051).

Temperatures of all DMMU-2 samples for were 0.0 – 7.7ºC upon receipt with ice present in all coolers. Temperatures of all DMMU-1 samples were 0.9 – 9.6 ºC upon receipt with ice present. Sediment and site water samples were stored in a walk-in cold room at 4 ± 2 ºC in the dark. Testing was conducted within the recommended eight-week (56 days) holding time calculated from the time of core sampling. Samples were evaluated in accordance with procedures outlined in the OTM (USEPA/USACE 1991) to establish suitability for ocean disposal and the more recent procedures described in the ITM (USEPA/USACE 1998). This program included bioassay analysis of one area composite sample and one reference sample for each DMMU evaluated (2 total DMMUs). Appropriate laboratory control samples (positive and negative) and reference samples (when applicable) were run with each of the selected test species. Bioassay testing for this project consisted of three water-column bioassays, two whole sediment bioassays, and three whole sediment bioaccumulation potential tests. The bioassays conducted in support of this project are summarized in Table 2.

2.3.1 Whole Sediment Bioassays

Benthic tests were performed to estimate the potential impact of ocean disposal of dredged material on benthic organisms that attempt to re-colonize the area. Sediment was tested in 10-day tests using two species: the polychaete, *Neanthes arenaceodentata,* and the amphipod, *Ampelisca abdita.*

The amphipods, *A. abdita,* were obtained from two different suppliers: Brezina and Associates in Dillon Beach, CA for tests with DMMU-2 and Aquatic Research Organisms in Hampton, New Hampshire for tests with DMMU-1. Animals for both DMMUs were held at 18°C prior to testing. Native sediment from the animal collection site (San Rafael, CA for DMMU-2 and Seabrook, New Hampshire for DMMU-1) was provided by the supplier for use as the control sediment in this test. Polychaete worms (*N. arenaceodentata*) were supplied by Aquatic Toxicology Support LLC in Bremerton, WA. Juvenile polychaetes were held in seawater at 20°C. Cultures of this organism are maintained in the absence of sediment and do not have an available "native" sediment for use as a control matrix. Control sediment used in the benthic polychaete test was the same as used for the *A. abdita*; a frequently used matrix known to support successful survival and growth.

Benthic tests were conducted as 10-day static exposures with five replicates for each test treatment, the reference, and control sediment. Two centimeters (cm) of sediment (approximately 175 milliliters, mL) were placed into each 1-L glass chamber with 775 mL of overlying water. Trickle-flow aeration was provided through glass pipettes, and care was taken to avoid disturbing the sediment surface. Test chambers were placed into randomly assigned positions and allowed to equilibrate to test conditions overnight.

Immediately prior to test initiation, water quality measurements were taken in one surrogate chamber for each test treatment and included dissolved oxygen (DO), temperature, salinity, and pH. To initiate the test, test organisms were randomly allocated to each of the test chambers. Initial stocking densities were 10 organisms per test chamber for the polychaete test, and 20 organisms per test chamber for the amphipod test.

During the test, water quality was monitored in a single water quality surrogate chamber per treatment, daily. No food was provided during the 10-day exposures. Ammonia was measured in both interstitial (pore water) and overlying water at initiation and termination. These measurements were made from a surrogate chamber for each test treatment. Sediment pore water was extracted via centrifugation. All water quality instruments were calibrated daily or on their recommended schedule. Records of instrument calibration were retained in the laboratory logs.

At test termination, the sediments were carefully sieved to remove the test organisms and survivorship assessed using methods described in the OTM (USEPA/USACE 1991). To evaluate the relative sensitivity of the organisms, reference toxicity tests were performed using standard reference toxicants (Lee 1980).

2.3.2 Water-Column Bioassays

Water-column tests were performed to estimate the potential impact of dredged material disposal to organisms that live in the water column. The water-column tests were performed using a 4:1 dilution by volume of site water (DMMU-2-Water-PG or DMMU-1-Water-PG) to sediment. For elutriate preparation, sediment from each project composite was combined with site water, vigorously agitated for 30 minutes, and then allowed to settle for approximately one hour at room temperature (16–18°C). Following settling, the supernatant was gently decanted. This supernatant represents the 100% test concentration. Subsequent test dilutions were created by mixing laboratory seawater (0.45 µm filtered north Hood Canal seawater) with the 100% supernatant for the water-column tests. Three species were tested: *Americamysis* (formerly *Mysidopsis*) *bahia* (mysid shrimp), *Menidia beryllina* (inland silverside fish), and *Mytilus galloprovincialis* (bay mussel) larvae.

Mysid shrimp (*A. bahia*) and inland silverside fish (*M. beryllina*) were supplied by Aquatic BioSystems in Fort Collins, Colorado. Mysids and fish were held at 20°C and fed *Artemia nauplii* ad libitum prior to testing.

Adult mussels (*M. galloprovincialis*) were supplied by Taylor Shellfish in Shelton, Washington. Mussels were held in seawater at 16°C prior to spawning for collection of gametes.

The water-column tests with mysid shrimp and fish were performed with dilutions of 100%, 50%, and 10% elutriate mixtures as well as a clean seawater control and a site water control. The fish and mysid tests were performed under static conditions (non-renewal). Ten animals were used per replicate with five replicates per elutriate concentration. These tests were run for 96 hours.

The bivalve larval development test was run using sample elutriates of 100%, 50%, 10%, and 1% concentrations along with a clean seawater control and site water control. There were five replicates per elutriate concentration. The test was terminated between 48 – 96 hours to ensure proper development of the bivalve larvae to the D-hinge prodissoconch stage in the control. At the termination of the study, survival and normal development were compared between the control and test groups to determine if significant mortality or abnormal development occurred.

Daily water quality monitoring of test chambers was carried out for pH, dissolved oxygen, salinity, and temperature. Ammonia was analyzed at the start and end of the tests in all concentrations. All water quality instruments were calibrated daily or on their recommended schedule. Records of instrument calibration were retained in the laboratory logs. To evaluate the relative sensitivity of the organisms, reference toxicity tests were performed using standard reference toxicants (Lee 1980).

2.3.3 Bioaccumulation Potential Testing

Assessment of bioaccumulation potential was carried out using the polychaete worm *Neanthes* (formerly *Nereis) virens* and the bivalve *Macoma nasuta* over a 28-day test period.

The polychaetes *N. virens* were obtained from Aquatic Research Organisms Inc. in Hampton, New Hampshire. Organisms were acclimated to and held at 14°C prior to testing. Native *N. virens* sediment from the Damariscotta River, Boothbay Harbor,

Maine was provided by Aquatic Research Organisms for use as the control sediment in the polychaete test. The bivalves *M. nasuta* were supplied by J & G Gunstone in Discovery Bay, Washington and held at 14°C prior to testing. Native *M. nasuta* sediment from Discovery Bay, Washington was provided by J & G Gunstone for use as the control sediment in the bivalve test. These control sediments have been routinely tested in conjunction with their respective organisms at this laboratory, as well as many other bioassay laboratories. Results of historical testing have demonstrated acceptable organism health and sediment quality.

The bioaccumulation assessment was performed in 10-gallon aquaria modified with overflow standpipe water ports. Chambers were loaded with 4 – 5 liters of sediment to a depth of 4 – 5 cm, and supplied with a continuous seawater supply through an adjustable valve. Chambers were filled with approximately 18.5 L of overlying water to the level of the overflow standpipe, and the flow was maintained at a minimum of 6 water exchanges per day (111 L/day). Aeration was supplied to each chamber. For each DMMU, reference and test samples were initiated using five replicates while the control was started with three.

The test was conducted with both species (worm and clam) placed in separate chambers. Each chamber was initiated with 20 *N. virens* or 25 *M. nasuta*. The test chambers were maintained under flow-through conditions and water quality measurements were taken in one replicate of each test treatment daily. Water quality parameters included pH, salinity, temperature, dissolved oxygen, and water flow. All water quality instruments were calibrated daily or on their recommended schedule. Records of instrument calibration were retained in the laboratory logs. On Day 28 the sediment was sieved to remove the worms and clams. The surviving animals were placed in clean flow-through aquaria to purge their gut contents over 24 hours. Following depuration the organisms were then placed into separate certified-clean glass sample jars, and frozen. Clam tissue was removed from the shell prior to collection and the worms were collected as-is. To establish background tissue concentrations, a sub-sample of test organisms was isolated prior to test initiation, allowed to depurate for 24 hours, and then frozen for chemical analysis. Tissue samples were shipped to Eurofins CalScience Environmental Laboratories, Garden Grove, CA. for subsequent analysis.

2.3.4 Seawater for Bioassay Testing

Seawater used in this study, including the flow-through studies, came from the northern Hood Canal at Port Gamble, Washington. This seawater source has been used successfully on similar bioassay testing programs by the contracting team. Extensive testing on a variety of test species has shown that there is no significant potential for toxicity or bioaccumulation from this water supply. Acceptable survival of organisms in control sediment has been achieved consistently in previous dredge material testing conducted by the laboratory. Chemical analyses of this water source resulted in no significant contaminants of concern or bioaccumulation potential. Seawater was passed through a sand filter prior to use in the laboratory. For non-flow-through tests, the water was also filtered to 0.45 micrometers (µm).

2.3.5 Data Management and Analysis

All water quality and endpoint data were entered into Excel spreadsheets. Water quality parameters were summarized by calculating the mean, minimum, and

maximum values for each test treatment. Endpoint data were calculated for each replicate and the mean value and standard deviation were determined for each test treatment.

All hand-entered data were reviewed for data entry errors, which were corrected prior to summary calculations. A minimum of 10% of all calculations and data sorting were reviewed for errors. Review counts were conducted on any apparent outliers.

Statistical comparisons were made according to the guidance in the OTM (USEPA/USACE 1991). Statistical comparisons were performed using CETIS™ software for all bioassay test results. Statistical comparisons of results of total PCBs in tissues following 28-day bioaccumulation tests were performed in Excel. Laboratory Quality Assurance and Quality Control (QA/QC) methods included calibration, control samples, standard reference materials, replicates, matrix spikes, matrix spike duplicates, surrogate spikes, method blanks, and internal standards, following standard analytical method guidelines. QA/QC reports were provided by the analytical laboratories and included a narrative of the standard QA/QC protocols. Ramboll Environ conducted data validation after receipt of lab reports and a data validation report is provided (Appendix C).

3. PHYSICAL AND CHEMICAL CHARACTERIZATION OF DREDGED MATERIAL

3.1 Results of Core and Sample Collection

Sediment core sampling occurred on October 29th and 29th 2014, and March 26th and 27th 2015. Core sample details including locations, water depth and core length are included in Table 1. Field notes from sampling events are included in Appendix A-1. Four cores from each of Stations A1 to A5, and two cores from each of Stations B1 to B5 were collected for physical, chemical and biological analysis. The number of cores/station within a given DMMU was determined on basis of the average sampling depth within the DMMU and the volume of material required for subsequent testing and analysis. An equal number of cores/station were collected within a given DMMU to ensure adequate spatial representation of the material to be dredged. Cores were characterized at the time of collection before compositing for sampling. Core logs are provided in Appendix A-2. Cores from all A stations were composited for sample DMMU-1 and cores from all B stations were composited into DMMU-2 for analysis. Station locations, water depths, penetration and core recovery for all samples are shown in Table 1. All cores from DMMU-1 met the -55 ft. MLLW project depth as well as the 2-ft of overdredge before refusal was met. Two cores from DMMU-2 did not have appropriate recovery and additional cores were taken to achieve required sample depth. Z-layer samples were collected from all stations in DMMU-1 and three stations (B1, B3 & B4) from DMMU-2. Equal amounts (approximately 6 inches) of Z-layer were composited for each DMMU. It was noted upon post-plotting of the sampling locations (after sample composites had been generated) that station B-1 fell just outside of DMMU-2 within the maintenance portion of DMMU-1. This occurred as a result of needing to relocate the station location in the field in order to identify an area above the proposed design depth. Because of the narrowness of the footprint (50ft), accuracy of the GPS ± 10 ft), and the accuracy of the location of the dredging Polygon (±10 ft) the sample was collected from a location just within DMMU-1 despite appearing to be just within DMMU-2 (based on visual reference in the field). Since the B-1 sample location is immediately adjacent to DMMU-2 and the chemical characteristics of DMMU-1 and DMMU-2 are nearly identical (see Table 3) we do not believe the inclusion of the B-1 sample in the composite affects the representativeness of the DMMU-2 sample for purposes of a Tier III evaluation.

3.2 Results of Physical and Chemical Analysis

3.2.1 Physical and Chemical Analysis

Composite samples from DMMU-1 and DMMU-2 were submitted for chemical and physical analysis under chain of custody (COC, Appendix A-3). Details regarding analytical methods, target detection limits, and target reporting limits are detailed in the SAP (ENVIRON, 2014). Result of physical and chemical analysis for bulk sediment from DMMU-1, DMMU-2 and both LA-2 reference site samples are shown in Table 3. All results are presented in dry weight unless otherwise noted. Sediment chemistry results were compared to ERL and ERM values (Long et al. 1995) to identify sediments with elevated concentrations and identify potential contaminants of concern. ERL and ERM values are based on synoptic sediment chemistry and

toxicity data and represent the 10th and 50th percentile of effects, respectively. ERL and ERM values cannot be used to infer causality or establish suitability for either ocean disposal or upland placement.

DMMU-1 sediments were predominantly sand (79%), with smaller contributions of silt (16%) and clay (5%). Chemistry results indicated exceedances of ERL's for copper, mercury, 4,4'-DDE, total DDTs, and total PCBs. The LA-2 reference sample collected concurrently with DMMU-1 sampling, also showed ERL exceedances for 4,4'-DDE and total DDTs. There were no ERM exceedances in the DMMU-1 composite (Table 3).

DMMU-2 sediments were predominantly silt (59%) with some sand (26%) and clay (16%). Chemistry results indicated ERL exceedances for arsenic, copper, nickel, 4,4'-DDE, total DDTs, and total PCBs. ERL values for 4,4'-DDE and total DDTs were also exceeded in the reference sample for LA-2 collected concurrently with DMMU-2 sampling. No analytes in the DMMU-2 sample exceeded their respective ERM values (Table 3).

3.2.2 Dredging Elutriate Testing (DRET)

Results of the DRET for DMMU-1 and DMMU-2 were compared to the USEPA Criterion Continuous Concentration (CCC) value for protection of aquatic life in saltwater (Table 4). Elutriate from DMMU-1 sediment showed detectable levels of some metals and organotins; no semi-volatile organics, PCBs, or pesticides detected above method detection limits. All detected analytes were below the CCC values. Elutriate from DMMU-2 showed detectable levels of some metals, but all were below their respective CCC values. No semi-volatile organics, PCBs, pesticides or organotins were detected in the DMMU-2 elutriate.

3.3 Results of Biological Analyses

3.3.1 Solid Phase Testing

3.3.1.1 *Ampelisca abdita*

The benthic tests with *A. abdita* were initiated on November 14, 2014 (DMMU-2) and April 9, 2015 (DMMU-1). For both DMMUs, the test was validated by 97% survival in the native control sample; meeting the acceptability criterion of ≥90% survival. Mean survival for all samples is summarized in Table 5.1. Summaries of water quality measurements, ammonia concentrations, and test conditions are presented in Appendix B-1.

Measurements of dissolved oxygen, salinity, and pH were within the recommended limits during the test for both DMMUs. For each DMMU, a reference-toxicant test (positive control) was performed on the group of test organisms utilized. The median lethal concentration (LC50) values were within control chart limits (±2 standard deviations from the laboratory historical mean). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested.

Ammonia concentrations observed in the *A. abdita* tests are summarized in Appendix B-1.2. All values were well below the No Effects Concentration (NOEC) value derived from the concurrent ammonia reference-toxicant test. This indicates

that ammonia concentrations within the sediment samples should not have been a contributor to any adverse biological effects observed in the test treatments.

Mean survival within the project sediments were 79% for DMMU-2 and 98% for DMMU-1. The mean survival of sample DMMU-2 was statistically different than that of the associated LA-2 reference treatment. Mean percent survival in all treatments were within 20% of the associated reference (94% for DMMU-2 and 96% for DMMU-1), indicating that the test treatments met the limiting permissible concentration for benthic toxicity establishing suitability of the material for ocean disposal as defined in the OTM (USEPA/USACE 1991).

Based on results of the 10-day tests with *A. abdita* and in accordance with the phased approach outlined in the approved SAP (ENVIRON, 2014) additional Tier III testing was performed.

3.3.1.2 *Neanthes arenaceodentata*

The benthic tests with *N. arenaceodentata* were initiated on December 5, 2014 (DMMU-2) and April 24, 2015 (DMMU-1). The test was validated by 100% survival in the control sample for DMMU-2 and 96% for DMMU-1, meeting the acceptability criterion of ≥90%. Mean survival for all samples is summarized in Table 5.2. Summaries of water quality measurements, ammonia concentrations, and test conditions are presented in Appendix B-2.

Measurements of dissolved oxygen, temperature and pH were within the recommended limits during the test. For each DMMU, a reference-toxicant test (positive control) was performed on the group of test organisms utilized for this study. The LC50 value was within control chart limits (±2 standard deviations from the laboratory historical mean). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested.

Ammonia concentrations observed in the *N. arenaceodentata* test are summarized in Appendix B-2.2. All values were below the NOEC values derived from the concurrent ammonia reference-toxicant tests. This indicates that ammonia concentrations within the overlying or interstitial water should not have been a contributor to any adverse biological effects observed in the test treatments.

Mean survival in the LA-2 reference sample was 100% (in the test with DMMU-2) and 96% in the test with DMMU-1. Mean survival in the project sediments was 94% for both DMMU-2 and DMMU-1. Mortality in the test sediments did not exceed that in the reference samples by more than 10%; therefore, all samples met the limiting permissible concentration (LPC) for benthic toxicity establishing suitability of the material for ocean disposal as defined in the OTM (USEPA/USACE 1991).

3.3.2 Suspended Particle Phase Testing

3.3.2.1 *Americamysis bahia*

Water-column tests with *A. bahia* were initiated on December 5, 2014 (DMMU-2), and April 29, 2015 (DMMU-1). The tests were validated with 90% and 100% survival in the seawater control, meeting the acceptability criterion of ≥90%. Mean survival for all samples is summarized in Table 5.3. Summaries of water quality measurements, ammonia concentrations, and test conditions are presented in Appendix B-3.

All water quality parameters were within the target limits throughout the duration of the 96-hour test except minor deviations in salinity during the test of DMMU-1 due to slightly more saline site water. These deviations were within the tolerance ranges for this species, and, as evidenced by a lack of adverse effects for the test sample and site water control, would not be expected to affect the test results.

For each DMMU, a reference-toxicant test (positive control) was performed on the group of test organisms utilized. The LC50 values were within control chart limits (±2 standard deviations from the laboratory historical mean). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested.

Ammonia concentrations observed in the *A. bahia* test are summarized in Appendix B-3.2. The concurrent ammonia reference-toxicant derived NOEC was 13.1 mg/L (total ammonia) for tests with DMMU-2 and 21.8 milligram per liter (mg/L) (total ammonia) for tests with DMMU-1. Adverse biological effects due to ammonia would not be expected at or below this level within the prepared elutriates. Given that all measured elutriate samples were below 3.67 mg/L for tests with DMMU-2 and 0.630 mg/L for DMMU-1, ammonia was not expected to contribute to any observed negative biological effects.

Mean percentage survival in the 100% elutriate concentrations for both DMMUs was greater than or equal to 90% and the estimated LC50 value for all treatments was >100%. Statistical comparison of the treatments to the control survival for the 100% concentrations resulted in no significant differences.

3.3.2.2 *Menidia beryllina*

The water-column tests with *M. beryllina* was initiated on December 5, 2014 for DMMU-2 and April 29, 2015 for DMMU-1. The tests were validated by 90% survival in the seawater control for DMMU-2 and 98% survival for DMMU-1, meeting the acceptability criterion of ≥90%. Mean survival for all samples is summarized in Table 5.4. Summaries of water quality measurements, ammonia concentrations, and test conditions are presented in Appendix B-4.

Measurements of water quality parameters were within the recommended limits during the test for DMMU-2 while there were minor deviations in salinity during DMMU-1 testing. This was due to slightly more saline site water. However, mean survival in both the site water control and test sample were equal to or greater than that seen in the lab control, suggesting that no adverse effects were caused by salinity differences.

For each DMMU, a reference-toxicant test (positive control) was performed on the group of test organisms utilized for this study. The LC50 value was within control chart limits (±2 standard deviations from the laboratory historical mean). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested.

Ammonia concentrations observed in the *M. beryllina* elutriate test are summarized in Appendix B-4.2. The concurrent ammonia reference-toxicant derived NOEC was 12.9 mg/L (total ammonia) for DMMU-2 and 23.6 mg/L for DMMU-1. Adverse biological effects due to ammonia would not be expected at or below this level within the prepared elutriates. Given that the highest measured total ammonia

value was <2.61 mg/L for DMMU-2 and <0.154 mg/L for DMMU-1, ammonia was not expected to contribute to any observed negative biological effects with this species.

Mean percentage survival in the 100% elutriate concentrations was 98% for DMMU-1 samples and 72% for DMMU-2 samples. The estimated LC50 value for all treatments was >100% for both DMMUs. Statistical comparison of the treatments to the control survival for the 100% concentrations resulted in no significant differences for DMMU-1; DMMU-2 was significantly different than controls.

3.3.2.3 *Mytilus galloprovincialis*

The water-column tests with *M. galloprovincialis* were initiated on November 19, 2014 (DMMU-2) and April 30, 2015 (DMMU-1). The test met the acceptability criteria for proportion normal and survival (summarized in Table 5.5). The combined proportion normal endpoint data for all samples are summarized in Table 5.6. A summary of water quality measurements, ammonia concentrations, and test conditions are presented in Appendix B-5.

Measurements of water quality parameters were within the recommended limits during the test for DMMU-2 with slight deviations in salinity. For the test with DMMU-1, water quality parameters were within the recommended range during the test with slight deviations in temperature. In both instances, these deviations were within the tolerance ranges for this species, and, as evidenced by a lack of adverse effects for the test sample and site water control, would not be expected to affect test results. The embryo stocking density achieved in this test for DMMU-2 was 31.9 embryos/mL of test solution and 26.0 embryos/mL for DMMU-1. This density was near the recommended density of 15 – 30 embryos/mL and below the limit of 50 embryos/mL.

For each DMMU, a reference-toxicant test (positive control) was performed on the group of test organisms utilized for this study. The LC50 value was within control chart limits (±2 standard deviations from the laboratory historical mean). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested.

Ammonia concentrations observed in the *M. galloprovincialis* elutriate test are summarized in Appendix B-5.2. The concurrent ammonia reference-toxicant derived NOEC was 1.30 mg/L total ammonia for the test with DMMU-2 and 0.755 for DMMU-1. Adverse biological effects due to ammonia would not be expected at or below this level within the prepared elutriates. The highest measured total ammonia value in the test was 1.08 mg/L for DMMU-2, which fell below the expected threshold criterion. While the highest total ammonia value measured for the test of DMMU-1 was 0.953 mg/L in the highest concentration (slightly higher than the expected threshold), no significantly adverse effects were detected; mean combined normal development was 98.8%.

Mean combined percent normal development in the 100% elutriate concentrations were 92.3% for DMMU-2 and 98.8% for DMMU-1. The estimated median effective concentration (EC50) value for all treatments in both DMMUs was >100%.

Statistical comparison of the control to the 100% elutriate concentration for the normal development endpoint indicated no significant differences for either DMMU.

3.3.3 Bioaccumulation Potential Testing

Assessment of bioaccumulation potential (BP) was determined by a 28-day exposure to the treatment samples. The bioaccumulation test was conducted with the polychaete *Neanthes virens* and the clam *Macoma nasuta* in separate chambers. Following the laboratory exposures, the gut contents of the test organisms were purged for 24-hours in clean seawater in the absence of sediment. *M. nasuta* were then briefly rinsed under clean seawater and then shucked for tissue collection, placed in certified pre-cleaned glass jars and frozen. *N. virens* organisms were also briefly rinsed under clean seawater and placed in certified pre-cleaned glass containers and frozen. Tissues were shipped to Eurofins CalScience Environmental Laboratories in Garden Grove, California for subsequent chemical analysis. The tissues samples supplied for analysis included the reference samples, all project samples, and pre-exposure samples (Pretest) for both species.

The 28-day bioaccumulation tests were initiated on December 9, 2014 (DMMU-2) and May 1, 2015 (DMMU-1). Mean survival in the DMMU-2 control sample was 96.7% for *N. virens* and 84.0% for *M. nasuta*, while that in the DMMU-1 control sample was 100% for *N. virens* and 93.3% for *M. nasuta*. In the test of DMMU-2 the LA-2 reference sample survival was 98.0% for *N. virens* and 96.8% for *M. nasuta*. Reference sample survival for the test of DMMU-1 was 99.0% for *N. virens* and 99.2% for *M. nasuta*. Survival in the DMMU-2 test sample was 96% for *N. virens* and 93.6% for *M. nasuta*. DMMU-1 test sample survival was 98.0% for *N. virens* and 96.8% for *M*. *nasuta*. Mean survival for all samples is summarized in Table 5.7. Summaries of water quality measurements and test conditions are presented in Appendix B-6.

Water quality parameters were within the target limits throughout the duration of the test. Mean percent survival in all treatments met the limiting permissible concentration for benthic toxicity as defined in the OTM (USEPA/USACE 1991).

Following 28-day exposures, tissue samples for *N. virens* and *M. nasuta* were frozen and shipped to Eurofins CalScience in Garden Grove, CA where they were analyzed for PCBs and percent lipids. A determination to analyze tissue samples for PCBs only based on the sediment chemistry results was made in consultation with the Port of Los Angeles and the CSTF. For BP test of DMMU-2 tissue, samples were analyzed under EPA 8270SIM as outlined in ENVIRON (2014). EPA 8270SIM is a low resolution method reporting a reduced number of congeners. Due to changes in lab management practices and available methods, tissue samples from the BP test conducted on DMMU-1 samples was run under EPA 1668C. EPA 1668A is a high resolution method reporting all 209 PCB congeners. To allow better comparison between DMMU-1 and DMMU-2 samples, EPA 1668C was modified to report a similarly reduced number of congeners but with lower Method Detection Limits. This approach was determined in consultation with the Port of Los Angeles and the CSTF.

3.3.3.1 *N. Virens* Bioaccumulation Potential Test

N. virens tissue samples for DMMU-1 and DMMU-2 were submitted to Eurofins for PCB analysis.

Analytical results of tissue exposed to DMMU-1 and LA-2 reference sediments are presented in Table 6.1. PCB congeners were detected in *N. virens* tissue samples from both DMMU-1 (ranging from 4.8 to 7.7 µg/kg) and the LA-2 reference sediment (ranging from 0.51 to 1.26 µg/kg).

Analytical results of tissue exposed to DMMU-2 and LA-2 reference sediments are presented in Table 6.2. PCB congeners were detected in *N. virens* tissue samples from both DMMU-2 (ranging from 2.99 to 7.6 µg/kg) and the LA-2 reference sediment (ranging from 0.59 to 0.94 µg/kg).

Concentrations in tissues from DMMU-1 and DMMU-2 exposed *N. virens* were compared to results of tissues exposed to reference sediment using a non-parametric Mann Whitney U Test (also known as the Wilcoxson Sign Rank test) for non-normally distributed, independent sample populations compared on means. Results indicate tissue samples exposed to both DMMU-1 and DMMU-2 are statistically significant relative to LA-2 reference exposed organisms (Table 7).

3.3.3.2 *M. Nasuta* Bioaccumulation Potential Test

Analytical results of tissue exposed to DMMU-1 and LA-2 reference sediments are presented in Table 6.1. PCB congeners were detected in *M. nasuta* tissue samples exposed to both DMMU-1 (ranging from 9.2 to 12.35 µg/kg) and the LA-2 reference sediment (ranging from 0.33 to 0.72 µg/kg).

Analytical results of tissue exposed to DMMU-2 and LA-2 reference sediments are presented in Table 6.2. PCB congeners were detected in *M. nasuta* tissue samples from both DMMU-2 (ranging from 12.97 to 14.57 µg/kg) and the LA-2 reference sediment (ranging from 1.83 to 2.29 µg/kg).

Concentrations in tissues from DMMU-1 and DMMU-2 exposed *M. nasuta* were compared to results of tissues exposed to reference sediment using a non-parametric Mann Whitney U Test (also known as the Wilcoxson Sign Rank test) for non-normally distributed, independent sample populations compared on means. Results indicate tissue samples exposed to both DMMU-1 and DMMU-2 are statistically significant relative to LA-2 reference exposed organisms (Table 7).

3.3.4 Screening Level Risk Assessment for PCBs in *N. Virens* and *M. Nasuta*

3.3.4.1 Potential Effects in Invertebrates

Results of the tissue analyses indicated that the mean concentrations of total PCBs detected in tissues from *N. virens* and *M. nasuta* exposed to DMMU-1 and DMMU-2 sediments were significantly elevated compared to their respective LA-2 reference samples.

Because there is evidence that PCB concentrations in tissues may not reach steady state equilibrium within the 28 day BP test, it was necessary to estimate the steady state tissue concentrations. This was accomplished by applying conservative steady state correction factors reported by Kennedy et al (2010) to the highest, steady state corrected, mean PCB tissue concentration measured among all of the

composites evaluated as part of this project. As detailed in Kennedy et al. (2010), *N. virens* likely reach steady-state within 28 days and do not require the application of a correction factor. *M. nasuta* do not likely reach steady state within the 28 day exposure period, and require the application of a correction factor. In order to present a conservative approach, the upper 95% confidence limit of 1.31 was utilized as the correction factor to estimate steady state in tissues from *M. nasuta*. This correction factor was applied to *M. nasuta* concentrations of total PCBs and the highest concentration of total PCBs in tissues from both DMMUs was used for the risk assessment. Steady state concentrations are shown in Table 8.

Steady-state corrected concentrations of total PCBs in *N. virens* and *M. nasuta* were initially compared to Food and Drug Association (FDA) action limit (the limit at or above which the FDA will take legal action to remove products from the market) to establish potential Human Health risk as well as to the lowest applicable effects level in the Environmental Residue Effects Database (ERED), to assess potential risks to benthic invertebrates from PCBs in DMMU-1 and DMMU-2 sediments.

The FDA Action Limit for PCBs in edible portions of fish and shellfish is 2,000 µg/kg (US FDA, 2014). Concentrations of PCBs in both *N. virens* and *M. nasuta* are two orders of magnitude lower than the limit value.

The ERED contains values for a wide range of biological effects to a variety of organisms, from cellular to whole-body effects. Comparisons to ERED data were made using relevant effects values from species that were as taxonomically and ecologically similar to those organisms (i.e., marine bivalves and polychaetes) used in the bioaccumulation testing as possible. The lowest relevant effects value in the ERED was 1,700 µg/kg wet weight – a dose corresponding to a no effects concentration for burrowing, weight or mortality in *M. nasuta*. This value is several orders of magnitude higher than the levels observed in tissues of organisms exposed to DMMU-1 and DMMU-2 sediments indicating that there is little to no possibility for direct effects due to PCBs in the exposed organisms. No data was available in ERED for marine polychaete worms, there was data for the freshwater tubificid worm, *Lumbriculus variegatus*, with a NOEC value of 10,000 µg/kg for a survival endpoint well above concentrations observed in test organisms exposed to project sediments.

3.3.4.2 Potential Effects in Consumers

Since PCBs are known to bioaccumulate in marine food webs, the potential risks to marine life and human health associated with bioaccumulation of PCBs and potential transfer via the food web were also evaluated.

Higher trophic levels evaluated included humans consuming fish, as well as predatory fish and their consumers. A variety of demersal fish are commonly found off the coast of California in the LA-2 ODMDS. For the purposes of this risk assessment, Slender sole (*Lyposetta exilis*) and Pacific sanddab (*Citharichthys sordidus*) were selected as representative species. These species have been commonly identified and are abundant in the LA-2 ODMDS (USEPA Region 9, 1987). These species primarily feed on zoobenthos and small fish. Pacific sanddab and slender sole are commonly consumed by humans and other piscivorous

predators. The California sea lion (*Zalophus californianus*) was selected as a marine mammal receptor.

Concentrations of total PCBs in fish were predicted from the highest observed tissue concentration in invertebrate samples and food chain multipliers (FCM) derived for total PCBs (USEPA, 2000a). Conservative FCMs of 13.3 and 24.7 were used to predict concentrations in fish (trophic level 3) and marine mammals (trophic level 4) for total PCBs with an average log K_{OW} value of 6.9 (USEPA, 2000).

Potential Risks to Fish

The modeled concentration of PCBs in fish from ingestion of *M. nasuta* exposed to site sediments is 257 µg/kg and does not indicate a potential risk to fish (Table 8). This concentration is lower than the lowest relevant effects concentration of 7,100 µg/kg PCBs found in the ERED, which represents the concentration at which growth of the winter flounder *Pleuronectes americanus* was reduced.

Potential Risks to Marine Mammals

Predicted concentrations of total PCB in California Sea Lions from ingestion of *M. nasuta* exposed to site sediments is 477 µg/kg (Table 8). Results for PCBs were compared to toxicity reference values (TRVs) for Harbor seals – a surrogate for California Sea lion as no data were available. TRVs ranged from 1,300 µg/kg lipid (Mos et al. 2010) to 17,000 µg/kg lipid (Ross et al. 1996). Assuming 50% lipids in California Sea Lions (Kannan et al. 2004), the lipid normalized concentration of total PCBs is 1,016 µg/kg lipid – a value below all reported TRVs, indicating no significant risks to California Sea lions.

Potential Risks to Humans

Concentrations of total PCBs in Slender sole and Pacific sanddab were predicted to be 273.5 µg/kg (Table 8) – utilizing highly conservative assumptions such as 100% of the prey items consumed by these species were at the highest steady state adjusted tissue concentration observed in the BP tests with the material and applying conservative food chain multipliers to generate a worst case risk estimate. A comparison of the estimated concentration of total PCBs in selected fish species is well within the range of concentrations reported for fish in the region (USEPA Region 9, 2007). More than 20 species of fish were collected from the southern California coast, with total PCB concentrations ranging from 3 µg/kg to 347 µg/kg. Estimated concentration for Slender sole and Pacific Sanddab are also within the range more recently observed for White Croaker (2 to 516µg/kg) in the region (USEPA, 2014). For humans, the FDA tolerance level (the limit at or above which the FDA will take legal action to remove products from the market) for PCBs in edible portions of fish and shellfish is 2,000 µg/kg. USEPA fish consumption guidance is more conservative. For cancer health endpoints, calculated using a risk level estimating no more than one additional cancer case in a population of 100,000 persons, consumption limits range from less than 5.9 µg total PCBs/kg for unrestricted consumption to 380 µg total PCBs/kg for consumption of half a meal of fish (4 ounces) per month. For noncancer health endpoints (chronic, systemic effects), consumption limits range from less than 1.5 µg total PCBs/kg for unrestricted consumption to 94 µg PCBs/kg for consumption of half a meal of fish per month (USEPA 2000b). Comparison of these EPA values to the predicted worst

case estimates of total PCBs in fish (using overly conservative assumptions) suggests some potential risk associated with frequent consumption of fish exposed to project sediments through trophic transfer. However, it is important to note this worst case estimate was derived using a suite of highly conservative correction factors and assumptions and is not representative of a realistic exposure scenario. The highest tissue concentration observed in tests of the project material was adjusted to steady state using conservative correction factors, followed by application of conservative FCM factors to account for transference through the food web, finally it was assumed that 100% of the diet for the selected receptors was limited to the organisms exposed to the highest concentrations, further compounding the overall level of conservatism.

The LA-2 ODMDS is 6 miles off shore, with water depths ranging from 380 to 1,060 ft deep and contains a low abundance of benthic invertebrates, fish, and other higher trophic level species (US EPA Region 9, 1987), consequently it is unreasonable to assume that the selected receptors would consume only prey items exposed to the highest concentration for the project material within the ODMDS. The probability that trophic transfer of the highest concentrations of PCBs will occur across a complete exposure pathway under these assumed conditions is extremely low. Additionally, the conservative estimates of fish concentrations are within the reported background range for the region, therefore the placement of project sediments at LA-2 ODMDS would not result in an increase of current regional risk levels to consumers. Therefore these sediments present little to no risk to humans.

3.4 Quality Assurance / Quality Control

The quality assurance objectives described in the OTM (USEPA and USACE 1991), analytical laboratories' Quality Assurance Plans (QAPs), USEPA and USACE (1995), and Moore et al. (1994) were adhered to for accuracy and precision. Analytical laboratories conducted QA/QC as detailed by their respective laboratory quality control procedures and manuals including, but not limited to: standard method and operating procedures, calibration, internal QC, and preventative maintenance.

The quality assurance objectives for toxicity testing conducted by the testing laboratory are detailed in the OTM (USEPA/USACE 1991) and the laboratory's quality assurance plans (QAPs). These objectives for accuracy and precision involve all aspects of the testing process, including the following:

- Water and Sediment Sampling and Handling
- Source and Condition of Test Organisms
- Condition of Equipment
- Test Conditions
- Instrument Calibration
- Use of Reference Toxicants
- Record Keeping
- Data Evaluation

Each test species was evaluated in reference toxicant tests during the test period to establish the sensitivity of the test organisms. The reference toxicant LC50 or EC50 should fall within two standard deviations of the historical laboratory mean. Water quality measurements were monitored to ensure that they fell within prescribed limits.

The methods employed in every phase of the toxicity testing program are detailed in the Standard Operating Practices (SOP). All staff members receive regular, documented training in all SOPs and test methods. Finally, all data collected and produced as a result of these analyses were recorded on approved data sheets. If an aspect of a test deviated from protocol, the test was evaluated to determine whether it was valid according to the regulatory agencies responsible for approval of the proposed permitting action.

Analytical data was reviewed and verified by analytical laboratories and all data quality objectives were met. Final review was conducted by Ramboll Environ's quality assurance (QA) Officer and is included in Appendix C.

4. RECOMMENDATIONS AND CONCLUSIONS

Dredged material samples from DMMU-1 and DMMU-2 of the Everport Container Terminal Berths 262-232 were characterized for bulk chemistry, toxicity and bioaccumulation potential in accordance with procedures prescribed in the OTM (USEPA and USACE 1991) and ITM (USEPA and USACE 1998) to establish suitability for Ocean Disposal under Section 103 of the MPRSA. Results of this evaluation indicate the following:

- Chemical analysis of project samples showed no exceedances of ER-M values and few ER-L exceedances.
- Solid phase toxicity tests showed no toxicity to benthic invertebrates relative to reference indicating project material met the ocean disposal LPC for benthic toxicity.
- Suspended Particulate Phase Toxicity Tests showed no toxicity (i.e., calculated LC50 estimates all >100%) to water column organisms indicating project material met the ocean disposal LPC for water column toxicity.
- Results of bioaccumulation potential tests showed some uptake of PCBs relative to reference, however:
  - Steady state adjusted tissue residue concentrations were below FDA action limits and the lowest relevant tissue residue effect levels reported in the ERED for benthic invertebrates;
  - Application of conservative food chain multiplier factors to steady state adjusted invertebrate tissue concentrations showed projected tissue residues in fish consuming benthic invertebrates exposed to the highest concentration in the project material to be well below the lowest relevant tissue residue effect levels reported in the ERED for fish;
  - Conservatively projected fish tissue concentration was well within the range of regional fish tissue residue concentrations reported in the literature.
  - Projected tissue residues in marine mammals consuming 100% of their diet from organisms exposed to the highest concentrations were well below relevant published TRVs;
  - A conservative screening level risk assessment shows some elevated risk to humans associated with frequent consumption of fish whose diet is entirely benthic invertebrates exposed to the highest concentration of PCBs in the dredged material. However, the high level of conservatism utilized to develop a worst-case screening level risk estimate when taken in context of the disposal site characteristics indicates that the likelihood of a complete exposure pathway to humans is an extremely low-probability event. Consequently, ocean disposal of project material is expected to present little to no risk to humans.

Based on the results of this analysis, we recommend that the dredged material from Everport Berths 226-232 is suitable for placement at LA-2 Ocean Dredged Material Disposal Site.

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TABLES

Table 1. Core and Sample Information
Port of Los Angeles
San Pedro, California

Area and Composite ID	Station ID	Date Sampled	Latitude [1]	Longitude [1]	Project Depth [2] (ft. MLLW)	Core Attempt Number	Observed Water Depth (ft.)	Tide (ft.)	Actual Water Depth (ft. MLLW)	Target Core Length (ft.)	Penetration (ft. below mudline)	Final Core Length (ft.)	Final Core Length for Analysis (ft.)	Z-layer (cm)
DMMU-1	A1	3/26/2015	33°44.4875' N	118°16.4705' W	49	1	45.5	0.54	44.96	4	6.5	6.5	4.0	15.24 (station archive & DMMU composite)
						2	45.7	0.74	44.96	4	4	4.0	4.0	0
			33°44.4878' N	118°16.4627' W		3	45.8	0.88	44.9	4	4.5	4.5	4.0	15.24 (discarded)
			33°44.4897' N	118°16.4665' W		4	48.5	3.5	45	4	4	4.0	4.0	0
	A2	3/26/2015	33°44.5619' N	118°16.4160' W	49	1	47.9	1.9	46	3	3.5	3.5	3.0	15.24 (station archive & DMMU composite)
			33°44.5627' N	118°16.4159' W		2	48.1	2.1	46	3	3	3.0	3.0	0
			33°44.5620' N	118°16.4172' W		3	48.3	2.24	46	3	3.5	3.5	3.0	15.24 (discarded)
			33°44.5623' N	118°16.4165' W		4	48.4	2.37	46	3	4	4.0	3.0	30.48 (discarded)
	A3	3/26/2015	33°44.5812' N	118°16.4062' W	49	1	48.8	2.8	46	3	3.5	3.5	3.0	15.24 (station archive & DMMU composite)
			33°44.5816' N	118°16.4051' W		2	49	2.9	46	3	3.5	3.5	3.0	15.24 (discarded)
			33°44.5804' N	118°16.4070' W		3	49	3.01	46	3	3	3.0	3.0	0
			33°44.5802' N	118°16.4058' W		4	49.1	3.1	46	3	3.5	3.5	3.0	15.24 (discarded)
	A4	3/27/2015	33°44.6205' N	118°16.3853' W	49	1	47	2	45	4	6	5.8	4.0	15.24 (station archive & DMMU composite)
			33°44.6221' N	118°16.3803' W		2	46.4	1.4	45	4	4.8	4.8	4.0	0
			33°44.6227' N	118°16.3814' W		3	46.2	1.2	45	4	4	4.0	4.0	0
			33°44.6222' N	118°16.3910' W		4	46	1	45	4	4	4.0	4.0	0
	A5	3/27/2015	33°44.6838' N	118°16.3463' W	47	1	44.5	0.6	43.9	3.1	3	3.0	3.0	0
			33°44.6850' N	118°16.3464' W		2	44.5	0.5	44	3	3.33	3.3	3.0	7.62 (archived only)
			33°44.6840' N	118°16.3450' W		3	44.4	0.4	44	3	4.5	4.5	3.0	15.24 (station archive & DMMU composite)
			33°44.6851' N	118°16.3452' W		4	44.4	0.4	44	3	3.83	3.8	3.0	30.48 (discarded)
	Water Samples [3]	3/27/2015	NR	NR	Not Applicable									

Table 1. Core and Sample Information
Port of Los Angeles
San Pedro, California

Area and Composite ID	Station ID	Date Sampled	Latitude [1]	Longitude [1]	Project Depth [2] (ft. MLLW)	Core Attempt Number	Observed Water Depth (ft.)	Tide (ft.)	Actual Water Depth (ft. MLLW)	Target Core Length (ft.)	Penetration (ft. below mudline)	Final Core Length (ft.)	Final Core Length for Analysis (ft.)	Z-layer (cm)
DMMU-2	B1	10/28/2014	33°44.7071' N	118°16.3348' W	55	1	49.4	3	46.4	8.6	9	7.2	7.2	0
						2	49.4	3	46.4	8.6	Poor recovery; core discarded			
			33°44.7012' N	118°16.3371' W		3	50.3	1.5	48.8	6.2	7	6.2	6.2	0
	B2	10/28/2014	33°44.7793' N	118°16.2967' W	55	1	54.8	4.5	50.3	4.7	6	4.4	4.4	0
						2	53.3	3.5	49.8	5.2	7	5.2	4.9	9 (station archive & DMMU composite)
	B3	10/29/2014	33°44.8120' N	118°16.2712' W	55	1	49.5	3.1	46.4	8.6	9	8.6	8.3	8 (station archive & DMMU composite)
						2	49.5	3.1	46.4	8.6	No sample recovered			
						3	49.8	3.5	46.3	8.7	9	7.3	7.3	0
	B4	10/29/2014	33°44.8509' N	118°16.2449' W	55	1	51.1	3.7	47.4	7.6	8.5	6.6	6.6	0
						2	51.1	3.7	47.4	7.6	9	7.6	7.3	8 (station archive & DMMU composite)
	B5	10/29/2014	33°44.8822' N	118°16.2272' W	55	1	52.5	4.5	48	7	8	4.8	4.8	0
						2	52.5	4.5	48	7	9	6.9	6.9	0
	Water Samples [3]	10/29/2014	33°44.813' N	118°16.268' W	Not Applicable									
Reference (LA-2)		10/27/2014 & 3/25/2015	33°33.020' N	118°10.080' W	Sample collected via pipe dredge									

Notes:
1.) Latitude and longitude are in decimal degree minutes, World Geodetic System (WGS) 1984.
2.) Project depth includes 2 feet of overdredge.
3.) Water samples for bioassays and elutriate testing.
4.) Core diameter was 4 inches.

Abbreviations:
cm = centimeter
ft. = feet
MLLW = mean lower low water
N = north
W = west
NR= Not recorded

Table 2. Biological Testing Performed for Dredged Material Evaluation
Port of Los Angeles
San Pedro, California

Test Type	Type of Organism	Taxon	Project Sediments	Reference[1] Sediment	Control Sediment / Seawater
Whole Sediment	Amphipod	*Ampelisca abdita*	X	X	X
	Polychaete	*Neanthes arenaceodentata*	X	X	X
Water-Column	Fish	*Menidia beryllina*	X[2]		X
	Mysid shrimp	*Americamysis bahia*	X[2]		X
	Bivalve larvae	*Mytilus galloprovincialis*	X[2]		X
Bioaccumulation	Polychaete	*Neanthes (Nereis) virens*	X	X	X
	Bivalve	*Macoma nasuta*	X	X	X

Notes:

[1]Shaded areas indicate tests or treatments that are not applicable to the selected tests.

[2] Sediment elutriates of project material

Table 3: Results of Conventional and Chemical Analyses
Port of Los Angeles
San Pedro, California

Analyte	Units	ERL [2]	ERM [2]	Results [1]			
				DMMU-1	Reference LA-2 [3]	DMMU-2	Reference LA-2 [4]
Conventional							
HEM: Oil and Grease	mg/kg, dw	-	-	64	54	52	36
TRPH	mg/kg, dw	-	-	180	18	180	32
Sulfide, Total	mg/kg, dw	-	-	210	0.31	4	0.86
Sulfide, Dissolved	mg/kg, ww	-	-	0.1	< 0.10	< 0.017	< 0.017
Carbon, Total Organic	%	-	-	0.72	0.80	0.89	0.73
Ammonia (as N)	mg/kg, dw	-	-	4.9	4.8	14	4.8
Clay	%	-	-	4.91	3.52	15.83	3.55
Silt	%	-	-	15.89	20.61	58.61	23.61
Sand	%	-	-	79.2	75.87	25.56	72.84
Gravel	%	-	-	< 0.010	< 0.010	< 0.010	< 0.010
Solids, Total	%	-	-	68.3	64.8	69.7	70.0
Solids, Volatile	%	-	-	1.2	1.1	2.5	2.4
Metals							
Arsenic	mg/kg	8.2	70	7.09	3.89	**9.83**	2.47
Cadmium	mg/kg	1.2	9.6	0.209	0.230	0.437	0.218
Chromium	mg/kg	81	370	27.2	27.4	39.8	24.6
Copper	mg/kg	34	270	**54.4**	11.8	**49.4**	10.8
Lead	mg/kg	46.7	218	18.7	6.07	19.0	5.54
Nickel	mg/kg	20.9	51.6	16.8	14.1	**29.4**	13.0
Selenium	mg/kg	-	-	0.485	0.363	0.587	0.445
Silver	mg/kg	1.0	3.7	0.0791	0.0745	0.190	0.0602
Zinc	mg/kg	150	410	98.6	56.9	108	55.0
Mercury	mg/kg	0.15	0.71	**0.164**	0.0331	**0.247**	0.0238
Organotins							
Dibutyltin	µg/kg	-	-	19	< 4.6	11	< 1.0
Monobutyltin	µg/kg	-	-	3.4	< 4.6	< 2.0	< 2.0
Tetrabutyltin	µg/kg	-	-	< 4.3	< 4.6	< 1.1	< 1.1
Tributyltin	µg/kg	-	-	23	< 4.6	10	< 2.1
Chlorinated Pesticides							
2,4'-DDD	µg/kg	-	-	< 0.29	< 0.31	< 0.069	< 0.07
2,4'-DDE	µg/kg	-	-	3.3	0.65	1.7	0.75
2,4'-DDT	µg/kg	-	-	< 0.29	< 0.31	< 0.046	< 0.046
4,4'-DDD	µg/kg	-	-	< 0.29	0.47	< 0.061	0.38
4,4'-DDE	µg/kg	2.2	27	**20**	**5**	**11**	**6.1**
4,4'-DDT	µg/kg	-	-	< 0.29	< 0.31	< 0.12	< 0.12
4,4'-DDMU	µg/kg	-	-	< 0.29	< 0.31	1.4	0.72
Total DDTs [5]	µg/kg	1.58	46.1	**23.3**	**6.12**	**14.1**	**7.95**
4,4'-Dichlorobenzophenone	µg/kg	-	-	< 1.5	< 1.6	< 0.23	< 0.23
Aldrin	µg/kg	-	-	< 0.29	< 0.31	< 0.064	< 0.064
Alpha Chlordane	µg/kg	-	-	0.18	< 0.31	< 0.095	< 0.096
Alpha-BHC	µg/kg	-	-	< 0.29	< 0.31	< 0.092	< 0.092
Beta-BHC	µg/kg	-	-	< 0.29	< 0.31	< 0.096	< 0.097
Cis-nonachlor	µg/kg	-	-	0.11	< 0.31	< 0.034	< 0.034
Delta-BHC	µg/kg	-	-	< 0.29	< 0.31	< 0.069	< 0.07
Dieldrin	µg/kg	-	-	< 0.29	< 0.31	< 0.13	< 0.13
Endosulfan I	µg/kg	-	-	< 0.29	< 0.31	< 0.088	< 0.089
Endosulfan II	µg/kg	-	-	< 0.29	< 0.31	< 0.11	< 0.11
Endosulfan Sulfate	µg/kg	-	-	< 0.29	< 0.31	< 0.11	< 0.11
Endrin	µg/kg	-	-	< 0.29	< 0.31	< 0.13	< 0.13
Endrin Aldehyde	µg/kg	-	-	< 0.29	< 0.31	< 0.12	< 0.12
Endrin Ketone	µg/kg	-	-	< 0.29	< 0.31	< 0.12	< 0.12
Gamma Chlordane	µg/kg	-	-	0.13	< 0.31	< 0.066	< 0.066
Gamma-BHC	µg/kg	-	-	< 0.29	< 0.31	< 0.066	< 0.067
Heptachlor	µg/kg	-	-	< 0.29	< 0.31	< 0.082	< 0.083
Heptachlor Epoxide	µg/kg	-	-	< 0.29	< 0.31	< 0.079	< 0.08
Methoxychlor	µg/kg	-	-	< 0.29	< 0.31	< 0.082	< 0.083
Mirex	µg/kg	-	-	< 0.29	< 0.31	< 0.040	< 0.04
Oxychlordane	µg/kg	-	-	< 0.29	< 0.31	< 0.11	< 0.11
Toxaphene	µg/kg	-	-	< 29	< 31	< 9.0	< 9.1
Trans-nonachlor	µg/kg	-	-	0.12	< 0.31	< 0.069	< 0.069

Table 3: Results of Conventional and Chemical Analyses
Port of Los Angeles
San Pedro, California

Analyte	Units	ERL [2]	ERM [2]	Results [1]			
				DMMU-1	Reference LA-2 [3]	DMMU-2	Reference LA-2 [4]
Pyrethroid Pesticides							
Allethrin	µg/kg	-	-	< 0.74	< 0.77	< 0.37	< 0.36
Bifenthrin	µg/kg	-	-	0.55	< 0.77	0.20	0.32
Cyfluthrin	µg/kg	-	-	< 0.74	< 0.77	< 0.12	< 0.12
Cypermethrin	µg/kg	-	-	< 0.74	< 0.77	< 0.098	< 0.098
Deltamethrin/Tralomethrin	µg/kg	-	-	< 0.74	< 0.77	< 0.30	< 0.30
Fenpropathrin	µg/kg	-	-	< 0.74	< 0.77	< 0.052	< 0.052
Fenvalerate/Esfenvalerate	µg/kg	-	-	< 0.74	< 0.77	< 0.051	< 0.051
Fluvalinate	µg/kg	-	-	< 0.74	< 0.77	< 0.082	< 0.082
lambda-Cyhalothrin	µg/kg	-	-	< 0.74	< 0.77	< 0.062	< 0.062
Permethrin (cis/trans)	µg/kg	-	-	0.4	< 1.5	< 0.16	< 0.16
Phenothrin	µg/kg	-	-	< 0.74	< 0.77	< 0.098	< 0.098
Resmethrin/Bioresmethrin	µg/kg	-	-	< 0.74	< 0.77	< 0.13	< 0.13
Tetramethrin	µg/kg	-	-	< 0.74	< 0.77	< 0.054	< 0.054
Semivolatile Organics							
1,6,7-Trimethylnaphthalene	µg/kg	-	-	< 15	< 16	< 4.4	< 4.3
1-Methylnaphthalene	µg/kg	-	-	< 15	< 16	< 5.4	< 5.3
1-Methylphenanthrene	µg/kg	-	-	< 15	< 16	< 5.2	< 5.1
2,3,4,6-Tetrachlorophenol	µg/kg	-	-	< 15	< 16	< 5.6	< 5.5
2,4,5-Trichlorophenol	µg/kg	-	-	< 15	< 16	< 4.7	< 4.6
2,4,6-Trichlorophenol	µg/kg	-	-	< 15	< 16	< 5.2	< 5.1
2,4-Dichlorophenol	µg/kg	-	-	< 15	< 16	< 3.9	< 3.8
2,4-Dimethylphenol	µg/kg	-	-	< 15	< 16	< 4.4	< 4.4
2,4-Dinitrophenol	µg/kg	-	-	< 730	< 780	< 78	< 77
2,6-Dichlorophenol	µg/kg	-	-	< 15	< 16	< 8.6	< 8.4
2,6-Dimethylnaphthalene	µg/kg	-	-	45	12	< 4.9	< 4.8
2-Chlorophenol	µg/kg	-	-	< 15	< 16	< 4.9	< 4.8
2-Methylnaphthalene	µg/kg	70	670	< 15	< 16	< 5.2	< 5.1
2-Methylphenol	µg/kg	-	-	< 15	< 16	< 7.6	< 7.5
2-Nitrophenol	µg/kg	-	-	< 15	< 780	< 3.4	< 3.4
3/4-Methylphenol	µg/kg	-	-	< 15	< 16	< 3.7	< 3.7
4,6-Dinitro-2-Methylphenol	µg/kg	-	-	< 730	< 780	< 100	< 98
4-Chloro-3-Methylphenol	µg/kg	-	-	< 15	< 16	< 5.1	< 5.0
4-Nitrophenol	µg/kg	-	-	< 730	< 780	< 92	< 91
Acenaphthene	µg/kg	16	500	< 15	< 16	< 6.8	< 6.7
Acenaphthylene	µg/kg	44	640	17	< 16	9.0	< 6.4
Anthracene	µg/kg	85.3	1100	37	< 16	23	< 7.7
Benzo (a) Anthracene	µg/kg	261	1600	52	< 16	20	< 6.7
Benzo (a) Pyrene	µg/kg	430	1600	140	< 16	69	< 7.2
Benzo (b) Fluoranthene	µg/kg	-	-	180	< 16	87	< 7.3
Benzo (e) Pyrene	µg/kg	-	-	96	< 16	39	< 3.4
Benzo (g,h,i) Perylene	µg/kg	-	-	96	< 16	51	< 6.0
Benzo (k) Fluoranthene	µg/kg	-	-	170	< 16	83	< 9.4
Benzoic Acid	µg/kg	-	-	-- [8]	-- [8]	< 18	< 18
Biphenyl	µg/kg	-	-	< 15	< 16	< 5.8	< 5.8
Bis(2-Ethylhexyl) Phthalate	µg/kg	-	-	170	22	120	17
Butyl Benzyl Phthalate	µg/kg	-	-	13	8.7	10	< 6.3
Chrysene	µg/kg	384	2800	92	< 16	40	< 7.2
DCPA	µg/kg	-	-	< 15	< 16	< 3.4	< 3.4
Dibenz (a,h) Anthracene	µg/kg	63.4	260	28	< 16	16	< 5.3
Dibenzothiophene	µg/kg	-	-	< 15	< 16	< 8.4	< 8.2
Diethyl Phthalate	µg/kg	-	-	< 15	< 16	< 7.2	< 7.1
Dimethyl Phthalate	µg/kg	-	-	< 15	< 16	< 7.7	< 7.6
Di-n-Butyl Phthalate	µg/kg	-	-	< 15	50	32	20
Di-n-Octyl Phthalate	µg/kg	-	-	< 15	< 16	< 6.8	< 6.7

Table 3: Results of Conventional and Chemical Analyses
Port of Los Angeles
San Pedro, California

Analyte	Units	ERL [2]	ERM [2]	Results [1]			
				DMMU-1	Reference LA-2 [3]	DMMU-2	Reference LA-2 [4]
Semivolatile Organics (Continued)							
Fluoranthene	µg/kg	600	5100	96	< 16	29	< 8.3
Fluorene	µg/kg	19	540	< 15	< 16	< 7.4	< 7.3
Indeno (1,2,3-c,d) Pyrene	µg/kg	-	-	97	< 16	44	< 6.5
Isophorone	µg/kg	-	-	< 150	< 160	< 18	< 18
Naphthalene	µg/kg	160	2100	< 15	< 16	5.8	< 5.4
Pentachlorophenol	µg/kg	-	-	< 730	< 780	< 1.8	< 1.8
Perthane	µg/kg	-	-	< 15	< 16	< 1.9	< 1.8
Perylene	µg/kg	-	-	59	< 16	39	< 5.1
Phenanthrene	µg/kg	240	1500	33	< 16	14	< 8.2
Phenol	µg/kg	-	-	< 15	120	< 5.3	< 5.2
Pyrene	µg/kg	665	2600	99	< 16	55	< 7.6
Low molecular weight PAH [6]	µg/kg	552	3160	87	0	51.8	< 8.2
High molecular weight PAH [6]	µg/kg	1700	9600	507	0	229	< 8.3
Total PAH [6]	µg/kg	4022	44792	594	0	280.8	< 8.3
PCBs							
PCB003	µg/kg	-	-	< 0.29	< 0.31	< 0.067	< 0.067
PCB005/008	µg/kg	-	-	< 0.59	< 0.61	< 0.067	< 0.067
PCB015	µg/kg	-	-	1.3	< 0.31	< 0.033	< 0.033
PCB018	µg/kg	-	-	< 0.29	< 0.31	< 0.056	< 0.056
PCB027	µg/kg	-	-	< 0.29	< 0.31	< 0.040	< 0.040
PCB028	µg/kg	-	-	< 0.29	< 0.31	0.98	< 0.078
PCB029	µg/kg	-	-	< 0.29	< 0.31	0.72	< 0.049
PCB031	µg/kg	-	-	< 0.29	< 0.31	2.0	< 0.042
PCB033	µg/kg	-	-	< 0.29	< 0.31	1.1	< 0.049
PCB037	µg/kg	-	-	< 0.29	< 0.31	< 0.051	< 0.050
PCB044	µg/kg	-	-	< 0.29	< 0.31	1.5	< 0.13
PCB049	µg/kg	-	-	< 0.29	< 0.31	0.83	< 0.12
PCB052	µg/kg	-	-	< 0.29	< 0.31	1.7	< 0.073
PCB056	µg/kg	-	-	< 0.29	< 0.31	< 0.068	< 0.068
PCB060	µg/kg	-	-	< 0.29	< 0.31	< 0.089	< 0.089
PCB066	µg/kg	-	-	1.1	< 0.31	1.5	< 0.11
PCB070	µg/kg	-	-	1.3	< 0.31	1.5	< 0.069
PCB074	µg/kg	-	-	< 0.29	< 0.31	1.6	< 0.066
PCB077	µg/kg	-	-	< 0.29	< 0.31	< 0.12	< 0.12
PCB081	µg/kg	-	-	< 0.29	< 0.31	< 0.091	< 0.091
PCB087	µg/kg	-	-	1	< 0.31	1.9	< 0.058
PCB095	µg/kg	-	-	2.3	< 0.31	2.1	< 0.071
PCB097	µg/kg	-	-	1.9	< 0.31	< 0.062	< 0.061
PCB099	µg/kg	-	-	1.5	0.41	1.8	< 0.076
PCB101	µg/kg	-	-	3.5	0.38	3.4	< 0.072
PCB105	µg/kg	-	-	< 0.29	< 0.31	1.8	< 0.060
PCB110	µg/kg	-	-	3.2	< 0.31	3.3	< 0.065
PCB114	µg/kg	-	-	< 0.29	< 0.31	< 0.051	< 0.051
PCB118	µg/kg	-	-	2.9	< 0.31	3.4	< 0.084
PCB119	µg/kg	-	-	< 0.29	< 0.31	< 0.065	< 0.065
PCB123	µg/kg	-	-	< 0.29	< 0.31	< 0.067	< 0.067
PCB126	µg/kg	-	-	< 0.29	< 0.31	< 0.048	< 0.048
PCB128	µg/kg	-	-	< 0.29	< 0.31	0.98	< 0.056
PCB132/153	µg/kg	-	-	5.8	0.68	4.9	< 0.095
PCB137	µg/kg	-	-	< 0.29	< 0.31	< 0.069	< 0.068
PCB138/158	µg/kg	-	-	5.3	< 0.61	4.2	< 0.11

Table 3: Results of Conventional and Chemical Analyses
Port of Los Angeles
San Pedro, California

Analyte	Units	ERL [2]	ERM [2]	Results [1]			
				DMMU-1	Reference LA-2 [3]	DMMU-2	Reference LA-2 [4]
PCBs (continued)							
PCB141	µg/kg	-	-	< 0.29	< 0.31	0.81	< 0.14
PCB149	µg/kg	-	-	2.8	0.28	2.3	< 0.069
PCB151	µg/kg	-	-	1.7	< 0.31	1.1	< 0.088
PCB156	µg/kg	-	-	< 0.29	< 0.31	0.62	< 0.094
PCB157	µg/kg	-	-	< 0.29	< 0.31	< 0.074	< 0.073
PCB167	µg/kg	-	-	< 0.29	< 0.31	< 0.059	< 0.059
PCB168	µg/kg	-	-	3.6	< 0.31	< 0.064	< 0.064
PCB169	µg/kg	-	-	< 0.29	< 0.31	< 0.047	< 0.047
PCB170	µg/kg	-	-	1.3	< 0.31	1.4	< 0.072
PCB174	µg/kg	-	-	1.4	< 0.31	1.0	< 0.055
PCB177	µg/kg	-	-	0.88	< 0.31	0.45	< 0.056
PCB180	µg/kg	-	-	2.5	< 0.31	2.2	< 0.043
PCB183	µg/kg	-	-	0.58	< 0.31	0.62	< 0.046
PCB184	µg/kg	-	-	< 0.29	< 0.31	< 0.058	< 0.058
PCB187	µg/kg	-	-	1.4	0.17	1.2	< 0.055
PCB189	µg/kg	-	-	< 0.29	< 0.31	< 0.036	< 0.036
PCB194	µg/kg	-	-	< 0.29	< 0.31	< 0.059	< 0.058
PCB195	µg/kg	-	-	< 0.29	< 0.31	< 0.046	< 0.046
PCB200	µg/kg	-	-	< 0.29	< 0.31	< 0.084	< 0.084
PCB201	µg/kg	-	-	< 0.29	< 0.31	< 0.063	< 0.062
PCB203	µg/kg	-	-	< 0.29	< 0.31	0.65	< 0.049
PCB206	µg/kg	-	-	< 0.29	< 0.31	< 0.064	< 0.064
PCB209	µg/kg	-	-	< 0.29	< 0.31	0.80	< 0.095
Total PCBs [7]	µg/kg	22.7	180	**47.26**	1.92	**54.36**	< 0.14

Notes:

1.) Bolded values exceed ERL; Bolded and underlined values exceed ERM.

2.) ERL and ERM values are referenced from Long et al. (1995).

3.) Sampled at time of DMMU-1 collection.

4.) Sampled at time of DMMU-2 collection.

5.) Total DDTs are calculated as the total of the detected DDD, DDE, DDT, and DMMU

6.) As defined in Long et al. (1995).

7.) Total PCBs are calculated as the total of the detected, analyzed congeners. If no PCB congeners were detected, total PCBs is shown as the maximum detection limit.

8.) Between DMMU-2 and DMMU-1 sampling, benzoic acid was removed from the laboratory standard analyte list for semi-volatile organics

Abbreviations:

µg/kg = micrograms per kilogram
DDD = 1,1-dichloro-2,2-bis(p-chloro-phenyl)ethane
DDE = 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene
DDT = 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane
dw = dry weight
ERL = Effects Range Low
ERM = Effects Range Medium
HEM = n-hexane extractable material
mg/kg = milligrams per kilogram
mm = millimeter
N = un-ionized ammonia
NM = not measured
PCB = polychlorinated biphenyl
TRPH = Total Recoverable Petroleum Hydrocarbons
ww = wet weight

References:

Long, E. R., D. D. MacDonald, S. L. Smith, and F. D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environmental Management 19(1): 81-97.

Table 4: Results of Dredging Elutriate Chemistry Analyses
Port of Los Angeles
San Pedro, California

Analyte	Units	CCC [2,3]	Results [1]	
			DMMU-1	DMMU-2
Metals				
Aluminum	µg/L	-	10.5	11.2
Antimony	µg/L	-	0.564	0.629
Arsenic	µg/L	36	0.662	1.97
Barium	µg/L	-	10.6	28.2
Beryllium	µg/L	-	< 0.500	< 5.00
Cadmium	µg/L	8.8	0.0372	< 0.300
Chromium	µg/L	50 [5]	< 0.500	< 5.00
Cobalt	µg/L	-	0.244	0.576
Copper	µg/L	3.1	0.938	1.27
Iron	µg/L	-	2.62	11.7
Lead	µg/L	8.1	0.0686	< 0.300
Manganese	µg/L	-	2.72	22.4
Mercury	µg/L	0.94	< 0.0833	< 0.0500
Molybdenum	µg/L	-	18.9	13.1
Nickel	µg/L	8.2	0.805	1.45
Selenium	µg/L	71	0.102	0.366
Silver	µg/L	-	< 0.0500	< 0.500
Thallium	µg/L	-	< 0.0300	< 0.300
Vanadium	µg/L	-	1.90	7.64
Zinc	µg/L	81	14.9	< 5.00
Organotins				
Dibutyltin	ng/L	-	13	< 3.0
Monobutyltin	ng/L	-	46	< 3.0
Tetrabutyltin	ng/L	-	< 2.9	< 3.0
Tributyltin	ng/L	7.4	< 2.9	< 3.0
Chlorinated Pesticides				
2,4'-DDD	µg/L	-	< 0.0095	< 0.0019
2,4'-DDE	µg/L	-	< 0.0095	< 0.0019
2,4'-DDT	µg/L	-	< 0.0095	< 0.0019
4,4'-DDD	µg/L	-	< 0.0095	< 0.0019
4,4'-DDE	µg/L	-	< 0.0095	< 0.0019
4,4'-DDT	µg/L	0.001	< 0.0095	< 0.0019
Aldrin	µg/L	-	< 0.0095	< 0.0019
Alpha Chlordane	µg/L	-	< 0.0095	< 0.0019
Alpha-BHC	µg/L	-	< 0.0095	< 0.0019
Beta-BHC	µg/L	-	< 0.0095	< 0.0019
Chlordane	µg/L	0.004	< 0.024	< 0.024
Cis-nonachlor	µg/L	-	< 0.0095	< 0.0019
Delta-BHC	µg/L	-	< 0.0095	< 0.0019
Dieldrin	µg/L	0.0019	< 0.0095	< 0.0019
Endosulfan I	µg/L	0.0087	< 0.0095	< 0.0019
Endosulfan II	µg/L	0.0087	< 0.0095	< 0.0019
Endosulfan Sulfate	µg/L	-	< 0.0095	< 0.0019
Endrin	µg/L	0.0023	< 0.0095	< 0.0019
Endrin Aldehyde	µg/L	-	< 0.0095	< 0.0019
Endrin Ketone	µg/L	-	< 0.0095	< 0.0019
Gamma Chlordane	µg/L	-	< 0.0095	< 0.0019
Gamma-BHC	µg/L	-	< 0.0095	< 0.0019
Heptachlor	µg/L	0.0036	< 0.0095	< 0.0019
Heptachlor Epoxide	µg/L	0.0036	< 0.0095	< 0.0019
Methoxychlor	µg/L	0.03	< 0.0095	< 0.0019
Mirex	µg/L	0.001	< 0.0095	< 0.0019
Oxychlordane	µg/L	-	< 0.0095	< 0.0019
Toxaphene	µg/L	0.0002	< 0.12	< 0.12
Trans-nonachlor	µg/L	-	< 0.0095	< 0.0019

Table 4: Results of Dredging Elutriate Chemistry Analyses
Port of Los Angeles
San Pedro, California

Analyte	Units	CCC [2,3]	Results [1]	
			DMMU-1	DMMU-2
Semi-volatile Organics				
1,6,7-Trimethylnaphthalene	µg/L	-	< 0.19	< 0.19
1-Methylnaphthalene	µg/L	-	< 0.19	< 0.19
1-Methylphenanthrene	µg/L	-	< 0.19	< 0.19
2,6-Dimethylnaphthalene	µg/L	-	< 0.19	< 0.19
2-Methylnaphthalene	µg/L	-	< 0.19	< 0.19
Acenaphthene	µg/L	-	< 0.19	< 0.19
Acenaphthylene	µg/L	-	< 0.19	< 0.19
Anthracene	µg/L	-	< 0.19	< 0.19
Benzo (a) Anthracene	µg/L	-	< 0.19	< 0.19
Benzo (a) Pyrene	µg/L	-	< 0.19	< 0.19
Benzo (b) Fluoranthene	µg/L	-	< 0.19	< 0.19
Benzo (e) Pyrene	µg/L	-	< 0.19	< 0.19
Benzo (g,h,i) Perylene	µg/L	-	< 0.19	< 0.19
Benzo (k) Fluoranthene	µg/L	-	< 0.19	< 0.19
Biphenyl	µg/L	-	< 0.19	< 0.19
Chrysene	µg/L	-	< 0.19	< 0.19
Dibenz (a,h) Anthracene	µg/L	-	< 0.19	< 0.19
Dibenzothiophene	µg/L	-	< 0.19	< 0.19
Fluoranthene	µg/L	-	< 0.19	< 0.19
Fluorene	µg/L	-	< 0.19	< 0.19
Indeno (1,2,3-c,d) Pyrene	µg/L	-	< 0.19	< 0.19
Naphthalene	µg/L	-	< 0.19	< 0.19
Perylene	µg/L	-	< 0.19	< 0.19
Phenanthrene	µg/L	-	< 0.19	< 0.19
Pyrene	µg/L	-	< 0.19	< 0.19
PCBs				
PCB003	µg/L	-	< 0.0019	< 0.0019
PCB005/008	µg/L	-	< 0.0039	< 0.0038
PCB015	µg/L	-	< 0.0019	< 0.0019
PCB018	µg/L	-	< 0.0019	< 0.0019
PCB027	µg/L	-	< 0.0019	< 0.0019
PCB028	µg/L	-	< 0.0019	< 0.0019
PCB029	µg/L	-	< 0.0019	< 0.0019
PCB031	µg/L	-	< 0.0019	< 0.0019
PCB033	µg/L	-	< 0.0019	< 0.0019
PCB037	µg/L	-	< 0.0019	< 0.0019
PCB044	µg/L	-	< 0.0019	< 0.0019
PCB049	µg/L	-	< 0.0019	< 0.0019
PCB052	µg/L	-	< 0.0019	< 0.0019
PCB056	µg/L	-	< 0.0019	< 0.0019
PCB060	µg/L	-	< 0.0019	< 0.0019
PCB066	µg/L	-	< 0.0019	< 0.0019
PCB070	µg/L	-	< 0.0019	< 0.0019
PCB074	µg/L	-	< 0.0019	< 0.0019
PCB077	µg/L	-	< 0.0019	< 0.0019
PCB081	µg/L	-	< 0.0019	< 0.0019
PCB087	µg/L	-	< 0.0019	< 0.0019
PCB095	µg/L	-	< 0.0019	< 0.0019
PCB097	µg/L	-	< 0.0019	< 0.0019
PCB099	µg/L	-	< 0.0019	< 0.0019
PCB101	µg/L	-	< 0.0019	< 0.0019
PCB105	µg/L	-	< 0.0019	< 0.0019
PCB110	µg/L	-	< 0.0019	< 0.0019
PCB114	µg/L	-	< 0.0019	< 0.0019
PCB118	µg/L	-	< 0.0019	< 0.0019
PCB119	µg/L	-	< 0.0019	< 0.0019
PCB123	µg/L	-	< 0.0019	< 0.0019

Table 4: Results of Dredging Elutriate Chemistry Analyses
Port of Los Angeles
San Pedro, California

Analyte	Units	CCC [2,3]	Results [1]	
			DMMU-1	DMMU-2
PCBs (Continued)				
PCB126	µg/L	-	< 0.0019	< 0.0019
PCB128	µg/L	-	< 0.0019	< 0.0019
PCB132/153	µg/L	-	< 0.0039	< 0.0038
PCB137	µg/L	-	< 0.0019	< 0.0019
PCB138/158	µg/L	-	< 0.0039	< 0.0038
PCB141	µg/L	-	< 0.0019	< 0.0019
PCB149	µg/L	-	< 0.0019	< 0.0019
PCB151	µg/L	-	< 0.0019	< 0.0019
PCB156	µg/L	-	< 0.0019	< 0.0019
PCB157	µg/L	-	< 0.0019	< 0.0019
PCB167	µg/L	-	< 0.0019	< 0.0019
PCB168	µg/L	-	< 0.0019	< 0.0019
PCB169	µg/L	-	< 0.0019	< 0.0019
PCB170	µg/L	-	< 0.0019	< 0.0019
PCB174	µg/L	-	< 0.0019	< 0.0019
PCB177	µg/L	-	< 0.0019	< 0.0019
PCB180	µg/L	-	< 0.0019	< 0.0019
PCB183	µg/L	-	< 0.0019	< 0.0019
PCB184	µg/L	-	< 0.0019	< 0.0019
PCB187	µg/L	-	< 0.0019	< 0.0019
PCB189	µg/L	-	< 0.0019	< 0.0019
PCB194	µg/L	-	< 0.0019	< 0.0019
PCB195	µg/L	-	< 0.0019	< 0.0019
PCB200	µg/L	-	< 0.0019	< 0.0019
PCB201	µg/L	-	< 0.0019	< 0.0019
PCB203	µg/L	-	< 0.0019	< 0.0019
PCB206	µg/L	-	< 0.0019	< 0.0019
PCB209	µg/L	-	< 0.0019	< 0.0019
Total PCBs [6]	µg/L	0.03	< 0.0039	< 0.0038

Notes:

1.) Non-detect concentrations are listed as < Reporting Limit pending Method Detection Limit results from the analytical laboratory.
2.) U.S. EPA CCC for protection of saltwater aquatic life are referenced from

National Recommended Water Quality Criteria accessed at http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#altable in January 2015.
3.) For analytes which have detection limits that exceed the water quality criteria, when utilizing standard extraction and analytical methods, it is not possible to achieve detection limits below water quality criteria.
4.) Sampled at time of DMMU-2 collection.
5.) Criteria for Chromium (VI)
6.) Total PCBs are calculated as the total of the detected, analyzed congeners. If no PCB congeners were detected, total PCBs is shown as the maximum detection limit.

Abbreviations:

µg/L = micrograms per liter
CCC = Criterion Continuous Concentration
DDD = 1,1-dichloro-2,2-bis(p-chloro-phenyl)ethane
DDE = 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene
DDT = 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane
ng/L = nanogram per liter
NM = not measured
PCB = Polychlorinated Biphenyl
U.S. EPA = United States Environmental Protection Agency

Table 5.1. Survival Summary for the 10-Day Benthic Test with *Ampelisca abdita.*
Port of Los Angeles
San Pedro, California

Sample ID	Mean Survival (%)	Standard Deviation	Significant Biological Effect? R – T ≥ 20%?	Significantly Less Than Reference?	Exceeds LPC
Batch 1: November 14, 2014					
Control	97	2.7			
Ref-DMMU-2	94	4.2			
DMMU-2	79	8.2	15; No	Yes	No
Batch 2: April 9, 2015					
Control	97	4			
Ref-DMMU-1	96	4			
DMMU-1	98	4	-2; No	No	No

Notes & Abbreviations:
R = Mean survival of reference Ref-DMMU-2 (for Batch 1) or Ref-DMMU-1 (for Batch 2)
T = Mean survival of sediment composite
LPC = Limiting Permissible Concentration
% = percent

Table 5.2. Survival Summary for the 10-Day Benthic Test with *Neanthes arenaceodentata.*
Port of Los Angeles
San Pedro, California

Sample ID	Mean Survival (%)	Standard Deviation	Significant Biological Effect? R – T ≥ 10%?	Significantly Less Than Reference?	Exceeds LPC
Batch 1: December 5, 2014					
Control	100	0			
Ref-DMMU-2	100	0			
DMMU-2	94	8.9	6; No	No	No
Batch 2: April 24, 2015					
Control	96	5.5			
Ref-DMMU-1	96	8.9			
DMMU-1	94	5.5	2; No	No	No

Notes & Abbreviations:
R = Mean survival of reference Ref-DMMU-2 (for Batch 1) or Ref-DMMU-1 (for Batch 2)
T = Mean survival of sediment composite
LPC = Limiting Permissible Concentration
% = percent

Table 5.3. Survival Summary for *Americamysis bahia.*
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Mean Survival (%)	Standard Deviation	Statistically Less Than Control?	LC_{50} Value
Batch 1: December 5, 2014					
Control		90	14.1		
DMMU-2-Water-PG	100	90	7.1	No	>100
DMMU-2	10	90	7.1	--	
	50	88	8.4	--	
	100	90	7.1	No	
Batch 2: April 29, 2015					
Control		100	0		
DMMU-1-Water-PG	100	98	4.5	No	>100
DMMU-1	10	92	13	--	
	50	98	4.5	--	
	100	92	13	No	

Notes & Abbreviations:
% = percent
LC50 = median lethal concentration

Table 5.4. Survival Summary for *Menidia beryllina*
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Mean Survival (%)	Standard Deviation	Statistically Less Than Control?	LC_{50} Value
Batch 1 December 5, 2014					
Control		90	14.1		
DMMU-2-Water-PG	100	94	5.5	No	>100
DMMU-2	10	76	11.4	--	
	50	78	14.8	--	
	100	72	11	Yes	
Batch 2 April 29, 2015					
Control		98	4.5		
DMMU-1-Water-PG	100	98	4.5	No	>100
DMMU-1	10	98	4.5	--	
	50	100	0	--	
	100	98	4.5	No	

Notes & Abbreviations:
% = percent
LC50 = median lethal concentration
LC50 = median lethal concentration

Table 5.5. *Mytilus galloprovincialis* Control Acceptability Results
Port of Los Angeles
San Pedro, California

Test Date	Mean Proportion Normal (%)	Mean Proportion Survival (%)	Mean Combined Normal Development (%)[1]	Meets Acceptability Criteria?
	>70%	>70%		
November 19 – 21, 2014	95.8	97.7	95.7	Yes
April 30 – May 2, 2015	98.1	99.4	99.0	Yes

Notes & Abbreviations:
[1] Calculated as the number of normally developed embryos ÷ number of embryos stocked (stocking density).
% = percent

Table 5.6. Combined Proportion Normal Development Summary for *Mytilus galloprovincialis.*
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Mean Combined Normal Development (%)[1, 2]	Standard Deviation	Statistically Less Than Control?	EC_{50}[2]
Batch 1: November 19, 2014					
Control		95.7	4		
DMMU-2-Water-PG	100	98.2	3.6	No	>100%
DMMU-2	1	99.5	1.2	--	
	10	97.5	3.6	--	
	50	95.5	1.4	--	
	100	92.3	7.5	No	
Batch 2: April 30, 2015					
Control		99	2.3		
DMMU-1-Water-PG	100	100	0	No	>100%
DMMU-1	1	100	0	--	
	10	98.5	3.3	--	
	50	98.1	4.3	--	
	100	98.8	2.8	No	

Notes & Abbreviations:
[1] Calculated as the number of normally developed embryos ÷ number of embryos stocked (stocking density).
[2] Values derived from CETIS statistical output.
% = percent
EC50 = median effect concentration

Table 5.7. Survival Summary for *Neanthes virens* and *Macoma nasuta* Bioaccumulation Tests
Port of Los Angeles
San Pedro, California

Sample ID	*N. virens*		*M. nasuta*	
	Mean Survival (%)	Standard Deviation	Mean Survival (%)	Standard Deviation
Batch 1: December 9, 2014				
Control	96.7	5.8	84	4
Ref-DMMU-2	98	2.7	96.8	5.2
DMMU-2	96	4.2	93.6	10.4
Batch 2: May 1, 2015				
Control	100	0	93.3	8.3
Ref-DMMU-1	99	2.2	99.2	1.8
DMMU-1	98	2.7	96.8	3.3

Notes & Abbreviations:
% = percent

Table 6.1: Analytical Results for Bioaccumulation Tests for DMMU-1 and DMMU-1 Reference Sediment
Port of Los Angeles
San Pedro, California

Analyte	Units	DMMU-1 *Nereis virens*					
		Pre-test	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5
% Lipids	%	3.4	0.80	1.2	1.2	1.1	1.2
PCB3	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB5	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB8	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB18+30	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB27	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB15	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB26+29	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB31	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB20+28	µg/kg	< 0.0962	0.109 J	0.093 J	0.129 J	< 0.0943	< 0.084
PCB21+33	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB52	µg/kg	< 0.0962	0.353	0.255	0.377	0.267	0.27
PCB49+69	µg/kg	< 0.0962	0.103 J	< 0.0901	0.129 J	0.101 J	0.0874 J
PCB44+47+65	µg/kg	< 0.0962	0.15 J	0.119 J	0.173	0.121 J	< 0.084
PCB37	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB95	µg/kg	< 0.0962	0.394	0.277	0.495	0.367	0.37
PCB61+70+74+76	µg/kg	< 0.0962	0.11 J	0.0902 J	0.115 J	< 0.0943	< 0.084
PCB66	µg/kg	< 0.0962	0.165 J	0.127 J	0.16 J	0.118 J	0.107 J
PCB56	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB60	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB90+101+113	µg/kg	< 0.0962	0.572	0.374	0.613	0.526	0.47
PCB99	µg/kg	< 0.0962	0.278	0.181	0.316	0.255	0.224
PCB86+87+97+109+119+125	µg/kg	< 0.0962	< 0.0885	0.127 J	0.182	0.154 J	0.136 J
PCB110+115	µg/kg	< 0.192	0.425	0.286	0.498	0.381	0.365
PCB81	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB77	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB135+151	µg/kg	< 0.0962	0.197	0.141 J	< 0.082	< 0.0943	0.162 J
PCB147+149	µg/kg	< 0.0962	0.677	0.464	0.682	0.482	0.508
PCB123	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB118	µg/kg	< 0.192	0.383	0.225	0.365	0.308	0.26
PCB132	µg/kg	< 0.0962	0.119 J	< 0.0901	< 0.082	< 0.0943	0.0905 J
PCB114	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB105	µg/kg	< 0.0962	0.247	0.155 J	0.251	0.184 J	0.188
PCB184	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB153+168	µg/kg	0.171 J	1.04	0.769	1.1	0.814	0.807
PCB141	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB137	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB129+138+163	µg/kg	< 0.385	1.08	0.71	1.08	0.776	0.733
PCB158	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB126	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB128+166	µg/kg	< 0.192	< 0.177	< 0.18	< 0.164	< 0.189	< 0.168
PCB187	µg/kg	< 0.0962	0.284	0.219	0.35	0.251	0.245
PCB183+185	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB174	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB177	µg/kg	< 0.0962	< 0.0885	< 0.0901	0.0847 J	< 0.0943	< 0.084
PCB167	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB201	µg/kg	< 0.192	< 0.177	< 0.18	< 0.164	< 0.189	< 0.168
PCB156+157	µg/kg	< 0.0962	0.0996 J	< 0.0901	0.0887 J	< 0.0943	< 0.084
PCB197+200	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB180+193	µg/kg	< 0.0962	0.31	0.185	0.37	0.243	0.254
PCB170	µg/kg	< 0.0962	0.14 J	< 0.0901	0.137 J	0.109 J	0.102 J
PCB169	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB203	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB195	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB189	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB194	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB206	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
PCB209	µg/kg	< 0.0962	< 0.0885	< 0.0901	< 0.082	< 0.0943	< 0.084
Total PCBs	µg/kg	0.17	7.24	4.80	7.70	5.46	5.38

Table 6.1: Analytical Results for Bioaccumulation Tests for DMMU-1 and DMMU-1 Reference Sediment
Port of Los Angeles
San Pedro, California

Analyte	DMMU-1					
	Macoma nasuta					
	Pre-test	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5
% Lipids	0.50	0.79	0.80	0.24	0.62	0.70
PCB3	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB5	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB8	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	0.0883 J
PCB18+30	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB27	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB15	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB26+29	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB31	< 0.0862	0.124 J	0.144 J	0.154 J	0.139 J	0.166 J
PCB20+28	< 0.0862	0.269	0.307	0.322	0.306	0.369
PCB21+33	< 0.0862	< 0.0909	0.0927 J	0.106 J	0.0992 J	0.106 J
PCB52	< 0.0862	0.37	0.475	0.446	0.39	0.424
PCB49+69	< 0.0862	0.272	0.348	0.354	0.284	0.348
PCB44+47+65	< 0.0862	0.213	0.268	0.263	0.215	0.244
PCB37	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB95	< 0.0862	0.401	0.513	0.538	0.438	0.488
PCB61+70+74+76	< 0.0862	0.503	0.646	0.697	0.611	0.722
PCB66	< 0.0862	0.347	0.435	0.449	0.412	0.503
PCB56	< 0.0862	0.116 J	0.142 J	0.145 J	0.135 J	0.165 J
PCB60	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB90+101+113	< 0.0862	0.883	1.06	1.12	0.922	1.04
PCB99	< 0.0862	0.485	0.617	0.634	0.545	0.63
PCB86+87+97+109+119+125	< 0.0862	0.431	0.531	0.554	0.483	0.562
PCB110+115	< 0.172	0.833	0.982	1.05	0.921	1.09
PCB81	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB77	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB135+151	< 0.0862	0.251	0.286	0.32	0.263	< 0.0877
PCB147+149	< 0.0862	0.632	0.791	0.859	0.692	0.855
PCB123	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB118	< 0.172	0.645	0.782	0.843	0.778	0.911
PCB132	< 0.0862	0.226	0.273	0.312	0.249	0.305
PCB114	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB105	< 0.0862	0.223	0.266	0.284	0.247	0.307
PCB184	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB153+168	< 0.0862	0.744	0.905	1.01	0.866	1.02
PCB141	< 0.0862	0.104 J	0.136 J	< 0.0952	0.124 J	0.141 J
PCB137	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB129+138+163	< 0.345	0.789	0.921	1.03	0.908	1.12
PCB158	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	0.088 J
PCB126	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB128+166	< 0.172	< 0.182	< 0.159	< 0.19	< 0.196	< 0.175
PCB187	< 0.0862	0.169 J	0.192	0.224	0.184 J	0.229
PCB183+185	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB174	< 0.0862	< 0.0909	0.101 J	0.102 J	< 0.098	0.104 J
PCB177	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB167	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB201	< 0.172	< 0.182	< 0.159	< 0.19	< 0.196	< 0.175
PCB156+157	< 0.0862	< 0.0909	0.0877 J	0.103 J	0.101 J	0.111 J
PCB197+200	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB180+193	< 0.0862	0.166 J	0.206	0.2	0.205	0.212
PCB170	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB169	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB203	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB195	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB189	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB194	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB206	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
PCB209	< 0.0862	< 0.0909	< 0.0794	< 0.0952	< 0.098	< 0.0877
Total PCBs	< 0.345	9.20	11.51	12.12	10.52	12.35

Table 6.1: Analytical Results for Bioaccumulation Tests for DMMU-1 and DMMU-1 Reference Sediment
Port of Los Angeles
San Pedro, California

Analyte	Reference				
	Nereis virens				
	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5
% Lipids	0.97	1.1	1.2	1.4	1.1
PCB3	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB5	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB8	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB18+30	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB27	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB15	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB26+29	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB31	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB20+28	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB21+33	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB52	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB49+69	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB44+47+65	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB37	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB95	< 0.0877	< 0.0855	< 0.0909	0.0999 J	< 0.0917
PCB61+70+74+76	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB66	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB56	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB60	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB90+101+113	< 0.0877	0.093 J	< 0.0909	0.126 J	0.118 J
PCB99	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB86+87+97+109+119+125	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB110+115	< 0.175	< 0.171	< 0.182	< 0.153	< 0.183
PCB81	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB77	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB135+151	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB147+149	0.122 J	0.142 J	0.154 J	0.168	0.15 J
PCB123	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB118	< 0.175	< 0.171	< 0.182	< 0.153	< 0.183
PCB132	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB114	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB105	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB184	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB153+168	0.294	0.341	0.4	0.417	0.293
PCB141	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB137	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB129+138+163	< 0.351	< 0.342	< 0.364	0.325	< 0.367
PCB158	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB126	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB128+166	< 0.175	< 0.171	< 0.182	< 0.153	< 0.183
PCB187	0.0946 J	0.12 J	0.127 J	0.123 J	< 0.0917
PCB183+185	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB174	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB177	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB167	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB201	< 0.175	< 0.171	< 0.182	< 0.153	< 0.183
PCB156+157	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB197+200	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB180+193	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB170	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB169	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB203	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB195	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB189	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB194	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB206	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
PCB209	< 0.0877	< 0.0855	< 0.0909	< 0.0763	< 0.0917
Total PCBs	0.51	0.70	0.68	1.26	0.56

Table 6.1: Analytical Results for Bioaccumulation Tests for DMMU-1 and DMMU-1 Reference Sediment
Port of Los Angeles
San Pedro, California

Analyte	Reference				
	Macoma nasuta				
	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5
% Lipids	0.24	0.97	0.81	0.83	0.99
PCB3	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB5	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB8	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB18+30	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB27	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB15	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB26+29	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB31	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB20+28	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB21+33	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB52	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB49+69	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB44+47+65	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB37	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB95	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB61+70+74+76	0.0997 J	0.0972 J	< 0.0901	0.103 J	0.0934 J
PCB66	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB56	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB60	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB90+101+113	0.161 J	0.142 J	0.0983 J	< 0.073	< 0.0781
PCB99	0.103 J	0.0949 J	< 0.0901	0.104 J	< 0.0781
PCB86+87+97+109+119+125	< 0.084	< 0.0943	< 0.0901	0.08 J	< 0.0781
PCB110+115	< 0.168	< 0.189	< 0.18	< 0.146	< 0.156
PCB81	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB77	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB135+151	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB147+149	0.154 J	0.135 J	0.106 J	0.131 J	0.115 J
PCB123	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB118	< 0.168	< 0.189	< 0.18	< 0.146	< 0.156
PCB132	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB114	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB105	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB184	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB153+168	0.206	0.198	0.128 J	0.193	0.159
PCB141	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB137	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB129+138+163	< 0.336	< 0.377	< 0.36	< 0.292	< 0.313
PCB158	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB126	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB128+166	< 0.168	< 0.189	< 0.18	< 0.146	< 0.156
PCB187	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB183+185	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB174	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB177	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB167	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB201	< 0.168	< 0.189	< 0.18	< 0.146	< 0.156
PCB156+157	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB197+200	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB180+193	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB170	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB169	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB203	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB195	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB189	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB194	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB206	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
PCB209	< 0.084	< 0.0943	< 0.0901	< 0.073	< 0.0781
Total PCBs	0.72	0.67	0.33	0.61	0.37

Notes & Abbreviations:
Values detected below the reporting limit but above the detection limit are 'J' flagged.
PCB: polychlorinated biphenyl
µg/kg: microgram per kilogram
Non-detects are reported as < the reporting limit

Table 6.2: Analytical Results for Bioaccumulation Tests for DMMU-2 and DMMU-2 Reference Sediment
Port of Los Angeles
San Pedro, California

Analyte	Units	DMMU-2					
		Nereis virens					
		Pre-test	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5
% Lipids	%	1.1	1.40	1.2	1.3	1.1	0.77
PCB3	µg/kg	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB5/8	µg/kg	< 0.25	< 0.24	< 0.25	< 0.25	< 0.25	< 0.25
PCB15	µg/kg	< 0.15	< 0.14	< 0.14	< 0.14	< 0.14	< 0.15
PCB18	µg/kg	< 0.095	0.46	0.49	0.47	0.35	0.25
PCB27	µg/kg	< 0.14	< 0.13	< 0.14	< 0.14	< 0.14	< 0.14
PCB28	µg/kg	< 0.096	0.36	0.31	0.3	0.17 J	< 0.096
PCB29	µg/kg	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB31	µg/kg	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
PCB33	µg/kg	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
PCB37	µg/kg	< 0.12	< 0.11	< 0.11	< 0.11	< 0.11	< 0.12
PCB44	µg/kg	< 0.11	0.26	0.24	0.22	0.15 J	< 0.11
PCB49	µg/kg	< 0.085	0.11 J	0.13 J	0.17 J	0.14 J	< 0.085
PCB52	µg/kg	< 0.12	0.68	0.74	0.58	0.44	0.5
PCB56	µg/kg	< 0.19	< 0.18	< 0.19	< 0.19	< 0.19	< 0.19
PCB60	µg/kg	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19
PCB66	µg/kg	< 0.084	0.14 J	0.19 J	0.12 J	0.11 J	< 0.084
PCB70	µg/kg	< 0.11	0.19 J	< 0.11	0.11 J	0.17 J	< 0.11
PCB74	µg/kg	< 0.089	0.11 J	< 0.088	< 0.088	< 0.088	< 0.089
PCB77	µg/kg	< 0.049	< 0.048	< 0.049	< 0.049	< 0.049	< 0.049
PCB81	µg/kg	< 0.081	< 0.080	< 0.081	< 0.081	< 0.081	< 0.081
PCB87	µg/kg	< 0.076	0.083 J	0.087 J	< 0.076	< 0.076	< 0.076
PCB95	µg/kg	< 0.11	0.58	0.64	0.55	0.45	0.3
PCB97	µg/kg	< 0.15	0.31	< 0.15	0.21	< 0.15	< 0.15
PCB99	µg/kg	< 0.10	0.26	0.26	0.23	0.21	0.14 J
PCB101	µg/kg	< 0.083	0.64 B	0.64 B	0.58 B	0.46 B	0.27 B
PCB105	µg/kg	< 0.095	0.24	0.21	0.14 J	0.13 J	0.096 J
PCB110	µg/kg	< 0.087	0.4	0.43	0.33	0.27	0.16 J
PCB114	µg/kg	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060
PCB118	µg/kg	< 0.073	0.33	0.32	0.25	0.24	0.16 J
PCB119	µg/kg	< 0.076	< 0.075	< 0.076	< 0.076	< 0.076	< 0.076
PCB123	µg/kg	< 0.055	< 0.054	< 0.054	< 0.054	< 0.054	< 0.055
PCB126	µg/kg	< 0.081	< 0.080	< 0.080	< 0.080	< 0.080	< 0.081
PCB128	µg/kg	< 0.066	0.078 J	< 0.066	< 0.066	< 0.066	< 0.066
PCB132/153	µg/kg	0.27 J	0.88	0.87	0.85	0.69	0.45
PCB137	µg/kg	< 0.097	< 0.096	< 0.097	< 0.097	< 0.097	< 0.097
PCB138/158	µg/kg	< 0.13	0.54	0.57	0.49	0.41	0.26 J
PCB141	µg/kg	< 0.16	< 0.15	< 0.15	< 0.15	< 0.15	< 0.16
PCB149	µg/kg	< 0.070	0.39	0.4	0.35	0.31	0.18 J
PCB151	µg/kg	< 0.054	0.1 J	0.096 J	0.097 J	0.075 J	0.056 J
PCB156	µg/kg	< 0.088	< 0.087	< 0.087	< 0.087	< 0.087	< 0.088
PCB157	µg/kg	< 0.060	< 0.059	< 0.060	< 0.060	< 0.060	< 0.060
PCB167	µg/kg	< 0.078	< 0.077	< 0.077	< 0.077	< 0.077	< 0.078
PCB168	µg/kg	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057
PCB169	µg/kg	< 0.080	< 0.079	< 0.079	< 0.079	< 0.079	< 0.080
PCB170	µg/kg	< 0.082	< 0.081	< 0.082	< 0.082	< 0.082	< 0.082
PCB174	µg/kg	< 0.084	< 0.083	< 0.084	< 0.084	< 0.084	< 0.084
PCB177	µg/kg	< 0.070	< 0.069	< 0.069	< 0.069	< 0.069	< 0.070
PCB180	µg/kg	< 0.063	0.2	0.21	0.17 J	0.15 J	0.075 J
PCB183	µg/kg	< 0.063	0.07 J	0.077 J	0.078 J	0.064 J	< 0.063
PCB184	µg/kg	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
PCB187	µg/kg	< 0.075	0.17 J	0.14 J	0.15 J	0.14 J	0.093 J
PCB189	µg/kg	< 0.064	< 0.063	< 0.063	< 0.063	< 0.063	< 0.064
PCB194	µg/kg	< 0.064	< 0.064	< 0.064	< 0.064	< 0.064	< 0.064
PCB195	µg/kg	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19
PCB200	µg/kg	< 0.093	< 0.092	< 0.093	< 0.093	< 0.093	< 0.093
PCB201	µg/kg	< 0.092	< 0.091	< 0.091	< 0.091	< 0.091	< 0.092
PCB203	µg/kg	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
PCB206	µg/kg	< 0.075	< 0.074	< 0.075	< 0.075	< 0.075	< 0.075
PCB209	µg/kg	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Total PCBs	µg/kg	0.27	7.58	7.05	6.45	5.13	2.99

Table 6.2: Analytical Results for Bioaccumulation Tests for DMMU-2 and DMMU-2 Reference Sediment
Port of Los Angeles
San Pedro, California

Analyte	DMMU-2					
	Macoma nasuta					
	Pre-test	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5
% Lipids	0.63	0.99	0.95	1.1	0.9	0.92
PCB3	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB5/8	< 0.25	0.49	0.46	0.54	0.37 J	0.51
PCB15	< 0.15	< 0.15	< 0.15	< 0.14	< 0.15	< 0.15
PCB18	< 0.095	0.77	0.7	0.63	0.5	0.81
PCB27	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14
PCB28	< 0.096	0.55	0.65	0.71	0.54	0.73
PCB29	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB31	< 0.13	0.71	0.6	0.68	0.52	0.59
PCB33	< 0.12	0.8	0.72	0.82	0.73	0.74
PCB37	< 0.12	< 0.12	< 0.12	< 0.11	< 0.12	< 0.12
PCB44	< 0.11	0.17 J	0.21	0.2 J	0.2 J	0.16 J
PCB49	< 0.085	0.38	0.32	0.42	0.34	0.35
PCB52	< 0.12	0.66	0.65	0.81	0.56	0.74
PCB56	< 0.19	0.2 J	< 0.19	0.2 J	< 0.19	0.19 J
PCB60	< 0.19	0.26	0.23	< 0.19	0.22	0.2 J
PCB66	< 0.084	0.37	0.42	0.48	0.38	0.47
PCB70	< 0.11	0.66	0.56	0.75	0.59	0.66
PCB74	< 0.089	0.31	0.29	0.41	0.33	0.35
PCB77	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049
PCB81	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081
PCB87	< 0.076	0.36	0.31	0.44	0.32	0.41
PCB95	< 0.11	0.61	0.57	0.78	0.59	0.65
PCB97	0.16 J	0.69	0.68	0.67	0.7	0.68
PCB99	< 0.10	0.49	0.44	0.55	0.47	0.56
PCB101	< 0.083	0.98 B	0.93 B	1.2 B	0.9 B	1.2 B
PCB105	< 0.095	0.32	0.31	0.38	0.29	0.34
PCB110	< 0.087	0.83	0.74	1	0.74	0.91
PCB114	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060
PCB118	< 0.073	0.79	0.76	1	0.73	0.9
PCB119	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076
PCB123	< 0.055	< 0.055	< 0.055	< 0.054	< 0.055	< 0.055
PCB126	< 0.081	< 0.081	< 0.081	< 0.080	< 0.081	< 0.081
PCB128	< 0.066	0.16 J	0.11 J	0.15 J	0.12 J	0.15 J
PCB132/153	< 0.20	1.2	1.1	1.3	1.1	1.3
PCB137	< 0.097	< 0.097	< 0.097	< 0.097	< 0.097	< 0.097
PCB138/158	< 0.13	0.81	0.77	0.96	0.74	0.93
PCB141	< 0.16	< 0.16	< 0.16	0.21	< 0.16	0.19 J
PCB149	< 0.070	0.59	0.52	0.67	0.48	0.67
PCB151	< 0.054	0.18 J	0.18 J	0.18 J	0.13 J	0.19 J
PCB156	< 0.088	< 0.088	< 0.088	< 0.087	< 0.088	0.12 J
PCB157	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060
PCB167	< 0.078	< 0.078	< 0.078	< 0.077	< 0.078	< 0.078
PCB168	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057
PCB169	< 0.080	< 0.080	< 0.080	< 0.079	< 0.080	< 0.080
PCB170	< 0.082	< 0.082	< 0.082	< 0.082	< 0.082	< 0.082
PCB174	< 0.084	0.097 J	0.11 J	0.13 J	0.12 J	0.13 J
PCB177	< 0.070	< 0.070	< 0.070	< 0.069	0.072 J	< 0.070
PCB180	< 0.063	< 0.063	< 0.063	< 0.062	< 0.063	< 0.063
PCB183	< 0.063	< 0.063	0.067 J	0.077 J	0.07 J	0.087 J
PCB184	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
PCB187	< 0.075	0.13 J	0.14 J	0.15 J	0.12 J	0.17 J
PCB189	< 0.064	< 0.064	< 0.064	< 0.063	< 0.064	< 0.064
PCB194	< 0.064	< 0.064	< 0.064	< 0.064	< 0.064	< 0.064
PCB195	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19
PCB200	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093
PCB201	< 0.092	< 0.092	< 0.092	< 0.091	< 0.092	< 0.092
PCB203	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
PCB206	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075
PCB209	< 0.16	2.0	< 0.16	< 0.16	< 0.16	< 0.16
Total PCBs	0.16	14.57	13.55	16.50	12.97	16.09

Table 6.2: Analytical Results for Bioaccumulation Tests for DMMU-2 and DMMU-2 Reference Sediment
Port of Los Angeles
San Pedro, California

Analyte	Reference				
	Nereis virens				
	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5
% Lipids	1.2	1	1	1	1.3
PCB3	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB5/8	< 0.24	< 0.25	< 0.24	< 0.25	< 0.25
PCB15	< 0.14	< 0.15	< 0.14	< 0.14	< 0.15
PCB18	< 0.094	< 0.095	< 0.094	< 0.094	< 0.095
PCB27	< 0.13	< 0.14	< 0.13	< 0.14	< 0.14
PCB28	< 0.095	< 0.096	< 0.095	< 0.096	< 0.096
PCB29	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB31	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
PCB33	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
PCB37	< 0.11	< 0.12	< 0.11	< 0.11	< 0.12
PCB44	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
PCB49	< 0.084	< 0.085	< 0.084	< 0.084	< 0.085
PCB52	< 0.12	0.12 J	< 0.12	0.15 J	0.13 J
PCB56	< 0.18	< 0.19	< 0.18	< 0.19	< 0.19
PCB60	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19
PCB66	< 0.083	< 0.084	< 0.083	< 0.083	< 0.084
PCB70	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
PCB74	< 0.088	< 0.089	< 0.088	< 0.088	< 0.089
PCB77	< 0.048	< 0.049	< 0.048	< 0.049	< 0.049
PCB81	< 0.080	< 0.081	< 0.080	< 0.081	< 0.081
PCB87	< 0.075	< 0.076	< 0.075	< 0.076	< 0.076
PCB95	0.12 J	< 0.11	< 0.11	< 0.11	< 0.11
PCB97	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
PCB99	< 0.099	< 0.10	< 0.099	< 0.10	< 0.10
PCB101	0.088 B,J	< 0.083	0.082 B,J	0.1 B,J	0.096 B,J
PCB105	< 0.094	< 0.095	< 0.094	< 0.095	< 0.095
PCB110	< 0.086	< 0.087	< 0.086	< 0.086	< 0.087
PCB114	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060
PCB118	< 0.073	< 0.073	< 0.073	< 0.073	< 0.073
PCB119	< 0.075	< 0.076	< 0.075	< 0.076	< 0.076
PCB123	< 0.054	< 0.055	< 0.054	< 0.054	< 0.055
PCB126	< 0.080	< 0.081	< 0.080	< 0.080	< 0.081
PCB128	< 0.065	< 0.066	< 0.065	< 0.066	< 0.066
PCB132/153	0.32 J	0.25 J	0.3 J	0.24 J	0.34 J
PCB137	< 0.096	< 0.097	< 0.096	< 0.097	< 0.097
PCB138/158	0.19 J	0.14 J	0.16 J	0.13 J	0.19 J
PCB141	< 0.15	< 0.16	< 0.15	< 0.15	< 0.16
PCB149	0.12 J	0.084 J	0.11 J	0.085 J	0.1 J
PCB151	< 0.053	< 0.054	< 0.053	< 0.053	< 0.054
PCB156	< 0.087	< 0.088	< 0.087	< 0.087	< 0.088
PCB157	< 0.059	< 0.060	< 0.059	< 0.060	< 0.060
PCB167	< 0.077	< 0.078	< 0.077	< 0.077	< 0.078
PCB168	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057
PCB169	< 0.079	< 0.080	< 0.079	< 0.079	< 0.080
PCB170	< 0.081	< 0.082	< 0.081	< 0.082	< 0.082
PCB174	< 0.083	< 0.084	< 0.083	< 0.084	< 0.084
PCB177	< 0.069	< 0.070	< 0.069	< 0.069	< 0.070
PCB180	< 0.062	< 0.063	< 0.062	< 0.062	< 0.063
PCB183	< 0.062	< 0.063	< 0.062	< 0.062	< 0.063
PCB184	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
PCB187	0.091 J	< 0.075	< 0.074	< 0.074	0.083 J
PCB189	< 0.063	< 0.064	< 0.063	< 0.063	< 0.064
PCB194	< 0.064	< 0.064	< 0.064	< 0.064	< 0.064
PCB195	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19
PCB200	< 0.092	< 0.093	< 0.092	< 0.093	< 0.093
PCB201	< 0.091	< 0.092	< 0.091	< 0.091	< 0.092
PCB203	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
PCB206	< 0.074	< 0.075	< 0.074	< 0.075	< 0.075
PCB209	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Total PCBs	0.93	0.59	0.65	0.71	0.94

Table 6.2: Analytical Results for Bioaccumulation Tests for DMMU-2 and DMMU-2 Reference Sediment
Port of Los Angeles
San Pedro, California

Analyte	Reference				
	Macoma nasuta				
	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5
% Lipids	1.1	0.87	0.91	1.2	1.1
PCB3	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB5/8	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
PCB15	< 0.15	< 0.15	< 0.14	< 0.15	< 0.15
PCB18	< 0.095	< 0.095	< 0.094	< 0.095	< 0.095
PCB27	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14
PCB28	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096
PCB29	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB31	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
PCB33	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
PCB37	< 0.12	< 0.12	< 0.11	< 0.12	< 0.12
PCB44	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
PCB49	< 0.085	< 0.085	< 0.084	0.10 J	< 0.085
PCB52	0.17 J	0.14 J	0.14 J	0.13 J	0.19 J
PCB56	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19
PCB60	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19
PCB66	0.11 J	< 0.084	< 0.083	< 0.084	< 0.084
PCB70	0.11 J	0.14 J	0.12 J	< 0.11	0.16 J
PCB74	< 0.089	< 0.089	0.098 J	< 0.089	< 0.089
PCB77	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049
PCB81	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081
PCB87	0.19 J	0.13 J	0.12 J	0.11 J	0.17 J
PCB95	0.12 J	0.14 J	< 0.11	0.13 J	0.12 J
PCB97	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
PCB99	0.19 J	0.18 J	0.13 J	0.16 J	0.2 J
PCB101	0.19 B,J	0.2 B,J	0.15 B,J	0.19 B,J	0.18 B,J
PCB105	< 0.095	< 0.095	< 0.095	< 0.095	< 0.095
PCB110	0.17 J	0.18 J	0.17 J	0.14 J	0.19 J
PCB114	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060
PCB118	0.17 J	0.2 J	0.15 J	0.18 J	0.2
PCB119	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076
PCB123	< 0.055	< 0.055	< 0.054	< 0.055	< 0.055
PCB126	< 0.081	< 0.081	< 0.080	< 0.081	< 0.081
PCB128	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066
PCB132/153	0.39 J	0.36 J	0.35 J	0.35 J	0.39 J
PCB137	< 0.097	< 0.097	< 0.097	< 0.097	< 0.097
PCB138/158	0.24 J	0.23 J	0.19 J	0.23 J	0.26 J
PCB141	< 0.16	< 0.16	< 0.15	< 0.16	< 0.16
PCB149	0.16 J	0.16 J	0.13 J	0.13 J	0.17 J
PCB151	< 0.054	< 0.054	< 0.053	< 0.054	0.06 J
PCB156	< 0.088	< 0.088	< 0.087	< 0.088	< 0.088
PCB157	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060
PCB167	< 0.078	< 0.078	< 0.077	< 0.078	< 0.078
PCB168	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057
PCB169	< 0.080	< 0.080	< 0.079	< 0.080	< 0.080
PCB170	< 0.082	< 0.082	< 0.082	< 0.082	< 0.082
PCB174	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084
PCB177	< 0.070	< 0.070	< 0.069	< 0.070	< 0.070
PCB180	< 0.063	< 0.063	< 0.062	< 0.063	< 0.063
PCB183	< 0.063	< 0.063	< 0.062	< 0.063	< 0.063
PCB184	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
PCB187	0.08 J	< 0.075	0.079 J	0.08 J	< 0.075
PCB189	< 0.064	< 0.064	< 0.063	< 0.064	< 0.064
PCB194	< 0.064	< 0.064	< 0.064	< 0.064	< 0.064
PCB195	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19
PCB200	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093
PCB201	< 0.092	< 0.092	< 0.091	< 0.092	< 0.092
PCB203	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
PCB206	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075
PCB209	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Total PCBs	2.29	2.06	1.83	1.83	2.29

Notes & Abbreviations:
Values detected below the reporting limit but above the detection limit are 'J' flagged.
PCB: polychlorinated biphenyl
µg/kg: microgram per kilogram
Non-detects are reported as < the reporting limit

Table 7: Summary of Tissue Residue PCB Concentrations and Statistical Evaluation
Port of Los Angeles
San Pedro, California

Species	Test Area	Units	Day 0 Tissue Concentration	Sample Mean Tissue Concentration	Reference Mean Tissue Concentration	Ratio to Reference	Statistical Test	Test 'U' Value	Mann Whitney 'U' Critical Value [1]	Conclusion [2]
N. virens	DMMU-1	µg/kg	0.17	6.11	0.74	8.2	Mann Whitney Signed Rank Test	0	2	Statistically different from reference
	DMMU-2	µg/kg	0.27	5.84	0.76	7.6		0	2	Statistically different from reference
M. nasuta	DMMU-1	µg/kg	< 0.345	11.14	0.54	20.6		0	2	Statistically different from reference
	DMMU-2	µg/kg	0.16	14.73	2.06	7.1		0	2	Statistically different from reference

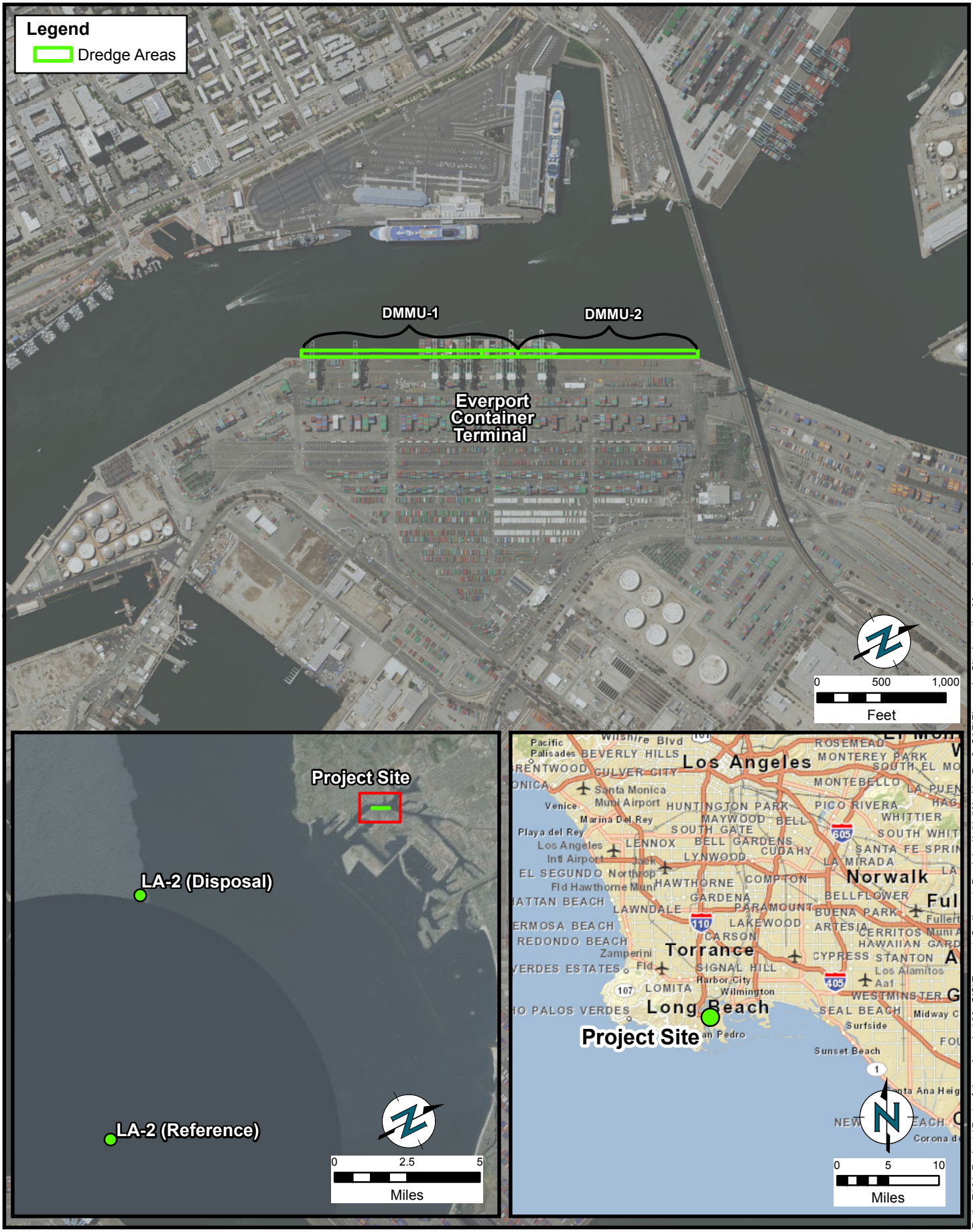
Notes & Abbreviations:
1: U Critical based on n=5 for both populations
2: If lower of U values from sample and reference results is less than U critical, reject null hypothesis
µg/kg = microgram per kilogram
Non-detects are reported as < the reporting limit

Table 8: Summary of Screening Level Risk Assesment for PCBs
Port of Los Angeles
San Pedro, California

Species	Test Area	Sample Mean Concentration of PCBs in Tissues (µg/kg)	Steady State Concentration of PCBs (µg/kg)	Highest Exposure Concentration (µg/kg)	Food Chain Multiplier - Trophic Level 3	Food Chain Multiplier - Trophic Level 4	Predicted Concentration in Slender Sole (µg/kg)	Predicted Concentration in Pacific Sanddab (µg/kg)	Predicted Concentration in California Sea Lion (µg/kg)	FDA Action Level for PCBs in Shellfish (µg/kg)	ERED Effect Value - *M. nasuta* (µg/kg)	ERED Effect Value - *P. americanus* (µg/kg)	Range of PCB Concentration in Southern California Coastal Fish (µg/kg)
N. virens	DMMU-1	6.11	6.11	19.30	13.3	24.7	256.6	256.6	476.6	2,000	1,700	7,000	2 - 516
	DMMU-2	5.84	5.84										
M. nasuta	DMMU-1	11.14	14.59										
	DMMU-2	14.73	19.30										

Notes & Abbreviations
µg/kg = microgram per kilogram
PCB = Polychlorinated biphenyls
FDA = Food and Drug Assocaition
ERED = Enviornmental Residue Effects Database

FIGURES



Path: Z:\01_Projects\Port_of_Los_Angeles\03_GIS\Everport_Sediment_Dredging\Initial\WorkingDraft_SAP\Figure 1 - Site Location Map.mxd

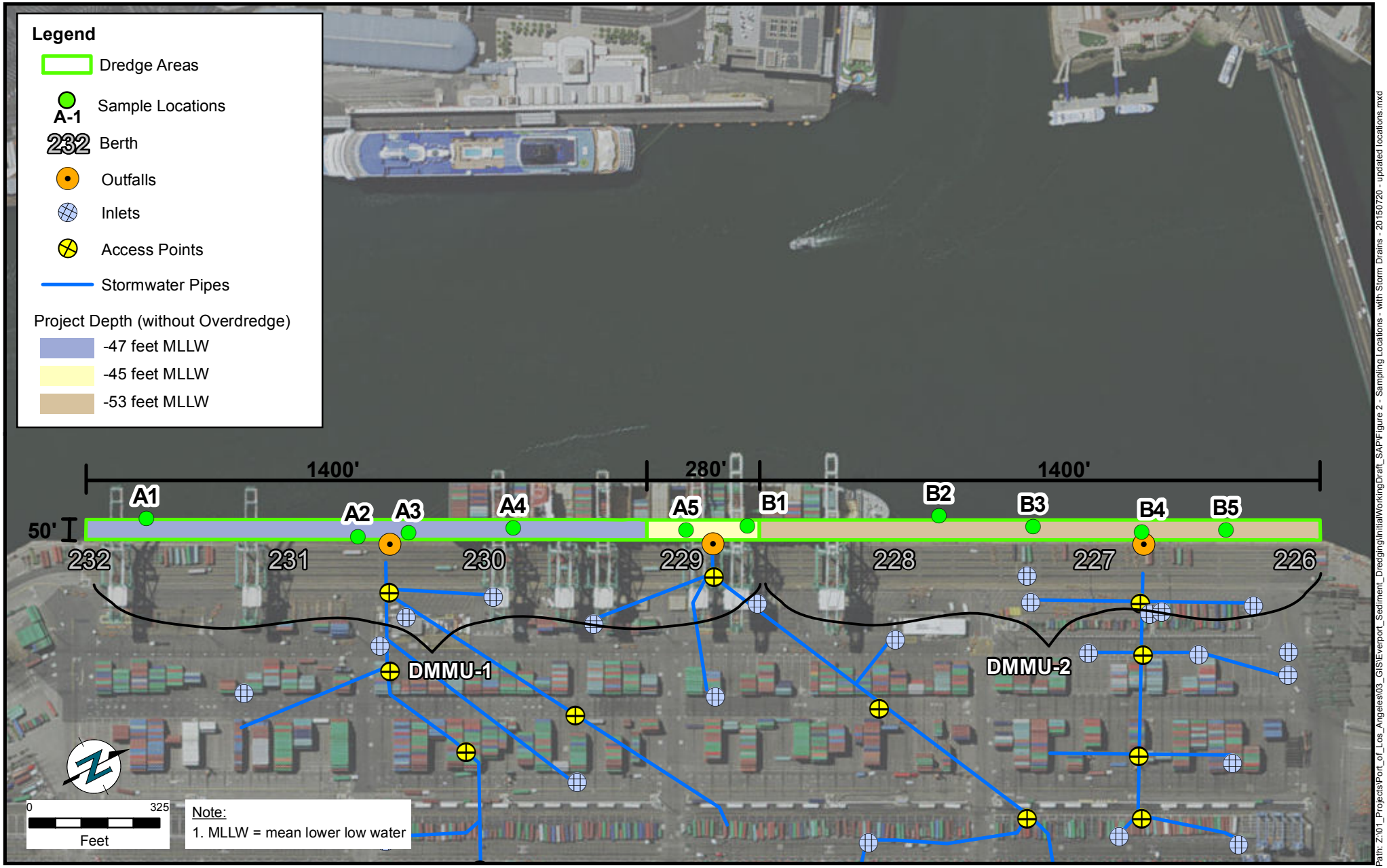
RAMBOLL ENVIRON

Site Location Map

Port of Los Angeles
San Pedro, California

Figure
1

DRAFTED BY: SShin | Date: 7/28/2015 | PROJECT: 04-33310A05



Path: Z:\01_Projects\Port_of_Los_Angeles\03_GIS\Everport_Sediment_Dredging\InitialWorkingDraft_SAP\Figure 2 - Sampling Locations - with Storm Drains - 20150720 - updated locations.mxd

RAMBOLL ENVIRON

Everport Project Sample Locations

Port of Los Angeles
San Pedro, California

Figure
2

DRAFTED BY: MGrover/SShin | Date: 7/21/2015 | PROJECT: 04-33310A05

APPENDIX A
SUPPORTING FIELD INFORMATION

APPENDIX A-1
FIELD NOTES

ENVIRON
18100 Von Karman Ave., Suite 600
Irvine, California 92612
(949) 261-5151
(949) 261-6202 (FAX)

FIELD INVESTIGATION DAILY LOG

PROJECT NAME: POLA Everport
FIELD PERSON: M. Grover / D. Moore
PROJECT NUMBER: 0433310A05
PROJECT MANAGER: L. Conder / D. Moore.
PROJECT LOCATION: San Pedro, CA
DATE: 10/28/14

DAILY SUMMARY: Core Sampling Site B: B2 + B1
WEATHER CONDITIONS: 77°F, Clear skies. Wind 5mph North
VISITORS/SUBCONTRACTORS: Ken Neilson / Bob Lohrman, SeaVentures & Brian Riley, Aquatic Plus

MILITARY TIME	ACTIVITIES
7:00	meet at Cabrillo Marina after getting ice at Vons.
	6 20# bags. Health + Safety meeting.
7:30	Leave Cabrillo Marina
11:27	Back on land. B. Riley to retrieve back up vibracore.
15:16	Headed out to Site B Everport
17:54	Headed back to Cabrillo
18:28	Leave boat + coolers at Cabrillo Marina

Prepared By (name/signature): Melissa Grover MG Date: 10/28/14
Reviewed By (name/signature): _____ Date: _____

ENVIRON
18100 Von Karman Ave., Suite 600
Irvine, California 92612
(949) 261-5151
(949) 261-6202 (FAX)

FIELD INVESTIGATION DAILY LOG

PROJECT NAME: POLA Everport
PROJECT NUMBER: 0433310A05
PROJECT LOCATION: San Pedro, CA
FIELD PERSON: M. Grover/ M. Rapaso
PROJECT MANAGER: J. Conder/ D. Moore
DATE: 10-29-14

DAILY SUMMARY: Core Sampling Site B (DMMU-2): B3, B4, B5
WEATHER CONDITIONS: 84°F, Clear, 5 mph North
VISITORS/SUBCONTRACTORS: Kenny Neilson/Bob Lohrman, Sea Ventures; Brian Riley, Aquatic Blue.

MILITARY TIME	ACTIVITIES
6:15	Get ice at Vons on 25th St. 6 bags of the 3-pk pack
7:00	Depart for B3
12:28	Collect TWO 20-L site water samples. Live boat near center of DMMU-2. Head back to Cabrillo Marina. Need to be out of area due to in-coming cargo vessel.
13:15	Arrive at Cabrillo Marina. Demobilize all equipment and coolers. CalScience courier picks up coolers with water samples from DoubleTree. Sediment transported in Uhaul van to ENVIRON's processing center in Irvine. Sediment to be homogenized and subsampled tomorrow.

Prepared By (name/signature): Melissa Grover MG Date: 10/29/14
Reviewed By (name/signature): _____ Date: _____

ENVIRON
18100 Von Karman Ave., Suite 600
Irvine, California 92612
(949) 261-5151
(949) 261-6202 (FAX)

FIELD INVESTIGATION DAILY LOG

PROJECT NAME: Freeport
FIELD PERSON: J. Arblaster
PROJECT NUMBER: 04-33310A06
PROJECT MANAGER: D. Moore
PROJECT LOCATION: San Pedro
DATE: 03/26/15

DAILY SUMMARY: Sampling of DMMU-1
WEATHER CONDITIONS: Clear, mid 80's
VISITORS/SUBCONTRACTORS: Ken & Bob (SeaVentures) B. Riley (Aquatic Blue), D Moore & M Rapoza (ENVIRON)

MILITARY TIME	ACTIVITIES
0560	Leave for warehouse to get supplies
0515	Leave for San Pedro.
0600	Stop for ice in San Pedro.
0630	Arrive at Cabrillo Marina. Begin mobing equipment to boat.
0730	Begin mixing reference sediment picked up by Ken & Bob on 3/25/15. Reference sediment is sandy, homogenized easily
0930	Finished sampling reference sediment. 15 x 16oz jars for phys/chem analysis, 3.5 full sediment bags for bioassay.
1030	Begin mob to A-1 after vibracore set up.
1045	Anchor @ Station A-1
1105	Take first core. Log & take 2-layer archive, save half for DMMU-1 composite.
1125	Take 2nd Core @ A1.
1200	Take 3rd Core @ A1. Composite & subsample for archive. Pot in sediment bag for hold until all stations finished.
1230	Decon all equipment.

Prepared By (name/signature): _____ Date: 3/26/15
Reviewed By (name/signature): _____ Date: _____

ENVIRON
18100 Von Karman Ave., Suite 600
Irvine, California 92612
(949) 261-5151
(949) 261-6202 (FAX)

FIELD INVESTIGATION DAILY LOG

PROJECT NAME: Everport
FIELD PERSON: J. Arblaster
PROJECT NUMBER: 04-33510 A06
PROJECT MANAGER: D. Moore
PROJECT LOCATION: San Pedro
DATE: 3/26/15

DAILY SUMMARY: A1 Station sampling
WEATHER CONDITIONS: Clear, mid 80's
VISITORS/SUBCONTRACTORS:

MILITARY TIME	ACTIVITIES
12 55	Mob to station A2. Depth too deep to core, not enough dredged material to include. Decide to take 4 cores @ each station to ensure adequate volume.
13 30	
1500	Finish @ A2. Confirm depths & mark out stations. Mob to A3 to begin sampling. Decon all equipment before.
16 10	Finish sampling A3. 4 cores of 3ft recovery. Mob to A1 to collect 4th core.
16 45	Head back to dock.
17 15	Back @ dock. Demob.
17 30	Head to hotel.

Prepared By (name/signature): [signature] Date: 3/26/15
Reviewed By (name/signature): _____ Date: _____

ENVIRON
18100 Von Karman Ave., Suite 600
Irvine, California 92612
(949) 261-5151
(949) 261-6202 (FAX)

FIELD INVESTIGATION DAILY LOG

PROJECT NAME: Everport
FIELD PERSON: J. Ashlaster
PROJECT NUMBER: 04 33310 A05
PROJECT MANAGER: D. Moore.
PROJECT LOCATION: San Pedro.
DATE: 3/27/15

DAILY SUMMARY: Sampling A4 & A5.
WEATHER CONDITIONS: Clear, mid 80°F
VISITORS/SUBCONTRACTORS: SeaVentures, Aquatic Blue.

MILITARY TIME	ACTIVITIES
0615	Meet MR, go to get ice.
0645	Meet @ Early Bird II, head to A4.
0800	Set up @ A4. Collect site water samples before begining core collection.
1000	Finish A4 → 4 cores of good recovery. Mob to A5 to sample.
1100	Collect A5 2-layer from Core 2 (Mesh) Add 2-layer from core 3 to composite.
1130	2-layer homogenized & DMMU-1-2-layer sampled.
1145	Begin homogenizing all Stations.
1230	Begin jarring/bagging all DMMU-1 samples.
1345	Back @ dock. Begin unloading.
1500	Leave Cabrillo.
1607	Drop off samples @ Calscience. Head to FedEx
1645	Arrive @ FedEx.
1730	Head to warehouse to offload
1815	Return rental van.
1830	Head for home.

Prepared By (name/signature): [signature] Date: 3/27/15
Reviewed By (name/signature): _____ Date: _____

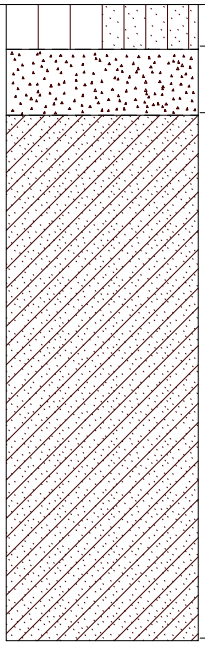
APPENDIX A-2
CORE LOGS

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B1 - Core 1	Date: 10/28/14	Latitude:33.74512	Longitude: -118.27225
Water Depth: 49.4 ft	Tide: 3 ft	MLLW:46.4 ft	Project Depth: 55 ft
Target Core Length: 8.6 ft	Penetration: 9 ft	Final Core Length: 7.2 ft	Core Length for Analysis: 7.2 ft
Core Diameter: 4 in.	Start Time: 16:02	End Time: 16:15	Cord.Systm: NAD83CASPV

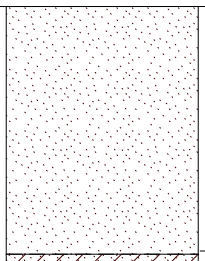
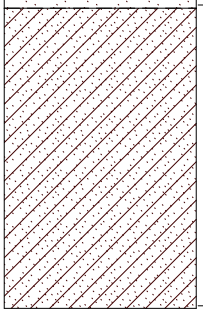
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silty sand.	GLEY 1 2.5/N - Black	None	
		Clayey sand.	GLEY 1 2.5/N - Black	None	
2					
3					
4		Clay with sand.	GLEY 1 2.5/N - Black	None	No Z-layer.
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B1 - Core 3	Date: 10/28/14	Latitude:33.74512	Longitude: -118.27225
Water Depth: 50.3 ft	Tide: 1.5 ft	MLLW:48.8 ft	Project Depth: 55 ft
Target Core Length: 6.2 ft	Penetration: 7 ft	Final Core Length: 6.2 ft	Core Length for Analysis: 6.2 ft
Core Diameter: 4 in.	Start Time: 17:17	End Time: 17:27	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1–2		Sand.	GLEY 1 4/10GY - Dark greenish grey	None	
3–6		Clay with sand.	GLEY 1 4/10GY - Dark greenish grey	None	No Z-layer.

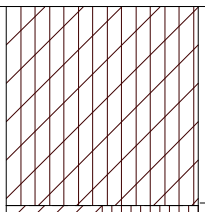
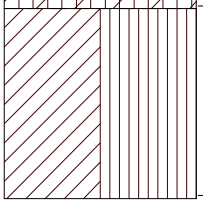
7 8 9 10 11 12 13 14

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B2 - Core 1	Date: 10/28/14	Latitude:33.74632	Longitude: -118.27161
Water Depth: 54.8 ft	Tide: 4.5 ft	MLLW:50.3 ft	Project Depth: 55 ft
Target Core Length: 4.7 ft	Penetration: 6 ft	Final Core Length: 4.4 ft	Core Length for Analysis: 4.4 ft
Core Diameter: 4 in.	Start Time: 09:56	End Time: 10:05	Cord.Systm: NAD83CASPV

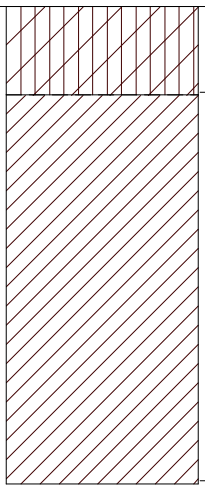
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1–2		Clayey silt.	GLEY 1 4/10Y - Dark greenish gray	None	
3–4		Silty clay.	GLEY 1 4/10Y - Dark greenish gray	None	No Z-layer.
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B2 - Core 2	Date: 10/28/14	Latitude:33.74632	Longitude: -118.27161
Water Depth: 53.3 ft	Tide: 3.5 ft	MLLW:49.8 ft	Project Depth: 55 ft
Target Core Length: 5.2 ft	Penetration: 7 ft	Final Core Length: 5.2 ft	Core Length for Analysis: 4.9 ft
Core Diameter: 4 in.	Start Time: 08:29	End Time: 08:48	Cord.Systm: NAD83CASPV

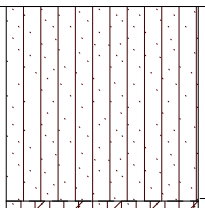
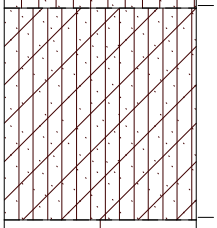
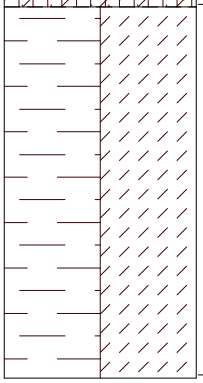
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Clayey silt.	GLEY 2.5/N - Black	None	
2					
3		Clay.	GLEY 2.5/N - Black	None	Z-layer = 9 cm.
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B3 - Core 1	Date: 10/29/14	Latitude:33.74687	Longitude: -118.27119
Water Depth: 49.5 ft	Tide: 3.1 ft	MLLW:46.4 ft	Project Depth: 55 ft
Target Core Length: 8.6 ft	Penetration: 9 ft	Final Core Length: 8.6 ft	Core Length for Analysis: 8.3 ft
Core Diameter: 4 in.	Start Time: 07:50	End Time: 08:10	Cord.Systm: NAD83CASPV

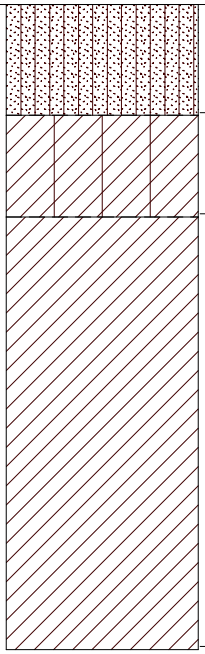
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1–2		Silt with sand.	GLEY 1 2.5/10GY - Greenish black	None	
3–4		Clayey silt with sand.	GLEY 1 2.5/10GY - Greenish black	None	
5–8		Clay with silt.	GLEY 1 3/10Y - Very dark greenish gray	None	Z-layer = 8 cm.
9					
10					
11					
12					
13					
14					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B3 - Core 3	Date: 10/29/14	Latitude:33.74687	Longitude: -118.27119
Water Depth: 49.8 ft	Tide: 3.5 ft	MLLW:46.3 ft	Project Depth: 55 ft
Target Core Length: 8.7 ft	Penetration: 9 ft	Final Core Length: 7.3 ft	Core Length for Analysis: 7.3 ft
Core Diameter: 4 in.	Start Time: 09:00	End Time: 09:08	Cord.Systm: NAD83CASPV

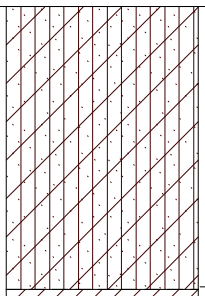
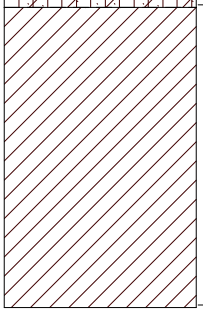
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Sand with silt.	GLEY 1 3/5GY - Very dark greenish gray	None	
2		Silty clay.	GLEY 1 3/5GY - Very dark greenish gray	None	
3					
4					
5		Clay.	GLEY 1 3/10Y - Very dark greenish gray	None	No Z-layer
6					
7					
8					
9					
10					
11					
12					
13					
14					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B4 - Core 1	Date: 10/29/14	Latitude:33.74752	Longitude: -118.27075
Water Depth: 51.1 ft	Tide: 3.7 ft	MLLW:47.4 ft	Project Depth: 55 ft
Target Core Length: 7.6 ft	Penetration: 8.5 ft	Final Core Length: 6.6 ft	Core Length for Analysis: 6.6 ft
Core Diameter: 4 in.	Start Time: 09:43	End Time: 09:55	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1–3		Clayey silt with sand.	GLEY 1 3/10Y - Very dark greenish gray	None	Some shell hash.
4–6		Clay.	GLEY 1 3/10Y - Very dark greenish gray	None	No Z-layer.

7 8 9 10 11 12 13 14

RAMBOLL ENVIRON

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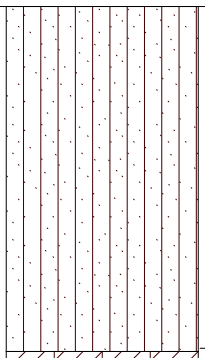
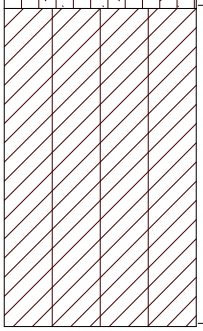
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B4 - Core 2	Date: 10/29/14	Latitude:33.74752	Longitude: -118.27075
Water Depth: 51.1 ft	Tide: 3.7 ft	MLLW:47.4 ft	Project Depth: 55 ft
Target Core Length: 7.6 ft	Penetration: 9 ft	Final Core Length: 7.6 ft	Core Length for Analysis: 7.3 ft
Core Diameter: 4 in.	Start Time: 10:17	End Time: 10:25	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1–3		Silt with sand.	GLEY 1 2.5/N - Black	None.	
4–7		Silty clay.	GLEY 1 3/N - Very dark gray	None.	Z-layer = 8 cm.
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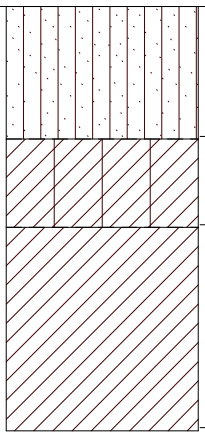
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B5 - Core 1	Date: 10/29/14	Latitude:33.74804	Longitude: -118.27045
Water Depth: 52.5 ft	Tide: 4.5 ft	MLLW:48.0 ft	Project Depth: 55 ft
Target Core Length: 7.0 ft	Penetration: 8 ft	Final Core Length: 4.8 ft	Core Length for Analysis: 4.8 ft
Core Diameter: 4 in.	Start Time: 11:23	End Time: 11:30	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silt with sand.	GLEY 1 3/10Y - Very dark greenish gray	None.	Some shell hash.
2		Silty clay.	GLEY 1 3/10Y - Very dark greenish gray	None.	Shell.
3		Clay.	GLEY 1 3/10Y - Very dark greenish gray	None.	No Z-layer.
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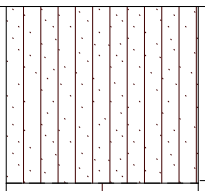
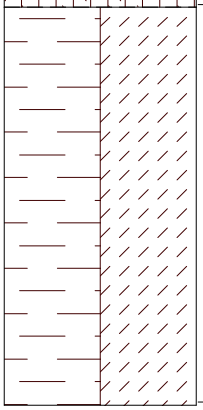
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: M. Grover
Station ID: B5 - Core 2	Date: 10/29/14	Latitude:33.74804	Longitude: -118.27045
Water Depth: 52.5 ft	Tide: 4.5 ft	MLLW:48.0 ft	Project Depth: 55 ft
Target Core Length: 7.0 ft	Penetration: 9 ft	Final Core Length: 6.5 ft	Core Length for Analysis: 6.5 ft
Core Diameter: 4 in.	Start Time: 11:49	End Time: 12:00	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1–2		Silt with sand.	GLEY 1 3/10Y - Very dark greenish gray	None	Some shell hash.
3–6		Clay with silt.	GLEY 1 3/10Y - Very dark greenish gray	None	No Z-layer.

7 8 9 10 11 12 13 14

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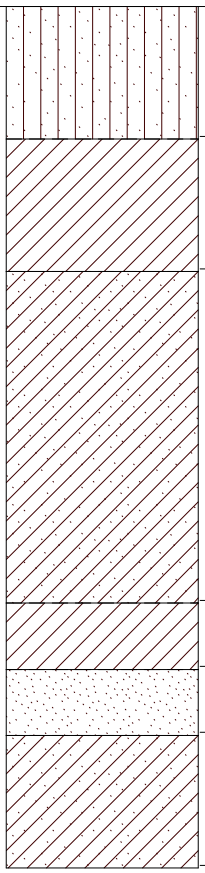
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A1 - Core 1	Date: 3/26/15	Latitude:33.74145833	Longitude: -118.2745083
Water Depth: 45.5 ft	Tide: 0.5 ft	MLLW:45.0 ft	Project Depth: 47 ft
Target Core Length: 4.0 ft	Penetration: 6.5 ft	Final Core Length: 6.5 ft	Core Length for Analysis: 4.0 ft
Core Diameter: 4 in.	Start Time: 10:55	End Time: 11:10	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silt with some sand.	5Y 3/1 - Very Dark Gray	Light sulfur.	Perodic shells and shell hash.
2		Clay.	5Y 3/1 - Very Dark Gray	Light sulfur.	Some shell hash.
3		Stiffer clay with sand.	5Y 3/1 - Very Dark Gray	Light sulfur.	Increasing shell hash.
4					
5		Very stiff clay.	5Y 3/1 - Very Dark Gray	Light sulfur.	
		Sand Lens.	5Y 4/1 - Dark Gray.	None.	
6		Sandy clay with some silt.	5Y 4/1 - Dark Gray.	None.	Z-layer = 6 inches.
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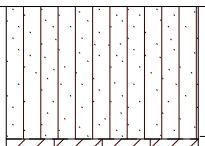
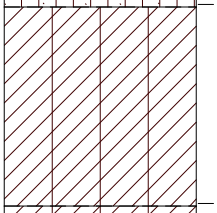
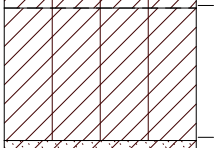
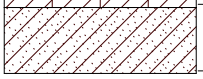
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A1 - Core 2	Date: 3/26/15	Latitude:33.74145833	Longitude: -118.2745083
Water Depth: 45.7 ft	Tide: 0.7 ft	MLLW:45.0 ft	Project Depth: 47 ft
Target Core Length: 4.0 ft	Penetration: 4 ft	Final Core Length: 4.0 ft.	Core Length for Analysis: 4.0 ft
Core Diameter: 4 in.	Start Time: 11:25	End Time: 11:51	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silt with sand.	5Y 4/1 - Dark Gray	Slight sulfur.	Shell hash.
2		Silt with clay.	5Y 4/1 - Dark Gray	Slight sulfur.	Shell hash.
3		Silt with stiff clay.	5Y 3/1 - Very Dark Gray	Slight sulfur.	Shell hash.
4		Sandy clay.	5Y 3/1 - Very Dark Gray	None.	No Z-layer.
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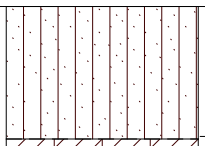
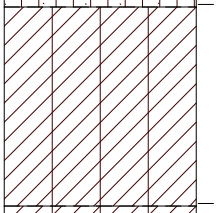
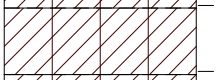
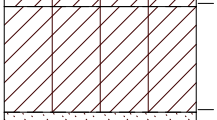
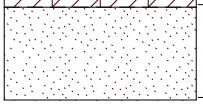
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A1 - Core 3	Date: 3/26/15	Latitude:33.74146333	Longitude: -118.2743783
Water Depth: 45.8 ft	Tide: 0.8 ft	MLLW:45.0 ft	Project Depth: 47 ft
Target Core Length: 4.0 ft	Penetration: **4.5 ft**	Final Core Length: 4.5 ft.	Core Length for Analysis: 4.0 ft
Core Diameter: 4 in.	Start Time: 11:55	End Time: 12:15	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silt with sand.	5Y 3/1 - Very Dark Gray	Slight sulfur.	Shell hash.
2		Silt with clay.	5Y 3/1 - Very Dark Gray	Slight sulfur.	Shell hash.
3		Silt with stiff clay.	5Y 3/1 - Very Dark Gray	Slight sulfur.	Shell hash.
		Silt with stiff clay.	5Y 5/2 - Olive Gray	Slight sulfur.	Shell hash.
4		Sand lens.	5Y 5/3 - Olive	None.	Z-layer = 6" (discarded).
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RAMBOLL ENVIRON

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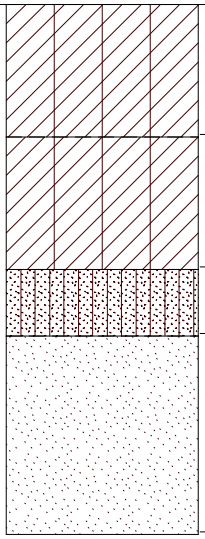
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A1 - Core 4	Date: 3/26/15	Latitude:33.741495	Longitude: -118.2744417
Water Depth: 48.5 ft	Tide: 3.5 ft	MLLW:45.0 ft	Project Depth: 47 ft
Target Core Length: 4.0 ft	Penetration: 4 ft	Final Core Length: 4.0 ft.	Core Length for Analysis: 4.0 ft
Core Diameter: 4 in.	Start Time: 16:40	End Time: 17:00	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silt clay.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
2		Silt stiff clay.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
		Silty sand.	5Y 5/3 - Olive	None.	Trace shell hash.
3		Sand.	5Y 5/3 - Olive	None.	No Z-layer.
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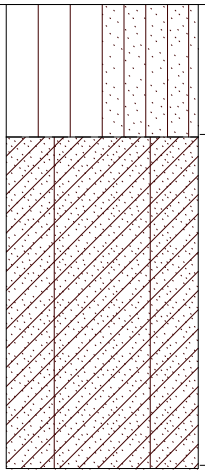
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A2 - Core 1	Date: 3/26/15	Latitude:33.74269833	Longitude: -118.2736
Water Depth: 47.9 ft	Tide: 1.9 ft	MLLW:46.0 ft	Project Depth: 47 ft
Target Core Length: 3.0 ft	Penetration: 3.5 ft	Final Core Length: 3.5 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 13:40	End Time: 13:50	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Sandy silt.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
2		Silty clay with sand.	5Y 3/1 - Very Dark Gray	None.	Shell hash. Z-layer = 6"
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RAMBOLL ENVIRON

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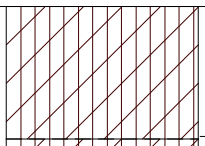
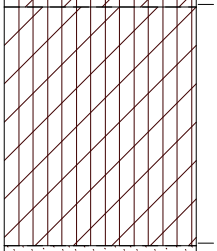
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A2 - Core 2	Date: 3/26/15	Latitude:33.74271167	Longitude: -118.2735983
Water Depth: 48.1 ft	Tide: 2.1 ft	MLLW:46.0 ft	Project Depth: 47 ft
Target Core Length: 3.0 ft	Penetration: 3.0 ft	Final Core Length: 3.0 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 14:00	End Time: 14:10	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Clayey silt.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
2		Clayey silt with stiffer clay.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
3		Sand.	5Y 3/1 - Very Dark Gray	None.	Shell hash. No Z-layer.
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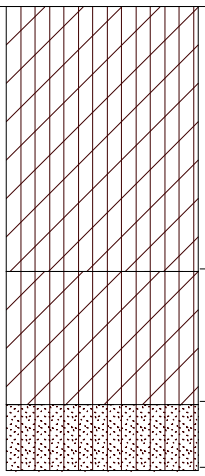
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A2 - Core 3	Date: 3/26/15	Latitude:33.7427	Longitude: -118.27362
Water Depth: 48.3 ft	Tide: 2.3 ft	MLLW:46.0 ft	Project Depth: 47 ft
Target Core Length: 3.0 ft	Penetration: 3.5 ft	Final Core Length: 3.5 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 14:13	End Time: 14:20	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Clayey Silt.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
2		Clayey Silt with stiffer clay.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
3		Fine Sand with silt.	5Y 3/1 - Very Dark Gray	None.	Z-layer = 6" (discarded).
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RAMBOLL ENVIRON

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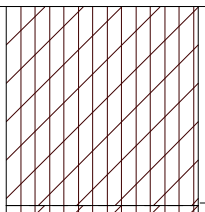
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A2 - Core 4	Date: 3/26/15	Latitude:33.742705	Longitude: -118.2736083
Water Depth: 48.4 ft	Tide: 2.4 ft	MLLW:46.0 ft	Project Depth: 47 ft
Target Core Length: 3.0 ft	Penetration: 4 ft	Final Core Length: 4.0 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 14:25	End Time: 14:35	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Clayey silt.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
2		Clayey silt with stiffer clay.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
3		Clayey silt with stiffer clay.	5Y 3/1 - Very Dark Gray	Strong sulfur.	Shell hash.
		Silty sand.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
4		Sand.	5Y 4/1 - Dark Gray	None.	Shell hash. Z-layer = 1 ft. (discarded).
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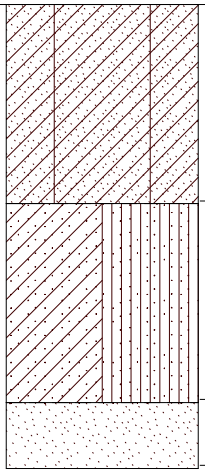
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A3 - Core 1	Date: 3/26/15	Latitude:33.74302	Longitude: -118.2734367
Water Depth: 48.8 ft	Tide: 2.8 ft	MLLW:46.0 ft	Project Depth: 47 ft
Target Core Length: 3.0 ft	Penetration: 3.5 ft	Final Core Length: 3.5 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 15:30	End Time: 15:40	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silty clay with sand.	5Y 3/1 - Very Dark Gray	None.	
2		Stiff clay with silt and sand.	5Y 3/1 - Very Dark Gray	None.	
3		Sand.	5Y 3/1 - Very Dark Gray	None.	Z-layer = 6".
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RAMBOLL ENVIRON

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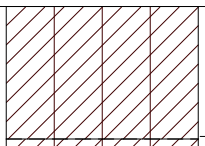
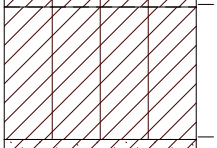
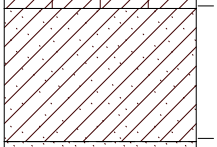
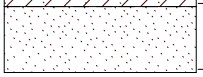
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID A3 - Core 2	Date: 3/26/15	Latitude:33.74302667	Longitude: -118.2734183
Water Depth: 49.0 ft	Tide: 2.9 ft	MLLW:46.1 ft	Project Depth: 47 ft
Target Core Length: 3.1 ft	Penetration: 3.5 ft	Final Core Length: 3.5 ft.	Core Length for Analysis: 3.1 ft
Core Diameter: 4 in.	Start Time: 15:40	End Time: 15:50	Cord.Systm: NAD83CASPV

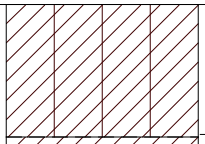
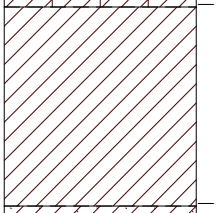
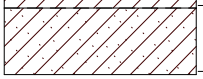
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silty clay.	5Y 3/1 - Very Dark Gray	None.	
2		Clay with silt.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
3		Clay with sand.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
		Sand.	5Y 5/3 - Olive	None.	Shell hash. Z-layer = 6" (discarded).
4					
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A3 - Core 3	Date: 3/26/15	Latitude:33.74300667	Longitude: -118.27345
Water Depth: 49.0 ft	Tide: 3.0 ft	MLLW:46.0 ft	Project Depth: 47 ft
Target Core Length: 3.0 ft	Penetration: 3 ft	Final Core Length: 3.0 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 15:50	End Time: 16:00	Cord.Systm: NAD83CASPV

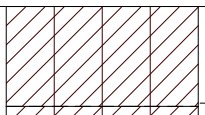
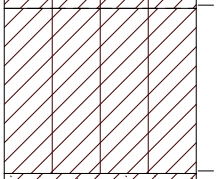
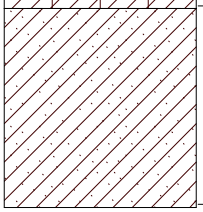
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silty clay.	5Y 3/1 - Very Dark Gray	None.	
2		Stiffer clay with silt.	5Y 3/1 - Very Dark Gray	None.	Trace shell hash.
3		Clayey sand.	5Y 5/3 - Olive	None.	Trace shell hash. No Z-layer.
4					
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A3 - Core 4	Date: 3/26/15	Latitude:33.74300333	Longitude: -118.27343
Water Depth: 49.1 ft	Tide: 3.1 ft	MLLW:46.0 ft	Project Depth: 47 ft
Target Core Length: 3.0 ft	Penetration: 3.5 ft	Final Core Length: 3.5 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 16:05	End Time: 16:13	Cord.Systm: NAD83CASPV

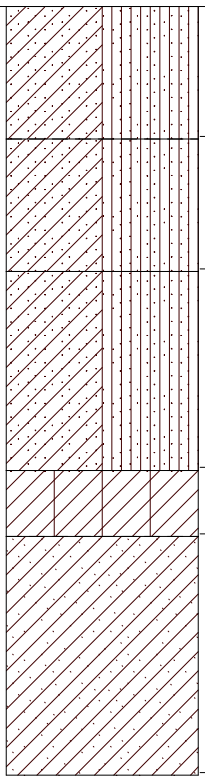
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silty clay.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
2		Silty stiffer clay.	5Y 3/1 - Very Dark Gray	Slight sulfur.	Trace shell hash.
3		Clayey sand.	5Y 5/3 - Olive	None.	Trace shell hash. Z-layer = 6" (discarded).
4					
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A4 - Core 1	Date: 3/27/15	Latitude:33.743675	Longitude: -118.2730883
Water Depth: 47.0 ft	Tide: 2.0 ft	MLLW:45.0 ft	Project Depth: 47 ft
Target Core Length: 4.0 ft	Penetration: 6 ft	Final Core Length: 5.8 ft.	Core Length for Analysis: 4.0 ft
Core Diameter: 4 in.	Start Time: 8:20	End Time: 8:35	Cord.Systm: NAD83CASPV

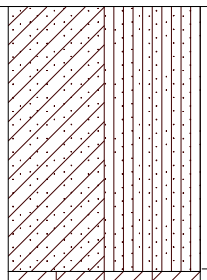
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silty clay with sand.	5Y 3/1 - Very Dark Gray	None.	
2		Silty, stiff clay with sand.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
3		Silty clay with trace sand.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
4		Silt with clay.	5Y 3/1 - Very Dark Gray	None.	Shell hash.
5		Clayey sand.	5Y 3/2 - Dark Olive Gray	None.	Shell hash. Z-layer = 1.8', top 6" sampled.
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A4 - Core 2	Date: 3/27/15	Latitude:33.74370167	Longitude: -118.273005
Water Depth: 46.4 ft	Tide: 1.4 ft	MLLW:45.0 ft	Project Depth: 47 ft
Target Core Length: 4.0 ft	Penetration: 4.8 ft	Final Core Length: 4.8 ft.	Core Length for Analysis: 4.0 ft
Core Diameter: 4 in.	Start Time: 8:50	End Time: 9:05	Cord.Systm: NAD83CASPV

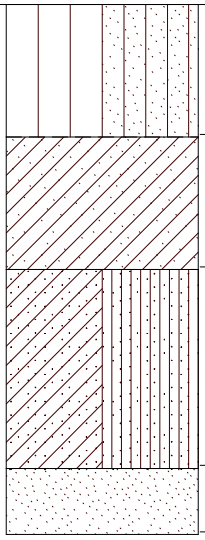
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silty clay with trace sand.	5Y 3/1 - Very Dark Gray	None.	Trace shell hash.
2					
3		Silty, stiff clay.	5Y 3/1 - Very Dark Gray	None.	Significant shell hash at 3 ft.
4		Clayey sand.	5Y 3/1 - Very Dark Gray	None.	Trace shell hash. No Z-layer.
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A4 - Core 3	Date: 3/27/15	Latitude:33.74371167	Longitude: -118.2730233
Water Depth: 46.2 ft	Tide: 1.2 ft	MLLW:45.0 ft	Project Depth: 47 ft
Target Core Length: 4.0 ft	Penetration: 4 ft	Final Core Length: 4.0 ft.	Core Length for Analysis: 4.0 ft
Core Diameter: 4 in.	Start Time: 9:10	End Time: 9:25	Cord.Systm: NAD83CASPV

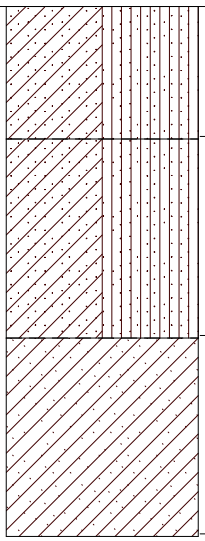
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Sandy silt.	5Y 3/1 - Very Dark Gray	None	
2		Clayey sand.	5Y 3/1 - Very Dark Gray	None	Shell hash.
3		Silty clay with trace sand.	5Y 3/1 - Very Dark Gray	None	Significant shell hash at 3'4".
4		Sand.	5Y 3/1 - Very Dark Gray	None	No Z-layer.
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A4 - Core 4	Date: 3/27/15	Latitude:33.74370333	Longitude: -118.2731833
Water Depth: 46.0 ft	Tide: 1.0 ft	MLLW:45.0 ft	Project Depth: 47 ft
Target Core Length: 4.0 ft	Penetration: 4 ft	Final Core Length: 4.0 ft.	Core Length for Analysis: 4.0 ft
Core Diameter: 4 in.	Start Time: 9:40	End Time: 9:50	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Silty clay with trace sand.	5Y 4/1 - Dark Gray	Slight sulfur.	Trace shell hash.
2		Silty stiff clay with trace sand.	5Y 3/1 - Very Dark Gray	Slight sulfur.	Shell hash.
3		Sandy clay.	5Y 3/1 - Very Dark Gray	Slight sulfur.	Shell hash. No Z-layer.
4					
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

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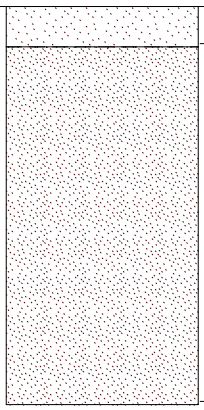
Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A5 - Core 1	Date: 3/27/15	Latitude:33.74473	Longitude: -118.2724383
Water Depth: 44.5 ft	Tide: 0.6 ft	MLLW:43.9 ft	Project Depth: 45 ft
Target Core Length: 3.1 ft	Penetration: 3 ft	Final Core Length: 3.0 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 10:20	End Time: 10:35	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Fine sand.	5Y 4/3 - Olive	None.	
2		Medium course sand.	5Y 4/3 - Olive	None.	No Z-layer.
3					
4					
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A5 - Core 2	Date: 3/27/15	Latitude:33.74475	Longitude: -118.27244
Water Depth: 44.5 ft	Tide: 0.5 ft	MLLW:44.0 ft	Project Depth: 45 ft
Target Core Length: 3.0 ft	Penetration: 3.3 ft	Final Core Length: 3.3 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 10:45	End Time: 11:00	Cord.Systm: NAD83CASPV

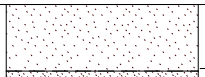
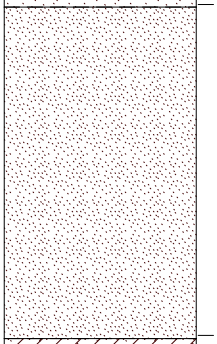
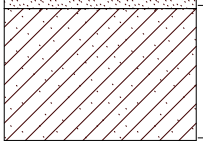
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
		Fine sand.	5Y 4/3 - Olive	None.	
1					
2		Medium course sand.	5Y 4/3 - Olive	None.	
3		Clayey sand.	5Y 4/3 - Olive	None.	Z-layer = 3"
4					
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A5 - Core 3	Date: 3/27/15	Latitude:33.74473333	Longitude: -118.2724167
Water Depth: 44.4 ft	Tide: 0.4 ft	MLLW:44.0 ft	Project Depth: 45 ft
Target Core Length: 3.0 ft	Penetration: 4.5 ft	Final Core Length: 4.5 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 11:10	End Time: 11:20	Cord.Systm: NAD83CASPV

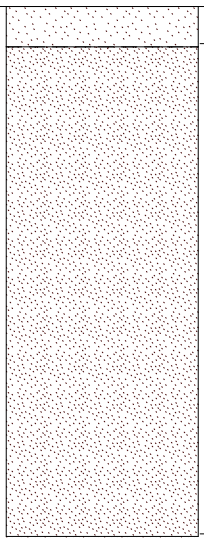
DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Fine sand.	5Y 4/3 - Olive	None.	
2		Medium course sand.	5Y 4/3 - Olive	None.	
3		Clayey sand.	5Y 4/3 - Olive	None.	Z-layer = 6".
4					
5					
6					
7					
8					
9					

RAMBOLL ENVIRON

18100 Von Karman, Suite 600, Irvine, CA 92612

Core Processing Log

Project Name: Everport Term. Dredged Material Assmnt	Project #: 04-33310A05	Project Manager: David Moore	Field Person: J. Arblaster
Station ID: A5 - Core 4	Date: 3/27/15	Latitude:33.74475167	Longitude: -118.27242
Water Depth: 44.4 ft	Tide: 0.4 ft	MLLW:44.0 ft	Project Depth: 45 ft
Target Core Length: 3.0 ft	Penetration: 3.9 ft	Final Core Length: 3.9 ft.	Core Length for Analysis: 3.0 ft
Core Diameter: 4 in.	Start Time: 11:25	End Time: 11:45	Cord.Systm: NAD83CASPV

DEPTH (ft.)	LITHOLOGY	SEDIMENT TYPE	COLOR	ODOR	NOTES
1		Fine sand.	5Y 4/3 - Olive	None.	
2		Medium course sand.	5Y 4/3 - Olive	None.	Significant shell hash at 2'4". Z-layer = 1 ft. (discarded).
3					
4					
5					
6					
7					
8					
9					

APPENDIX A-3
SAMPLE CHAINS OF CUSTODY

ENVIRON CHAIN-of-CUSTODY № 10724

PAGE 1 of 1

☒ 18100 Von Karman Ave., Suite 600, Irvine, CA 92612, (949) 261-5151, (949) 261-6202 (fax)

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☐ 1702 E Highland Avenue, Suite 412, Phoenix, AZ 85016, (602) 734-7700, (602) 734-7701 (fax)

MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA Everport

FIELD PERSON: M. Grower

PROJECT NUMBER: 04-33310A05 DATE: 10-29-14

PROJECT MANAGER: J. Conder

PROJECT LOCATION: POLA Everport

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: —

SAMPLER: M. Grower

SIGNATURE:

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED / UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for biossay	COMMENTS
DMMU-2-WATER-PG	10/29	1230	X	X	W	1	U	No	X	Hold pending sed chem analysis. Contact David Moore w/ questions dmoore@environcorp.com
TOTAL	X	X	X	—	—	1	—	—	1	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
	10/29/14 4:30		
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp —

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

ENVIRON CHAIN-of-CUSTODY № 10522

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(949) 261-6202 (fax)

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Los Angeles, Calif. 90017
(213) 943-6300
(213) 943-6301 (fax)

☐ 1702 E Highland Avenue, Suite 412
Phoenix, AZ 85016
(602) 734-7700
(602) 734-7701 (fax)

PAGE 1 of 1

PROJECT NAME / FACILITY ID: POLA Everport

PROJECT NUMBER: 04-3331OA05 DATE: 10-29-14

PROJECT LOCATION: POLA Everport

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

MSA#: — WO#: —

FIELD PERSON: M. Grover

PROJECT MANAGER: J. Conder

LABORATORY: CalScience

SAMPLER: M. Grover

SIGNATURE: M. Grover

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold pending further instruction. Electrical analysis	COMMENTS
DMMU-2-WATER-CAL	10/29	12:55	—	—	W	1	U	ND	X	Please contact David Moore @ dmoore@environcorp.com with questions
TOTAL	X	X	X	—	—	1	—	—	1	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
M. Grover	10/29/14 · 12:55		
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

ENVIRON CHAIN-of-CUSTODY № 10671

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☐ 1702 E Highland Avenue, Suite 412, Phoenix, AZ 85016, (602) 734-7700, (602) 734-7701 (fax)

PAGE 1 of 1

MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

PROJECT NUMBER: 04-33310A05 DATE: 10-30-14

PROJECT LOCATION: POLA EVER PORT

FIELD PERSON: M. Grover

PROJECT MANAGER: J. Conder

LABORATORY: CalScience

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Grover

SIGNATURE: M. Grover

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: ARCHIVE	COMMENTS
DMMU-2-Z-LAYER	10/29	—	—	—	S	1	U	NO	X	Archive frozen
DMMU-2-B2-Z-LAYER	10/29	—	—	—	S	1	U	NO		
DMMU-2B3-Z-LAYER	10/29	—	—	—	S	1	U	NO		
DMMU-2-B4-Z-LAYER	10/29	—	—	—	S	1	U	NO		Questions to David Moore @ dmoore@environcorp.com
DMMU-2-B1-ARCHIVE										
DMMU-2-B2-ARCHIVE										
DMMU-2-B3-ARCHIVE										
DMMU-2-B4-ARCHIVE										
DMMU-2B5-ARCHIVE										
DMMU-2-ARCHIVE	↓	↓	↓	↓	↓	↓	↓	↓	↓	
TOTAL	X	X	X	—	—	10	—	—	10	

RELINQUISHED BY: M. Grover TIME/DATE: 10/30/14 14:57

RECEIVED BY: [illegible] (COMPANY): ECI TIME/DATE: 1457 10/30/14

RELINQUISHED BY: TIME/DATE:

RECEIVED BY: (COMPANY): TIME/DATE:

RELINQUISHED BY: TIME/DATE:

RECEIVED BY: (COMPANY): TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

ENVIRON CHAIN-of-CUSTODY № 10670

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PAGE 1 of 1

PROJECT NAME / FACILITY ID: POLA EVERPORT

PROJECT NUMBER: 04-33310A5 DATE: 10-30-14

PROJECT LOCATION: POLA EVERPORT

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

MSA#: _____ WO#: _____

FIELD PERSON: M. Grover

PROJECT MANAGER: J. Conder

LABORATORY: CalScience

SAMPLER: M. Grover

SIGNATURE: M. Grover

SAMPLE I.D. NUMBER	SAMPLE DATE (YEAR 2014)	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Sediment Chemistry and Physical	Hold DRET	Hold TCLP	COMMENTS
DMMU-2	10/29	—	—	—	S	15	U	No	15	15	15	See Final Sampling and Analysis Plan for analytes for sediment chemistry and physical. Hold DRET and TCLP analysis.
												Questions to David Moore dmoore@environcorp.com
TOTAL	X	X	X	—	—	15	—		15	15	15	

MATRIX: A = AIR; S = SOIL; G = GAS; W = WATER

PRESERVATION: U = UNKNOWN; NO = NONE; S = H_2SO_4; N = HNO_3; H = HCL; O = OTHER

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
M. Grover	10/30/14 14:57	(COMPANY): AM/ECI	1457 10/31/14
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	

TURNAROUND TIME (CIRCLE ONE): SAME DAY; 24 HOURS; 48 HOURS; 72 HOURS; (5 DAYS); NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

FILE: LOG FORMS\Chain_of_Custody

ENVIRON — CHAIN-of-CUSTODY № 10669

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MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

PROJECT NUMBER: 04-33310A05 DATE: 10-30-14

PROJECT LOCATION: POLA EVERPORT

FIELD PERSON: M. Grover

PROJECT MANAGER: J. Conder

LABORATORY: CalScience

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Grover

SIGNATURE: M. Grover

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Sediment Chemistry and Physical	Hold DRET	Hold TCLP	COMMENTS
REF-DMMU-2	10/27	—	—	—	S	15	V	No	15	15	15	See Final Sampling and Analysis Plan for analytes for sediment chemistry and physical. Hold DRET and TCLP analysis. Questions to David Moore dmoore@environcorp.com
TOTAL	X	X	X	—		15	—		15	15	15	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
M. Grover	10/30/14 1457	[illegible] ECI	1457 10/31/14
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, (NORMAL)

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

U = UNKNOWN; NO = NONE; O = OTHER; S = H_2SO_4; N = HNO_3; H = HCL;

FILE: LOG FORMS\Chain_of_Custody

ENVIRON CHAIN-of-CUSTODY № 10831

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(602) 734-7701 (fax)

MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

PROJECT NUMBER: 04-33310A05 DATE: 10-30-14

PROJECT LOCATION: POLAEVERPORT

FIELD PERSON: M. Grover

PROJECT MANAGER: J. Comeau

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Grover

SIGNATURE:

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED / UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for biossay	COMMENTS
REF-DMMU-2	10.27	—	—	—	S	1	U	No	X	Questions to David Moore
TOTAL	X	X	X	—		1	—		1	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
[signature]	10/30/14 12:00		
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

ENVIRON CHAIN-of-CUSTODY № 10667

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MSA#: _____ WO#: _____

PROJECT NAME / FACILITY ID: POLA EVERPORT

PROJECT NUMBER: 04-33310 A05 DATE: 10-30-14

PROJECT LOCATION: POLA EVERPORT

FIELD PERSON: M. Grover

PROJECT MANAGER: J. Conder

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Grover

SIGNATURE:

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for bioassay	COMMENTS
REF-DMMU-2	10-27	—	—	—	S	1	U	NO	X	Questions to David Moore
TOTAL	X	X	X	—		1	—		1	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
	10/30/14 12:00		
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, (NORMAL)

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

ENVIRON CHAIN-of-CUSTODY № 10668

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PAGE 1 of 1

MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

FIELD PERSON: M. Grover

PROJECT NUMBER: 04-33310A05 DATE: 10-30-14

PROJECT MANAGER: J. Conder

PROJECT LOCATION: POLA EVERPORT

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Grover

SIGNATURE: M. Grover

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for bioassay										COMMENTS
REF-DMMU-2	10/27	—	—	—	S	1	U	No	X										Questions to David Moore
TOTAL	X	X	X	—	—	1	—	—	1										

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
[signature]	10/31/14 12:00		
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, (NORMAL)

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

ENVIRON CHAIN-of-CUSTODY № 10830

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(602) 734-7701 (fax)

MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

FIELD PERSON: M. Grover

PROJECT NUMBER: 04-33310105 DATE: 10-30-14

PROJECT MANAGER: J. Conder

PROJECT LOCATION: POLA EVERPORT

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Grover

SIGNATURE: M. Grover

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for bioassay	COMMENTS
DMMV-2	10/29	—	—	—	S	1	U	No	X	Hold for bioassay
										Contact David Moore
TOTAL	X	X	X	—		1	—		1	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
M. Grover	10-30-14 12:00	(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

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(602) 734-7701 (fax)

MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

PROJECT NUMBER: 04-33310A05 DATE: 10-30-14

PROJECT LOCATION: POLA EVERPORT

FIELD PERSON: M. Groner

PROJECT MANAGER: J. Conder

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Groner

SIGNATURE: M. Groner

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for bioassay	COMMENTS
DMMU-2	10/29	—	—	—	S	1	U	No	X	Hold for bioassay
										Contact David Moore
TOTAL	X	X	X	—		1	—		1	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
M. Groner	10-30-14 12:00	(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

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ENVIRON CHAIN-of-CUSTODY № 10828

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MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

FIELD PERSON: M. Gruner

PROJECT NUMBER: 04-33310A05 DATE: 10-30-14

PROJECT MANAGER: J. Conder

PROJECT LOCATION: POLA EVERPORT

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Gruner

SIGNATURE: M. Gruner

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for bioassay	COMMENTS
DMMU-2	10/29	—	—	—	S	1	U	No	X	Hold for bioassay
										Contact David Moore
TOTAL	X	X	X	—		1	—		1	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
M. Gruner	10-30-14 12:00	(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

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MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

PROJECT NUMBER: 04-33104A05 DATE: 10-30-14

PROJECT LOCATION: POLA EVERPORT

FIELD PERSON: M. Grover

PROJECT MANAGER: J. Conder

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Grover

SIGNATURE: M. Grover

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for bioassay	COMMENTS
DMMU-2	10/29	—	—	—	S	1	U	NO	X	Hold for bioassay
										Contact David Moore
TOTAL	X	X	X	—		1	—		1	

RELINQUISHED BY: M. Grover TIME/DATE: 10/30/14 17:00

RELINQUISHED BY: TIME/DATE:

RELINQUISHED BY: TIME/DATE:

RECEIVED BY: TIME/DATE: (COMPANY):

RECEIVED BY: TIME/DATE: (COMPANY):

RECEIVED BY: TIME/DATE: (COMPANY):

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, (NORMAL)

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

O = OTHER; NO = NONE; U = UNKNOWN; S = H_2SO_3; N = HNO_3; H = HCL;

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(602) 734-7701 (fax)

MSA#: — WO#: —

PROJECT NAME / FACILITY ID: POLA EVERPORT

PROJECT NUMBER: 04-33310A05 DATE: 10-30-14

PROJECT LOCATION: POLA EVERPORT

FIELD PERSON: M. Grover

PROJECT MANAGER: J. Conder

LABORATORY: ENVIRON, Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: M. Grover

SIGNATURE: M Grover

SAMPLE I.D. NUMBER	YEAR 2014 SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED / UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for possibly biossay	COMMENTS
BMMU-2	10/29	—	—	—	S	1	U	No	X	Hold for biossay
										Contact D. Moore
TOTAL	X	X	X	—		1	—		1	

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
M Grover	10/30/14 12:00		
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, (NORMAL)

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

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ENVIRON — CHAIN-of-CUSTODY № 10683

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(602) 734-7701 (fax)

MSA#: _____ WO#: _____

PROJECT NAME / FACILITY ID: POLA - Everport

FIELD PERSON: J Arola-Ker

PROJECT NUMBER: 04 33310 A05 DATE: 3/27/15

PROJECT MANAGER: D Moore

PROJECT LOCATION: San Pedro CA

LABORATORY: Calscience

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

SAMPLER: JA

SIGNATURE:

Danielle Gansman-PM

SAMPLE I.D. NUMBER	YEAR / SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Sed. metal Chemistry + Physical	DRET (HOLD)	TCLP (HOLD)								COMMENTS
DMMU-1	3/27	1230	—	—	S	17	U	NP	X	X	X								See Table 4 in Sampling & Analysis Plan for Chemistry & physical tests. HOLD DRET & TCLP Questions: Dmoore@environcorp.com + mgrover@environcorp.com
TOTAL	X	X	X			17													

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
	1607 3/27/15	(COMPANY): Prey - TEC	1607 3/27/15
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:

TURNAROUND TIME (CIRCLE ONE): SAME DAY / (24 HOURS) / 48 HOURS / 72 HOURS / 5 DAYS / NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

O = OTHER; NO = NONE; U = UNKNOWN; S = H_2SO_4; N = HNO_3; H = HCL;

FILE: LOG FORMS\Chain_of_Custody

ENVIRON CHAIN-of-CUSTODY № 11208

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MSA#: ______ WO#: ______

PROJECT NAME / FACILITY ID: Everport

FIELD PERSON: J. Arblaster

PROJECT NUMBER: 04-33310A05 DATE: 3/26/15 & 3/27/15

PROJECT MANAGER: D. Moore

PROJECT LOCATION: San Pedro, CA

LABORATORY: Calscience

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: ______

SAMPLER: JA

SIGNATURE: [signature]

YEAR: 2015

SAMPLE I.D. NUMBER	SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Sediment Chemistry & Physical Analysis	Hold DRET	Hold TCLP	Archive	COMMENTS
DMMU-1-REF	3/26	0800	-	-	S	15	U	No	X	X	X		See Table 4 of
DMMU-1-A1-ZLAYER	↓	1105	↓	↓	↓	1	↓	↓				X	Sampling & Analysis
DMMU-1-A1-ARCHIVE	3/27	1215	↓	↓	↓	1	↓	↓				X	Plan for Sed.
DMMU-1-A2-ZLAYER	↓	1330	↓	↓	↓	1	↓	↓				X	Chem. & Pys. analysis
DMMU-1-A2-ARCHIVE	↓	1440	↓	↓	↓	1	↓	↓				X	~~at RUSH TAT~~ (JA)
DMMU-1-A3-ZLAYER	↓	1530	↓	↓	↓	1	↓	↓				X	Hold DRET &
DMMU-1-A3-ARCHIVE	↓	1630	↓	↓	↓	1	↓	↓				X	TCLP tests.
DMMU-1-A4-ZLAYER	3/27	0830	↓	↓	↓	1	↓	↓				X	
DMMU-1-A4-ARCHIVE	↓	0945	↓	↓	↓	1	↓	↓				X	Questions:
DMMU-1-A5-ZLAYER	↓	1100	↓	↓	↓	1	↓	↓				X	dmoore@environcorp.com
DMMU-1-A5-ARCHIVE	↓	1145	↓	↓	↓	1	↓	↓				X	mgrover@
DMMU-1-ARCHIVE	↓	1230	↓	↓	↓	2	↓	↓				X	environcorp.com
DMMU-1-ZLAYER	↓	1130	↓	↓	↓	2	↓	↓				X	
TOTAL	X	X	X										

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
[signature]	1607 3/27/15	[signature] EG	3/27/15 1607

TURNAROUND TIME (CIRCLE ONE): SAME DAY / 24 HOURS / 48 HOURS / 72 HOURS / 5 DAYS / (NORMAL)

SAMPLE INTEGRITY — INTACT: Y N Temp______

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

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PROJECT NAME / FACILITY ID: POLA - Everport

PROJECT NUMBER: 04 3330 A05 DATE: 3/27/15

PROJECT LOCATION: San Pedro

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: _____

MSA#: _____ WO#: _____

FIELD PERSON: J. Arblaster

PROJECT MANAGER: D. Moore

LABORATORY: Calscience

SAMPLER: JA

SIGNATURE:

SAMPLE I.D. NUMBER	SAMPLE DATE (YEAR 2015)	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED / UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Hold for future tests										COMMENTS
DMHV-1-WATER-CAL	3/27	0800	-	-	W	1	U	NO	X										HOLD
																			Dmoore@
																			environcorp.com
																			for questions.
																			or mgraver@
																			environcorp.com
TOTAL	X	X	X																

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
	1607 3/27/15	(COMPANY): Prelog / EG	1609 3/27/15
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

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MSA#: ____________ WO#: ____________

PROJECT NAME / FACILITY ID: POLA Everport

FIELD PERSON: J. [illegible]

PROJECT NUMBER: 0X1 3351UA05 DATE: 1/27/15

PROJECT MANAGER: D. [illegible]

PROJECT LOCATION: San Pedro, CA

LABORATORY: [illegible]

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y N IF YES, GLOBAL ID #: ____________

SAMPLER: ____________

SIGNATURE: ____________

SAMPLE I.D. NUMBER	SAMPLE DATE (YEAR)	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED										COMMENTS
DMW-1		1230	-		S	1	U	W	X										HOLD
TOTAL	X	X	X																

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
[signature]	16:45 3/27/15		

TURNAROUND TIME (CIRCLE ONE): SAME DAY / 24 HOURS / 48 HOURS / 72 HOURS / 5 DAYS / NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp________

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

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PROJECT NAME / FACILITY ID: POLA Freeport

PROJECT NUMBER: 0433310A05 DATE: 3/27/15

PROJECT LOCATION: San Pedro, CA

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y N IF YES, GLOBAL ID #: _____

MSA#: _____ WO#: _____

FIELD PERSON: Mchale

PROJECT MANAGER: D Moore

LABORATORY: ENVIRON - Pace Gamble

SAMPLER: A

SIGNATURE: A

SAMPLE I.D. NUMBER	YEAR / SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED / UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Dissolved										COMMENTS
DMW-1	3/27	1230	-	-	S	1	U	NO	X										HOLD
TOTAL	X	X	X																

RELINQUISHED BY: A TIME/DATE: 1645 3/27/15

RELINQUISHED BY: TIME/DATE:

RELINQUISHED BY: TIME/DATE:

RECEIVED BY: TIME/DATE:
(COMPANY):

RECEIVED BY: TIME/DATE:
(COMPANY):

RECEIVED BY: TIME/DATE:
(COMPANY):

TURNAROUND TIME (CIRCLE ONE)
SAME DAY 72 HOURS
24 HOURS 5 DAYS
48 HOURS NORMAL

SAMPLE INTEGRITY
INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY
INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain_of_Custody

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MSA#: ________ WO#: ________

PROJECT NAME / FACILITY ID: POLA Everport

FIELD PERSON: [illegible]

PROJECT NUMBER: [illegible] A05

DATE: 3/27/15

PROJECT MANAGER: [illegible]

PROJECT LOCATION: San Pedro CA

LABORATORY: [illegible]

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: ________

SAMPLER: [illegible]

SIGNATURE: [illegible]

SAMPLE I.D. NUMBER	YEAR / SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Bioassay										COMMENTS
DHHU-1	3/27	1250	–	–	–	1	U	N	X										HOLD
TOTAL	X	X	X																

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
[signature]	16:45 3/27/15		

TURNAROUND TIME (CIRCLE ONE): SAME DAY / 24 HOURS / 48 HOURS / 72 HOURS / 5 DAYS / NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp________

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO3; S = H_2SO; U = UNKNOWN; NO = NONE; O = OTHER

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MSA#: _____ WO#: _____

PROJECT NAME / FACILITY ID: _____ FIELD PERSON: _____

PROJECT NUMBER: _____ DATE: _____ PROJECT MANAGER: _____

PROJECT LOCATION: _____ LABORATORY: _____

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y N IF YES, GLOBAL ID #: _____

SAMPLER: _____

SIGNATURE: _____

SAMPLE I.D. NUMBER	YEAR / SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED										COMMENTS
DMW-1-WATER-PG	5/27	909	-	-	W	1	U	NO	X										HOLD
TOTAL	X	X	X																

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
	1645 5/27/15	(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

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MSA#: ____________ WO#: ____________

PROJECT NAME / FACILITY ID: POLA Everport

FIELD PERSON: J. Armbrister

PROJECT NUMBER: 04 33310A05

DATE: 3-26-15

PROJECT MANAGER: D. Hone

PROJECT LOCATION: San Pedro, CA

LABORATORY: Environ - Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y N IF YES, GLOBAL ID #: ____________

SAMPLER: JA

SIGNATURE: [signature]

YEAR: 2015

SAMPLE I.D. NUMBER	SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Bioassay										COMMENTS
DH4U-1-REF	3/26	0830	-	-	S	1	U	NO	X										HOLD
TOTAL	X	X	X																

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
[signature]	1615 3/27/15	(COMPANY):	
		(COMPANY):	
		(COMPANY):	

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp ________

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

FILE: LOG FORMS\Chain of Custody

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MSA#: ______ WO#: ______

PROJECT NAME / FACILITY ID: POLA Everport

FIELD PERSON: J. Ambaster

PROJECT NUMBER: 0435110A05 DATE: 3/26/15

PROJECT MANAGER: J. Moore

PROJECT LOCATION: San Pedro, CA

LABORATORY: NewFields - Port Gamble

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y (N) IF YES, GLOBAL ID #: ______

SAMPLER: JA

SIGNATURE: [signature]

SAMPLE I.D. NUMBER	SAMPLE DATE (YEAR)	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED: Bioassay										COMMENTS
DMMU-1-REF	3/26	1010	–	–	S	1	U	No	X										HOLD
TOTAL	X	X	X																

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
[signature]	16:45 3/27/15		

TURNAROUND TIME (CIRCLE ONE): SAME DAY / 24 HOURS / 48 HOURS / 72 HOURS / 5 DAYS / NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp______

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO3; S = H_2SO; U = UNKNOWN; NO = NONE; O = OTHER

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PROJECT NAME / FACILITY ID: LOLA Eveport — MSA#: _____ WO#: _____

PROJECT NUMBER: 04-310905 — DATE: 3/26/15 — FIELD PERSON: J Detwiler

PROJECT LOCATION: San Pedro, CA — PROJECT MANAGER: D Marx

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y N IF YES, GLOBAL ID #: _____ — LABORATORY: Eurofins - Port Gamble

SAMPLER: JA

SIGNATURE:

YEAR: 15

SAMPLE I.D. NUMBER	SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED										COMMENTS
DMW-1-REF	3/26	1200	-	-	S	1	U	NO	X										HOLD
TOTAL	X	X	X																

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
	1645 3/27/15	(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	
RELINQUISHED BY:	TIME/DATE:	RECEIVED BY:	TIME/DATE:
		(COMPANY):	

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp_____

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

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MSA#: ____________ WO#: ____________

PROJECT NAME / FACILITY ID: [illegible]

FIELD PERSON: [illegible]

PROJECT NUMBER: [illegible] DATE: [illegible]/15

PROJECT MANAGER: [illegible]

PROJECT LOCATION: [illegible]

LABORATORY: [illegible]

IS THIS A UST PROJECT OR IS EDF REQUIRED? Y N (circled) IF YES, GLOBAL ID #: ____________

SAMPLER: [illegible]

SIGNATURE: [illegible]

SAMPLE I.D. NUMBER	YEAR / SAMPLE DATE	SAMPLE TIME	SAMPLE DEPTH (ft)	AIR SAMPLE VOLUME (L)	MATRIX (A) AIR (S) SOIL (G) GAS (W) WATER	NUMBER OF CONTAINERS	FILTERED/UNFILTERED (F/U)	PRESERVATION (SEE KEY)	ANALYSIS REQUIRED										COMMENTS
[illegible]	[illegible]	1230	-		S	1	U	NO	X										HOLD
TOTAL	X	X	X																

RELINQUISHED BY:	TIME/DATE:	RECEIVED BY: (COMPANY):	TIME/DATE:
[signature]	1645 3/27/15		

TURNAROUND TIME (CIRCLE ONE): SAME DAY, 24 HOURS, 48 HOURS, 72 HOURS, 5 DAYS, NORMAL

SAMPLE INTEGRITY — INTACT: Y N Temp________

IF SEALED, SEAL INTEGRITY — INTACT: Y N

H = HCL; N = HNO_3; S = H_2SO_4; U = UNKNOWN; NO = NONE; O = OTHER

APPENDIX B
SUPPORTING BIOASSAY INFORMATION

APPENDIX B-1
WATER QUALITY, AMMONIA AND TEST CONDITIONS FOR *AMPELISCA ABDITA* BIOASSAYS

Appendix B-1.1. Water Quality Summary for the Benthic Test with *Ampelisca abdita.*
Port of Los Angeles
San Pedro, California

Sample ID	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Batch 1: November 14, 2014												
Control	7.6	7.3	7.7	20.0	19.5	20.3	31	30	32	8.0	7.8	8.2
Ref-DMMU-2	7.6	7.3	7.8	20.0	19.3	20.2	31	30	32	8.1	8.0	8.2
DMMU-2	7.5	7.2	7.6	20.1	19.5	20.3	31	31	32	8.0	7.8	8.1
Batch 2: April 9, 2015												
Control	7.5	7.3	7.8	20.3	19.4	20.8	29	29	30	8.0	7.8	8.1
Ref-DMMU-1	7.5	7.3	7.8	20.4	20.0	20.8	30	30	31	8.1	8.0	8.2
DMMU-1	7.5	7.3	8.0	20.4	19.9	20.8	30	30	31	8.1	7.9	8.4

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
ppt = parts per thousand

Appendix B-1.2. Ammonia Summary for the Benthic Test with *Ampelisca abdita.*
Port of Los Angeles
San Pedro, California

Sample ID	Overlying Total Ammonia (mg/L)		Interstitial Total Ammonia (mg/L) [1]	
	Day 0	Day 10	Day 0	Day 10
Batch 1: November 14, 2014 [2]				
Control	0.000	0.000	1.24	1.02
Ref-DMMU-2	0.000	1.03	1.16	1.49
DMMU-2	0.840	0.33	0.26	0.84
Batch 2: April 9, 2015 [3]				
Control	0.420	0.102	0.619	0.117
Ref-DMMU-1	0.324	1.61	NA	NA
DMMU-1	0.215	0.132	4.00	0.0475

Notes:
[1] NA = Not analyzed; insufficient volume recovered for pore water analysis
[2] Batch 1 NOEC (concurrent reference-toxicant test derived) = 59.4 mg/L total ammonia; 0.943 mg/L UIA
[3] Batch 2 NOEC (concurrent reference-toxicant test derived) = 32.2 mg/L total ammonia; 0.926 mg/L UIA
mg/L = milligrams per liter

Appendix B-1.3. Test Condition Summary for *Ampelisca abdita.*
Port of Los Angeles
San Pedro, California

Test Conditions: *Ampelisca abdita*		
	Batch 1	**Batch 2**
Sample Identification	DMMU-2, Ref-DMMU-2, and Control	DMMU-1, Ref-DMMU-1, and Control
Date sampled	October 27and 29, 2014	March 26 – 27, 2015
Date received	October 31, 2014	March 28, 2015
Sample storage conditions	4°C, dark	
Test dates	November 14 – 24, 2014	April 9 – 19, 2015
Days of holding Recommended: ≤8 weeks (56 days)	18 Days	14 Days
Source of control sediment	San Rafael, CA	Seabrook, NH
Test Species	*Ampelisca abdita*	
Supplier	Brezina and Associates, Dillon Beach, CA	
Date acquired	November 13, 2014	April 7, 2015
Acclimation/holding time	1 day	2 days
Age class	Sub-adult, 3 – 5 mm	Sub-adult, 3 – 5 mm
Test Procedures	ITM	
Test location	Ramboll Environ, Port Gamble, WA	
Test type/duration	10-Day/ Static	
Control water	0.45 µm-filtered, North Hood Canal seawater, adjusted with DI water	
Test dissolved oxygen Recommended: > 5.0 mg/L 60% Sat. @ 15°C, 30ppt	Actual: 7.2 – 7.8 mg/L	Actual: 7.3 – 8.0 mg/L
Test temperature Recommended: 20 ± 1°C	Actual: 19.3 – 20.3 °C	Actual: 19.4 – 20.8 °C
Test Salinity Targeted: 30 ± 2 ppt	Actual: 30 – 32 ppt	Actual: 29 – 31 ppt
Test pH Recommended: 7 – 9	Actual: 7.8 – 8.2	Actual: 7.8 – 8.4
Control performance standard Recommended: ≥ 90% survival	Actual: 97%; Pass	Actual: 97%; Pass
Reference Toxicant LC_{50} (total ammonia)	LC_{50} = 168.3 mg/L	LC_{50} = 44.22 mg/L
Mean; Control Chart Range (total ammonia)	136.5; 40.8 – 232.3 mg/L	43.55; 6.0 – 81.1 mg/L
NOEC (total ammonia)	59.4 mg/L	32.2 mg/L
NOEC (unionized ammonia)	0.943 mg/L	0.926 mg/L
Test Lighting	Continuous	
Test chamber	1000-mL Glass Chamber	
Replicates/treatment	5 + 2 surrogates	
Concentration/treatment	Not Applicable	
Organisms/replicate	20	
Exposure volume	175 mL sediment (2 cm) / 775 mL of overlying seawater	
Feeding	None	
Water renewal	None	
Deviations from Test Protocol	None	None

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
mL = milliliter
ppt = parts per thousand
ITM = Inland Testing Manual
LC50 = median lethal concentration

APPENDIX B-2
WATER QUALITY, AMMONIA AND TEST CONDITIONS FOR *NEANTHES ARENACEODENTATA* BIOASSAYS

Appendix B-2.1. Water Quality Summary for the Benthic Test with *Neanthes arenaceodentata.*
Port of Los Angeles
San Pedro, California

Sample ID	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Batch 1: December 5, 2014												
Control	7.6	7.3	8.9	20.3	19.8	20.6	30	30	31	8.0	7.9	8.1
Ref-DMMU-2	7.4	7.2	7.6	20.3	20.0	20.7	30	30	31	8.1	7.9	8.2
DMMU-2	7.4	7.2	7.6	20.3	19.5	20.6	31	30	32	8.1	7.9	8.1
Batch 2: April 24, 2015												
Control	7.5	7.3	7.7	20.3	20.0	20.6	30	30	31	8.0	7.8	8.1
Ref-DMMU-1	7.5	7.3	7.7	20.4	19.9	20.8	31	30	31	8.1	8.0	8.2
DMMU-1	7.4	7.2	7.8	20.5	20.0	20.9	30	30	31	8.1	8.0	8.3

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
ppt = parts per thousand

Appendix B-2.2. Ammonia Summary for the Benthic Test with *Neanthes arenaceodentata.*

Port of Los Angeles
San Pedro, California

Sample ID	Overlying Total Ammonia (mg/L)		Interstitial Total Ammonia (mg/L) [1]	
	Day 0	Day 10	Day 0	Day 10
Batch 1: December 5, 2014 [2]				
Control	0.00	0.00	0.00	0.00
Ref-DMMU-2	0.27	2.23	1.48	1.68
DMMU-2	1.17	4.01	5.09	10.1
Batch 2: April 24, 2015 [3]				
Control	0.41	0.00	NA	0.00
Ref-DMMU-1	0.49	2.01	NA	0.82
DMMU-1	0.34	0.00	1.29	0.12

Notes:

[1] NA = Not analyzed; insufficient volume recovered for pore water analysis

[2] Batch 1 NOEC (concurrent reference-toxicant test derived) = 81.9 mg/L total ammonia; 0.885 mg/L UIA

[3] Batch 2 NOEC (concurrent reference-toxicant test derived) = 54.3 mg/L total ammonia; 0.659 mg/L UIA

mg/L = milligrams per liter

Appendix B-2.3 Test Condition Summary for *Neanthes arenaceodentata.*
Port of Los Angeles
San Pedro, California

Test Conditions: *Neanthes arenaceodentata*		
	Batch 1	**Batch 2**
Sample Identification	DMMU-2, Ref-DMMU-2, and Control	DMMU-1, Ref-DMMU-1, and Control
Date sampled	October 27 and 29, 2014	March 26 – 27, 2015
Date received	October 31, 2014	March 28, 2015
Sample storage conditions	4°C, dark	4°C, dark
Test dates	December 5 – 15, 2014	April 24 – May 4, 2015
Days of holding Recommended: ≤8 weeks (56 days)	39 Days	29 Days
Source of control sediment	Yaquina Bay, OR	Yaquina Bay, OR
Test Species	*Neanthes arenaceodentata*	
Supplier	Aquatic Toxicology Support, LLC. Bremerton,	
Date acquired	December 5, 2014	April 24, 2015
Acclimation/holding time	0 days	0 days
Age class	Juvenile; 2-3 week post-emergence	
Test Procedures	ITM	ITM
Test location	Ramboll Environ, Port Gamble, WA	
Test type/duration	10-Day/ Static	
Control water	0.45 µm-filtered, North Hood Canal seawater	
Test dissolved oxygen Recommended: > 4.6 mg/L 60% Sat. @ 20°C, 30ppt	Actual: 7.2 – 8.9 mg/L	Actual: 7.2 – 7.8 mg/L
Test temperature Recommended: 20 ± 1°C	Actual: 19.5 – 20.7 °C	Actual: 19.9 – 20.9 °C
Test Salinity Recommended: 30 ± 2 ppt	Actual: 30 – 32 ppt	Actual: 30 – 31 ppt
Test pH Recommended: 7 – 9	Actual: 7.9 – 8.2	Actual: 7.8 – 8.3
Control performance standard Recommended: ≥ 90% survival	Actual: 100%, Pass	Actual: 96%, Pass
Reference Toxicant LC_{50} (total ammonia)	LC_{50} = 123.1 mg/L	LC_{50} = 103.1 mg/L
Mean; Acceptable Range (total ammonia)	142.8; 44.9 – 240.7 mg/L	151.3; 60.6 – 242 mg/L
NOEC (total ammonia)	81.9 mg/L	54.3 mg/L
NOEC (unionized ammonia)	0.885 mg/L	0.659 mg/L
Test Lighting	12 hour light / 12 hour dark	
Test chamber	1000-mL Glass Chamber	
Replicates/treatment	5 + 2 surrogates	
Concentration/treatment	Not Applicable	
Organisms/replicate	10	
Exposure volume	175 mL sediment (2 cm) / 775 mL of overlying	
Feeding	None	
Water renewal	None	
Deviations from Test Protocol	None	None

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
mL = milliliter
ppt = parts per thousand
ITM = Inland Testing Manual
LC50 = median lethal concentration

APPENDIX B-3
WATER QUALITY, AMMONIA AND TEST CONDITIONS FOR *AMERICAMYSIS BAHIA* BIOASSAYS

Appendix B-3.1. Water Quality Summary for the Water Column Test with *Americamysis bahia.*
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
		Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Batch 1: December 5, 2014													
Control		6.6	5.8	7.8	20.0	19.4	20.3	30	30	31	7.8	7.6	7.9
DMMU-2-Water-PG	100	6.6	5.5	8.7	20.1	19.6	20.4	30	30	31	7.8	7.5	8.0
DMMU-2	10	6.6	5.8	8.2	20.1	19.4	20.3	30	30	31	7.8	7.6	7.9
	50	6.8	6.1	8.0	20.0	19.6	20.3	31	30	32	7.9	7.7	8.0
	100	6.6	5.8	7.8	20.1	19.9	20.2	31	31	32	8.0	7.8	8.1
Batch 2: April 29, 2015													
Control		6.1	4.9	8.4	20.0	19.8	20.2	29	29	30	7.7	7.6	7.8
DMMU-1-Water-PG	100	6.1	4.7	7.5	20.3	19.9	21.0	34	33	34	7.8	7.6	8.0
DMMU-1	10	6.6	5.0	8.9	20.4	20.0	21.0	30	30	31	7.8	7.6	7.9
	50	6.5	5.2	8.2	20.2	20.0	20.4	32	31	32	7.9	7.7	8.0
	100	6.6	5.3	8.1	20.4	20.2	20.7	34	33	35	7.9	7.8	8.0

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
ppt = parts per thousand

Appendix B-3.2. Ammonia Summary for the Water Column Test with *Americamysis bahia*
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Overlying Ammonia (mg/L)			
		Day 0		Day 4	
		Total	UIA	Total	UIA
Batch 1: December 5, 2014 [1]					
Control		0.000	0.000	0.547	0.011
DMMU-2-Water-PG	100	0.000	0.000	0.267	0.006
DMMU-2	10	0.085	0.002	0.635	0.013
	50	0.972	0.03	1.96	0.051
	100	2.09	0.082	3.67	0.095
Batch 2: April 29, 2015 [2]					
Control		0.000	0.000	0.536	0.007
DMMU-1-Water-PG	100	0.297	0.01	0.424	0.005
DMMU-1	10	0.204	0.004	0.512	0.007
	50	0.371	0.012	0.630	0.010
	100	0.453	0.015	0.512	0.010

Notes:
[1] Batch 1 NOEC (concurrent reference-toxicant test derived) = 13.1 mg/L total ammonia; 0.408 mg/L UIA
[2] Batch 2 NOEC (concurrent reference-toxicant test derived) = 21.8 mg/L total ammonia; 0.334 mg/L UIA
% = percent
mg/L = milligrams per liter
UIA = Un-ionized ammonia

Appendix B-3.3. Test Condition Summary for *Americamysis bahia.*
Port of Los Angeles
San Pedro, California

Test Conditions: *Americamysis bahia*		
	Batch 1	**Batch 2**
Sample Identification	DMMU-2, DMMU-2-Water-PG, and Control	DMMU-1, DMMU-1-Water-PG, and Control
Date sampled	October 29, 2014	March 27, 2015
Date received	October 30-31, 2014	March 28, 2015
Sample storage conditions	4°C, dark	
Test dates	December 5–9, 2014	April 29-May 3, 2015
Days of holding Recommended: ≤8 weeks (56 days)	37 Days	33 Days
Test Species	*Americamysis bahia*	
Supplier	Aquatic BioSystems, Fort Collins, CO	
Date acquired	December 5, 2014	April 28, 2015
Acclimation/holding time	0 days	1 day
Age at test initiation Recommended: 1 – 5 days old	5 days old	4 days old
Test Procedures	ITM	
Test location	Ramboll Environ, Port Gamble, WA	
Test type/duration	96-Hour/ Static	
Control water	0.45 µm-filtered, North Hood Canal seawater	
Test Dissolved Oxygen Recommended: > 4.6 mg/L 60% Sat. @ 20°C, 30ppt	Actual: 5.5 – 8.7 mg/L	Actual: 4.7 – 8.9 mg/L
Test Temperature Recommended: 20 ± 1°C	Actual: 19.4 – 20.4 °C	Actual: 19.8 – 21.0 °C
Test Salinity Recommended: 30 ± 2 ppt	Actual: 30 – 32 ppt	Actual: 30 – 35 ppt
Test pH Recommended: 6 – 9	Actual: 7.5 – 8.1	Actual: 7.6 – 8.0
Control performance standard: Recommended: ≥ 90% survival	Actual: 90%; Pass	Actual: 100%; Pass
Reference Toxicant LC_{50} (total ammonia)	LC_{50} = 16.6 mg/L	LC_{50} = 32.6 mg/L
Mean; Acceptable Control Chart Range ± 2 standard deviations (total ammonia)	33.4; 13.0 – 53.8 mg/L	32.5; 13.1 – 51.9 mg/L
NOEC (total ammonia)	13.1 mg/L	21.8 mg/L
NOEC (unionized ammonia)	0.408 mg/L	0.334 mg/L
Test Lighting	16 hour light / 8 hour dark	
Test Chamber	400-mL Glass Chamber	
Replicates/treatment	5	
Concentration/treatment	10, 50, and 100% elutriate	
Organisms/replicate	10	
Exposure volume	250 mL	
Feeding	0.1 mL of *Artemia* nauplii, twice daily	
Test solution renewal	None	
Deviations from Test Protocol	None	Salinity

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
mL = milliliter
ppt = parts per thousand
ITM = Inland Testing Manual
LC50 = median lethal concentration

APPENDIX B-4
WATER QUALITY, AMMONIA AND TEST CONDITIONS FOR *MENIDIA BERYLLINA* BIOASSAYS

Appendix B-4.1. Water Quality Summary for the Water Column Test with *Menidia beryllina*.
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
		Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Batch 1: December 5, 2014													
Control		7.2	6.7	7.8	20.1	19.4	20.6	30	30	31	7.9	7.7	8.0
DMMU-2-Water-PG	100	7.3	6.6	8.7	20.1	19.6	20.5	30	30	31	7.9	7.8	8.0
DMMU-2	10	7.2	6.7	8.2	20.1	19.4	20.3	30	30	31	7.9	7.8	8.0
	50	7.2	6.7	8.0	20.2	19.6	20.4	31	30	31	8.0	7.9	8.1
	100	7.0	6.6	7.8	20.3	19.9	20.5	31	31	32	8.1	8.0	8.2
Batch 2: April 29, 2015													
Control		7.2	6.5	8.4	20.1	20.0	20.2	29	29	30	7.9	7.8	7.9
DMMU-1-Water-PG	100	6.7	6.0	7.5	20.4	20.0	21.0	34	33	34	7.9	7.9	8.0
DMMU-1	10	7.2	6.4	8.9	20.3	19.9	21.0	30	30	30	7.9	7.8	7.9
	50	7.1	6.4	8.2	20.2	19.9	20.4	32	31	32	8.0	7.9	8.0
	100	6.9	6.3	8.1	20.3	20.0	20.7	34	33	34	8.0	8.0	8.0

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
ppt = parts per thousand

Appendix B-4.2. Ammonia Summary for the Water Column Test with *Menidia beryllina.*
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Overlying Ammonia (mg/L)			
		Day 0		Day 4	
		Total	UIA	Total	UIA
Batch 1: December 5, 2014 [1]					
Control		0.000	0.000	0.152	0.003
DMMU-2-Water-PG	100	0.000	0.000	0.157	0.004
DMMU-2	10	0.085	0.002	0.411	0.011
	50	0.972	0.030	1.41	0.046
	100	2.09	0.082	2.61	0.106
Batch 2: April 29, 2015 [2]					
Control		0.000	0.000	0.026	0.001
DMMU-1-Water-PG	100	0.297	0.010	0.000	0.000
DMMU-1	10	0.204	0.004	0.000	0.000
	50	0.371	0.012	0.104	0.003
	100	0.453	0.015	0.154	0.005

Notes:
[1] Batch 1 NOEC (concurrent reference-toxicant test derived) = 12.9 mg/L total ammonia; 0.157 mg/L UIA
[2] Batch 2 NOEC (concurrent reference-toxicant test derived) = 23.6 mg/L total ammonia; 0.611 mg/L UIA
% = percent
mg/L = milligrams per liter
UIA = Un-ionized ammonia

Appendix B-4.3. Test Condition Summary for *Menidia beryllina*.
Port of Los Angeles
San Pedro, California

Test Conditions: *Menidia beryllina*		
	Batch 1	**Batch 2**
Sample Identification	DMMU-2, DMMU-2-Water-PG, and Control	DMMU-1, DMMU-1-Water-PG, and Control
Date sampled	October 29, 2014	March 27, 2015
Date received	October 30-31, 2014	March 28, 2015
Sample storage conditions	4°C, dark	4°C, dark
Test dates	December 5–9, 2014	April 29-May 3, 2015
Days of holding Recommended: ≤8 weeks (56 days)	37 Days	33 Days
Test Species	*Menidia beryllina*	
Supplier	Aquatic BioSystems, Fort Collins, CO	
Date acquired	December 5, 2014	April 28, 2015
Acclimation/holding time	0 days	1 day
Age at test initiation Recommended: 9 – 14 days old	10 days old	13 days old
Test Procedures	ITM	
Test location	Ramboll Environ, Port Gamble, WA	
Test type/duration	96-Hour/ Static	
Control water	0.45 µm-filtered, North Hood Canal seawater,	
Test Dissolved Oxygen Recommended: > 4.6 mg/L 60% Sat. @ 20°C, 30ppt	Actual: 6.6 – 8.7 mg/L	Actual: 6.0 – 8.9 mg/L
Test Temperature Recommended: 20 ± 1°C	Actual: 19.4 – 20.6 °C	Actual: 19.9 – 21.0 °C
Test Salinity Recommended: 30 ± 2 ppt	Actual: 30 – 32 ppt	Actual: 30 – 34 ppt
Test pH Recommended: 7 – 9	Actual: 7.7 – 8.1	Actual: 7.8 – 8.0
Control performance standard: Recommended: ≥ 90% survival	Actual: 90%, Pass	Actual: 98%, Pass
Reference Toxicant LC_{50} (total ammonia)	LC_{50} = 10.9 mg/L	LC_{50} = 30.82 mg/L
Mean; Control Chart Range ± 2SD (total ammonia)	25.8; 4.9 – 46.7 mg/L	27.16; 6.7 – 47.6 mg/L
NOEC (total ammonia)	12.9 mg/L	23.6 mg/L
NOEC (unionized ammonia)	0.157 mg/L	0.611 mg/L
Test Lighting	16 hour light / 8 hour dark	
Test chamber	600-mL Glass Chamber	
Replicates/treatment	5	
Concentration/treatment	10, 50, and 100% elutriate	
Organisms/replicate	10	
Exposure volume	250 mL	
Feeding	0.2 mL of *Artemia* nauplii on Day 2	
Test solution renewal	None	
Deviations from Test Protocol	None	Salinity

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
mL = milliliter
ppt = parts per thousand
ITM = Inland Testing Manual
LC50 = median lethal concentration

APPENDIX B-5
WATER QUALITY, AMMONIA AND TEST CONDITIONS FOR *MYTILUS GALLOPROVINCIALIS* BIOASSAYS

Appendix B-5.1. Water Quality Summary for the Water Column Test with *Mytilus galloprovincialis.*
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
		Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Batch 1: November 19, 2014													
Control		7.8	7.7	8.0	16.3	16.0	16.5	29	29	29	7.8	7.7	7.9
DMMU-2-Water-PG	100	8.0	7.6	8.4	16.1	15.4	16.5	34	34	34	8.0	7.9	8.0
DMMU-2	1	8.1	7.8	8.3	16.0	15.4	16.5	30	30	30	8.1	7.9	8.3
	10	8.2	8.0	8.3	15.8	15.1	16.3	30	30	30	7.9	7.8	8.0
	50	8.0	7.9	8.1	15.9	15.0	16.3	32	32	32	8.0	7.9	8.0
	100	7.9	7.8	8.0	16.0	15.4	16.4	34	34	34	8.0	8.0	8.1
Batch 2: April 30, 2015													
Control		8.4	7.8	9.3	15.5	14.5	16.0	28	28	29	7.9	7.9	7.9
DMMU-1-Water-PG	100	8.8	7.9	10.2	15.3	14.0	15.9	30	30	30	8.0	7.9	8.1
DMMU-1	1	8.2	7.9	8.6	15.7	15.2	15.9	29	29	29	8.0	7.9	8.0
	10	8.1	8.0	8.2	15.8	15.7	16.0	29	29	29	8.0	7.9	8.0
	50	8.1	7.9	8.3	15.7	15.4	15.8	30	29	30	8.0	8.0	8.1
	100	8.2	7.9	8.6	15.2	14.0	15.8	30	30	30	8.2	8.1	8.3

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
ppt = parts per thousand

Appendix B-5.2. Ammonia Summary for the Water Column Test with *Mytilus galloprovincialis.*
Port of Los Angeles
San Pedro, California

Sample ID	Concentration (%)	Overlying Ammonia (mg/L) [1]			
		Day 0		Day 2	
		Total	UIA	Total	UIA
Batch 1 November 19, 2014 [2]					
Control		0.000	0.000	0.000	0.000
DMMU-2-Water-PG	100	0.000	0.000	0.000	0.000
DMMU-2	1	0.000	0.000	0.000	0.000
	10	0.000	0.000	0.000	0.000
	50	0.291	0.005	0.305	0.007
	100	0.790	0.018	1.08	0.026
Batch 2 April 30, 2015 [3]					
Control		0.000	0.000	0.026	0.000
DMMU-1-Water-PG	100	0.092	0.002	0.000	0.000
DMMU-1	1	0.068	0.002	0.000	0.000
	10	0.079	0.002	0.000	0.000
	50	0.443	0.013	0.327	0.008
	100	0.791	0.032	**0.953**	0.028

Notes:
[1] Bold values are slightly above NOEC threshold
[2] Batch 1 NOEC (concurrent reference-toxicant test derived) = 1.30 mg/L total ammonia; 0.014 mg/L UIA
[3] Batch 2 NOEC (concurrent reference-toxicant test derived) = 0.755 mg/L total ammonia; 0.063 mg/L UIA
% = percent
mg/L = milligrams per liter
UIA = Un-ionized ammonia

Appendix B-5.3. Test Condition Summary for *Mytilus galloprovincialis*.
Port of Los Angeles
San Pedro, California

Test Conditions: *Mytilus galloprovincialis*		
	Batch 1	**Batch 2**
Sample Identification	DMMU-2, DMMU-2-Water-PG, and Control	DMMU-1, DMMU-1-Water-PG, and Control
Date sampled	October 29, 2014	March 27, 2015
Date received	October 30-31, 2014	March 28, 2015
Sample storage conditions	4°C, dark	4°C, dark
Test dates	November 19 – Nov 21, 2014	April 30 – May 2, 2015
Days of holding Recommended: ≤8 weeks (56 days)	21 Days	32 days
Test Species	*Mytilus galloprovincialis*	
Supplier	Taylor Shellfish	
Date acquired	November 19, 2014	April 30, 2015
Acclimation/holding time	0 days	0 days
Age class (used for testing) Recommended: <4hr old embryos	<4 hours	<4 hours
Test Procedures	ITM	
Test location	Ramboll Environ, Port Gamble, WA	
Test type/duration: 48 – 96 ± 2 Hour/ Static	47 hours	47 hours
Control water	0.45 µm-filtered, North Hood Canal seawater, adjusted with DI water	
Test Dissolved Oxygen Recommended: > 4.9 mg/L 60% Sat. @ 16°C, 30ppt	Actual: 7.6 – 8.4 mg/L	Actual: 7.8 – 10.2 mg/L
Test Temperature Recommended: 16 ± 1°C	Actual: 15.0 – 16.5 °C	Actual: 14.0 – 16.0 °C
Test Salinity Recommended: 18-32 ± 1 ppt; Targeted 30 ± 1 ppt	Actual: 29 – 34 ppt	Actual: 28 – 30 ppt
Test pH Recommended: 7 – 9	Actual: 7.7 – 8.3	Actual: 7.9 – 8.3
Control performance standard	Actual:	Actual:
Recommended: ≥ 70% normal development; ≥ 70% survival	95.8% Normality, Pass;	98.1% Normality, Pass;
	97.7% Survival, Pass	99.4% Survival, Pass
Reference Toxicant LC_{50} (total ammonia)	LC_{50} = 1.863 mg/L	LC_{50} = 3.781 mg/L
Mean; Acceptable Range (total ammonia)	5.45; 1.33 – 9.56 mg/L	5.28; 0.4004 – 10.18 mg/L
NOEC (total ammonia)	1.30 mg/L	0.755 mg/L
NOEC (unionized ammonia)	0.014 mg/L	0.063 mg/L
Test Lighting	16 hour light / 8 hour dark	
Test chamber	25-mL Glass Vial	
Replicates/treatment	5	
Concentration/treatment	100, 50, 10, and 1% elutriate	
Organisms/replicate Recommended: 15 –30 embryos per mL. Not to exceed 50 embryos per mL	Actual: 31.9 embryos per mL	Actual: 26.0 embryos per mL
Exposure volume	10 mL	
Feeding	None	
Test solution renewal	None	
Deviations from Test Protocol	Salinity	Temperature

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
mL = milliliter
ppt = parts per thousand
ITM = Inland Testing Manual
LC50 = median lethal concentration

APPENDIX B-6
WATER QUALITY, AMMONIA AND TEST CONDITIONS FOR *NEANTHES VIRENS* AND *MACOMA NASUTA* BIOACCUMULATION TESTS

Appendix B-6.1. Water Quality Summary for *Neanthes virens* and *Macoma nasuta* Bioaccumulation Tests.
Port of Los Angeles
San Pedro, California

Sample ID		Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (pH units)			Flow (mL/30 sec)		
		Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Batch 1: December 9, 2014																
N. virens	Control	7.6	6.5	8.1	14.8	14.2	16.0	29	27	31	7.7	7.5	7.8	49	40	56
	Ref-DMMU-2	7.8	6.8	8.4	14.8	14.2	15.2	29	27	31	7.7	7.5	7.9	46	38	56
	DMMU-2	7.6	7.0	8.4	14.6	14.1	15.0	29	27	31	7.7	7.5	7.8	47	39	56
M. nasuta	Control	7.9	7.1	8.5	14.7	14.3	15.3	29	28	31	7.7	7.6	7.9	47	39	56
	Ref-DMMU-2	7.9	7.5	8.6	14.7	14.3	15.8	29	27	31	7.7	7.5	7.9	48	38	56
	DMMU-2	7.8	6.9	8.3	14.8	14.3	16.3	29	27	31	7.7	7.5	7.9	47	38	56
Batch 2: May 1, 2015																
N. virens	Control	8.0	7.4	8.4	14.3	12.7	15.8	29	29	30	7.9	7.7	8	48	38	56
	Ref-DMMU-1	8.0	7.0	8.6	14.4	12.5	15.9	30	29	31	7.9	7.7	8	48	39	56
	DMMU-1	7.9	6.8	8.4	14.6	13.1	16.0	30	29	31	7.9	7.7	8	48	38	56
M. nasuta	Control	8.2	7.3	8.7	14.1	12.5	15.6	29	29	31	7.9	7.8	8	48	39	56
	Ref-DMMU-1	8.2	7.8	8.6	14.4	12.6	15.9	30	29	31	7.9	7.7	8	48	38	56
	DMMU-1	8.1	7.7	8.7	14.3	12.5	15.8	30	29	30	7.9	7.8	8	50	39	56

Notes:
mg/L = milligrams per liter
°C = degrees Celsius
ppt = parts per thousand
mL = milliliter

Appendix B-6.2. Test Condition Summary for *Neanthes (Nereis) virens.*
Port of Los Angeles
San Pedro, California

Test Conditions: *Neanthes (Nereis) virens*		
	Batch 1	**Batch 2**
Sample Identification	DMMU-2, Ref-DMMU-2, and Control	DMMU-1, Ref-DMMU-1, and Control
Date sampled	October 27 and 29, 2014	March 26 – 27, 2015
Date received	October 31, 2014	March 28, 2015
Sample storage conditions	4°C, dark	
Test dates	December 9, 2014 – January 6, 2015	May 1 – 29, 2015
Days of holding Recommended: ≤8 weeks (56 days)	43 Days	36 Days
Source of control sediment	Damariscotta River, Boothbay Harbor, ME	
Test Species	*Neanthes (Nereis) virens*	
Supplier	Aquatic Research Organisms, Hampton, NH	
Date acquired	December 9, 2014	April 29, 2015
Acclimation/holding time	0 days	2 days
Age class	Adult	Adult
Test Procedures	ITM	ITM
Test location	Ramboll Environ, Port Gamble, WA	
Test type/duration	28-Day/ Flow-through	
Control water	Sand-filtered, North Hood Canal seawater	
Test dissolved oxygen Recommended: > 5.1 mg/L 60% Sat. @ 14°C, 30ppt	Actual: 6.5 – 8.4 mg/L	Actual: 6.8 – 8.6 mg/L
Test temperature Recommended: 14 ± 2 °C	Actual: 14.1 – 16.0 °C	Actual: 12.5 – 16.0 °C
Test salinity Recommended: 30 ± 2 ppt (Range: 25-35 ppt)	Actual: 27 – 31 ppt	Actual: 29 – 31 ppt
Test pH Recommended: 7 – 9	Actual: 7.5 – 7.9	Actual: 7.7 – 8.0
Control performance standard Recommended: ≥ 75% survival	Actual: 96.7%, Pass	Actual: 100%, Pass
Test Lighting	16 hours light: 8 hours dark	
Test chamber	10 Gallon Glass Aquaria (49.5 x 24.8 x 29.2 cm)	
Replicates/treatment	5 (3 for control)	
Concentration/treatment	Not Applicable	
Organisms/replicate	20	
Exposure volume	4 – 5 L sediment (4-5 cm) / 18.5 L of overlying seawater	
Feeding	None	
Water renewal (Flow-through) Recommended:	Actual:	Actual:
6 volumes/day minimum 111 L/day	38 – 56 mL/30 sec	38 – 56 mL/30 sec
	109.4 – 161.3 L/day	109.4 – 161.3 L/day
Deviations from Test Protocol	None	None

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
mL = milliliter
ppt = parts per thousand
ITM = Inland Testing Manual

Appendix B-6.3. Test Condition Summary for *Macoma nasuta.*
Port of Los Angeles
San Pedro, California

Test Conditions: *Macoma nasuta*		
	Batch 1	**Batch 2**
Sample Identification	DMMU-2, Ref-DMMU-2, and Control	DMMU-1, Ref-DMMU-1, and Control
Date sampled	October 27 – 29, 2014	March 26 – 27, 2015
Date received	October 31, 2014	March 28, 2015
Sample storage conditions	4°C, dark	
Test dates	December 9, 2014 – January 6, 2015	May 1 – 29, 2015
Days of holding Recommended: ≤8 weeks (56 days)	43 Days	36 Days
Source of control sediment	Discovery Bay, WA	
Test Species	*Macoma nasuta*	
Supplier	J & G Gustone, Discovery Bay, WA	
Date acquired	December 9, 2014	April 29, 2015
Acclimation/holding time	0 days	2 days
Age class	Adult	
Test Procedures	ITM	
Test location	Ramboll Environ, Port Gamble, WA	
Test type/duration	28-Day/ Flow-through	
Control water	Sand-filtered, North Hood Canal seawater	
Test dissolved oxygen Recommended: > 5.1 mg/L 60% Sat. @ 14°C, 30ppt	Actual: 6.9 – 8.6 mg/L	Actual: 7.3 – 8.7 mg/L
Test temperature Recommended: 14 ± 2 °C	Actual: 14.3 – 16.3 °C	Actual: 12.5 – 15.9 °C
Test salinity Recommended: 30 ± 2 ppt (Range: 25-35 ppt)	Actual: 27 – 31 ppt	Actual: 29 – 31 ppt
Test pH Recommended: 7 – 9	Actual: 7.5 – 7.9	Actual: 7.7 – 8.0
Control performance standard Recommended: ≥ 75% survival	Actual: 84.0%, Pass	Actual: 93.3%, Pass
Test Lighting	16 hours light: 8 hours dark	
Test chamber	10 Gallon Glass Aquaria (49.5 x 24.8 x 29.2 cm)	
Replicates/treatment	5 (3 for control)	
Concentration/treatment	Not Applicable	
Organisms/replicate	25	
Exposure volume	4 – 5 L sediment (4-5 cm) / 18.5 L of overlying seawater	
Feeding	None	
Water renewal (Flow-through) Recommended:	Actual:	Actual:
6 volumes/day minimum 111 L/day	38 – 56 mL/30 sec	38 – 56 mL/30 sec
	109.4 – 161.3 L/day	109.4 – 161.3 L/day
Deviations from Test Protocol	None	None

Notes:
% = percent
mg/L = milligrams per liter
°C = degrees Celsius
mL = milliliter
ppt = parts per thousand
ITM = Inland Testing Manual

APPENDIX B-7
LABORATORY DATA SHEETS AND STATISTICAL COMPARISONS FOR BIOASSAYS

APPENDIX B-7

Contents

APPENDIX B-7.1 *Americamysis bahia* Water-Column Test

96 HOUR WATER-COLUMN TEST

SPECIES					
				Americamysis bahia	
CLIENT	**PROJECT**	**JOB NO.**	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**
POLA	Everport	.	David Moore	Port Gamble /	USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS: 10

CLIENT/ ENVIRON ID	CONC. value	CONC. units	REP	INITIAL NUMBER	Day 1 DATE: 12/06/14 TECHNICIAN: JL			Day 2 DATE: 12/7/14 TECHNICIAN: [illegible]			Day 3 DATE: 12/8/14 TECHNICIAN: [illegible]			Day 4 DATE: 12/9/14 TECHNICIAN: MK		
					#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Control / .	0	%	1	10	10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0		10	0		9	1		8	1①	
			3		10	0		10	0		10	0		10	0	
			4		10	0		10	0		10	0		10	0	
			5		10	0		9	INB		9	1	IFB	7	2NB	
DMMU-2-WATER-PG / .	0	%	1		10	0	N	10	0	N	10	0	N	9	1	N
			2		8	1	INB	9	0	IFB	9	0		9	0	
			3		10	0	N	10	0	N	10	0		10	0	
			4		9	1		8	1	N	8	0		8	0	
			5		10	0		10	0	N	9	0	INB	9	0	

① 1 body being eaten by another mysid. MK 12/9.

96 HOUR WATER-COLUMN TEST

SPECIES					
				Americamysis bahia	
CLIENT	**PROJECT**	**JOB NO.**	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**
POLA	Everport		David Moore	Port Gamble /	USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS: 10

				Day 1			Day 2			Day 3			Day 4		
				DATE: 12/06/14			DATE: 12/7/14			DATE: 12/8/14			DATE: 12/9/14		
				TECHNICIAN: JL			TECHNICIAN: [illegible]			TECHNICIAN: [illegible]			TECHNICIAN: MK		
CLIENT/ ENVIRON ID	CONC. value	CONC. units	REP	INITIAL NUMBER	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
DMMU-2 / .	10 %		1	10	10	0	N	10	0	N	10	0	N	10	0	N
			2		9	0	INB	9	0	↓	8	1	↓	8	0	↓
			3		10	0	N	10	0	↓	10	0	↓	9	0	INB
			4		10	0	↓	10	0	↓	10	0	↓	9	0	INB
			5		10	0	↓	9	0	INB	9	0	↓	9	0	N
DMMU-2 / .	50 %		1		10	0	N	9	0	INB	9	0	N	9	0	N
			2		10	0	↓	9	0	INB	10	0	IFB	10	0	↓
			3		10	0	↓	9	0	INB	10	0	IFB	8	1,	INB
			4		9	1	↓	8	0	INB	9	0	IFB	9	0	N
			5		10	0	↓	9	0	INB	9	0	N	8	0	INB
DMMU-2 / .	100 %		1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	↓	10	0	↓	10	0	↓	10	0	↓
			3		10	0	↓	10	0	↓	10	0	↓	9	0	INB
			4		10	0	↓	10	0	↓	10	0	↓	10	0	N
			5		10	0	↓	10	0	↓	10	0	↓	10	0	↓

DWC HH 12/7

96 HOUR WATER-COLUMN TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	DILUTION WATER BATCH	TEST START DATE	TIME
POLA	Everport	*Americamysis bahia*	FSW120514.01	05Dec14	1455
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**	**TEST END DATE**	**TIME**
———	David Moore	Port Gamble	USEPA/USCOE 1991 / ENVIRON SED021	09Dec14	1255

WATER QUALITY DATA

CLIENT/ ENVIRON ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	DO (mg/L) >4.6 D.O. meter	DO (mg/L) >4.6 D.O. mg/L	TEMP (C) 20 ± 1 TEMP. meter	TEMP (C) 20 ± 1 TEMP. °C	SALINITY (ppt) 30 ± 2 SALINITY meter	SALINITY (ppt) 30 ± 2 SALINITY ppt	pH 6 - 9 pH meter	pH 6 - 9 pH unit	Total Ammonia (mg/L)	Date	Tech	FEEDING AM	FEEDING PM
Control / .	0	%	**0**	Stock	8	7.8	8	19.4	8	30	8	7.9	0.00	12/05	JL		JL
Control / .	0	%	**1**	1	8	7.1	8	20.1	8	30	8	7.9		12/06	JL	HE	JL
Control / .	0	%	**2**	2	8	6.0	8	19.9	8	30	8	7.8		12/07	JL	HE	JL
Control / .	0	%	**3**	3	9	5.8	9	20.2	9	31	9	7.6		12/08	JL	JL	MK
Control / .	0	%	**4**	4	8	6.1	8	20.3	8	30		7.8	0.547	12/9	JL	JL	
DMMU-2-WATER-PG / .	0	%	**0**	Stock	8	8.7	8	19.6	8	30	8	8.0	0.00	12/05	JL		JL
DMMU-2-WATER-PG / .	0	%	**1**	1	8	6.9	8	20.3	8	30	8	8.0		12/06	JL	HE	JL
DMMU-2-WATER-PG / .	0	%	**2**	2	8	6.0	8	20.4	8	30	8	7.8		12/07	JL	HE	JL
DMMU-2-WATER-PG / .	0	%	**3**	3	9	5.5	9	20.1	9	31	9	7.5		12/08	JL	JL	MK
DMMU-2-WATER-PG / .	0	%	**4**	4	8	6.0	8	20.2	8	30	8	7.8	0.267	12/9	JL	JL	

96 HOUR WATER-COLUMN TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	DILUTION WATER BATCH	TEST START DATE	TIME
POLA	Everport	*Americamysis bahia*	FSW120514.01	05Dec14	1455
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**	**TEST END DATE**	**TIME**
—	David Moore	Port Gamble	USEPA/USCOE 1991 / ENVIRON SED021	09Dec14	1255

WATER QUALITY DATA

CLIENT/ ENVIRON ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	DO (mg/L) >4.6 D.O. meter	DO (mg/L) >4.6 D.O. mg/L	TEMP (C) 20 ± 1 TEMP. meter	TEMP (C) 20 ± 1 TEMP. °C	SALINITY (ppt) 30 ± 2 SALINITY meter	SALINITY (ppt) 30 ± 2 SALINITY ppt	pH 6 - 9 pH meter	pH 6 - 9 pH unit	Total Ammonia (mg/L)	Date	Tech	FEEDING AM	FEEDING PM
DMMU-2 / .	10	%	**0**	Stock	8	8.2	8	19.4	8	30	8	7.9	0.0848	12/05	JL		JL
DMMU-2 / .	10	%	**1**	1	8	6.9	8	20.3	8	30	8	7.9		12/06	JL	HE	JL
DMMU-2 / .	10	%	**2**	2	8	5.8	8	20.3	8	30	8	7.8		12/07	JL	HE	JL
DMMU-2 / .	10	%	**3**	3	9	6.0	9	20.2	9	31	9	7.6		12/08	JL	JL	MK
DMMU-2 / .	10	%	**4**	4	8	6.0	8	20.2	8	31	8	7.8	0.635	12/9	JL	JL	
DMMU-2 / .	50	%	**0**	Stock	8	8.0	8	19.6	8	30	8	8.0	0.972	12/05	JL		JL
DMMU-2 / .	50	%	**1**	1	8	7.1	8	20.3	8	30	8	8.0		12/06	JL	HE	JL
DMMU-2 / .	50	%	**2**	2	8	6.4	8	20.0	8	31	8	7.9		12/07	JL	HE	JL
DMMU-2 / .	50	%	**3**	3	9	6.2	9	20.0	9	32	9	7.7		12/08	JL	JL	MK
DMMU-2 / .	50	%	**4**	4	8	6.1	8	20.2	8	31	8	7.9	1.96	12/9	JL	JL	
DMMU-2 / .	100	%	**0**	Stock	8	7.8	8	19.9	8	31	8	8.1	2.09	12/05	JL		JL
DMMU-2 / .	100	%	**1**	1	8	7.0	8	20.0	8	31	8	8.1		12/06	JL	HE	JL
DMMU-2 / .	100	%	**2**	2	8	6.1	8	20.2	8	31	8	8.0		12/07	JL	HE	JL
DMMU-2 / .	100	%	**3**	3	9	5.8	9	20.1	9	32	9	7.8		12/08	JL	JL	MK
DMMU-2 / .	100	%	**4**	4	8	6.1	8	20.2	8	31	8	7.9	3.67	12/9	JL	JL	

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA	Mysid & Menidia	4

PRETEST / INITIAL / FINAL / OTHER (circle one) DAY of TEST: 4

OVERLYING (OV) / POREWATER (PW) (circle one)

Comments: SPP

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
12/9/14	20.5	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
Mys. Ø	—	12/9/14 MK	0.547	20.0	12/9/14 MMB	N			
SW	—		0.267						
DMMH.2	10%.		0.635						
	50%.		1.96						
	100%.		3.67						
Men. Ø	—	12/9/14 MK	0.152	20.0	12/9/14 MMB	N			
SW	—		0.157						
DMMH.2	10%.		0.411						
	50%.		1.41						
	100%.		2.61						

ENVIRON

ORGANISM RECEIPT LOG

Date: 12/5/14	Time: 1200	Batch No. ABS 9089 ab
Organism / Project: Mysids / POLA, NBPL	Source: Aquatic BioSystems	
Address: On File		Invoice Attached (Yes) No
Phone: On File	Contact: On File	
No. Ordered: 1025	No. Received: 1125	Source Batch: Hatch: 11/30/14
Condition of Organisms: Good	Approximate Size or Age: 5 days	
Shipper: UPS	B of L (Tracking No.) 1ZF4673R0194719089	
Condition of Container: Good	Received By: MMB	

Container	D.O. (mg/L)	Temp. (°C)	Conductivity or Salinity (Include Units)	pH (Units)	Technician (Initials)
1	11.4	19.0	31 ppt	7.3	MMB
2	10.5	19.0	30 ppt	7.2	↓

Notes:

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

ORGANISM HISTORY

DATE: 12/4/2014

SPECIES: *Americamysis bahia* (formerly Mysidopsis)

AGE: 4 day

LIFE STAGE: Juvenile

HATCH DATE: 11/30/2014

BEGAN FEEDING: Immediately

FOOD: *Artemia* sp.

Water Chemistry Record:	Mean	Range
TEMPERATURE:	25°C	23-26 °C
SALINITY/CONDUCTIVITY:	30 ppt	21-30 ppt
TOTAL HARDNESS (as $CaCO_3$):	--	--
TOTAL ALKALINITY (as $CaCO_3$):	150 mg/l	140-170 mg/l
pH:	8.16	7.62-8.23

Comments:

Facility Supervisor

96 HOUR WATER-COLUMN TEST

SPECIES					
				Americamysis bahia	
CLIENT	**PROJECT**	**JOB NO.**	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**
POLA	Everport	.	David Moore	Port Gamble /	USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS

				Day 1			Day 2			Day 3			Day 4		
				DATE 4/30			DATE 5/01			DATE 5/02			DATE 5/03		
				TECHNICIAN			TECHNICIAN JL			TECHNICIAN J-			TECHNICIAN JL		
CLIENT/ ENVIRON ID	CONC. value	CONC. units	REP	INITIAL NUMBER	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Control / .	0 %		1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	↓	10	0	↓	10	0	↓	10	0	↓
			3		10	0	↓	10	0	↓	10	0	↓	10	0	↓
			4		10	0	↓	10	0	↓	10	0	↓	10	0	↓
			5		10	0	↓	10	0	↓	10	0	↓	10	0	↓
DMMU-1-Water / .	0 %		1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	↓	10	0	↓	10	0	↓	10	0	↓
			3		10	0	↓	10	0	↓	10	0	↓	10	0	↓
			4		9	0	NB	9	0	↓	9	0	↓	9	0	↓
			5		10	0	N	10	0	↓	10	0	↓	10	0	↓

96 HOUR WATER-COLUMN TEST

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	SPECIES / LABORATORY	PROTOCOL
POLA	Everport		David Moore	*Americamysis bahia* / Port Gamble /	USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS

CLIENT/ ENVIRON ID	CONC. value	CONC. units	REP	INITIAL NUMBER	Day 1 DATE: 4/30 TECHNICIAN: JL			Day 2 DATE: 5/01 TECHNICIAN: JL			Day 3 DATE: 5/02 TECHNICIAN: JL			Day 4 DATE: 5/03 TECHNICIAN: JL		
					#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
DMMU-1 / .	10 %		1		10 (1)	0	2NB	10	0	N	10	0	2	7	0	3NB
			2		9	0	1NB	10	0	1FB	10	0	↓	10	0	2
			3		8	1	2NB	9	0	1FB	9	0		9	0	2
			4		10	0	N	10	0	2	10	0		10	0	↓
			5		10	0	N	10	0	↓	10	0	↓	10	0	↓
DMMU-1 / .	50 %		1		10	0	N	10	0	2	10	0	2	10	0	2
			2		10	0	↓	10	0	↓	10	0	↓	10	0	↓
			3		7	3NB	↓	8	0	1FB	8	0	↓	9	0	1FB
			4		10	0	↓	10	0	2	10	0	↓	10	0	2
			5		9	0	1NB	10	0	1FB	10	0	↓	10	0	↓
DMMU-1 / .	100 %		1		10	0	N	10	0	2	10	0	2	10	0	2
			2		9	1NB	N	10	0	1FB	10	0	↓	10	0	↓
			3		9	0	1NB	9	0	2	9	0	↓	10	0	1FB
			4		7	0	3NB	10	0	3FB	10	0	↓	9	0	1NB
			5		9 (2)	0	1NB	(3) 10	0	2	9	0	↓	9	0	2

(1) WC HE 4/30 (2) IE HE 4/30
(3) WC. JL 5/04/15.

96 HOUR WATER-COLUMN TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	DILUTION WATER BATCH	TEST START DATE	TIME
POLA	Everport	*Americamysis bahia*	0	29Apr15	1625
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**	**TEST END DATE**	**TIME**
.	David Moore	Port Gamble	USEPA/USCOE 1991 / ENVIRON SED021	03May15	1540

WATER QUALITY DATA

CLIENT/ ENVIRON ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	DO (mg/L) >4.6 D.O. meter	DO (mg/L) >4.6 D.O. mg/L	TEMP (C) 20 ± 1 TEMP. meter	TEMP (C) 20 ± 1 TEMP. °C	SALINITY (ppt) 30 ± 2 SALINITY meter	SALINITY (ppt) 30 ± 2 SALINITY ppt	pH 6 - 9 pH meter	pH 6 - 9 pH unit	Total Ammonia (mg/L)	Date	Tech	FEEDING AM	FEEDING PM
Control / .	0	%	**0**	Stock	①~~8~~	8.4	~~8~~	20.0	8	29	8	7.8	0.00	4/29	~~JL~~		HE
Control / .	0	%	**1**	1	8	6.9	8	20.2	8	29	8	7.8		4/30	MK	MK	JE
Control / .	0	%	**2**	2	8	5.1	8	20.0	8	29	8	7.6		5/01	JL	JE	~~JE~~
Control / .	0	%	**3**	3	9	5.0	9	20.2	9	29	9	7.6		5/02	JL	JL	JL
Control / .	0	%	**4**	4	9	③~~5~~.4.9	9	19.8	9	30	9	7.6	0.536	5/03	JL	JL	
DMMU-1-Water / .	0	%	**0**	Stock	8	7.5	8	21.0	8	33	8	8.0	0.297	4/29	~~JL~~		HE
DMMU-1-Water / .	0	%	**1**	1	8	7.0	8	20.2	8	②~~30~~.34	8	7.9		4/30	MK	MK	JE
DMMU-1-Water / .	0	%	**2**	2	8	6.0	8	19.9	8	34	8	7.8		5/01	JL	JE	~~JE~~
DMMU-1-Water / .	0	%	**3**	3	9	5.4	9	20.3	9	34	9	7.8		5/02	JL	JL	JL
DMMU-1-Water / .	0	%	**4**	4	9	4.7	9	20.3	9	34	9	7.6	0.424	5/03	JL	JL	

①Wrong meter ~~HE~~ 4/29 ③MP. JL 5/03/15.
②wp. MK 4/30.

96 HOUR WATER-COLUMN TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	DILUTION WATER BATCH	TEST START DATE	TIME
POLA	Everport	*Americamysis bahia*	0	29Apr15	1625
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**	**TEST END DATE**	**TIME**
.	David Moore	Port Gamble	USEPA/USCOE 1991 / ENVIRON SED021	03May15	1540

WATER QUALITY DATA

CLIENT/ ENVIRON ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	DO (mg/L) >4.6 D.O. meter	DO (mg/L) >4.6 D.O. mg/L	TEMP (C) 20 ± 1 TEMP. meter	TEMP (C) 20 ± 1 TEMP. °C	SALINITY (ppt) 30 ± 2 SALINITY meter	SALINITY (ppt) 30 ± 2 SALINITY ppt	pH 6 - 9 pH meter	pH 6 - 9 pH unit	Total Ammonia (mg/L)	Date	Tech	FEEDING AM	FEEDING PM
DMMU-1 / .	10	%	0	Stock	8	8.9	8	21.0	8	30	8	7.8	0.204	4/29	[illegible]		[illegible]
DMMU-1 / .	10	%	1	1	8	7.1	8	20.2	8	30	8	7.9		4/30	MK	MK	[illegible]
DMMU-1 / .	10	%	2	2	8	6.1	8	20.0	8	30	8	7.8		5/01	JL	[illegible]	[illegible]
DMMU-1 / .	10	%	3	3	9	5.8	9	20.3	9	30	9	7.8		5/02	JL	JL	JL
DMMU-1 / .	10	%	4	4	9	5.0	9	20.3	9	31	9	7.6	0.512	5/03	JL	JL	
DMMU-1 / .	50	%	0	Stock	8	8.2	8	20.2	8	31	8	8.0	0.371	4/29	[illegible]		[illegible]
DMMU-1 / .	50	%	1	1	8	7.1	8	20.2	8	32	8	8.0		4/30	MK	MK	[illegible]
DMMU-1 / .	50	%	2	2	8	6.3	8	20.0	8	31	8	7.8		5/01	JL	[illegible]	[illegible]
DMMU-1 / .	50	%	3	3	9	5.9	9	20.2	9	32	9	7.8		5/02	JL	JL	JL
DMMU-1 / .	50	%	4	4	9	5.2	9	20.4	9	32	9	7.7	0.630	5/03	JL	JL	
DMMU-1 / .	100	%	0	Stock	8	8.1	8	20.7	8	33	8	8.0	0.453	4/29	[illegible]		[illegible]
DMMU-1 / .	100	%	1	1	8	7.0	8	20.3	8	34	8	8.0		4/30	MK	MK	[illegible]
DMMU-1 / .	100	%	2	2	8	6.3	8	20.2	8	34	8	7.9		5/01	JL	[illegible]	[illegible]
DMMU-1 / .	100	%	3	3	9	6.2	9	20.2	9	34	9	7.8		5/02	JL	JL	JL
DMMU-1 / .	100	%	4	4	9	5.3	9	20.4	9	35	9	7.8	0.512	5/03	JL	JL	

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
4/28/15	1335	Abs 5898 Ab

Organism / Project: Mysid / Everport

Source / Supplier: ABS

Phone:	Contact:
On File	Scott Kellman

No. Ordered:	No. Received:	Source Batch: Collection date (hatch date, etc.):
715	785	4/25/15

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
Good	3 day

Shipper:	B of L (Tracking No.)
FedEx	0201 5803 3905 5898

Condition of Container:	Received By:
Good	CR

Container	D.O. (mg/L)	Temp. (°C)	Cond. or (Sal.) (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
1	8.9	20.6	26 ppt	7.0	—	CR

Notes:

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

ORGANISM HISTORY

DATE: 4/27/2015

SPECIES: *Americamysis bahia* (formerly Mysidopsis)

AGE: 2 day

LIFE STAGE: Juvenile

HATCH DATE: 4/25/2015

BEGAN FEEDING: Immediately

FOOD: *Artemia* sp.

Water Chemistry Record:	Mean	Range
TEMPERATURE:	26°C	23-26 °C
SALINITY/CONDUCTIVITY:	25 ppt	21-30 ppt
TOTAL HARDNESS (as $CaCO_3$):	--	--
TOTAL ALKALINITY (as $CaCO_3$):	140 mg/l	140-180 mg/l
pH:	7.89	7.60-8.00

Comments:

Facility Supervisor

ENVIRON

MAINTENANCE LOG FOR CULTURES

ORGANISM: Mysids

LOCATION: Bath 5

Batch Number: ABS5498AB | Date Received: 4/28/15

Date	Feed AM	Feed PM	Tub No.	D.O.	Temp (°C)	Cond/ Sal	pH	H_2O Change	No. Dead	NH_3	Init.
4/28	✓ ①	✓	~~8~~ ① 1	8.9	20.6	26 ppt	7.0	Y	—	—	CR
4/29	✓		1	7.1	19.4	28	7.5	N	→	→	KE

END

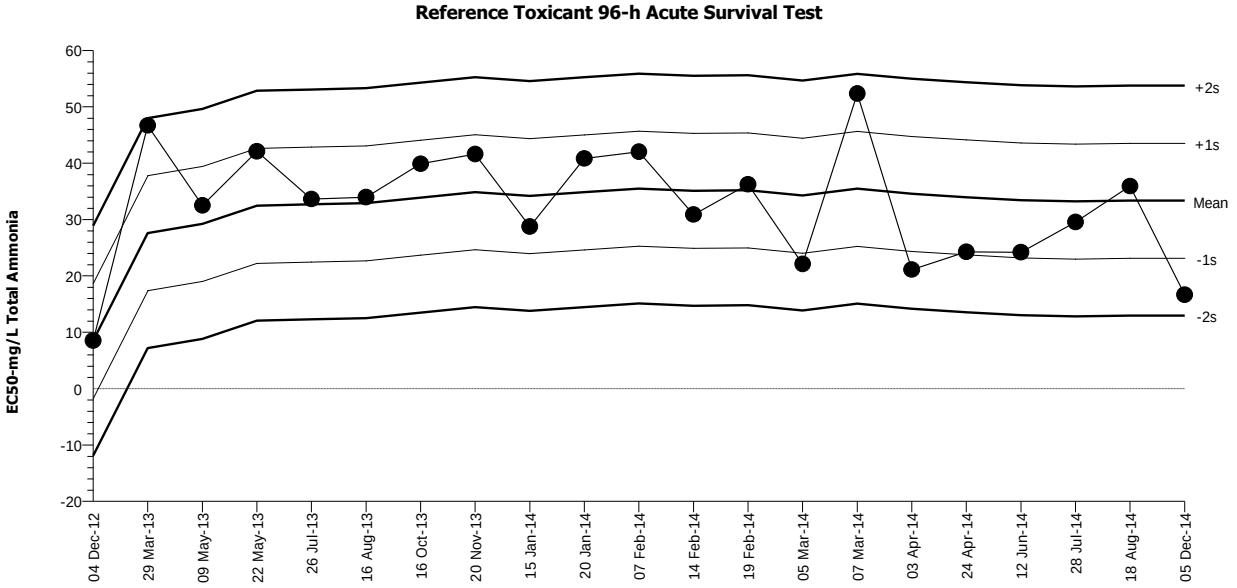
FT = Flow-through

① [illegible] 4/29

CETIS QC Plot

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type: Survival **Organism:** Americamysis bahia (Atlantic Mysid) **Material:** Total Ammonia
Protocol: EPA/821/R-02-012 (2002) **Endpoint:** Proportion Survived **Source:** Reference Toxicant-REF



Mean:	33.35	**Count:**	20	**-1s Warning Limit:**	23.15	**-2s Action Limit:**	12.95
Sigma:	10.2	**CV:**	30.60%	**+1s Warning Limit:**	43.55	**+2s Action Limit:**	53.75

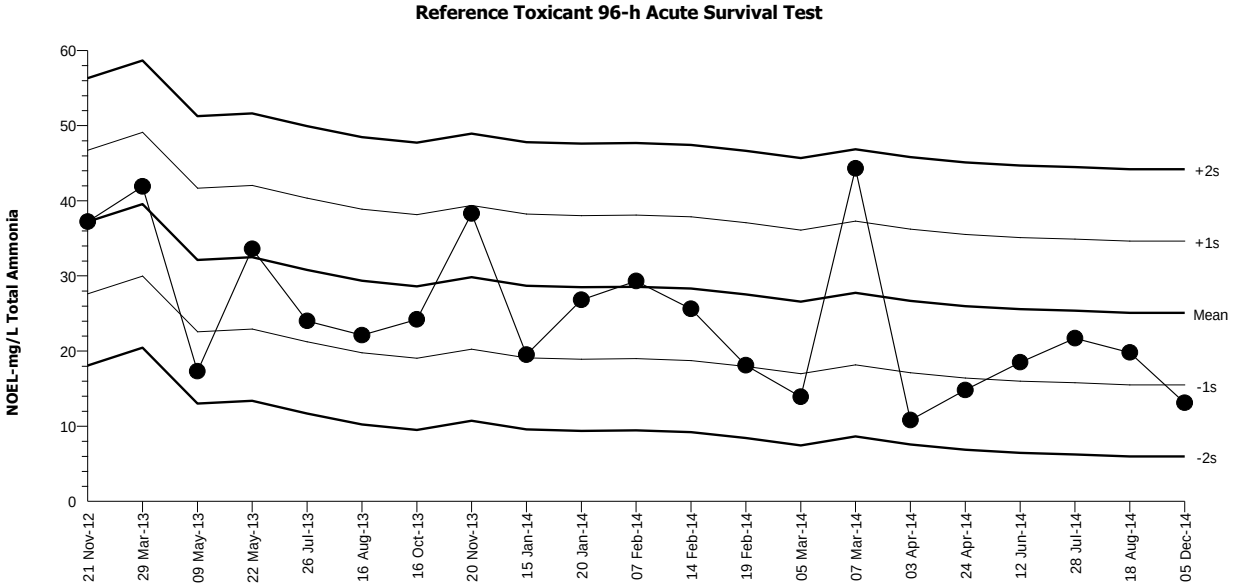
Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Dec	4	15:00	8.506	-24.84	-2.436	(-)	(-)	09-2916-0329	09-1278-2633	NewFields
2	2013	Mar	29	16:00	46.69	13.34	1.308	(+)		09-5280-7777	15-4155-1511	NewFields
3		May	9	16:30	32.5	-0.8475	-0.08309			00-6559-1335	13-1442-8916	NewFields
4			22	11:50	42.09	8.744	0.8572			16-8626-7737	15-9199-1613	NewFields
5		Jul	26	18:10	33.63	0.2783	0.02729			00-6289-6815	19-7660-3839	NewFields
6		Aug	16	16:00	33.96	0.6111	0.05991			11-6472-8917	02-9301-5891	NewFields
7		Oct	16	18:00	39.88	6.533	0.6405			13-7694-6121	13-1634-3118	NewFields
8		Nov	20	15:50	41.61	8.256	0.8094			18-3235-9369	18-9059-0151	NewFields
9	2014	Jan	15	19:25	28.75	-4.603	-0.4513			13-0307-4674	16-4052-1808	NewFields
10			20	16:45	40.82	7.474	0.7327			06-6902-5900	08-9895-6951	NewFields
11		Feb	7	16:40	42.02	8.667	0.8497			00-6517-4037	09-5248-5452	NewFields
12			14	15:00	30.87	-2.479	-0.243			01-2256-4126	16-7076-6406	NewFields
13			19	17:45	36.23	2.883	0.2827			10-3491-7656	13-8215-9008	NewFields
14		Mar	5	18:05	22.11	-11.24	-1.102	(-)		06-0811-4275	13-6817-0658	NewFields
15			7	15:45	52.34	18.99	1.862	(+)		08-9612-3433	11-8446-6591	NewFields
16		Apr	3	18:25	21.11	-12.24	-1.2	(-)		15-6202-6343	06-5272-0912	NewFields
17			24	16:10	24.25	-9.103	-0.8924			03-1824-4795	06-7906-5636	NewFields
18		Jun	12	15:55	24.18	-9.166	-0.8987			13-1309-3316	05-6450-0852	ENVIRON
19		Jul	28	14:35	29.54	-3.815	-0.374			20-2238-3661	08-6663-5876	ENVIRON
20		Aug	18	15:15	35.92	2.568	0.2518			16-4779-0954	12-9666-7701	ENVIRON
21		Dec	5	15:40	16.64	-16.71	-1.638	(-)		05-4780-5963	02-0202-5849	ENVIRON

CETIS QC Plot

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type:	Survival	**Organism:**	Americamysis bahia (Atlantic Mysid)	**Material:**	Total Ammonia
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	25.08	**Count:**	20	**-1s Warning Limit:**	15.53	**-2s Action Limit:**	5.967
Sigma:	9.559	**CV:**	38.10%	**+1s Warning Limit:**	34.64	**+2s Action Limit:**	44.2

Quality Control Data

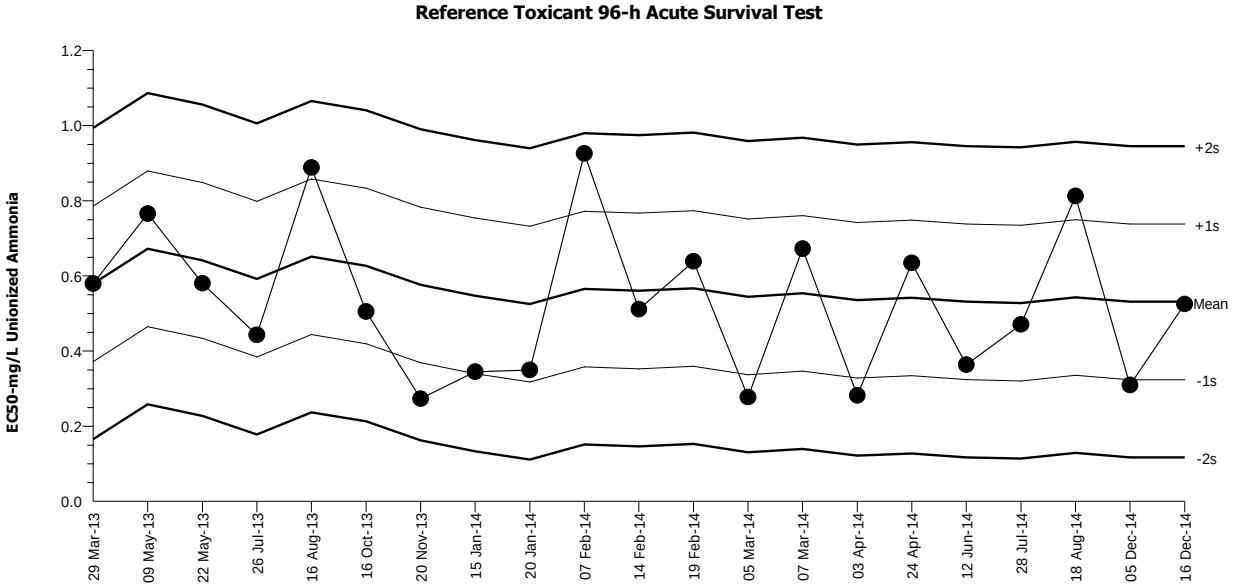
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Nov	21	16:15	37.2	12.12	1.268	(+)		13-7797-8750	20-4087-6937	NewFields
2	2013	Mar	29	16:00	41.9	16.82	1.76	(+)		09-5280-7777	01-6350-1611	NewFields
3		May	9	16:30	17.3	-7.78	-0.8139			00-6559-1335	18-8726-8367	NewFields
4			22	11:50	33.6	8.52	0.8913			16-8626-7737	02-0537-4965	NewFields
5		Jul	26	18:10	24	-1.08	-0.113			00-6289-6815	07-9062-3428	NewFields
6		Aug	16	16:00	22.1	-2.98	-0.3117			11-6472-8917	19-2692-9685	NewFields
7		Oct	16	18:00	24.2	-0.88	-0.09206			13-7694-6121	18-9823-4811	NewFields
8		Nov	20	15:50	38.3	13.22	1.383	(+)		18-3235-9369	18-1202-5897	NewFields
9	2014	Jan	15	19:25	19.5	-5.58	-0.5837			13-0307-4674	16-5529-9454	NewFields
10			20	16:45	26.8	1.72	0.1799			06-6902-5900	14-0402-3582	NewFields
11		Feb	7	16:40	29.3	4.22	0.4415			00-6517-4037	10-4607-7007	NewFields
12			14	15:00	25.6	0.52	0.0544			01-2256-4126	11-1785-1663	NewFields
13			19	17:45	18.1	-6.98	-0.7302			10-3491-7656	03-8558-2127	NewFields
14		Mar	5	18:05	13.9	-11.18	-1.17	(-)		06-0811-4275	15-5506-2963	NewFields
15			7	15:45	44.3	19.22	2.011	(+)	(+)	08-9612-3433	09-1259-2863	NewFields
16		Apr	3	18:25	10.8	-14.28	-1.494	(-)		15-6202-6343	15-6650-9676	NewFields
17			24	16:10	14.8	-10.28	-1.075	(-)		03-1824-4795	18-5519-6082	NewFields
18		Jun	12	15:55	18.5	-6.58	-0.6884			13-1309-3316	11-3938-3675	ENVIRON
19		Jul	28	14:35	21.7	-3.38	-0.3536			20-2238-3661	17-6506-9584	ENVIRON
20		Aug	18	15:15	19.8	-5.28	-0.5524			16-4779-0954	16-8154-7614	ENVIRON
21		Dec	5	15:40	13.1	-11.98	-1.253	(-)		05-4780-5963	12-1905-4097	ENVIRON

CETIS QC Plot

Report Date: 03 Jan-15 21:21 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — **All Matching Labs**

Test Type:	Survival	**Organism:**	Americamysis bahia (Atlantic Mysid)	**Material:**	Unionized Ammonia
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



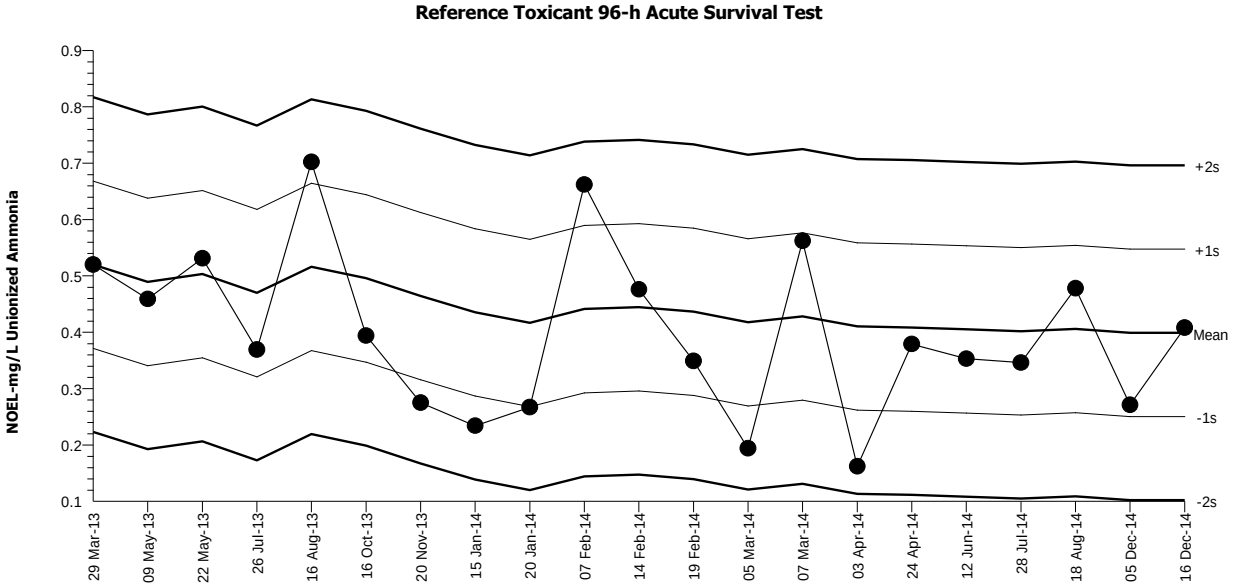
Mean:	0.5312	**Count:**	20	**-1s Warning Limit:**	0.3241	**-2s Action Limit:**	0.117
Sigma:	0.2071	**CV:**	39.00%	**+1s Warning Limit:**	0.7383	**+2s Action Limit:**	0.9454

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Mar	29	16:00	0.5794	0.04825	0.233			18-2277-6297	16-9599-8914	NewFields
2		May	9	16:30	0.7654	0.2342	1.131	(+)		18-2970-9952	16-2259-8392	NewFields
3			22	11:50	0.5801	0.04885	0.2359			14-6493-3472	05-6360-6461	NewFields
4		Jul	26	18:10	0.4427	-0.0885	-0.4273			19-7248-3361	04-0785-8543	NewFields
5		Aug	16	16:00	0.8884	0.3572	1.725	(+)		01-3117-4348	16-1737-6048	NewFields
6		Oct	16	18:00	0.5047	-0.02655	-0.1282			08-0727-6779	17-3460-2468	NewFields
7		Nov	20	15:50	0.2731	-0.2581	-1.246	(-)		04-5029-3711	15-6559-6723	NewFields
8	2014	Jan	15	19:25	0.3446	-0.1866	-0.9011			03-1509-9195	01-4918-0037	NewFields
9			20	16:45	0.3496	-0.1816	-0.877			14-1556-9198	05-1071-2882	NewFields
10		Feb	7	16:40	0.9254	0.3942	1.903	(+)		02-7518-2916	02-7923-5475	NewFields
11			14	15:00	0.5109	-0.02029	-0.09796			04-3795-6902	03-5710-9614	NewFields
12			19	17:45	0.6384	0.1072	0.5178			03-6922-1085	21-3491-2200	NewFields
13		Mar	5	18:05	0.2773	-0.2539	-1.226	(-)		19-2814-6370	19-1123-6959	NewFields
14			7	15:45	0.672	0.1408	0.6799			14-4314-4064	12-3571-7864	NewFields
15		Apr	3	18:25	0.2816	-0.2496	-1.205	(-)		03-3486-5708	18-6758-9525	NewFields
16			24	16:10	0.6343	0.1031	0.4977			01-9832-6489	11-5036-9768	NewFields
17		Jun	12	15:55	0.3637	-0.1675	-0.809			10-4549-4385	15-3904-7423	ENVIRON
18		Jul	28	14:35	0.4706	-0.06064	-0.2928			15-3171-6174	11-5629-5965	ENVIRON
19		Aug	18	15:15	0.8124	0.2812	1.358	(+)		12-8021-9111	15-7834-4384	ENVIRON
20		Dec	5	15:40	0.3092	-0.222	-1.072	(-)		02-5040-8156	05-8376-7486	ENVIRON
21			16	15:20	0.5249	-0.0063	-0.03041			15-4810-4901	19-0588-0946	ENVIRON

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type: Survival **Organism:** Americamysis bahia (Atlantic Mysid) **Material:** Unionized Ammonia
Protocol: EPA/821/R-02-012 (2002) **Endpoint:** Proportion Survived **Source:** Reference Toxicant-REF



Mean:	0.3991	**Count:**	20	**-1s Warning Limit:**	0.2506	**-2s Action Limit:**	0.1022
Sigma:	0.1485	**CV:**	37.20%	**+1s Warning Limit:**	0.5476	**+2s Action Limit:**	0.6962

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Mar	29	16:00	0.52	0.1209	0.8141			18-2277-6297	01-5767-6666	NewFields
2		May	9	16:30	0.459	0.0599	0.4034			18-2970-9952	10-3024-7327	NewFields
3			22	11:50	0.531	0.1319	0.8882			14-6493-3472	14-9177-1776	NewFields
4		Jul	26	18:10	0.369	-0.0301	-0.2027			19-7248-3361	20-6060-1515	NewFields
5		Aug	16	16:00	0.702	0.3029	2.04	(+)	(+)	01-3117-4348	00-7230-4827	NewFields
6		Oct	16	18:00	0.394	-0.0051	-0.03434			08-0727-6779	01-7961-5305	NewFields
7		Nov	20	15:50	0.275	-0.1241	-0.8357			04-5029-3711	12-0847-6137	NewFields
8	2014	Jan	15	19:25	0.234	-0.1651	-1.112	(-)		03-1509-9195	14-5177-7859	NewFields
9			20	16:45	0.267	-0.1321	-0.8896			14-1556-9198	13-9131-5531	NewFields
10		Feb	7	16:40	0.662	0.2629	1.77	(+)		02-7518-2916	15-1888-1587	NewFields
11			14	15:00	0.476	0.0769	0.5178			04-3795-6902	08-0606-7457	NewFields
12			19	17:45	0.349	-0.0501	-0.3374			03-6922-1085	00-0373-4704	NewFields
13		Mar	5	18:05	0.194	-0.2051	-1.381	(-)		19-2814-6370	11-9578-8435	NewFields
14			7	15:45	0.562	0.1629	1.097	(+)		14-4314-4064	10-6381-5799	NewFields
15		Apr	3	18:25	0.162	-0.2371	-1.597	(-)		03-3486-5708	11-7117-8030	NewFields
16			24	16:10	0.379	-0.0201	-0.1354			01-9832-6489	16-9093-3166	NewFields
17		Jun	12	15:55	0.353	-0.0461	-0.3104			10-4549-4385	07-2736-3202	ENVIRON
18		Jul	28	14:35	0.346	-0.0531	-0.3576			15-3171-6174	19-4038-8871	ENVIRON
19		Aug	18	15:15	0.478	0.0789	0.5313			12-8021-9111	20-3212-2650	ENVIRON
20		Dec	5	15:40	0.271	-0.1281	-0.8626			02-5040-8156	08-2610-6896	ENVIRON
21			16	15:20	0.408	0.0089	0.05993			15-4810-4901	18-5241-5996	ENVIRON

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Batch ID:	14-1888-8504	**Test Type:**	Survival	**Analyst:**	
Start Date:	05 Dec-14 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 14:20	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Research Organisms, NH	**Age:**	
Sample ID:	06-7154-8721	**Code:**	28070531	**Client:**	Internal Lab
Sample Date:	05 May-14	**Material:**	Total Ammonia	**Project:**	Reference Toxicant
Receive Date:	05 May-14	**Source:**	Reference Toxicant		
Sample Age:	214d 16h	**Station:**	P140505.47		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
12-1905-4097	Proportion Survived	13.1	21.6	16.82	26.3%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
02-0202-5849	Proportion Survived	EC50	16.64	15.91	17.41		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9333	0.7899	1	0.9	1	0.03333	0.05774	6.19%	0.0%
13.1		3	0.8333	0.4539	1	0.7	1	0.08819	0.1528	18.33%	10.71%
21.6		3	0.06667	0	0.3535	0	0.2	0.06667	0.1155	173.2%	92.86%
30.2		3	0	0	0	0	0	0	0		100.0%
40.7		3	0	0	0	0	0	0	0		100.0%
61.2		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	0.9	0.9
13.1		0.7	0.8	1
21.6		0.2	0	0
30.2		0	0	0
40.7		0	0	0
61.2		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	9/10	9/10
13.1		7/10	8/10	10/10
21.6		2/10	0/10	0/10
30.2		0/10	0/10	0/10
40.7		0/10	0/10	0/10
61.2		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Start Date: 05 Dec-14 15:40 **Species:** Americamysis bahia **Sample Code:** 28070531
End Date: 09 Dec-14 14:20 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Reference Toxicant
Sample Date: 05 May-14 **Material:** Total Ammonia **Sample Station:** P140505.47

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	9	10	10	
0	D	2	14	10	9	
0	D	3	15	10	9	
13.1		1	3	10	7	
13.1		2	1	10	8	
13.1		3	18	10	10	
21.6		1	7	10	2	
21.6		2	5	10	0	
21.6		3	17	10	0	
30.2		1	13	10	0	
30.2		2	8	10	0	
30.2		3	12	10	0	
40.7		1	16	10	0	
40.7		2	11	10	0	
40.7		3	10	10	0	
61.2		1	4	10	0	
61.2		2	2	10	0	
61.2		3	6	10	0	

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Batch ID:	16-2460-0880	**Test Type:**	Survival	**Analyst:**	
Start Date:	05 Dec-14 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 14:20	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Research Organisms, NH	**Age:**	
Sample ID:	06-4484-4577	**Code:**	266F8C21	**Client:**	Internal Lab
Sample Date:	05 May-14	**Material:**	Unionized Ammonia	**Project:**	Reference Toxicant
Receive Date:	05 May-14	**Source:**	Reference Toxicant		
Sample Age:	214d 16h	**Station:**	P140505.47		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
08-2610-6896	Proportion Survived	0.271	0.357	0.311	26.3%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
05-8376-7486	Proportion Survived	EC50	0.3092	0.3016	0.317		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9333	0.7899	1	0.9	1	0.03333	0.05774	6.19%	0.0%
0.271		3	0.8333	0.4539	1	0.7	1	0.08819	0.1528	18.33%	10.71%
0.357		3	0.06667	0	0.3535	0	0.2	0.06667	0.1155	173.2%	92.86%
0.499		3	0	0	0	0	0	0	0		100.0%
0.54		3	0	0	0	0	0	0	0		100.0%
0.647		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	0.9	0.9
0.271		0.7	0.8	1
0.357		0.2	0	0
0.499		0	0	0
0.54		0	0	0
0.647		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	9/10	9/10
0.271		7/10	8/10	10/10
0.357		2/10	0/10	0/10
0.499		0/10	0/10	0/10
0.54		0/10	0/10	0/10
0.647		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

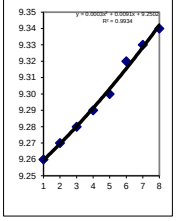
Start Date: 05 Dec-14 15:40 **Species:** Americamysis bahia **Sample Code:** 266F8C21
End Date: 09 Dec-14 14:20 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Reference Toxicant
Sample Date: 05 May-14 **Material:** Unionized Ammonia **Sample Station:** P140505.47

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	3	10	10	
0	D	2	2	10	9	
0	D	3	1	10	9	
0.271		1	10	10	7	
0.271		2	16	10	8	
0.271		3	17	10	10	
0.357		1	9	10	2	
0.357		2	15	10	0	
0.357		3	7	10	0	
0.499		1	13	10	0	
0.499		2	11	10	0	
0.499		3	18	10	0	
0.54		1	5	10	0	
0.54		2	14	10	0	
0.54		3	12	10	0	
0.647		1	6	10	0	
0.647		2	4	10	0	
0.647		3	8	10	0	

CLIENT:	POLA	Date of Test:	05-Dec-14
PROJECT:	Everport	Test Type:	Mysid RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	*NH3T (mg/L)*	*salinity (ppt)*	*pH*	*temp (C)*	temp (K)	i-factor	Mod	**NH3U (mg/L)**
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		**#VALUE!**
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		**0.008**
1										
2										
3	15.6		13.1	30	7.8	20.2	293.36	9.3242		**0.271**
4	22.3		21.6	30	7.7	20.2	293.36	9.3242		**0.357**
5	31.85		30.2	30	7.7	20.2	293.36	9.3242		**0.499**
6	45.5		40.7	30	7.6	20.3	293.46	9.3242		**0.540**
7	65		61.2	30	7.5	20.3	293.46	9.3242		**0.647**
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ENVIRON

96-Hour *Americamysis bahia* Reference Toxicant Test

Test ID: P140505.47	Replicates: 3	Study Director: B. Hester	Location: Bath B
Dilution Water Batch: FSW 120414.01	Organism Batch:	Associated Test(s):	No. of Organisms: 10
Toxicant: Ammonium chloride	Lot Number:	Date Dilutions Prepared: 12/05/14	Initials: KB
Target Concentrations: 65, 45.5, 31.85, 22.3, 15.6 ppm	Quantity of Stock: Target: See Spiking Worksheet / Actual: ↓	Quantity of Diluent: Target: 750 mL / Actual: ↓	

0 Hours	Date: 12/05/14	WQ Time: 1230	Initials: JL	Start Time: 1540	Initials: JL

STOCK

	Control	15.6	22.3	31.85	45.5	65
D.O. (mg/L)	7.4	7.3	7.3	7.3	7.3	7.3
Temperature	20.1	20.2	20.2	20.2	20.3	20.3
Salinity	30	30	30	30	30	30
pH	7.9	7.8	7.7	7.7	7.6	7.5

24 Hours	Date: 12/06/14	WQ Time: 1110	Replicate: 1	Initials: JL

STOCK

	Control	15.6	22.3	31.85	45.5	65
D.O. (mg/L)	7.2	6.9	6.9	6.9	7.0	7.0
Temperature	20.0	20.2	20.3	20.1	20.1	20.1
Salinity	30	30	30	30	30	30
pH	8.0	7.9	7.9	7.8	7.8	7.7

24 Hours	Date: 12/06/14	Time: 1255	Initials: JL

	Control	15.6	22.3	31.85	45.5	65
No. Alive Rep 1	10	10	9 (1)	8 (2)	6 (4)	0 (9, INB)
No. Alive Rep 2	10	9 (1)	9 (1)	7 (3)	2 (8)	4 (6)
No. Alive Rep 3	9 (1)	10	9 (1)	7 (3)	6 (4)	2 (8)

96-Hour *Americamysis bahia*
Reference Toxicant Test

48 Hours	Date: 12/07/14	WQ Time: 1205	Replicate: 2	Initials: JL

STOCK

	Control	15.6	22.3	31.85	45.5	65
D.O. (mg/L)	6.2	6.3	6.5	6.7	6.9	6.9
Temperature	20.1	20.3	20.1	20.3	20.0	20.0
Salinity	30	30	30	30	30	30
pH	7.8	7.9	7.9	7.9	7.9	7.9

48 Hours	Date: 12/7	Time: 1240	Initials: JL

	Control	15.6	22.3	31.85	45.5	65
No. Alive Rep 1	10	10	6 (3)	0 (8)	0 (6)	—
No. Alive Rep 3	10	9	6 (3)	1 (6)	0 (2)	0 (4)
No. Alive Rep 3	9	10	7 (2NB)	0 (7)	0 (6)	0 (2)

72 Hours	Date: 12/08/14	WQ Time: 0910	Replicate: 3	Initials: JL

STOCK

	Control	15.6	22.3	31.85	45.5	65
D.O. (mg/L)	6.2	5.9	6.3	6.6		
Temperature	20.3	20.2	20.2	20.3		
Salinity	31	31	31	31		
pH	7.7	7.7	7.7	7.7		

72 Hours	Date: 12/8/14	Time: 1110	Initials: JL

	Control	15.6	22.3	31.85	45.5	65
No. Alive Rep 1	10	8(1) 1NB	6	—		
No. Alive Rep 2	10	9	6	0(1)		
No. Alive Rep 3	9	10	4(3)	—		

96-Hour *Americamysis bahia*
Reference Toxicant Test

96 Hours	Date: 12/9/14	WQ Time: 1210	Replicate: 1	Initials:

STOCK

	Control	15.6	22.3	31.85	45.5	65
D.O. (mg/L)	②~~7.8~~6.3	②~~7.7~~5.7	6.3			
Temperature	①~~20.1~~20.5	20.4	20.5			
Salinity	30	30	30			
pH	②~~6.3~~7.8	7.7	7.8			

96 Hour Survival Data	End Time: 1420		Initials: MK

	Control	15.6	22.3	31.85	45.5	65
No. Alive Rep 1	10	7(1)	2(4)			
No. Alive Rep 2	9(1)	8(1)	Ø(6)			
No. Alive Rep 3	9	10	Ø(4)			

☒ Pass ☐ Fail

① MR 12/9
② WC 12/9

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Mysid NH_3 RT

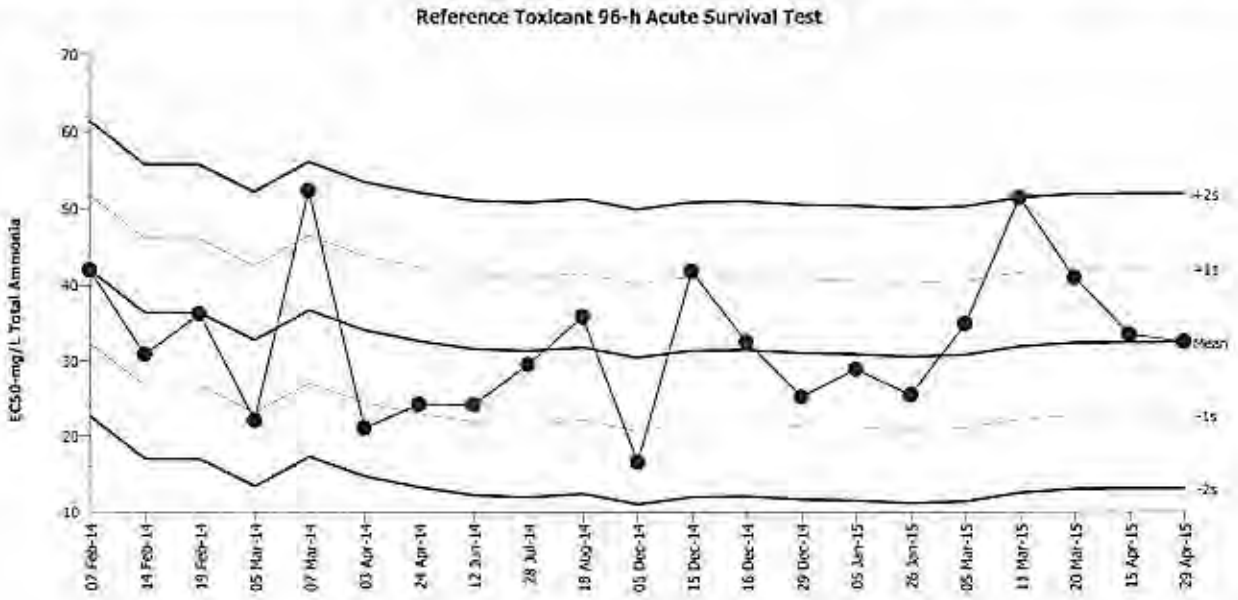
Assumptions in Model
Stock ammonia concentration is 9,000 mg/L = 9 mg/mL

Actual Reading
4560

Test Solutions			Volume of stock to reach desired concentration		
Measured Concentration	**Desired Concentration**	**Volume**			
mg/L	mg/L	mL	mL stock to increase		
0.0562	**0**	750	[redacted]	[redacted]	SALT WATER
13.1	**15.6**	750			**3.849**
21.6	**22.3**	750			**5.502**
30.2	**31.85**	750			**7.858**
40.7	**45.5**	750			**11.225**
61.2	**65**	750			**16.036**

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	Organism:	Americamysis bahia (Atlantic Mysid)	Material:	Total Ammonia
Protocol:	EPA/821/R-02-012 (2002)	Endpoint:	Proportion Survived	Source:	Reference Toxicant-REF



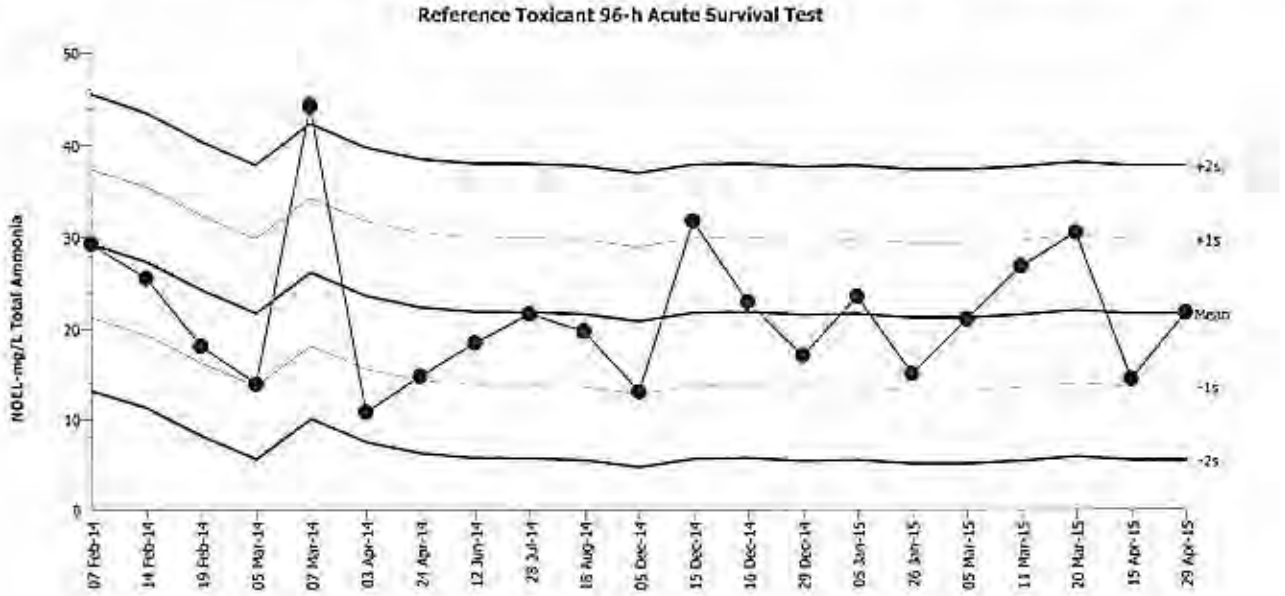
Mean:	32.5	Count:	20	-1s Warning Limit:	22.81	-2s Action Limit:	13.11
Sigma:	9.695	CV:	29.80%	+1s Warning Limit:	42.2	+2s Action Limit:	51.89

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2014	Feb	7	16:40	42.02	9.517	0.9817			00-6517-4037	09-5248-5452	NewFields
2			14	15:00	30.87	-1.629	-0.168			01-2256-4126	16-7076-6406	NewFields
3			19	17:45	36.23	3.733	0.3851			10-3491-7656	13-8215-9008	NewFields
4		Mar	5	18:05	22.11	-10.39	-1.072	(-)		06-0811-4275	13-6817-0658	NewFields
5			7	15:45	52.34	19.84	2.047	(+)	(+)	08-9612-3433	11-8446-6591	NewFields
6		Apr	3	18:25	21.11	-11.39	-1.175	(-)		15-6202-6343	06-5272-0912	NewFields
7			24	16:10	24.25	-8.253	-0.8513			03-1824-4795	06-7906-5636	NewFields
8		Jun	12	15:55	24.18	-8.316	-0.8578			13-1309-3316	05-6450-0852	ENVIRON
9		Jul	28	14:35	29.54	-2.965	-0.3058			20-2238-3661	08-6663-5876	ENVIRON
10		Aug	18	15:15	35.92	3.418	0.3526			16-4779-0954	12-9666-7701	ENVIRON
11		Dec	5	15:40	16.64	-15.86	-1.636	(-)		05-4780-5963	02-0202-5849	ENVIRON
12			15	14:20	41.87	9.365	0.966			09-2201-4388	04-1070-0277	ENVIRON
13			16	15:20	32.58	0.07698	0.00794			11-5085-0453	10-1541-9511	ENVIRON
14			29	15:35	25.23	-7.274	-0.7503			17-8877-7277	09-9162-7279	ENVIRON
15	2015	Jan	5	16:10	28.92	-3.583	-0.3696			14-8456-9041	13-4601-3538	ENVIRON
16			26	18:10	25.5	-7.001	-0.7221			09-7386-6198	03-2399-7405	ENVIRON
17		Mar	5	16:55	34.94	2.439	0.2516			07-1395-6446	18-9562-2807	ENVIRON
18			11	17:55	51.39	18.89	1.948	(+)		09-6852-2773	15-2566-6589	ENVIRON
19			20	13:50	40.97	8.474	0.8741			06-0832-9019	06-0393-2559	ENVIRON
20		Apr	15	16:15	33.51	1.013	0.1045			00-3555-6258	12-2788-4150	ENVIRON
21			29	16:35	32.57	0.06673	0.006883			03-0040-9104	06-4533-7190	ENVIRON

Reference Toxicant 96-h Acute Survival Test | All Matching Labs

Test Type: Survival | Organism: Americamysis bahia (Atlantic Mysid) | Material: Total Ammonia
Protocol: EPA/821/R-02-012 (2002) | Endpoint: Proportion Survived | Source: Reference Toxicant-REF



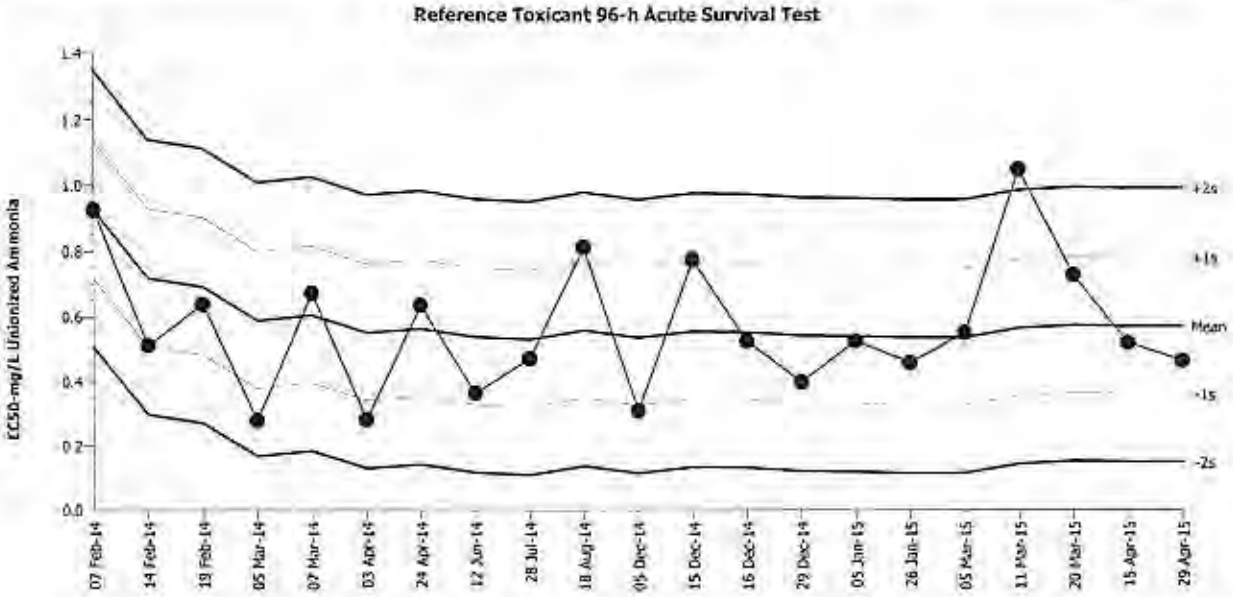
Mean:	21.68	Count:	20	-1s Warning Limit:	13.6	-2s Action Limit:	5.515
Sigma:	8.08	CV:	37.30%	+1s Warning Limit:	29.75	+2s Action Limit:	37.83

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2014	Feb	7	16:40	29.3	7.62	0.9431			00-6517-4037	10-4607-7007	NewFields
2			14	15:00	25.6	3.92	0.4851			01-2256-4126	11-1785-1663	NewFields
3			19	17:45	18.1	-3.58	-0.4431			10-3491-7656	03-8558-2127	NewFields
4		Mar	5	18:05	13.9	-7.78	-0.9629			06-0811-4275	15-5506-2963	NewFields
5			7	15:45	44.3	22.62	2.8	(+)	(+)	08-9612-3433	09-1259-2863	NewFields
6		Apr	3	18:25	10.8	-10.88	-1.347	(-)		15-6202-6343	15-6650-9676	NewFields
7			24	16:10	14.8	-6.88	-0.8515			03-1824-4795	18-5519-6082	NewFields
8		Jun	12	15:55	18.5	-3.18	-0.3936			13-1309-3316	11-3938-3675	ENVIRON
9		Jul	28	14:35	21.7	0.02	0.002475			20-2238-3661	17-6506-9584	ENVIRON
10		Aug	18	15:15	19.8	-1.88	-0.2327			16-4779-0954	16-8154-7614	ENVIRON
11		Dec	5	15:40	13.1	-8.58	-1.062	(-)		05-4780-5963	12-1905-4097	ENVIRON
12			15	14:20	31.8	10.12	1.252	(+)		09-2201-4388	16-4856-0854	ENVIRON
13			16	15:20	23	1.32	0.1634			11-5085-0453	18-8883-8642	ENVIRON
14			29	15:35	17.1	-4.58	-0.5668			17-8877-7277	19-3109-9163	ENVIRON
15	2015	Jan	5	16:10	23.6	1.92	0.2376			14-8456-9041	09-2526-7961	ENVIRON
16			26	18:10	15.1	-6.58	-0.8144			09-7386-6198	20-9237-1297	ENVIRON
17		Mar	5	16:55	21.1	-0.58	-0.07178			07-1395-6446	00-8392-7973	ENVIRON
18			11	17:55	26.9	5.22	0.646			09-6852-2773	07-4261-9582	ENVIRON
19			20	13:50	30.5	8.82	1.092	(+)		06-0832-9019	18-5866-7540	ENVIRON
20		Apr	15	16:15	14.5	-7.18	-0.8886			00-3555-6258	19-4157-4086	ENVIRON
21			29	16:35	21.8	0.12	0.01485			03-0040-9104	19-1748-2354	ENVIRON

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type: Survival | Organism: Americamysis bahia (Atlantic Mysid) | Material: Unionized Ammonia
Protocol: EPA/821/R-02-012 (2002) | Endpoint: Proportion Survived | Source: Reference Toxicant-REF



Mean:	0.5711	Count:	20	-1s Warning Limit:	0.3607	-2s Action Limit:	0.1503
Sigma:	0.2104	CV:	36.80%	+1s Warning Limit:	0.7815	+2s Action Limit:	0.9919

Quality Control Data

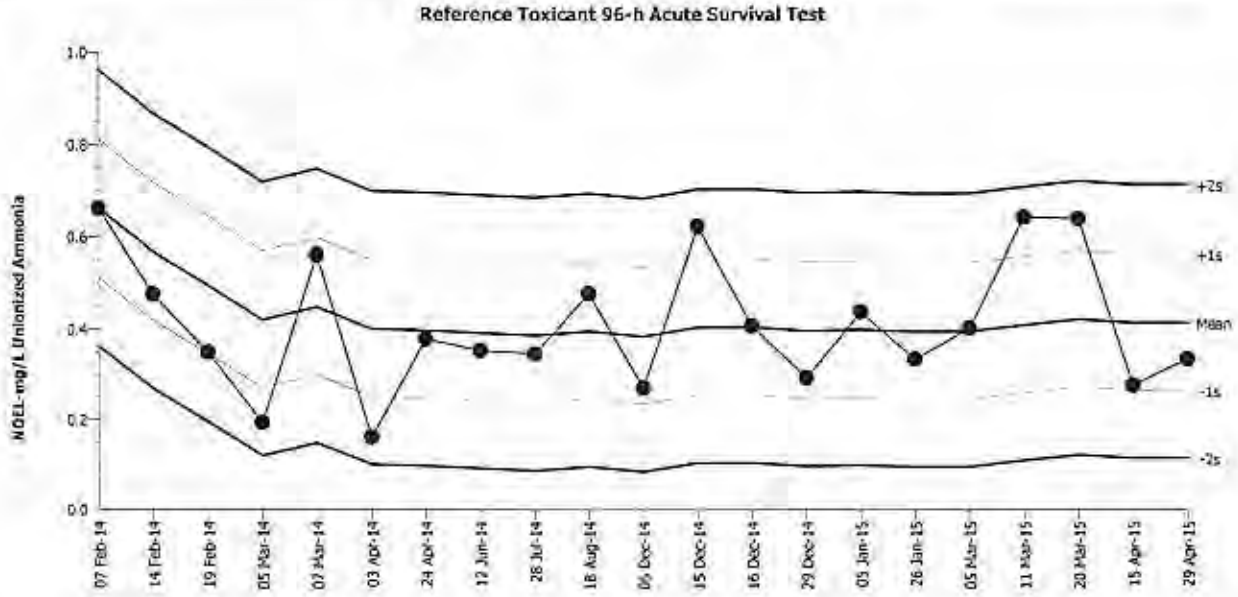
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2014	Feb	7	16:40	0.9254	0.3543	1.684	(+)		02-7518-2916	02-7923-5475	NewFields
2			14	15:00	0.5109	-0.06019	-0.2861			04-3795-6902	03-5710-9614	NewFields
3			19	17:45	0.6384	0.06734	0.3201			03-6922-1085	21-3491-2200	NewFields
4		Mar	5	18:05	0.2773	-0.2938	-1.396	(-)		19-2814-6370	19-1123-6959	NewFields
5			7	15:45	0.672	0.1009	0.4796			14-4314-4064	12-3571-7864	NewFields
6		Apr	3	18:25	0.2816	-0.2895	-1.376	(-)		03-3486-5708	18-6758-9525	NewFields
7			24	16:10	0.6343	0.06318	0.3003			01-9832-6489	11-5036-9768	NewFields
8		Jun	12	15:55	0.3637	-0.2074	-0.9859			10-4549-4385	15-3904-7423	ENVIRON
9		Jul	28	14:35	0.4706	-0.1005	-0.4779			15-3171-6174	11-5629-5965	ENVIRON
10		Aug	18	15:15	0.8124	0.2413	1.147	(+)		12-8021-9111	15-7834-4384	ENVIRON
11		Dec	5	15:40	0.3092	-0.2619	-1.245	(-)		02-5040-8155	05-8376-7486	ENVIRON
12			15	14:20	0.7743	0.2032	0.9658			03-6228-3610	18-7500-8500	ENVIRON
13			16	15:20	0.5249	-0.0462	-0.2196			15-4810-4901	19-0588-0946	ENVIRON
14			29	15:35	0.398	-0.1731	-0.8227			07-4988-6181	02-2342-0969	ENVIRON
15	2015	Jan	5	16:10	0.5256	-0.04545	-0.216			18-0584-4987	19-5564-4809	ENVIRON
16			26	18:10	0.4577	-0.1134	-0.5387			03-1912-2708	17-3670-6426	ENVIRON
17		Mar	5	16:55	0.5509	-0.02015	-0.09579			18-0105-8716	01-7006-8357	ENVIRON
18			11	17:55	1.048	0.477	2.267	(+)	(+)	15-1160-7109	14-3082-6058	ENVIRON
19			20	13:50	0.7268	0.1557	0.7399			05-5697-2175	02-5568-6765	ENVIRON
20		Apr	15	16:15	0.519	-0.05206	-0.2474			02-6633-2620	12-2729-0527	ENVIRON
21			29	16:35	0.4626	-0.1085	-0.5156			05-0005-1405	08-9587-7365	ENVIRON

CETIS QC Plot

Report Date: 22 May-15 14:45 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Americamysis bahia (Atlantic Mysid)	**Material:**	Unionized Ammonia
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	0.4146	**Count:**	20	**-1s Warning Limit:**	0.265	**-2s Action Limit:**	0.1152
Sigma:	0.1497	**CV:**	36.10%	**+1s Warning Limit:**	0.5644	**+2s Action Limit:**	0.714

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2014	Feb	7	16:40	0.662	0.2474	1.653	(+)		02-7518-2916	15-1888-1587	NewFields
2			14	15:00	0.476	0.0614	0.4102			04-3795-6902	08-0606-7457	NewFields
3			19	17:45	0.349	-0.0656	-0.4382			03-6922-1085	00-0373-4704	NewFields
4		Mar	5	18:05	0.194	-0.2206	-1.474	(-)		19-2814-6370	11-9578-8435	NewFields
5			7	15:45	0.562	0.1474	0.9846			14-4314-4064	10-6381-5799	NewFields
6		Apr	3	18:25	0.162	-0.2526	-1.687	(-)		03-3486-5708	11-7117-8030	NewFields
7			24	16:10	0.379	-0.0356	-0.2378			01-9832-6489	16-9093-3166	NewFields
8		Jun	12	15:55	0.353	-0.0616	-0.4115			10-4549-4385	07-2736-3202	ENVIRON
9		Jul	28	14:35	0.346	-0.0686	-0.4582			15-3171-6174	19-4036-8871	ENVIRON
10		Aug	18	15:15	0.478	0.0634	0.4235			12-8021-9111	20-3212-2650	ENVIRON
11		Dec	5	15:40	0.271	-0.1436	-0.9593			02-5040-8156	08-2610-6896	ENVIRON
12			15	14:20	0.624	0.2094	1.399	(+)		03-6228-3610	14-5929-6544	ENVIRON
13			16	15:20	0.408	-0.0066	-0.04409			15-4810-4901	18-5241-5996	ENVIRON
14			29	15:35	0.293	-0.1216	-0.8123			07-4988-6181	19-9668-7298	ENVIRON
15	2015	Jan	5	16:10	0.439	0.0244	0.163			18-0584-4987	18-8062-2394	ENVIRON
16			26	18:10	0.334	-0.0806	-0.5384			03-1912-2708	15-8377-7891	ENVIRON
17		Mar	5	16:55	0.403	-0.0116	-0.07749			18-0105-8716	09-4053-2039	ENVIRON
18			11	17:55	0.643	0.2284	1.526	(+)		15-1160-7109	16-6591-8662	ENVIRON
19			20	13:50	0.64	0.2254	1.506	(+)		06-5697-2175	10-6967-1301	ENVIRON
20		Apr	15	16:15	0.277	-0.1376	-0.9192			02-6633-2620	21-2336-8824	ENVIRON
21			29	16:35	0.334	-0.0806	-0.5384			05-0005-1405	14-6302-4412	ENVIRON

Analyst: JL QA: MK

Reference Toxicant 96-h Acute Survival Test ENVIRON

Batch ID:	14-6981-5449	Test Type:	Survival	Analyst:	
Start Date:	29 Apr-15 16:35	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Laboratory Seawater
Ending Date:	03 May-15 16:10	Species:	Americamysis bahia	Brine:	Not Applicable
Duration:	96h	Source:	Aquatic Biosystems, CO	Age:	
Sample ID:	20-4940-5831	Code:	7A277387	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Total Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	359d 17h	Station:	p140505.100		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
19-1748-2354	Proportion Survived	21.8	31.5	26.2	17.2%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
06-4533-7190	Proportion Survived	EC50	32.57	30.18	35.15		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	0.0%
15.3		4	0.9	0.7701	1	0.8	1	0.04082	0.08165	9.07%	7.69%
21.8		4	0.85	0.6446	1	0.7	1	0.06455	0.1291	15.19%	12.82%
31.5		4	0.675	0.347	1	0.4	0.9	0.1031	0.2062	30.54%	30.77%
42.6		4	0.05	0	0.1419	0	0.1	0.02887	0.05774	115.5%	94.87%
59.4		4	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9	1	1	1
15.3		0.9	0.8	0.9	1
21.8		0.9	1	0.7	0.8
31.5		0.4	0.9	0.7	0.7
42.6		0.1	0	0.1	0
59.4		0	0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	9/10	10/10	10/10	10/10
15.3		9/10	8/10	9/10	10/10
21.8		9/10	10/10	7/10	8/10
31.5		4/10	9/10	7/10	7/10
42.6		1/10	0/10	1/10	0/10
59.4		0/10	0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test				ENVIRON
Start Date:	29 Apr-15 16:35	Species:	Americamysis bahia	Sample Code: 7A277387
End Date:	03 May-15 16:10	Protocol:	EPA/821/R-02-012 (2002)	Sample Source: Reference Toxicant
Sample Date:	05 May-14	Material:	Total Ammonia	Sample Station: p140505.100

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	8	10	9	
0	D	2	10	10	10	
0	D	3	12	10	10	
0	D	4	23	10	10	
15.3		1	9	10	9	
15.3		2	20	10	8	
15.3		3	11	10	9	
15.3		4	4	10	10	
21.8		1	6	10	9	
21.8		2	17	10	10	
21.8		3	14	10	7	
21.8		4	13	10	8	
31.5		1	5	10	4	
31.5		2	16	10	9	
31.5		3	2	10	7	
31.5		4	21	10	7	
42.6		1	3	10	1	
42.6		2	7	10	0	
42.6		3	1	10	1	
42.6		4	15	10	0	
59.4		1	22	10	0	
59.4		2	18	10	0	
59.4		3	24	10	0	
59.4		4	19	10	0	

Analyst: JL QA: MK

Reference Toxicant 96-h Acute Survival Test ENVIRON

Batch ID:	14-6981-5449	Test Type:	Survival	Analyst:	
Start Date:	29 Apr-15 16:35	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Laboratory Seawater
Ending Date:	03 May-15 16:10	Species:	Americamysis bahia	Brine:	Not Applicable
Duration:	96h	Source:	Aquatic Biosystems, CO	Age:	
Sample ID:	20-2065-0261	Code:	7870AD15	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Unionized Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	359d 17h	Station:	p140505.100		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
14-6302-4412	Proportion Survived	0.334	0.487	0.4033	17.2%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
08-9587-7365	Proportion Survived	EC50	0.4626	0.436	0.4908		Trimmed Spearman-Karber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	0.0%
0.245		4	0.9	0.7701	1	0.8	1	0.04082	0.08165	9.07%	7.69%
0.334		4	0.85	0.6446	1	0.7	1	0.06455	0.1291	15.19%	12.82%
0.487		4	0.675	0.347	1	0.4	0.9	0.1031	0.2062	30.54%	30.77%
0.517		4	0.05	0	0.1419	0	0.1	0.02887	0.05774	115.5%	94.87%
0.721		4	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9	1	1	1
0.245		0.9	0.8	0.9	1
0.334		0.9	1	0.7	0.8
0.487		0.4	0.9	0.7	0.7
0.517		0.1	0	0.1	0
0.721		0	0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	9/10	10/10	10/10	10/10
0.245		9/10	8/10	9/10	10/10
0.334		9/10	10/10	7/10	8/10
0.487		4/10	9/10	7/10	7/10
0.517		1/10	0/10	1/10	0/10
0.721		0/10	0/10	0/10	0/10

CETIS Test Data Worksheet

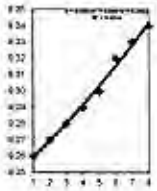
Reference Toxicant 96-h Acute Survival Test				ENVIRON
Start Date:	29 Apr-15 16:35	Species:	Americamysis bahia	Sample Code: 7870AD15
End Date:	03 May-15 16:10	Protocol:	EPA/821/R-02-012 (2002)	Sample Source: Reference Toxicant
Sample Date:	05 May-14	Material:	Unionized Ammonia	Sample Station: p140505.100

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	5	10	9	
0	D	2	8	10	10	
0	D	3	2	10	10	
0	D	4	19	10	10	
0.245		1	22	10	9	
0.245		2	6	10	8	
0.245		3	11	10	9	
0.245		4	23	10	10	
0.334		1	3	10	9	
0.334		2	21	10	10	
0.334		3	24	10	7	
0.334		4	9	10	8	
0.487		1	20	10	4	
0.487		2	14	10	9	
0.487		3	4	10	7	
0.487		4	12	10	7	
0.517		1	18	10	1	
0.517		2	1	10	0	
0.517		3	7	10	1	
0.517		4	16	10	0	
0.721		1	13	10	0	
0.721		2	15	10	0	
0.721		3	10	10	0	
0.721		4	17	10	0	

CLIENT:	ERA	Date of Test:	29-Apr-15
PROJECT:	DMR-QA 35	Test Type:	Mysid RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	I-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1										
2										
3										
4	15.6		15.3	29	7.7	19.7	292.86	9.3214		0.245
5	22.3		21.8	29	7.7	19.1	292.26	9.3214		0.334
6	31.85		31.5	29	7.7	19.2	292.36	9.3214		0.487
7	45.5		42.6	29	7.6	19.0	292.16	9.3214		0.517
8	60		59.400	29	7.6	19.0	292.16	9.3214		0.721
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ENVIRON

96-Hour Mysid Ammonia Reference Toxicant Test

Toxicant:	Ammonium Chloride
Ref Tox ID:	P146505.100
Lot #:	3244C535
Protocol:	TOX099
Replicates:	4

Date Test Started:	4/29/2015
Date Test Ended:	5/3/2015
Matrix:	Liquid
Species:	*Americamysis bahia*
No. of Org. per Chamber:	10

	Conc.	Meter #:	DO (mg/L) (>4.0)	Meter #:	Temp (°C) (20±1°C)	Meter #:	Salinity (ppt) (30±2ppt)	Meter #:	pH (6 - 9)
Day 0 (Stock)	Control	9	7.7	9	19.0	9	29	9	7.8
Date: 4/29	15.6		8.0		19.7		29		7.7
Time: 1500	22.3		8.2		19.1		29		7.7
Technician: JH	31.85		8.1		19.2		29		7.7
	45.5		8.1		19.0		29		7.6
	65		8.2		19.0		29		7.6
			Day 1		Day 2		Day 3		Day 4
Temperature (OLD)			20.2		19.9		20.2		—
Temperature (NEW)									
Feed: 0.1mL *Artemia* (Time/Init.)	AM		0930 MK		0845 JE		JL		JL
	PM		1645 MK		1607 JE		JL		—
Day 4	Control	9	6.1	9	20.0	9	30	9	7.7
Date: 5/03	15.6		5.8		19.9		30		7.7
Time: 1520	22.3		5.7		19.9		30		7.7
Replicate No.: 4	31.85		5.9		19.9		30		7.7
Technician: JL	45.5		6.3		20.0		30		7.8
	65		—		—		—		—

Dilution Preparation (Mysid NH_3 RT Spiking Worksheet)

Test Solution NH_3 Concentration				Volume of Stock to Reach Desired Concentration	
Measured		Desired	Volume		
mg/L		mg/L	mL	mL stock to increase	
Day 0	Day 2				SALT WATER
59.4		65	1000		12.326
42.6		45.5	1000		8.628
31.5		31.85	1000		6.040
21.9		22.3	1000		4.229
15.3		15.6	1000		2.958
		0	1000		0.000

Start Time:	1635
End Time:	1610
Test Acceptability:	≥90% survival in control

Test Location:	Bath 8
Dilution Water Batch:	FSW042915.02
Supplier:	ABS
Organism Batch:	ABS5898AB Age: 4
Chamber Size/Type:	400 mL Beaker
Exposure Volume:	~ 250 mL

ENVIRON **96-Hour Americamysis bahia Reference Toxicant Test**

Toxicant:	Ammonium Chloride
Ref Tox ID:	
Species:	Americamysis bahia

Date Test Started:	4/29/2015
Date Test Ended:	5/3/2015

Concentration	Rep	Day 1 Date: 4/30/15 Time: 1600		Day 2 Date: 5/01 Time: 1005		Day 3 Date: 5/02 Time: 1620		Day 4 Date: 5/03 Time: 1610	
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead
Control	1	10	Ø	10	Ø	9	Ø, INB	9	Ø
	2	10	Ø	10	Ø	10	Ø	10	Ø
	3	10	Ø	10	Ø	10	Ø	10	Ø
	4	10	Ø	10	Ø	10	Ø	10	Ø
15.6	1	10	Ø	10	Ø	9	1	9	Ø
	2	9	INB	9	Ø	8	1	8	Ø
	3	10	Ø	10	Ø	9	Ø, INB	9	Ø
	4	10	Ø	10	Ø	10	Ø	10	Ø
22.3	1	10	Ø	10	Ø	9	Ø, INB	9	Ø
	2	10	Ø	10	Ø	10	Ø	10	Ø
	3	9	INB	9	Ø	9	Ø	7	Ø, 2 NB
	4	9	1 ①	9	Ø	9	Ø	8	Ø, 1 ND
31.85	1	9	~~②+NB~~ 1	9	Ø	7	1, INB	4	2, INB
	2	10	Ø	10	Ø	10	Ø	9	1
	3	10	Ø	10	Ø	10	Ø	7	3
	4	10	Ø	10	Ø	8	2	7	1
45.5	1	9	1	8	1	4	4	1	3
	2	10	Ø	10	Ø	2	8	Ø	2
	3	9	1	6 ~~4~~ ②	3 ~~Ø~~ ②	3	3	1	2
	4	10	Ø	7	3, INB	3	5, 1 FB	Ø	3
65	1	6	4	4	2	Ø	4		
	2	7	3	2	5	Ø	2		
	3	10	Ø	2	8	Ø	2		
	4	6	4	1	5	Ø	1		
INITIALS:		MK		JL		JL		JL	

① 1 stranded above water line. MK 4/30

② WC. MK 4/30.

③ WC. JL 5/01.

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Reference Toxicant ID: P140505.100
Date Prepared: 4/29/15
Technician Initials: HE

Mysid NH_3 RT

Assumptions in Model
Stock ammonia concentration is 9,000 mg/L = 9 mg/mL

Actual Reading
7910

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	Desired Concentration	Volume		
mg/L	mg/L	mL	mL stock to increase	
0.00	0	1000	[redacted]	SALT WATER
15.3	15.6	1000		2.958
21.9	22.3	1000		4.229
31.5	31.85	1000		6.040
42.6	45.5	1000		8.628
59.4	65	1000		12.326

APPENDIX B-7.2 *Menidia beryllina* Water-Column Test

96 HOUR WATER-COLUMN TEST

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	SPECIES / LABORATORY	PROTOCOL
POLA	Everport		David Moore	*Menidia beryllina* / Port Gamble /	USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS: 10

CLIENT/ ID	CONC. value	CONC. units	REP	INITIAL NUMBER	Day 1 DATE: 12/06/14 TECHNICIAN: JL			Day 2 DATE: 12/7/14 TECHNICIAN: JL			Day 3 DATE: 12/8/14 TECHNICIAN: dm			Day 4 DATE: 12.9.14 TECHNICIAN: MC/BH		
					#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Control / .	0	%	1	10	10	Ø	N	10	0	N	10	0	N	10	Ø	N
			2	↓	9	1	↓	8	1	↓	7	1	↓	7	Ø	↓
			3		10	Ø		10	0		10	0		10	Ø	
			4		8	2		8	0		8	0		8	Ø	
			5		10	Ø	↓	10	0	↓	10	0	↓	10	Ø	↓
DMMU-2-WATER-PG / .	0	%	1	↓	10	Ø	N	10	0	N	10	0	N	10	Ø	N
			2		10	Ø	↓	9	1	↓	9	①1 0	↓	9	Ø	↓
			3		10	Ø		9	1		9	0		9	Ø	
			4		10	Ø		10	0		10	0		10	Ø	
			5	↓	10	Ø	↓	9	1	↓	9	0	↓	9	Ø	↓

① IE 12/8/14 dm

96 HOUR WATER-COLUMN TEST

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	SPECIES	LABORATORY	PROTOCOL
POLA	Everport	.	David Moore	*Menidia beryllina*	Port Gamble /	USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS: 10

CLIENT/ ID	CONC. value	CONC. units	REP	INITIAL NUMBER	Day 1 DATE: 12/06/14 (1)	Day 1 TECHNICIAN: JL			Day 2 DATE: 12/7/14	Day 2 TECHNICIAN: [illegible]			Day 3 DATE: 12/8/14	Day 3 TECHNICIAN: [illegible]			Day 4 DATE: 12/9/14	Day 4 TECHNICIAN: MK		
					#ALIVE	#DEAD	OBS		#ALIVE	#DEAD	OBS		#ALIVE	#DEAD	OBS		#ALIVE	#DEAD	OBS	
DMMU-2 / .	10	%	1	10	10	0	N		10	0	N		8	2	N		8	0	N	
			2		9	1			8	1			7	1			7	0	↓	
			3		10	0			10	0			10	0	↓		8	2	3Q	
			4		10	0			10	0			10	0	1Q		9	1	2Q	
			5		10	0	↓		9	1	↓		6	3	N		6	0	N	
DMMU-2 / .	50	%	1		10	0	N		10	0	N		8	2	N		8	0	N	
			2		8	2	↓		8	0			7	1			7	0	1 LOE	
			3		9	0	INB		9	0			9	0			8	1	1 LOE	
			4		10	0	N		10	0			10	0			10	0	1Q	
			5		10	0	↓		8	2	↓		6	2	↓		6	0	N	
DMMU-2 / .	100	%	1		10	0	N		7	3	N		6	1	N		6	0	N	
			2		9	1			9	0			8	1			8	0	2 LOE	
			3		9	1			9	0			8	1			8	0	1 LOE	
			4		10	0			9	1			8	1			8	0	N	
			5		9	1	↓		9	0	↓		6	3	↓		6	0	↓	

(1) Stray mark. JL 12/06/14.

96 HOUR WATER-COLUMN TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	DILUTION WATER BATCH	TEST START DATE	TIME
POLA	Everport	*Menidia beryllina*	FSM20514.01	05Dec14	1425
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**	**TEST END DATE**	**TIME**
—	David Moore	Port Gamble	USEPA/USCOE 1991 / ENVIRON SED021	09Dec14	1310

WATER QUALITY DATA

TEST CONDITIONS			DAY	REP	DO (mg/L) >4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 30 ± 2		pH 6 - 9		Total Ammonia (mg/L)	Date	Tech	FEEDING	
CLIENT/ ID	CONCENTRATION				D.O.		TEMP.		SALINITY		pH						
	value	units			meter	mg/L	meter	°C	meter	ppt	meter	unit				AM	PM
Control / .	0	%	**0**	Stock	8	7.8	8	19.4	8	30	8	7.9	0.00	12/05	JL		
Control / .	0	%	**1**	1	8	7.3	8	20.2	8	30	8	8.0		12/06	JL		
Control / .	0	%	**2**	2	8	7.4	8	20.1	8	30	8	8.0		12/07	JL	\	JL
Control / .	0	%	**3**	3	9	6.7	9	20.1	9	31	9	7.8		12/08	JL		
Control / .	0	%	**4**	4	9	6.8	9	20.6	9	31	9	7.7	0.152	12/09	CR		
DMMU-2-WATER-PG / .	0	%	**0**	Stock	8	~~8.7~~ 8.7 ①	8	19.6	8	30	8	8.0	0.00	12/05	JL		
DMMU-2-WATER-PG / .	0	%	**1**	1	8	7.3	8	20.3	8	30	8	8.0		12/06	JL		
DMMU-2-WATER-PG / .	0	%	**2**	2	8	7.3	8	20.5	8	30	8	8.0		12/07	JL	\	JL
DMMU-2-WATER-PG / .	0	%	**3**	3	9	6.7	9	20.2	9	31	9	7.8		12/08	JL		
DMMU-2-WATER-PG / .	0	%	**4**	4	9	6.6	9	19.8	9	30	9	7.9	0.157	12/09	CR		

① IE. 8.7 mg/L. JL 12/05/14.

96 HOUR WATER-COLUMN TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	DILUTION WATER BATCH	TEST START DATE	TIME
POLA	Everport	*Menidia beryllina*	FSW120514.01	05Dec14	1425
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**	**TEST END DATE**	**TIME**
—	David Moore	Port Gamble	USEPA/USCOE 1991 / ENVIRON SED021	09Dec14	1310

WATER QUALITY DATA

TEST CONDITIONS			DAY	REP	DO (mg/L) >4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 30 ± 2		pH 6 - 9		Total Ammonia (mg/L)	Date	Tech	FEEDING	
					D.O.		TEMP.		SALINITY		pH						
CLIENT/ ID	CONCENTRATION value	units			meter	mg/L	meter	°C	meter	ppt	meter	unit				AM	PM
DMMU-2 / .	10	%	0	Stock	8	8.2	8	19.4	8	30	8	7.9	0.0848	12/05	JL		
DMMU-2 / .	10	%	1	1	8	7.2	8	20.3	8	30	8	8.0		12/06	JL		
DMMU-2 / .	10	%	2	2	8	7.3	8	20.3	8	30	8	8.0		12/07	JL	~	JL
DMMU-2 / .	10	%	3	3	9	6.7	9	20.3	9	31	9	7.8		12/08	JL		
DMMU-2 / .	10	%	4	4	8	6.8	8	20.3	8	30	8	7.9	0.411	12/9	JL		
DMMU-2 / .	50	%	0	Stock	8	8.0	8	19.6	8	30	8	8.0	0.972	12/05	JL		
DMMU-2 / .	50	%	1	1	8	7.2	8	20.4	8	30	8	8.0		12/06	JL		
DMMU-2 / .	50	%	2	2	8	7.4	8	20.3	8	31	8	8.1		12/07	JL	~	JL
DMMU-2 / .	50	%	3	3	9	6.7	9	20.2	9	31	9	7.9		12/08	JL		
DMMU-2 / .	50	%	4	4	8	6.7	8	20.3	8	31	8	8.0	1.41	12/9	JL		
DMMU-2 / .	100	%	0	Stock	8	7.8	8	19.9	8	31	8	8.1	2.09	12/05	JL		
DMMU-2 / .	100	%	1	1	8	7.0	8	20.5	8	31	8	8.1		12/06	JL		
DMMU-2 / .	100	%	2	2	8	7.2	8	20.4	8	31	8	8.2		12/07	JL	~	JL
DMMU-2 / .	100	%	3	3	9①	6.6	9	20.3	9	32	9	8.0		12/08	JL		
DMMU-2 / .	100	%	4	4	8	6.6	8	20.3	8	31	8	8.1	2.61	12/9	JL		

① wrong meter. JL 12/08/14.

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA	Mysid & Menidia	4

PRETEST / INITIAL / FINAL / OTHER (circle one) DAY of TEST: 4
OVERLYING (OV) / POREWATER (PW) (circle one)

Comments: SPP

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
12/9/14	20.5°C	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
Mys. Ø	—	12/9/14 MK	0.547	20.0	12/9/14 MMB	N			
SW	—		0.267						
DMMH.2	10%.		0.635						
	50%.		1.96						
	100%.		3.67						
Men. Ø	—	12/9/14 MK	0.152	20.0	12/9/14 MMB	N			
SW	—		0.157						
DMMH.2	10%.		0.411						
	50%.		1.41						
	100%.		2.61						

ENVIRON

ORGANISM RECEIPT LOG

Date: 12/5/14	Time: 1200	Batch No. ABS9089mb
Organism / Project: Menidia / POLA, NBPL	Source: Aquatic BioSystems	
Address: On File		Invoice Attached (Yes) No
Phone: On File	Contact: On File	
No. Ordered: 1025	No. Received: 1125	Source Batch: Hatch: 11/25/14
Condition of Organisms: Good	Approximate Size or Age: 10 days	
Shipper: UPS	B of L (Tracking No.) 1ZF4673R0194719089	
Condition of Container: Good	Received By: MMB	

Container	D.O. (mg/L)	Temp. (°C)	Conductivity or (Salinity) (Include Units)	pH (Units)	Technician (Initials)
1	10.5	19.0	32 ppt	7.6	MMB
2	10.3	19.0	33 ppt	7.7	↓
3	10.9	19.1	30 ppt	7.6	↓

Notes:

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

ORGANISM HISTORY

DATE: 12/4/2014

SPECIES: *Menidia beryllina*

AGE: 9 day

LIFE STAGE: Juvenile

HATCH DATE: 11/25/2014

BEGAN FEEDING: Immediately

FOOD: Rotifers, *Artemia* sp.

Water Chemistry Record:	Current	Range
TEMPERATURE:	23°C	23-26 °C
SALINITY/CONDUCTIVITY:	25 ppt**	23-26 ppt
TOTAL HARDNESS (as $CaCO_3$):	--	--
TOTAL ALKALINITY (as $CaCO_3$):	170 mg/l	150-210 mg/l
pH:	8.20	7.86-8.20

Comments: ** Acclimated to 30 ppt on 12/4/14.

Facility Supervisor

96 HOUR WATER-COLUMN TEST

SPECIES					
				Menidia beryllina	
CLIENT	**PROJECT**	**JOB NO.**	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**
POLA	Everport	.	David Moore	Port Gamble /	USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS: 10

				Day 1			Day 2			Day 3			Day 4		
				DATE: 4/30			DATE: 5/01			DATE: 5/02			DATE: 5/03		
				TECHNICIAN: [signature]			TECHNICIAN: JL			TECHNICIAN: JL			TECHNICIAN: JL ~~[illegible]~~ ①		
CLIENT/ ID	CONC. value	CONC. units	REP	INITIAL NUMBER	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Control / .	0	%	1	10	10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0		10	0		10	0		10	0	
			3		10	0		10	0		10	0		10	0	
			4		10	0		10	0		10	0		10	0	
			5		10	0		10	0		~~10~~ 9	① ~~0~~ 1		9	0	
DMMU-1-Water / .	0	%	1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0		10	0		10	0		10	0	
			3		10	0		10	0		10	0		9	1	
			4		10	0		10	0		10	0		10	0	
			5		10	0		10	0		10	0		10	0	

① WC, JL 5/02/15.

96 HOUR WATER-COLUMN TEST

SPECIES					
Menidia beryllina					
CLIENT	**PROJECT**	**JOB NO.**	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**
POLA	Everport	.	David Moore	Port Gamble /	USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS: 10

CLIENT/ ID	CONC. value	CONC. units	REP	INITIAL NUMBER	Day 1 DATE: 4/30 TECHNICIAN: AE			Day 2 DATE: 5/01 TECHNICIAN: JL			Day 3 DATE: 5/02 TECHNICIAN: JL			Day 4 DATE: 5/03 TECHNICIAN: JL		
					#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
DMMU-1 / .	10	%	1	10	10	0	N	10	0	N	10	0	2	10	0	2
			2		10	0		10	0		10	0		10	0	
			3		10	0		10	0		10	0		10	0	
			4		10	0		10	0		10	0		10	0	
			5		10	0		10	0		9	1		9	0	
DMMU-1 / .	50	%	1		10	0	N	10	0	N	10	0	2	10	0	2
			2		10	0		10	0		10	0		10	0	
			3		10	0		10	0		10	0		10	0	
			4		10	0		10	0		10	0		10	0	
			5		10	0		10	0		10	0		10	0	
DMMU-1 / .	100	%	1		10	0	N	10	0	N	10	0	2	10	0	2
			2		10	0		10	0		9	1		9	0	
			3		10	0		10	0		10	0		10	0	
			4		10	0		10	0		10	0		10	0	
			5		10	0		10	0		10	0		10	0	

96 HOUR WATER-COLUMN TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	DILUTION WATER BATCH	TEST START DATE	TIME
POLA	Everport	*Menidia beryllina*	0	29Apr15	1655
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**	**TEST END DATE**	**TIME**
.	David Moore	Port Gamble	USEPA/USCOE 1991 / ENVIRON SED021	03May15	1555

WATER QUALITY DATA

TEST CONDITIONS			DAY	REP	DO (mg/L) >4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 30 ± 2		pH 6 - 9		Total Ammonia (mg/L)	Date	Tech	FEEDING	
CLIENT/ ID	CONCENTRATION				D.O.		TEMP.		SALINITY		pH						
	value	units			meter	mg/L	meter	°C	meter	ppt	meter	unit				AM	PM
Control / .	0	%	**0**	Stock	8	8.4	8	20.8	8	29	8	7.8	0.00	4/29	~~JL~~		
Control / .	0	%	**1**	1	9	7.0	9	20.0	9	30	9	7.8		4/30	MK		
Control / .	0	%	**2**	2	8	7.0	8	20.0	8	29	8	7.9		5/01	JL	HE	—
Control / .	0	%	**3**	3	9	6.5	9	20.2	9	29	9	7.9		5/02	JL		
Control / .	0	%	**4**	4	9	6.9	9	20.1	9	30	9	7.9	0.0261	5/03	JL		
DMMU-1-Water / .	0	%	**0**	Stock	8	7.5	8	21.0	8	33	8	8.0	0.297	4/29	~~JL~~		
DMMU-1-Water / .	0	%	**1**	1	9	6.9	9	20.0	9	34	9	7.9		4/30	MK		
DMMU-1-Water / .	0	%	**2**	2	8	6.8	8	20.0	8	34	8	8.0		5/01	JL	HE	—
DMMU-1-Water / .	0	%	**3**	3	~~98~~ 9	6.0	9	20.6	9	34	9	7.9		5/02	JL		
DMMU-1-Water / .	0	%	**4**	4	9	6.1	9	20.4	9	34	9	7.9	0.00	5/03	JL		

① wrong meter. JL 5/02/15.

96 HOUR WATER-COLUMN TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	DILUTION WATER BATCH	TEST START DATE	TIME
POLA	Everport	*Menidia beryllina*	0	29Apr15	1655
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**	**TEST END DATE**	**TIME**
.	David Moore	Port Gamble	USEPA/USCOE 1991 / ENVIRON SED021	03May15	1555

WATER QUALITY DATA

TEST CONDITIONS			DAY	REP	DO (mg/L) >4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 30 ± 2		pH 6 - 9		Total Ammonia (mg/L)	Date	Tech	FEEDING	
CLIENT/ ID	CONCENTRATION value	CONCENTRATION units			D.O. meter	D.O. mg/L	TEMP. meter	TEMP. °C	SALINITY meter	SALINITY ppt	pH meter	pH unit				AM	PM
DMMU-1 / .	10 %		0	Stock	8	8.9	8	21.0	8	30	8	7.8	0.704	4/29	~~HE~~		
DMMU-1 / .	10 %		1	1	9	7.2	9	19.9	9	30	9	7.9		4/30	MK		
DMMU-1 / .	10 %		2	2	8	6.9	8	20.3	8	30	8	7.9		5/01	JL	HE	—
DMMU-1 / .	10 %		3	3	9	6.4	9	20.1	9	30	9	7.9		5/02	JL		
DMMU-1 / .	10 %		4	4	9	6.4	9	20.4	9	30	9	7.9	0.00	5/03	JL		
DMMU-1 / .	50 %		0	Stock	8	8.2	8	20.2	8	31	8	8.0	0.371	4/29	~~HE~~		
DMMU-1 / .	50 %		1	1	9	7.2	9	19.9	9	32	9	7.9		4/30	MK		
DMMU-1 / .	50 %		2	2	8	7.0	8	20.2	8	31	8	8.0		5/01	JL	HE	—
DMMU-1 / .	50 %		3	3	9	6.4	9	20.2	9	32	9	7.9		5/02	JL		
DMMU-1 / .	50 %		4	4	9	6.5	9	20.4	9	32	9	8.0	0.104	5/03	JL		
DMMU-1 / .	100 %		0	Stock	8	8.1	8	20.7	8	33	8	~~8.6~~ ①	0.453	4/29	HE		
DMMU-1 / .	100 %		1	1	9	7.0	9	20.0	9	34	9	8.0		4/30	MK		
DMMU-1 / .	100 %		2	2	8	6.8	8	20.1	8	34	8	8.0		5/01	JL	HE	—
DMMU-1 / .	100 %		3	3	9	6.3	9	20.2	9	34	9	~~7.8~~ ②		5/02	JL		
DMMU-1 / .	100 %		4	4	9	6.4	9	20.3	9	34	9	8.0	0.154	5/03	JL		

① IE ~~HE~~ 4/29 ② MK. JL 5/02/15

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
4/28/15	1320	ABS 5898 Mb

Organism / Project: Menidia / Everport

Source / Supplier: ABS

Phone:	Contact:
On File	Scott Kellman

No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
715	785	4/15/15

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
	13 day

Shipper:	B of L (Tracking No.)
FedEx	020158033390 5898

Condition of Container:	Received By:
Good	CR

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
1	10.8	20.7	30 ppt	7.4	24	CR
2	10.0	20.6	30 ppt	7.3	15	CR

Notes:

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

ORGANISM HISTORY

DATE: 4/27/2015

SPECIES: *Menidia beryllina*

AGE: 12 day

LIFE STAGE: Juvenile

HATCH DATE: 4/15/2015

BEGAN FEEDING: Immediately

FOOD: Rotifers, *Artemia* sp.

Water Chemistry Record:	Current	Range
TEMPERATURE:	25°C	23-26 °C
SALINITY/CONDUCTIVITY:	26 ppt	23-26 ppt
TOTAL HARDNESS (as $CaCO_3$):	--	--
TOTAL ALKALINITY (as $CaCO_3$):	170 mg/l	150-200 mg/l
pH:	8.14	7.92-8.31

Comments:

Facility Supervisor

ENVIRON

MAINTENANCE LOG FOR CULTURES

ORGANISM: Menidia
LOCATION: Bath 5

Batch Number: ABS 5898 MB | Date Received: 4/28/15

Date	Feed AM	Feed PM	Tub No.	D.O.	Temp (°C)	Cond/ (sal)	pH	H_2O Change	No. Dead	NH_3	Init.
4/28/15		✓	1	10.8	20.7	30	7.4	~~4~~ ①	24	—	CR
4/28/15		✓	2	10.0	20.6	30	7.3	~~4~~ ①	13	—	CR
4/29	✓		1	7.0	19.9	~~30~~ 30	7.6	4	8	—	~~JH~~
↓	✓		2	6.8	19.9	30	7.7	4	2	—	↓

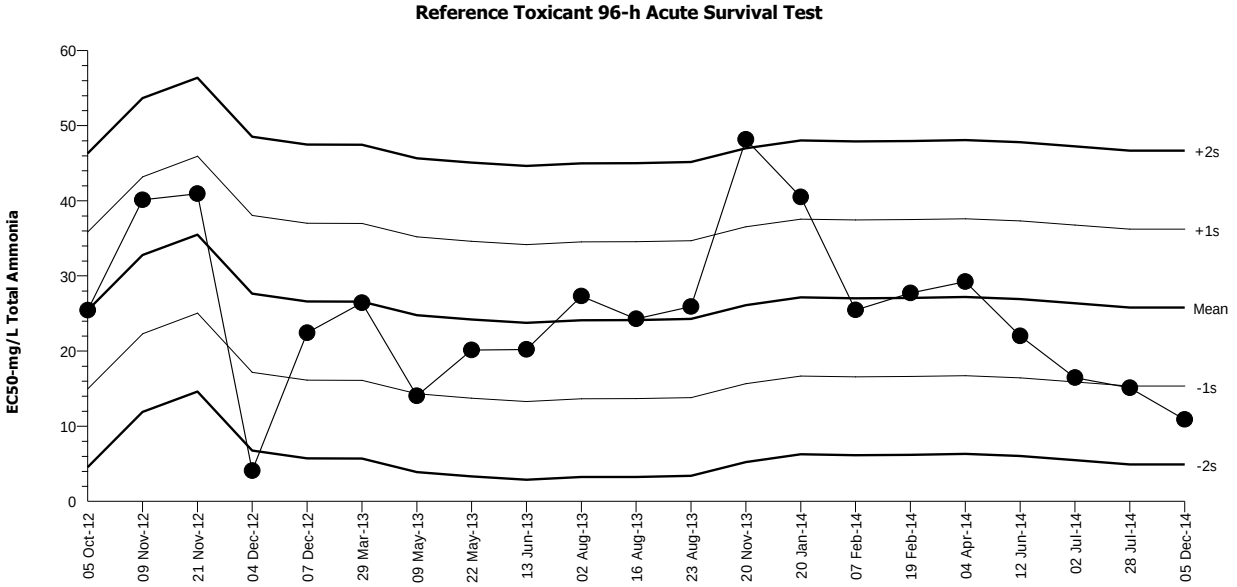
END OF CULTURE

FT = Flow-through

0 WC 4/29

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type: Survival **Organism:** Menidia beryllina (Inland Silverside) **Material:** Total Ammonia
Protocol: EPA/821/R-02-012 (2002) **Endpoint:** Proportion Survived **Source:** Reference Toxicant-REF



Mean:	25.79	**Count:**	20	**-1s Warning Limit:**	15.35	**-2s Action Limit:**	4.912
Sigma:	10.44	**CV:**	40.50%	**+1s Warning Limit:**	36.23	**+2s Action Limit:**	46.67

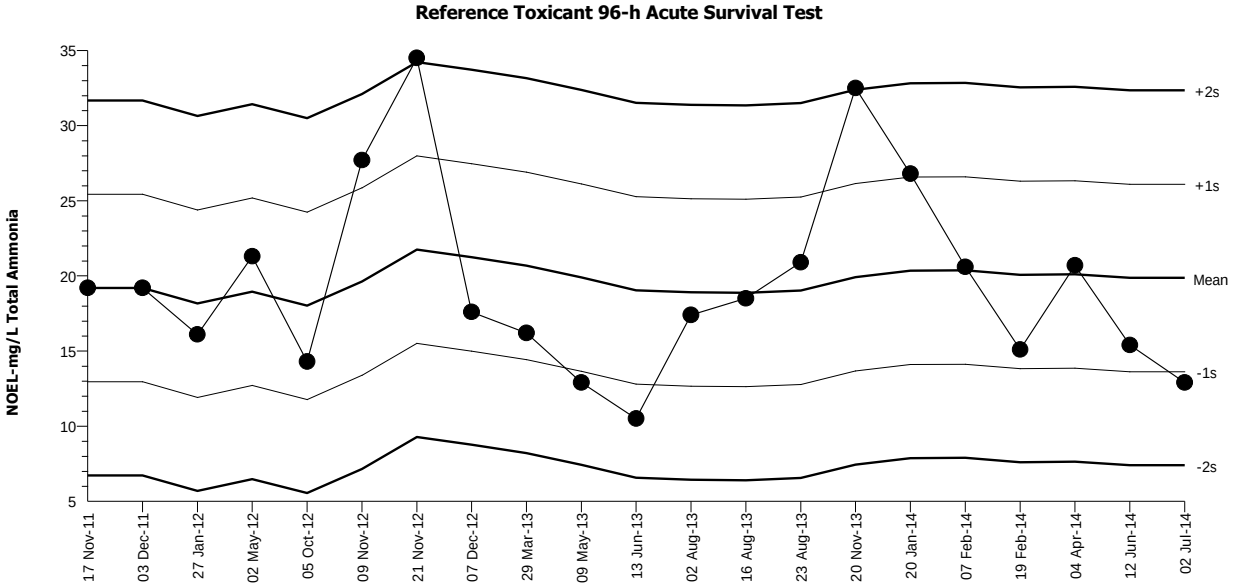
Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Oct	5	17:30	25.42	-0.366	-0.03506			11-8705-5892	18-1236-3180	NewFields
2		Nov	9	16:50	40.12	14.33	1.372	(+)		10-9947-7092	06-9379-9250	NewFields
3			21	17:40	40.93	15.14	1.45	(+)		09-5241-8709	16-1639-2237	NewFields
4		Dec	4	16:40	4.077	-21.71	-2.08	(-)	(-)	04-2938-2554	02-3843-4687	NewFields
5			7	18:00	22.43	-3.362	-0.322			07-1944-1107	08-0578-9892	NewFields
6	2013	Mar	29	17:30	26.41	0.6232	0.05969			15-6629-7016	01-6143-5562	NewFields
7		May	9	17:15	14.03	-11.76	-1.127	(-)		05-2515-0422	09-7554-7266	NewFields
8			22	13:00	20.13	-5.664	-0.5425			02-1650-1674	15-0431-6258	NewFields
9		Jun	13	14:35	20.21	-5.583	-0.5347			20-5493-9860	05-5535-3084	NewFields
10		Aug	2	16:55	27.31	1.521	0.1457			02-5761-9711	15-6695-8541	NewFields
11			16	17:05	24.28	-1.511	-0.1447			03-1026-2061	15-7497-8436	NewFields
12			23	15:30	25.91	0.1166	0.01116			03-7016-3962	03-7864-2310	NewFields
13		Nov	20	16:40	48.15	22.36	2.142	(+)	(+)	16-5818-2880	13-3967-3265	NewFields
14	2014	Jan	20	16:30	40.49	14.7	1.408	(+)		03-8316-8468	13-8558-6238	NewFields
15		Feb	7	16:45	25.46	-0.3326	-0.03186			01-5915-8877	03-7844-7324	NewFields
16			19	17:40	27.72	1.929	0.1847			20-2231-9789	21-1367-6896	NewFields
17		Apr	4	16:50	29.24	3.445	0.33			20-1389-1099	14-0689-6392	ENVIRON
18		Jun	12	15:19	22	-3.79	-0.363			04-7381-4293	03-5750-6017	ENVIRON
19		Jul	2	15:45	16.45	-9.336	-0.8943			16-0856-1779	10-6124-6051	ENVIRON
20			28	15:10	15.11	-10.68	-1.023	(-)		01-9654-2979	02-2302-5084	ENVIRON
21		Dec	5	15:25	10.89	-14.9	-1.428	(-)		20-5776-4016	04-6704-7736	ENVIRON

CETIS QC Plot

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type: Survival **Organism:** Menidia beryllina (Inland Silverside) **Material:** Total Ammonia
Protocol: EPA/821/R-02-012 (2002) **Endpoint:** Proportion Survived **Source:** Reference Toxicant-REF



Mean:	19.87	**Count:**	20	**-1s Warning Limit:**	13.63	**-2s Action Limit:**	7.396
Sigma:	6.237	**CV:**	31.40%	**+1s Warning Limit:**	26.11	**+2s Action Limit:**	32.34

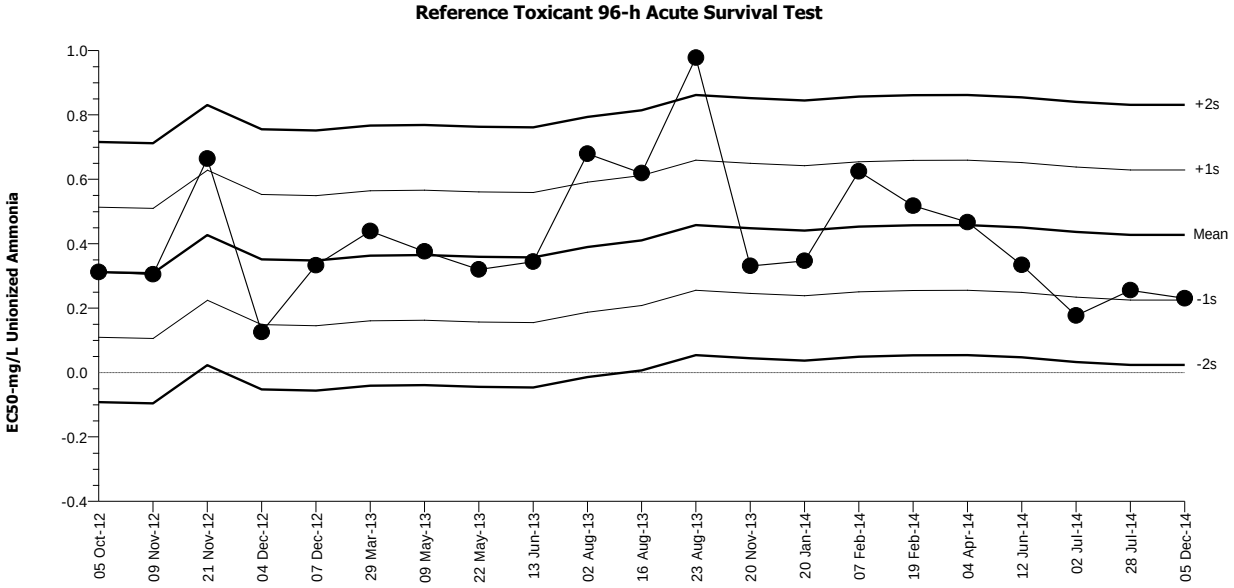
Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2011	Nov	17	15:00	19.2	-0.67	-0.1074			02-5818-9266	11-0569-2532	NewFields
2		Dec	3	13:00	19.2	-0.67	-0.1074			07-1663-2602	04-1116-2487	NewFields
3	2012	Jan	27	15:35	16.1	-3.77	-0.6045			06-7921-9387	00-8363-6930	NewFields
4		May	2	14:45	21.3	1.43	0.2293			15-3413-2419	20-0749-4984	NewFields
5		Oct	5	17:30	14.3	-5.57	-0.8931			11-8705-5892	02-1881-7753	NewFields
6		Nov	9	16:50	27.7	7.83	1.255	(+)		10-9947-7092	19-0937-6517	NewFields
7			21	17:40	34.5	14.63	2.346	(+)	(+)	09-5241-8709	06-2623-5934	NewFields
8		Dec	7	18:00	17.6	-2.27	-0.364			07-1944-1107	09-2382-2727	NewFields
9	2013	Mar	29	17:30	16.2	-3.67	-0.5884			15-6629-7016	08-5086-4918	NewFields
10		May	9	17:15	12.9	-6.97	-1.118	(-)		05-2515-0422	04-5846-5135	NewFields
11		Jun	13	14:35	10.5	-9.37	-1.502	(-)		20-5493-9860	10-1570-8714	NewFields
12		Aug	2	16:55	17.4	-2.47	-0.396			02-5761-9711	13-4375-7151	NewFields
13			16	17:05	18.5	-1.37	-0.2197			03-1026-2061	12-6474-8877	NewFields
14			23	15:30	20.9	1.03	0.1651			03-7016-3962	14-4501-9544	NewFields
15		Nov	20	16:40	32.5	12.63	2.025	(+)	(+)	16-5818-2880	00-8858-9367	NewFields
16	2014	Jan	20	16:30	26.8	6.93	1.111	(+)		03-8316-8468	09-5333-7337	NewFields
17		Feb	7	16:45	20.6	0.73	0.117			01-5915-8877	03-5403-0899	NewFields
18			19	17:40	15.1	-4.77	-0.7648			20-2231-9789	00-8190-7911	NewFields
19		Apr	4	16:50	20.7	0.83	0.1331			20-1389-1099	16-6973-6554	ENVIRON
20		Jun	12	15:19	15.4	-4.47	-0.7167			04-7381-4293	18-4981-0150	ENVIRON
21		Jul	2	15:45	12.9	-6.97	-1.118	(-)		16-0856-1779	03-2378-2904	ENVIRON

CETIS QC Plot

Reference Toxicant 96-h Acute Survival Test — **All Matching Labs**

Test Type:	Survival	**Organism:**	Menidia beryllina (Inland Silverside)	**Material:**	Unionized Ammonia
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



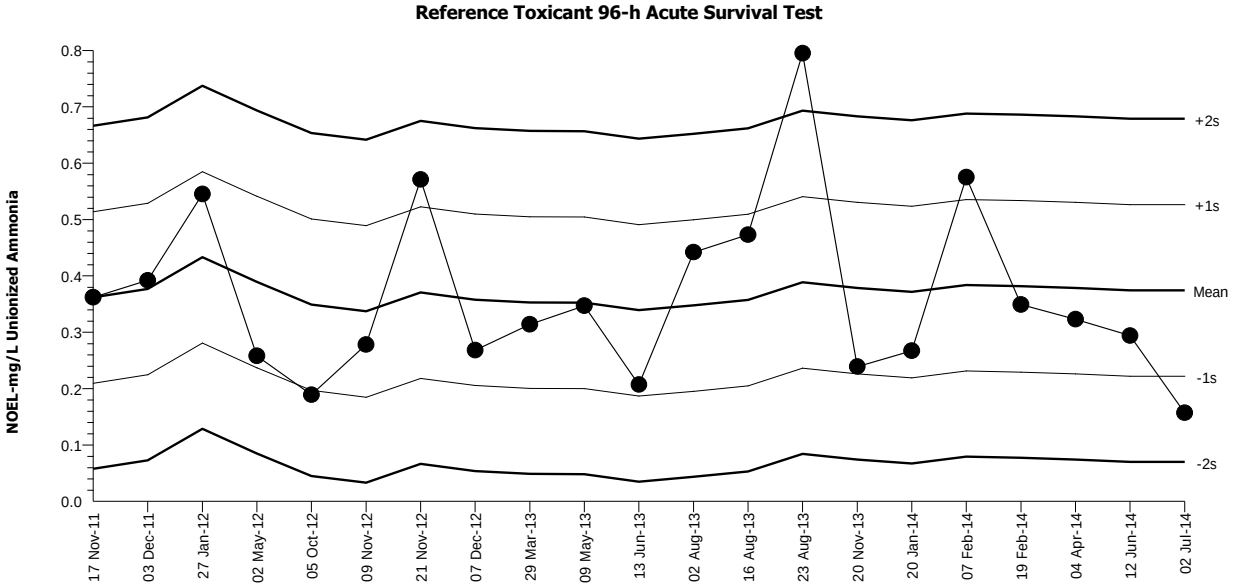
Mean:	0.4273	**Count:**	20	**-1s Warning Limit:**	0.2254	**-2s Action Limit:**	0.02354
Sigma:	0.2019	**CV:**	47.30%	**+1s Warning Limit:**	0.6292	**+2s Action Limit:**	0.8311

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Oct	5	17:30	0.3118	-0.1155	-0.5721			20-0252-0929	11-4480-5563	NewFields
2		Nov	9	16:50	0.3047	-0.1226	-0.6072			06-8912-5820	01-4372-5731	NewFields
3			21	17:40	0.664	0.2367	1.172	(+)		13-3564-1765	19-0701-8478	NewFields
4		Dec	4	16:40	0.1255	-0.3018	-1.495	(-)		09-7399-9766	06-6988-4971	NewFields
5			7	18:00	0.3328	-0.09451	-0.4681			08-3888-7269	05-7696-0069	NewFields
6	2013	Mar	29	17:30	0.4391	0.01181	0.05847			20-7362-7128	15-1784-9888	NewFields
7		May	9	17:15	0.3759	-0.05141	-0.2546			17-2216-3359	13-3747-6067	NewFields
8			22	13:00	0.3196	-0.1077	-0.5335			20-3854-2322	05-4600-3511	NewFields
9		Jun	13	14:35	0.3442	-0.0831	-0.4116			06-7935-4299	19-7954-2799	NewFields
10		Aug	2	16:55	0.6794	0.2521	1.248	(+)		07-4827-6187	16-5847-1989	NewFields
11			16	17:05	0.6189	0.1916	0.9492			02-7670-7538	12-6858-1224	NewFields
12			23	15:30	0.9776	0.5503	2.726	(+)	(+)	02-7931-2327	08-6196-8679	NewFields
13		Nov	20	16:40	0.331	-0.09634	-0.4772			00-5670-8889	03-4956-3533	NewFields
14	2014	Jan	20	16:30	0.3468	-0.08053	-0.3989			10-4601-7006	03-8347-2013	NewFields
15		Feb	7	16:45	0.6246	0.1973	0.9774			06-3386-1201	18-4306-3796	NewFields
16			19	17:40	0.5178	0.09052	0.4483			15-4176-2850	17-3589-9306	NewFields
17		Apr	4	16:50	0.4667	0.03937	0.195			10-3853-0984	12-8741-3238	ENVIRON
18		Jun	12	15:19	0.334	-0.09333	-0.4622			06-0659-9100	16-2602-7223	ENVIRON
19		Jul	2	15:45	0.1769	-0.2504	-1.24	(-)		01-9725-8507	06-3470-5790	ENVIRON
20			28	15:10	0.2555	-0.1718	-0.8508			02-6034-2660	02-2479-8936	ENVIRON
21		Dec	5	15:25	0.2305	-0.1968	-0.9749			11-6424-3662	18-1629-4264	ENVIRON

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type: Survival **Organism:** Menidia beryllina (Inland Silverside) **Material:** Unionized Ammonia
Protocol: EPA/821/R-02-012 (2002) **Endpoint:** Proportion Survived **Source:** Reference Toxicant-REF



Mean:	0.3744	**Count:**	20	**-1s Warning Limit:**	0.2222	**-2s Action Limit:**	0.07
Sigma:	0.1522	**CV:**	40.70%	**+1s Warning Limit:**	0.5266	**+2s Action Limit:**	0.6788

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2011	Nov	17	15:00	0.362	-0.0124	-0.08147			17-3808-7563	18-1085-6875	NewFields
2		Dec	3	13:00	0.392	0.0176	0.1156			03-4597-8397	14-2469-1316	NewFields
3	2012	Jan	27	15:35	0.545	0.1706	1.121	(+)		16-8421-0766	20-3901-9455	NewFields
4		May	2	14:45	0.258	-0.1164	-0.7648			14-7614-0254	04-4063-9462	NewFields
5		Oct	5	17:30	0.189	-0.1854	-1.218	(-)		20-0252-0929	02-8082-6967	NewFields
6		Nov	9	16:50	0.278	-0.0964	-0.6334			06-8912-5820	10-0353-5749	NewFields
7			21	17:40	0.571	0.1966	1.292	(+)		13-3564-1765	21-3816-3119	NewFields
8		Dec	7	18:00	0.268	-0.1064	-0.6991			08-3888-7269	18-3798-1139	NewFields
9	2013	Mar	29	17:30	0.314	-0.0604	-0.3968			20-7362-7128	00-7877-4581	NewFields
10		May	9	17:15	0.347	-0.0274	-0.18			17-2216-3359	18-1799-7373	NewFields
11		Jun	13	14:35	0.207	-0.1674	-1.1	(-)		06-7935-4299	16-2815-3647	NewFields
12		Aug	2	16:55	0.442	0.0676	0.4442			07-4827-6187	17-9598-2969	NewFields
13			16	17:05	0.473	0.0986	0.6478			02-7670-7538	06-1736-3232	NewFields
14			23	15:30	0.795	0.4206	2.763	(+)	(+)	02-7931-2327	13-4467-3069	NewFields
15		Nov	20	16:40	0.239	-0.1354	-0.8896			00-5670-8889	10-6934-5345	NewFields
16	2014	Jan	20	16:30	0.267	-0.1074	-0.7057			10-4601-7006	14-5438-2451	NewFields
17		Feb	7	16:45	0.575	0.2006	1.318	(+)		06-3386-1201	08-9520-2984	NewFields
18			19	17:40	0.349	-0.0254	-0.1669			15-4176-2850	15-8957-5109	NewFields
19		Apr	4	16:50	0.323	-0.0514	-0.3377			10-3853-0984	21-2079-5003	ENVIRON
20		Jun	12	15:19	0.294	-0.0804	-0.5283			06-0659-9100	11-9023-9776	ENVIRON
21		Jul	2	15:45	0.157	-0.2174	-1.428	(-)		01-9725-8507	07-4951-4035	ENVIRON

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Batch ID:	12-9412-6111	**Test Type:**	Survival	**Analyst:**	
Start Date:	05 Dec-14 15:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 14:10	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	15-0332-0907	**Code:**	599ADB4B	**Client:**	Internal Lab
Sample Date:	05 May-14	**Material:**	Total Ammonia	**Project:**	Reference Toxicant
Receive Date:	05 May-14	**Source:**	Reference Toxicant		
Sample Age:	214d 15h	**Station:**	p140505.48		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
09-9576-9742	Proportion Survived	<10.4	10.4	NA	25.4%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
04-6704-7736	Proportion Survived	EC50	10.89	8.802	13.46		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9333	0.7899	1	0.9	1	0.03333	0.05774	6.19%	0.0%
10.4		3	0.5	0.003172	0.9968	0.3	0.7	0.1155	0.2	40.0%	46.43%
17.2		3	0.1333	0	0.4202	0	0.2	0.06667	0.1155	86.6%	85.71%
30.8		3	0	0	0	0	0	0	0		100.0%
45.5		3	0	0	0	0	0	0	0		100.0%
58.6		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	0.9	0.9
10.4		0.7	0.3	0.5
17.2		0	0.2	0.2
30.8		0	0	0
45.5		0	0	0
58.6		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	9/10	9/10
10.4		7/10	3/10	5/10
17.2		0/10	2/10	2/10
30.8		0/10	0/10	0/10
45.5		0/10	0/10	0/10
58.6		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Start Date: 05 Dec-14 15:25 **Species:** Menidia beryllina **Sample Code:** 599ADB4B
End Date: 09 Dec-14 14:10 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Reference Toxicant
Sample Date: 05 May-14 **Material:** Total Ammonia **Sample Station:** p140505.48

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	15	10	10	
0	D	2	8	10	9	
0	D	3	6	10	9	
10.4		1	2	10	7	
10.4		2	12	10	3	
10.4		3	13	10	5	
17.2		1	14	10	0	
17.2		2	1	10	2	
17.2		3	7	10	2	
30.8		1	18	10	0	
30.8		2	9	10	0	
30.8		3	10	10	0	
45.5		1	11	10	0	
45.5		2	3	10	0	
45.5		3	16	10	0	
58.6		1	17	10	0	
58.6		2	4	10	0	
58.6		3	5	10	0	

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Batch ID:	20-5394-1622	**Test Type:**	Survival	**Analyst:**	
Start Date:	05 Dec-14 15:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 14:10	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	13-7623-3165	**Code:**	5207A6CD	**Client:**	Internal Lab
Sample Date:	05 May-14	**Material:**	Unionized Ammonia	**Project:**	Reference Toxicant
Receive Date:	05 May-14	**Source:**	Reference Toxicant		
Sample Age:	214d 15h	**Station:**	p140505.48		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
16-2323-1739	Proportion Survived	<0.22	0.22	NA	25.4%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
18-1629-4264	Proportion Survived	EC50	0.2305	0.1857	0.2861		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9333	0.7899	1	0.9	1	0.03333	0.05774	6.19%	0.0%
0.22		3	0.5	0.003172	0.9968	0.3	0.7	0.1155	0.2	40.0%	46.43%
0.367		3	0.1333	0	0.4202	0	0.2	0.06667	0.1155	86.6%	85.71%
0.516		3	0	0	0	0	0	0	0		100.0%
0.608		3	0	0	0	0	0	0	0		100.0%
0.624		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	0.9	0.9
0.22		0.7	0.3	0.5
0.367		0	0.2	0.2
0.516		0	0	0
0.608		0	0	0
0.624		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	9/10	9/10
0.22		7/10	3/10	5/10
0.367		0/10	2/10	2/10
0.516		0/10	0/10	0/10
0.608		0/10	0/10	0/10
0.624		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

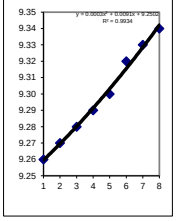
Start Date: 05 Dec-14 15:25 **Species:** Menidia beryllina **Sample Code:** 5207A6CD
End Date: 09 Dec-14 14:10 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Reference Toxicant
Sample Date: 05 May-14 **Material:** Unionized Ammonia **Sample Station:** p140505.48

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	12	10	10	
0	D	2	4	10	9	
0	D	3	15	10	9	
0.22		1	9	10	7	
0.22		2	3	10	3	
0.22		3	11	10	5	
0.367		1	7	10	0	
0.367		2	13	10	2	
0.367		3	8	10	2	
0.516		1	17	10	0	
0.516		2	16	10	0	
0.516		3	5	10	0	
0.608		1	10	10	0	
0.608		2	6	10	0	
0.608		3	1	10	0	
0.624		1	2	10	0	
0.624		2	14	10	0	
0.624		3	18	10	0	

CLIENT:	POLA	Date of Test:	05-Dec-14
PROJECT:	Everport	Test Type:	Menidia RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer:	I-factor
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	*NH3T (mg/L)*	*salinity (ppt)*	*pH*	*temp (C)*	temp (K)	i-factor	Mod	**NH3U (mg/L)**
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		**#VALUE!**
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		**0.008**
1										
2										
3	17		10.4	30	7.8	20.5	293.66	9.3242		**0.220**
4	25		17.2	30	7.8	20.6	293.76	9.3242		**0.367**
5	35		30.8	30	7.7	20.4	293.56	9.3242		**0.516**
6	50		45.5	30	7.6	20.4	293.56	9.3242		**0.608**
7	65		58.6	30	7.5	20.4	293.56	9.3242		**0.624**
8										
9										
10										
11										
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ENVIRON

96-Hour *Menidia beryllina* Reference Toxicant Test

Test ID: P140505.48	Replicates: 3	Study Director: B. Hester	Location: Bath 8
Dilution Water Batch: FSW120414.01	Organism Batch: ABS 1089mb	Associated Test(s):	No. of Organisms: 10
Toxicant: Ammonium chloride	Lot Number: 32447535	Date Dilutions Prepared: 12.5.14	Initials: KB
Target Concentrations: **0, 17, 25, 35, 50, 65 ppm**	Quantity of Stock: Target: See Spiking Worksheet	Quantity of Diluent: Target: 1200 mL	
65 ppm	Actual: ↓	Actual: ↓	

Reference toxicant concentrations are 50, 35, 25, and 17 ppm.

0 Hours	Date: 12/05/14	WQ Time: 1235	Initials: JL	Start Time: 1525	Initials: HE

STOCK

	Control	17	25	35	50	65
D.O. (mg/L)	7.2	7.3	7.3	7.3	7.3	7.3
Temperature	20.5	20.5	20.6	20.4	20.4	20.4
Salinity	30	30	30	30	30	30
pH	7.9	7.8	7.8	7.7	7.6	7.5

24 Hours	Date: 12/06/14	WQ Time: 1110	Replicate: 1	Initials: JL

STOCK

	Control	17	25	35	50	65
D.O. (mg/L)	7.1	7.2	7.2	7.1	7.1	7.1
Temperature	20.2	20.3	20.4	20.2	20.2	20.1
Salinity	30	30	30	30	30	30
pH	8.0	7.9	7.9	7.8	7.8	7.7

24 Hours	Date:	Time:	Initials:

	Control	17	25	35	50	65
No. Alive Rep 1	10	9 (1)	② ~~9 (1)~~ 9 (1)	7 (8)	0 (10)	0 (10)
No. Alive Rep 2	10	10	⑥ ~~+0~~ 9 (1)	1 (9)	0 (10)	0 (10)
No. Alive Rep 3	10	③ ~~6 LH~~ 10	① ~~6 LH~~ ④	4 (6)	0 (10)	0 (10)

① SM HE 12/6 ② WC. HE 12/6 25 rep 3 = 9(1)
③ IE HE 12/6

ENVIRON

96-Hour *Menidia beryllina* Reference Toxicant Test

48 Hours	Date: 12/07/14	WQ Time: 1200	Replicate: 2	Initials: JL

STOCK

	Control	17	25	35	50	65
D.O. (mg/L)	7.5	7.4	7.0	7.0		
Temperature	20.1	20.3	20.5	20.5		
Salinity	30	30	30	30		
pH	8.0	8.0	7.9	7.9		

48 Hours	Date: 12/07/14	Time: 1200	Initials: JL

	Control	17	25	35	50	65
No. Alive Rep 1	10	10	6(3)	Ø(2)		
No. Alive Rep 2	10	5(1)	6(3)	Ø(1)		
No. Alive Rep 3	9(1)	9	6(3)	Ø(4)		

72 Hours	Date: 12/08/14	WQ Time: 0905	Replicate: 3	Initials: JL

STOCK

	Control	17	25	35	50	65
D.O. (mg/L)	6.7	6.6	6.8			
Temperature	20.4	20.4	20.4			
Salinity	31	31	31			
pH	7.8	7.8	7.8			

72 Hours	Date: 12/8/14	Time: 1100	Initials: JL

	Control	17	25	35	50	65
No. Alive Rep 1	10	9(1)	Ø(6)			
No. Alive Rep 2	9(1)	3(2)	2(4)			
No. Alive Rep 3	9	5(4)	2(4)			

ENVIRON

96-Hour *Menidia beryllina* Reference Toxicant Test

96 Hours	Date: 12/9	WQ Time: 1225	Replicate: 1	Initials: ~~BA~~

STOCK

	Control	17	25 (2)	35	50	65
D.O. (mg/L)	6.8	(1) 6.9	7.1			
Temperature	20.5	20.6	20.4			
Salinity	30	30	30			
pH	7.9	7.9	7.9			

96 Hour Survival Data	End Time: 1410		Initials: CR

	Control	17	25	35	50	65
No. Alive Rep 1	10	7(2)	—			
No. Alive Rep 2	9	3	2			
No. Alive Rep 3	9	5	2			

☐ Pass ☐ Fail

(1) SM 12/9

(2) rep 3

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Menidia NH_3 RT

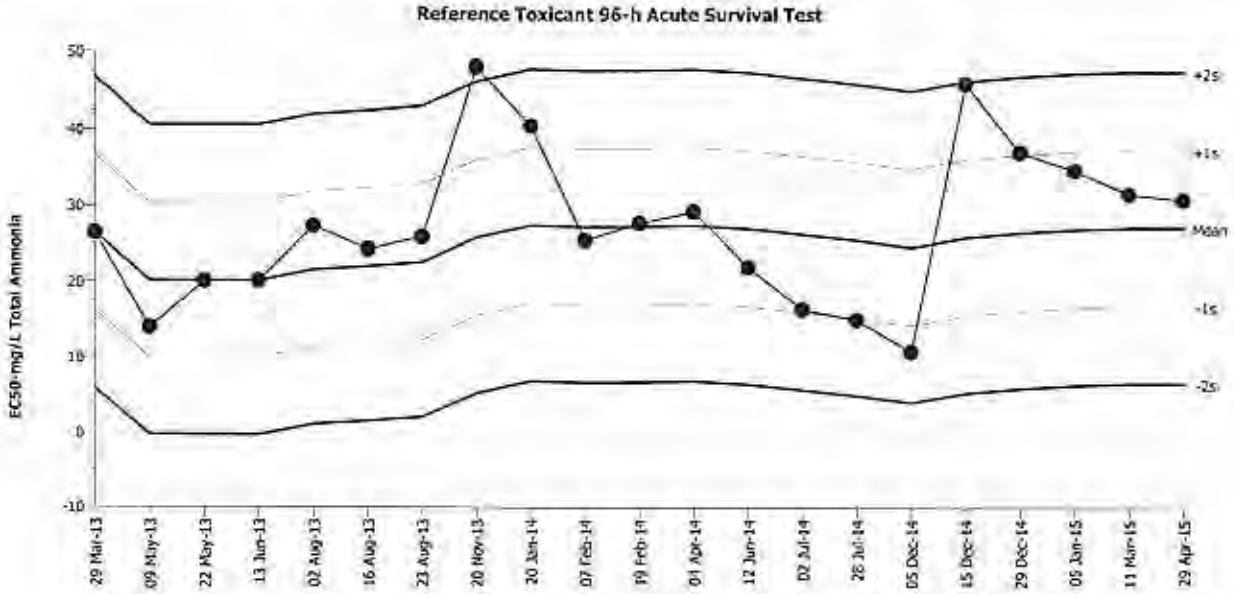
Assumptions in Model
Stock ammonia concentration is 9,000 mg/L = 9 mg/mL

Actual Reading
4560

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	**Desired Concentration**	**Volume**		
mg/L	mg/L	mL	mL stock to increase	
0.00	0	1200	[redacted]	SALT WATER
10.4	**17**	1200	[redacted]	**6.711**
17.2	**25**	1200	[redacted]	**9.868**
30.8	**35**	1200	[redacted]	**13.816**
45.5	**50**	1200	[redacted]	**19.737**
58.6	**65**	1200	[redacted]	**25.658**
			[redacted]	
			[redacted]	
			[redacted]	

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type: Survival | Organism: Menidia beryllina (Inland Silverside) | Material: Total Ammonia
Protocol: EPA/821/R-02-012 (2002) | Endpoint: Proportion Survived | Source: Reference Toxicant-REF



Mean:	27.16	Count:	20	-1s Warning Limit:	16.93
Sigma:	10.23	CV:	37.70%	+1s Warning Limit:	37.39

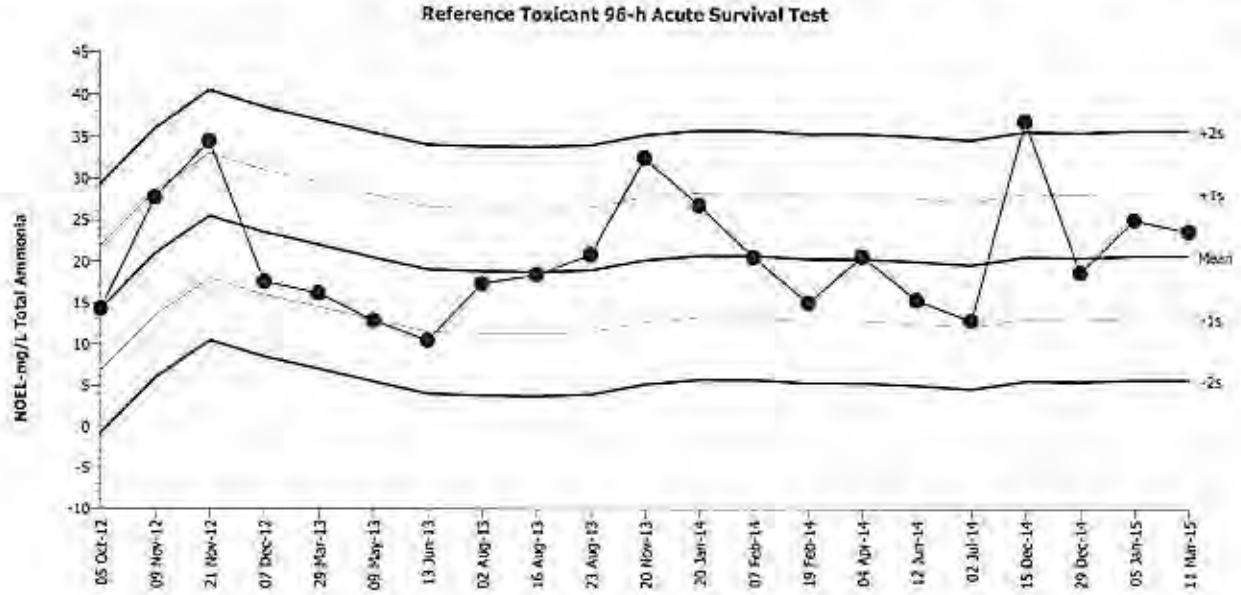
-2s Action Limit: 6.699
+2s Action Limit: 47.62

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Mar	29	17:30	26.41	-0.7468	-0.073			15-6629-7016	01-6143-5562	NewFields
2		May	9	17:15	14.03	-13.13	-1.284	(-)		05-2515-0422	09-7554-7266	NewFields
3			22	13:00	20.13	-7.034	-0.6875			02-1650-1674	15-0431-6258	NewFields
4		Jun	13	14:35	20.21	-6.953	-0.6796			20-5493-9860	06-5535-3084	NewFields
5		Aug	2	16:55	27.31	0.1514	0.0148			02-5761-9711	15-6695-8541	NewFields
6			16	17:05	24.28	-2.881	-0.2816			03-1026-2061	15-7497-8436	NewFields
7			23	15:30	25.91	-1.253	-0.1225			03-7016-3962	03-7864-2310	NewFields
8		Nov	20	16:40	48.15	20.99	2.052	(+)	(+)	16-5818-2880	13-3967-3265	NewFields
9	2014	Jan	20	16:30	40.49	13.33	1.303	(+)		03-8316-8468	13-8558-6238	NewFields
10		Feb	7	16:45	25.46	-1.703	-0.1664			01-5915-8877	03-7844-7324	NewFields
11			19	17:40	27.72	0.5586	0.05461			20-2231-9789	21-1367-6896	NewFields
12		Apr	4	16:50	29.24	2.075	0.2029			20-1389-1099	14-0689-6392	ENVIRON
13		Jun	12	15:19	22	-5.16	-0.5044			04-7361-4293	03-5750-6017	ENVIRON
14		Jul	2	15:45	16.45	-10.71	-1.047	(-)		16-0856-1779	10-6124-6051	ENVIRON
15			28	15:10	15.11	-12.05	-1.178	(-)		01-9654-2979	02-2302-5084	ENVIRON
16		Dec	5	15:25	10.89	-16.27	-1.591	(-)		20-5776-4016	04-6704-7736	ENVIRON
17			15	16:40	46.05	18.89	1.846	(+)		02-3281-3676	08-8429-9047	ENVIRON
18			29	15:45	37.08	9.92	0.9697			15-4403-1615	05-4452-6566	ENVIRON
19	2015	Jan	5	16:10	34.67	7.514	0.7345			12-6894-2756	04-2303-7997	ENVIRON
20		Mar	11	18:00	31.61	4.455	0.4355			00-9606-4287	20-3963-2871	ENVIRON
21		Apr	29	17:20	30.82	3.657	0.3574			17-1845-3532	03-6846-2302	ENVIRON

Reference Toxicant 96-h Acute Survival Test | All Matching Labs

Test Type: Survival | Organism: Menidia beryllina (Inland Silverside) | Material: Total Ammonia
Protocol: EPA/821/R-02-012 (2002) | Endpoint: Proportion Survived | Source: Reference Toxicant-REF



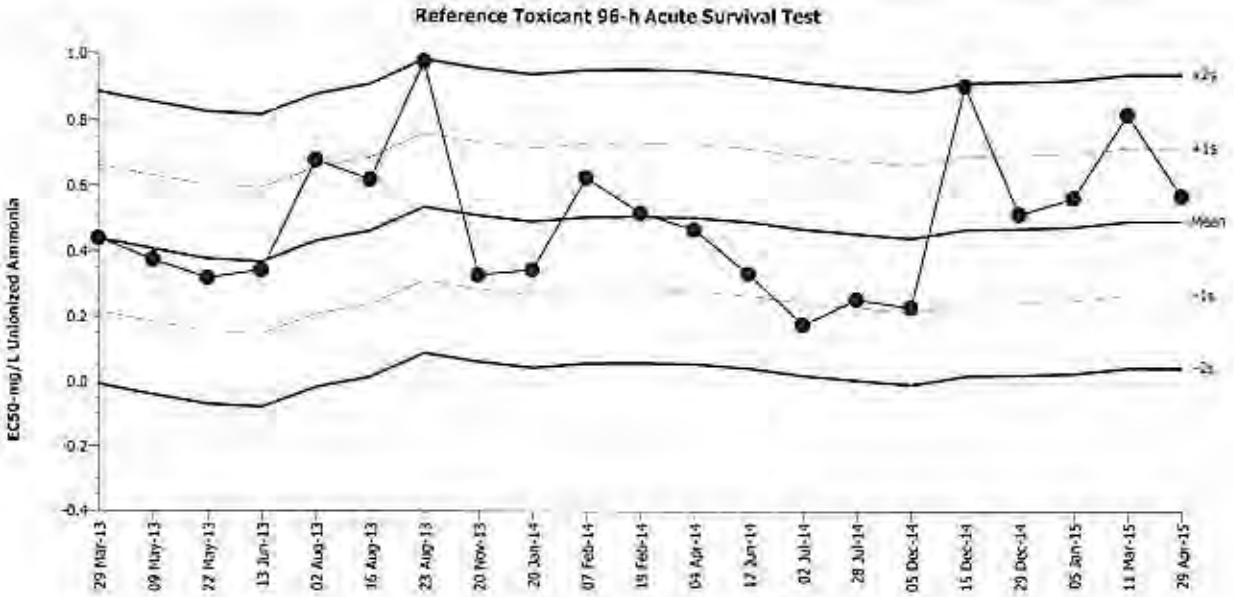
Mean:	20.76	Count:	20	-1s Warning Limit:	13.24	-2s Action Limit:	5.729
Sigma:	7.513	CV:	36.20%	+1s Warning Limit:	28.27	+2s Action Limit:	35.78

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Oct	5	17:30	14.3	-6.46	-0.8598			11-8705-5892	02-1881-7753	NewFields
2		Nov	9	16:50	27.7	6.94	0.9237			10-9947-7092	19-0937-6517	NewFields
3			21	17:40	34.5	13.74	1.829	(+)		09-5241-8709	06-2623-5934	NewFields
4		Dec	7	18:00	17.6	-3.16	-0.4206			07-1944-1107	09-2382-2727	NewFields
5	2013	Mar	29	17:30	16.2	-4.56	-0.6069			15-6629-7016	08-5086-4918	NewFields
6		May	9	17:15	12.9	-7.86	-1.046	(-)		05-2515-0422	04-5846-5135	NewFields
7		Jun	13	14:35	10.5	-10.26	-1.366	(-)		20-5493-9860	10-1570-8714	NewFields
8		Aug	2	16:55	17.4	-3.36	-0.4472			02-5761-9711	13-4375-7151	NewFields
9			16	17:05	18.5	-2.26	-0.3008			03-1026-2061	12-6474-6877	NewFields
10			23	15:30	20.9	0.14	0.01863			03-7016-3962	14-4501-9544	NewFields
11		Nov	20	16:40	32.5	11.74	1.563	(+)		16-5818-2880	00-8858-9367	NewFields
12	2014	Jan	20	16:30	26.8	6.04	0.8039			03-8316-8468	09-5333-7337	NewFields
13		Feb	7	16:45	20.6	-0.16	-0.0213			01-5915-8877	03-5403-0899	NewFields
14			19	17:40	15.1	-5.66	-0.7534			20-2231-9789	00-8190-7911	NewFields
15		Apr	4	16:50	20.7	-0.06	-0.00799			20-1389-1099	16-6973-6554	ENVIRON
16		Jun	12	15:19	15.4	-5.36	-0.7134			04-7381-4293	18-4981-0150	ENVIRON
17		Jul	2	15:45	12.9	-7.86	-1.046	(-)		16-0856-1779	03-2378-2904	ENVIRON
18		Dec	15	16:40	36.9	16.14	2.148	(+)	(+)	02-3281-3676	06-4639-7453	ENVIRON
19			29	15:45	18.7	-2.06	-0.2742			15-4403-1615	10-3398-5096	ENVIRON
20	2015	Jan	5	16:10	25	4.24	0.5644			12-6894-2756	01-4020-7848	ENVIRON
21		Mar	11	18:00	23.6	2.84	0.378			00-9606-4287	18-3991-4377	ENVIRON

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type: Survival | Organism: Menidia beryllina (Inland Silverside) | Material: Unionized Ammonia
Protocol: EPA/821/R-02-012 (2002) | Endpoint: Proportion Survived | Source: Reference Toxicant-REF



Mean:	0.4918	Count:	20	-1s Warning Limit:	0.2681	-2s Action Limit:	0.0444
Sigma:	0.2237	CV:	45.50%	+1s Warning Limit:	0.7155	+2s Action Limit:	0.9392

Quality Control Data

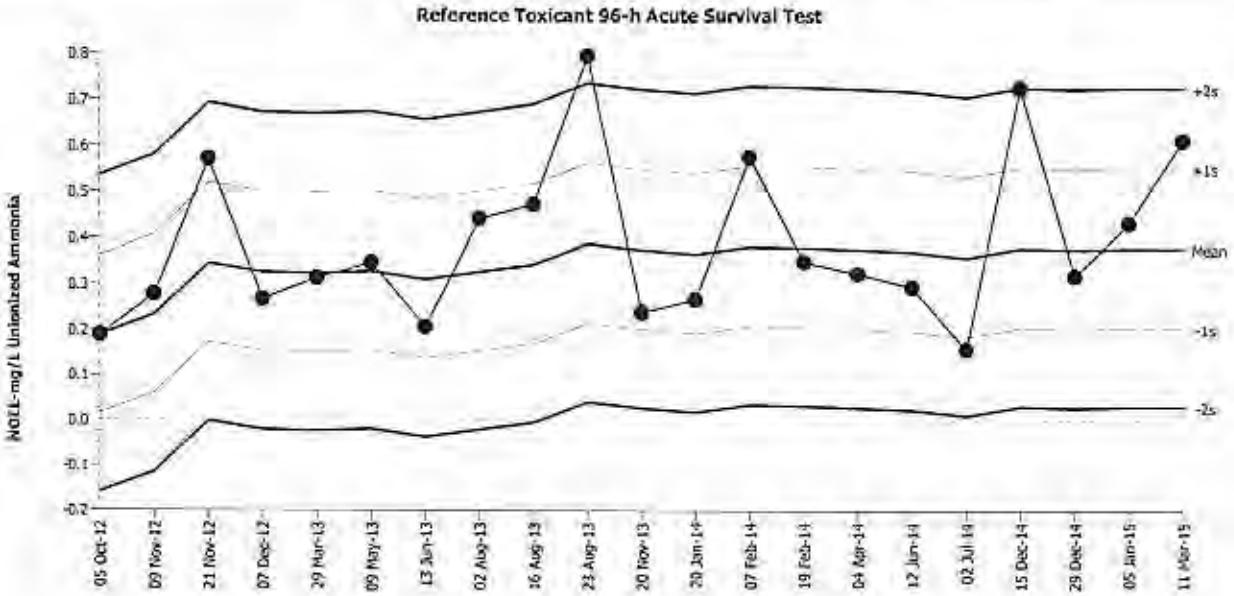
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Mar	29	17:30	0.4391	-0.05269	-0.2356			20-7362-7128	15-1784-9888	NewFields
2		May	9	17:15	0.3759	-0.1159	-0.5182			17-2216-3359	13-3747-6067	NewFields
3			22	13:00	0.3196	-0.1722	-0.7699			20-3854-2322	05-4600-3511	NewFields
4		Jun	13	14:35	0.3442	-0.1476	-0.6598			06-7935-4299	19-7954-2799	NewFields
5		Aug	2	16:55	0.6794	0.1876	0.8385			07-4827-6187	16-5847-1989	NewFields
6			16	17:05	0.6189	0.1271	0.5684			02-7670-7538	12-6858-1224	NewFields
7			23	15:30	0.9776	0.4858	2.172	(+)	(+)	02-7931-2327	08-6196-8679	NewFields
8		Nov	20	16:40	0.331	-0.1608	-0.719			00-5670-8889	03-4956-3533	NewFields
9	2014	Jan	20	16:30	0.3468	-0.145	-0.6483			10-4601-7006	03-8347-2013	NewFields
10		Feb	7	16:45	0.6246	0.1328	0.5938			06-3386-1201	18-4306-3796	NewFields
11			19	17:40	0.5178	0.02602	0.1163			15-4176-2850	17-3589-9306	NewFields
12		Apr	4	16:50	0.4667	-0.02513	-0.1123			10-3853-0984	12-8741-3238	ENVIRON
13		Jun	12	15:19	0.334	-0.1578	-0.7055			06-0659-9100	16-2602-7223	ENVIRON
14		Jul	2	15:45	0.1769	-0.3149	-1.408	(-)		01-9725-8507	06-3470-5790	ENVIRON
15			28	15:10	0.2555	-0.2363	-1.056	(-)		02-6034-2660	02-2479-8936	ENVIRON
16		Dec	5	15:25	0.2305	-0.2613	-1.168	(-)		11-6424-3652	18-1629-4264	ENVIRON
17			15	16:40	0.9043	0.4125	1.844	(+)		17-3978-4601	19-4709-0774	ENVIRON
18			29	15:45	0.5132	0.02145	0.09588			13-1447-3848	12-7311-5217	ENVIRON
19	2015	Jan	5	16:10	0.5621	0.0703	0.3143			15-7916-2568	21-2234-4936	ENVIRON
20		Mar	11	18:00	0.818	0.3262	1.458	(+)		14-4484-7270	16-8269-9405	ENVIRON
21		Apr	29	17:20	0.5686	0.07683	0.3434			16-5283-9725	15-8944-2512	ENVIRON

CETIS QC Plot

Report Date: 22 May-15 14:54 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	Organism:	Menidia beryllina (Inland Silverside)	Material:	Unionized Ammonia
Protocol:	EPA/821/R-02-012 (2002)	Endpoint:	Proportion Survived	Source:	Reference Toxicant-REF



Mean:	0.3782	Count:	20	-1s Warning Limit:	0.2044	-2s Action Limit:	0.03075
Sigma:	0.1737	CV:	45.90%	+1s Warning Limit:	0.5519	+2s Action Limit:	0.7255

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Oct	5	17:30	0.189	-0.1892	-1.089	(-)		20-0252-0929	02-8082-6967	NewFields
2		Nov	9	16:50	0.278	-0.1002	-0.5769			06-8912-5820	10-0353-5749	NewFields
3			21	17:40	0.571	0.1928	1.11	(+)		13-3564-1765	21-3816-3119	NewFields
4		Dec	7	18:00	0.268	-0.1102	-0.6344			08-3888-7269	18-3798-1139	NewFields
5	2013	Mar	29	17:30	0.314	-0.0642	-0.3696			20-7362-7128	00-7877-4581	NewFields
6		May	9	17:15	0.347	-0.0312	-0.1796			17-2216-3359	18-1799-7373	NewFields
7		Jun	13	14:35	0.207	-0.1712	-0.9856			06-7935-4299	16-2815-3647	NewFields
8		Aug	2	16:55	0.442	0.0638	0.3673			07-4827-6187	17-9598-2969	NewFields
9			16	17:05	0.473	0.0948	0.5458			02-7670-7538	06-1736-3232	NewFields
10			23	15:30	0.795	0.4168	2.4	(+)	(+)	02-7931-2327	13-4467-3069	NewFields
11		Nov	20	16:40	0.239	-0.1392	-0.8014			00-5670-8889	10-6934-5345	NewFields
12	2014	Jan	20	16:30	0.267	-0.1112	-0.6402			10-4601-7005	14-5438-2451	NewFields
13		Feb	7	16:45	0.575	0.1968	1.133	(+)		06-3386-1201	08-9520-2984	NewFields
14			19	17:40	0.349	-0.0292	-0.1681			15-4176-2850	15-8957-5109	NewFields
15		Apr	4	16:50	0.323	-0.0552	-0.3178			10-3853-0984	21-2079-5003	ENVIRON
16		Jun	12	15:19	0.294	-0.0842	-0.4847			06-0659-9100	11-9023-9776	ENVIRON
17		Jul	2	15:45	0.157	-0.2212	-1.273	(-)		01-9725-8507	07-4951-4035	ENVIRON
18		Dec	15	16:40	0.725	0.3468	1.997	(+)		17-3978-4601	10-2194-5705	ENVIRON
19			29	15:45	0.318	-0.0602	-0.3466			13-1447-3848	11-5031-0959	ENVIRON
20	2015	Jan	5	16:10	0.432	0.0538	0.3097			15-7916-2568	05-9659-8745	ENVIRON
21		Mar	11	18:00	0.611	0.2328	1.34	(+)		14-4484-7270	14-3542-4206	ENVIRON

CETIS Summary Report

Report Date: 22 May-15 14:50 (p 1 of 1)
Test Code: 666D851C | 17-1845-3532

Reference Toxicant 96-h Acute Survival Test

ENVIRON

Batch ID:	13-4168-3699	Test Type:	Survival	Analyst:	
Start Date:	29 Apr-15 17:20	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Laboratory Seawater
Ending Date:	03 May-15 16:15	Species:	Menidia beryllina	Brine:	Not Applicable
Duration:	95h	Source:	Aquatic Biosystems, CO	Age:	
Sample ID:	08-5707-7767	Code:	3315F807	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Total Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	359d 17h	Station:	P140505.99		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
11-2180-6116	Proportion Survived	<18.6	18.6	NA	14.3%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
03-8846-2302	Proportion Survived	EC50	30.82	28.02	33.89		Trimmed Spearman-Karber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
18.6		4	0.825	0.6727	0.9773	0.7	0.9	0.04787	0.09574	11.61%	17.5%
25.7		4	0.75	0.4744	1	0.6	1	0.0866	0.1732	23.09%	25.0%
34.5		4	0.375	0.2227	0.5273	0.3	0.5	0.04787	0.09574	25.53%	62.5%
46.6		4	0	0	0	0	0	0	0		100.0%
61.8		4	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
18.6		0.7	0.9	0.9	0.8
25.7		0.7	0.7	1	0.6
34.5		0.3	0.3	0.4	0.5
46.6		0	0	0	0
61.8		0	0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	10/10	10/10
18.6		7/10	9/10	9/10	8/10
25.7		7/10	7/10	10/10	6/10
34.5		3/10	3/10	4/10	5/10
46.6		0/10	0/10	0/10	0/10
61.8		0/10	0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test				ENVIRON
Start Date:	29 Apr-15 17:20	Species:	Menidia beryllina	Sample Code: 3315F807
End Date:	03 May-15 16:15	Protocol:	EPA/821/R-02-012 (2002)	Sample Source: Reference Toxicant
Sample Date:	05 May-14	Material:	Total Ammonia	Sample Station: P140505.99

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	11	10	10	
0	D	2	7	10	10	
0	D	3	19	10	10	
0	D	4	1	10	10	
18.6		1	23	10	7	
18.6		2	6	10	9	
18.6		3	20	10	9	
18.6		4	22	10	8	
25.7		1	15	10	7	
25.7		2	8	10	7	
25.7		3	4	10	10	
25.7		4	10	10	6	
34.5		1	21	10	3	
34.5		2	12	10	3	
34.5		3	13	10	4	
34.5		4	17	10	5	
46.6		1	2	10	0	
46.6		2	3	10	0	
46.6		3	14	10	0	
46.6		4	9	10	0	
61.8		1	5	10	0	
61.8		2	16	10	0	
61.8		3	18	10	0	
61.8		4	24	10	0	

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test

ENVIRON

Batch ID:	05-8517-8052	Test Type:	Survival	Analyst:	
Start Date:	29 Apr-15 17:20	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Laboratory Seawater
Ending Date:	03 May-15 16:15	Species:	Menidia beryllina	Brine:	Not Applicable
Duration:	95h	Source:	Aquatic Biosystems, CO	Age:	
Sample ID:	06-6165-9756	Code:	2770206C	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Unionized Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	359d 17h	Station:	P140505.99		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
13-5269-0300	Proportion Survived	<0.285	0.285	NA	14.3%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
15-8944-2512	Proportion Survived	EC50	0.5686	0.5127	0.6307		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
0.285		4	0.825	0.6727	0.9773	0.7	0.9	0.04787	0.09574	11.61%	17.5%
0.548		4	0.75	0.4744	1	0.6	1	0.0866	0.1732	23.09%	25.0%
0.608		4	0.375	0.2227	0.5273	0.3	0.5	0.04787	0.09574	25.53%	62.5%
0.71		4	0	0	0	0	0	0	0		100.0%
0.778		4	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
0.285		0.7	0.9	0.9	0.8
0.548		0.7	0.7	1	0.6
0.608		0.3	0.3	0.4	0.5
0.71		0	0	0	0
0.778		0	0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	10/10	10/10
0.285		7/10	9/10	9/10	8/10
0.548		7/10	7/10	10/10	6/10
0.608		3/10	3/10	4/10	5/10
0.71		0/10	0/10	0/10	0/10
0.778		0/10	0/10	0/10	0/10

CETIS Test Data Worksheet

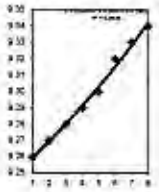
Reference Toxicant 96-h Acute Survival Test				ENVIRON
Start Date:	29 Apr-15 17:20	Species:	Menidia beryllina	Sample Code: 2770206C
End Date:	03 May-15 16:15	Protocol:	EPA/821/R-02-012 (2002)	Sample Source: Reference Toxicant
Sample Date:	05 May-14	Material:	Unionized Ammonia	Sample Station: P140505.99

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	15	10	10	
0	D	2	12	10	10	
0	D	3	7	10	10	
0	D	4	11	10	10	
0.285		1	16	10	7	
0.285		2	1	10	9	
0.285		3	20	10	9	
0.285		4	3	10	8	
0.548		1	14	10	7	
0.548		2	5	10	7	
0.548		3	19	10	10	
0.548		4	17	10	6	
0.608		1	4	10	3	
0.608		2	21	10	3	
0.608		3	16	10	4	
0.608		4	24	10	5	
0.71		1	22	10	0	
0.71		2	6	10	0	
0.71		3	9	10	0	
0.71		4	23	10	0	
0.778		1	8	10	0	
0.778		2	10	10	0	
0.778		3	13	10	0	
0.778		4	2	10	0	

CLIENT:	ERA	Date of Test:	29-Apr-15
PROJECT:	DMR-QA 35	Test Type:	Menidia RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1										
2										
3										
4	17		18.6	29	7.7	19.1	292.26	9.3214		0.285
5	25		25.7	29	7.8	20.5	293.66	9.3214		0.548
6	35		34.5	29	7.7	21.0	294.16	9.3214		0.608
7	50		46.6	29	7.7	19.0	292.16	9.3214		0.710
8	65		61.800	29	7.6	19.5	292.66	9.3214		0.778
9										
10										
11										
12										
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ENVIRON

96-Hour Menidia Ammonia Reference Toxicant Test

Toxicant:	Ammonium Chloride
Ref Tox ID:	P140505.99
Lot #:	3244 C535
Protocol:	TOX099
Replicates:	4

Date Test Started:	4/29/2015
Date Test Ended:	5/3/2015
Matrix:	Liquid
Species:	*Menidia beryllina*
No. of Org. per Chamber:	10

	Conc.	Meter #:	DO (mg/L) (>4.0)	Meter #:	Temp (°C) (20±1°C)	Meter #:	Salinity (ppt) (30±2ppt)	Meter #:	pH (6 - 9)
Day 0 (Stock)	Control	9	8.3	9	19.0	9	29	9	7.8
Date: 4/29/15	17		8.5		19.1		29		7.7
Time: 1510	25		7.7		20.5		29		7.8
Technician: HE	35		7.8		21.0		29		7.7
	50		8.2		19.0		29		7.7
	65		8.3		19.5		29		7.6
			Day 1		Day 2		Day 3		Day 4
Temperature (OLD)			20.3		20.2		20.2		—
Temperature (NEW)									
Feed: 0.2mL *Artemia* (Time/Init.) AM ~~PM~~					0845 HE				
Day 4	Control	9	6.6	9	20.5	9	30	9	7.9
Date: 5/03	17		6.4		20.6		30		7.9
Time: 1525	25		6.2		20.7		29		7.9
Replicate No.: 4	35		6.4		20.7		30		7.9
Technician: JL	50		—		—		—		—
	65		—		—		—		—

Dilution Preparation (Menidia NH_3 RT Spiking Worksheet)

Test Solution NH_3 Concentration				Volume of Stock to Reach Desired Concentration	
Measured		Desired	Volume		
mg/L		mg/L	mL	mL stock to increase	
Day 0	Day 2				SALT WATER
0.00		0	1600		0.000
10.6		17	1600		5.15.8
15.7		25	1600		7.585
34.5		35	1600		10.619
46.6		50	1600		15.171
61.8		65	1600		19.722

Start Time:	1720
End Time:	1615
Test Acceptability:	≥90% survival in control

Test Location:	Bath 5
Dilution Water Batch:	FSW042915.02
Supplier:	ABS
Organism Batch:	ABS5898 M6 Age: 14day
Chamber Size/Type:	600 mL Beaker
Exposure Volume:	~ 400mL

ENVIRON

96-Hour Menidia Reference Toxicant Test

Toxicant:	Ammonium Chloride
Ref Tox ID:	P1905B5.99
Species:	Menidia beryllina

Date Test Started:	4/29/2015
Date Test Ended:	5/3/2015

Concentration	Rep	Day 1 Date: 4/30 Time: 1535		Day 2 Date: 5/01 Time: 1000		Day 3 Date: 5/02 Time: 1630		Day 4 Date: 5/03 Time: 1615	
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead
Control	1	10	0	10	0	10	0	10	0
	2	10	0	10	0	10	0	10	0
	3	10	0	10	0	10	0	10	0
	4	10	0	10	0	10	0	10	0
17	1	10	0	8	2	7	1	7	0
	2	10	0	10	0	10	0	9	1
	3	10	0	10	0	10	0	9	1
	4	10	0	10	0	8	2	8	0
25	1	10	0	10	0	7	3	7	0
	2	10	0	9	1	7	2	7	0
	3	10	0	10	0	10	0	10	0
	4	10	0	9	1	6	3	6	0
35	1	10	0	6	4	3	3	3	0
	2	10	0	6	4	3	3	3	0
	3	10	0	9	1	5	4	4	0
	4	10	0	9	1	6	3	5	1
50	1	10	0	0	10				
	2	8	2	0	8				
	3	5	5	0	5				
	4	8	2	0	8				
65	1	0	10						
	2	0	10						
	3	0	10						
	4	0	10						
INITIALS:				JL		JL		JL	

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Reference Toxicant ID: P140505.99
Date Prepared: 4/29/15
Technician Initials: JW

Menidia NH_3 RT

Assumptions in Model
Stock ammonia concentration is 9,000 mg/L = 9 mg/mL

Actual Reading
7910

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	Desired Concentration	Volume		
mg/L	mg/L	mL	mL stock to increase	
0.00	0	1600	[redacted]	SALT WATER
18.6	17	1600		5.158
25.7	25	1600		7.585
34.5	35	1600		10.619
46.6	50	1600		15.171
61.8	65	1600		19.722

APPENDIX B-7.3 *Mytilus galloprovincialis* Water-Column Test

ENVIRON

BIVALVE LARVAL DEVELOPMENT
SUSPENDED PARTICULATE PHASE ENDPOINT DATA SHEET

SPECIES	
Mytilus sp. (mussel)	

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	LABORATORY	PROTOCOL
POLA	Everport		B. Hester	Port Gamble Incubator	USACE/EPA 1991

LARVAL OBSERVATION DATA

CLIENT/ ID	CONCENTRATION VALUE	CONCENTRATION UNITS	VIAL NUMBER	REP	NUMBER NORMAL	NUMBER ABNORMAL	DATE	TECHNICIAN	COMMENTS
ZERO-TIME (PRE)	[illegible]	%		1	313		11/24/14 ①	JW	
				2	292				
				3	317				
				4	340				
				5	335				
Control / .	0	%		1	297	10			
				2	293	10			
				3	375	16			
				4	299	13			
				5	320	22			
DMMU-2-WATER-PG / .	100	%		1	344	16			
				2	317	25			
				3	393	22			
				4	320	16			
				5	293	20			

① WC. JW 11/24/14.

ENVIRON

BIVALVE LARVAL DEVELOPMENT
SUSPENDED PARTICULATE PHASE ENDPOINT DATA SHEET

SPECIES					
Mytilus sp. (mussel)					
CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	LABORATORY	PROTOCOL
POLA	Everport		B. Hester	Port Gamble Incubator	USACE/EPA 1991

LARVAL OBSERVATION DATA

CLIENT/ ID	CONCENTRATION VOL.	CONCENTRATION UNITS	VIAL NUMBER	REP	NUMBER NORMAL	NUMBER ABNORMAL	DATE	TECHNICIAN	COMMENTS
DMMU-2 / .				1	353	22	11/24/14	JW	
				2	320	13			
				3	361	14			
				4	311	17			
				5	333	20			
DMMU-2 / .	10 %			1	304	16			
				2	336	11			
				3	321	19			
				4	~~336~~ 341	~~11~~ 13			
				5	~~304~~ 295	~~16~~ 16			
DMMU-2 /	50 %			1	271	19			
				2	326	18			
				3	323	14			
				4	314	20			
				5	301	21			
DMMU-2 / .	100 %			1	352	19			
				2	287	20			
				3	314	25			
				4	295	23			
				5	259	18			

D WC 12/1/14

ENVIRON

BIVALVE LARVAI DEVELOPMENTAL SUSPENDED PARTICULATE PHASE TEST
WQ DATA SHEET

CLIENT	PROJECT
POLA	Everport
JOB NUMBER	PROJECT MANAGER
~	B. Hester

SPECIES		LABORATORY		PROTOCOL
Mytilus sp. (mussel)		Port Gamble Incubator		USACE/EPA 1991
TEST START DATE	TIME	TEST END DATE	TIME	
19Nov14	1745	21Nov14	1700	
DILUTION WATER BATCH		TEMP Recorder (HOBO)#		
FSW111914.01		NA		

WATER QUALITY DATA

Test contions				DO (mg/L)		TEMPERATURE (°C)		Salinity (ppt)		pH (units)		Ammonia		Sulfides			
				≥ 4.9		16 ± 1		30 ± 1		8.0 ± 1							
CLIENT/ ID	CONCENTRATION		DAY	DISS. OXYGEN		TEMPERATURE		SALINITY		pH		AMMONIA		Sulfides		Date	Tech
	value	units		meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L	Techn.	mg/L		
Control / .	0	%	0	8	7.7	8	16.0	8	29	8	7.7	HE	0.00			11/19	CR
			1	8	8.0	8	16.3	8	29	8	7.9					11/20	JL
			2	8	7.7	8	16.5	8	29	8	7.9	KB	0.00			11/21	KB
			3														
DMMU-2-WATER-PG / .	100	%	0	8	8.4	8	15.4	8	34	8	8.0	HE	0.00			11/19	CR
			1	8	8.0	8	16.3	8	34	8	8.0					11/20	JL
			2	8	7.6	8	16.5	8	34	8	7.9	KB	0.00			11/21	KB
			3														

ENVIRON

BIVALVE LARVAI DEVELOPMENTAL SUSPENDED PARTICULATE PHASE TEST
WQ DATA SHEET

CLIENT	PROJECT
POLA	Everport
JOB NUMBER	PROJECT MANAGER
~~	B. Hester

SPECIES		LABORATORY		PROTOCOL
Mytilus sp. (mussel)		Port Gamble Incubator		USACE/EPA 1991
TEST START DATE	TIME	TEST END DATE	TIME	
19Nov14	1745	21Nov14	1700	
DILUTION WATER BATCH		TEMP Recorder (HOBO)#		
FSW111914.01		NA		

WATER QUALITY DATA

Test contions				DO (mg/L)		TEMPERATURE (°C)		Salinity (ppt)		pH (units)		Ammonia		Sulfides			
				≥ 4.9		16 ± 1		30 ± 1		8.0 ± 1							
CLIENT/ ID	CONCENTRATION value	CONCENTRATION units	DAY	DISS. OXYGEN meter	DISS. OXYGEN mg/L	TEMPERATURE meter	TEMPERATURE °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	AMMONIA Techn.	AMMONIA mg/L	Sulfides Techn.	Sulfides mg/L	Date	Tech
DMMU-2 / .	1	%	0	8	8.3	8	15.4	8	30	8	8.3	HE	0.00			11/19	CK
			1	8	8.3	8	16.1	8	30	8	8.0					11/20	JL
			2	8	7.8	8	16.5	8	②30.4	8	7.9	KB	0.00			"/21	KB
			3														
DMMU-2 / .	10	%	0	8	8.2	8	15.1	8	30	8	7.8	HE	0.00			11/19	CK
			1	8	8.3	8	16.1	8	30	8	8.0					11/20	JL
			2	8	8.0	8	16.3	8	30	8	7.9	KB	0.00			11/21	KB
			3														
DMMU-2 / .	50	%	0	8	8.1	8	15.0	8	32	8	7.9	HE	0.291			11/19	CK
			1	8	8.1	8	16.3	8	~~33~~ 33 ②	8	8.0					11/20	JL
			2	8	7.9	8	16.3	8	32	8	8.0	KB	0.305			"/21	KB
			3														
DMMU-2 / .	100	%	0	8	8.0	8	15.4	8	34	8	8.0	HE	0.790			11/19	CK
			1	8	8.0	8	16.3	8	34	8	8.1					11/20	JL
			2	8	7.8	8	16.4	8	34	8	8.0	KB	1.08			11/21	KB
			2														

① JL 11/20/14 ② WP. KB. 11/21/14

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA / Evapart SPP	Mytilus spp. larval	2

PRETEST / ~~INITIAL~~ / FINAL / OTHER (circle one) **DAY of TEST:** 0
OVERLYING (OV) / POREWATER (PW) (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	**Temperature:**	
11/19/14	21.5 °C	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
Control	0	11/19/14 HE	0.00	21.6	11/19/14 HE	N			
SW	100%	↓	0.00	21.6	↓	↓			
DMMU.2	1:1		0.00	21.4					
↓	10:1		0.00	21.8					
	50:1		0.291	21.6					
	100%		0.790	21.6					

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA/ EVERPORT	MYTILUS SP.	2 DAYS

PRETEST / INITIAL / FINAL / OTHER (circle one) DAY of TEST: 2

OVERLYING (OV) / POREWATER (PW) (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
11/21/14	21.1°C	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
Ø		11/21/14 KMB	0.00	20.1°C	11/21/14 KMB	N			
DMMU-2 SW		↓	0.00	20.2°	↓	↓			
DMMU-2	1%		0.00	20.5°					
"	10%		0.00	20.5°					
"	50%		0.305	20.5					
"	100%	↓	1.08	20.5	↓	↓			

ENVIRON

ELUTRIATE PREPARTION WORKSHEET

DATE:	CLIENT:	PROJECT:
11/19/14	POLA	Everport

ELUTRIATE PREPARED FOR: (CIRCLE OR DESCRIBE)

MYSID ACUTE FISH ACUTE LARVAL DEVELOPMENT OTHER_____

DILUENT SOURCE: (Y/N)

PROJECT SITE WATER y LABORATORY WATER_____

CLIENT ID:	LAB ID:
DMMU.2.WATER.PG	P141030.01

STANDARD ELUTRIATE IS PREPARED AT 1 PART SEDIMENT TO 4 PARTS WATER

ELUTRIATE RATIO SELECTED:	1:4
TOTAL VOLUME OF ELUTRIATE PREPARATION VESSEL:	1000 mL
VOLUME OF SEDIMENT PER SAMPLE:	180 mL
VOLUME OF DILUENT:	720 mL
TOTAL NUMBER OF PREPARTION VESSELS PER SAMPLE:	1

# Cont's	SAMPLE:	TIME SPIN START:	TIME SETTLE START:	TIME OF ELUTRIATE COLLECTION:	VOLUME RECOVERED:	CENTRIFUGED (Y/N)
1	DMMU.2	0935	NA	1040	~700mL	y

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
11/19/14	0935	TS4821

Organism / Project:	Source:
Mytilus / West Bay & Eastport	Taylor Shellfish

Address:	Invoice Attached
On File	Yes (No)

Phone:	Contact:
On File	On File

No. Ordered:	No. Received:	Source Batch:

Condition of Organisms:	Approximate Size or Age:
Good	Adult

Shipper:	B of L (Tracking No.)
UPS	1Z98X6850131004821

Condition of Container:	Received By:
Good	MMB

Container	D.O. (mg/L)	Temp. (°C)	Conductivity or Salinity (Include Units)	pH (Units)	Technician (Initials)
1	* →				MMB

Notes: *: received dry @ 7.3°C

ENVIRON

BIVALVE LARVAL DEVELOPMENT
SUSPENDED PARTICULATE PHASE ENDPOINT DATA SHEET

SPECIES					
Mytilus sp. (mussel)					
CLIENT	**PROJECT**	**JOB NUMBER**	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**
POLA	Everport	.	B. Hester	Port Gamble Incubator	USACE/EPA 1991

LARVAL OBSERVATION DATA

CLIENT/ ID	CONCENTRATION value	CONCENTRATION units	VIAL NUMBER	REP	NUMBER NORMAL	NUMBER ABNORMAL	DATE	TECHNICIAN	COMMENTS
ZERO-TIME (PRE)	0	%		1	275		5/5/15	CR	
				2	262				
				3	244				
				4	279				
				①5	261				
Control / .	0	%		1	271	9			
				2	281	5			
				3	247	5			
				4	273	4			
				5	264	3			
DMMU-1-WATER-PG / .	100	%		1	277	6			
				2	269	2			
				3	291	5			
				4	265	4			
				5	275	6			

① vial 6 = 240 SD.

ENVIRON

BIVALVE LARVAL DEVELOPMENT
SUSPENDED PARTICULATE PHASE ENDPOINT DATA SHEET

SPECIES					
Mytilus sp. (mussel)					
CLIENT	**PROJECT**	**JOB NUMBER**	**PROJECT MANAGER**	**LABORATORY**	**PROTOCOL**
POLA	Everport	.	B. Hester	Port Gamble Incubator	USACE/EPA 1991

LARVAL OBSERVATION DATA

CLIENT/ ID	CONCENTRATION value	CONCENTRATION units	VIAL NUMBER	REP	NUMBER NORMAL	NUMBER ABNORMAL	DATE	TECHNICIAN	COMMENTS
DMMU-1 / .	1	%		1	276	6	①4/5/15	CR	
				2	276	7			
				3	278	7			
				4	265	2			
				5	260	1			
DMMU-1 / .	10	%		1	260	4			
				2	270	6			
				3	284	3			
				4	241	6			
				5	281	1			
DMMU-1 / .	50	%		1	302	2			
				2	298	0			
				3	270	4			
				4	235	5			
				5	278	6			
DMMU-1 / .	100	%		1	309	3			
				2	271	4			
				3	281	4			
				4	244	7			
				5	272	4			

①Wrong date CR

ENVIRON

BIVALVE LARVAI DEVELOPMENTAL SUSPENDED PARTICULATE PHASE TEST
WQ DATA SHEET

CLIENT	PROJECT
POLA	Everport
JOB NUMBER	PROJECT MANAGER
.	B. Hester
CHAMBER TYPE / SIZE	EXPOSURE VOLUME
30mL Shell vial	10 mL

SPECIES		LABORATORY		PROTOCOL
Mytilus sp. (mussel)		Port Gamble Incubator		USACE/EPA 1991
TEST START DATE	TIME	TEST END DATE	TIME	
30Apr15	1804	02May15	1705	
DILUTION WATER BATCH		TEMP Recorder (HOBO)#		
①FSW043015 FSW042915.02		NA		

WATER QUALITY DATA

Test contions				DO (mg/L)		TEMPERATURE (°C)		Salinity (ppt)		pH (units)		Ammonia		Sulfides			
				≥ 4.0		15 ± 1		30 ± 2		8.0 ± 1							
CLIENT/ ID	CONCENTRATION		DAY	DISS. OXYGEN		TEMPERATURE		SALINITY		pH		AMMONIA		Sulfides		Date	Tech
	value	units		meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L	Techn.	mg/L		
Control / .	0	%	0	8	9.3	8	14.5	8	29	8	7.9	[illegible]	0.00			4/30	[illegible]
			1	9	7.8	9	16.0	9	28	9	7.9					5/01	JL
			2	9	8.0	9	16.0	9	28	9	7.9	JL	0.00			5/02	JL
			3														
DMMU-1-WATER-PG / .	100	%	0	8	10.2	8	14.0	8	30	8	8.1	[illegible]	0.0916			4/30	[illegible]
			1	9	8.2	9	15.9	9	30	9	7.9					5/01	JL
			2	9	7.9	9	15.9	9	30	9	8.0	JL	0.00			5/02	JL
			3														

①WP. MK 4/30.

ENVIRON

BIVALVE LARVAI DEVELOPMENTAL SUSPENDED PARTICULATE PHASE TEST
WQ DATA SHEET

CLIENT	PROJECT
POLA	Everport
JOB NUMBER	PROJECT MANAGER
.	B. Hester
CHAMBER TYPE / SIZE	EXPOSURE VOLUME
30 mL Shell vial	10 mL

SPECIES		LABORATORY		PROTOCOL
Mytilus sp. (mussel)		Port Gamble Incubator		USACE/EPA 1991
TEST START DATE	TIME	TEST END DATE	TIME	
30Apr15	1804	02May15	1705	
DILUTION WATER BATCH		TEMP Recorder (HOBO)#		
FSW042915.02		NA		

WATER QUALITY DATA

Test contions				DO (mg/L)		TEMPERATURE (°C)		Salinity (ppt)		pH (units)		Ammonia		Sulfides			
				≥ 4.0		15 ± 1		30 ± 2		8.0 ± 1							
CLIENT/ ID	CONCENTRATION value	units	DAY	DISS. OXYGEN meter	mg/L	TEMPERATURE meter	°C	SALINITY meter	ppt	pH meter	unit	AMMONIA Techn.	mg/L	Sulfides Techn.	mg/L	Date	Tech
DMMU-1 / .	1	%	0	8	8.6	8	15.2	8	29	8	8.0	HE	0.0681			4/30	HE
			1	9	8.1	9	15.9	9	29	9	7.9					5/01	JL
			2	9	7.9	9	15.9	9	29	9	8.0	JL	0.00			5/02	JL
			3														
DMMU-1 / .	10	%	0	8	8.2	8	16.0	8	29	8	8.0	HE	0.0790			4/30	HE
			1	9	8.1	9	15.8	9	29	9	7.9					5/01	JL
			2	9	8.0	9	15.7	9	29	9	8.0	JL	0.00			5/02	JL
			3														
DMMU-1 / .	50	%	0	8	8.3	8	15.4	8	29	8	8.1	HE	0.443			4/30	HE
			1	9	8.0	9	15.8	9	30	9	8.0					5/01	JL
			2	9	7.9	9	15.8	9	30	9	8.0	JL	0.327			5/02	JL
			3														
DMMU-1 / .	100	%	0	8	8.6	8	14.0	8	30	8	8.3	HE	0.791			(1) 4/30	HE
			1	9	8.0	9	15.8	9	30	9	8.1					5/01	JL
			2	9	7.9	9	15.8	9	30	9	8.1	JL	0.953			5/02	JL
			2														

(1) WC late 4/30

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	LABORATORY	PROTOCOL
POLA	Everport	.	B. Hester	Port Gamble Incubator	USACE/EPA 1991

TEST ORGANISM SPAWNING DATA

SPECIES		
Mytilus sp. (mussel)		
SUPPLIER: Taylor Shellfish		ORGANISM BATCH NO.: TS7462
DATE RECEIVED: 4.30.15	TIME RECEIVED:	DATE USED: 4.30.15
SPAWNING METHOD: feed/heatshock	INITIAL SPAWNING TIME: 1610	FINAL SPAWNING TIME: 1625
MALES: 3 / FEMALES: 2	SPERM VIABILITY: ✓	EGG CONDITION: Good
BEGIN FERTILIZATION: 1625	END FERTILIZATION: 1804	CONDITION OF EMBRYOS: >90% dev

SAMPLE STORAGE
4 Degrees Celsius - dark
SEDIMENT TREATMENT: 4:1 seawater:sediment ratio
TEST CHAMBERS: 25 mL shell vials
EXPOSURE VOLUME: 10 mL elutriate/seawater

SOURCE OF DILUENT: FSW	TEMP (C)	DO (mg/L)	pH
	—	—	—

SUBSAMPLE DILUTION FACTOR: 100X	SUBSAMPLE VOLUME (mL): 1mL

COUNT 1.	COUNT 2.	COUNT 3.	MEAN OF COUNTS
—	—	—	34

EXPOSURE VOLUME (mL)	TARGET VIAL DENSITY(#/mL)	TARGET INNOC. VOL. (mL)
L elutriate/seaw	~~30~~ 27	10

STOCK DENSITY (#/mL)
MEAN OF COUNTS / SUBSAMPLE DILUTION FACTOR / SUBSAMPLE VOLUME
34 x100 = 3400 esss/mL

DILUTION FACTOR FOR ADJUSTMENT OF STOCK DENSITY
(EXP. VOLUME * TARGET VIAL DENSITY / TARGET INNOC.VOLUME) / (STOCK DENSITY)
2700/3400 = 0.79 • 100 79mL esstock 21mL c-H_2O

INNOCULATION VOLUME (mL)
(TARGET VIAL DENSITY * EXPOSURE VOLUME) / ADJUSTED STOCK DENSITY
0.100mL

ESTIMATED VIAL DENSITY (#/mL)
(ADJUSTED STOCK DENSITY * INNOC.VOLUME) / (EXPOSURE VOLUME + INNOC. VOLUME)
27

DATE/TIME INNOC.	COUNTS BY	CALCULATIONS BY	QA BY
4.30.15 1804	BH	BH	NA

ENVIRON

ELUTRIATE PREPARTION WORKSHEET

DATE:	CLIENT:	PROJECT:
9/30/15	POLA	Everport

ELUTRIATE PREPARED FOR: (CIRCLE OR DESCRIBE)

MYSID ACUTE FISH ACUTE (LARVAL DEVELOPMENT) OTHER_____

DILUENT SOURCE: (Y/N)

PROJECT SITE WATER Y LABORATORY WATER N

CLIENT ID:	LAB ID:
DMMU-1-Water-pg	P150328.01

STANDARD ELUTRIATE IS PREPARED AT 1 PART SEDIMENT TO 4 PARTS WATER

ELUTRIATE RATIO SELECTED:	1:4
TOTAL VOLUME OF ELUTRIATE PREPARATION VESSEL:	1000 mL
VOLUME OF SEDIMENT PER SAMPLE:	180 mL
VOLUME OF DILUENT:	720 mL
TOTAL NUMBER OF PREPARTION VESSELS PER SAMPLE:	1

# Cont's	SAMPLE:	TIME SPIN START:	TIME SETTLE START:	TIME OF ELUTRIATE COLLECTION:	VOLUME RECOVERED:	CENTRIFUGED (Y/N)
1	DMMU-1	0950	1020	1040	~700mL	Y

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
4/30/15	1200	TS 7462

Organism / Project: Mytilus / Everport

Source / Supplier: Taylor Shellfish

Phone:	Contact:
On File	

No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
1 batch	50+	collected 4/29/15

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
Good	Adult

Shipper:	B of L (Tracking No.)
UPS	1Z 98X 685 01 3100 7462

Condition of Container:	Received By:
Good	GR

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
* →						

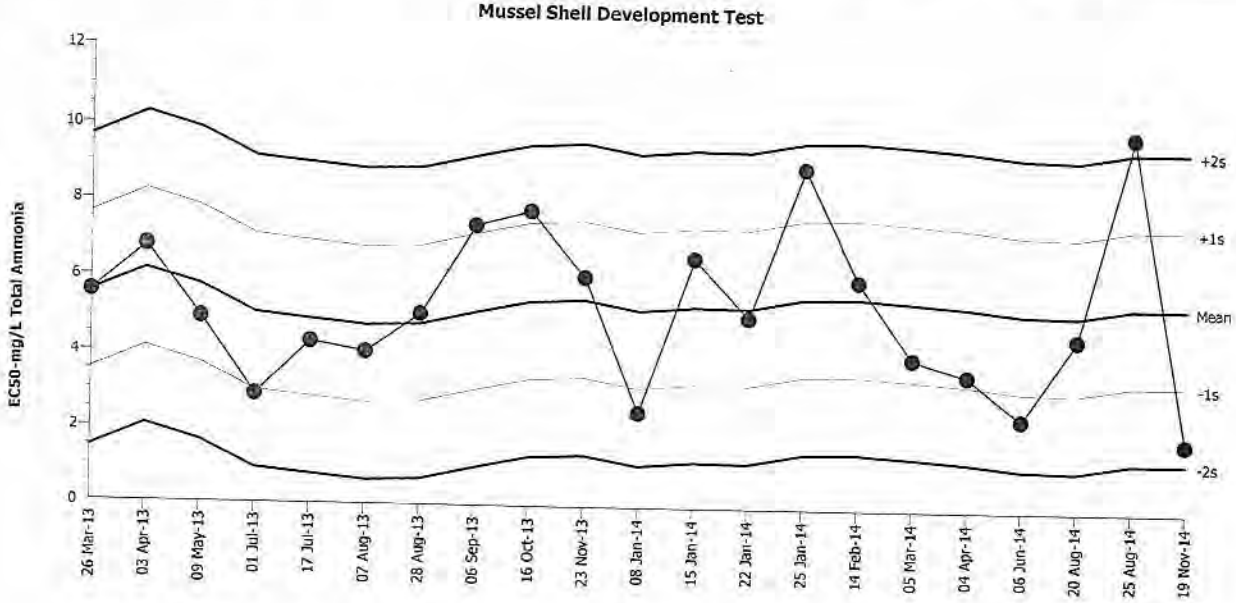
Notes: * Received dry

CETIS QC Plot

Report Date: 29 Dec-14 10:17 (1 of 1)

Mussel Shell Development Test — All Matching Labs

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	5.445	**Count:**	20	**-1s Warning Limit:**	3.387	**-2s Action Limit:**	1.329
Sigma:	2.058	**CV:**	37.80%	**+1s Warning Limit:**	7.503	**+2s Action Limit:**	9.561

Quality Control Data

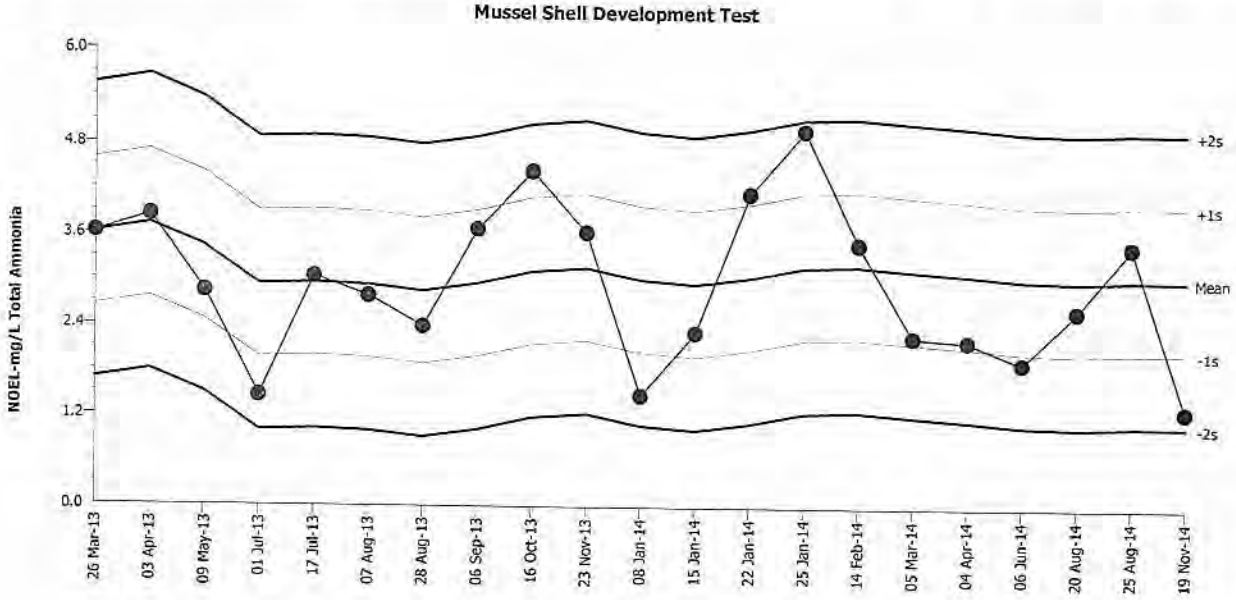
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Mar	26	18:15	5.579	0.1341	0.06518			03-8532-3895	00-6308-0782	NewFields
2		Apr	3	0:00	6.805	1.36	0.661			10-3604-5723	04-8356-0800	NewFields
3		May	9	17:15	4.927	-0.5183	-0.2518			00-6360-9095	16-4147-0802	NewFields
4		Jul	1	19:00	2.895	-2.55	-1.239	(-)		19-5961-2730	13-0986-6895	NewFields
5			17	17:55	4.313	-1.132	-0.5499			18-2536-1347	00-8750-2223	NewFields
6		Aug	7	19:00	4.051	-1.394	-0.6774			04-7788-4843	09-8595-7999	NewFields
7			28	16:55	5.063	-0.3823	-0.1857			19-6611-9162	04-7207-2891	NewFields
8		Sep	6	18:55	7.413	1.968	0.9563			15-9826-4846	08-5407-1877	NewFields
9		Oct	16	20:15	7.813	2.368	1.15	(+)		06-1596-0976	02-5933-8680	NewFields
10		Nov	23	17:25	6.092	0.6465	0.3141			16-7309-8662	15-4529-5520	NewFields
11	2014	Jan	8	18:22	2.527	-2.918	-1.418	(-)		17-8058-8048	06-8566-9958	NewFields
12			15	18:45	6.625	1.18	0.5732			13-6807-1804	14-8094-6245	NewFields
13			22	18:47	5.072	-0.3729	-0.1812			13-2808-9359	13-2338-2483	NewFields
14			25	20:20	9.018	3.573	1.736	(+)		14-2680-8854	01-2301-1257	NewFields
15		Feb	14	15:45	6.063	0.618	0.3003			00-9581-0604	10-3047-2486	NewFields
16		Mar	5	19:35	4.03	-1.415	-0.6876			00-1473-4954	06-0848-4308	NewFields
17		Apr	4	19:30	3.594	-1.851	-0.8993			00-0374-9463	01-3815-4471	NewFields
18		Jun	6	18:15	2.465	-2.98	-1.448	(-)		06-9491-1560	12-3152-8677	ENVIRON
19		Aug	20	18:55	4.595	-0.8497	-0.4129			03-3666-4351	12-9663-9075	ENVIRON
20			25	19:45	9.954	4.509	2.191	(+)	(+)	18-5120-4553	05-8275-9550	ENVIRON
21		Nov	19	17:40	1.863	-3.582	-1.741	(-)		16-6497-0143	19-4546-4847	ENVIRON

CETIS QC Plot

Report Date: 29 Dec-14 10:17 (1 of 1)

Mussel Shell Development Test — All Matching Labs

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



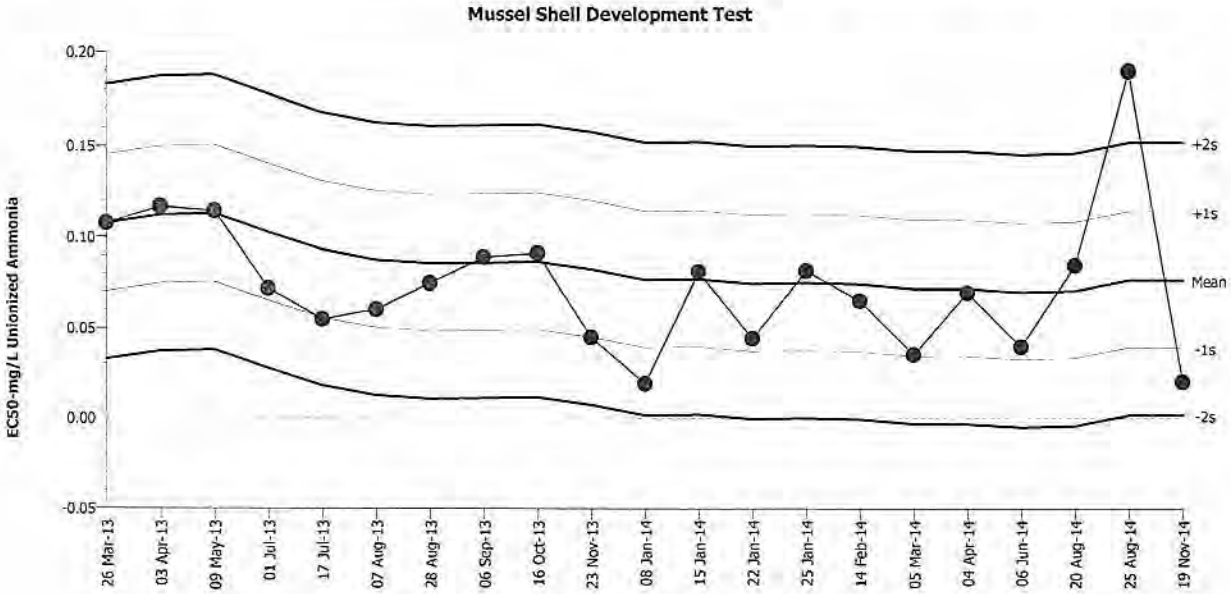
Mean:	3.037	**Count:**	20	**-1s Warning Limit:**	2.068	**-2s Action Limit:**	1.099
Sigma:	0.969	**CV:**	31.90%	**+1s Warning Limit:**	4.006	**+2s Action Limit:**	4.975

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Mar	26	18:15	3.62	0.583	0.6017			03-8532-3895	01-1639-1779	NewFields
2		Apr	3	0:00	3.85	0.813	0.839			10-3604-5723	13-5448-8759	NewFields
3		May	9	17:15	2.85	-0.187	-0.193			00-6360-9095	00-7540-8630	NewFields
4		Jul	1	19:00	1.46	-1.577	-1.627	(-)		19-5961-2730	20-9160-8614	NewFields
5			17	17:55	3.05	0.013	0.01342			18-2536-1347	04-3468-0815	NewFields
6		Aug	7	19:00	2.79	-0.247	-0.2549			04-7788-4843	18-8631-2521	NewFields
7			28	16:55	2.39	-0.647	-0.6677			19-6611-9162	06-3129-4473	NewFields
8		Sep	6	18:55	3.68	0.643	0.6636			15-9826-4846	11-1511-0674	NewFields
9		Oct	16	20:15	4.445	1.408	1.453	(+)		06-1596-0976	11-9282-8356	NewFields
10		Nov	23	17:25	3.64	0.603	0.6223			16-7309-8662	17-7125-0481	NewFields
11	2014	Jan	8	18:22	1.48	-1.557	-1.607	(-)		17-8058-8048	14-0659-1138	NewFields
12			15	18:45	2.32	-0.717	-0.7399			13-6807-1804	20-8888-7287	NewFields
13			22	18:47	4.16	1.123	1.159	(+)		13-2808-9359	09-9457-8825	NewFields
14			25	20:20	4.99	1.953	2.015	(+)	(+)	14-2680-8854	19-4144-0794	NewFields
15		Feb	14	15:45	3.5	0.463	0.4778			00-9581-0604	14-2175-7836	NewFields
16		Mar	5	19:35	2.27	-0.767	-0.7915			00-1473-4954	06-9188-5839	NewFields
17		Apr	4	19:30	2.22	-0.817	-0.8431			00-0374-9463	13-5593-8276	NewFields
18		Jun	6	18:15	1.93	-1.107	-1.142	(-)		06-9491-1560	15-1591-7876	ENVIRON
19		Aug	20	18:55	2.62	-0.417	-0.4303			03-3666-4351	02-5771-3266	ENVIRON
20			25	19:45	3.48	0.443	0.4572			18-5120-4553	02-0328-1110	ENVIRON
21		Nov	19	17:40	1.3	-1.737	-1.793	(-)		16-6497-0143	01-0463-0999	ENVIRON

Mussel Shell Development Test **All Matching Labs**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Unionized Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	0.07694	**Count:**	20	**-1s Warning Limit:**	0.03938	**-2s Action Limit:**	0.00182
Sigma:	0.03756	**CV:**	48.80%	**+1s Warning Limit:**	0.1145	**+2s Action Limit:**	0.1521

Quality Control Data

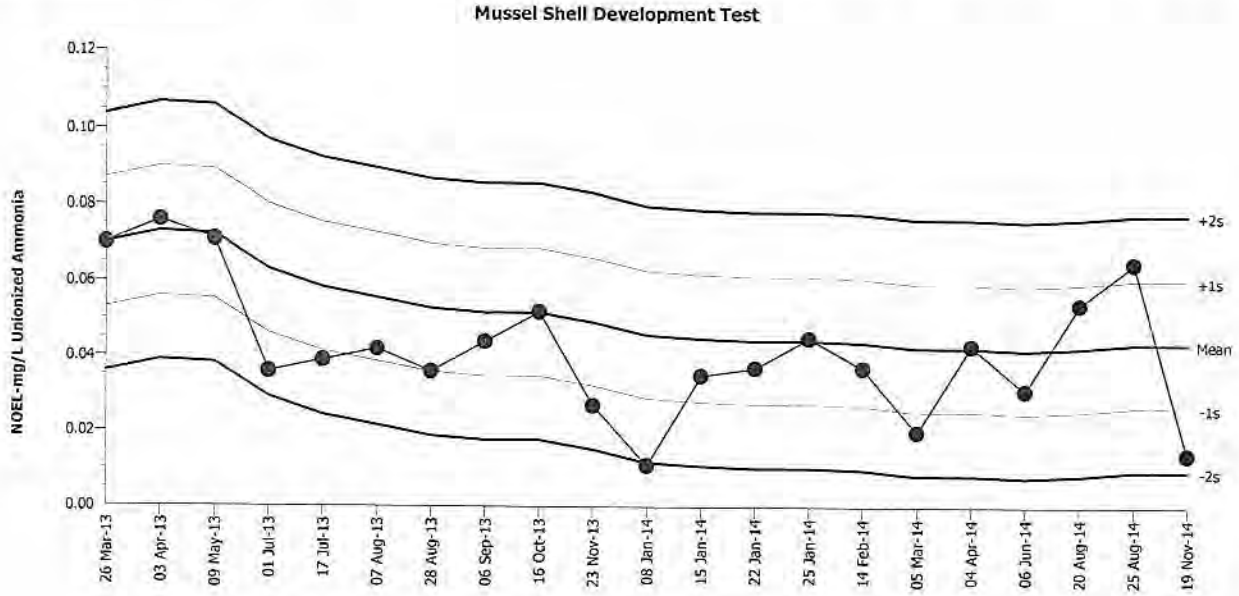
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Mar	26	18:15	0.1079	0.03094	0.8238			10-2444-9875	09-9596-0674	NewFields
2		Apr	3	0:00	0.1168	0.03991	1.062	(+)		20-6076-9735	05-3848-1619	NewFields
3		May	9	17:15	0.1144	0.03746	0.9973			14-3450-0734	06-3515-6667	NewFields
4		Jul	1	19:00	0.07187	-0.00507	-0.1349			10-8846-7294	05-7595-2849	NewFields
5			17	17:55	0.0548	-0.02214	-0.5895			10-3414-5102	08-1738-2772	NewFields
6		Aug	7	19:00	0.06027	-0.01667	-0.4438			10-7217-0339	06-7338-0554	NewFields
7			28	16:55	0.07491	-0.00204	-0.05418			19-6745-0030	16-9398-7287	NewFields
8		Sep	6	18:55	0.08923	0.01229	0.3272			20-4996-9287	13-4360-8251	NewFields
9		Oct	16	20:15	0.0914	0.01446	0.3849			08-6327-9927	19-9515-4386	NewFields
10		Nov	23	17:25	0.04496	-0.03198	-0.8514			13-8738-6674	02-5355-5019	NewFields
11	2014	Jan	8	18:22	0.01919	-0.05775	-1.538	(-)		02-3576-5336	17-1917-6754	NewFields
12			15	18:45	0.0814	0.004458	0.1187			06-9099-5939	00-9901-2590	NewFields
13			22	18:47	0.04434	-0.0326	-0.868			15-7285-0453	02-5494-3481	NewFields
14			25	20:20	0.08179	0.004845	0.129			04-0859-3739	09-7301-2928	NewFields
15		Feb	14	15:45	0.0653	-0.01164	-0.3099			15-0233-5150	16-5673-1462	NewFields
16		Mar	5	19:35	0.03552	-0.04142	-1.103	(-)		02-2074-6026	13-5083-6151	NewFields
17		Apr	4	19:30	0.06967	-0.00727	-0.1935			08-9987-7352	06-2075-5011	NewFields
18		Jun	6	18:15	0.03982	-0.03712	-0.9882			20-1079-3686	12-0135-9289	ENVIRON
19		Aug	20	18:55	0.08475	0.007807	0.2078			14-9751-1227	04-1532-7472	ENVIRON
20			25	19:45	0.1905	0.1136	3.023	(+)	(+)	00-8792-7550	08-9753-5531	ENVIRON
21		Nov	19	17:40	0.0203	-0.05664	-1.508	(-)		06-3984-9090	13-7269-9515	ENVIRON

CETIS QC Plot

Report Date: 29 Dec-14 10:19 (1 of 1)

Mussel Shell Development Test — All Matching Labs

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Unionized Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	0.04355	**Count:**	20	**-1s Warning Limit:**	0.02655	**-2s Action Limit:**	0.00955
Sigma:	0.017	**CV:**	39.00%	**+1s Warning Limit:**	0.06055	**+2s Action Limit:**	0.07755

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Mar	26	18:15	0.07	0.02645	1.556	(+)		10-2444-9875	00-8976-6127	NewFields
2		Apr	3	0:00	0.076	0.03245	1.909	(+)		20-6076-9735	14-2423-4592	NewFields
3		May	9	17:15	0.071	0.02745	1.615	(+)		14-3450-0734	19-5425-3899	NewFields
4		Jul	1	19:00	0.036	-0.00755	-0.4441			10-8846-7294	11-2659-9719	NewFields
5			17	17:55	0.039	-0.00455	-0.2676			10-3414-5102	05-6701-2859	NewFields
6		Aug	7	19:00	0.042	-0.00155	-0.09118			10-7217-0339	15-9321-6181	NewFields
7			28	16:55	0.036	-0.00755	-0.4441			19-6745-0030	11-4907-1298	NewFields
8		Sep	6	18:55	0.044	0.00045	0.02647			20-4996-9287	08-7464-1360	NewFields
9		Oct	16	20:15	0.052	0.00845	0.4971			08-6327-9927	20-4743-8794	NewFields
10		Nov	23	17:25	0.027	-0.01655	-0.9735			13-8738-6674	05-6624-9800	NewFields
11	2014	Jan	8	18:22	0.011	-0.03255	-1.915	(-)		02-3576-5336	15-3876-8049	NewFields
12			15	18:45	0.035	-0.00855	-0.5029			06-9099-5939	01-3042-8920	NewFields
13			22	18:47	0.037	-0.00655	-0.3853			15-7285-0453	12-0010-0113	NewFields
14			25	20:20	0.045	0.00145	0.08529			04-0859-3739	20-3446-9116	NewFields
15		Feb	14	15:45	0.037	-0.00655	-0.3853			15-0233-5150	19-2470-0896	NewFields
16		Mar	5	19:35	0.02	-0.02355	-1.385	(-)		02-2074-6026	10-8335-1484	NewFields
17		Apr	4	19:30	0.043	-0.00055	-0.03235			08-9987-7352	01-2582-7818	NewFields
18		Jun	6	18:15	0.031	-0.01255	-0.7382			20-1079-3686	02-2339-8824	ENVIRON
19		Aug	20	18:55	0.054	0.01045	0.6147			14-9751-1227	13-4768-2245	ENVIRON
20			25	19:45	0.065	0.02145	1.262	(+)		00-8792-7550	14-4895-9621	ENVIRON
21		Nov	19	17:40	0.014	-0.02955	-1.738	(-)		06-3984-9090	04-2355-4660	ENVIRON

CETIS Summary Report

Mussel Shell Development Test — **ENVIRON**

Batch ID:	02-7927-0323	Test Type:	Development-Survival	Analyst:	
Start Date:	19 Nov-14 17:40	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Laboratory Seawater
Ending Date:	21 Nov-14 17:00	Species:	Mytilus galloprovincialis	Brine:	Not Applicable
Duration:	47h	Source:	Taylor Shellfish	Age:	
Sample ID:	09-2254-4068	Code:	36FCE7C4	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Total Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	198d 18h	Station:	p140505.57		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-0463-0999	Combined Proportion Norm	1.3	2.63	1.849	10.7%		Dunnett Multiple Comparison Test
12-3890-7500	Proportion Survived	20.1	>20.1	NA	28.3%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
19-4546-4847	Combined Proportion Norm	EC50	1.863	1.855	1.871		Spearman-Kärber
17-7898-0696	Proportion Survived	EC5	>20.1	N/A	N/A		Linear Interpolation (ICPIN)
		EC10	>20.1	N/A	N/A		
		EC15	>20.1	N/A	N/A		
		EC20	>20.1	N/A	N/A		
		EC25	>20.1	N/A	N/A		
		EC40	>20.1	N/A	N/A		
		EC50	>20.1	N/A	N/A		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
12-3890-7500	Proportion Survived	Control Resp	0.8511	0.5 - NL	Yes	Passes Acceptability Criteria
17-7898-0696	Proportion Survived	Control Resp	0.8511	0.5 - NL	Yes	Passes Acceptability Criteria
01-0463-0999	Combined Proportion Norm	PMSD	0.107	NL - 0.25	No	Passes Acceptability Criteria

Combined Proportion Normal Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.8139	0.6622	0.9655	0.7532	0.8753	0.03524	0.06104	7.5%	0.0%
0.573		3	0.8312	0.6938	0.9685	0.7714	0.8805	0.03192	0.05528	6.65%	-2.13%
1.3		3	0.858	0.7927	0.9233	0.8416	0.8883	0.01517	0.02628	3.06%	-5.43%
2.63		3	0.002597	0	0.00905	0	0.005195	0.0015	0.002597	100.0%	99.68%
5.36		3	0.006061	0	0.01351	0.002597	0.007792	0.001732	0.002999	49.49%	99.26%
11.1		3	0	0	0	0	0	0	0		100.0%
20.1		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.8511	0.6865	1	0.7844	0.9169	0.03824	0.06624	7.78%	0.0%
0.573		3	0.8701	0.7047	1	0.8	0.9325	0.03844	0.06658	7.65%	-2.24%
1.3		3	0.9082	0.8504	0.9661	0.8935	0.9351	0.01344	0.02328	2.56%	-6.71%
2.63		3	0.884	0.705	1	0.8234	0.9636	0.04159	0.07204	8.15%	-3.87%
5.36		3	0.9004	0.5724	1	0.7506	1	0.07623	0.132	14.66%	-5.8%
11.1		3	0.8788	0.6475	1	0.7714	0.9377	0.05376	0.09312	10.6%	-3.26%
20.1		3	0.8684	0.6641	1	0.774	0.9247	0.04748	0.08223	9.47%	-2.04%

Mussel Shell Development Test

ENVIRON

Combined Proportion Normal Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	0.813	0.7532	0.8753
0.573		0.7714	0.8805	0.8416
1.3		0.8416	0.8442	0.8883
2.63		0	0.002597	0.005195
5.36		0.007792	0.002597	0.007792
11.1		0	0	0
20.1		0	0	0

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	0.8519	0.7844	0.9169
0.573		0.8	0.9325	0.8779
1.3		0.8961	0.8935	0.9351
2.63		0.8649	0.8234	0.9636
5.36		0.9506	0.7506	1
11.1		0.9273	0.7714	0.9377
20.1		0.9247	0.774	0.9065

Combined Proportion Normal Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	313/385	290/385	337/385
0.573		297/385	339/385	324/385
1.3		324/385	325/385	342/385
2.63		0/385	1/385	2/385
5.36		3/385	1/385	3/385
11.1		0/385	0/385	0/385
20.1		0/385	0/385	0/385

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	328/385	302/385	353/385
0.573		308/385	359/385	338/385
1.3		345/385	344/385	360/385
2.63		333/385	317/385	371/385
5.36		366/385	289/385	385/385
11.1		357/385	297/385	361/385
20.1		356/385	298/385	349/385

CETIS Test Data Worksheet

Mussel Shell Development Test — **ENVIRON**

Start Date:	19 Nov-14 17:40	**Species:**	Mytilus galloprovincialis
End Date:	21 Nov-14 17:00	**Protocol:**	EPA/600/R-95/136 (1995)
Sample Date:	05 May-14	**Material:**	Total Ammonia
Sample Code:	36FCE7C4		
Sample Source:	Reference Toxicant		
Sample Station:	p140505.57		

C-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	21	385	328	328	313	
0	D	2	18	385	302	302	290	
0	D	3	5	385	353	353	337	
0.573		1	8	385	308	308	297	
0.573		2	9	385	359	359	339	
0.573		3	4	385	338	338	324	
1.3		1	2	385	345	345	324	
1.3		2	12	385	344	344	325	
1.3		3	15	385	360	360	342	
2.63		1	11	385	333	333	0	
2.63		2	14	385	317	317	1	
2.63		3	1	385	371	371	2	
5.36		1	7	385	366	366	3	
5.36		2	10	385	289	289	1	
5.36		3	3	385	404	404	3	
11.1		1	13	385	357	357	0	
11.1		2	20	385	297	297	0	
11.1		3	19	385	361	361	0	
20.1		1	17	385	356	356	0	
20.1		2	16	385	298	298	0	
20.1		3	6	385	349	349	0	

Mussel Shell Development Test — **ENVIRON**

Batch ID:	06-7743-6136	Test Type:	Development-Survival	Analyst:	
Start Date:	19 Nov-14 17:40	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Laboratory Seawater
Ending Date:	21 Nov-14 17:00	Species:	Mytilus galloprovincialis	Brine:	Not Applicable
Duration:	47h	Source:	Taylor Shellfish	Age:	

Sample ID:	16-4767-5590	Code:	623588C6	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Unionized Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	198d 18h	Station:	p140505.57		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
04-2355-4660	Combined Proportion Norm	0.014	0.029	0.02015	10.7%		Dunnett Multiple Comparison Test
06-0313-6726	Proportion Survived	0.222	>0.222	NA	28.3%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
13-7269-9515	Combined Proportion Norm	EC50	0.0203	0.02021	0.02039		Spearman-Kärber
02-7795-6681	Proportion Survived	EC5	>0.222	N/A	N/A		Linear Interpolation (ICPIN)
		EC10	>0.222	N/A	N/A		
		EC15	>0.222	N/A	N/A		
		EC20	>0.222	N/A	N/A		
		EC25	>0.222	N/A	N/A		
		EC40	>0.222	N/A	N/A		
		EC50	>0.222	N/A	N/A		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
02-7795-6681	Proportion Survived	Control Resp	0.8511	0.5 - NL	Yes	Passes Acceptability Criteria
06-0313-6726	Proportion Survived	Control Resp	0.8511	0.5 - NL	Yes	Passes Acceptability Criteria
04-2355-4660	Combined Proportion Norm	PMSD	0.107	NL - 0.25	No	Passes Acceptability Criteria

Combined Proportion Normal Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.8139	0.6622	0.9655	0.7532	0.8753	0.03524	0.06104	7.5%	0.0%
0.006		3	0.8312	0.6938	0.9685	0.7714	0.8805	0.03192	0.05528	6.65%	-2.13%
0.014		3	0.858	0.7927	0.9233	0.8416	0.8883	0.01517	0.02628	3.06%	-5.43%
0.029		3	0.002597	0	0.00905	0	0.005195	0.0015	0.002597	100.0%	99.68%
0.059		3	0.006061	0	0.01351	0.002597	0.007792	0.001732	0.002999	49.49%	99.26%
0.121		3	0	0	0	0	0	0	0		100.0%
0.222		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.8511	0.6865	1	0.7844	0.9169	0.03824	0.06624	7.78%	0.0%
0.006		3	0.8701	0.7047	1	0.8	0.9325	0.03844	0.06658	7.65%	-2.24%
0.014		3	0.9082	0.8504	0.9661	0.8935	0.9351	0.01344	0.02328	2.56%	-6.71%
0.029		3	0.884	0.705	1	0.8234	0.9636	0.04159	0.07204	8.15%	-3.87%
0.059		3	0.9004	0.5724	1	0.7506	1	0.07623	0.132	14.66%	-5.8%
0.121		3	0.8788	0.6475	1	0.7714	0.9377	0.05376	0.09312	10.6%	-3.26%
0.222		3	0.8684	0.6641	1	0.774	0.9247	0.04748	0.08223	9.47%	-2.04%

Mussel Shell Development Test
ENVIRON

Combined Proportion Normal Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	0.813	0.7532	0.8753
0.006		0.7714	0.8805	0.8416
0.014		0.8416	0.8442	0.8883
0.029		0	0.002597	0.005195
0.059		0.007792	0.002597	0.007792
0.121		0	0	0
0.222		0	0	0

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	0.8519	0.7844	0.9169
0.006		0.8	0.9325	0.8779
0.014		0.8961	0.8935	0.9351
0.029		0.8649	0.8234	0.9636
0.059		0.9506	0.7506	1
0.121		0.9273	0.7714	0.9377
0.222		0.9247	0.774	0.9065

Combined Proportion Normal Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	313/385	290/385	337/385
0.006		297/385	339/385	324/385
0.014		324/385	325/385	342/385
0.029		0/385	1/385	2/385
0.059		3/385	1/385	3/385
0.121		0/385	0/385	0/385
0.222		0/385	0/385	0/385

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	328/385	302/385	353/385
0.006		308/385	359/385	338/385
0.014		345/385	344/385	360/385
0.029		333/385	317/385	371/385
0.059		366/385	289/385	385/385
0.121		357/385	297/385	361/385
0.222		356/385	298/385	349/385

CETIS Test Data Worksheet

Mussel Shell Development Test — **ENVIRON**

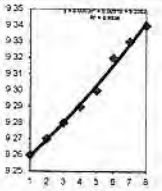
Start Date:	19 Nov-14 17:40	**Species:**	Mytilus galloprovincialis	**Sample Code:**	623588C6
End Date:	21 Nov-14 17:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	05 May-14	**Material:**	Unionized Ammonia	**Sample Station:**	p140505.57

C-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	13	385	328	328	313	
0	D	2	18	385	302	302	290	
0	D	3	20	385	353	353	337	
0.006		1	6	385	308	308	297	
0.006		2	8	385	359	359	339	
0.006		3	2	385	338	338	324	
0.014		1	17	385	345	345	324	
0.014		2	3	385	344	344	325	
0.014		3	14	385	360	360	342	
0.029		1	12	385	333	333	0	
0.029		2	10	385	317	317	1	
0.029		3	9	385	371	371	2	
0.059		1	7	385	366	366	3	
0.059		2	4	385	289	289	1	
0.059		3	21	385	404	404	3	
0.121		1	5	385	357	357	0	
0.121		2	16	385	297	297	0	
0.121		3	1	385	361	361	0	
0.222		1	19	385	356	356	0	
0.222		2	15	385	298	298	0	
0.222		3	11	385	349	349	0	

CLIENT:	Pioneer Tech.	Date of Test:	19-Nov-14
PROJECT:	West Bay	Test Type:	Mytilus RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1										
2										
3	0.75		0.573	30	7.7	14.5	287.66	9.3242		0.006
4	1.5		1.3	30	7.7	14.5	287.66	9.3242		0.014
5	3		2.63	30	7.7	14.6	287.76	9.3242		0.029
6	6		5.36	30	7.7	14.6	287.76	9.3242		0.059
7	12		11.1	30	7.7	14.5	287.66	9.3242		0.121
8	18		20	30	7.7	14.7	287.86	9.3242		0.222
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ENVIRON

LARVAL DEVELOPMENT TEST
AMMONIA REF TOX WQ

CLIENT	PROJECT	SPECIES	LAB / LOCATION		PROTOCOL
Pioneer Technologies	West Bay	*Mytilus galloprovincialis*	Port Gamble / Incubator		PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE:	TIME	TEST END DATE	TIME
—	Bill Gardiner	19Nov14	1740	21 NOV 14	1700
TEST ID	LOT #:				
P1405OS.57	3244C535				

WATER QUALITY DATA

DILTIN.WAT.BATCH	ORGANISM BATCH	REFERENCE TOX. MATERIAL	REFERENCE TOXICANT
FSW111914.01		Ammonium chloride	Ammonia - TAN

					DO (mg/L)		TEMP(C)		SAL (ppt)		pH			
					>5.0		16 ± 1		28 ± 1		7 - 9			
CLIENT/ ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	D.O.		TEMP.		SALINITY		pH		TECH.	DATE
					meter	mg/L	meter	°C	meter	ppt	meter	unit		
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	8	7.8	8	14.9	8	29	8	7.7	CR	11/19
	0	mg/L	1	Stock	8	8.3	8	16.3	8	30	8	8.0	JL	11/20
	Actual:		2	Stock	8	7.8	8	16.3	8	29	8	7.9	KB	11/21
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	8	8.0	8	14.5	8	30	8	7.7	CR	11/19
	0.75	mg/L	1	Stock	8	8.2	8	16.3	8	30	8	7.9	JL	11/20
	Actual:		2	Stock	8	8.1	8	16.1	8	30	8	7.9	KB	11/21
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	8	8.0	8	14.5	8	30	8	7.7	CR	11/19
	1.5	mg/L	1	Stock	8	8.2	8	16.3	8	30	8	7.9	JL	11/20
	Actual:		2	Stock	8	8.1	8	16.1	8	30	8	7.9	KB	11/21
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	8	8.1	8	14.6	8	30	8	7.7	CR	11/19
	3	mg/L	1	Stock	8	8.2	8	16.3	8	30	8	7.9	JL	11/20
	Actual:		2	Stock	8	8.1	8	16.2	8	30	8	7.9	KB	11/21
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	8	8.2	8	14.6	8	30	8	7.7	CR	11/19
	6	mg/L	1	Stock	8	8.2	8	16.3	8	30	8	7.9	JL	11/20
	Actual:		2	Stock	8	8.1	8	16.2	8	30	8	7.9	KB	11/21
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	8	8.2	8	14.5	8	30	8	7.7	CR	11/19
	12	mg/L	1	Stock	8	8.2	8	16.3	8	30	8	7.9	JL	11/20
	Actual:		2	Stock	8	8.1	8	16.2	8	30	8	7.9	KB	11/21
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	8	8.2	8	14.7	8	30	8	7.7	CR	11/19
	18	mg/L	1	Stock	8	8.2	8	16.3	8	30	8	7.9	JL	11/20
	Actual:		2	Stock	8	8.1	8	16.3	8	30	8	7.9	KB	11/21
			3	Stock										
			4	Stock										

ENVIRON

LARVAL DEVELOPMENT TEST
AMMONIA REF TOX OBSERVATION SHEET

SPECIES					
Mytilus galloprovincialis					
CLIENT	**PROJECT**	**JOB NUMBER**	**PROJECT MANAGER**	**LAB / LOCATION**	**PROTOCOL**
Pioneer Technologies	West Bay		Bill Gardiner	Port Gamble / Incubator	PSEP (1995)
TEST ID	**ORGANISM BATCH**	**TEST START DATE:**	**TIME**	**TEST END DATE:**	**TIME**
P140505.57	TS4821	19 NOV 14	1740	21 NOV 14	1700

LARVAL OBSERVATION DATA

CLIENT/ ID	CONC. value	CONC. units	VIAL NUMBER	REP	NUMBER NORMAL	NUMBER ABNORMAL	DATE	TECHNICIAN	COMMENTS
Ref.Tox. - Ammonia - TAN	0	mg/L		1	313	15	11/25/14	JW	
				2	296	12			
				3	337	16			
Ref.Tox. - Ammonia - TAN	0.75	mg/L		1	297	11			
				2	339	20			
				3	324	14			
Ref.Tox. - Ammonia - TAN	1.5	mg/L		1	324	21			
				2	325	19			
				3	342	18			
Ref.Tox. - Ammonia - TAN	3	mg/L		1	6	333			
				2	1	316			
				3	2	369			
Ref.Tox. - Ammonia - TAN	6	mg/L		1	3	363			
				2	1	288			
				3	3	401			
Ref.Tox. - Ammonia - TAN	12	mg/L		1	0	357			
				2	0	297			
				3	0	361			
Ref.Tox. - Ammonia - TAN	18	mg/L		1	0	356			
				2	0	298			
				3	0	349	↓	↓	
STOCKING DENSITY				1		379	—	4	402
				2		354	—	5	381
				3		410	—	—	—

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Biv NH_3 RT

Assumptions in Model
Stock ammonia concentration is 9,000 mg/L = 9 mg/mL

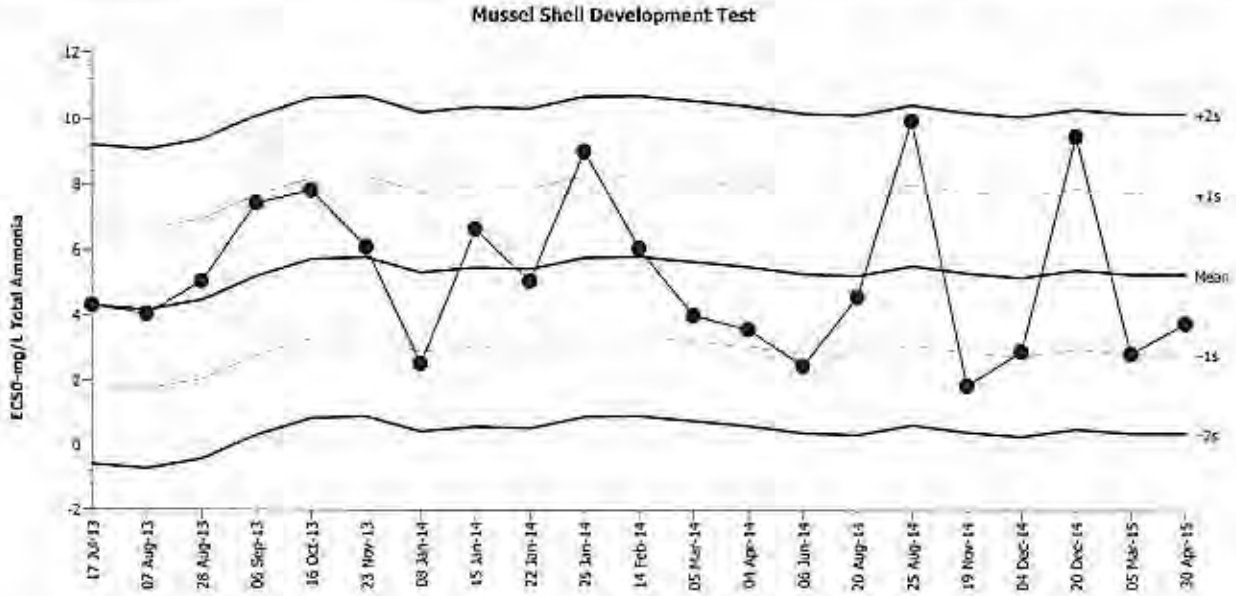
Actual Reading
9327

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	**Desired Concentration**	**Volume**		
mg/L	mg/L	mL	mL stock to increase	
			[redacted]	SALT WATER
0.573	**0.75**	250		**0.030**
1.3	**1.5**	250		**0.060**
2.63	**3**	250		**0.121**
5.36	**6**	250		**0.241**
11.1 ~~12.7~~ ①	**12**	250		**0.482**
20.1	**18**	250		**0.724**

① MR ~~BE~~ 11/19

Mussel Shell Development Test — **All Matching Labs**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



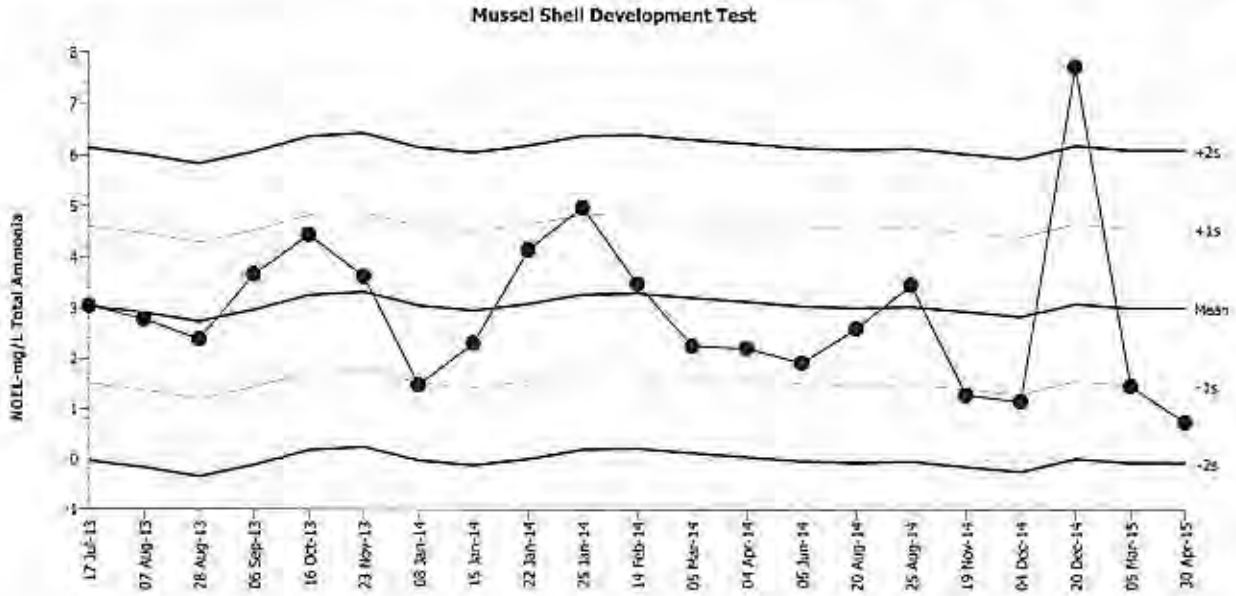
Mean:	5.288	**Count:**	20	**-1s Warning Limit:**	2.844	**-2s Action Limit:**	0.4004
Sigma:	2.444	**CV:**	46.20%	**+1s Warning Limit:**	7.732	**+2s Action Limit:**	10.16

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Jul	17	17:55	4.313	-0.9746	-0.3988			18-2536-1347	00-8750-2223	NewFields
2		Aug	7	19:00	4.051	-1.237	-0.5062			04-7788-4843	09-8595-7999	NewFields
3			28	16:55	5.063	-0.2253	-0.09217			19-6611-9162	04-7207-2891	NewFields
4		Sep	6	18:55	7.413	2.125	0.8695			15-9826-4846	08-5407-1877	NewFields
5		Oct	16	20:15	7.813	2.525	1.033	(+)		06-1596-0976	02-5933-8680	NewFields
6		Nov	23	17:25	6.092	0.8035	0.3288			16-7309-8662	15-4529-5520	NewFields
7	2014	Jan	8	18:22	2.527	-2.761	-1.13	(-)		17-8058-8048	06-8566-9958	NewFields
8			15	18:45	6.625	1.337	0.5469			13-6807-1804	14-8094-6245	NewFields
9			22	18:47	5.072	-0.2159	-0.08836			13-2808-9359	13-2338-2483	NewFields
10			25	20:20	9.018	3.73	1.526	(+)		14-2680-8854	01-2301-1257	NewFields
11		Feb	14	15:45	6.063	0.775	0.3171			00-9581-0604	10-3047-2486	NewFields
12		Mar	5	19:35	4.03	-1.258	-0.5147			00-1473-4954	06-0848-4308	NewFields
13		Apr	4	19:30	3.594	-1.694	-0.6931			00-0374-9463	01-3815-4471	NewFields
14		Jun	6	18:15	2.465	-2.823	-1.155	(-)		06-9491-1560	12-3152-8677	ENVIRON
15		Aug	20	18:55	4.595	-0.6927	-0.2834			03-3666-4351	12-9663-9075	ENVIRON
16			25	19:45	9.954	4.666	1.909	(+)		18-5120-4553	05-8275-9550	ENVIRON
17		Nov	19	17:40	1.863	-3.425	-1.401	(-)		16-6497-0143	19-4546-4847	ENVIRON
18		Dec	4	17:10	2.911	-2.377	-0.9724			16-3776-3251	02-2399-5582	ENVIRON
19			20	14:48	9.463	4.175	1.708	(+)		18-9022-1075	07-2923-3003	ENVIRON
20	2015	Mar	5	17:00	2.844	-2.444	-1			19-9854-1539	03-8736-8673	ENVIRON
21		Apr	30	18:04	3.781	-1.507	-0.6167			20-6119-4159	02-4196-3961	ENVIRON

Mussel Shell Development Test **All Matching Labs**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



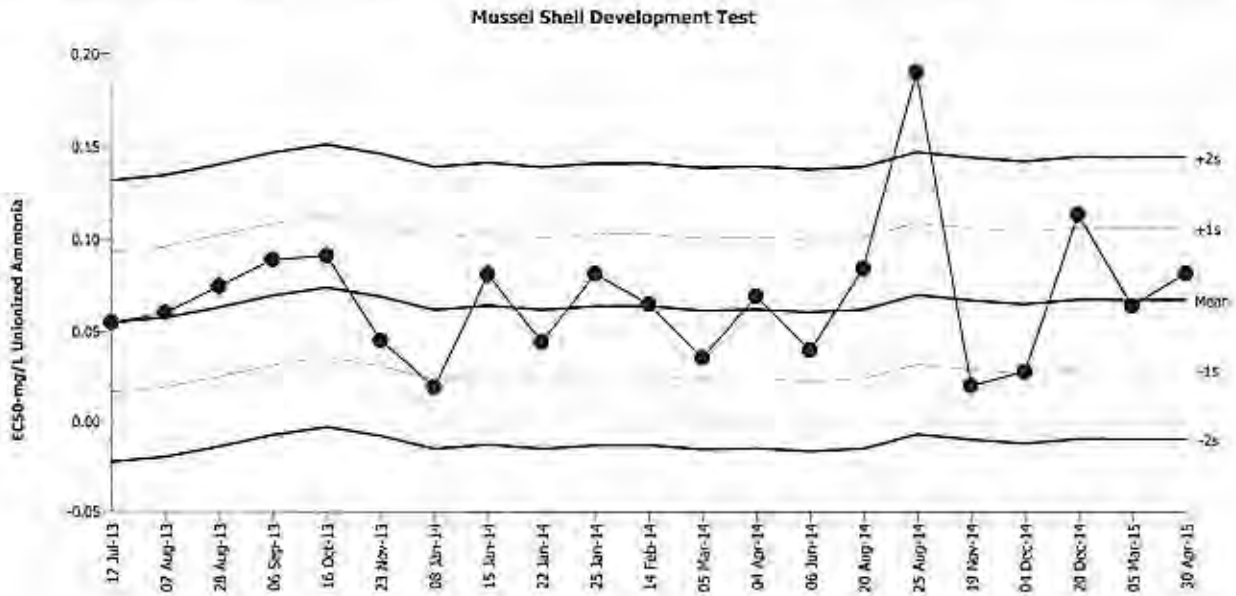
Mean:	3.033	**Count:**	20	**-1s Warning Limit:**	1.488	**-2s Action Limit:**	-0.0573
Sigma:	1.545	**CV:**	50.90%	**+1s Warning Limit:**	4.578	**+2s Action Limit:**	6.123

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Jul	17	17:55	3.05	0.017	0.011			18-2536-1347	04-3468-0815	NewFields
2		Aug	7	19:00	2.79	-0.243	-0.1573			04-7788-4843	18-8631-2521	NewFields
3			28	16:55	2.39	-0.643	-0.4162			19-6611-9162	06-3129-4473	NewFields
4		Sep	6	18:55	3.68	0.647	0.4188			15-9826-4846	11-1511-0674	NewFields
5		Oct	16	20:15	4.445	1.412	0.9139			06-1596-0976	11-9282-8356	NewFields
6		Nov	23	17:25	3.64	0.607	0.3929			16-7309-8662	17-7125-0481	NewFields
7	2014	Jan	8	18:22	1.48	-1.553	-1.005	(-)		17-8058-8048	14-0659-1138	NewFields
8			15	18:45	2.32	-0.713	-0.4615			13-6807-1804	20-8888-7287	NewFields
9			22	18:47	4.16	1.127	0.7294			13-2808-9359	09-9457-8825	NewFields
10			25	20:20	4.99	1.957	1.267	(+)		14-2680-9854	19-4144-0794	NewFields
11		Feb	14	15:45	3.5	0.467	0.3023			00-9581-0604	14-2175-7836	NewFields
12		Mar	5	19:35	2.27	-0.763	-0.4939			00-1473-4954	06-9188-5839	NewFields
13		Apr	4	19:30	2.22	-0.813	-0.5262			00-0374-9463	13-5593-8276	NewFields
14		Jun	6	18:15	1.93	-1.103	-0.7139			06-9491-1560	15-1591-7876	ENVIRON
15		Aug	20	18:55	2.62	-0.413	-0.2673			03-3666-4351	02-5771-3266	ENVIRON
16			25	19:45	3.48	0.447	0.2893			18-5120-4553	02-0328-1110	ENVIRON
17		Nov	19	17:40	1.3	-1.733	-1.122	(-)		16-6497-0143	01-0463-0999	ENVIRON
18		Dec	4	17:10	1.17	-1.863	-1.206	(-)		16-3776-3251	12-6094-6851	ENVIRON
19			20	14:48	7.74	4.707	3.047	(+)	(+)	18-9022-1075	16-5805-5458	ENVIRON
20	2015	Mar	5	17:00	1.48	-1.553	-1.005	(-)		19-9854-1539	01-8753-6379	ENVIRON
21		Apr	30	18:04	0.755	-2.278	-1.474	(-)		20-6119-4159	10-8995-2230	ENVIRON

Mussel Shell Development Test | All Matching Labs

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Unionized Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	0.06769	**Count:**	20	**-1s Warning Limit:**	0.02915	**-2s Action Limit:**	-0.0094
Sigma:	0.03854	**CV:**	56.90%	**+1s Warning Limit:**	0.1062	**+2s Action Limit:**	0.1448

Quality Control Data

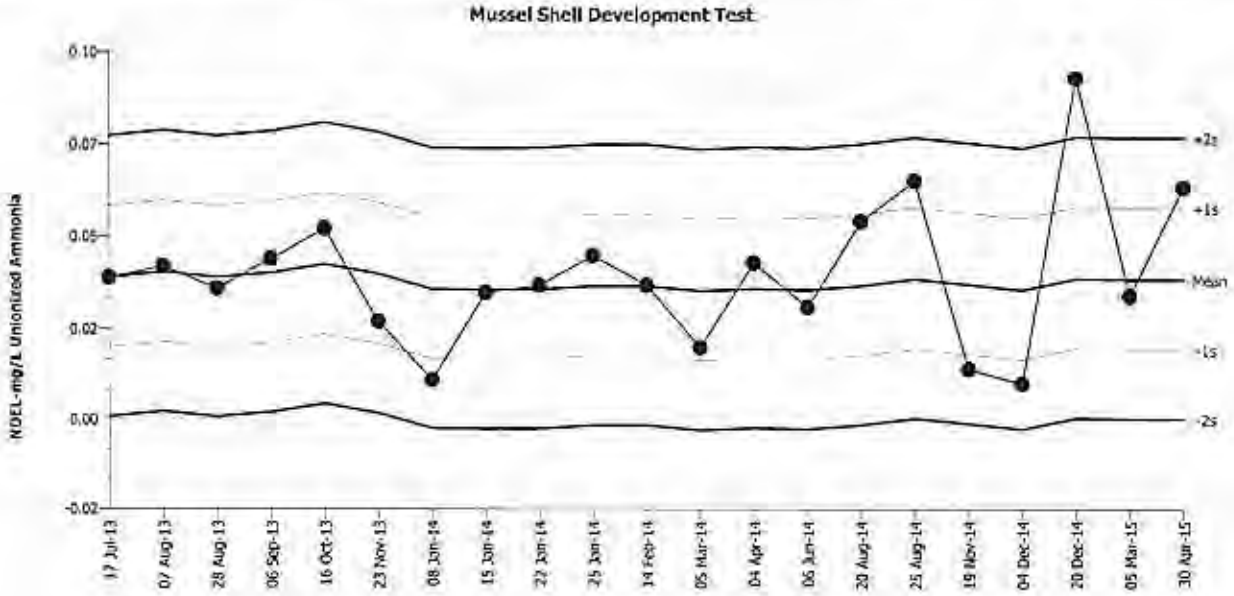
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Jul	17	17:55	0.0548	-0.01289	-0.3345			10-3414-5102	08-1738-2772	NewFields
2		Aug	7	19:00	0.06027	-0.00742	-0.1925			10-7217-0339	06-7338-0554	NewFields
3			28	16:55	0.07491	0.007215	0.1872			19-6745-0030	16-9398-7287	NewFields
4		Sep	6	18:55	0.08923	0.02154	0.5589			20-4996-9287	13-4360-8251	NewFields
5		Oct	16	20:15	0.0914	0.02371	0.6151			08-6327-9927	19-9515-4386	NewFields
6		Nov	23	17:25	0.04496	-0.02273	-0.5898			13-8738-6674	02-5355-5019	NewFields
7	2014	Jan	8	18:22	0.01919	-0.0485	-1.258	(-)		02-3576-5336	17-1917-6754	NewFields
8			15	18:45	0.0814	0.01371	0.3557			06-9099-5939	00-9901-2590	NewFields
9			22	18:47	0.04434	-0.02335	-0.6059			15-7285-0453	02-5494-3481	NewFields
10			25	20:20	0.08179	0.0141	0.3657			04-0859-3739	09-7301-2928	NewFields
11		Feb	14	15:45	0.0653	-0.00239	-0.06197			15-0233-5150	16-5673-1462	NewFields
12		Mar	5	19:35	0.03552	-0.03217	-0.8346			02-2074-6026	13-5083-6151	NewFields
13		Apr	4	19:30	0.06967	0.001983	0.05145			08-9987-7352	06-2075-5011	NewFields
14		Jun	6	18:15	0.03982	-0.02787	-0.7231			20-1079-3686	12-0135-9289	ENVIRON
15		Aug	20	18:55	0.08475	0.01706	0.4426			14-9751-1227	04-1532-7472	ENVIRON
16			25	19:45	0.1905	0.1228	3.186	(+)	(+)	00-8792-7550	08-9753-5531	ENVIRON
17		Nov	19	17:40	0.0203	-0.04739	-1.23	(-)		06-3984-9090	13-7269-9515	ENVIRON
18		Dec	4	17:10	0.02788	-0.03981	-1.033	(-)		12-3986-2462	11-3972-7037	ENVIRON
19			20	14:48	0.1135	0.04577	1.188	(+)		09-9287-5419	07-6460-4486	ENVIRON
20	2015	Mar	5	17:00	0.06436	-0.00333	-0.08632			13-3685-7547	03-1524-4615	ENVIRON
21		Apr	30	18:04	0.08192	0.01423	0.3691			03-9240-3383	09-4512-5047	ENVIRON

CETIS QC Plot

Report Date: 27 May-15 15:18 (1 of 1)

Mussel Shell Development Test — All Matching Labs

Test Type:	Development-Survival	Organism:	Mytilus galloprovincialis (Bay Mussel	Material:	Unionized Ammonia
Protocol:	EPA/600/R-95/136 (1995)	Endpoint:	Combined Proportion Normal	Source:	Reference Toxicant-REF



Mean:	0.03845	Count:	20	-1s Warning Limit:	0.01933	-2s Action Limit:	0.00021
Sigma:	0.01912	CV:	49.70%	+1s Warning Limit:	0.05757	+2s Action Limit:	0.07669

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Jul	17	17:55	0.039	0.00055	0.02877			10-3414-5102	05-6701-2859	NewFields
2		Aug	7	19:00	0.042	0.00355	0.1857			10-7217-0339	15-9321-6181	NewFields
3			28	16:55	0.036	-0.00245	-0.1281			19-6745-0030	11-4907-1298	NewFields
4		Sep	6	18:55	0.044	0.00555	0.2903			20-4996-9287	08-7464-1360	NewFields
5		Oct	16	20:15	0.052	0.01355	0.7087			08-6327-9927	20-4743-8794	NewFields
6		Nov	23	17:25	0.027	-0.01145	-0.5988			13-8738-6674	05-6624-9800	NewFields
7	2014	Jan	8	18:22	0.011	-0.02745	-1.436	(-)		02-3576-5336	15-3876-8049	NewFields
8			15	18:45	0.035	-0.00345	-0.1804			06-9099-5939	01-3042-8920	NewFields
9			22	18:47	0.037	-0.00145	-0.07584			15-7285-0453	12-0010-0113	NewFields
10			25	20:20	0.045	0.00655	0.3426			04-0859-3739	20-3446-9116	NewFields
11		Feb	14	15:45	0.037	-0.00145	-0.07584			15-0233-5150	19-2470-0896	NewFields
12		Mar	5	19:35	0.02	-0.01845	-0.965			02-2074-6026	10-8335-1484	NewFields
13		Apr	4	19:30	0.043	0.00455	0.238			08-9987-7352	01-2582-7818	NewFields
14		Jun	6	18:15	0.031	-0.00745	-0.3896			20-1079-3686	02-2339-8824	ENVIRON
15		Aug	20	18:55	0.054	0.01555	0.8133			14-9751-1227	13-4768-2245	ENVIRON
16			25	19:45	0.065	0.02655	1.389	(+)		00-8792-7550	14-4895-9621	ENVIRON
17		Nov	19	17:40	0.014	-0.02445	-1.279	(-)		06-3984-9090	04-2355-4660	ENVIRON
18		Dec	4	17:10	0.01	-0.02845	-1.488	(-)		12-3986-2462	15-5042-0469	ENVIRON
19			20	14:48	0.093	0.05455	2.853	(+)	(+)	09-9287-5419	18-5647-4199	ENVIRON
20	2015	Mar	5	17:00	0.034	-0.00445	-0.2327			13-3685-7547	15-2807-2719	ENVIRON
21		Apr	30	18:04	0.063	0.02455	1.284	(+)		03-9240-3383	00-2807-5882	ENVIRON

Mussel Shell Development Test ENVIRON

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-0732-0588	Combined Proportion Norm	2.94	5.73	4.104	10.2%		Dunnett Multiple Comparison Test
00-7019-4496	Proportion Survived	11	14.7	12.72	NA		Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
02-4196-3961	Combined Proportion Norm	EC50	3.781	3.717	3.846		Trimmed Spearman-Karber
04-8756-4921	Proportion Survived	EC50	12.59	12.49	12.7		Trimmed Spearman-Karber

Combined Proportion Normal Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9872	0.932	1	0.9615	1	0.01282	0.02221	2.25%	0.0%
0.755		3	0.9808	0.898	1	0.9423	1	0.01923	0.03331	3.4%	0.65%
1.52		3	0.9333	0.7822	1	0.8808	1	0.03513	0.06085	6.52%	5.46%
2.94		3	0.909	0.7222	1	0.8462	0.9923	0.04342	0.07521	8.27%	7.92%
5.73		3	0.003846	0.003846	0.003846	0.003846	0.003846	0	0	0.0%	99.61%
11		3	0	0	0	0	0	0	0		100.0%
14.7		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9897	0.9456	1	0.9692	1	0.01026	0.01776	1.8%	0.0%
0.755		3	0.9846	0.9184	1	0.9538	1	0.01538	0.02665	2.71%	0.52%
1.52		3	0.941	0.8018	1	0.8885	1	0.03236	0.05604	5.96%	4.92%
2.94		3	0.9859	0.9252	1	0.9577	1	0.0141	0.02443	2.48%	0.39%
5.73		3	0.9974	0.9864	1	0.9923	1	0.002564	0.004441	0.45%	-0.78%
11		3	1	1	1	1	1	0	0	0.0%	-1.04%
14.7		3	0	0	0	0	0	0	0		100.0%

CETIS Test Data Worksheet

Mussel Shell Development Test				ENVIRON
Start Date: 30 Apr-15 18:04	Species: Mytilus galloprovincialis	Sample Code: 2E6BEE2A		
End Date: 02 May-15 17:05	Protocol: EPA/600/R-95/136 (1995)	Sample Source: Reference Toxicant		
Sample Date: 05 May-14	Material: Total Ammonia	Sample Station: P140505.101		

C-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	3	260	269	269	266	
0	D	2	7	260	274	274	271	
0	D	3	8	260	252	252	250	
0.755		1	11	260	275	275	271	
0.755		2	6	260	280	280	277	
0.755		3	19	260	248	248	245	
1.52		1	16	260	231	231	229	
1.52		2	1	260	243	243	239	
1.52		3	18	260	286	286	285	
2.94		1	5	260	269	269	231	
2.94		2	10	260	249	249	220	
2.94		3	15	260	292	292	258	
5.73		1	20	260	258	258	1	
5.73		2	17	260	266	266	1	
5.73		3	12	260	276	276	1	
11		1	9	260	282	282	0	
11		2	2	260	289	289	0	
11		3	14	260	306	306	0	
14.7		1	21	260	0	0	0	
14.7		2	4	260	0	0	0	
14.7		3	13	260	0	0	0	

Mussel Shell Development Test

ENVIRON

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-2807-5862	Combined Proportion Norm	0.063	0.126	0.0891	10.2%		Dunnett Multiple Comparison Test
02-5945-0030	Proportion Survived	0.239	0.339	0.2846	6.48%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
09-4512-5047	Combined Proportion Norm	EC50	0.08192	0.0805	0.08336		Trimmed Spearman-Kärber
09-7508-7178	Proportion Survived	EC50	0.2818	0.2793	0.2843		Trimmed Spearman-Kärber

Combined Proportion Normal Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9872	0.932	1	0.9615	1	0.01282	0.02221	2.25%	0.0%
0.016		3	0.9808	0.898	1	0.9423	1	0.01923	0.03331	3.4%	0.65%
0.032		3	0.9333	0.7822	1	0.8808	1	0.03513	0.06085	6.52%	5.46%
0.063		3	0.909	0.7222	1	0.8462	0.9923	0.04342	0.07521	8.27%	7.92%
0.126		3	0.003846	0.003846	0.003846	0.003846	0.003846	0	0	0.0%	99.61%
0.239		3	0	0	0	0	0	0	0		100.0%
0.339		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9897	0.9456	1	0.9692	1	0.01026	0.01776	1.8%	0.0%
0.016		3	0.9846	0.9184	1	0.9538	1	0.01538	0.02665	2.71%	0.52%
0.032		3	0.941	0.8018	1	0.8885	1	0.03236	0.05604	5.96%	4.92%
0.063		3	0.9859	0.9252	1	0.9577	1	0.0141	0.02443	2.48%	0.39%
0.126		3	0.9974	0.9864	1	0.9923	1	0.002564	0.004441	0.45%	-0.78%
0.239		3	1	1	1	1	1	0	0	0.0%	-1.04%
0.339		3	0	0	0	0	0	0	0		100.0%

CETIS Test Data Worksheet

Mussel Shell Development Test — **ENVIRON**

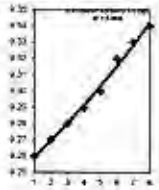
Start Date:	30 Apr-15 18:04	Species:	Mytilus galloprovincialis
End Date:	02 May-15 17:05	Protocol:	EPA/600/R-95/136 (1995)
Sample Date:	05 May-14	Material:	Unionized Ammonia
Sample Code:	26B3016E		
Sample Source:	Reference Toxicant		
Sample Station:	P140505.101		

C-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	19	260	269	269	266	
0	D	2	9	260	274	274	271	
0	D	3	20	260	252	252	250	
0.016		1	4	260	275	275	271	
0.016		2	16	260	280	280	277	
0.016		3	17	260	248	248	245	
0.032		1	6	260	231	231	229	
0.032		2	2	260	243	243	239	
0.032		3	21	260	286	286	285	
0.063		1	13	260	269	269	231	
0.063		2	12	260	249	249	220	
0.063		3	7	260	292	292	258	
0.126		1	15	260	258	258	1	
0.126		2	8	260	266	266	1	
0.126		3	3	260	276	276	1	
0.239		1	18	260	282	282	0	
0.239		2	10	260	289	289	0	
0.239		3	14	260	306	306	0	
0.339		1	1	260	0	0	0	
0.339		2	5	260	0	0	0	
0.339		3	11	260	0	0	0	

CLIENT:	POLA	Date of Test:	30-Apr-15
PROJECT:	Everport	Test Type:	Bivalve RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer:	I-factor
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	I-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1										
2										
3										
4	0.75		0.755	29	8.0	14.0	287.16	9.3214		0.016
5	1.5		1.52	29	8.0	14.2	287.36	9.3214		0.032
6	3		2.94	29	8.0	14.5	287.66	9.3214		0.063
7	6		5.73	29	8.0	14.8	287.96	9.3214		0.126
8	12		11.000	29	8.0	14.6	287.76	9.3214		0.239
9	18		14.700	29	8.0	15.4	288.56	9.3214		0.339
10										
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ENVIRON

LARVAL DEVELOPMENT TEST
AMMONIA REF TOX WQ

CLIENT	PROJECT	SPECIES	LAB / LOCATION		PROTOCOL
POLA	Everport	*Mytilus sp*	Port Gamble / Incubator		PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE:	TIME	TEST END DATE	TIME
	D. Moore	30Apr15	1804	2 May 15	1705
TEST ID	LOT #:				
P140505.101	3244 C535				

WATER QUALITY DATA

DILTN WAT BATCH	ORGANISM DATCH	REFERENCE TOX. MATERIAL	REFERENCE TOXICANT
0		Ammonium chloride	Ammonia - TAN

CLIENT/ ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	DO (mg/L) >5.0 D.O. meter	DO (mg/L) >5.0 D.O. mg/L	TEMP(C) 16 ± 1 TEMP. meter	TEMP(C) 16 ± 1 TEMP. °C	SAL (ppt) 28 ± 1 SALINITY meter	SAL (ppt) 28 ± 1 SALINITY ppt	pH 7 - 9 pH meter	pH 7 - 9 pH unit	TECH.	DATE
Ref.Tox.-Ammonia - TAN	Target: 0	mg/L	0	Stock	8	8.3	8	14.1	8	29	8	8.1	[illegible]	4/30
			1	Stock	9	7.9	9	15.9	9	29	9	7.9	JL	5/01
	Actual: 0.00		2	Stock	9	8.0	9	15.8	9	29	9	8.0	JL	5/02
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target: 0.75	mg/L	0	Stock	8	8.3	8	14.0	8	29	8	8.0	[illegible]	4/30
			1	Stock	9	8.0	9	15.8	9	29	9	7.9	JL	5/01
	Actual: 0.755		2	Stock	9	8.0	9	15.7	9	29	9	8.0	JL	5/02
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target: 1.5	mg/L	0	Stock	8	8.3	8	14.2	8	29	8	8.0	[illegible]	4/30
			1	Stock	9	8.1	9	15.8	9	29	9	7.9	JL	5/01
	Actual: 1.52		2	Stock	9	8.0	9	15.7	9	29	9	8.0	JL	5/02
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target: 3	mg/L	0	Stock	8	8.3	8	14.5	8	29	8	8.0	[illegible]	4/30
			1	Stock	9	8.1	9	15.7	9	29	9	7.9	JL	5/01
	Actual: 2.94		2	Stock	9	8.0	9	15.7	9	29	9	8.0	JL	5/02
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target: 6	mg/L	0	Stock	8	8.1	8	14.8	8	29	8	8.0	[illegible]	4/30
			1	Stock	9	8.1	9	15.7	9	29	9	7.9	JL	5/01
	Actual: 5.73		2	Stock	9	8.0	9	15.7	9	29	9	8.0	JL	5/02
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target: 12	mg/L	0	Stock	8	8.1	8	14.6	8	29	8	8.0	[illegible]	4/30
			1	Stock	9	8.1	9	15.7	9	29	9	7.9	JL	5/01
	Actual: 11.0		2	Stock	9	8.0	9	15.7	9	30	9	7.9	JL	5/02
			3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target: 18	mg/L	0	Stock	8	7.3	8	15.4	8	29	8	7.8	[illegible]	4/30
			1	Stock	9	8.0	9	15.8	9	29	9	7.9	JL	5/01
	Actual: 14.7		2	Stock	9	8.0	9	15.6	9	29	9	7.9	JL	5/02
			3	Stock										
			4	Stock										

ENVIRON

LARVAL DEVELOPMENT TEST
AMMONIA REF TOX OBSERVATION SHEET

SPECIES					
Mytilus sp					
CLIENT	**PROJECT**	**JOB NUMBER**	**PROJECT MANAGER**	**LAB / LOCATION**	**PROTOCOL**
POLA	Everport	—	0	Port Gamble / Incubator	PSEP (1995)

TEST ID	ORGANISM BATCH	TEST START DATE:	TIME	TEST END DATE:	TIME
P140505.101	T57462	4/30/15	1804	5/02/15	1705

LARVAL OBSERVATION DATA

CLIENT/ ID	CONC. value	CONC. units	VIAL NUMBER	REP	NUMBER NORMAL	NUMBER ABNORMAL	DATE	TECHNICIAN	COMMENTS
Ref.Tox. - Ammonia - TAN	0	mg/L		1	266	3	5/5/15	CR	
				2	271	3	↓	↓	
				3	250	2	↓	↓	
Ref.Tox. - Ammonia - TAN	0.75	mg/L		1	271	4	↓	↓	
				2	277	3	↓	↓	
				3	245	3	↓	↓	
Ref.Tox. - Ammonia - TAN	1.5	mg/L		1	229	2	↓	↓	
				2	239	4	↓	↓	
				3	285	1	↓	↓	
Ref.Tox. - Ammonia - TAN	3	mg/L		1	231	38	↓	↓	
				2	220	29	↓	↓	
				3	258	34	↓	↓	
Ref.Tox. - Ammonia - TAN	6	mg/L		1	1	257	↓	↓	
				2	1	265	↓	↓	
				3	1	275	↓	↓	
Ref.Tox. - Ammonia - TAN	12	mg/L		1	0	282	↓	↓	
				2	0	289	↓	↓	
				3	0	306	↓	↓	
Ref.Tox. - Ammonia - TAN	18	mg/L		1	—	—	↓	↓	
				2	—	—	↓	↓	
				3	—	—	↓	↓	

STOCKING DENSITY		1	—	275	5/5/15	CR	
		2	—	262	↓	↓	
		3	—	244	↓	↓	
		4	—	279	↓	↓	
		5	—	261	↓	↓	
		6	—	240	↓	↓	

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Reference Toxicant ID: P140505.101
Date Prepared: 4130115
Technician Initials: BKL

Mytilus NH_3 RT

Assumptions in Model
Stock ammonia concentration is 9,000 mg/L = 9 mg/mL

Actual Reading
7910

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	Desired Concentration	Volume		
mg/L	mg/L	mL	mL stock to increase	
			[redacted]	SALT WATER (mL)
14.7	16	250		0.759
11.0	12	250		0.569
5.73	6	250		0.284
2.94	3	250		0.142
1.52	1.5	250		0.071
0.755	0.75	250		0.036

APPENDIX B-7.4 *Ampelisca abdita* Benthic Test

ENVIRON

10 DAY SOLID PHASE TEST DATA

CLIENT	PROJECT	ENVIRON JOB N0.	PROJECT MAN.	ENVIRON LAB	PROTOCOL	SPECIES
ENVIRON	Everport	0	Brian Hester	Port Gamble Bath 9	USEPA/USCOE 1991	*Ampelisca abdida*

ENDPOINT DATA & OBSERVATIONS

#S= Number on the Surface FOS= Floating on water surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows

INITIAL # OF ORGANISMS: 20

CLIENT/ ENVIRON ID	REP	JAR #	INITIAL #	DAY 1 OBSERVNS.	DAY 2 OBSERVNS.	DAY 3 OBSERVNS.	DAY 4 OBSERVNS.	DAY 5 OBSERVNS.	DAY 6 OBSERVNS.	DAY 7 OBSERVNS.	DAY 8 OBSERVNS.	DAY 9 OBSERVNS.	DAY 10 OBSERVNS.	NUMBER REMAINING
				DATE 11/15	DATE 11/16	DATE 11/17	DATE 11/18	DATE 11/19/14	DATE 11/20/14	DATE 11/21/14	DATE 11/22/14	DATE 11/23	DATE 11/24	
				TECHNICIAN JL	TECHNICIAN JL	TECHNICIAN MK	TECHNICIAN [illegible]	TECHNICIAN KMB	TECHNICIAN [illegible]	TECHNICIAN KMB	TECHNICIAN [illegible]	TECHNICIAN JL	TECHNICIAN MK	
Control /	1	2		N	N	N	N	N	N	N	N	N	N	20
	2	7												20
	3	15												19
	4	4			1FOS								1F	19
	5	14			N								N	19
Ref-DMMU-2 /	1	3		1FOS										18
	2	11		N										20
	3	10			1FOS									19
	4	8			N									19
	5	9												18
DMMU-2 /	1	6												17(1)
	2	12				1FOS								17(1)
	3	5		1FOS		N								14(3)
	4	13		N			1FOS							17(2)
	5	1					N		1FOS					14

ENVIRON

10 DAY SOLID PHASE TEST DATA

PROTOCOL
USEPA/USCOE 1991

CLIENT	PROJECT	SPECIES	TEST START DATE	TEST START DATE	TEST END DATE
ENVIRON	Everport	*Ampelisca abdida*	Port Gamble	14Nov14	24Nov14
ENVIRON JOB NUMBER	**PROJECT MANAGER**	**ENVIRON LABORATORY**	**DILUTION WATER BATCH**	**START TIME**	**END TIME**
0	Brian Hester	Port Gamble	FSW111314.01	—	—

WATER QUALITY DATA

TEST CONDITIONS			D.O. (mg/L) > 4.5		TEMP (°C) 20 ± 1		SALINITY (ppt) 30 ± 2		pH (pH units) 7.8 ± 0.5		TECH.	Date
			D.O.		TEMP		SALINITY		pH			
CLIENT/ENVIRON ID	DAY	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit		
Control /	0	1	8	7.6	8	19.5	8	31	8	7.9	JL	11/14/14
Control /	0	2		7.7		19.5		30		8.0		
Control /	0	3		7.7		19.5		30		8.0		
Control /	0	4		7.6		19.5		30		8.0		
Control /	0	5		7.7		19.5		30		8.0		
Control /	1	1	8	7.6	8	20.2	8	31	8	8.0	JL	11/15
Control /	2	2	8	7.7	8	20.2	8	30	8	8.1	JL	11/16
Control /	3	3	8	7.5	8	20.2	8	① ~~35~~ 31	8	8.0	KB	11/17
Control /	4	4	8	7.3	8	20.1	8	31	8	7.8	[illegible]	11/18
Control /	5	5	8	7.5	8	19.5	8	31	8	7.9	KMB	11/19/14
Control /	6	1	8	7.5	8	20.3	8	31	8	8.1	JL	11/20
Control /	7	2	8	7.3	8	20.1	8	32	8	~~32~~ 8.1	KB	11/21
Control /	8	3	8	7.4	8	20.2	8	31	8	8.0	[illegible]	11/22
Control /	9	4	8	7.7	8	20.0	8	32	8	8.2	JL	11/23
Control /	10	1	8	7.7	8	20.1	8	31	8	7.9	KMB	11/24
Control /	10	2		7.6		~~30~~ 20.2 ③		31		7.9		
Control /	10	3		7.6		20.2		30		8.0		
Control /	10	4		7.6		20.2		30		7.9		
Control /	10	5		7.6		20.2		31		8.0		

① DMR. Meter recal due to suspected deviation KMB. 11/17/14

② WC. KB. 11/21/14

③ WC. KB. 11/24/14

ENVIRON

10 DAY SOLID PHASE TEST DATA

					PROTOCOL: USEPA/USCOE 1991
CLIENT: ENVIRON	PROJECT: Everport	SPECIES: *Ampelisca abdida*	TEST START DATE: Port Gamble	TEST START DATE: 14Nov14	TEST END DATE: 24Nov14
ENVIRON JOB NUMBER: 0	PROJECT MANAGER: Brian Hester	ENVIRON LABORATORY: Port Gamble	DILUTION WATER BATCH: FSW111314.01	START TIME: —	END TIME: —

WATER QUALITY DATA

TEST CONDITIONS			D.O. (mg/L) > 4.5		TEMP (°C) 20 ± 1		SALINITY (ppt) 30 ± 2		pH (pH units) 7.8 ± 0.5		TECH.	Date
			D.O.		TEMP		SALINITY		pH			
CLIENT/ENVIRON ID	DAY	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit		
Ref-DMMU-2 /	0	1	8	7.7	8	20.0	8	30	8	8.1	JL	11/14/14
Ref-DMMU-2 /	0	2	|	7.6	|	20.0	|	31	|	8.1	|	|
Ref-DMMU-2 /	0	3	|	7.6	|	20.0	|	31	|	8.1	|	|
Ref-DMMU-2 /	0	4	|	7.6	|	20.0	|	31	|	8.1	|	|
Ref-DMMU-2 /	0	5	↓	7.6	↓	20.0	↓	30	↓	8.1	↓	↓
Ref-DMMU-2 /	1	1	8	7.7	8	20.2	8	31	8	8.0	JL	11/15
Ref-DMMU-2 /	2	2	8	7.7	8	20.2	8	31	8	8.1	JL	11/16
Ref-DMMU-2 /	3	3	8	7.5	8	20.2	8	① ~~33~~ 31	8	8.1	KB	11/17
Ref-DMMU-2 /	4	4	8	7.6	8	20.1	8	32	8	8.1	[illegible]	11/18
Ref-DMMU-2 /	5	5	8	7.4	8	19.3	8	32	8	8.0	KMB	11/19/14
Ref-DMMU-2 /	6	1	8	7.5	8	20.2	8	32	8	8.2	JL	11/20
Ref-DMMU-2 /	7	2	8	7.4	8	20.2	8	32	8	8.1	KB	11/21
Ref-DMMU-2 /	8	3	8	7.3	8	20.2	8	32	8	8.1	[illegible]	11/22
Ref-DMMU-2 /	9	4	8	7.8	8	19.5	8	32	8	8.2	JL	11/23
Ref-DMMU-2 /	10	1	8	7.6	8	20.1	8	31	8	8.1	KMB	11/24/14
Ref-DMMU-2 /	10	2	|	~~7.7~~	|	20.1	|	31	|	8.1	|	|
Ref-DMMU-2 /	10	3	|	7.6	|	20.1	|	31	|	8.0	|	|
Ref-DMMU-2 /	10	4	|	7.6	|	20.2	|	31	|	8.0	|	|
Ref-DMMU-2 /	10	5	↓	7.6	↓	20.1	↓	31	↓	8.0	↓	↓

① see note ① on pg 1. KMB 11/17/14

ENVIRON

10 DAY SOLID PHASE TEST DATA

PROTOCOL					
					USEPA/USCOE 1991
CLIENT	PROJECT	SPECIES	TEST START DATE	TEST START DATE	TEST END DATE
ENVIRON	Everport	*Ampelisca abdida*	Port Gamble	14Nov14	24Nov14
ENVIRON JOB NUMBER	PROJECT MANAGER	ENVIRON LABORATORY	DILUTION WATER BATCH	START TIME	END TIME
0	Brian Hester	Port Gamble	FSW111314.01	✓	—

WATER QUALITY DATA

TEST CONDITIONS			D.O. (mg/L) > 4.5		TEMP (°C) 20 ± 1		SALINITY (ppt) 30 ± 2		pH (pH units) 7.8 ± 0.5		TECH.	Date
			D.O.		TEMP		SALINITY		pH			
CLIENT/ENVIRON ID	DAY	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit		
DMMU-2 /	0	1	8	7.6	8	20.1	8	31	8	8.1	JL	11/14/14
DMMU-2 /	0	2	↓	7.6	↓	19.9	↓	31	↓	8.1	↓	↓
DMMU-2 /	0	3	↓	7.6	↓	20.0	↓	31	↓	8.1	↓	↓
DMMU-2 /	0	4	↓	7.6	↓	20.0	↓	31	↓	8.1	↓	↓
DMMU-2 /	0	5	↓	7.6	↓	20.1	↓	31	↓	8.1	↓	↓
DMMU-2 /	1	1	8	7.6	8	20.0	8	31	8	8.0	JL	11/15
DMMU-2 /	2	2	8	7.6	8	20.1	8	31	8	8.1	JL	11/16
DMMU-2 /	3	3	8	7.4	8	20.1	8	① ~~33~~ 31	8	8.1	KB	11/17
DMMU-2 /	4	4	8	7.5	8	20.2	8	32	8	8.0	[illegible]	11/18
DMMU-2 /	5	5	8	7.3	8	19.5	8	31	8	7.9	KMB	11/19/14
DMMU-2 /	6	1	8	7.6	8	20.3	8	~~32~~ 31	8	② 8.0 ~~8.2~~	JL	11/20
DMMU-2 /	7	2	8	7.3	8	20.2	8	31	8	8.0	KB	11/21
DMMU-2 /	8	3	8	7.2	8	20.1	8	32	8	7.9	[illegible]	11/22
DMMU-2 /	9	4	8	7.6	8	20.1	8	32	8	8.0	JL	11/23
DMMU-2 /	10	1	8	7.6	8	20.1	8	31	8	7.9	KB	11/24
DMMU-2 /	10	2	↓	7.6	↓	20.2	↓	31	↓	7.9	↓	↓
DMMU-2 /	10	3	↓	7.5	↓	20.1	↓	31	↓	7.8	↓	↓
DMMU-2 /	10	4	↓	7.5	↓	20.1	↓	32	↓	7.9	↓	↓
DMMU-2 /	10	5	↓	7.6	↓	20.1	↓	32	↓	7.9	↓	↓

① See note ① on page 1 - KMB 11/17/14 ② WP. JL 11/20/14.

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
Everport	Amp	10

PRETEST / ~~INITIAL~~ / FINAL / OTHER ~~(circle one)~~ DAY of TEST: ∅

OVERLYING (OV) / ~~POREWATER (PW)~~ (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
11/14/14	21.6°C	

	Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
OV	∅	OV	11/14/14 KMB	0.0	21.3	11/14/14 KMB	N			
↓	Ref DMMU-2	↓	↓	0.0	21.5	↓	↓			
↓	DMMU-2	↓	↓	0.836	21.1	↓	↓			
PW	∅	PW	11/14/14 MK	1.24	21.1	11/14/14 KMB↑ HE	N	7.6	29	
↓	Ref DMMU-2	↓	↓	1.16	22.1	↓	↓	7.8	30	
↓	DMMU-2	↓	↓	0.263	22.1	↓	↓	7.9	30	

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
Everport	Ampelisca	10

PRETEST / INITIAL / (FINAL) / OTHER (circle one) DAY of TEST: 10

(OVERLYING (OV)) / (POREWATER (PW)) (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
11/24/14	21.8	

	Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
OV ↓	Control		11/24/14 MK	0.00	21.0	11/24/14 MK	N			
	Ref-DMMU-2		↓	1.03	21.1	↓	↓			
	DMMU-2		↓	0.332	20.9	↓	↓			
PW ↓	Control		11/24/14 MK	1.02	22.0	11/24/14 MK	N	7.5	31	
	Ref-DMMU-2		↓	1.49	22.2	↓	↓	7.7	32	
	DMMU-2		↓	0.839	22.2	↓	↓	7.8	31	

ENVIRON

ORGANISM RECEIPT LOG

Date: 11/13/14	Time: 1405	Batch No. JB 6459
Organism / Project: Amps / Evnport	Source: Brazina & Assoc.	
Address: On File		Invoice Attached: Yes (No)
Phone: On File	Contact: On File	
No. Ordered:	No. Received:	Source Batch: Field
Condition of Organisms: Good	Approximate Size or Age: Adult	
Shipper: FedEx	B of L (Tracking No.) 8043 2695 6459	
Condition of Container: Good	Received By: MMS	

Container	D.O. (mg/L)	Temp. (°C)	Conductivity or (Salinity) (Include Units)	pH (Units)	Technician (Initials)
1	23.8	14.6	30 ppt	7.4	MMS

Notes:

ENVIRON

10 DAY SOLID PHASE TEST DATA

CLIENT	PROJECT	ENVIRON JOB N0.	PROJECT MAN.	ENVIRON LAB	PROTOCOL	SPECIES
POLA	Everport	0433310A05	David Moore	Port Gamble	USEPA/USCOE 1991	*Ampelisca abdita*

ENDPOINT DATA & OBSERVATIONS

#S= Number on Sediment Surface
#FOS= Number Floating on Water Surface
#M= Number of Mortality
#E= Number Emerged from Sediment, Free Swimming
L=Anoxic Surface
G=Growth (Algal, Bacterial, Fungal)
D=No Air Flow (DO?)
U=Excess food
N=Normal
"=No Burrows

INITIAL # OF ORGANISMS: 20

CLIENT/ ENVIRON ID	REP	JAR #	INITIAL #	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	NUMBER REMAINING
				DATE 4/10	DATE 4/11	DATE 4/12	DATE 4/13	DATE 4/14	DATE 4/15	DATE 4/16	DATE 4/17	DATE 4/18	DATE 4/19	
				TECHNICIAN CR	TECHNICIAN JL	TECHNICIAN JL	TECHNICIAN	TECHNICIAN	TECHNICIAN MK	TECHNICIAN	TECHNICIAN MK	TECHNICIAN	TECHNICIAN	
				OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	
Control /	1			N	N	N	N	N	N	N	N	N	N	20
	2													20
	3													20
	4													19
	5													18
DMMU-1-REF /	1													19
	2													20
	3													18
	4													19
	5													20
DMMU-1 /	1													18
	2													20
	3													20
	4													20
	5													20

ENVIRON

10 DAY SOLID PHASE TEST DATA

PROTOCOL
USEPA/USCOE 1991

CLIENT	PROJECT	SPECIES	TEST START DATE	TEST START DATE	TEST END DATE
POLA	Everport	*Ampelisca abdita*	Port Gamble	09Apr15	19Apr15
ENVIRON JOB NUMBER	**PROJECT MANAGER**	**ENVIRON LABORATORY**	**DILUTION WATER BATCH**	**START TIME**	**END TIME**
0433310A05	David Moore	Port Gamble	FSW040815.01	1240	1500

WATER QUALITY DATA

TEST CONDITIONS			D.O. (mg/L) > 4.6		TEMP (°C) 20 ± 2		SALINITY (ppt) 28 ± 2		pH (pH units) 7.8 ± 0.5		TECH.	Date
			D.O.		TEMP		SALINITY		pH			
CLIENT/ENVIRON ID	DAY	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit		
Control /	0	1	8	7.8	8	19.7	8	29	8	8.0	MK	4/9/15
Control /	0	2		7.6		19.7		29		8.0		
Control /	0	3		7.6		20.4		29		7.8		
Control /	0	4		7.5		20.4		29		7.8		
Control /	0	5	↓	7.8	↓	19.6	↓	29	↓	7.9	↓	↓
Control /	1	1	9	7.5	9	19.4	9	29	9	8.0	JL	4/10/15
Control /	2	2	9	7.5	9	19.8	9	29	9	8.1	JL	4/11
Control /	3	3	9	7.5	9	20.5	9	29	9	8.0	JL	4/12
Control /	4	4	8	7.6	8	20.8	8	29	8	8.0	[illegible]	4/13
Control /	5	5	8	7.5	8	20.5	8	29	8	7.9	[illegible]	4/14
Control /	6	1	9	7.6	9	19.9	9	29	9	8.1	MK	4/15
Control /	7	2	8	7.5	8	20.7	8	30	8	8.0	MK	4/16
Control /	8	3	9	7.4	9	20.7	9	29	9	8.1	[illegible]	4/17
Control /	9	4	9	7.5	9	20.6	9	29	9	8.1	[illegible]	4/18
Control /	10	1	9	7.4	9	20.5	9	29	9	8.1	[illegible]	4/19
Control /	10	2		7.4		20.6		29		8.1		
Control /	10	3		7.4		20.7		29		8.1		
Control /	10	4		7.3		20.8		29		8.0		
Control /	10	5	↓	7.3	↓	20.6	↓	29	↓	8.1	↓	↓

ENVIRON

10 DAY SOLID PHASE TEST DATA

PROTOCOL					
					USEPA/USCOE 1991
CLIENT	PROJECT	SPECIES	TEST START DATE	TEST START DATE	TEST END DATE
POLA	Everport	*Ampelisca abdita*	Port Gamble	09Apr15	19Apr15
ENVIRON JOB NUMBER	PROJECT MANAGER	ENVIRON LABORATORY	DILUTION WATER BATCH	START TIME	END TIME
0433310A05	David Moore	Port Gamble	FSW040815.01	1240	1500

WATER QUALITY DATA

TEST CONDITIONS			D.O. (mg/L) > 4.6		TEMP (°C) 20 ± 2		SALINITY (ppt) 28 ± 2		pH (pH units) 7.8 ± 0.5		TECH.	Date
CLIENT/ENVIRON ID	DAY	REP	D.O.		TEMP		SALINITY		pH			
			meter	mg/L	meter	°C	meter	ppt	meter	unit		
DMMU-1-REF /	0	1	8	7.7	8	① ~~20.5~~ 20.3	8	30	8	① ~~7.9~~ 8.1	MK	4/9/15
DMMU-1-REF /	0	2	↓	7.7	↓	① ~~20.2~~ 20.0	↓	30	↓	8.0	↓	↓
DMMU-1-REF /	0	3		7.7		① ~~20.5~~ 20.3		30		8.0		
DMMU-1-REF /	0	4		① ~~7.7~~ 7.8		① ~~20.4~~ 20.3		30		8.0		
DMMU-1-REF /	0	5	↓	① ~~7.5~~ 7.6	↓	20.1	↓	30	↓	① ~~7.9~~ 8.1	↓	↓
DMMU-1-REF /	1	1	9	~~7.4~~ ~~7.5~~ ②	9	20.0	9	30	9	8.1 ~~7.9~~ ②	JL	4/10/15
DMMU-1-REF /	2	2	9	7.5	9	20.2	9	30	9	8.1	JL	4/11
DMMU-1-REF /	3	3	9	7.4	9	20.1	9	30	9	8.1	JL	4/12
DMMU-1-REF /	4	4	8	7.6	8	20.8	8	30	8	8.0	~~MK~~	4/13
DMMU-1-REF /	5	5	8	7.6	8	20.5	8	31	8	8.1	~~MK~~	4/14
DMMU-1-REF /	6	1	9	7.8	9	20.1	9	31	9	8.2	MK	4/15
DMMU-1-REF /	7	2	8	7.5	8	20.6	8	③ ~~30~~ 31	8	③ ~~8.0~~ 8.1	MK	4/16
DMMU-1-REF /	8	3	9	7.4	9	20.5	9	30	9	8.1	~~MK~~	4/17
DMMU-1-REF /	9	4	9	7.4	9	20.1	9	31	9	8.0	~~MK~~	4/18
DMMU-1-REF /	10	1	9	7.3	9	20.8	9	31	9	8.1	~~MK~~	4/19
DMMU-1-REF /	10	2	↓	7.4	↓	20.4	↓	30	↓	8.2	↓	↓
DMMU-1-REF /	10	3		7.3		20.7		30		8.1		
DMMU-1-REF /	10	4		7.4		20.4		30		8.1		
DMMU-1-REF /	10	5	↓	7.4	↓	20.8	↓	31	↓	8.2	↓	↓

① WP. MK 4/9. ② WP. JL 4/10/15. ③ WC. MK 4/16.

ENVIRON

10 DAY SOLID PHASE TEST DATA

PROTOCOL					
					USEPA/USCOE 1991
CLIENT	PROJECT	SPECIES	TEST START DATE	TEST START DATE	TEST END DATE
POLA	Everport	*Ampelisca abdita*	Port Gamble	09Apr15	19Apr15
ENVIRON JOB NUMBER	PROJECT MANAGER	ENVIRON LABORATORY	DILUTION WATER BATCH	START TIME	END TIME
0433310A05	David Moore	Port Gamble	FSW040815.01	1240	1500

WATER QUALITY DATA

TEST CONDITIONS			D.O. (mg/L) > 4.6		TEMP (°C) 20 ± 2		SALINITY (ppt) 28 ± 2		pH (pH units) 7.8 ± 0.5		TECH.	Date
			D.O.		TEMP		SALINITY		pH			
CLIENT/ENVIRON ID	DAY	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit		
DMMU-1 /	0	1	8	7.7	8	20.5	8	30	8	7.9	MK	4/9/15
DMMU-1 /	0	2		7.7		20.2		30		8.0		
DMMU-1 /	0	3		7.7		20.5		30		8.0		
DMMU-1 /	0	4		7.7		20.4		30		8.0		
DMMU-1 /	0	5		7.5		20.1		30		7.9		
DMMU-1 /	1	1	9	7.3	9	20.0	9	30	9	7.9	JL	4/10/15
DMMU-1 /	2	2	9	7.5	9	20.0	9	30	9	8.1	JL	4/11
DMMU-1 /	3	3	9	7.4	9	20.6	9	30	9	8.1	JL	4/12
DMMU-1 /	4	4	8	7.5	8	20.6	8	30	8	8.1	~~JL~~	4/13
DMMU-1 /	5	5	8	7.6	8	20.4	8	31	8	8.1	~~JL~~	4/14
DMMU-1 /	6	1	9	8.0	9	19.9	9	31	9	8.2	MK	4/15
DMMU-1 /	7	2	8	7.4	8	20.8	8	31	8	8.0	MK	4/16
DMMU-1 /	8	3	9	7.4	9	20.7	9	30	9	8.2	~~JL~~	4/17
DMMU-1 /	9	4	9	7.4	9	20.6	9	30	9	8.2	~~JL~~	4/18
DMMU-1 /	10	1	9	7.4	9	20.3	9	30	9	8.4	JL	4/19
DMMU-1 /	10	2		7.4		20.6		31		8.2		
DMMU-1 /	10	3		7.4		20.3		30		8.4		
DMMU-1 /	10	4		7.4		20.5		31		8.3		
DMMU-1 /	10	5		7.3		20.7		31		8.3		

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA Everport	Ampelisca	10

PRETEST / (INITIAL) / FINAL / OTHER (circle one) DAY of TEST: 0
OVERLYING (OV) / POREWATER (PW) (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
① ~~21.3~~ 4/9	21.3	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
0 OV	Surr	4/9/15 HE	0.420	21.8	4/9/15 HE	N			
REF_DMMU OV			0.324						
DMMU-1 OV			0.215						
0 PW			0.619				7.0	26	
REF-DMMU PW			②						
DMMU-1 PW			4.0				7.8	29	

① Use HE 4/9 ② Insufficient PW 4/9

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA1 Everport	Ampelisca	10

PRETEST / INITIAL / FINAL / OTHER (circle one) **DAY of TEST:** 10
OVERLYING (OV) / POREWATER (PW) (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	**Temperature:**	
4/19	21.0 °C	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
⊗ OV	Surr	HK 4/19	0.102	20.0	HK 4/19	N			
Ref-DMMU OV	↓	↓	1.61	↓	↓	↓			
DMMU-1 OV			0.132	↓					
⊗ PW	↓	↓	0.117	20.3	↓	↓	6.9	29	
DMMU Ref (1)									
DMMU-1 PW	Surr	HK 4/19	0.0475	20.3	HK 4/19	N	(2) 6.9	31	

(1) NO pore water (2) WL HK 4/19

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
4/7/15	1300	AR08684

Organism / Project: Amps / Everport

Source / Supplier: Aquatic Research Organisms

Phone:	Contact:
On File	Stan

No. Ordered:	No. Received:	Source Batch: (Collection date, hatch date, etc.):
650	650+	field collected 4/6/15 Seabrook NH

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
Good	2-4mm long

Shipper:	B of L (Tracking No.)
FedEx	606980998684

Condition of Container:	Received By:
Good	MK

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
1	8.0	13.8	29 ppt	7.3	—	MK
2	7.7	13.7	30 ppt	7.1	—	↓

Notes:

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Ampelisca abdita

Source: Lab reared ~~X~~ (Lab) Hatchery reared _____ Field collected X

~~Hatch~~ collection date 4/6/15 Receipt date 04/06/15 Aa

Lot number 04 06 15 Aa Strain wild

Brood origination Seabrook, NH

II. Water Quality

Temperature 20 °C Salinity ~28 ppt D.O. SAT ppm

pH ~8.0 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater X Other _____

Recirculating _____ Flow through X Static renewal _____

DIET: Flake food _____ Phytoplankton X Trout chow _____

Artemia _____ Rotifers _____ YCT _____ Other _____

Prophylactic treatments: _____

Comments: 2-4mm long

_____

IV. Shipping Information

Client: Fuss Port Gamble # of Organisms 650+

Carrier: fedex Date shipped 4/6/15

Biologist: _____

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

ENVIRON

MAINTENANCE LOG FOR CULTURES

ORGANISM: Ampelisca
LOCATION: Bath 9

Batch Number: AR08684 | Date Received: ① ~~4/8/15~~ 4/7/15

Date	Feed AM/PM	Tub No.	D.O.	Temp (°C)	Cond/ (Sal)	pH	H_2O Change	No. Dead	NH_3	Init.
4/8	✓	1	7.7	18.4	29	8.0	N	2	—	MK
4/9	—	1	7.8	19.0	29	7.9	N	4	—	MK
4/10	—	1	7.7	18.1	30	8.0	N	—	—	JL
4/11	—	1	7.9	18.4	30	8.1	N	—	—	JL
4/12	—	1	7.8	18.3	31	8.1	N	—	—	JL
4/14	—	1	7.1	18.6	32	8.0	N	—	—	JL
			END	OF	CULTURE					

FT = Flow-through

① WC. MK 4/8.

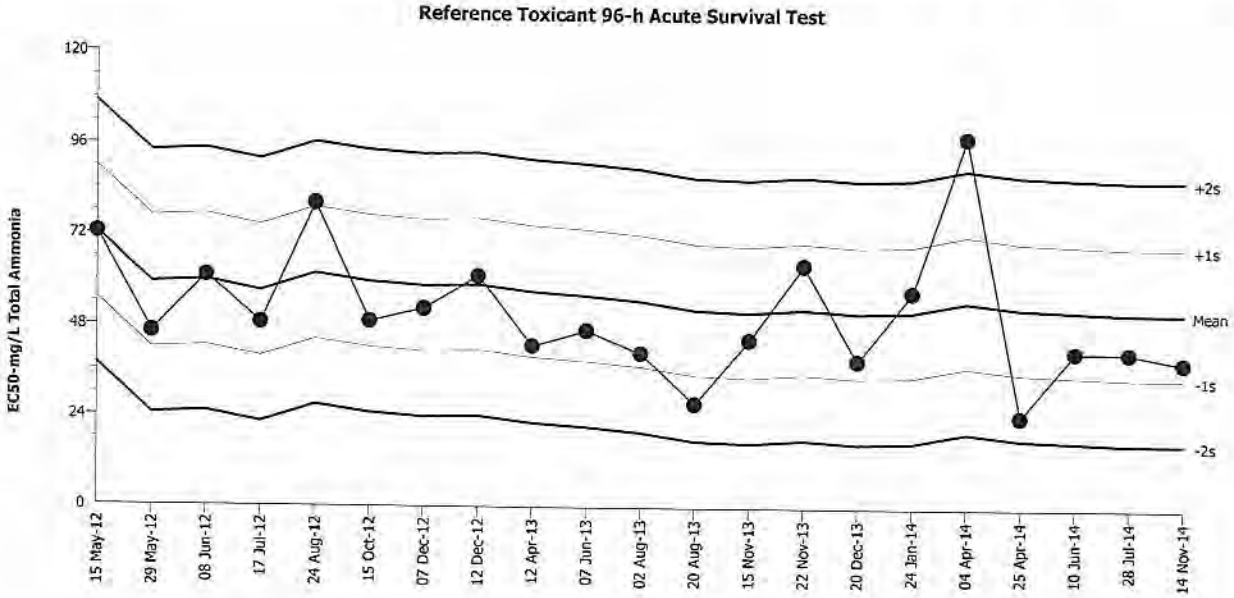
CETIS QC Plot

Report Date: 30 Nov-14 17:55 (1 of 1)

Reference Toxicant 96-h Acute Survival Test

All Matching Labs

Test Type:	Survival	**Organism:**	Ampelisca abdita (Amphipod)	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	52.15	**Count:**	20	**-1s Warning Limit:**	34.77	**-2s Action Limit:**	17.39
Sigma:	17.38	**CV:**	33.30%	**+1s Warning Limit:**	69.53	**+2s Action Limit:**	86.91

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	May	15	15:35	72.39	20.24	1.165	(+)		19-7667-7405	14-3535-3938	NewFields
2			29	16:30	46.32	-5.834	-0.3357			03-7733-4362	00-5524-0466	NewFields
3		Jun	8	13:20	61.19	9.036	0.5199			13-8637-6080	02-7852-3336	NewFields
4		Jul	17	15:35	48.77	-3.385	-0.1947			13-6908-0253	15-9441-6932	NewFields
5		Aug	24	16:00	80.22	28.07	1.615	(+)		05-1157-3267	06-6926-6880	NewFields
6		Oct	15	14:05	49.17	-2.984	-0.1717			20-5208-6497	10-3695-2553	NewFields
7		Dec	7	14:10	52.54	0.3914	0.02252			09-7213-1371	16-2148-8780	NewFields
8			12	14:35	61.3	9.152	0.5266			09-4120-7349	01-5095-3015	NewFields
9	2013	Apr	12	15:10	42.89	-9.26	-0.5328			12-7034-8436	01-8907-2059	NewFields
10		Jun	7	14:27	47.05	-5.099	-0.2934			09-6757-3966	14-2869-9159	NewFields
11		Aug	2	14:30	41.11	-11.04	-0.6355			19-9079-9629	15-4478-6705	NewFields
12			20	16:00	27.72	-24.43	-1.406	(-)		13-7509-8421	14-8949-6958	NewFields
13		Nov	15	14:50	44.72	-7.433	-0.4276			18-3292-0330	04-0023-6359	NewFields
14			22	15:50	64.51	12.36	0.7112			02-3495-3785	12-6433-7419	NewFields
15		Dec	20	13:00	39.28	-12.87	-0.7406			02-4678-2263	05-0741-7107	NewFields
16	2014	Jan	24	14:20	57.44	5.287	0.3042			09-0650-4326	20-4403-3655	NewFields
17		Apr	4	19:35	98.17	46.02	2.648	(+)	(+)	03-6871-1212	08-3988-4843	ENVIRON
18			25	13:00	24.6	-27.55	-1.585	(-)		20-1058-8272	14-4182-5616	ENVIRON
19		Jun	10	16:40	41.85	-10.3	-0.5925			11-7635-5332	05-2120-2836	ENVIRON
20		Jul	28	16:15	41.7	-10.45	-0.601			17-2488-9105	00-3978-3185	ENVIRON
21		Nov	14	14:00	39.01	-13.14	-0.756			10-9252-3954	10-9601-0432	ENVIRON

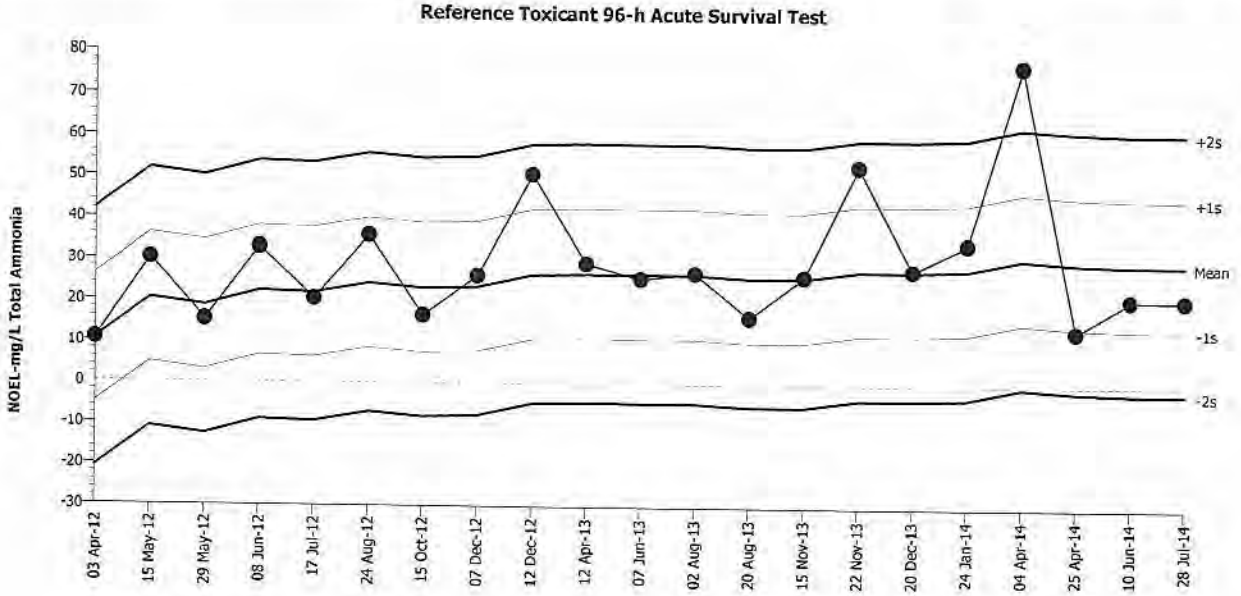
CETIS QC Plot

Report Date: 30 Nov-14 17:55 (1 of 1)

Reference Toxicant 96-h Acute Survival Test

All Matching Labs

Test Type:	Survival	**Organism:**	Ampelisca abdita (Amphipod)	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	29.6	**Count:**	20	**-1s Warning Limit:**	13.89	**-2s Action Limit:**	-1.815
Sigma:	15.71	**CV:**	53.10%	**+1s Warning Limit:**	45.31	**+2s Action Limit:**	61.03

Quality Control Data

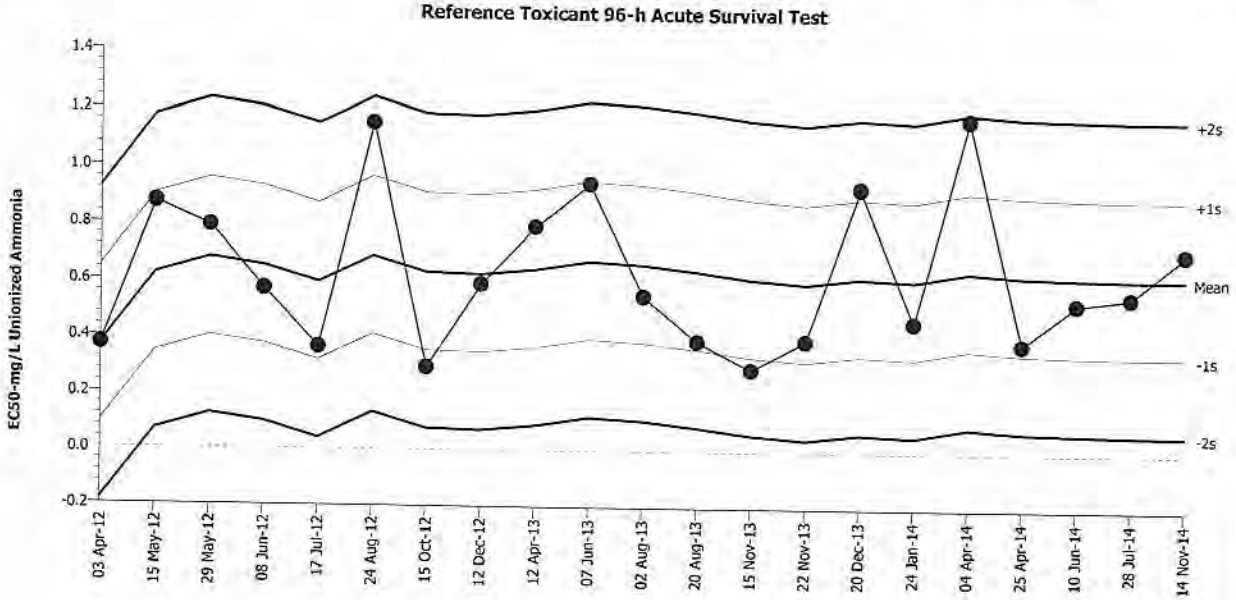
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Apr	3	15:30	10.7	-18.9	-1.203	(-)		08-8729-6483	21-1434-6496	NewFields
2		May	15	15:35	30.3	0.7	0.04456			19-7667-7405	08-1012-4639	NewFields
3			29	16:30	15.4	-14.2	-0.9039			03-7733-4362	15-2881-2817	NewFields
4		Jun	8	13:20	33	3.4	0.2164			13-8637-6080	11-0166-8393	NewFields
5		Jul	17	15:35	20.5	-9.1	-0.5792			13-6908-0253	01-0052-5043	NewFields
6		Aug	24	16:00	35.9	6.3	0.401			05-1157-3267	08-5831-5485	NewFields
7		Oct	15	14:05	16.6	-13	-0.8275			20-5208-6497	00-9472-6466	NewFields
8		Dec	7	14:10	26.3	-3.3	-0.2101			09-7213-1371	15-3724-7545	NewFields
9			12	14:35	50.8	21.2	1.349	(+)		09-4120-7349	14-7366-3468	NewFields
10	2013	Apr	12	15:10	29.4	-0.2	-0.01273			12-7034-8436	09-1665-9388	NewFields
11		Jun	7	14:27	25.8	-3.8	-0.2419			09-6757-3966	16-0158-1126	NewFields
12		Aug	2	14:30	27.2	-2.4	-0.1528			19-9079-9629	14-0752-3636	NewFields
13			20	16:00	16.5	-13.1	-0.8339			13-7509-8421	21-3120-5219	NewFields
14		Nov	15	14:50	26.4	-3.2	-0.2037			18-3292-0330	03-2680-3996	NewFields
15			22	15:50	53	23.4	1.489	(+)		02-3495-3785	03-4630-5877	NewFields
16		Dec	20	13:00	28.1	-1.5	-0.09548			02-4678-2263	19-1567-9831	NewFields
17	2014	Jan	24	14:20	34.5	4.9	0.3119			09-0650-4326	20-7968-7866	NewFields
18		Apr	4	19:35	77.1	47.5	3.024	(+)	(+)	03-6871-1212	10-6236-8293	ENVIRON
19			25	13:00	13.4	-16.2	-1.031	(-)		20-1058-8272	11-6567-3054	ENVIRON
20		Jun	10	16:40	21.2	-8.4	-0.5347			11-7635-5332	16-5592-8257	ENVIRON
21		Jul	28	16:15	21.1	-8.5	-0.5411			17-2488-9105	04-5147-3668	ENVIRON

CETIS QC Plot

Report Date: 30 Nov-14 17:58 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Ampelisca abdita (Amphipod)	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	0.6229	**Count:**	20	**-1s Warning Limit:**	0.3456	**-2s Action Limit:**	0.06829
Sigma:	0.2773	**CV:**	44.50%	**+1s Warning Limit:**	0.9002	**+2s Action Limit:**	1.177

Quality Control Data

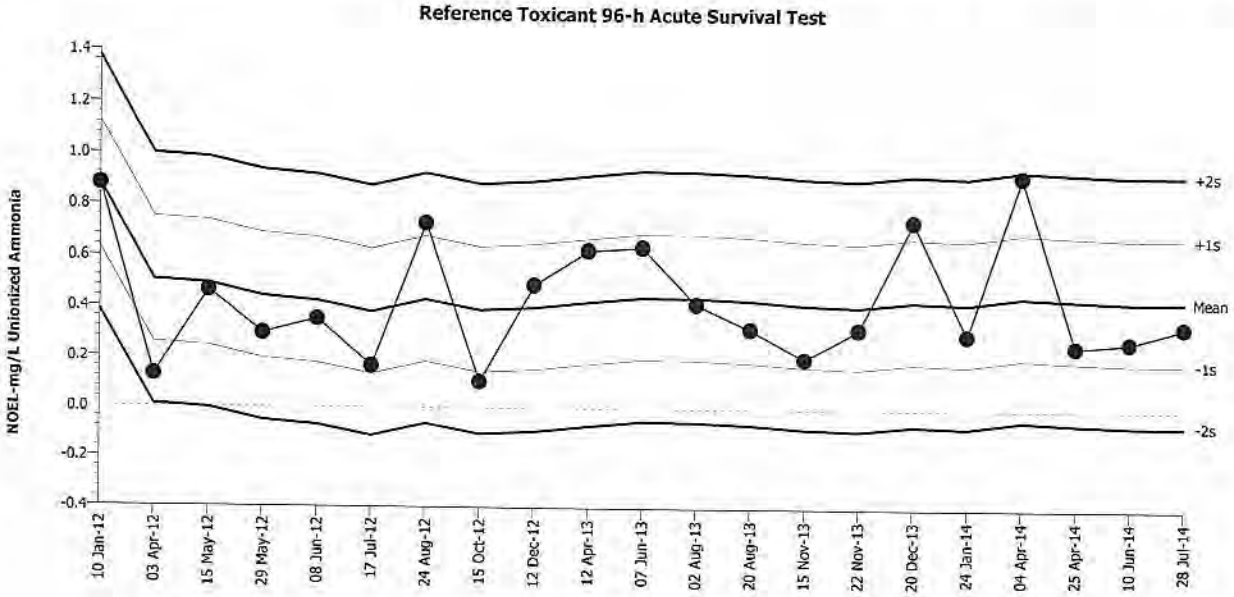
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Apr	3	15:30	0.3727	-0.2502	-0.9023			09-4195-0171	16-7041-3249	NewFields
2		May	15	15:35	0.8746	0.2517	0.9078			19-0654-4665	02-2736-5527	NewFields
3			29	16:30	0.7925	0.1696	0.6115			16-2142-7193	00-6495-6483	NewFields
4		Jun	8	13:20	0.5713	-0.05163	-0.1862			16-9847-8166	14-4844-2376	NewFields
5		Jul	17	15:35	0.3655	-0.2574	-0.9283			16-1062-4289	18-5210-8917	NewFields
6		Aug	24	16:00	1.153	0.5298	1.911	(+)		08-8752-6542	18-9827-5067	NewFields
7		Oct	15	14:05	0.2948	-0.3281	-1.183	(-)		21-3290-0327	06-9210-9670	NewFields
8		Dec	12	14:35	0.5915	-0.03144	-0.1134			19-9334-0562	19-2787-5813	NewFields
9	2013	Apr	12	15:10	0.7944	0.1715	0.6184			18-6740-5427	01-0210-3355	NewFields
10		Jun	7	14:27	0.9455	0.3226	1.164	(+)		17-9272-1074	09-3984-5720	NewFields
11		Aug	2	14:30	0.5525	-0.07035	-0.2537			05-2050-2330	19-4439-2397	NewFields
12			20	16:00	0.3944	-0.2285	-0.824			00-4509-6567	12-4262-0365	NewFields
13		Nov	15	14:50	0.2942	-0.3287	-1.185	(-)		15-3359-5488	14-2144-3552	NewFields
14			22	15:50	0.3974	-0.2255	-0.813			04-9377-1262	01-8605-2924	NewFields
15		Dec	20	13:00	0.9362	0.3133	1.13	(+)		08-0807-5446	00-7157-7679	NewFields
16	2014	Jan	24	14:20	0.4651	-0.1578	-0.5692			04-5730-2845	16-3665-2448	NewFields
17		Apr	4	19:35	1.179	0.5559	2.005	(+)	(+)	12-5203-4937	05-0119-6068	ENVIRON
18			25	13:00	0.3893	-0.2336	-0.8424			17-7359-2221	08-0470-1515	ENVIRON
19		Jun	10	16:40	0.5349	-0.08795	-0.3172			06-5060-1224	07-6052-8696	ENVIRON
20		Jul	28	16:15	0.5594	-0.06354	-0.2291			20-0809-2704	10-4192-6452	ENVIRON
21		Nov	14	14:00	0.7146	0.09166	0.3306			20-3538-6444	06-3950-2909	ENVIRON

CETIS QC Plot

Report Date: 30 Nov-14 17:58 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Ampelisca abdita (Amphipod)	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	0.4321	**Count:**	20	**-1s Warning Limit:**	0.1849	**-2s Action Limit:**	-0.0623
Sigma:	0.2472	**CV:**	57.20%	**+1s Warning Limit:**	0.6794	**+2s Action Limit:**	0.9265

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Jan	10	13:20	0.88	0.4479	1.812	(+)		14-0134-9355	16-9430-9459	NewFields
2		Apr	3	15:30	0.13	-0.3021	-1.222	(-)		09-4195-0171	03-4555-9841	NewFields
3		May	15	15:35	0.465	0.0329	0.1331			19-0654-4665	02-1023-3166	NewFields
4			29	16:30	0.296	-0.1361	-0.5506			16-2142-7193	05-9105-0121	NewFields
5		Jun	8	13:20	0.353	-0.0791	-0.32			16-9847-8166	07-7881-0150	NewFields
6		Jul	17	15:35	0.167	-0.2651	-1.072	(-)		16-1062-4289	06-2935-3737	NewFields
7		Aug	24	16:00	0.731	0.2989	1.209	(+)		08-8752-6542	06-6737-8668	NewFields
8		Oct	15	14:05	0.106	-0.3261	-1.319	(-)		21-3290-0327	16-3835-9075	NewFields
9		Dec	12	14:35	0.491	0.0589	0.2383			19-9334-0562	05-1325-4403	NewFields
10	2013	Apr	12	15:10	0.627	0.1949	0.7884			18-6740-5427	16-6473-6896	NewFields
11		Jun	7	14:27	0.641	0.2089	0.8451			17-9272-1074	01-9841-1337	NewFields
12		Aug	2	14:30	0.418	-0.0141	-0.05704			05-2050-2330	09-8914-1463	NewFields
13			20	16:00	0.32	-0.1121	-0.4535			00-4509-6567	15-4368-4994	NewFields
14		Nov	15	14:50	0.202	-0.2301	-0.9308			15-3359-5488	19-6913-3405	NewFields
15			22	15:50	0.32	-0.1121	-0.4535			04-9377-1262	07-8500-9484	NewFields
16		Dec	20	13:00	0.746	0.3139	1.27	(+)		08-0807-5446	09-0763-9169	NewFields
17	2014	Jan	24	14:20	0.299	-0.1331	-0.5384			04-5730-2845	21-0869-8694	NewFields
18		Apr	4	19:35	0.923	0.4909	1.986	(+)		12-5203-4937	03-7390-9737	ENVIRON
19			25	13:00	0.255	-0.1771	-0.7164			17-7359-2221	18-2233-7637	ENVIRON
20		Jun	10	16:40	0.273	-0.1591	-0.6436			06-5060-1224	15-0495-7506	ENVIRON
21		Jul	28	16:15	0.334	-0.0981	-0.3968			20-0809-2704	18-5911-9161	ENVIRON

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test

ENVIRON

Batch ID:	14-7989-5695	Test Type:	Survival	Analyst:	
Start Date:	14 Nov-14 14:00	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	18 Nov-14 14:05	Species:	Ampelisca abdita	Brine:	Not Applicable
Duration:	4d 0h	Source:	Brezina and Associates	Age:	
Sample ID:	09-9834-3878	Code:	3B8184C6	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Total Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	193d 14h	Station:	P140505.44		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
02-2239-6053	Proportion Survived	<16.8	16.8	NA	19.3%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
10-9601-0432	Proportion Survived	EC50	39.01	30.43	50.02		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	0.0%
16.8		3	0.7667	0.4798	1	0.7	0.9	0.06667	0.1155	15.06%	20.69%
46.3		3	0.5	0.06973	0.9303	0.3	0.6	0.1	0.1732	34.64%	48.28%
70.7		3	0	0	0	0	0	0	0		100.0%
117		3	0	0	0	0	0	0	0		100.0%
412		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	0.9
16.8		0.7	0.7	0.9
46.3		0.3	0.6	0.6
70.7		0	0	0
117		0	0	0
412		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	9/10
16.8		7/10	7/10	9/10
46.3		3/10	6/10	6/10
70.7		0/10	0/10	0/10
117		0/10	0/10	0/10
412		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test — **ENVIRON**

Start Date:	14 Nov-14 14:00	**Species:**	Ampelisca abdita
End Date:	18 Nov-14 14:05	**Protocol:**	PSEP (1995)
Sample Date:	05 May-14	**Material:**	Total Ammonia
Sample Code:	3B8184C6		
Sample Source:	Reference Toxicant		
Sample Station:	P140505.44		

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	16	10	10	
0	D	2	7	10	10	
0	D	3	10	10	9	
16.8		1	6	10	7	
16.8		2	18	10	7	
16.8		3	3	10	9	
46.3		1	13	10	3	
46.3		2	17	10	6	
46.3		3	8	10	6	
70.7		1	11	10	0	
70.7		2	5	10	0	
70.7		3	12	10	0	
117		1	14	10	0	
117		2	9	10	0	
117		3	4	10	0	
412		1	2	10	0	
412		2	15	10	0	
412		3	1	10	0	

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test

ENVIRON

Batch ID:	20-8596-2725	Test Type:	Survival	Analyst:	
Start Date:	14 Nov-14 14:00	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	18 Nov-14 14:05	Species:	Ampelisca abdita	Brine:	Not Applicable
Duration:	4d 0h	Source:	Brezina and Associates	Age:	
Sample ID:	13-8876-6076	Code:	52C6E37C	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Unionized Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	193d 14h	Station:	P140505.44		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
12-9956-8177	Proportion Survived	<0.319	0.319	NA	19.3%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
06-3950-2909	Proportion Survived	EC50	0.7146	0.5713	0.8937		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	0.0%
0.319		3	0.7667	0.4798	1	0.7	0.9	0.06667	0.1155	15.06%	20.69%
0.879		3	0.5	0.06973	0.9303	0.3	0.6	0.1	0.1732	34.64%	48.28%
1.071		3	0	0	0	0	0	0	0		100.0%
1.422		3	0	0	0	0	0	0	0		100.0%
3.175		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	0.9
0.319		0.7	0.7	0.9
0.879		0.3	0.6	0.6
1.071		0	0	0
1.422		0	0	0
3.175		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	9/10
0.319		7/10	7/10	9/10
0.879		3/10	6/10	6/10
1.071		0/10	0/10	0/10
1.422		0/10	0/10	0/10
3.175		0/10	0/10	0/10

CETIS Test Data Worksheet

Report Date: 30 Nov-14 17:58 (p 1 of 1)
Test Code: 20-3538-6444/7951884C

Reference Toxicant 96-h Acute Survival Test — ENVIRON

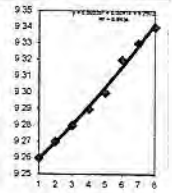
Start Date:	14 Nov-14 14:00	**Species:**	Ampelisca abdita
End Date:	18 Nov-14 14:05	**Protocol:**	PSEP (1995)
Sample Date:	05 May-14	**Material:**	Unionized Ammonia
Sample Code:	52C6E37C		
Sample Source:	Reference Toxicant		
Sample Station:	P140505.44		

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	14	10	10	
0	D	2	7	10	10	
0	D	3	10	10	9	
0.319		1	17	10	7	
0.319		2	13	10	7	
0.319		3	15	10	9	
0.879		1	8	10	3	
0.879		2	18	10	6	
0.879		3	1	10	6	
1.071		1	6	10	0	
1.071		2	11	10	0	
1.071		3	9	10	0	
1.422		1	12	10	0	
1.422		2	3	10	0	
1.422		3	2	10	0	
3.175		1	4	10	0	
3.175		2	16	10	0	
3.175		3	5	10	0	

CLIENT:	Everport	Date of Test:	14-Nov-14
PROJECT:	POLA	Test Type:	Ampelisca RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer:	I-factor
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1										
2										
3	15		16.8	30	7.8	19.0	292.16	9.3242		0.319
4	30		46.3	31	7.8	19.1	292.26	9.3270		0.879
5	60		70.7	31	7.7	19.1	292.26	9.3270		1.071
6	120		117	31	7.6	19.2	292.36	9.3270		1.422
7	240		412	31	7.4	19.2	292.36	9.3270		3.175
8										
9										
10										
11										
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ENVIRON

REFERENCE TOXICANT TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	ENVIRON LABORATORY	PROTOCOL
ENVIRON	Everport	*Ampelisca abdida*	Port Gamble Bath 9	USEPA/USCOE 1991

ENVIRON JOB NUMBER	PROJECT MANAGER	QUANTITY OF STOCK TARGET:	QUANTITY OF DILUENT: 1500mL	INIT KMB
0	Brian Hester	ACTUAL: see Spike sheet	ACTUAL: see spike sheet	DATE PREP 5 11/14/14

TEST ID	LOT #:	TEST START DATE	TIME	TEST END DATE	TIME
P140505.44	32446535	14Nov14	1400	18Nov14	1405

WATER QUALITY DATA

DILTIN.WAT.BATCH	TEMP REC#	REFERENCE TOX. MATERIAL	REFERENCE TOXICANT	LOT NO.	96-H LC_{50}
FSW111314.01	NA	0	0		

TEST CONDITIONS	DO (mg/L)	TEMP(C)	SAL (ppt)	pH	TECHNICIAN	AMMONIA	SULFIDES
	> 5.0	20 ± 1	30 ± 1	7.8 ± 0.5			

CLIENT/ENVIRON ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	D.O. meter	D.O. mg/L	TEMP. meter	TEMP. °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WQ TECH	AMMONIA METER	AMMONIA mg/L	Tech	SULFIDES meter	SULFIDES mg/L	Tech
Ref.Tox.-	0	mg/L	0	Stock	8	7.7	8	19.1	8	30	8	7.9	11/14	3	0.0	KMB			
			4	1	8	7.6	8	19.6	8	31	8	7.9	11/18						
Ref.Tox.-	15	mg/L	0	Stock	8	7.9	8	19.0	8	30	8	7.8	11/14	3	16.8	KMB			
			4	1	8	7.5	8	19.9	8	31	8	7.9	11/18						
Ref.Tox.-	30	mg/L	0	Stock	8	7.9	8	19.1	8	31	8	7.8	11/14	3	46.3	KMB			
			4	1	8	7.5	8	19.8	8	31	8	7.9	11/18						
Ref.Tox.-	60	mg/L	0	Stock	8	7.9	8	19.1	8	31	8	7.7	11/14	3	70.7	KMB			
			4	1	8	7.5	8	19.9	8	31	8	7.9	11/18						
Ref.Tox.-	120	mg/L	0	Stock	8	7.9	8	19.2	8	31	8	7.6	11/14	3	117	KMB			
			4	1	8	7.5	8	20.0	8	31	8	7.8	11/18						
Ref.Tox.-	240	mg/L	0	Stock	8	7.9	8	19.2	8	31	8	7.4	11/14	3	412	KMB			
			4																

① WD. KMB. 11/14.

ENVIRON REFERENCE TOXICANT TEST SURVIVAL DATASHEET

CLIENT	PROJECT	ENVIRON JOB #	PROJECT MANAGER	SPECIES	
ENVIRON	Everport	0	Brian Hester	*Ampelisca abdida*	
				ENVIRON LABORATORY: Port Gamble Bath 9	PROTOCOL: USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS: 10

				DAY 1			DAY 2			DAY 3			DAY 4		
				DATE: 11/15/14			DATE: 11/16/14			DATE: 11/17/14			DATE: 11/18/14		
				TECHNICIAN: JL			TECHNICIAN: JL			TECHNICIAN: JL			TECHNICIAN:		
CLIENT/ENVIRON ID	CONC. value	CONC. units	REP	INITIAL NUMBER	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Ref.Tox.-	0	mg/L	1		10	0	2F	10	0	2F	10	0	1F	10	0	2F
			2		10	0	N	10	0	2F	10	0	4F	10	0	3F
			3		10	0	↓	10	0	1F	9	1	N	9	0	N
Ref.Tox.-	15	mg/L	1		10	0	N	10	0	N	8	2	N	7	1	N
			2		10	0	↓	9	1	↓	8	1	↓	7	1	N
			3		10	0	↓	9	1	2F	9	0	↓	9	0	N
Ref.Tox.-	30	mg/L	1		10	0	N	8	2	N	8	0	1F	3	5	N
			2		9	1	↓	9	0	1F	8	1	N	6	2	↓
			3		10	0	↓	9	1	N	7	1	INB	6	1	↓
Ref.Tox.-	60	mg/L	1		10	0	Q	4	6	Q	2	2	1F/Q	0	2	|
			2		9	1	↓	6	3	Q/1F	4	2	1F/Q	0	4	|
			3		10	0	N	5	5	Q	3	2	1F/Q	0	3	|
Ref.Tox.-	120	mg/L	1		4	6	Q	1	3	Q	1	0	Q	0	1	|
			2		6	4	↓	0	6	NA	—	—	—	—	—	—
			3		9	1	1F	0	9	↓	—	—	—	—	—	—
Ref.Tox.-	240	mg/L	1		1	9	Q	0	1	NA	\	\	\	\	\	\
			2		1	9	↓	0	1	↓	\	\	\	\	\	\
			3		0	10	NA	—	—	—	\	\	\	\	\	\

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Amp/Eoh NH_3 RT

Assumptions in Model
Stock ammonia concentration is 10,000 mg/L = 10 mg/mL

Actual Reading
9327

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	Desired Concentration	Volume		
mg/L	mg/L	mL	mL stock to increase	
				SALT WATER
412	240	750		28.948
117	120	750		14.474
70.7	60	750		7.237
46.3	30	750		3.619
16.8	15	750		1.809
0.0	0	750		0.000
				0.000
				0.000

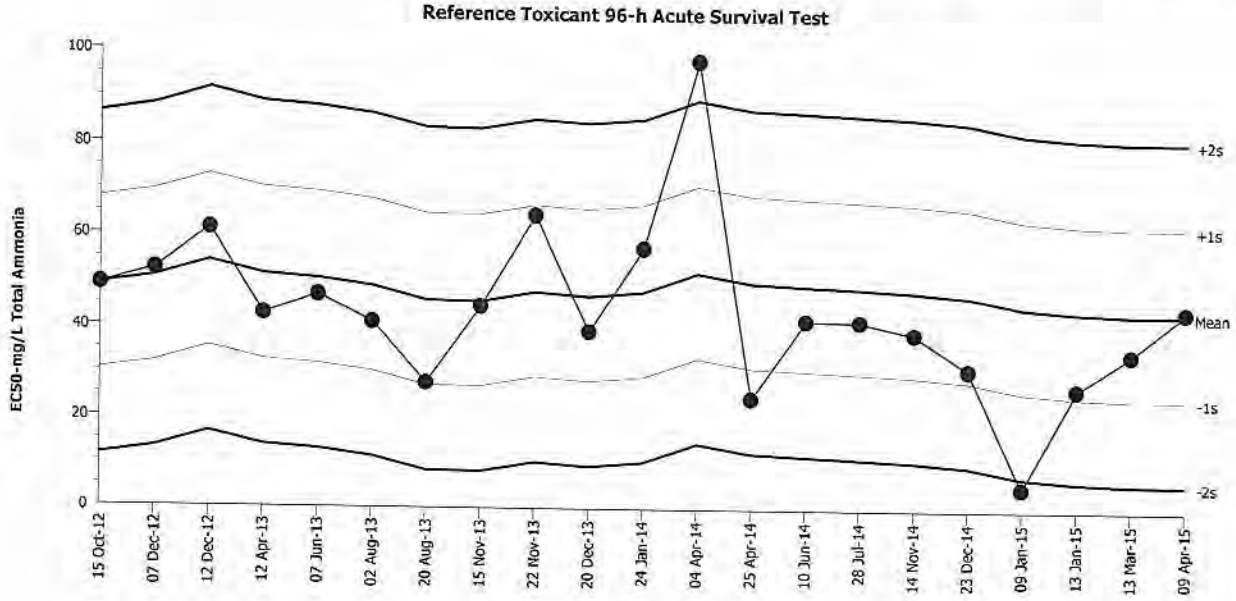
KMB 11/14/14 1105

CETIS QC Plot

Report Date: 15 May-15 09:08 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Ampelisca abdita (Amphipod)	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	43.55	**Count:**	20	**-1s Warning Limit:**	24.77	**-2s Action Limit:**	5.99
Sigma:	18.78	**CV:**	43.10%	**+1s Warning Limit:**	62.33	**+2s Action Limit:**	81.11

Quality Control Data

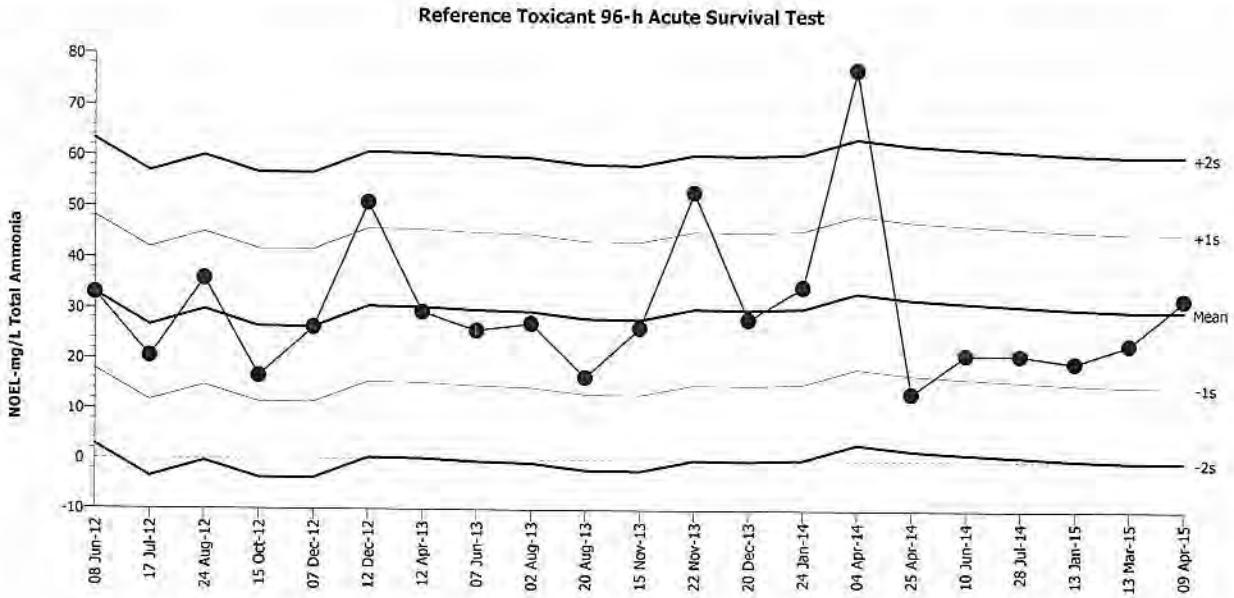
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Oct	15	14:05	49.17	5.616	0.2991			20-5208-6497	10-3695-2553	NewFields
2		Dec	7	14:10	52.54	8.991	0.4788			09-7213-1371	16-2148-8780	NewFields
3			12	14:35	61.3	17.75	0.9453			09-4120-7349	01-5095-3015	NewFields
4	2013	Apr	12	15:10	42.89	-0.6598	-0.03513			12-7034-8436	01-8907-2059	NewFields
5		Jun	7	14:27	47.05	3.501	0.1864			09-6757-3966	14-2869-9159	NewFields
6		Aug	2	14:30	41.11	-2.445	-0.1302			19-9079-9629	15-4478-6705	NewFields
7			20	16:00	27.72	-15.83	-0.8431			13-7509-8421	14-8949-6958	NewFields
8		Nov	15	14:50	44.72	1.167	0.06216			18-3292-0330	04-0023-6359	NewFields
9			22	15:50	64.51	20.96	1.116	(+)		02-3495-3785	12-6433-7419	NewFields
10		Dec	20	13:00	39.28	-4.271	-0.2274			02-4678-2263	05-0741-7107	NewFields
11	2014	Jan	24	14:20	57.44	13.89	0.7395			09-0650-4326	20-4403-3655	NewFields
12		Apr	4	19:35	98.17	54.62	2.908	(+)	(+)	03-6871-1212	08-3988-4843	ENVIRON
13			25	13:00	24.6	-18.95	-1.009	(-)		20-1058-8272	14-4182-5616	ENVIRON
14		Jun	10	16:40	41.85	-1.698	-0.09041			11-7635-5332	05-2120-2836	ENVIRON
15		Jul	28	16:15	41.7	-1.846	-0.09829			17-2488-9105	00-3978-3185	ENVIRON
16		Nov	14	14:00	39.01	-4.539	-0.2417			10-9252-3954	10-9601-0432	ENVIRON
17		Dec	23	15:30	31.19	-12.36	-0.658			19-5482-6343	00-1019-4364	ENVIRON
18	2015	Jan	9	16:15	5.082	-38.47	-2.048	(-)	(-)	03-2907-5947	20-4788-9667	ENVIRON
19			13	16:00	26.97	-16.58	-0.8827			11-0005-4089	00-1766-7111	ENVIRON
20		Mar	13	15:35	34.7	-8.855	-0.4715			09-7525-3416	07-3537-3952	ENVIRON
21		Apr	9	14:55	44.22	0.6706	0.03571			14-1741-4007	12-0515-5797	ENVIRON

CETIS QC Plot

Report Date: 15 May-15 09:08 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Ampelisca abdita (Amphipod)	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	29.98	**Count:**	20	**-1s Warning Limit:**	14.88	**-2s Action Limit:**	-0.235
Sigma:	15.11	**CV:**	50.40%	**+1s Warning Limit:**	45.1	**+2s Action Limit:**	60.21

Quality Control Data

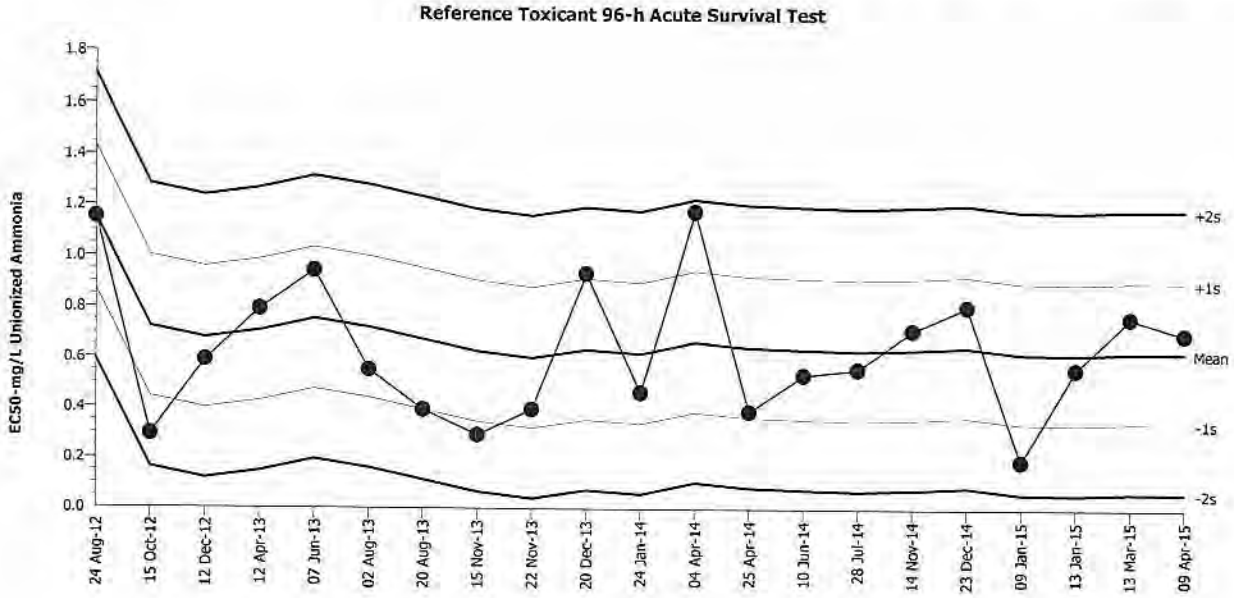
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Jun	8	13:20	33	3.02	0.1999			13-8637-6080	11-0166-8393	NewFields
2		Jul	17	15:35	20.5	-9.48	-0.6274			13-6908-0253	01-0052-5043	NewFields
3		Aug	24	16:00	35.9	5.92	0.3918			05-1157-3267	08-5831-5485	NewFields
4		Oct	15	14:05	16.6	-13.38	-0.8855			20-5208-6497	00-9472-6466	NewFields
5		Dec	7	14:10	26.3	-3.68	-0.2435			09-7213-1371	15-3724-7545	NewFields
6			12	14:35	50.8	20.82	1.378	(+)		09-4120-7349	14-7366-3468	NewFields
7	2013	Apr	12	15:10	29.4	-0.58	-0.03839			12-7034-8436	09-1665-9388	NewFields
8		Jun	7	14:27	25.8	-4.18	-0.2766			09-6757-3966	16-0158-1126	NewFields
9		Aug	2	14:30	27.2	-2.78	-0.184			19-9079-9629	14-0752-3636	NewFields
10			20	16:00	16.5	-13.48	-0.8921			13-7509-8421	21-3120-5219	NewFields
11		Nov	15	14:50	26.4	-3.58	-0.2369			18-3292-0330	03-2680-3996	NewFields
12			22	15:50	53	23.02	1.523	(+)		02-3495-3785	03-4630-5877	NewFields
13		Dec	20	13:00	28.1	-1.88	-0.1244			02-4678-2263	19-1567-9831	NewFields
14	2014	Jan	24	14:20	34.5	4.52	0.2991			09-0650-4326	20-7968-7866	NewFields
15		Apr	4	19:35	77.1	47.12	3.118	(+)	(+)	03-6871-1212	10-6236-8293	ENVIRON
16			25	13:00	13.4	-16.58	-1.097	(-)		20-1058-8272	11-6567-3054	ENVIRON
17		Jun	10	16:40	21.2	-8.78	-0.5811			11-7635-5332	16-5592-8257	ENVIRON
18		Jul	28	16:15	21.1	-8.88	-0.5877			17-2488-9105	04-5147-3668	ENVIRON
19	2015	Jan	13	16:00	19.6	-10.38	-0.687			11-0005-4089	00-7181-8880	ENVIRON
20		Mar	13	15:35	23.3	-6.68	-0.4421			09-7525-3416	09-6701-2387	ENVIRON
21		Apr	9	14:55	32.2	2.22	0.1469			14-1741-4007	08-5423-6117	ENVIRON

CETIS QC Plot

Report Date: 15 May-15 09:19 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Ampelisca abdita (Amphipod)	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	0.626	**Count:**	20	**-1s Warning Limit:**	0.3459	**-2s Action Limit:**	0.06578
Sigma:	0.2801	**CV:**	44.70%	**+1s Warning Limit:**	0.9061	**+2s Action Limit:**	1.186

Quality Control Data

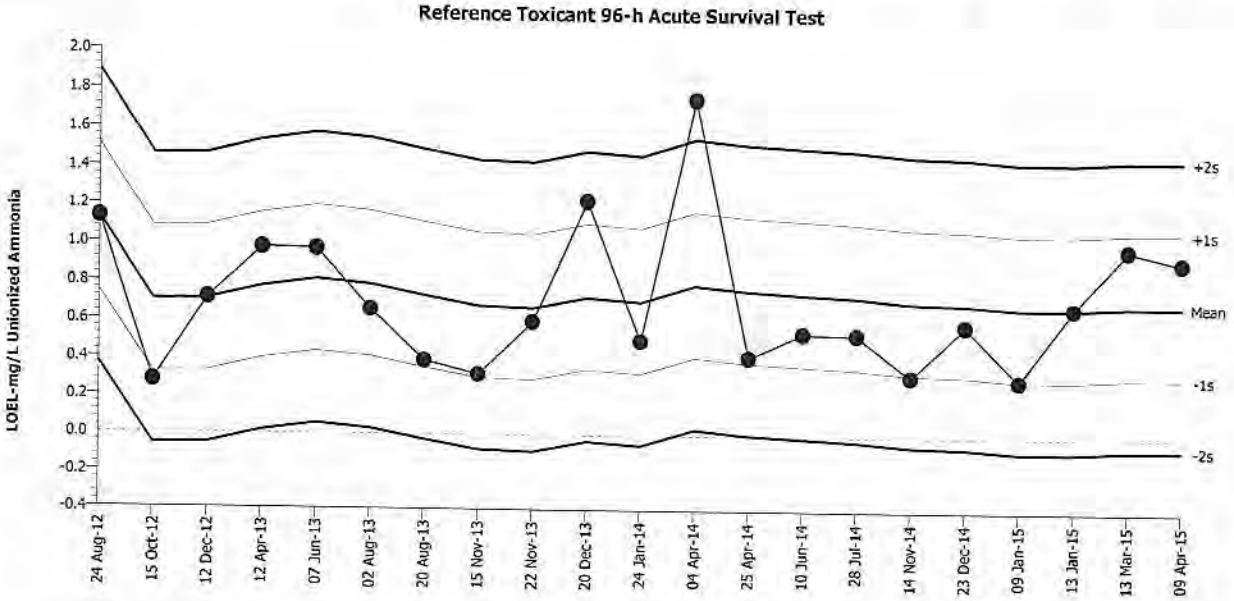
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Aug	24	16:00	1.153	0.5267	1.88	(+)		08-8752-6542	18-9827-5067	NewFields
2		Oct	15	14:05	0.2948	-0.3312	-1.182	(-)		21-3290-0327	06-9210-9670	NewFields
3		Dec	12	14:35	0.5915	-0.03454	-0.1233			19-9334-0562	19-2787-5813	NewFields
4	2013	Apr	12	15:10	0.7944	0.1684	0.6012			18-6740-5427	01-0210-3355	NewFields
5		Jun	7	14:27	0.9455	0.3195	1.141	(+)		17-9272-1074	09-3984-5720	NewFields
6		Aug	2	14:30	0.5525	-0.07345	-0.2622			05-2050-2330	19-4439-2397	NewFields
7			20	16:00	0.3944	-0.2316	-0.8268			00-4509-6567	12-4262-0365	NewFields
8		Nov	15	14:50	0.2942	-0.3318	-1.185	(-)		15-3359-5488	14-2144-3552	NewFields
9			22	15:50	0.3974	-0.2286	-0.816			04-9377-1262	01-8605-2924	NewFields
10		Dec	20	13:00	0.9362	0.3102	1.107	(+)		08-0807-5446	00-7157-7679	NewFields
11	2014	Jan	24	14:20	0.4651	-0.1609	-0.5745			04-5730-2845	16-3665-2448	NewFields
12		Apr	4	19:35	1.179	0.5528	1.974	(+)		12-5203-4937	05-0119-6068	ENVIRON
13			25	13:00	0.3893	-0.2367	-0.845			17-7359-2221	08-0470-1515	ENVIRON
14		Jun	10	16:40	0.5349	-0.09105	-0.3251			06-5060-1224	07-6052-8696	ENVIRON
15		Jul	28	16:15	0.5594	-0.06664	-0.2379			20-0809-2704	10-4192-6452	ENVIRON
16		Nov	14	14:00	0.7146	0.08856	0.3162			20-3538-6444	06-3950-2909	ENVIRON
17		Dec	23	15:30	0.8084	0.1824	0.6513			12-0688-4124	14-1818-4294	ENVIRON
18	2015	Jan	9	16:15	0.1911	-0.4349	-1.553	(-)		03-6562-4771	11-3395-6853	ENVIRON
19			13	16:00	0.5595	-0.06651	-0.2375			02-6638-2388	18-5216-5523	ENVIRON
20		Mar	13	15:35	0.7647	0.1387	0.4952			07-4271-9413	05-1187-2854	ENVIRON
21		Apr	9	14:55	0.6996	0.07364	0.2629			05-1064-0201	13-0134-8289	ENVIRON

CETIS QC Plot

Report Date: 15 May-15 09:19 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Ampelisca abdita (Amphipod)	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	0.6955	**Count:**	20	**-1s Warning Limit:**	0.3158	**-2s Action Limit:**	-0.0641
Sigma:	0.3798	**CV:**	54.60%	**+1s Warning Limit:**	1.075	**+2s Action Limit:**	1.455

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2012	Aug	24	16:00	1.131	0.4355	1.147	(+)		08-8752-6542	06-6737-8668	NewFields
2		Oct	15	14:05	0.279	-0.4165	-1.097	(-)		21-3290-0327	16-3835-9075	NewFields
3		Dec	12	14:35	0.717	0.0215	0.05661			19-9334-0562	05-1325-4403	NewFields
4	2013	Apr	12	15:10	0.978	0.2825	0.7438			18-6740-5427	16-6473-6896	NewFields
5		Jun	7	14:27	0.973	0.2775	0.7306			17-9272-1074	01-9841-1337	NewFields
6		Aug	2	14:30	0.659	-0.0365	-0.0961			05-2050-2330	09-8914-1463	NewFields
7			20	16:00	0.391	-0.3045	-0.8017			00-4509-6567	15-4368-4994	NewFields
8		Nov	15	14:50	0.32	-0.3755	-0.9887			15-3359-5488	19-6913-3405	NewFields
9			22	15:50	0.598	-0.0975	-0.2567			04-9377-1262	07-8500-9484	NewFields
10		Dec	20	13:00	1.228	0.5325	1.402	(+)		08-0807-5446	09-0763-9169	NewFields
11	2014	Jan	24	14:20	0.501	-0.1945	-0.5121			04-5730-2845	21-0869-8694	NewFields
12		Apr	4	19:35	1.759	1.064	2.8	(+)	(+)	12-5203-4937	03-7390-9737	ENVIRON
13			25	13:00	0.415	-0.2805	-0.7385			17-7359-2221	18-2233-7637	ENVIRON
14		Jun	10	16:40	0.543	-0.1525	-0.4015			06-5060-1224	15-0495-7506	ENVIRON
15		Jul	28	16:15	0.538	-0.1575	-0.4147			20-0809-2704	18-5911-9161	ENVIRON
16		Nov	14	14:00	0.319	-0.3765	-0.9913			20-3538-6444	12-9956-8177	ENVIRON
17		Dec	23	15:30	0.588	-0.1075	-0.283			12-0688-4124	18-9082-7003	ENVIRON
18	2015	Jan	9	16:15	0.3	-0.3955	-1.041	(-)		03-6562-4771	11-7471-1355	ENVIRON
19			13	16:00	0.683	-0.0125	-0.03291			02-6638-2388	09-1536-6118	ENVIRON
20		Mar	13	15:35	0.991	0.2955	0.778			07-4271-9413	14-5750-7806	ENVIRON
21		Apr	9	14:55	0.926	0.2305	0.6069			05-1064-0201	17-0318-0665	ENVIRON

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test

ENVIRON

Batch ID:	07-6828-3295	Test Type:	Survival	Analyst:	
Start Date:	09 Apr-15 14:55	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	13 Apr-15 15:05	Species:	Ampelisca abdita	Brine:	Not Applicable
Duration:	4d 0h	Source:	Brezina and Associates	Age:	
Sample ID:	08-5840-1548	Code:	332A2B0C	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Total Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	339d 15h	Station:	P140505.92		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
08-5423-6117	Proportion Survived	32.2	64	45.4	25.4%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
12-0515-5797	Proportion Survived	EC50	44.22	37.43	52.24		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
14.5		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
32.2		3	0.7667	0.1415	1	0.5	1	0.1453	0.2517	32.83%	23.33%
64		3	0.2333	0	0.6128	0.1	0.4	0.08819	0.1528	65.47%	76.67%
122		3	0	0	0	0	0	0	0		100.0%
246		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
14.5		0.9	1	1
32.2		1	0.8	0.5
64		0.2	0.1	0.4
122		0	0	0
246		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	10/10
14.5		9/10	10/10	10/10
32.2		10/10	8/10	5/10
64		2/10	1/10	4/10
122		0/10	0/10	0/10
246		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test — **ENVIRON**

Start Date:	09 Apr-15 14:55	**Species:**	Ampelisca abdita
End Date:	13 Apr-15 15:05	**Protocol:**	PSEP (1995)
Sample Date:	05 May-14	**Material:**	Total Ammonia
Sample Code:	332A2B0C		
Sample Source:	Reference Toxicant		
Sample Station:	P140505.92		

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	7	10	10	
0	D	2	5	10	10	
0	D	3	1	10	10	
14.5		1	6	10	9	
14.5		2	12	10	10	
14.5		3	10	10	10	
32.2		1	9	10	10	
32.2		2	8	10	8	
32.2		3	14	10	5	
64		1	3	10	2	
64		2	13	10	1	
64		3	2	10	4	
122		1	16	10	0	
122		2	4	10	0	
122		3	15	10	0	
246		1	11	10	0	
246		2	18	10	0	
246		3	17	10	0	

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test

ENVIRON

Batch ID:	06-0222-0165	Test Type:	Survival	Analyst:	
Start Date:	09 Apr-15 14:55	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	13 Apr-15 15:05	Species:	Ampelisca abdita	Brine:	Not Applicable
Duration:	4d 0h	Source:	Brezina and Associates	Age:	
Sample ID:	03-7489-7340	Code:	16587ABC	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Unionized Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	339d 15h	Station:	P140505.92		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-0318-0665	Proportion Survived	0.58	0.926	0.7329	25.4%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
13-0134-8289	Proportion Survived	EC50	0.6996	0.6144	0.7967		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
0.263		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
0.58		3	0.7667	0.1415	1	0.5	1	0.1453	0.2517	32.83%	23.33%
0.926		3	0.2333	0	0.6128	0.1	0.4	0.08819	0.1528	65.47%	76.67%
1.406		3	0	0	0	0	0	0	0		100.0%
1.811		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
0.263		0.9	1	1
0.58		1	0.8	0.5
0.926		0.2	0.1	0.4
1.406		0	0	0
1.811		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	10/10
0.263		9/10	10/10	10/10
0.58		10/10	8/10	5/10
0.926		2/10	1/10	4/10
1.406		0/10	0/10	0/10
1.811		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test — ENVIRON

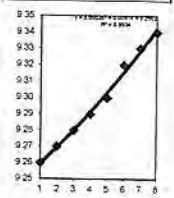
Start Date:	09 Apr-15 14:55	**Species:**	Ampelisca abdita
End Date:	13 Apr-15 15:05	**Protocol:**	PSEP (1995)
Sample Date:	05 May-14	**Material:**	Unionized Ammonia
Sample Code:	16587ABC		
Sample Source:	Reference Toxicant		
Sample Station:	P140505.92		

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	14	10	10	
0	D	2	11	10	10	
0	D	3	16	10	10	
0.263		1	5	10	9	
0.263		2	15	10	10	
0.263		3	9	10	10	
0.58		1	18	10	10	
0.58		2	13	10	8	
0.58		3	10	10	5	
0.926		1	12	10	2	
0.926		2	3	10	1	
0.926		3	7	10	4	
1.406		1	8	10	0	
1.406		2	17	10	0	
1.406		3	1	10	0	
1.811		1	6	10	0	
1.811		2	2	10	0	
1.811		3	4	10	0	

CLIENT:	POLA	Date of Test:	09-Apr-15
PROJECT:	Everport	Test Type:	Ampelisca RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer:	I-factor
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1										
2										
3										
4	15		14.5	29	7.8	18.3	291.46	9.3214		0.263
5	30		32.2	29	7.8	18.2	291.36	9.3214		0.580
6	60		64	29	7.7	18.3	291.46	9.3214		0.926
7	120		122	29	7.6	18.3	291.46	9.3214		1.406
8	240		246.000	30	7.4	18.5	291.66	9.3242		1.811
9										
10										
11										
12										
13										
14										
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ENVIRON

REFERENCE TOXICANT TEST
WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	ENVIRON LABORATORY	PROTOCOL
POLA	Everport	*Ampelisca abdita*	Port Gamble	USEPA/USCOE 1991

ENVIRON JOB NUMBER	PROJECT MANAGER	QUANTITY OF STOCK TARGET: see spiking sheet	QUANTITY OF DILUENT: 750 mL	INIT
0433310A05	David Moore	ACTUAL: see spiking sheet	ACTUAL: see spiking sheet	DATE PREP 4/9/15

TEST ID	LOT #:	TEST START DATE	TIME	TEST END DATE	TIME
P140505.92	3244C535	09Apr15	1455	13Apr15	1505

WATER QUALITY DATA

DILTIN.WAT.BATCH	TEMP REC#	REFERENCE TOX. MATERIAL	REFERENCE TOXICANT	LOT NO.	96-H LC_{50}
FSW040815.01	NA	0	0		

TEST CONDITIONS					DO (mg/L)		TEMP(C)		SAL (ppt)		pH		TECHNICIAN	AMMONIA			SULFIDES		
					> 4.6		20 ± 2		28 ± 2		7.8 ± 0.5								
CLIENT/ENVIRON ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	D.O. meter	D.O. mg/L	TEMP. meter	TEMP. °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WQ TECH	AMMONIA METER	AMMONIA mg/L	Tech	SULFIDES meter	SULFIDES mg/L	Tech
Ref.Tox.-	0	mg/L	0	Stock	9	7.7	9	18.2	9	29	9	7.8	JL 4/09	3	0.00				
			4	1	8	7.6	8	19.6	8	31	8	7.9	4/13						
Ref.Tox.-	15	mg/L	0	Stock	9	8.0	9	18.3	9	29	9	7.8	JL 4/09	3	14.5				
			4	1	8	7.6	8	19.7	8	31	8	7.9	4/13						
Ref.Tox.-	30	mg/L	0	Stock	9	8.0	9	18.2	9	29	9	7.8	JL 4/09	3	32.2				
			4	1	8	7.6	8	19.7	8	31	8	7.9	4/13						
Ref.Tox.-	60	mg/L	0	Stock	9	8.0	9	18.3	9	29	9	7.7	JL 4/09	3	64.0				
			4	1	8	7.5	8	19.9	8	31	8	7.9	4/13						
Ref.Tox.-	120	mg/L	0	Stock	9	7.9	9	18.3	9	29	9	7.6	JL 4/09	3	122				
			4	1	8	7.5	8	19.7	8	32	8	7.8	4/13						
Ref.Tox.-	240	mg/L	0	Stock	9	7.9	9	18.5	9	30	9	7.9	JL 4/09	3	246				
			4																

① DWC 4/13

ENVIRON REFERENCE TOXICANT TEST SURVIVAL DATASHEET

CLIENT	PROJECT	ENVIRON JOB #	PROJECT MANAGER	SPECIES	
POLA	Everport	0433310A05	David Moore	*Ampelisca abdita*	
				ENVIRON LABORATORY: Port Gamble	PROTOCOL: USEPA/USCOE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = normal
LOE= loss of equilibrium
Q = quiescent
DC = discoloration
NB = no body
F= Floating on Surface

INITIAL # OF ORGANISMS

				DAY 1			DAY 2			DAY 3			DAY 4		
				DATE: 4/10			DATE: 4/11			DATE: 4/12			DATE: 4/13		
				TECHNICIAN: CR			TECHNICIAN: JL			TECHNICIAN: JL			TECHNICIAN:		
CLIENT/ ENVIRON ID	CONC. value	CONC. units	REP	INITIAL NUMBER	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Ref.Tox.-	0	mg/L	1		10	0	1F	10	0	4F	10	0	1F	10	0	1F
			2		10	0	1F	10	0	2F	10	0	3F	10	0	2F
			3		10	0	N	10	0	1F	10	0	3F	10	0	3F
Ref.Tox.-	15	mg/L	1		9	0	NB3	9	0	4F	9	0	1F	9	0	N
			2		10	0	1F	10	0	1F	10	0	4F	10	0	N
			3		10	0	1F	10	0	N	10	0	2F	10	0	1F
Ref.Tox.-	30	mg/L	1		10	0	N	10	0	1F	10	0	1F	10	0	N
			2		10	0	↓	10	0	N	9	1	N	8	1	1F
			3		8	2	↓	8	0	1F	7	1	1F	5	2	N
Ref.Tox.-	60	mg/L	1		9	1①	N	8	1	N	6	2	1F	2	4	Q
			2		10	0	N	8	2	↓	4	4	Q	1	3	Q
			3		10	0	1F	8	2	↓	7	1	↓	4 3 ②	3	Q
Ref.Tox.-	120	mg/L	1		6	4	1F	4	2	Q	4	0	Q	0	4	
			2		6	4	N	4	2	↓	4	0	↓	0	4	
			3		7	3	N	6	1	↓	4	2	↓	0	4	
Ref.Tox.-	240	mg/L	1		0	10	N									
			2		0	10	↓									
			3		0	10	↓									

① 1 animal stuck on side of jar above water line ② IC 4/13

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Reference Toxicant ID: P140505.92

Date Prepared: 4/9/15

Technician Initials: [redacted]

Amp/Eoh NH_3 RT

Assumptions in Model
Stock ammonia concentration is 10,000 mg/L = 10 mg/mL

Actual Reading
7910

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	**Desired Concentration**	**Volume**		
mg/L	mg/L	mL	mL stock to increase	
			[redacted]	SALT WATER
246	**240**	750		**34.134**
122	**120**	750		**17.067**
64.0	**60**	750		**8.534**
32.2	**30**	750		**4.267**
14.5	**15**	750		**2.133**
0.00	**0**	750		**0.000**

APPENDIX B-7.5 *Neanthes arenaceodentata* Benthic Test

10-DAY SOLID PHASE TEST OBSERVATION DATA

CLIENT	PROJECT	SPECIES	LABORATORY	PROTOCOL
POLA	Everport	*Neanthes arenaceodentata*	Port Gamble	USACE 1991
	PROJECT MANAGER: David Moore	TEST START DATE: 5-Dec-14	TEST END DATE: 15-Dec-14	

#E = Emergence
#M = Number of Mortality
#F = Floating on Surface
A = Algal Growth
B = Beggiatoa
D = No Air Flow (DO?)
N = Normal

Client/ ID	Rep	Jar #	Initial # of Organisms	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Number Alive
				ENDPOINT DATA AND OBSERVATIONS										
				Date 12/06	Date 12/07	Date 12/08	Date 12/09	Date 12/10	Date 12/11	Date 12/12	Date 12/13	Date 12/14	Date 12/15	
				Technician JL	Technician JL	Technician KHB	Technician KB	Technician KB	Technician KB	Technician MK	Technician JL	Technician JL	Technician KB/MK	
Control	1		10	N	N	N	N	N	N	N	N	N	N	10
	2													10
	3													10
	4											IE		10
	5				IE							N		10
REF-DMMU-2	1		10		N	N	N	N	A	N			N	10
	2													10
	3													10
	4													10
	5													10
DMMU-2	1		10			N	N	N	N	N			N	8
	2													10
	3													10
	4													10
	5													9

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT	SPECIES	LABORATORY	PROTOCOL
POLA	Everport	*Neanthes arenaceodentata*	Port Gamble	USACE 1991

Test Conditions				WATER QUALITY DATA									
				DO (mg/L)		Temperature (°C)		Salinity (ppt)		pH		Tech	Date
				>4.6		20 ± 1		30 ± 2		6 - 9			
Client/ ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
Control	0	Surr	16	9	7.4	9	20.6	9	30	9	8.0	JL	12/05/14
Control	1	Surr		8	7.5	8	20.5	8	30	8	8.1	JL	12/06
Control	2	Surr		8	7.6	8	20.4	8	30	8	8.1	JL	12/07
Control	3	Surr		8	7.5	8	20.3	8	30	8	8.0	KB	12/08
Control	4	Surr		8	7.3	8	20.4	8	31	8	8.0	KB	12/09
Control	5	Surr		8	7.4	8	20.3	8	30	8	8.1	KB	12/10
Control	6	Surr		8	7.4	8	20.4	8	30	8	8.1	KB	12/11
Control	7	Surr		9	7.4	9	20.3	9	31	9	8.1	MK	12/12
Control	8	Surr		8	7.5	8	20.6	8	30	8	8.1	JL	12/13
Control	9	Surr		8	7.6	8	20.0	8	30	8	8.0	JL	12/14
Control	10	Surr	↓	9	8.9	9	19.8	9	30	9	7.9	JL	12/15
REF-DMMU-2	0	Surr	2	9	7.3	9	20.6	9	30	9	8.0	JL	12/05/14
REF-DMMU-2	1	Surr		8	7.4	8	20.4	8	30	8	8.1	JL	12/06
REF-DMMU-2	2	Surr		8	7.6	8	20.4	8	30	8	8.2	JL	12/07
REF-DMMU-2	3	Surr		8	7.4	8	20.2	8	30	8	7.9	KB	12/08
REF-DMMU-2	4	Surr		8	7.2	8	20.5	8	31	8	8.1	KB	12/09
REF-DMMU-2	5	Surr		8	7.3	8	20.1	8	30	8	8.1	KB	12/10
REF-DMMU-2	6	Surr		8	7.3	8	20.3	8	30	8	8.1	KB	12/11
REF-DMMU-2	7	Surr		9	7.2	9	20.3	9	31	9	8.2	MK	12/12
REF-DMMU-2	8	Surr		8	7.5	8	20.7	8	30	8	8.2	JL	12/13
REF-DMMU-2	9	Surr		8	7.6	8	20.3	8	30	8	8.1	JL	12/14
REF-DMMU-2	10	Surr	↓	9	7.4	9	20.0	9	30	9	8.0	JL	12/15

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT	SPECIES	LABORATORY	PROTOCOL
POLA	Everport	*Neanthes arenaceodentata*	Port Gamble	USACE 1991

Test Conditions				WATER QUALITY DATA									
				DO (mg/L)		Temperature (°C)		Salinity (ppt)		pH		Tech	Date
				>4.6		20 ± 1		30 ± 2		6 - 9			
Client/ ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
DMMU-2	0	Surr	18	9	7.3	9	20.6	9	30	9	8.1	JL	12/05/14
DMMU-2	1	Surr		8	7.5	8	20.4	8	30	8	8.1	JL	12/06
DMMU-2	2	Surr		8	7.5	8	20.4	8	30	8	8.1	JL	12/07
DMMU-2	3	Surr		8	7.5	8	20.4	8	30	8	8.0	KB	12/08
DMMU-2	4	Surr		8	7.2	8	20.5	8	31	8	8.1	KB	12/09
DMMU-2	5	Surr		8	7.3	8	20.4	8	30	8	8.1	KB	12/10
DMMU-2	6	Surr		8	7.3	8	20.4	8	30	8	8.1	KB	12/11
DMMU-2	7	Surr		9	7.3	9	20.4	9	32	9	8.1	MK	12/12
DMMU-2	8	Surr		8	7.5	8	20.4	8	31	8	8.1	JL	12/13
DMMU-2	9	Surr		8	7.6	8	20.1	8	31	8	8.0	JL	12/14
DMMU-2	10	Surr		9	7.4	9	19.5	9	31	9	7.9	JL	12/15

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA / Everport	Neanthes	10

PRETEST / (INITIAL) / FINAL / OTHER (circle one) DAY of TEST: Ø

(OVERLYING (OV)) / (POREWATER (PW)) (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date: 12/05/14	Temperature: 21.6°C	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
OV Ø	Surr.	12/05/14 JL	0.00	20.6	12/05/14 JL	N			
Ref. pmmu 2			0.267						
pmmu 2			1.17						
PW Ø			0.00	21.1		N	7.2	28	
Ref. pmmu 2			1.48	20.5			7.7	32	
pmmu 2			5.09	20.9			7.8	32	

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA & Everport	Neanthes	10

PRETEST / INITIAL / ~~FINAL~~ / OTHER (circle one) DAY of TEST: 10

~~OVERLYING (OV)~~ / ~~POREWATER (PW)~~ (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
12/15	21.5 °C	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
Ø OV	Surr	12/15 JL	0.00	21.5	12/15 JL	N			
REF-DMMU2 OV	↓	↓	2.23	21.5	↓	↓			
DMMU2 OV	↓	↓	4.01	21.5	↓	↓			
PW Ø	Surr	12/15 HE	0.00	20.6	12/15 HE	N	7.5	31	
REF DMMU-2	↓	↓	1.68	21.6	↓	↓	7.8	30	
DMMU2	↓	↓	10.1	20.6	↓	↓	7.8	32	

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
12/05/14	0835	ATS120514

Organism / Project:	Source:
Nearshes / POLA & NBPL	Aquatic TOX. Support

Address:	Invoice Attached
On File	(Yes) No

Phone:	Contact:
On File	On File

No. Ordered:	No. Received:	Source Batch:
730	730 + 10.1	Emerged Nov 10-12

Condition of Organisms:	Approximate Size or Age:
Good	25 days

Shipper:	B of L (Tracking No.)
Courier	NA

Condition of Container:	Received By:
Good	JL

Container	D.O. (mg/L)	Temp. (°C)	Conductivity or Salinity (Include Units)	pH (Units)	Technician (Initials)
1	13.0	19.2	30 ppt	7.1	JL

Notes:

Aquatic Toxicology Support
1849 Charleston Beach Road West
Bremerton, Washington 98312
(360) 813-1202

Order Summary

Species: *Neanthes arenaceodentata**	Emerge Date: 10-12 Nov '14
Number Ordered: 730	Number Shipped: 730 + 10%
Date Shipped: 5 Dec '14	Salinity (ppt): 30

*Smith 1964. CSU Long Beach strain. Feed upon arrival.

ENVIRON

10-DAY SOLID PHASE TEST OBSERVATION DATA

CLIENT	PROJECT	SPECIES	LABORATORY	PROTOCOL
POLA	Everport	*Neanthes arenaceodentata*	Port Gamble	USACE 1991
	PROJECT MANAGER: David Moore	TEST START DATE: 24-Apr-15	TEST END DATE: 4-May-15	

#E = Emergence
#M = Number of Mortality
#F = Floating on Surface
A = Algal Growth
B = Begglatoa
D = No Air Flow (DO?)
N = Normal

Client/ ID	Rep	Jar #	Initial # of Organisms	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Number Alive
				ENDPOINT DATA AND OBSERVATIONS										
			10	Date 4/25	Date 4/26	Date 4/27	Date 4/28	Date 4/29	Date 4/30	Date 5/1	Date 5/02	Date 5/03	Date 5/4	
				Technician JL	Technician [illegible]	Technician MK	Technician JL	Technician [illegible]	Technician MK	Technician [illegible]	Technician JL	Technician JL	Technician JL	
Control	1			N	N	N	N	N	N	N	N	N	N	9
	2													10
	3													10
	4													9
	5												↓	10
DMMU-1-REF	1												N	10
	2													10
	3													10
	4													8
	5												↓	10
DMMU-1	1												N	10
	2													9
	3													9
	4													10
	5			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	9

ENVIRON

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT	SPECIES	LABORATORY	PROTOCOL
POLA	Everport	*Neanthes arenaceodentata*	Port Gamble	USACE 1991

Test Conditions				WATER QUALITY DATA									
				DO (mg/L)		Temperature (°C)		Salinity (ppt)		pH		Tech	Date
				>4.6		20 ± 1		30 ± 2		6 - 9			
Client/ ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
Control	0	Surr	15	8	7.6	8	20.1	8	30	8	7.8	[illegible]	4/24/15
Control	1	Surr		9	7.5	9	20.0	9	30	9	8.1	JL	4/25
Control	2	Surr		9	7.6	9	20.1	9	30	9	7.9	[illegible]	4/26
Control	3	Surr		9	7.3	9	20.5	9	30	9	8.1	MK	4/27
Control	4	Surr		8	7.4	8	20.6	8	30	8	7.9	[illegible]	4/28
Control	5	Surr		9	7.7	9	20.3	9	31	9	8.1	[illegible]	4/29
Control	6	Surr		8	7.5	8	20.6	8	30	8	8.1	MK	4/30
Control	7	Surr		9	7.5	9	20.3	9	30	9	8.0	[illegible]	① ~~4~~ 5/1
Control	8	Surr		9	7.5	9	20.3	9	30	9	8.1	JL	5/02
Control	9	Surr		9	7.3	9	20.4	9	30	9	8.0	JL	5/03
Control	10	Surr		②									
DMMU-1-REF	0	Surr	6	8	7.5	8	20.2	8	30	8	8.0	[illegible]	4/24/15
DMMU-1-REF	1	Surr		9	7.5	9	20.1	9	30	9	8.2	[illegible]	4/25
DMMU-1-REF	2	Surr		9	7.5	9	20.1	9	31	9	8.0	[illegible]	4/26
DMMU-1-REF	3	Surr		9	7.7	9	20.5	9	31	9	8.2	MK	4/27
DMMU-1-REF	4	Surr		8	7.5	8	20.8	8	30	8	8.1	[illegible]	4/28
DMMU-1-REF	5	Surr		9	7.6	9	20.4	9	31	9	8.1	[illegible]	4/29
DMMU-1-REF	6	Surr		8	7.3	8	20.8	8	30	8	8.2	MK	4/30
DMMU-1-REF	7	Surr		9	7.4	9	20.5	9	31	9	8.2	[illegible]	5/1
DMMU-1-REF	8	Surr		9	7.5	9	20.3	9	31	9	8.2	JL	5/02
DMMU-1-REF	9	Surr		9	7.3	9	20.6	9	31	9	8.1	JL	5/03
DMMU-1-REF	10	Surr		9	7.3	9	19.9	9	31	9	8.2	CR	5/4

①wrong date for 5/1 ②Surrogate emptied prior to WQ being performed

ENVIRON

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT	SPECIES	LABORATORY	PROTOCOL
POLA	Everport	*Neanthes arenaceodentata*	Port Gamble	USACE 1991

Test Conditions				WATER QUALITY DATA									
				DO (mg/L)		Temperature (°C)		Salinity (ppt)		pH		Tech	Date
				>4.6		20 ± 1		30 ± 2		6 - 9			
Client/ ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
DMMU-1	0	Surr	11	8	7.5	8	20.2	8	30	8	8.0	JL	4/24/15
DMMU-1	1	Surr		9	7.5	9	20.0	9	30	9	8.1	JL	4/25
DMMU-1	2	Surr		9	7.4	9	20.2	9	30	9	8.0	JL	4/26
DMMU-1	3	Surr		9	7.3	9	20.6	9	31	9	8.1	MK	4/27
DMMU-1	4	Surr		8	7.4	8	20.9	8	30	8	8.0	JL	4/28
DMMU-1	5	Surr		9	7.6	9	20.5	9	30	9	8.1	JL	4/29
DMMU-1	6	Surr		8	7.3	8	20.6	8	30	8	8.2	MK	4/30
DMMU-1	7	Surr		9	7.3	9	20.5	9	30	9	8.2	JL	5/1
DMMU-1	8	Surr		9	7.4	9	20.4	9	30	9	8.2	JL	5/02
DMMU-1	9	Surr		9	7.2	9	20.6	9	30	9	8.2	JL	5/03
DMMU-1	10	Surr		9	7.8	9	20.4	9	30	9	8.3	CR	5/4

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
POLA Everport	Neanthes	10

PRETEST / INITIAL / FINAL / OTHER (circle one) DAY of TEST: 0
OVERLYING (OV) / POREWATER (PW) (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
4/24	17.9	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
Q OV	SUR	4/24/15 [illegible]	0.414	17.0	[illegible] 4/24/15	N			
REF OV	↓	↓	0.485	↓	↓	↓			
DMMU-1 OV	↓	↓	0.336	↓	↓	↓			
Q PW	SUR (2)	4/24/15 [illegible]							
REF PW	(1)								
DMMU-1 PW	SUR	4/24/15 [illegible]	1.29		4/24/15 [illegible]	N	7.8	30	

(1) No PW [illegible] 4/24 (2) Insufficient PW [illegible]

ENVIRON

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
Everport / POLA	Neanthes	10

PRETEST / INITIAL / ~~FINAL~~ / OTHER (circle one) **DAY of TEST:** 10

~~OVERLYING (OV)~~ / ~~POREWATER (PW)~~ (circle one)

Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date: 5/04/15	**Temperature:** 19.7°C	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
OV Ø	Surv.	5/04/15 MK	0.00	19.6	5/04 JL	N			
↓ Ref.	↓	↓	2.01	↓	↓	↓			
↓ Dmmu-1	↓	↓	0.00	↓	↓	↓			
PW Ø	↓	↓	0.00	19.8	5/04 JL	N ~~27~~ ①	7.5	27	
↓ Ref.	↓	↓	0.818	↓	↓	↓ ~~27~~	7.7	27	
↓ Dmmu-1	↓	↓	0.116	↓	↓	↓ ~~27~~	7.4	27	

① WL. JL 5/04/15.

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
4/24/15	1215	ATS 0424

Organism / Project: Neanthes / POLA

Source / Supplier: ATS

Phone:	Contact:
on file	Mary Ann

No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
360	396	emerge 30 mar - 3 Apr.

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
	21 - 25 days

Shipper:	B of L (Tracking No.)
Courier	NA

Condition of Container:	Received By:
Good	[signature]

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
1	8.5	20.6	30	7.0	–	[initials]

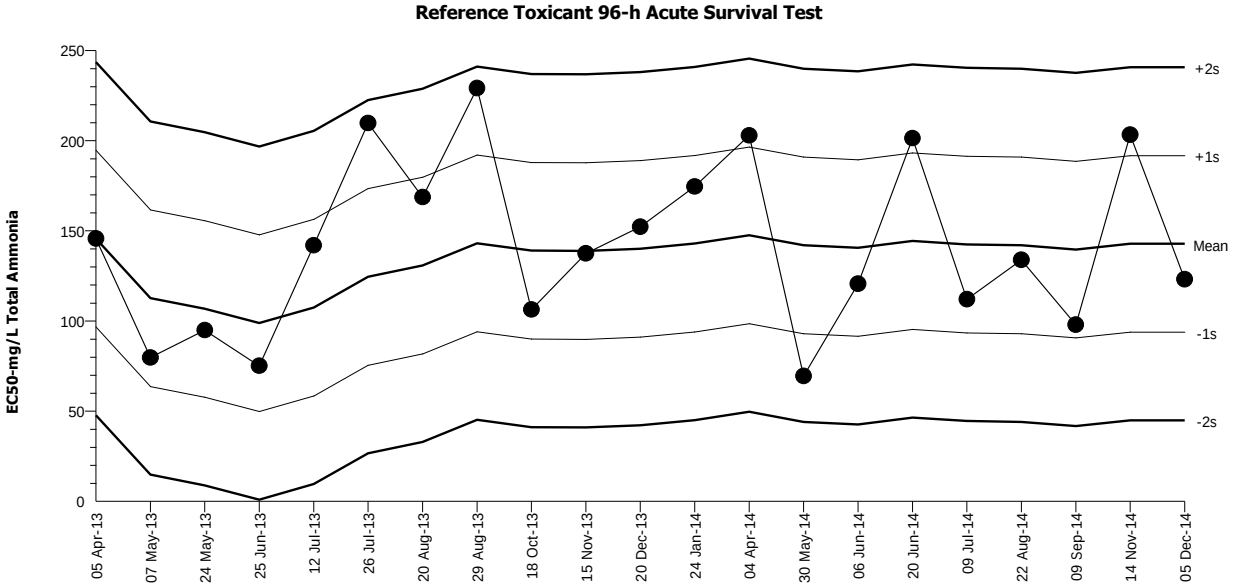
Notes:

CETIS QC Plot

Report Date: 03 Jan-15 20:53 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — **All Matching Labs**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



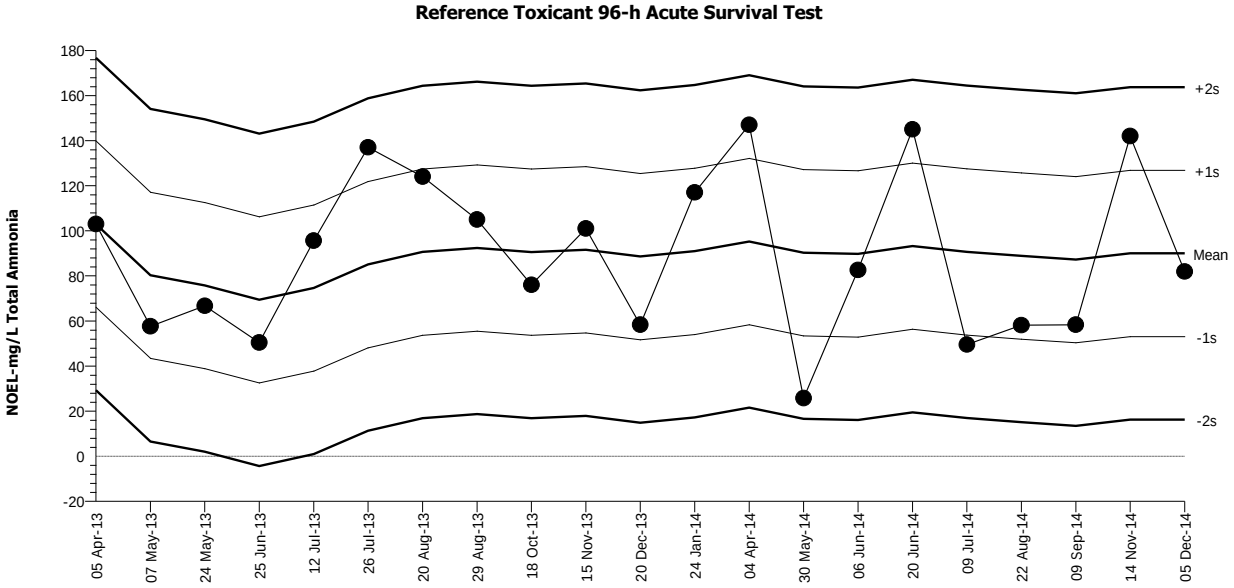
Mean:	142.8	**Count:**	20	**-1s Warning Limit:**	93.87	**-2s Action Limit:**	44.91
Sigma:	48.96	**CV:**	34.30%	**+1s Warning Limit:**	191.8	**+2s Action Limit:**	240.7

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Apr	5	10:40	145.7	2.864	0.0585			12-4084-6308	11-0088-3368	NewFields
2		May	7	13:00	79.7	-63.1	-1.289	(-)		03-6682-4675	04-2369-0564	NewFields
3			24	11:30	94.89	-47.91	-0.9785			19-1651-0673	18-8601-2491	NewFields
4		Jun	25	14:13	75.13	-67.67	-1.382	(-)		08-9049-5052	01-8172-0753	NewFields
5		Jul	12	13:20	141.9	-0.8669	-0.01771			14-1288-0905	06-4191-8012	NewFields
6			26	12:00	209.7	66.91	1.367	(+)		21-1882-7830	07-5315-7472	NewFields
7		Aug	20	15:45	168.6	25.85	0.5279			00-0072-4465	03-0193-2385	NewFields
8			29	13:40	229.1	86.33	1.763	(+)		00-4506-4349	11-1553-1817	NewFields
9		Oct	18	15:35	106.3	-36.49	-0.7454			21-0368-6339	03-0733-6178	NewFields
10		Nov	15	15:30	137.4	-5.37	-0.1097			16-5727-5696	09-2903-6118	NewFields
11		Dec	20	14:00	152.2	9.371	0.1914			08-9922-1254	05-5343-6267	NewFields
12	2014	Jan	24	13:20	174.5	31.72	0.648			20-9603-7883	05-6245-5381	NewFields
13		Apr	4	15:40	202.9	60.08	1.227	(+)		09-1443-8374	04-8864-2138	ENVIRON
14		May	30	16:25	69.43	-73.37	-1.499	(-)		18-4751-2702	06-4812-5268	ENVIRON
15		Jun	6	14:00	120.6	-22.23	-0.454			02-4901-6395	02-6665-3375	ENVIRON
16			20	13:20	201.3	58.55	1.196	(+)		04-8899-1061	18-6388-8462	ENVIRON
17		Jul	9	15:30	112	-30.78	-0.6286			00-3047-6484	19-8550-4064	ENVIRON
18		Aug	22	12:30	133.9	-8.933	-0.1824			19-3698-7324	19-8424-2994	ENVIRON
19		Sep	9	15:00	97.87	-44.93	-0.9178			04-0379-7898	08-6657-8417	ENVIRON
20		Nov	14	11:11	203.3	60.48	1.235	(+)		09-0815-7159	21-3147-5839	ENVIRON
21		Dec	5	11:50	123.1	-19.71	-0.4025			14-5288-4655	12-0797-2995	ENVIRON

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



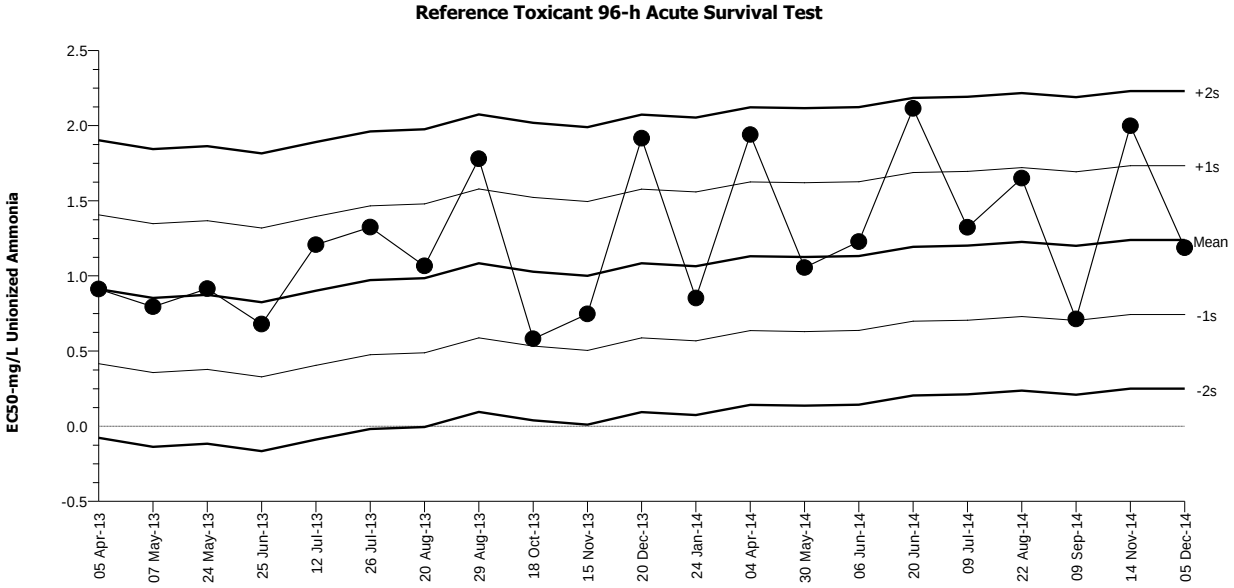
Mean:	89.99	**Count:**	20	**-1s Warning Limit:**	53.12	**-2s Action Limit:**	16.25
Sigma:	36.87	**CV:**	41.00%	**+1s Warning Limit:**	126.9	**+2s Action Limit:**	163.7

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Apr	5	10:40	103	13.01	0.3529			12-4084-6308	12-0348-0416	NewFields
2		May	7	13:00	57.6	-32.39	-0.8785			03-6682-4675	13-3264-9963	NewFields
3			24	11:30	66.7	-23.29	-0.6317			19-1651-0673	19-7443-7088	NewFields
4		Jun	25	14:13	50.4	-39.59	-1.074	(-)		08-9049-5052	06-0503-5931	NewFields
5		Jul	12	13:20	95.6	5.61	0.1522			14-1288-0905	07-0996-7321	NewFields
6			26	12:00	137	47.01	1.275	(+)		21-1882-7830	14-5107-6466	NewFields
7		Aug	20	15:45	124	34.01	0.9224			00-0072-4465	04-2226-9652	NewFields
8			29	13:40	105	15.01	0.4071			00-4506-4349	03-1605-8937	NewFields
9		Oct	18	15:35	76	-13.99	-0.3794			21-0368-6339	09-9293-9888	NewFields
10		Nov	15	15:30	101	11.01	0.2986			16-5727-5696	19-4124-7251	NewFields
11		Dec	20	14:00	58.3	-31.69	-0.8595			08-9922-1254	11-2068-6689	NewFields
12	2014	Jan	24	13:20	117	27.01	0.7326			20-9603-7883	15-6685-9407	NewFields
13		Apr	4	15:40	147	57.01	1.546	(+)		09-1443-8374	10-8829-6450	ENVIRON
14		May	30	16:25	25.7	-64.29	-1.744	(-)		18-4751-2702	12-3702-5556	ENVIRON
15		Jun	6	14:00	82.6	-7.39	-0.2004			02-4901-6395	20-5404-5146	ENVIRON
16			20	13:20	145	55.01	1.492	(+)		04-8899-1061	10-6019-5810	ENVIRON
17		Jul	9	15:30	49.5	-40.49	-1.098	(-)		00-3047-6484	08-3152-1432	ENVIRON
18		Aug	22	12:30	58.1	-31.89	-0.8649			19-3698-7324	16-9806-3196	ENVIRON
19		Sep	9	15:00	58.3	-31.69	-0.8595			04-0379-7898	19-3535-3112	ENVIRON
20		Nov	14	11:11	142	52.01	1.411	(+)		09-0815-7159	10-8173-5203	ENVIRON
21		Dec	5	11:50	81.9	-8.09	-0.2194			14-5288-4655	20-6606-9579	ENVIRON

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



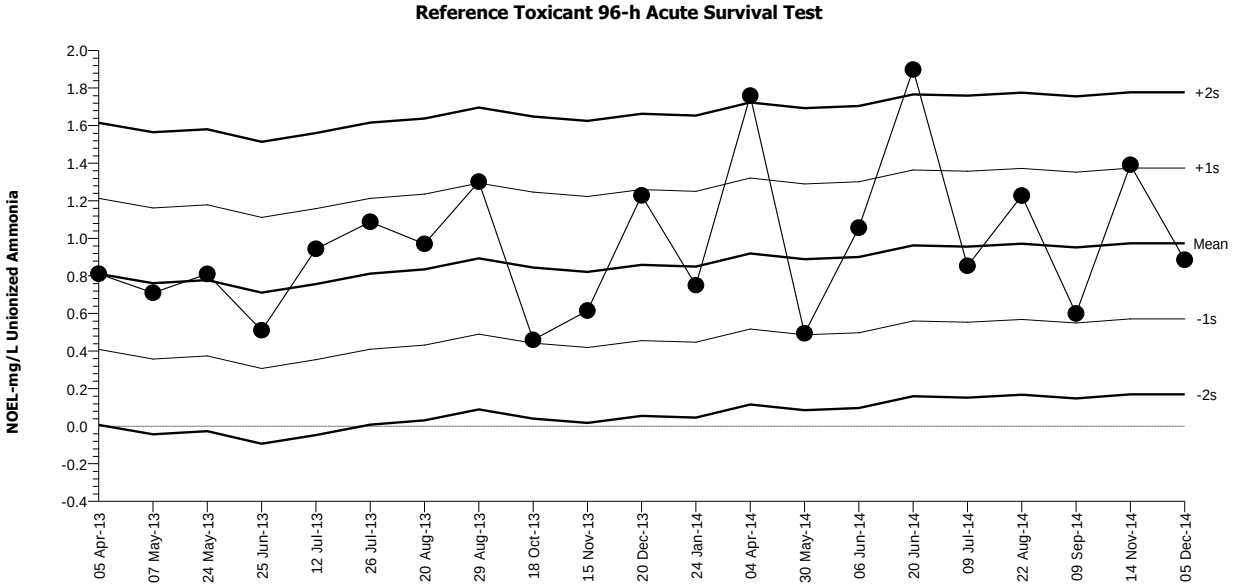
Mean:	1.239	**Count:**	20	**-1s Warning Limit:**	0.7443	**-2s Action Limit:**	0.2492
Sigma:	0.4951	**CV:**	40.00%	**+1s Warning Limit:**	1.734	**+2s Action Limit:**	2.23

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Apr	5	10:40	0.9122	-0.3268	-0.6601			03-5469-7681	20-0412-7755	NewFields
2		May	7	13:00	0.794	-0.445	-0.8987			11-4883-5754	10-2519-8358	NewFields
3			24	11:30	0.9143	-0.3247	-0.6559			03-1268-0321	17-3627-5339	NewFields
4		Jun	25	14:30	0.6782	-0.5608	-1.133	(-)		07-6412-1006	01-8270-7142	NewFields
5		Jul	12	13:20	1.207	-0.03181	-0.06425			06-2793-5359	03-5477-0692	NewFields
6			26	12:00	1.324	0.08472	0.1711			08-3568-6719	13-1071-7473	NewFields
7		Aug	20	15:45	1.065	-0.1736	-0.3506			11-8125-8700	06-3963-9074	NewFields
8			29	13:40	1.779	0.5399	1.091	(+)		06-4372-6299	20-5863-7836	NewFields
9		Oct	18	15:35	0.5812	-0.6578	-1.329	(-)		21-1191-9888	03-5569-7261	NewFields
10		Nov	15	15:30	0.746	-0.493	-0.9957			09-2209-5330	09-1007-2814	NewFields
11		Dec	20	14:00	1.916	0.6766	1.367	(+)		01-5055-0133	16-3961-8899	NewFields
12	2014	Jan	24	13:20	0.8517	-0.3873	-0.7822			09-1104-1497	12-8333-6553	NewFields
13		Apr	4	15:40	1.94	0.7007	1.415	(+)		00-6512-2526	06-9520-2408	NewFields
14		May	30	16:25	1.055	-0.1842	-0.3721			04-6747-6619	11-2879-2220	ENVIRON
15		Jun	6	14:00	1.228	-0.01144	-0.0231			19-7971-8908	15-6482-0033	ENVIRON
16			20	13:20	2.113	0.8745	1.766	(+)		01-9511-3585	14-0146-3778	ENVIRON
17		Jul	9	15:30	1.322	0.08328	0.1682			09-1500-8488	10-4546-7656	ENVIRON
18		Aug	22	12:30	1.65	0.4108	0.8298			18-5611-8800	16-9514-3424	ENVIRON
19		Sep	9	15:00	0.7125	-0.5265	-1.063	(-)		18-5349-8839	17-4717-4294	ENVIRON
20		Nov	14	11:11	1.998	0.7594	1.534	(+)		17-3054-3443	08-9007-7058	ENVIRON
21		Dec	5	11:50	1.187	-0.05239	-0.1058			14-0275-5265	10-7706-7479	ENVIRON

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	0.9735	**Count:**	20	**-1s Warning Limit:**	0.5717	**-2s Action Limit:**	0.1698
Sigma:	0.4019	**CV:**	41.30%	**+1s Warning Limit:**	1.375	**+2s Action Limit:**	1.777

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Apr	5	10:40	0.811	-0.1625	-0.4043			03-5469-7681	20-7653-9268	NewFields
2		May	7	13:00	0.71	-0.2635	-0.6556			11-4883-5754	20-7240-7121	NewFields
3			24	11:30	0.81	-0.1635	-0.4068			03-1268-0321	20-4684-2719	NewFields
4		Jun	25	14:30	0.51	-0.4635	-1.153	(-)		07-6412-1006	18-2969-6397	NewFields
5		Jul	12	13:20	0.943	-0.0305	-0.07589			06-2793-5359	18-9450-4090	NewFields
6			26	12:00	1.087	0.1135	0.2824			08-3568-6719	20-5296-6252	NewFields
7		Aug	20	15:45	0.97	-0.0035	-0.00871			11-8125-8700	00-8450-2616	NewFields
8			29	13:40	1.301	0.3275	0.8149			06-4372-6299	17-0691-0612	NewFields
9		Oct	18	15:35	0.459	-0.5145	-1.28	(-)		21-1191-9888	08-6606-1702	NewFields
10		Nov	15	15:30	0.615	-0.3585	-0.892			09-2209-5330	09-5248-1072	NewFields
11		Dec	20	14:00	1.228	0.2545	0.6332			01-5055-0133	05-3710-3857	NewFields
12	2014	Jan	24	13:20	0.75	-0.2235	-0.5561			09-1104-1497	11-9980-1624	NewFields
13		Apr	4	15:40	1.759	0.7855	1.954	(+)		00-6512-2526	16-4646-7758	NewFields
14		May	30	16:25	0.494	-0.4795	-1.193	(-)		04-6747-6619	20-5692-2184	ENVIRON
15		Jun	6	14:00	1.056	0.0825	0.2053			19-7971-8908	15-9945-9119	ENVIRON
16			20	13:20	1.898	0.9245	2.3	(+)	(+)	01-9511-3585	21-4292-7262	ENVIRON
17		Jul	9	15:30	0.853	-0.1205	-0.2998			09-1500-8488	15-2291-7760	ENVIRON
18		Aug	22	12:30	1.227	0.2535	0.6308			18-5611-8800	02-5634-5468	ENVIRON
19		Sep	9	15:00	0.599	-0.3745	-0.9318			18-5349-8839	09-1071-5088	ENVIRON
20		Nov	14	11:11	1.391	0.4175	1.039	(+)		17-3054-3443	03-6925-5177	ENVIRON
21		Dec	5	11:50	0.885	-0.0885	-0.2202			14-0275-5265	10-6284-3142	ENVIRON

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Batch ID:	09-0799-9577	**Test Type:**	Survival	**Analyst:**	
Start Date:	05 Dec-14 11:50	**Protocol:**	PSEP (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 13:50	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Duration:	4d 2h	**Source:**	Aquatic Toxicology Support	**Age:**	
Sample ID:	00-5619-3321	**Code:**	3597129	**Client:**	Internal Lab
Sample Date:	05 May-14	**Material:**	Total Ammonia	**Project:**	Reference Toxicant
Receive Date:	05 May-14	**Source:**	Reference Toxicant		
Sample Age:	214d 12h	**Station:**	P140505.46		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-6606-9579	Proportion Survived	81.9	185	123.1	NA		Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
12-0797-2995	Proportion Survived	EC50	123.1	81.9	185		Binomial/Graphical

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
20.4		3	1	1	1	1	1	0	0	0.0%	0.0%
46.8		3	1	1	1	1	1	0	0	0.0%	0.0%
81.9		3	1	1	1	1	1	0	0	0.0%	0.0%
185		3	0	0	0	0	0	0	0		100.0%
325		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
20.4		1	1	1
46.8		1	1	1
81.9		1	1	1
185		0	0	0
325		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	10/10
20.4		10/10	10/10	10/10
46.8		10/10	10/10	10/10
81.9		10/10	10/10	10/10
185		0/10	0/10	0/10
325		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Start Date: 05 Dec-14 11:50 **Species:** Neanthes arenaceodentata **Sample Code:** 3597129
End Date: 09 Dec-14 13:50 **Protocol:** PSEP (1995) **Sample Source:** Reference Toxicant
Sample Date: 05 May-14 **Material:** Total Ammonia **Sample Station:** P140505.46

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	12	10	10	
0	D	2	7	10	10	
0	D	3	10	10	10	
20.4		1	13	10	10	
20.4		2	18	10	10	
20.4		3	16	10	10	
46.8		1	11	10	10	
46.8		2	15	10	10	
46.8		3	14	10	10	
81.9		1	4	10	10	
81.9		2	3	10	10	
81.9		3	6	10	10	
185		1	1	10	0	
185		2	17	10	0	
185		3	5	10	0	
325		1	8	10	0	
325		2	9	10	0	
325		3	2	10	0	

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

Batch ID:	10-0192-9223	**Test Type:**	Survival	**Analyst:**	
Start Date:	05 Dec-14 11:50	**Protocol:**	PSEP (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 13:50	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Duration:	4d 2h	**Source:**	Aquatic Toxicology Support	**Age:**	
Sample ID:	02-9403-7580	**Code:**	1186A84C	**Client:**	Internal Lab
Sample Date:	05 May-14	**Material:**	Unionized Ammonia	**Project:**	Reference Toxicant
Receive Date:	05 May-14	**Source:**	Reference Toxicant		
Sample Age:	214d 12h	**Station:**	P140505.46		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
10-6284-3142	Proportion Survived	0.885	1.591	1.187	NA		Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
10-7706-7479	Proportion Survived	EC50	1.187	0.885	1.591		Binomial/Graphical

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
0.432		3	1	1	1	1	1	0	0	0.0%	0.0%
0.796		3	1	1	1	1	1	0	0	0.0%	0.0%
0.885		3	1	1	1	1	1	0	0	0.0%	0.0%
1.591		3	0	0	0	0	0	0	0		100.0%
1.758		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
0.432		1	1	1
0.796		1	1	1
0.885		1	1	1
1.591		0	0	0
1.758		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	10/10
0.432		10/10	10/10	10/10
0.796		10/10	10/10	10/10
0.885		10/10	10/10	10/10
1.591		0/10	0/10	0/10
1.758		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test **ENVIRON**

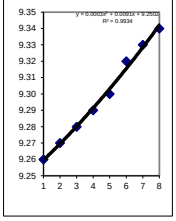
Start Date: 05 Dec-14 11:50 **Species:** Neanthes arenaceodentata **Sample Code:** 1186A84C
End Date: 09 Dec-14 13:50 **Protocol:** PSEP (1995) **Sample Source:** Reference Toxicant
Sample Date: 05 May-14 **Material:** Unionized Ammonia **Sample Station:** P140505.46

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	5	10	10	
0	D	2	13	10	10	
0	D	3	18	10	10	
0.432		1	11	10	10	
0.432		2	1	10	10	
0.432		3	12	10	10	
0.796		1	7	10	10	
0.796		2	9	10	10	
0.796		3	15	10	10	
0.885		1	10	10	10	
0.885		2	8	10	10	
0.885		3	17	10	10	
1.591		1	3	10	0	
1.591		2	4	10	0	
1.591		3	16	10	0	
1.758		1	6	10	0	
1.758		2	14	10	0	
1.758		3	2	10	0	

CLIENT:	POLA	Date of Test:	05-Dec-14
PROJECT:	Everport	Test Type:	Neanthes RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	*NH3T (mg/L)*	*salinity (ppt)*	*pH*	*temp (C)*	temp (K)	i-factor	Mod	**NH3U (mg/L)**
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		**#VALUE!**
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		**0.008**
1										
2										
3	15		20.4	30	7.8	20.5	293.66	9.3242		**0.432**
4	30		46.8	30	7.7	20.6	293.76	9.3242		**0.796**
5	60		81.9	30	7.5	20.6	293.76	9.3242		**0.885**
6	120		185	30	7.4	20.6	293.76	9.3242		**1.591**
7	240		325	31	7.2	20.6	293.76	9.3270		**1.758**
8										
9										
10										
11										
12										
13										
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Ammonia Reference Toxicant Test Water Quality Data Sheet

CLIENT	PROJECT	SPECIES	LABORATORY	PROTOCOL
		Neanthes arenaceodentata	Port Gamble	USACE 1991

TEST ID	LOT #:	TEST START DATE	TIME	TEST END DATE	TIME
P140505.46	3244C535	05Dec14	1150	15Dec14	1350

WATER QUALITY DATA

TEST CONDITIONS					DO (mg/L) >4.6		TEMP(C) 20 ± 1		SAL (ppt) 30 ± 2		pH 6 - 9		TECHNICIAN	AMMONIA			SULFIDES		
CLIENT/ ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	D.O. meter	D.O. mg/L	TEMP. meter	TEMP. °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WQ TECH/ DATE	AMMONIA METER	AMMONIA mg/L	Tech	SULFIDES meter	SULFIDES mg/L	Tech
Ref.Tox.-ammonia	0	mg/L	0	Stock	9	7.3	9	20.5	9	30	9	7.9	JL 12/05	3	0.00	KB			
			4	1	~~8~~9	7.0	~~8~~9	20.6	~~8~~9	31	~~8~~9	7.9	KB 12/09						
			6	2	8	③3.0	8	20.0	8	30	8	7.3	KB 12/11						
			8	3	8	7.6	8	19.8	8	31	8	8.1	JL 12/13						
			10	1	9	7.5	9	18.7	9	34	9	7.9	JL 12/15 ⑤	15					
Ref.Tox.-ammonia	15	mg/L	0	Stock	9	7.3	9	20.5	9	30	9	7.8	JL 12/05	3	20.4	KB			
			4	1	~~8~~9	7.0	~~8~~9	20.3	~~8~~9	31	~~8~~9	7.9	KB 12/09						
			6	2	~~8~~8	③3.0	8	20.5	8	30	8	7.4	KB 12/11						
			8	3	8	7.6	8	19.6	8	32	8	④~~7.6~~	JL 12/13						
			10	1	9	7.5	9	19.0	9	34	9	7.9	JL 12/15						
Ref.Tox.-ammonia	30	mg/L	0	Stock	9	7.2	9	20.6	9	30	9	7.7	JL 12/05	3	46.8	KB			
			4	1	~~8~~9	7.0	9	20.4	9	31	9	7.9	KB 12/09						
			6	2	~~8~~③	2.7	8	20.1	8	30	8	②4.5	KB 12/11						
			8	3	8	7.6	8	19.2	8	33	8	7.9	JL 12/13						
			10	1	9	7.4	9	18.7	9	36	9	7.7	JL 12/15						
Ref.Tox.-ammonia	60	mg/L	0	Stock	9	7.2	9	20.6	9	30	9	7.5	JL 12/05	3	81.9	KB			
			4	1	9	7.0	9	20.4	9	31	9	7.8	KB 12/09						
			6	2	~~8~~③	5.0	8	19.9	8	30	8	7.6	KB 12/11						
			8	3															
			10	1															
Ref.Tox.-ammonia	120	mg/L	0	Stock	9	7.2	9	20.6	9	30	9	7.4	JL 12/05	3	185	KB			
			4	1															
			6	2															
			8	3															
			10	1															
Ref.Tox.-ammonia	240	mg/L	0	Stock	9	7.2	9	20.6	9	31	9	7.2	JL 12/05	3	325	KB			
			4	1															
			6	2															
			8	3															
			10	1															

① IC - wrong meter number. KB. 12/09/14

② Illegible. pH = 7.5. KB. 12/11/14

③ Initiated aeration on all reps. KB. 12/11/14

④ WC. 8.0 pH. JL 12/13/14.

⑤ WD. JL 12/15/14.

Ammonia Reference Toxicant Test Survival Data Sheet

SPECIES		
Neanthes arenaceodentata		
PROJECT MANAGER	LABORATORY	PROTOCOL
B. Hester	Port Gamble	USACE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = Normal
LOE = Loss of equilibium
Q = Quinscent
DC = Discoloration
NB = No body
F = Floating on surface

INITIAL # OF ORGANISMS: 10

CLIENT/ ID	CONC. value	CONC. units	REP	INITIAL NUMBER	DAY 1 DATE 12/06 TECHNICIAN JL			DAY 2 DATE 12/07 TECHNICIAN JL			DAY 3 DATE 12/08 TECHNICIAN KMB			DAY 4 DATE 12/09 TECHNICIAN KMB			DAY 5 DATE 12/10 TECHNICIAN KMB			DAY 6 DATE 12/11 TECHNICIAN KMB			DAY 7 DATE 12/12 TECHNICIAN MK			DAY 8 DATE 12/13 TECHNICIAN JL			DAY 9 DATE 12/14 TECHNICIAN JL			DAY 10 DATE 12/15 TECHNICIAN KB		
					#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Ref.Tox.- Ammonia	0	mg/L	1	10	10	0	N	10	0	N	10	0	IF	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	↓	10	0	↓	10	0	N	10	0	↓	10	0	↓	10	0	N	10	0	↓	10	0	↓	10	0	↓	10	0	↓
			3		10	0	↓	10	0	↓	10	0	N	10	0	↓	10	0	↓	10	0	N	10	0	↓	10	0	↓	10	0	↓	10	0	↓
Ref.Tox.- Ammonia	15	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	↓	10	0	↓	10	0	↓	10	0	↓	10	0	↓	9	0	↓	9	0	↓	9	0	↓	9	0	↓	9	0	↓
			3		10	0	↓	10	0	↓	10	0	↓	10	0	↓	10	0	↓	10	0	IF	10	0	↓	10	0	↓	10	0	↓	10	0	↓
Ref.Tox.- Ammonia	30	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	Q	10	0	Q	10	0	Q	10	0	Q
			2		10	0	↓	10	0	↓	10	0	↓	10	0	↓	10	0	↓	10	0	Q	5	5	↓	4	1	↓	9	0	↓	3	1	↓
			3		10	0	↓	10	0	↓	10	0	↓	10	0	↓	10	0	↓	10	0	N	10	0	↓	10	0	↓	10	0	↓	10	0	↓
Ref.Tox.- Ammonia	60	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	Q	0	10	Q	—	—	—												
			2		10	0	↓	10	0	↓	10	0	↓	10	0	↓	4	6	↓	0	4	—												
			3		10	0	↓	10	0	↓	10	0	↓	10	0	↓	7	3	↓	8	7	—												
Ref.Tox.- Ammonia	120	mg/L	1		10	0	N	10	0	Q	0	10																					
			2		10	0	↓	10	0	↓	0	10																					
			3		10	0	↓	10	0	↓	0	10																					
Ref.Tox.- Ammonia	240	mg/L	1		10	0	D	0	10	NA																							
			2		10	0	↓	0	10	↓																							
			3	↓	10	0	↓	0	10	↓																							

Feed: KB

① 1 organism lost on water quality equipment. KB. 12/10/14

ENVIRON **Ammonia Reference Toxicant Spiking Worksheet**

Neanthes NH_3 RT

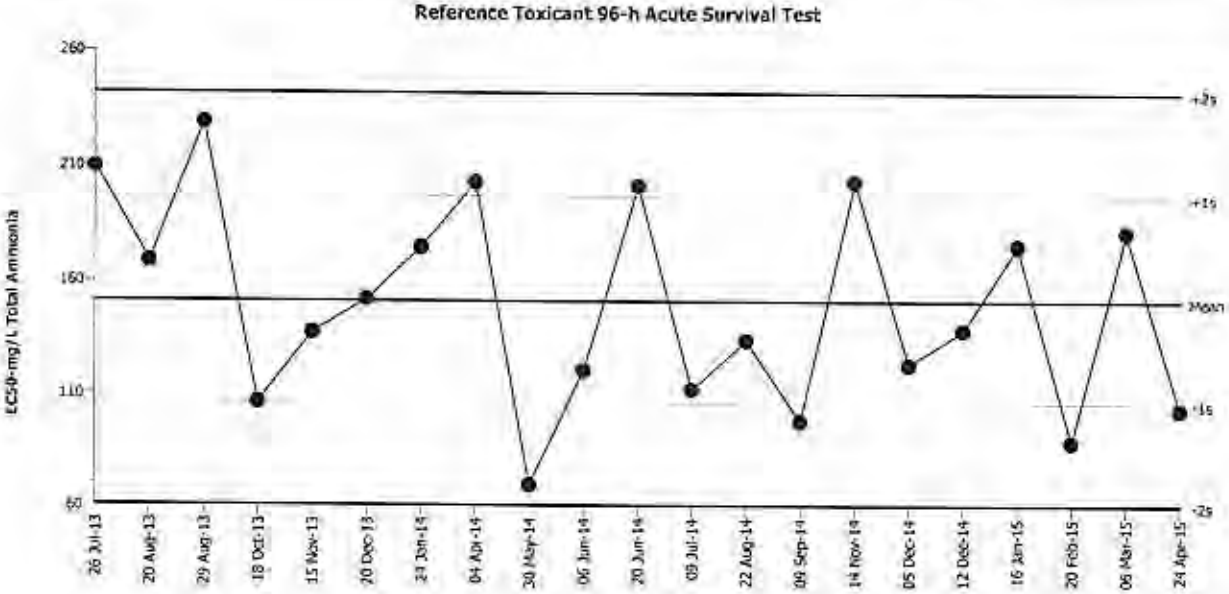
Assumptions in Model
Stock ammonia concentration is 10,000 mg/L = 10 mg/mL

Actual Reading reading from
4560

Test Solutions			Volume of stock to reach desired concentration		
Measured Concentration	**Desired Concentration**	**Volume**			
mg/L	mg/L	mL	mL stock to increase		
			[redacted]	[redacted]	SALT WATER (mL)
325	**240**	750			**59.211**
185	**120**	750			**29.605**
81.9	**60**	750			**14.803**
46.8	**30**	750			**7.401**
20.4	**15**	750			**3.701**
0.00	0	750			0.000

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	Organism:	Neanthes arenaceodentata (Polycha	Material:	Total Ammonia
Protocol:	PSEP (1995)	Endpoint:	Proportion Survived	Source:	Reference Toxicant-REF



Mean:	151.3	Count:	20	-1s Warning Limit:	105.9	-2s Action Limit:	60.58
Sigma:	45.36	CV:	30.00%	+1s Warning Limit:	196.7	+2s Action Limit:	242

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Jul	26	12:00	209.7	58.41	1.288	(+)		21-1882-7830	07-5315-7472	NewFields
2		Aug	20	15:45	168.6	17.35	0.3824			00-0072-4465	03-0193-2385	NewFields
3			29	13:40	229.1	77.83	1.716	(+)		00-4506-4349	11-1553-1817	NewFields
4		Oct	18	15:35	106.3	-44.99	-0.992			21-0368-6339	03-0733-6178	NewFields
5		Nov	15	15:30	137.4	-13.87	-0.3058			16-5727-5696	09-2903-6118	NewFields
6		Dec	20	14:00	152.2	0.871	0.0192			08-9922-1254	05-5343-6267	NewFields
7	2014	Jan	24	13:20	174.5	23.22	0.512			20-9603-7883	05-6245-5381	NewFields
8		Apr	4	15:40	202.9	51.58	1.137	(+)		09-1443-8374	04-8864-2138	ENVIRON
9		May	30	16:25	69.43	-81.87	-1.805	(-)		18-4751-2702	06-4812-5268	ENVIRON
10		Jun	6	14:00	120.6	-30.73	-0.6774			02-4901-6395	02-6665-3375	ENVIRON
11			20	13:20	201.3	50.05	1.103	(+)		04-8899-1061	18-6388-8462	ENVIRON
12		Jul	9	15:30	112	-39.28	-0.8659			00-3047-6484	19-8550-4064	ENVIRON
13		Aug	22	12:30	133.9	-17.43	-0.3843			19-3698-7324	19-8424-2994	ENVIRON
14		Sep	9	15:00	97.87	-53.43	-1.178	(-)		04-0379-7898	08-6657-8417	ENVIRON
15		Nov	14	11:11	203.3	51.98	1.146	(+)		09-0815-7159	21-3147-5839	ENVIRON
16		Dec	5	11:50	123.1	-28.21	-0.6219			14-5288-4655	12-0797-2995	ENVIRON
17			12	11:45	138.4	-12.86	-0.2834			04-7774-5498	11-0912-6539	ENVIRON
18	2015	Jan	16	11:15	175.3	23.99	0.5288			03-9642-9379	19-1724-7286	ENVIRON
19		Feb	20	14:50	88.65	-62.65	-1.381	(-)		12-3560-9864	07-2965-5219	ENVIRON
20		Mar	6	11:50	181.2	29.86	0.6582			09-2159-7453	09-1672-5355	ENVIRON
21		Apr	24	12:50	103.1	-48.22	-1.063	(-)		01-6315-9057	02-6990-5019	ENVIRON

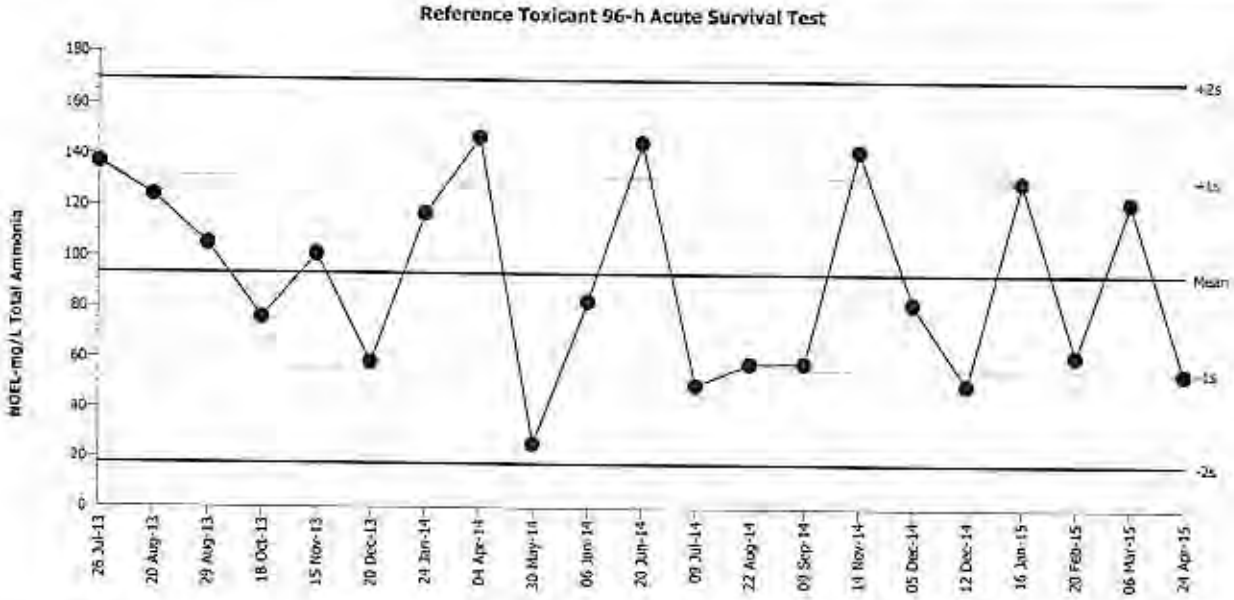
Reference Toxicant 96-h Acute Survival Test

All Matching Labs

Test Type: Survival
Protocol: PSEP (1995)

Organism: Neanthes arenaceodentata (Polycha
Endpoint: Proportion Survived

Material: Total Ammonia
Source: Reference Toxicant-REF



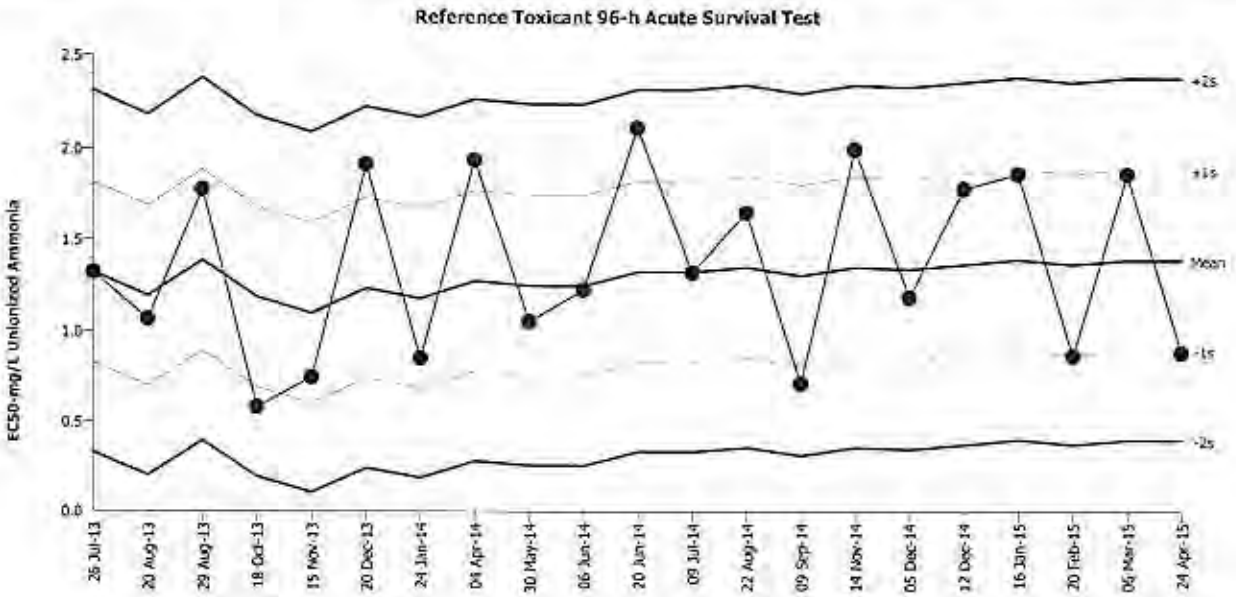
Mean:	93.58	Count:	20	-1s Warning Limit:	55.64	-2s Action Limit:	17.7
Sigma:	37.94	CV:	40.50%	+1s Warning Limit:	131.5	+2s Action Limit:	169.5

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Jul	26	12:00	137	43.42	1.144	(+)		21-1882-7830	14-5107-6466	NewFields
2		Aug	20	15:45	124	30.42	0.8018			00-0072-4465	04-2226-9652	NewFields
3			29	13:40	105	11.42	0.301			00-4506-4349	03-1605-8937	NewFields
4		Oct	18	15:35	76	-17.58	-0.4634			21-0368-6339	09-9293-9888	NewFields
5		Nov	15	15:30	101	7.42	0.1956			16-5727-5696	19-4124-7251	NewFields
6		Dec	20	14:00	58.3	-35.28	-0.9299			08-9922-1254	11-2068-6689	NewFields
7	2014	Jan	24	13:20	117	23.42	0.6173			20-9603-7883	15-6685-9407	NewFields
8		Apr	4	15:40	147	53.42	1.408	(+)		09-1443-8374	10-8829-6450	ENVIRON
9		May	30	16:25	25.7	-67.88	-1.789	(-)		18-4751-2702	12-3702-5556	ENVIRON
10		Jun	6	14:00	82.6	-10.98	-0.2894			02-4901-6395	20-5404-5146	ENVIRON
11			20	13:20	145	51.42	1.355	(+)		04-8899-1061	10-6019-5810	ENVIRON
12		Jul	9	15:30	49.5	-44.08	-1.162	(-)		00-3047-6484	08-3152-1432	ENVIRON
13		Aug	22	12:30	58.1	-35.48	-0.9352			19-3698-7324	16-9806-3196	ENVIRON
14		Sep	9	15:00	58.3	-35.28	-0.9299			04-0379-7898	19-3535-3112	ENVIRON
15		Nov	14	11:11	142	48.42	1.276	(+)		09-0815-7159	10-8173-5203	ENVIRON
16		Dec	5	11:50	81.9	-11.68	-0.3079			14-5288-4655	20-6606-9579	ENVIRON
17			12	11:45	49.7	-43.88	-1.157	(-)		04-7774-5498	10-4327-6265	ENVIRON
18	2015	Jan	16	11:15	130	36.42	0.9599			03-9642-9379	02-7191-1789	ENVIRON
19		Feb	20	14:50	61.4	-32.18	-0.8482			12-3560-9864	14-9510-1611	ENVIRON
20		Mar	6	11:50	122	28.42	0.7491			09-2159-7453	06-6960-4147	ENVIRON
21		Apr	24	12:50	54.3	-39.28	-1.035	(-)		01-6315-9057	00-4642-5370	ENVIRON

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	1.392	**Count:**	20	**-1s Warning Limit:**	0.8959	**-2s Action Limit:**	0.3997
Sigma:	0.4962	**CV:**	35.60%	**+1s Warning Limit:**	1.888	**+2s Action Limit:**	2.384

Quality Control Data

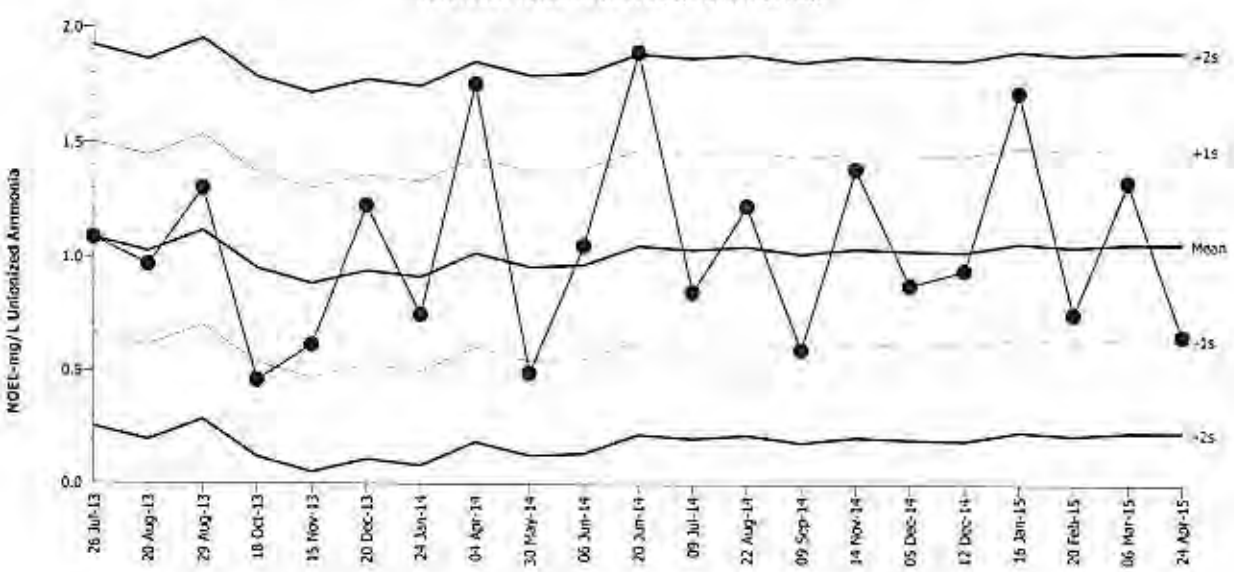
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Jul	26	12:00	1.324	-0.06828	-0.1376			08-3568-6719	13-1071-7473	NewFields
2		Aug	20	15:45	1.065	-0.3266	-0.6582			11-8125-8700	06-3963-9074	NewFields
3			29	13:40	1.779	0.3869	0.7797			06-4372-6299	20-5863-7836	NewFields
4		Oct	18	15:35	0.5812	-0.8108	-1.634	(-)		21-1191-9888	03-5569-7261	NewFields
5		Nov	15	15:30	0.746	-0.646	-1.302	(-)		09-2209-5330	09-1007-2814	NewFields
6		Dec	20	14:00	1.916	0.5236	1.055	(+)		01-5055-0133	16-3961-8899	NewFields
7	2014	Jan	24	13:20	0.8517	-0.5403	-1.089	(-)		09-1104-1497	12-8333-6553	NewFields
8		Apr	4	15:40	1.94	0.5477	1.104	(+)		00-6512-2526	06-9520-2408	NewFields
9		May	30	16:25	1.055	-0.3372	-0.6796			04-6747-6619	11-2879-2220	ENVIRON
10		Jun	6	14:00	1.228	-0.1644	-0.3314			19-7971-8908	15-6482-0033	ENVIRON
11			20	13:20	2.113	0.7215	1.454	(+)		01-9511-3585	14-0146-3778	ENVIRON
12		Jul	9	15:30	1.322	-0.06972	-0.1405			09-1500-8488	10-4546-7656	ENVIRON
13		Aug	22	12:30	1.65	0.2578	0.5196			18-5611-8800	16-9514-3424	ENVIRON
14		Sep	9	15:00	0.7125	-0.6795	-1.369	(-)		18-5349-8839	17-4717-4294	ENVIRON
15		Nov	14	11:11	1.998	0.6064	1.222	(+)		17-3054-3443	08-9007-7058	ENVIRON
16		Dec	5	11:50	1.187	-0.2054	-0.4139			14-0275-5265	10-7706-7479	ENVIRON
17			12	11:45	1.782	0.3904	0.7869			04-5967-6225	06-1786-3304	ENVIRON
18	2015	Jan	16	11:15	1.864	0.472	0.9512			18-9719-6747	15-5803-7088	ENVIRON
19		Feb	20	14:50	0.866	-0.526	-1.06	(-)		15-6687-7653	15-3894-5718	ENVIRON
20		Mar	6	11:50	1.861	0.4693	0.9458			11-3697-1780	11-9165-3524	ENVIRON
21		Apr	24	12:50	0.8832	-0.5088	-1.025	(-)		01-0867-6874	09-2102-1717	ENVIRON

CETIS QC Plot

Report Date: 15 May-15 09:55 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	Organism:	Neanthes arenaceodentata (Polycha	Material:	Unionized Ammonia
Protocol:	PSEP (1995)	Endpoint:	Proportion Survived	Source:	Reference Toxicant-REF



Mean:	1.067	Count:	20	-1s Warning Limit:	0.6497	-2s Action Limit:	0.2329
Sigma:	0.4169	CV:	39.10%	+1s Warning Limit:	1.484	+2s Action Limit:	1.9

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2013	Jul	26	12:00	1.087	0.02	0.04797			08-3568-6719	20-5296-6252	NewFields
2		Aug	20	15:45	0.97	-0.097	-0.2327			11-8125-8700	00-8450-2616	NewFields
3			29	13:40	1.301	0.234	0.5613			06-4372-6299	17-0691-0612	NewFields
4		Oct	18	15:35	0.459	-0.608	-1.458	(-)		21-1191-9888	08-6606-1702	NewFields
5		Nov	15	15:30	0.615	-0.452	-1.084	(-)		09-2209-5330	09-5248-1072	NewFields
6		Dec	20	14:00	1.228	0.161	0.3862			01-5055-0133	05-3710-3857	NewFields
7	2014	Jan	24	13:20	0.75	-0.317	-0.7604			09-1104-1497	11-9980-1624	NewFields
8		Apr	4	15:40	1.759	0.692	1.66	(+)		00-6512-2526	16-4646-7758	NewFields
9		May	30	16:25	0.494	-0.573	-1.374	(-)		04-6747-6619	20-5692-2184	ENVIRON
10		Jun	6	14:00	1.056	-0.011	-0.02639			19-7971-8908	15-9945-9119	ENVIRON
11			20	13:20	1.898	0.831	1.993	(+)		01-9511-3585	21-4292-7262	ENVIRON
12		Jul	9	15:30	0.853	-0.214	-0.5133			09-1500-8488	15-2291-7760	ENVIRON
13		Aug	22	12:30	1.227	0.16	0.3838			18-5611-8800	02-5634-5468	ENVIRON
14		Sep	9	15:00	0.599	-0.468	-1.123	(-)		18-5349-8839	09-1071-5088	ENVIRON
15		Nov	14	11:11	1.391	0.324	0.7772			17-3054-3443	03-6925-5177	ENVIRON
16		Dec	5	11:50	0.885	-0.182	-0.4366			14-0275-5265	10-6284-3142	ENVIRON
17			12	11:45	0.949	-0.118	-0.283			04-5967-6225	18-7114-9710	ENVIRON
18	2015	Jan	16	11:15	1.723	0.656	1.574	(+)		18-9719-6747	13-2446-7374	ENVIRON
19		Feb	20	14:50	0.756	-0.311	-0.746			15-6687-7653	19-8246-2320	ENVIRON
20		Mar	6	11:50	1.333	0.266	0.638			11-3697-1780	05-2303-0535	ENVIRON
21		Apr	24	12:50	0.659	-0.408	-0.9787			01-0857-6874	18-8094-8803	ENVIRON

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test — ENVIRON

Batch ID:	00-2611-9423	Test Type:	Survival	Analyst:	
Start Date:	24 Apr-15 12:50	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	28 Apr-15 14:50	Species:	Neanthes arenaceodentata	Brine:	Not Applicable
Duration:	4d 2h	Source:	Aquatic Toxicology Support	Age:	
Sample ID:	09-1798-0904	Code:	36B746E8	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Total Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	354d 13h	Station:	P140505.97		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-4642-5370	Proportion Survived	54.3	124	82.06	NA		Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
02-6990-5019	Proportion Survived	EC50	103.1	91.01	116.8		Trimmed Spearman-Karber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
16		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
25.3		3	1	1	1	1	1	0	0	0.0%	0.0%
54.3		3	1	1	1	1	1	0	0	0.0%	0.0%
124		3	0.3333	0	0.8504	0.1	0.5	0.1202	0.2082	62.45%	66.67%
221		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
16		0.9	1	1
25.3		1	1	1
54.3		1	1	1
124		0.5	0.1	0.4
221		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	10/10
16		9/10	10/10	10/10
25.3		10/10	10/10	10/10
54.3		10/10	10/10	10/10
124		5/10	1/10	4/10
221		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test				ENVIRON
Start Date:	24 Apr-15 12:50	Species:	Neanthes arenaceodentata	Sample Code: 36B746E8
End Date:	28 Apr-15 14:50	Protocol:	PSEP (1995)	Sample Source: Reference Toxicant
Sample Date:	05 May-14	Material:	Total Ammonia	Sample Station: P140505.97

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	12	10	10	
0	D	2	4	10	10	
0	D	3	3	10	10	
16		1	17	10	9	
16		2	5	10	10	
16		3	1	10	10	
25.3		1	14	10	10	
25.3		2	16	10	10	
25.3		3	15	10	10	
54.3		1	8	10	10	
54.3		2	2	10	10	
54.3		3	13	10	10	
124		1	6	10	5	
124		2	18	10	1	
124		3	11	10	4	
221		1	9	10	0	
221		2	7	10	0	
221		3	10	10	0	

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test — ENVIRON

Batch ID:	13-9742-6051	Test Type:	Survival	Analyst:	
Start Date:	24 Apr-15 12:50	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	28 Apr-15 14:50	Species:	Neanthes arenaceodentata	Brine:	Not Applicable
Duration:	4d 2h	Source:	Aquatic Toxicology Support	Age:	

Sample ID:	10-2090-1423	Code:	3CD9B82F	Client:	Internal Lab
Sample Date:	05 May-14	Material:	Unionized Ammonia	Project:	Reference Toxicant
Receive Date:	05 May-14	Source:	Reference Toxicant		
Sample Age:	354d 13h	Station:	P140505.97		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-8094-8803	Proportion Survived	0.659	0.991	0.8081	NA		Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
09-2102-1717	Proportion Survived	EC50	0.8832	0.8414	0.9271		Trimmed Spearman-Karber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
0.242		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
0.386		3	1	1	1	1	1	0	0	0.0%	0.0%
0.659		3	1	1	1	1	1	0	0	0.0%	0.0%
0.991		3	0.3333	0	0.8504	0.1	0.5	0.1202	0.2082	62.45%	66.67%
1.135		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
0.242		0.9	1	1
0.386		1	1	1
0.659		1	1	1
0.991		0.5	0.1	0.4
1.135		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	10/10
0.242		9/10	10/10	10/10
0.386		10/10	10/10	10/10
0.659		10/10	10/10	10/10
0.991		5/10	1/10	4/10
1.135		0/10	0/10	0/10

CETIS Test Data Worksheet

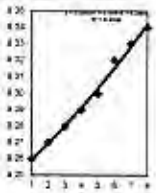
Reference Toxicant 96-h Acute Survival Test				ENVIRON
Start Date:	24 Apr-15 12:50	Species:	Neanthes arenaceodentata	Sample Code: 3CD9B82F
End Date:	28 Apr-15 14:50	Protocol:	PSEP (1995)	Sample Source: Reference Toxicant
Sample Date:	05 May-14	Material:	Unionized Ammonia	Sample Station: P140505.97

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	12	10	10	
0	D	2	3	10	10	
0	D	3	18	10	10	
0.242		1	10	10	9	
0.242		2	13	10	10	
0.242		3	16	10	10	
0.386		1	2	10	10	
0.386		2	8	10	10	
0.386		3	7	10	10	
0.659		1	4	10	10	
0.659		2	17	10	10	
0.659		3	5	10	10	
0.991		1	14	10	5	
0.991		2	15	10	1	
0.991		3	11	10	4	
1.135		1	1	10	0	
1.135		2	6	10	0	
1.135		3	9	10	0	

CLIENT:	POLA	Date of Test:	24-Apr-15
PROJECT:	Everport	Test Type:	Neanthes RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer:	I-factor
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	I-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1										
2										
3										
4	15		16	30	7.7	19.0	292.16	9.3242		0.242
5	30		25.3	30	7.7	19.1	292.26	9.3242		0.386
6	60		54.3	30	7.6	19.1	292.26	9.3242		0.659
7	120		124	30	7.4	19.6	292.76	9.3242		0.991
8	240		221.000	31	7.2	19.9	293.06	9.3270		1.135
9										
10										
11										
12										
13										
14										
15										
16										
17										
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ENVIRON

Ammonia Reference Toxicant Test Water Quality Data Sheet

CLIENT	PROJECT	SPECIES	LABORATORY	PROTOCOL
		Neanthes arenaceodentata	Port Gamble	USACE 1991

TEST ID	LOT #	TEST START DATE	TIME	TEST END DATE	TIME
P140505.97	32446535	4/24/15	1250	4/28/15	1450

WATER QUALITY DATA

TEST CONDITIONS					DO (mg/L)		TEMP(C)		SAL (ppt)		pH		TECHNICIAN	AMMONIA			SULFIDES		
					>4.6		20 ± 1		30 ± 2		6 - 9								
CLIENT ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	D.O. meter	D.O. mg/L	TEMP. meter	TEMP. °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WQ TECH/ DATE	AMMONIA meter	AMMONIA mg/L	Tech	SULFIDES meter	SULFIDES mg/L	Tech
Ref.Tox.-ammonia	0	mg/L	0	Stock	9	7.6	9	19.0	9	30	9	7.7	HE 4/24	3	0.00	HE			
			4	1	8	7.0	8	20.3	8	30	8	7.6	4/28 JL						
			6	2	8	6.7	8	20.6	8	30	8	7.9	4/30 MK						
			8	3	9	7.2	9	19.8	9	31	9	8.0	5/02 JL						
			10	1	~~98~~ 8	7.2	~~96~~ 8	~~19.8~~	~~98~~ 8	31	~~9~~ 8	8.0	~~5/4 KB~~ 5/4 MK						
Ref.Tox.-ammonia	15	mg/L	0	Stock	9	7.8	9	19.0	9	30	9	7.7	HE 4/24	3	16.0	HE			
			4	1	8	7.2	8	20.6	8	30	8	7.8	JL 4/28						
			6	2	8	6.4	8	20.4	8	31	8	7.8	4/30 MK						
			8	3	9	6.9	9	20.2	9	31	9	7.9	5/02 JL						
			10	1	98 8	7.3	9	20.1	8	31	9	8.0	5/4 KB						
Ref.Tox.-ammonia	30	mg/L	0	Stock	9	8.1	9	19.1	9	30	9	7.7	HE 4/24	3	25.3	HE			
			4	1	8	7.1	8	20.6	8	30	8	7.8	JL 4/28						
			6	2	8	5.9	8	20.6	8	31	8	7.8	4/30 MK						
			8	3	9	7.0	9	20.4	9	30	9	7.9	5/02 JL						
			10	1	9	6.8	8	20.1	9	31	9	8.0	5/04 KB						
Ref.Tox.-ammonia	60	mg/L	0	Stock	9	8.0	9	19.1	9	30	9	7.6	HE 4/24	3	54.3	HE			
			4	1	8	7.1	8	20.3	8	31	8	7.7	JL 4/28						
			6	2	8	6.0	8	20.8	8	30	8	7.7	4/30 MK						
			8	3	9	6.8	9	20.1	9	32	9	7.8	5/02 JL						
			10	1	9	6.9	9	19.7	9	33	9	7.8	5/04 KB						
Ref.Tox.-ammonia	120	mg/L	0	Stock	9	8.1	9	19.6	9	30	9	7.4	HE 4/24	3	124	HE			
			4	1	8	6.8	8	20.2	8	31	8	7.6	JL 4/28						
			6	~~3~~ 2	8	6.4	8	20.2	8	31	8	7.6	4/30 MK						
			8	3	—		—		—		—								
			10	1	—		—		—		—								
Ref.Tox.-ammonia	240	mg/L	0	Stock	9	8.0	9	19.9	9	31	9	7.2	HE 4/24	3	221	HE			
			4	1	8	—	8	—	8	—	8	—	4/28 JL						
			6	2	—		—		—		—		4/30 MK						
			8	3	\		\		\		\								
			10	1	\		\		\		\								

① wrong date. MK 4/30 5/4. Actual date = 5/4.

② wrong meter. Meter 9. 5/4 JL KMB

ENVIRON

Ammonia Reference Toxicant Test Survival Data Sheet

SPECIES		
Neanthes arenaceodentata		
PROJECT MANAGER	LABORATORY	PROTOCOL
David Moore	Port Gamble	USACE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = Normal
LOE = Loss of equilibium
Q = Quiescent
DC = Discoloration
NB = No body
F = Floating on surface

INITIAL # OF ORGANISMS: 10

CLIENT ID	CONC. value	CONC. units	REP	INITIAL NUMBER	DAY 1			DAY 2			DAY 3			DAY 4			DAY 5			DAY 6			DAY 7			DAY 8			DAY 9			DAY 10		
					#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
					DATE 4/25			DATE 4/26			DATE 4/27			DATE 4/28			DATE 4/29			DATE 4/30			DATE 5/01			DATE 5/02			DATE 5/03			DATE 5/4		
					TECHNICIAN JL			TECHNICIAN HE			TECHNICIAN MK			TECHNICIAN CR			TECHNICIAN HE			TECHNICIAN MK			TECHNICIAN JL			TECHNICIAN JL			TECHNICIAN JL			TECHNICIAN MK		
Ref.Tox.- Ammonia	0	mg/L	1	10	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0		10	0		10	0		10	0		10	0	HP	10	0		10	0		10	0		10	0		10	0	
			3		10	0		10	0		10	0		10	0		10	0	HP	10	0		10	0		10	0		10	0		9	0	NB
Ref.Tox - Ammonia	15	mg/L	1		10	0	N	10	0	N	10	0	N	9	0	NB	9	0	N	9	0	N	9	0	N	9	0	N	9	0	N	9	0	N
			2		10	0		10	0		10	0		10	0	N	10	0		9	0	NB	9	0		9	0		9	0		9	0	
			3		10	0		10	0		10	0		10	0	N	10	0		10	0	N	10	0		10	0		10	0		10	0	
Ref.Tox.- Ammonia	30	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0		10	0		10	0		10	0		10	0		10	0		10	0		10	0		10	0		9	0	
			3		10	0		10	0		10	0		10	0		10	0		10	0		10	0		10	0		10	0		10	0	Q
Ref.Tox - Ammonia	60	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N	10	0	N	10	0	Q	10	0	Q	10	0	Q	10	0	Q	10	0	Q
			2		10	0		10	0		10	0		10	0		10	0		10	0		10	0		1	9		1	0		1	0	
			3		10	0		10	0		10	0		10	0		10	0		10	0		10	0		10	0		10	0		10	0	
Ref.Tox.- Ammonia	120	mg/L	1		10	0	N	10	0	N	10	0	Q	5	5	Q	3	2	Q	0	3	—											
			2		10	0		10	0		3	7		1	2		0	1	—														
			3		10	0		10	0		10	0		4	6		1	3	Q	0	1	—											
Ref.Tox.- Ammonia	240	mg/L	1		10	0	Q	10	0	Q	0	10	—																				
			2		10	0		10	0		0	10	—																				
			3		10	0		10	0		0	10	—																				

① WC HE N 4/29

Feed: HE

APPENDIX B-7.6 *Neanthes virens* and *Macoma nasuta* Bioaccumulation Test

28-DAY BIOACCUMULATION NEREIS TEST OBSERVATION DATA SHEET 3

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY	PROTOCOL	SPECIES
POLA	Everport		David Moore	0	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)	*Macoma Nasuta*

Observation Key

#S= Number on the Surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows

INITIAL # OF ORGANISMS: 25

ENDPOINT DATA & OBSERVATIONS

CLIENT / Environ ID	REP	INITIAL # IF DIFF	Jar #	Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
				DATE / TECHN.	12/10 KMB	12/11 KMB	12/12 MK	12/13 JL	12/14 JL	12/15 JL	12/16 KMB	12/17 KMB	12/18 KMB	12/19	12/20 JL	12/21	12/22 JL	12/23 KB
REF-DMMU-2	4		1		N	N	N	N	2S	N	N	N	N	1S	N	N	1S	N
DMMU-2	3		2		↓	1S	1S	1S	1S	↓	↓	↓	↓	N	↓	↓	1S	↓
DMMU-2	2		3		1S	1S	1S	1S	1S	1S	↓	↓	↓	↓	↓	↓	N	↓
DMMU-2	4		4		1S	1S	1S	N	N	N	↓	↓	↓	↓	↓	↓	↓	↓
Control	3		5		1S	2S	2S	3S	3S	2S	4S	4S	5S	4S	6S	5S	4S	5S
REF-DMMU-2	3		6		2S	2S	1S	1S	4S	3S	2S	2S	1M 2S	2S	3S	N	N	N
Control	1		7		1S	N	1S	2S	2S	3S	1S	3S	2S	1S	3S	2S	5S,1M	5S
DMMU-2	5		8		2S	2S	2S	1S	1S	1S	1S	N	N	N	N	N	N	N
REF-DMMU-2	1		9		N	1S	N	1S	N	1S	① ~~2S~~ N	1S	↓	↓	↓	1S	1S	2S
DMMU-2	1		10		6S	3S	1S	1S	1S	2S	~~2S~~ 4S ①	2S	2S	↓	1S	1S	1S	N
Control	2		11		2S	3S	2S	1S	2S	1S	4S	2S	3S	4S	4S	3S	1S,1M	↓
REF-DMMU-2	5		12		N	N	N	N	1M	N	N	N	N	N	N	2S	N	↓
REF-DMMU-2	2		13		↓	↓	1S	1S	N	1S	↓	1S	1S	N	1S	1S	1S	↓

① WC. KMB. 12/16/14

28-DAY BIOACCUMULATION NEREIS TEST OBSERVATION DATA SHEET 3

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY	PROTOCOL	SPECIES
POLA	Everport	0	David Moore	0	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)	*Macoma Nasuta*

Observation Key

#S= Number on the Surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows

INITIAL # OF ORGANISMS: 25

ENDPOINT DATA & OBSERVATIONS

CLIENT / ENVIRON	REP	INITIAL # IF DIFF	Jar #	DATE / TECHN.	12/24 KB	12.25 BH	12.26 BH	12/27 JL	12/28 JL	12/29 KB	12/30 KB	12/31 [illegible]	01/01 CR	01/02 KB	1/03 JL	1/04 JL	1/5 [illegible]	1/6/15 KB	Number Remaining	
				Day	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
REF-DMMU-2	4		1		N	2S	1S	2S	1S	N	N	3S	N	N	1S	1S	1S	1S	25	
DMMU-2	3		2		↓	N	N	N	N	↓	↓	N	1M	N	N	N	N	N	19	
DMMU-2	2		3		↓	N	N	↓	↓	↓	↓	↓	N	N	↓	↓	↓	↓	25	
DMMU-2	4		4		↓	N	N	↓	↓	↓	↓	↓	N	N	1S	N ~~5S~~ ⑤	↓	↓	25	
Control	3		5		6S	6S	7S	5S	6S ②	6S 1M	6S	5S, 1M ③	3S, 1M	5S	4S	5S	6S	7S, 1M	20	1M
REF-DMMU-2	3		6		N	1S	1S	~~4S, 1M~~ 5S ①	② ~~6S~~ 3S	N	1S	1M	N	1S	1S	2S	1S	1S	22	1M
Control	1		7		4S	2S	5S	6S	② ~~3S~~ 4S	6S	4S	6S, 1M ④	2S	4S	4S	5S	3S	6S	22	1M
DMMU-2	5		8		N	N	N	N	N	N	N	N	N	N	N	N	N	N	~~25~~ 21	~~1M~~ ⑥
REF-DMMU-2	1		9		↓	N	N	↓	1M	↓	↓	↓	↓	N	1S	1S	2S	2S	24	
DMMU-2	1		10		↓	1M	N	↓	N	↓	↓	↓	↓	N	1S	1S	N	N	23	1M
Control	2		11		2S	1S	4S	5S	5S	4S	3S	4S	4S	1M, 4S	7S	6S	6S	7S	21	1M
REF-DMMU-2	5		12		N	N	N	N	N	N	N	N	N	N	N	1S	N	N	25	
REF-DMMU-2	2		13		↓	1S	2S	2S	↓	N	↓	↓	N	3S	3S	3S	1S	1S	25	

① IE. JL 12/27/14. ② WC. JL 12/28/14 ③ [illegible] [illegible] 12/31

④ Tank is leaking through glass crack. Bumped up H_2O flow. MK 12/31.

⑤ WC. JL 1/04/15.

⑥ WC [illegible] 1/6

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	TECHNICIAN	FLOW 38-56 ml/30sec
Control / .	0	1	7	8	7.7	8	14.3	8	29	8	7.7	KMB 12/09/14	56
		2	11	↓	7.8	↓	14.4	↓	29	↓	7.7	↓	55
		3	5	↓	7.7	↓	14.3	↓	29		7.7		41
Control / .	1	1	7	8	7.6	8	15.0	8	28	8	7.7	KMB 12/10	53
Control / .	2	2	11	8	~~7.8~~ 7.9	8	15.3	8	29	8	7.9	KMB 12/11	42
Control / .	3	3	5	9	7.6	9	15.0	9	29	9	7.8	MK 12/12	48
Control / .	4	1	7	8	8.1	8	14.5	8	28	8	7.8	JL 12/13	46
Control / .	5	2	11	8	8.2	8	14.6	8	28	8	7.7	JL 12/14	39
Control / .	6	3	5	9	8.0	9	14.7	9	28	9	7.7	JL 12/15	40
Control / .	7	1	7	8	8.1	8	14.5	8	28	8	7.8	KB 12/16	54
Control / .	8	2	11	9	8.0	9	15.0	9	28	9	7.8	KMB 12/17	46
Control / .	9	3	5	9	8.0	9	14.4	9	28	9	7.6	KMB 12/18	54
Control / .	10	1	7	9	8.0	9	14.8	9	28	9	7.7	HK 12/19	39
Control / .	11	2	11	8	8.1	8	14.9	8	29	8	7.8	JL 12/20	42
Control / .	12	3	5	8	7.9	8	14.9	8	29	8	7.8	HK 12/21	(2) 38 41
Control / .	13	1	7	8	8.2	8	14.6	8	30	8	7.8	JL 12/22	40
Control / .	14	2	11	9	8.0 ~~7.9~~ (3)	9	14.9	9	30	9	~~7.8~~ (3) ~~7.7~~	KB 12/23	55

(1) WC. KMB. 12/4/14 (2) WP HK 12/21 (3) WC. KMB. 12/23/14

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Control / .	15	3	5	9	7.8	9	14.7	9	29	9	7.7	HF 12/24	39
Control / .	16	1	7	8	8.0	8	14.6	8	30	8	7.7	BH 12.25	48
Control / .	17	2	11	8	8.1	8	14.5	8	31	8	7.8	BH 12.26	47
Control / .	18	3	5	8	7.7	8	14.8	8	31	8	7.8	JL 12/27	55
Control / .	19	1	7	8	7.8	8	14.4	8	30	8	7.7	JL 12/28	56
Control / .	20	2	11	8	8.5	8	14.9	8	28	8	7.9	KB 12/29	41
Control / .	21	3	5	9	7.9	9	14.8	9	29	9	7.7	KB 12/30	56
Control / .	22	1	7	8	7.1	8	14.4	8	29	8	7.6	HF 12/31	55
Control / .	23	2	11	9	7.9	9	15.1	9	30	9	7.7	CR 1/1	47
Control / .	24	3	5	9	7.5	9	14.7	9	29	9	7.6	KB 01/02/15	48
Control / .	25	1	7	8	7.9	8	14.4	8	28	8	7.8	JL 1/03	56
Control / .	26	2	11	8	8.1	8	14.9	8	28	8	7.8	JL 1/04	44
Control / .	27	3	5	8	8.1	8	14.7	8	28	8	7.8	HF 1/5	44
Control / .	28	1	14	9	7.8	9	14.7	9	28	9	7.6	KB 1/6/14 (15①)	46
		2	13	↓	7.9	↓	15.2	↓	28	↓	7.7	↓	48
		3	16	↓	8.0	↓	14.5	↓	28	↓	7.6	↓	39

① Wrong date. KB. 1/6/15

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Ref-DMMU-2 / .	0	1	9	8	8.0	8	15.3	8	29	8	7.9	KMB 12/09/14	52
		2	13	↓	8.0	↓	14.6	↓	29	↓	7.8	↓	52
		3	6		7.9		14.3		29		7.8		38
		4	1		7.5		14.9		29		7.7		50
		5	12		7.9		14.5		29		7.7		46
Ref-DMMU-2 / .	1	1	9	8	7.5	8	14.6	8	29	8	7.7	KMB 12/10	53
Ref-DMMU-2 / .	2	2	13	8	7.7	8	14.9	8	28	8	7.9	KMB 12/11	52
Ref-DMMU-2 / .	3	3	6	9	7.6	9	15.0	9	29	9	7.7	MK 12/12	54
Ref-DMMU-2 / .	4	4	1	8	8.1	8	14.5	8	28	8	7.8	JL 12/13	40
Ref-DMMU-2 / .	5	5	12	8	7.9	8	14.6	8	28	8	7.7	JL 12/14	38
Ref-DMMU-2 / .	6	1	9	9	8.2	9	14.5	9	28	9	7.7	L 12/15	53
Ref-DMMU-2 / .	7	2	13	8	7.6	8	15.8	8	28	8	7.7	KB 12/16	50
Ref-DMMU-2 / .	8	3	6	9	7.8	9	14.9	9	28	9	7.7	KMB 12/17	49
Ref-DMMU-2 / .	9	4	1	9	7.9	9	14.7	9	28	9	7.7	KMB 12/18	52
Ref-DMMU-2 / .	10	5	12	9	7.9	9	14.5	9	28	9	7.8	MK 12/19	51
Ref-DMMU-2 / .	11	1	9	8	7.8	8	14.6	8	29	8	7.7	JL 12/20	39
Ref-DMMU-2 / .	12	2	13	8	8.1	8	14.6	8	29	8	7.8	MK 12/21	43
Ref-DMMU-2 / .	13	3	6	8	8.2	8	14.5	8	30	8	7.8	JL 12/22	51
Ref-DMMU-2 / .	14	4	1	9	~~7.8~~ 8.0 ~~7.6~~	9	14.7	9	29	9	~~7.8~~ 7.7 ~~7.6~~	KB 12/23	51

① WC. KB. 12/23/14

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Ref-DMMU-2 / .	15	5	12	9	7.9	9	14.4	9	30	9	7.7	~~KB~~ 12/24	55
Ref-DMMU-2 / .	16	1	9	8	7.6	8	14.4	8	30	8	7.7	KH 12.25	50
Ref-DMMU-2 / .	17	2	13	8	8.0	8	14.6	8	31	8	7.8	KH 12.26	48
Ref-DMMU-2 / .	18	3	6	8	7.8	8	14.5	8	31	8	7.8	JL 12/27	39
Ref-DMMU-2 / .	19	4	1	8	8.1	8	14.6	8	30	8	7.8	JL 12/28	44
Ref-DMMU-2 / .	20	5	12	8	8.6	8	14.6	8	27	8	7.8	KB 12/29	42
Ref-DMMU-2 / .	21	1	9	9	7.6	9	14.4	9	29	9	7.6	KB 12/30	54
Ref-DMMU-2 / .	22	2	13	8	8.1	8	14.5	8	29	8	7.8	~~KB~~ 12/31	53
Ref-DMMU-2 / .	23	3	6	9	7.6	9	14.3	9	30	9	7.5	CR 1/1	50
Ref-DMMU-2 / .	24	4	1	9	7.9	9	14.8	9	29	9	7.7	KB 01/02/15	50
Ref-DMMU-2 / .	25	5	12	8	8.0	8	14.8	8	28	8	7.8	JL 1/03	42
Ref-DMMU-2 / .	26	1	9	8	8.1	8	14.6	8	28	8	7.8	JL 1/04	47
Ref-DMMU-2 / .	27	2	13	8	8.2	8	14.7	8	28	8	7.8	~~KB~~ 1/5	42
Ref-DMMU-2 / .	28	1	9	9	8.0	9	14.7	9	28	9	7.6	KB 1/6/15 ① 15.0	52
		2	13	↓	8.1	↓	14.6	↓	28	↓	7.6	↓	40
		3	6		8.0		14.3		28		7.6		45
		4	1		8.0		15.0		28		7.6		56
		5	12		8.1		14.6		28		7.6		51

① Wrong date. KB 1/6/15

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	TECHNICIAN	FLOW 38-56 ml/30sec
DMMU-2 / .	0	1	10	8	7.8	8	14.3	8	29	8	7.9	KMB 12/09/14	47
		2	3	↓	8.0	↓	14.5	↓	29	↓	7.9	↓	49
		3	2	↓	7.9	↓	15.2	↓	29	↓	7.9	↓	44
		4	4	↓	7.9	↓	14.3	↓	29	↓	7.8	↓	45
		5	8	↓	7.5	↓	14.4	↓	29	↓	7.7	↓	52
DMMU-2 / .	1	1	10	8	6.9	8	15.2	8	28	8	7.7	KMB 12/10	48
DMMU-2 / .	2	2	3	8	7.6	8	14.6	8	28	8	7.8	KMB 12/11	47
DMMU-2 / .	3	3	2	9	7.6	9	15.1	9	29	9	7.8	MK 12/12	46
DMMU-2 / .	4	4	4	8	8.2	8	14.5	8	28	8	7.8	JL 12/13	50
DMMU-2 / .	5	5	8	8	7.7	8	14.3	8	29	8	7.7	JL 12/14	56
DMMU-2 / .	6	1	10	9	8.0	9	15.1	9	28	9	7.7	KB 12/15	42
DMMU-2 / .	7	2	3	8	7.9	8	14.7	8	28	8	7.8	KB 12/16	54
DMMU-2 / .	8	3	2	9	7.7	9	15.0	9	28	9	7.7	KMB 12/17	42
DMMU-2 / .	9	4	4	9	8.1	9	14.6	9	28	9	7.7	KMB 12/18	40
DMMU-2 / .	10	5	8	9	7.9	9	14.3	9	29	9	7.8	12/19	40
DMMU-2 / .	11	1	10	8	7.9	8	14.8	8	29	8	7.7	JL 12/20	38
DMMU-2 / .	12	2	3	8	7.8	8	14.9	8	29	8	7.8	12/21	38
DMMU-2 / .	13	3	2	8	8.3	8	14.7	8	30	8	7.8	JL 12/22	49
DMMU-2 / .	14	4	4	9	8.0 ① ~~7.6~~	9	14.7	9	30	9	7.8 ~~7.6~~ ①	KB 12/23	42

① WC. KMB. 12/23/14

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
DMMU-2 / .	15	5	8	9	7.8	9	14.7	9	29	9	7.7	~~HK~~ 12/24	41
DMMU-2 / .	16	1	10	8	7.6	8	15.0	8	30	8	7.8	BH 12.25	48
DMMU-2 / .	17	2	3	8	7.9	8	14.5	8	31	8	7.8	BH 12.26	51
DMMU-2 / .	18	3	2	8	7.3	8	15.2	8	30	8	7.9	JL 12/27	42
DMMU-2 / .	19	4	4	8	8.1	8	14.5	8	30	8	7.7	JL 12/28	41
DMMU-2 / .	20	5	8	8	7.6	8	14.7	8	27	8	7.8	KB 12/29	55
DMMU-2 / .	21	1	10	9	7.8	9	14.7	9	29	9	7.8	KB 12/30	50
DMMU-2 / .	22	2	3	8	7.9	8	14.6	8	29	8	7.7	~~HK~~ 12/31	52
DMMU-2 / .	23	3	2	9	7.5	9	14.7	9	30	9	7.5	CR 1/1	53
DMMU-2 / .	24	4	4	9	7.9	9	14.7	9	29	9	7.7	KB 1/2	40
DMMU-2 / .	25	5	8	8	8.1	8	14.5	8	28	8	7.8	JL 1/03	48
DMMU-2 / .	26	1	10	8	8.0	8	14.6	8	28	8	7.7	JL 1/04	57
DMMU-2 / .	27	2	3	8	7.9	8	14.7	8	28	8	7.8	~~HK~~ 1/5	42
DMMU-2 / .	28	1	10	9	7.1	9	15.3	9	28	9	7.6	KB 1/6/15	56
		2	3	↓	7.9	↓	14.6	↓	28	↓	7.6	↓	54
		3	2		7.7		14.9		28		7.5		44
		4	4		8.1		14.8		28		7.6		45
		5	8		8.1		14.7		28		7.7		51

ENVIRON

ORGANISM RECEIPT LOG

Date: 12.9.14	Time: 1315	Batch No. RG 120914
Organism / Project: Macoma nasuta	Source: Gunstone	
Address: On File		Invoice Attached: Yes (No)
Phone:	Contact: Reed Gunstone	
No. Ordered: 350 2100	No. Received: 2450 +	Source Batch: Field
Condition of Organisms: Good	Approximate Size or Age: Adult	
Shipper: ENVIRON COURIER	B of L (Tracking No.) NA	
Condition of Container: Good	Received By: BH	

Container	D.O. (mg/L)	Temp. (°C)	Conductivity or Salinity (Include Units)	pH (Units)	Technician (Initials)
1	-	10.2	—	-	BH

Notes: Transported dry

ENVIRON

MAINTENANCE LOG FOR CULTURES

ORGANISM: Macoma nasuta
LOCATION: Bath 3

Batch Number: RG 120914 | Date Received: 12.9.14 ~~12.10~~.14

Date	Feed AM/PM	Tub No.	D.O.	Temp (°C)	Cond/ Sal	pH	H_2O Change	No. Dead	NH_3	Init.
12.10.14	X	1	7.1	14.5	29	7.7	FT	2	—	BH
	X	2	7.3	14.3	29	7.7	FT	0	—	
	X	3	7.6	14.7	29	7.7	FT	0	—	
	X	4	~~6.1~~ ①	14.8	29	7.6	FT	0	—	
	✓	5	6.4	15.0	29	7.6	FT	0	—	
	X	6	7.5	14.6	29	7.8	FT	0	—	BH
12.11.14	X	1	7.2	14.4	29	7.7	FT	0	—	BH
	X	2	7.0	14.6	29	7.7	FT	0	—	
	X	3	7.6	14.4	28	7.7	FT	1	—	
	X	4	7.5	14.4	28	7.7	FT	1	—	
	X	5	7.4	14.4	29	7.7	FT	0	—	
	X	6	7.5	14.4	28	7.7	FT	0	—	
12/12/14	Y	1	7.7	14.6	29	7.7	FT	0	N	~~BH~~
		2	7.6	14.6	29	7.6		0		
		3	7.7	15.0	29	7.6		0		
		4	7.5	14.6	29	7.6		0		
		5	7.6	14.7	29	7.7		0		
		6	7.6	14.5	29	7.6		0		
12/13/14	—	1	7.5	14.3	29	7.7	FT	0	—	JL
	—	2	7.4	14.3	29	7.7		2	—	
	—	3	7.8	14.2	29	7.7		0	—	
	—	4	7.9	14.3	29	7.7		0	—	
	—	5	7.5	14.3	29	7.7		0	—	
	—	6	7.5	14.3	29	7.7		0	—	
12/14	—	1	7.4	14.4	29	7.6	FT	1 ~~0~~ ②	—	JL
	—	2	7.4	14.4	29	7.6		0	—	
	—	3	7.7	14.2	29	7.6		0	—	
	—	4	7.4	14.4	29	7.6		0	—	

FT = Flow through

① MR 12.10.14 BH

② WC. JL 12/14/14.

ENVIRON

MAINTENANCE LOG FOR CULTURES

ORGANISM: Macoma nasuta

LOCATION: Bath 3 moved to bath 5 on 12.15.14 moved bath 9A 12/18

Batch Number: 26120914	Date Received: 12/09/14

Date	Feed AM/PM	Tub No.	D.O.	Temp (°C)	Cond/ Sal	pH	H_2O Change	No. Dead	NH_3	Init.
12/14	—	5	7.5	14.4	29	7.6	FT	Ø	—	JL
↓	—	6	7.5	14.3	29	7.6	↓	Ø	—	↓
12/15	— X	1	7.1	14.5	28	7.6	FT	0	—	
↓	X	2	6.8	14.5	28	7.5	↓	0	—	↓
	X	3	7.8	14.3	29	7.6		6 Ø 1	—	
	✓	4	7.7	14.4	28	7.6		0	—	
	X	5	7.6	14.5	28	7.6		0	—	
↓	X	6	7.6	14.3	28	7.6	↓	(1) Ø 2	—	↓
12/16	—	1	6.9	15.0	28	7.5	FT	Ø		KMB
↓	—	2	7.1	14.7	28	7.2	↓	Ø		↓
	—	3	7.6	14.5	29	7.7		Ø		
	—	4	7.8	14.5	29	7.7		Ø		
	—	5	7.7	14.4	29	7.7		Ø		
↓	—	6	7.7	14.4	29	7.6	↓	Ø		↓
12/17	—	1	7.1	14.2	30	7.6	FT	0	—	CR
↓	—	2	7.0	14.2	30	7.5	↓	1	—	↓
	—	3	7.3	14.3	30	7.6		0	—	
	—	4	7.4	13.9	30	7.6		0	—	
	—	5	7.1	14.1	30	7.5		0	—	
↓	—	6	7.0	14.3	30	7.3	↓	0	—	↓
12/18	—	1	7.2	14.1	29	7.9	FT	Ø	—	MK
↓	—	2	7.8	14.1	29	7.8	↓	Ø	—	↓
12/19	—	1	7.5	14.6	29	7.5	FT	0	—	
	—	2	7.9	14.0	30	7.5	↓	0	—	↓
12/20	—	1	7.9	14.0	30	7.5	FT	Ø	—	JL
↓	—	2	8.0	13.9	30	7.6	↓	Ø	—	↓
12/21	—	1	8.1	13.8	28	7.7	FT	Ø	—	JL
↓	—	2	8.1	13.7	28	7.7	↓	Ø	—	↓
12/22	—	1	8.2	13.8	29	7.7	FT	Ø	—	JL

FT = Flow-through

(1) IE 12.15.14 BM

ENVIRON

MAINTENANCE LOG FOR CULTURES

ORGANISM: Macoma nasuta
LOCATION: Bath 3 → Bath 9A

Batch Number: RG120914	Date Received: 12/09/14

Date	Feed AM/PM	Tub No.	D.O.	Temp (°C)	Cond/ (Sal)	pH	H_2O Change	No. Dead	NH_3	Init.
12/22	—	2	8.2	13.7	29	7.5	FT	~~0~~	—	JL
12/23	—	1	7.7	14.3	30	7.5	FT	0	—	✱
12/23	—	2	7.9	13.9	30	7.8	↓	0	—	↓
12/24/14	—	1	7.7	14.1	30	7.8	FT	0	—	KB
		2	7.8	13.8	31	7.8	↓	↓	—	↓
			END OF CULTURE							

FT = Flow-through

28-DAY BIOACCUMULATION NEREIS TEST OBSERVATION DATA SHEET 3

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY	PROTOCOL	SPECIES
POLA	Everport		David Moore	0	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)	*Macoma Nasuta*

Observation Key

#S= Number on the Surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows

INITIAL # OF ORGANISMS: 25

ENDPOINT DATA & OBSERVATIONS

CLIENT / Environ ID	REP	INITIAL # IF DIFF	Jar #	Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
				DATE / TECHN.	JL 5/02	JL 5/03	KB 5/04	~~KB~~ 5/5	~~KB~~ 5/6	MK 5/7	KB 5/8	5/9 ~~KB~~	5/10 KB	5/11 ~~KB~~	5/12 MK	5/13 MK	5/14 MK	5/15 JL
REF-DMMU-1	4		1		N	1S	N	N	N	N	N	N	N	N	N	N	N	N
DMMU-1	3		2		↓	2S	1S	1S	1S	1S			1S	1S	2S	1S	1S	1S
DMMU-1	1		3		1S	N	N	N	N	N			N	N	N	N	N	N
REF-DMMU-1	5		4		N					↓			↓	↓	↓		↓	
REF-DMMU-1	1		5		↓							↓	↓	↓	N	↓	↓	↓
Control	1		6		1S					1S		2S	2S	3S	2S	2S	3S	2S
DMMU-1	2		7		N				↓	1S	① ↓	~~N~~ 1S	1S	N	N	1S	1S	N
Control	3		8		1S	1S	↓	↓	1S	1S		~~1S~~ 1S	1S	1S	1S	1S	2S	↓
Control	2		9		2S	3S	1S	2S	1M	N		N	2S	2S	2S	2S	1S	1S
DMMU-1	5		10		N	1S	N	N	N	↓		N	N	N	N	N	N	N
REF-DUMMU-1	2		11		1S	↓	↓	1S	↓	N		N	↓	↓	↓	1S	2S	↓
DMMU-1	4		12		2S	↓	↓	N	↓	↓		1S	1S	1S	2S	N	N	1S
REF-DMMU-1	3		13		1S	1S	2S	N	↓	N		N	N	N	N	↓	N	N

① E. KB. 05/04/15

28-DAY BIOACCUMULATION NEREIS TEST OBSERVATION DATA SHEET 3

CLIENT	PROJECT	JOB N0.	PROJECT MANAGER	LABORATORY	PROTOCOL	SPECIES	
POLA	Everport		David Moore	0	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)	*Macoma Nasuta*	

Observation Key

#S= Number on the Surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows

INITIAL # OF ORGANISMS: 25

ENDPOINT DATA & OBSERVATIONS

CLIENT / ENVIRON	REP	INITIAL # IF DIFF	Jar #	Day	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Number Remaining
DATE / TECHN.					5.16.15 BH	5.17 BH	5/18 MK	5/19 MK	5/20 KB	5/21	5/22 KB	5/23 JL	5/24 KB	5.25 BH	5/26 CR	5/27 JL	5/28	5/29	
REF-DMMU-1	4		1		N	N	N	N	N	N	N	N	N	N	N	N	N	N	25
DMMU-1	3		2		↓	Is	Is	Is	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	① ~~25~~ 24
DMMU-1	1		3		↓	N	N	N	↓	Is	↓	↓	↓	↓	↓	↓	↓	↓	① ~~25~~ 24
REF-DMMU-1	5		4		↓	↓	↓	↓	Im	N	↓	↓	Is	↓	↓	↓	↓	↓	24
REF-DMMU-1	1		5		↓	↓	↓	↓	N	N	↓	↓	N	↓	↓	↓	↓	↓	25
Control	1		6		2S	2S	Is, Im	Is	Is	N	↓	↓	↓	Is	↓	↓	Is	Is	24
DMMU-1	2		7		N		N	N	N	↓	↓	↓	↓	N	↓	↓	N	N	25
Control	3		8		↓	Is	Is	Is	Is	Is	↓	Is	Is	Is	↓	↓	N	Is	25
Control	2		9		↓	N	N	N	Is	Is	↓	Is	Is	Is	3S	2S	3S	3S ①	~~23~~, ITM 21
DMMU-1	5		10		↓	↓	Is	Is	N	N	↓	N	N	N	N	N	N	N	25
REF-DUMMU-1	2		11		↓	↓	Is	Is	↓	↓	↓	↓	↓	N	↓	↓	↓	↓ ①	~~26~~ 25
DMMU-1	4		12		↓	↓	N	N	↓	↓	↓	Is	Is	N	↓	↓	↓	↓ ①	~~24~~, ITM 23
REF-DMMU-1	3		13		2S	↓	↓	↓	↓	↓	↓	N	N	N	↓	↓	↓		25

① Empty shells found while shucking on Day 29. JL 5/30/15.

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	~~30-Apr-2015~~ 1 May	~~28-May-2015~~ 29 May

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	TECHNICIAN	FLOW 38-56 ml/30sec
Control / .	0	1	6	9	8.6	9	13.9	9	29	9	8.0	HR 5/1	55
		2	9	9	8.6	9	14.1	9	29	9	8.0	↓	48
		3	8	9	8.6	9	14.0	9	29	9	8.0	↓	②
Control / .	1	1	6	9	8.2	9	14.2	9	29	9	8.0	JL 5/02	56
Control / .	2	2	9	9	8.2	9	13.6	9	29	9	8.0	JL 5/03	49
Control / .	3	3	8	9	8.3 ~~7.7~~ 8	9	12.7	9	29	9	7.9 ① ~~8.2~~	KB 5/04	42
Control / .	4	1	6	9	8.2	9	13.3	9	29	9	7.9	HR 5/5	47
Control / .	5	2	9	9	8.3	9	13.3	9	29	9	7.9	~~HR~~ 5/6	③ ~~53~~ 47
Control / .	6	3	8	9	8.2	9	13.7	9	29	9	8.0	MK 5/7	39
Control / .	7	1	6	8	8.7	8	12.5	8	30	8	8.0	KB 5/8	52
Control / .	8	2	9	9	8.4	8	13.9	8	30	8	7.9	HR 5/9	40
Control / .	9	3	8	8	7.9	8	14.7	8	30	8	7.8	KB 5/10	41
Control / .	10	1	6	8	8.5	8	13.5	8	30	8	8.0	HR 5/11	54
Control / .	11	2	9	9	8.2	8	13.5	9	29	9	7.9	KB 5/12	56
Control / .	12	3	8	9	8.2	9	12.6	9	29	9	7.9	MK 5/13	50
Control / .	13	1	6	9	8.2	9	13.8	9	29	9	7.9	JL 5/14	56
Control / .	14	2	9	9	8.1	9	14.7	9	30	9	8.0	JL 5/15 HR	39

D16. KB. 05/04/15

② accidentally not recorded

③ WP HR 5/6 WP

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Ref-DMMU-1 / .	0	1	5	9	8.5	9	14.0	9	29	9	8.0	HR 5/1	50
		2	11	9	8.3	9	14.5	9	29	9	8.0	↓	39
		3	13	9	8.5	9	14.5	9	29	9	8.0	↓	47
		4	1	9	8.5	9	14.0	9	29	9	8.0	HR 5/1	47
		5	4	9	8.3	9	14.0	9	29	9	8.0	HR 5/1	43
Ref-DMMU-1 / .	1	1	5	9	8.2	9	14.3	9	29	9	7.9	JL 5/02	49
Ref-DMMU-1 / .	2	2	11	9	8.1	9	13.6	9	29	9	7.9	JL 5/03	55
Ref-DMMU-1 / .	3	3	13	9	8.4	9	12.8	9	29	9	7.9	KB 5/04	54
Ref-DMMU-1 / .	4	4	1	9	7.8	9	12.9	9	29	9	7.7	HR 5/5	43
Ref-DMMU-1 / .	5	5	4	9	8.4	9	13.7	9	29	9	8.0	HR 5/6	50
Ref-DMMU-1 / .	6	1	5	9	8.1	9	13.9	9	29	9	7.9	MK 5/7	45
Ref-DMMU-1 / .	7	2	11	8	8.1	8	13.1	8	30	8	7.9	KB 5/8	51
Ref-DMMU-1 / .	8	3	13	8	7.8	8	14.2	8	30	8	7.8	HR 5/9	48
Ref-DMMU-1 / .	9	4	1	8	8.2	8	14.8	8	31	8	7.9	KB 5/10	55
Ref-DMMU-1 / .	10	5	4	8	8.6	8	13.6	8	30	8	8.0	HR 5/11	46
Ref-DMMU-1 / .	11	1	5	9	8.4	9	13.2	9	30	9	8.0	KB 5/12	55
Ref-DMMU-1 / .	12	2	11	9	8.4	9	12.6	9	30	9	7.9	MK 5/13	56
Ref-DMMU-1 / .	13	3	13	9	8.3	9	13.8	9	29	9	8.0	JL 5/14	48
Ref-DMMU-1 / .	14	4	1	9	8.0	9	15.8	9	30	9	7.9	JL 5/15	56

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	TECHNICIAN	FLOW 38-56 ml/30sec
DMMU-1 / .	0	1	3	9	8.3	9	14.5	9	29	9	8.0	HK 5|1	56
		2	7	9	8.6	9	14.1	9	29	9	8.0		45
		3	2	9	8.4	9	14.1	9	29	9	8.0		56
		4	12	9	8.4	9	14.7		29		8.0		55
		5	10	9	8.4	9	14.3	9	29	9	8.0	✓	44
DMMU-1 / .	1	1	3	9	8.1	9	14.2	9	29	9	7.9	JL 5/02	55
DMMU-1 / .	2	2	7	9	8.2	9	13.7	9	30	9	8.0	JL 5/03	51
DMMU-1 / .	3	3	2	9	7.7	9	13.0	9	29	9	7.9	KB 5/04	39
DMMU-1 / .	4	4	12	9	8.0	9	13.4	9	29	9	7.9	HK 5|5	56
DMMU-1 / .	5	5	10	9	8.2	9	13.3	9	29	9	7.9	HK 5/6	53
DMMU-1 / .	6	1	3	9	7.7	9	14.1	9	29	9	7.9	MK 5/7	42
DMMU-1 / .	7	2	7	8	8.5	8	12.7	8	30	8	7.9	KB 5/8	56
DMMU-1 / .	8	3	2	8	8.3	8	14.4	8	30	8	7.9	HK 5/9	44
DMMU-1 / .	9	4	12	8	8.3	8	14.4	8	30	8	8.0	KB 5|10	45
DMMU-1 / .	10	5	10	8	8.5	8	13.4	8	30	8	8.0	HK 5|11	56
DMMU-1 / .	11	1	3	9	8.7	9	13.1	9	29	9	8.0	KB 5/12	49
DMMU-1 / .	12	2	7	9	7.8	9	12.5	9	29	9	7.9	MK 5/13	44
DMMU-1 / .	13	3	2	9	8.1	9	13.6	9	29	9	7.9	JL 5/14	55
DMMU-1 / .	14	4	12	9	8.2	9	15.0	9	30	9	8.0	JL 5/15	42

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	1 May ~~30-Apr-2015~~	29 May ~~28-May-2015~~

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Control / .	15	3	8	9	8.1	9	14.0	9	30	9	7.9	BH 5116	52
Control / .	16	1	6	9	8.0	9	13.9	9	30	9	8.0	BH 5.17.15	48
Control / .	17	2	9	9	8.1	9	14.1	9	30	9	7.9	MK 5/18	54
Control / .	18	3	8	8	7.9	8	14.4	8	29	8	7.9	MK 5/19	47
Control / .	19	1	6	9	8.2	9	13.7	9	31	9	7.9	KB 5/20	51
Control / .	20	2	9	8	8.2	8	14.1	8	30	8	7.9	KB 5/21	50
Control / .	21	3	8	8	7.3	8	14.5	8	29	8	7.8	KB 5/22	55
Control / .	22	1	6	9	7.9	9	14.8	9	30	9	8.0	UL 5/23	49
Control / .	23	2	9	8	8.2	8	14.6	8	29	8	7.9	KB 5/24	52
Control / .	24	3	8	8	8.3	8	14.8	8	29	8	7.9	BH 5.25	50
Control / .	25	1	6	8	8.3	8	14.7	8	29	8	7.9	UL 5/26	39
Control / .	26	2	9	9	8.1	9	15.0	9	29	9	8.0	JL 5/27	41
Control / .	27	3	8	8	7.9	8	15.0	8	29	8	7.9	HR 5/28	53
Control / .	28	1	6	8	8.3	8	15.2	8	29	8	7.9	MK 5/29	42
		2	9	↓	8.2	↓	15.2	↓	29	↓	7.9	↓	48
		3	8	↓	8.2	↓	15.6	↓	29	↓	7.9		40

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Ref-DMMU-1 / .	15	5	4	9	8.2	9	14.6	9	30	9	7.9	BH	40
Ref-DMMU-1 / .	16	1	5	9	8.1	9	13.7	9	30	9	7.9	BH 5.17.15	42
Ref-DMMU-1 / .	17	2	11	9	7.8	9	14.4	9	30	9	7.9	MK 5/18	38
Ref-DMMU-1 / .	18	3	13	8	7.9	8	14.8	8	29	8	7.9	MK 5/19	43
Ref-DMMU-1 / .	19	4	1	9	8.0	9	14.1	9	31	9	7.9	KB 5/20	56
Ref-DMMU-1 / .	20	5	4	8	8.2	8	14.4	8	30	8	7.9	[illegible] 5/21	39
Ref-DMMU-1 / .	21	1	5 ①	8	8.0	8	14.4	8	30	8	7.9	KB 5/22	54
Ref-DMMU-1 / .	22	2	11	9	7.8	9	15.1	9	30	9	7.9	JL 5/23	40
Ref-DMMU-1 / .	23	3	13	8	8.2	8	15.1	8	30	8	7.9	KB 5/24	40
Ref-DMMU-1 / .	24	4	1	8	8.2	8	15.0	8	30	8	7.9	BH 5.25	48
Ref-DMMU-1 / .	25	5	4	8	8.4	8	14.3	8	29	8	7.9	CR 5/26	53
Ref-DMMU-1 / .	26	1	5	9	8.1	9	15.2	9	29	9	8.0	JL 5/27	41
Ref-DMMU-1 / .	27	2	11	8	8.1	8	15.3 ②	8	29	8	7.9	[illegible] 5/28	55
Ref-DMMU-1 / .	28	1	5	8	8.2	8	15.2	8	29	8	7.9	MK 5/29	56
		2	11	↓	8.1	↓	15.5	↓	29	↓	7.9	↓	55
		3	13		7.9		15.9		29		7.9		56
		4	1		7.9		15.6		29		7.9		39
		5	4	↓	8.2	↓	15.1	↓	29	↓	7.9	↓	43

① WL KB 5.22.15 ② Bath temp'd 0.5°C [illegible] 5/28

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Macoma Nasuta*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 12-16 ±1		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
DMMU-1 / .	15	5	10	9	8.0	9	14.5	9	30	9	7.9	BM	39
DMMU-1 / .	16	1	3	9	7.8	9	13.4	9	30	9	7.9	BM 5.17.15	53
DMMU-1 / .	17	2	7	9	8.1	9	14.7	9	30	9	7.9	MK 5/18	56
DMMU-1 / .	18	3	2	8	8.0	8	14.4	8	29	8	7.9	MK 5/19	55
DMMU-1 / .	19	4	12	9	7.8	9	14.8	9	30	9	7.8	KB 5/20	39
DMMU-1 / .	20	5	10	8	7.9	8	14.2	8	30	8	7.8	BM 5/21	45
DMMU-1 / .	21	1	3	8	8.0	8	14.3	8	30	8	7.9	KB 5/22	43
DMMU-1 / .	22	2	7	9	8.0	9	14.7	9	30	9	8.0	JL 5/23	52
DMMU-1 / .	23	3	2	8	7.9	8	15.4	8	29	8	7.9	KB 5/24	57
DMMU-1 / .	24	4	12	8	8.2	8	15.1	8	30	8	7.9	BM 5.25	54
DMMU-1 / .	25	5	10	8	8.2	8	14.6	8	30	8	7.9	CR 5/26	51
DMMU-1 / .	26	1	3	9	7.9	9	15.2	9	29	9	8.0	JL 5/27	46
DMMU-1 / .	27	2	7	8	8.1	8	15.3 ②	8	29	8	7.9	BM 5/28	49
DMMU-1 / .	28	1	3	8	8.0	8	15.2	8	30	8	7.9	MK 5/29	54
		2	7	↓	8.2	↓	15.4	↓	30	↓	7.9	↓	56
		3	2		7.9		15.1		29		7.9		53
		4	12		8.1		15.5		30		7.9		46
		5	10		8.1		15.8		29		7.9		56

① IE 5.16.15 BM

② Bath temp ↓ 0.5°C

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
4/29/15	1416	KG042915 ~~KG042915~~

Organism / Project: Macoma Nasuta / POLA

Source / Supplier: Reed Gunstone

Phone:	Contact:
on file	on file.

No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
375	375	Field collected 03/08/15

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
Good	Adult
Shipper: Courier	**B of L (Tracking No.)** NA
Condition of Container: Good	**Received By:** KB

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
1	—	8.0	—	—	—	KB

Notes:

ENVIRON

MAINTENANCE LOG FOR CULTURES

ORGANISM: Macoma
LOCATION: Bath 4

Batch Number: RG042915 | Date Received: ~~4/29/30~~ 4/29/15

Date	Feed AM	Feed PM	Tub No.	D.O.	Temp (°C)	Cond/(Sal)	pH	H_2O Change	No. Dead	NH_3	Init.
4/30		✓	1	5.7 ①	15.2	29	7.5	FT	0	—	MK
5/1	✓		1	7.6	13.7	29	7.8	FT	0	—	MK

END of Culture

FT = Flow-through ① Added another airline. MK 4/30.

28-DAY BIOACCUMULATION NEREIS TEST OBSERVATION DATA SHEET 3

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY	PROTOCOL	SPECIES
POLA	Everport	0	David Moore	0	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)	*Nereis virens*

Observation Key

#S= Number on the Surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows
G= Growth

INITIAL # OF ORGANISMS: 20

ENDPOINT DATA & OBSERVATIONS

CLIENT / Environ ID	REP	INITIAL # IF DIFF	Jar #	Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
				DATE / TECHN.	12/10 KMB	12/11 KMB	12/12 MK	12/13 JL	12/14 JL	12/15 12/14 #2 JL	12/16 KMB	12/17 KMB	12/18 KMB	12/19 #1	12/20 JL	12/21 #1	12/22 JL	12/23 KB
REF-DMMU-2	4		1		N	N	N	N	1S	1M	N	N	N	N	N	N	N	N
DMMU-2	3		2		5 worms	↓	1S	1S	1S	1S								
DMMU-2	2		3		N	3S	1S	N	N	N								
DMMU-2	4		4			N	N	↓										
Control	3		5				1M	1S										
REF-DMMU-2	3		6				N	N										
Control	1		7				1S	↓										
DMMU-2	5		8			↓	2S											
REF-DMMU-2	1		9			1S	1M	↓	↓		↓	↓			↓	↓	↓	
DMMU-2	1		10			N	1S	1S	1M		1S	1NM			G	G	G	
Control	2		11		↓	↓	N	N	N		N	N			1S	N	N	
REF-DMMU-2	5		12		1 worm	1S	1M	↓	↓		↓	↓			N	↓	↓	
REF-DMMU-2	2		13		N	N	1S	↓	1M	↓	1S	↓	↓	↓	↓	↓	↓	↓

① I.E. KB. 12/10/14
② WD JL 12/15/14

28-DAY BIOACCUMULATION NEREIS TEST OBSERVATION DATA SHEET 3

CLIENT	PROJECT	JOB N0.	PROJECT MANAGER	LABORATORY	PROTOCOL	SPECIES
POLA	Everport	0	David Moore	0	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)	*Nereis virens*

Observation Key

#S= Number on the Surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows

INITIAL # OF ORGANISMS: 20

ENDPOINT DATA & OBSERVATIONS

CLIENT / ENVIRON	REP	INITIAL # IF DIFF	Jar #	Day	DATE / TECHN.	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Number Remaining
						12/14 KB	12.25 BH	12.26 BH	12/27 JL	12/28 JL	12/29 KB	12/30 KB	12 31 [illegible]	01/01 CR	01/02/15 KB	1/03 JL	1/04 JL	1/5 [illegible]	1/6 KB	
REF-DMMU-2	4		1			N	N	N	N	N	N	N	N	N	N	N	N	N	N	20
DMMU-2	3		2			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	19
DMMU-2	2		3																	20
DMMU-2	4		4																	20
Control	3		5																	18
REF-DMMU-2	3		6																	20
Control	1		7																↓	20
DMMU-2	5		8																N	19
REF-DMMU-2	1		9																N	19
DMMU-2	1		10												↓				↓	19
Control	2		11												15					20
REF-DMMU-2	5		12												N					19
REF-DMMU-2	2		13			↓	↓	↓	↓	↓	↓	↓	↓	↓	N	↓	↓	↓	↓	~~20~~ 20

Illegible [illegible] 1/6/15

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Control / .	0	1	7	8	6.6	8	15.3	8	29	8	7.5	KMB 12/9/14	55
		2	11	↓	7.5	↓	16.0	↓	29	↓	7.7	↓	43
		3	5	↓	7.8	↓	14.2	↓	29	↓	7.7	↓	56
Control / .	1	1	7	8	6.5	8	14.8	8	28	8	7.5	KMB 12/10	49
Control / .	2	2	11	8	7.5	8	14.6	8	28	8	7.7	KMB 12/11	43
Control / .	3	3	5	9	7.3	9	14.7	9	30	9	7.6	MK 12/12	56
Control / .	4	1	7	8	7.5	8	14.7	8	28	8	7.7	JL 12/13	47
Control / .	5	2	11	8	7.5	8	14.5	8	28	8	7.5	JL 12/14	41
Control / .	6	3	5	9	7.2	9	14.7	9	28	9	7.5	JL 12/15	45
Control / .	7	1	7	8	7.5	8	14.8	8	28	8	7.7	KB 12/16	45
Control / .	8	2	11	9	7.7	9	15.0	9	28	9	7.7	KMB 12/17	48
Control / .	9	3	5	9	7.7	9	14.4	9	28	9	7.7	KMB 12/18	53
Control / .	10	1	7	9	7.4	9	15.0	9	28	9	7.7	JL 12/19	56
Control / .	11	2	11	8	7.9	8	14.9	8	29	8	7.7	JL 12/20	49
Control / .	12	3	5	8	7.9	8	14.7	8	29	8	7.7	JL 12/21	55
Control / .	13	1	7	8	7.8	8	14.8	8	30	8	7.7	JL 12/22	47
Control / .	14	2	11	9	7.6	9	15.0	9	29	9	7.7	KB 12/23	52

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Control / .	15	3	5	9	7.5	9	14.8	9	29	9	7.6	MK 12/29	56
Control / .	16	1	7	8	7.6	8	14.7	8	30	8	7.7	BH 12.25	52
Control / .	17	2	11	8	7.8	8	14.7	8	31	8	7.7	BH 1226	56
Control / .	18	3	5	8	7.6	8	14.9	8	30	8	7.8	JL 12/27	40
Control / .	19	1	7	8	7.9	8	14.9	8	30	8	7.7	JL 12/28	42
Control / .	20	2	11	8	8.1	8	15.0	8	27	8	7.7	KB 12/29	41
Control / .	21	3	5	9	7.5	9	14.5.	9	29	9	7.5	KB 12/30	56
Control / .	22	1	7	8	7.6	8	14.8	8	29	8	7.7	MK 12/31	47
Control / .	23	2	11	9	7.8	9	14.8	9	30	9	7.5	CR 1/1	43
Control / .	24	3	5	9	7.7	9	14.7	9	29	9	7.6	KB 1/2/15	52
Control / .	25	1	7	8	7.4	8	14.7	8	28	8	7.7	JL 1/03	45
Control / .	26	2	11	8	7.4	8	14.9	8	28	8	7.7	JL 1/04	40
Control / .	27	3	5	8	8.1	8	14.7	8	28	8	7.8	MK 1/5	49
Control / .	28	1	~~7~~ 14	8	7.6	8	14.9	8	28	8	7.7	KB 1/6	44
		2	~~11~~ 18	↓	7.4	↓	14.9	↓	28	↓	7.8	↓	53
		3	~~5~~ 16	↓	7.6	↓	14.7	↓	28	↓	7.8	↓	51

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	TECHNICIAN	FLOW 38-56 ml/30sec
Ref-DMMU-2 / .	0	1	9	8	7.6	8	14.5	8	29	8	7.7	KMB 12/09/14	45
		2	13	↓	7.7	↓	14.9	↓	29	↓	7.7	↓	56
		3	6		7.7		14.2		29		7.7		48
		4	1		8.0		① ~~15.2~~ 15.0		29		7.8		47
		5	12		7.8		14.8		29		7.7		54
Ref-DMMU-2 / .	1	1	9	8	6.8	8	14.9	8	29	8	7.6	KMB 12/10	40
Ref-DMMU-2 / .	2	2	13	8	7.9	8	14.5	8	28	8	7.8	KMB 12/11	41
Ref-DMMU-2 / .	3	3	6	9	7.4	9	② ~~15.0~~ 14.9	9	29	9	7.7	MK 12/12	42
Ref-DMMU-2 / .	4	4	1	8	7.8	8	14.9	8	28	8	7.8	JL 12/13	39
Ref-DMMU-2 / .	5	5	12	8	7.8	8	14.5	8	29	8	7.6	JL 12/14	48
Ref-DMMU-2 / .	6	1	9	9	7.9	9	14.7	9	28	9	7.7	JL 12/15	47
Ref-DMMU-2 / .	7	2	13	8	7.6	8	14.7	8	28	8	7.7	KB 12/16	46
Ref-DMMU-2 / .	8	3	6	9	7.5	9	14.8	9	28	9	7.7	KMB 12/17	56
Ref-DMMU-2 / .	9	4	1	9	7.3	9	15.1	9	28	9	7.6	KMB 12/18	45
Ref-DMMU-2 / .	10	5	12	9	7.7	9	15.2	9	28	9	7.7	#K 12/19	③ ~~39~~ 39
Ref-DMMU-2 / .	11	1	9	8	8.0	8	15.0	8	29	8	7.8	JL 12/20	42
Ref-DMMU-2 / .	12	2	13	8	7.8	8	14.9	8	29	8	7.7	#K 12/21	39
Ref-DMMU-2 / .	13	3	6	8	7.9	8	14.6	8	30	8	7.7	JL 12/22	52
Ref-DMMU-2 / .	14	4	1	9	7.6	9	15.0	9	30	9	7.7	KB 12/23	46

① Remeasured. KMB. 19Dec14. ② IE. MK 12/12. ③ Illegible #K 12/19

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Ref-DMMU-2 / .	15	5	12	9	7.7	9	14.8	9	29	9	7.7	BH 12/24	43
Ref-DMMU-2 / .	16	1	9	8	7.9	8	14.8	8	30	8	7.8	BH 12.25	48
Ref-DMMU-2 / .	17	2	13	8	7.8	8	14.6	8	31	8	7.7	BH 12.25 12.26 ①	45
Ref-DMMU-2 / .	18	3	6	8	7.7	8	14.7	8	30	8	7.8	JL 12/27	50
Ref-DMMU-2 / .	19	4	1	8	8.0	8	14.6	8	30	8	7.8	JL 12/28	56
Ref-DMMU-2 / .	20	5	12	8	8.4	8	15.1	8	27	8	7.8	KB 12/29	48
Ref-DMMU-2 / .	21	1	9	9	8.2	9	14.8	9	29	9	7.7	KB 12/30	50
Ref-DMMU-2 / .	22	2	13	8	8.0	8	14.8	8	29	8	7.7	BH 12/31	52
Ref-DMMU-2 / .	23	3	6	9	7.7	9	14.8	9	30	9	7.5	CR 1/1	49
Ref-DMMU-2 / .	24	4	1	9	8.0	9	14.9	9	30	9	7.5	KB 1/2/15	56
Ref-DMMU-2 / .	25	5	12	8	8.0	8	15.0	8	28	8	7.8	JL 1/03	48
Ref-DMMU-2 / .	26	1	9	8	8.1	8	14.8	8	28	8	7.8	JL 1/04	39
Ref-DMMU-2 / .	27	2	13	8	8.0	8	14.9	8	28	8	7.7	BH 1/5	41
Ref-DMMU-2 / .	28	1	9	↑	8.2	↑	14.9	↑	28	↑	7.9		38
		2	13		7.6		14.8		28		7.7	↑	44
		3	6		8.0		14.7		28		7.8		49
		4	1	8	7.9	8	14.7	8	28	8	7.8	KB 1/6	39
		5	12	↓	8.0	↓	14.7	↓	28	↓	7.8	↓	45

① WD. BH 12/26/14.

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
DMMU-2 / .	0	1	10	8	7.7	8	14.4	8	29	8	7.7	KMB 12/09/14	56
		2	3	↓	7.6	↓	14.3	↓	29	↓	7.7	↓	51
		3	2		7.8		14.8		29		7.7		56
		4	4		7.6		14.1		29		7.7		46
		5	8	↓	8.0	↓	14.2	↓	29	↓	7.7	↓	44
DMMU-2 / .	1	1	10	8	7.2	8	14.6	8	29	8	7.7	KMB 12/10	56
DMMU-2 / .	2	2	3	8	7.1	8	15.0	8	28	8	7.7	KMB 12/11	47
DMMU-2 / .	3	3	2	9	7.0	9	14.9	9	29	9	7.8	MK 12/12	56
DMMU-2 / .	4	4	4	8	7.6	8	14.5	8	28	8	7.7	JL 12/13	40
DMMU-2 / .	5	5	8	8	7.5	8	14.5	8	28	8	7.5	JL 12/14	39
DMMU-2 / .	6	1	10	9	7.5	9	14.7	9	28	9	7.6	12/15	40
DMMU-2 / .	7	2	3	8	7.1	8	14.7	8	28	8	7.7	KB 12/16	54
DMMU-2 / .	8	3	2	9	7.3	9	15.0	9	28	9	7.7	KMB 12/17	56
DMMU-2 / .	9	4	4	9	7.4	9	14.7	9	28	9	7.7	KMB 12/18	52
DMMU-2 / .	10	5	8	9	7.3	9	14.6	9	29	9	7.7	12/19	39
DMMU-2 / .	11	1	10	8	8.0	8	14.8	8	29	8	7.8	JL 12/20	45
DMMU-2 / .	12	2	3	8	7.5	8	14.7	8	29	8	7.7	12/21	54
DMMU-2 / .	13	3	2	8	7.8	8	14.6	8	30	8	7.7	JL 12/22	39
DMMU-2 / .	14	4	4	9	7.4	9	14.4	9	30	9	7.6	KB 12/23	45

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	9-Dec-2014	6-Jan-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
DMMU-2 / .	15	5	8	9	7.4	9	14.7	9	29	9	7.7	~~HH~~ 12/24	40
DMMU-2 / .	16	1	10	8	7.9	8	14.9	8	30	8	7.7	BH 12.25	52
DMMU-2 / .	17	2	3	8	7.7	8	14.4	8	31	8	7.7	BH 12.26	47
DMMU-2 / .	18	3	2	8	7.6	8	14.6	8	31	8	7.8	JL 12/27	53
DMMU-2 / .	19	4	4	8	7.8	8	14.5	8	30	8	7.8	JL 12/28	50
DMMU-2 / .	20	5	8	8	8.4	8	14.7	8	27	8	7.8	KB 12/29	49
DMMU-2 / .	21	1	10	9	7.8	9	14.9	9	29	9	~~7.7~~ 7.8 ①	KB 12/30	45
DMMU-2 / .	22	2	3	8	7.6	8	14.9	8	29	8	7.7	~~HH~~ 12/31	43
DMMU-2 / .	23	3	2	9	7.1	9	14.7	9	30	9	7.5	CR 1/1	45
DMMU-2 / .	24	4	4	9	7.7	9	14.5	9	29	9	7.6	KB 1/2/15	47
DMMU-2 / .	25	5	8	8	7.6	8	14.6	8	28	8	7.7	JL 1/03	39
DMMU-2 / .	26	1	10	8	8.1	8	14.7	8	28	8	7.8	JL 1/04	42
DMMU-2 / .	27	2	3	8	7.5	8	14.7	8	28	8	7.7	~~HH~~ HH 1/5 ②	50
DMMU-2 / .	28	1	10	8	7.9	8	14.7	8	28	8	7.8	KB 1/6	55
		2	3	↓	7.6	↓	14.5	↓	28	↓	7.7	↓	43
		3	2		7.8		14.3		28		7.7		47
		4	4		7.8		14.8		28		7.8		44
		5	8	↓	8.1	↓	14.8	↓	27	↓	7.8	↓	41

① WC. KHB. 12/30/14 ② JL HH 1/5

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
12/9/14	1300	AR06898

Organism / Project:	Source:
Nereis virens / POLA Everport	Field collected

Address:	Invoice Attached
On file	Yes (No)

Phone:	Contact:
on file	On file

No. Ordered:	No. Received:	Source Batch:
350	350+	Field collected

Condition of Organisms:	Approximate Size or Age:
Good	Adult JE

Shipper:	B of L (Tracking No.)
Fedex	6069 8099 6898

Condition of Container:	Received By:
Good	JE

Container	D.O. (mg/L)	Temp. (°C)	Conductivity or Salinity (Include Units)	pH (Units)	Technician (Initials)
1-3	*	4.0	—		

Notes:

* shipped dry

Aquatic Research Organisms

DATA SHEET

CHAIN OF CUSTODY

I. Organism History

Species: Neries virens

Source: Lab reared_____ Hatchery reared_____ Field collected X

Collection date 12/8/14 Receipt date_____

Lot number 120814aV Strain Wild

Brood Origination Damariscotta River, Boothbay Harbor, Maine

II. Water Quality

Temperature_____ °C Salinity 28-32 ppt DO Saturated

pH 7.8-8.2 Hardness N.A. ppm

III. Culture Conditions

System: Held at 4°C on moist seaweed

Diet: Flake Food_____ Phytoplankton_____ Trout Chow_____

Brine Shrimp_____ Rotifers_____ Other Not feed

Prophylactic Treatments:_____

Comments: Shipped on moistened seaweed, gel ice packs to keep cool.

IV. Shipping Information

Client: ENVIRON P.C. # of Organisms: 350+

Carrier: FEDEX Date Shipped: 12/08/14

Tracking # 6069-8099 # of cartons 1

RELEASED BY: Steve Smith DATE: 12/08/14 TIME: 16:30

RECEIVED BY:_____ DATE: TIME:

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

28-DAY BIOACCUMULATION NEREIS TEST OBSERVATION DATA SHEET 3

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY	PROTOCOL	SPECIES
POLA	Everport		David Moore	Bath 1	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)	*Nereis virens*

Observation Key

#S= Number on the Surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows

INITIAL # OF ORGANISMS: 20

ENDPOINT DATA & OBSERVATIONS

CLIENT / Environ ID	REP	INITIAL # IF DIFF	Jar #	Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
				DATE / TECHN.	JL 5/02	JL 5/03	KB 5/04	[illegible] 5/5	[illegible] 5/6	MK 5/7	KB 5/8	[illegible] 5/9	KB 5/10	[illegible] 5/11	KB 5/12	MK 5/13	MK 5/14	JL 5/15
REF-DMMU-1	4		1		N	N	N	N	N	IS	N	N	N	N	N	N	N	N
DMMU-1	3		2		IS	2S			1E	2S						IS		
DMMU-1	1		3		N	N			N	N						N		
REF-DMMU-1	5		4															
REF-DMMU-1	1		5															
Control	1		6															
DMMU-1	2		7			IS					~~IS~~ D							
Control	3		8		IS	N					~~IS~~							
Control	2		9		N		IM											
DMMU-1	5		10				IE		1E									
REF-DMMU-1	2		11				N		N									
DMMU-1	4		12			IS												
REF-DMMU-1	3		13			IS												

D IE KB 05/04/15

28-DAY BIOACCUMULATION NEREIS TEST OBSERVATION DATA SHEET 3

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY	PROTOCOL	SPECIES	
POLA	Everport		David Moore	Bath 1	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)	*Nereis virens*	

Observation Key

#S= Number on the Surface
#M= Number of Mortality
L=Anoxic Surface
F=Fungal Patches
D=No Air Flow (DO?)
U=Excess food
N=Normal
B=No Burrows

INITIAL # OF ORGANISMS: 20

ENDPOINT DATA & OBSERVATIONS

CLIENT / ENVIRON	REP	INITIAL # IF DIFF	Jar #	Day	DATE / TECHN.	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Number Remaining
						5.16.15 BH	5,17 BH	5/18 MK	5/19 MK	5/20 KB	5/21	5/22 KB	5/23 JL	5/24 KB	5.25 BH	5/26 CR	5/27 JL	5/28	5/29	
REF-DMMU-1	4		1			N	N	N	N	N	N	N	N	N	N	N	N	N	N	20
DMMU-1	3		2																	20
DMMU-1	1		3																	21
REF-DMMU-1	5		4																	20
REF-DMMU-1	1		5																	20
Control	1		6																	20
DMMU-1	2		7																	19
Control	3		8																	20
Control	2		9																	20
DMMU-1	5		10																	20
REF-DMMU-1	2		11																	20
DMMU-1	4		12																	19
REF-DMMU-1	3		13																	19

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble Bath 1	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	1 May 2015 ~~30-Apr-2015~~	29 May 2015 ~~28-May-2015~~

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Control / .	0	1	G	9	8.3	9	14.6	9	29	9	7.9	~~JL~~ 5/1	38
		2	9	↓	8.3	↓	14.5	↓	29	↓	7.9	↓	53
		3	8	↓	8.2	↓	14.7	↓	29	↓	7.8	↓	54
Control / .	1	1	6	9	7.4	9	14.3	9	29	9	7.7	JL 5/02	56
Control / .	2	2	9	9	7.8	9	13.7	9	29	9	7.9	JL 5/03	42
Control / .	3	3	8	9	7.8	9	13.1	9	29	9	7.9	KB 5/04	50
Control / .	4	1	6	9	7.7	9	13.3	9	29	9	7.7	~~JL~~ 5/5	44
Control / .	5	2	9	9	7.6	9	13.9	9	29	9	7.7	~~JL~~ 5/6	52
Control / .	6	3	8	9	8.1	9	13.7	9	29	9	7.8	MK 5/7	55
Control / .	7	1	6	8	8.4	8	13.5	8	30	8	7.8	KB 5/8	50
Control / .	8	2	9	8	8.0	8	13.9	8	30	8	7.8	~~JL~~ 5/9	49
Control / .	9	3	8	8	8.0	8	14.1	8	30	8	7.8	KB 5/10	50
Control / .	10	1	6	8	8.0	8	13.6	8	30	8	8.0	~~JL~~ 5/11	47
Control / .	11	2	9	9	8.3	9	13.6	9	30	9	7.9	KB 5/12	50
Control / .	12	3	8	9	7.9	9	12.7	9	29	9	7.9	MK 5/13	56
Control / .	13	1	6	9	7.9	9	13.7	9	30	9	7.9	JL 5/14	44
Control / .	14	2	9	9	8.3	9	14.1	9	29	9	7.9	JL 5/15	50

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble Bath 1	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Ref-DMMU-1 /.	0	1	5	9	8.5	9	14.2	9	29	9	8.0	HE 5/1	43
		2	11		7.7		14.7		29		8.0		55
		3	13		8.3		15.9①		29		8.0		50
		4	1		8.5		14.3		29		8.0		39
		5	4	↓	8.3	↓	14.0	↓	29	↓	8.0	↓	52
Ref-DMMU-1 /.	1	1	5	9	7.3	9	14.1	9	29	9	7.8	JL 5/02	55
Ref-DMMU-1 /.	2	2	11	9	7.7	9	13.9	9	29	9	7.9	JL 5/03	56
Ref-DMMU-1 /.	3	3	13	9	8.0	9	13.7	9	29	9	7.9	KB 5/04	45
Ref-DMMU-1 /.	4	4	1	9	7.9	9	13.0	9	29	9	7.9	HE ②5/5 5/15	48
Ref-DMMU-1 /.	5	5	4	9	8.0	9	13.5	9	29	9	7.9	HE 5/6	40
Ref-DMMU-1 /.	6	1	5	9	7.8	9	13.2	9	29	9	7.9	MK 5/7	56
Ref-DMMU-1 /.	7	2	11	8	8.5	8	12.5	8	30	8	7.9	KB 5/8	43
Ref-DMMU-1 /.	8	3	13	8	7.5	8	15.5	8	30	8	7.7	HE 5/9	45
Ref-DMMU-1 /.	9	4	1	8	7.5	8	14.6	8	30	8	7.8	KB 5/10	42
Ref-DMMU-1 /.	10	5	4	8	8.2	8	13.5	8	30	8	8.0	HE 5/11	56
Ref-DMMU-1 /.	11	1	5	9	8.1	9	13.8	9	30	9	7.9	KB 5/12	49
Ref-DMMU-1 /.	12	2	11	9	8.2	9	12.6	9	30	9	7.9	MK 5/13	45
Ref-DMMU-1 /.	13	3	13	9	8.0	9	14.5	9	30	9	7.9	JL 5/14	56
Ref-DMMU-1 /.	14	4	1	9	7.8	9	15.0	9	30	9	7.9	JL 5/15	51

① Increased bath flow higher standpipe HE 5/1 ②Illegible HE 5/5

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble Bath 1	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	TECHNICIAN	FLOW 38-56 ml/30sec
DMMU-1 / .	0	1	7	9	8.3	9	14.5	9	30	9	8.0	~~HR~~ 511	45
		2	12		8.2		16.0 ②		29		7.9		45
		3	2		8.2		14.4		29		8.0		53
		4	3		8.3		14.1		29		8.0		47
		5	10		8.1		① 15.5		30		8.0		38
DMMU-1 / .	1	1	7	9	7.6	9	14.0	9	29	9	7.9	JL 5/02	51
DMMU-1 / .	2	2	12	9	7.1	9	③ 15.6	9	29	9	7.8	JL 5/03	45
DMMU-1 / .	3	3	2	9	~~7.8~~	9	13.1	9	29	9	7.9	KB 5/04	35
DMMU-1 / .	4	4	3	9	7.7	9	14.4	9	29	9	7.8	~~HR~~ 515	55
DMMU-1 / .	5	5	10	9	7.3	9	14.0	9	29	9	7.7	~~HR~~ 516	38
DMMU-1 / .	6	1	7	9	8.0	9	13.4	9	29	9	7.9	MK 5/7	42
DMMU-1 / .	7	2	12	8	7.8	8	15.0	8	31	8	7.9	KB 5/8	52
DMMU-1 / .	8	3	2	8	7.6	8	13.8	8	30	8	7.8	~~HR~~ 519	38
DMMU-1 / .	9	4	3	8	7.9	8	14.0	8	30	8	7.9	KB 5/10	40
DMMU-1 / .	10	5	10	8	7.3	8	14.3	8	30	8	7.9	~~HR~~ 5111	48
DMMU-1 / .	11	1	7	9	8.2	9	13.4	9	30	9	7.9	KB 5/12	56
DMMU-1 / .	12	2	12	9	7.6	9	15.2 ④	9	30	9	7.9	MK 5/13	54
DMMU-1 / .	13	3	2	9	7.9	9	13.6	9	29	9	7.9	JL 5/14	56
DMMU-1 / .	14	4	3	9	7.8	9	14.7	9	30	9	7.9	JL 5/15	50

① ↑ water flow to chamber ~~HR~~ 511 ② higher Stand pipe added to bath

③ Decreased bath temp. by 1.0°C JL 5/03/15 ④ decreased bath temp - MK 5/13

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble Bath 1	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
Control / .	15	3	B	9	7.8	9	14.9	9	30	9	7.9	BH	54
Control / .	16	1	6	9	7.9	9	14.1	9	30	9	7.8	BH 5.17.15	39
Control / .	17	2	9	9	8.0	9	13.7	9	30	9	7.9	MK 5/18	56
Control / .	18	3	B	8	8.1	8	13.8	8	29	8	7.9	MK 5/19	38
Control / .	19	1	6	9	7.5	9	14.1	9	30	9	7.8	KB 5/20	48
Control / .	20	2	9	8	7.9	8	14.7	8	29	8	7.8	KB 5/21	42
Control / .	21	3	B	8	7.6	8	15.1	8	30	8	7.8	KB 5/22	38
Control / .	22	1	6	9	7.7	9	14.9	9	30	9	7.9	JL 5/23	40
Control / .	23	2	9	8	8.1	8	15.1	8	30	8	7.9	KB 5/24	54
Control / .	24	3	B	8	8.2	8	15.3	8	30	8	7.9	BH 5.25	47
Control / .	25	1	6	8	8.4	8	14.6	8	29	8	7.9	CR 5/26	42
Control / .	26	2	9	9	8.0	9	15.3	9	29	9	8.0	JL 5/27	56
Control / .	27	3	B	8	8.0	8	15.7①	8	29	8	7.9	KB 5/28	49
Control / .	28	1	6	8	8.2	8	15.6	8	29	8	7.9	MK 5/29	51
		2	9	↓	8.1	↓	15.5	↓	29	↓	7.9	↓	56
		3	B	↓	8.2	↓	15.8	↓	29	↓	7.9	↓	45

① reduced bath temp 0.5° C AK 5/28

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble Bath 1	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
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	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	TECHNICIAN	FLOW 38-56 ml/30sec
Ref-DMMU-1 / .	15	5	4	9	8.1	9	14.2	9	30	9	7.9	BH 5/16	41
Ref-DMMU-1 / .	16	1	5	9	8.0	9	13.5	9	30	9	7.9	BH 5.17.15	51
Ref-DMMU-1 / .	17	2	11	9	7.6	9	14.7	9	30	9	7.8	MK 5/18	55
Ref-DMMU-1 / .	18	3	13	8	7.8	8	15.8 ①	8	30	8	7.8	MK 5/19	55
Ref-DMMU-1 / .	19	4	1	9	~~8.0~~ ②	9	~~13.7~~ 14.1 ②	9	31	9	7.9	KB 5/20	~~56~~ 41 ②
Ref-DMMU-1 / .	20	5	4	~~8~~	8.1	~~8~~	13.8	~~8~~	30	~~8~~	7.9	② KB 5/21	54
Ref-DMMU-1 / .	21	1	5	8	7.0	8	15.2	8	30	8	7.9	KB 5/22	50
Ref-DMMU-1 / .	22	2	11	9	7.9	9	14.9	9	30	9	7.9	JL 5/23	39
Ref-DMMU-1 / .	23	3	13	8	8.2	8	14.6	8	29	8	7.9	KB 5/24	56
Ref-DMMU-1 / .	24	4	1	8	8.2	8	15.0	8	30	8	7.9	BH 525	51
Ref-DMMU-1 / .	25	5	4	8	8.6	8	14.4	8	30	8	8.0	CR 5/26	40
Ref-DMMU-1 / .	26	1	5	9	8.1	9	14.9	9	29	9	8.0	JL 5/27	44
Ref-DMMU-1 / .	27	2	11	8	8.0	8	15.0	8	29	8	7.9	HE 5/28	43
Ref-DMMU-1 / .	28	1	5	8	8.4	8	15.6	8	29	8	8.0	MK 5/29	56
		2	11	↓	8.1	↓	~~15.8~~ ④	↓	④ ~~29~~ 30	↓	7.9	↓	④ ~~44~~ 42
		3	13		8.1		15.8		29		7.9		44
		4	1		8.0		15.8		29		7.9		③ 58 54
		5	4	↓	8.4	↓	15.5	↓	29	↓	8.0	↓	46

① decreased bath temp. MK 5/19.
② WC. KB. 5/20/15
③ MP. MK 5/29.
④ WP. MK 5/29.

28 DAY BIOACCUMULATION WQ DATA SHEET

CLIENT	PROJECT	SPECIES 1	LABORATORY	PROTOCOL
POLA	Everport	*Nereis virens*	Port Gamble Bath 1	ITM (USEPA/USACE 1998), OTM (USEPA/USACE 1991), ASTM E 1611, EPA Region 4 RIM (1993)
JOB NUMBER	**PROJECT MANAGER**	**WATER DESCRIPTION**	**TEST START DATE**	**TEST END DATE**
	David Moore	North Hood Canal; filtered	30-Apr-2015	28-May-2015

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		TEMP (C) 10±5		SALIN.(ppt) 30±2		pH 7.8±0.5			
CLIENT ID	DAY	REP	JAR #	D.O.		TEMP		SALINITY		pH		TECHNICIAN	FLOW
				meter	mg/L	meter	°C	meter	ppt	meter	unit		38-56 ml/30sec
DMMU-1 / .	15	5	10	9	7.8	9	13.6	9	30	9	7.9	BH	45
DMMU-1 / .	16	1	7	9	8.0	9	13.6	9	30	9	7.9	BH 5.17.15	49
DMMU-1 / .	17	2	12	9	7.8	9	15.5 ①	9	31	9	7.8	MK 5/18	56
DMMU-1 / .	18	3	2	8	7.5	8	14.3	8	29	8	7.9	MK 5/19	40
DMMU-1 / .	19	4	3	9	~~7.8~~ 7.7 ②	9	~~14.1~~ ~~14.8~~ ②	9	② 30 31	9	~~7.9~~ ② ~~7.8~~	KB 5/20	39
DMMU-1 / .	20	5	10	9	8.0	9	13.7	9	30	9	7.9	② ~~KB~~ KB 5/21	55
DMMU-1 / .	21	1	7	8	8.0	8	15.0	8	30	8	8.0	KB 5/22	53
DMMU-1 / .	22	2	12	9	7.7	9	15.3 ③	9	30	9	7.9	JL 5/23	39
DMMU-1 / .	23	3	2	8	8.0	8	14.6	8	29	8	7.9	KB 5/24	56
DMMU-1 / .	24	4	3	8	8.1	8	14.6	8	30	8	7.9	BH 5.24	48
DMMU-1 / .	25	5	10	8	8.4	8	13.9	8	29	8	8.0	CR 5/26	47
DMMU-1 / .	26	1	7	9	8.2	9	15.0	9	29	9	8.0	JL 5/27	54
DMMU-1 / .	27	2	12	8	6.8	8	15.4	8	29	8	7.9	KB 5/28	49
DMMU-1 / .	28	1	7	8	8.3	8	15.7	8	29	8	8.0	MK 5/29	40
		2	12	↓	④ ~~8.1~~ 7.7	↓	④ ~~15.7~~ 15.6	↓	④ ~~30~~ 29	↓	7.9	↓	④ ~~42~~ 56
		3	2		8.2		15.6		29		7.9		56
		4	3		8.3		15.5		30		8.0		55
		5	10	↓	7.9	↓	14.8	↓	29	↓	7.9	↓	42

① decreased bath temp. MK 5/18

② WC. KB. 5/20/15

③ Increased water flow to chamber. JL 5/23/15.

④ WP. MK 5/29.

ENVIRON

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
4/29/15	1300	~~AR09360~~ AR09360

Organism / Project: POLA Nereis

Source / Supplier: ARO

Phone:	Contact:
on file	on File

No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
350	350+	① ~~A~~ 4/27/15 collected

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
Good	Adult

Shipper:	B of L (Tracking No.)
Fed ex	6069 8099 9360

Condition of Container:	Received By:
good	NA

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
① →	→	6.2	② →	→	→	NA

Notes: ① IT NA ② Shipped dry NA 4/29

Aquatic Research Organisms

DATA SHEET

CHAIN OF CUSTODY

I. Organism History

Species: Neries virens

Source: Lab reared_____ Hatchery reared_____ Field collected X

Collection date 04/27/15 Receipt date 04/28/15

Lot number 042815NV Strain Wild

Brood Origination Damariscotta River, Boothbay Harbor, Maine

II. Water Quality

Temperature 7 °C Salinity 28-32 ppt DO Saturated

pH 7.8-8.2 Hardness N.A. ppm

III. Culture Conditions

System: Held at 4°C on moist seaweed

Diet: Flake Food_____ Phytoplankton_____ Trout Chow_____

Brine Shrimp_____ Rotifers_____ Other Not feed

Prophylactic Treatments:_____

Comments: Shipped on moistened seaweed, gel ice packs to keep cool.

IV. Shipping Information

Client: ENVIRON PRT. OMBL. # of Organisms: 350 T

Carrier: FED EX Date Shipped: 4/28/15

Tracking # 6069-8099-93 # of cartons 1

RELEASED BY: [signature] DATE: 4/28/15 TIME: 1630

RECEIVED BY:_____ DATE: TIME:

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

ENVIRON

MAINTENANCE LOG FOR CULTURES

ORGANISM: Nereis
LOCATION: Bath 4

Batch Number: AR09360 | Date Received: 4/29/15

Date	Feed AM/PM	Tub No.	D.O.	Temp (°C)	Cond/ (Sal)	pH	H_2O Change	No. Dead	NH_3	Init.
4/29 3:30	—	1	7.1	14.4	29	7.6	FT	3	—	MK
↓	—	2	6.9	14.8	29	7.5	↓	2	—	↓
5/11	✓	1	6.8	13.9	29	7.6	FT	2	—	~~MK~~
↓	—	2	6.5	14.6	29	7.4	↓	1	—	↓
			END OF CULTURE							

FT = Flow-through

APPENDIX B-7.7 Statistical Results: *A. bahia* Water-Column Test

Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	12-2280-4842	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	08-5655-5063	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	05 Dec-14 14:55	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 12:55	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	37d 15h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	14.0%	Passes 96h proportion survived

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		Site Water	0.1324	1.86	0.191	8	0.4490	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9	0.9 - NL	Yes	Passes Acceptability Criteria
Control Resp	0.9	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0004631006	0.0004631006	1	0.01753	0.8979	Non-Significant Effect
Error	0.2113362	0.02641703	8			
Total	0.2117993		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.535	23.15	0.2489	Equal Variances
Variances	Mod Levene Equality of Variance	0.8207	13.75	0.3999	Equal Variances
Variances	Levene Equality of Variance	6.203	11.26	0.0375	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8762	0.7411	0.1181	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2282	0.3025	0.1541	Normal Distribution
Distribution	D'Agostino Skewness	0.8649	2.576	0.3871	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.6315	3.878	0.1004	Normal Distribution

96h Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9	0.7244	1	1	0.7	1	0.06325	15.71%	0.0%
0	Site Water	5	0.9	0.8122	0.9878	0.9	0.8	1	0.03162	7.86%	0.0%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.267	1.015	1.519	1.412	0.9912	1.412	0.09076	16.02%	0.0%
0	Site Water	5	1.253	1.119	1.387	1.249	1.107	1.412	0.04827	8.61%	1.07%

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	0.8	1	1	0.7
0	Site Water	0.9	0.9	0.9	1	0.8

Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	12-2280-4842	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

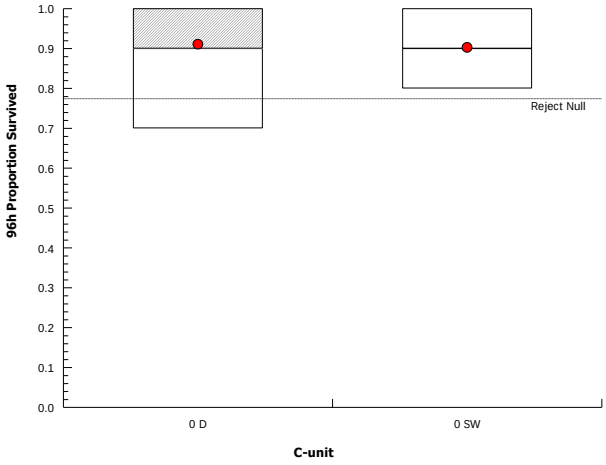
Angular (Corrected) Transformed Detail

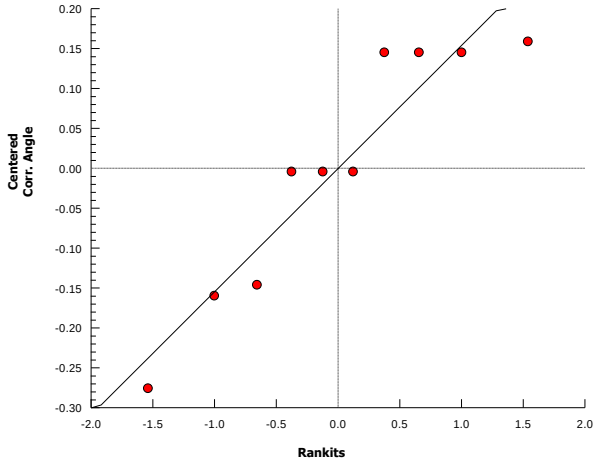
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.412	1.107	1.412	1.412	0.9912
0	Site Water	1.249	1.249	1.249	1.412	1.107

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	8/10	10/10	10/10	7/10
0	Site Water	9/10	9/10	9/10	10/10	8/10

Graphics





Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	00-9776-1696	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:06	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	08-5655-5063	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	05 Dec-14 14:55	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 12:55	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	37d 15h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	14.0%	100	>100	NA	

Dunnett Multiple Comparison Test

Control	vs	C-unit	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		10	0.1581	2.227	0.192	8	0.6901	CDF	Non-Significant Effect
		50	0.4877	2.227	0.192	8	0.5502	CDF	Non-Significant Effect
		100	-1.307	2.227	0.192	8	0.9817	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06902656	0.02300885	3	1.242	0.3274	Non-Significant Effect
Error	0.2964929	0.01853081	16			
Total	0.3655195		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.852	11.34	0.2779	Equal Variances
Variances	Mod Levene Equality of Variance	0.8712	5.953	0.4829	Equal Variances
Variances	Levene Equality of Variance	3.636	5.292	0.0358	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9323	0.866	0.1708	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1865	0.2235	0.0664	Normal Distribution
Distribution	D'Agostino Skewness	0.8435	2.576	0.3990	Normal Distribution
Distribution	D'Agostino Kurtosis	0.1859	2.576	0.8525	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	0.746	9.21	0.6887	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.6984	3.878	0.0682	Normal Distribution

96h Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9	0.7244	1	1	0.7	1	0.06325	15.71%	0.0%
10		5	0.9	0.8122	0.9878	0.9	0.8	1	0.03162	7.86%	0.0%
50		5	0.88	0.7761	0.9839	0.9	0.8	1	0.03742	9.51%	2.22%
100		5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	-8.89%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.267	1.015	1.519	1.412	0.9912	1.412	0.09076	16.02%	0.0%
10		5	1.253	1.119	1.387	1.249	1.107	1.412	0.04827	8.61%	1.07%
50		5	1.225	1.068	1.382	1.249	1.107	1.412	0.05653	10.32%	3.31%
100		5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	-8.88%

Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	00-9776-1696	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:06	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	0.8	1	1	0.7
10		0.8	0.9	0.9	1	0.9
50		0.9	1	0.8	0.9	0.8
100		1	0.9	1	1	1

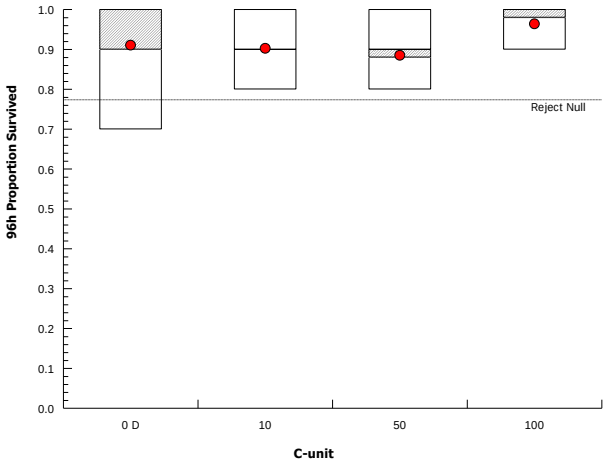
Angular (Corrected) Transformed Detail

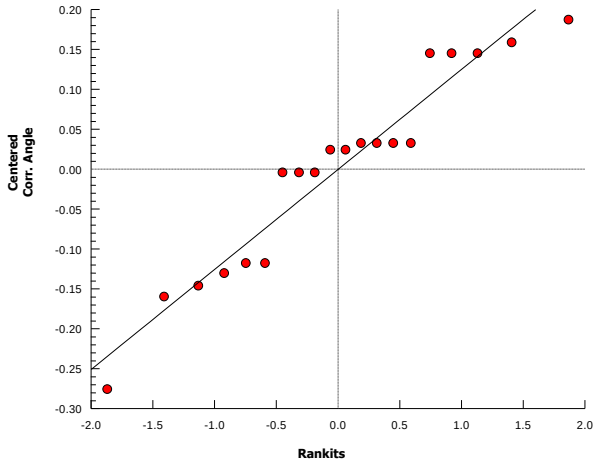
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.412	1.107	1.412	1.412	0.9912
10		1.107	1.249	1.249	1.412	1.249
50		1.249	1.412	1.107	1.249	1.107
100		1.412	1.249	1.412	1.412	1.412

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	8/10	10/10	10/10	7/10
0	Site Water	9/10	9/10	9/10	10/10	8/10
10		8/10	9/10	9/10	10/10	9/10
50		9/10	10/10	8/10	9/10	8/10
100		10/10	9/10	10/10	10/10	10/10

Graphics





CETIS Test Data Worksheet

Mysidopsis 96-h Acute Survival Test **ENVIRON**

Start Date: 05 Dec-14 14:55 **Species:** Americamysis bahia **Sample Code:** DMMU-2
End Date: 09 Dec-14 12:55 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Port of Los Angeles
Sample Date: 29 Oct-14 **Material:** Sediment Sample **Sample Station:** DMMU-2

C-unit	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	15	10				10	
0	D	2	3	10				8	
0	D	3	20	10				10	
0	D	4	8	10				10	
0	D	5	21	10				7	
0	SW	1	24	10				9	
0	SW	2	16	10				9	
0	SW	3	7	10				9	
0	SW	4	6	10				10	
0	SW	5	13	10				8	
10		1	4	10				8	
10		2	19	10				9	
10		3	17	10				9	
10		4	11	10				10	
10		5	5	10				9	
50		1	18	10				9	
50		2	14	10				10	
50		3	10	10				8	
50		4	23	10				9	
50		5	22	10				8	
100		1	9	10				10	
100		2	1	10				9	
100		3	25	10				10	
100		4	12	10				10	
100		5	2	10				10	

Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	17-8207-9897	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	08-5655-5063	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	05 Dec-14 14:55	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 12:55	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	37d 15h	**Station:**	DMMU-2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1788852	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	unit	95% LCL	95% UCL
EC5	>100	N/A	N/A
EC10	>100	N/A	N/A
EC15	>100	N/A	N/A
EC20	>100	N/A	N/A
EC25	>100	N/A	N/A
EC40	>100	N/A	N/A
EC50	>100	N/A	N/A

96h Proportion Survived Summary

			Calculated Variate(A/B)								
C-unit	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	5	0.9	0.7	1	0.06325	0.1414	15.71%	0.0%	45	50
10		5	0.9	0.8	1	0.03162	0.07071	7.86%	0.0%	45	50
50		5	0.88	0.8	1	0.03742	0.08367	9.51%	2.22%	44	50
100		5	0.98	0.9	1	0.02	0.04472	4.56%	-8.89%	49	50

96h Proportion Survived Detail

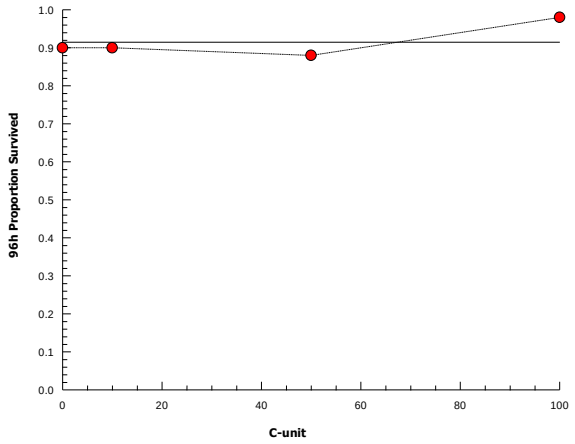
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	0.8	1	1	0.7
10		0.8	0.9	0.9	1	0.9
50		0.9	1	0.8	0.9	0.8
100		1	0.9	1	1	1

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	8/10	10/10	10/10	7/10
0	Site Water	9/10	9/10	9/10	10/10	8/10
10		8/10	9/10	9/10	10/10	9/10
50		9/10	10/10	8/10	9/10	8/10
100		10/10	9/10	10/10	10/10	10/10

Mysidopsis 96-h Acute Survival Test					**ENVIRON**
Analysis ID:	17-8207-9897	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	00-0435-7295	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:18	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-5549-0693	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	29 Apr-15 16:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	03 May-15 15:40	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	33d 16h	**Station:**	DMMU-1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.74%	Passes 96h proportion survived

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Control	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		Site Water	25	NA	1	8	0.5000	Exact	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.98	0.9 - NL	Yes	Passes Acceptability Criteria
Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002655933	0.002655933	1	1	0.3466	Non-Significant Effect
Error	0.02124747	0.002655933	8			
Total	0.0239034		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	13.75	0.3559	Equal Variances
Variances	Levene Equality of Variance	7.111	11.26	0.0285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6247	0.7411	0.0001	Non-normal Distribution
Distribution	Kolmogorov-Smirnov D	0.4	0.3025	<0.0001	Non-normal Distribution
Distribution	D'Agostino Skewness	3.335	2.576	0.0009	Non-normal Distribution
Distribution	Anderson-Darling A2 Normality	1.796	3.878	<0.0001	Non-normal Distribution

96h Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1	1	1	1	1	1	0	0.0%	0.0%
0	Site Water	5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	2.0%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
0	Site Water	5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	2.31%

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	1	1	1
0	Site Water	1	1	1	1	0.9

Angular (Corrected) Transformed Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.412	1.412	1.412	1.412	1.412
0	Site Water	1.412	1.412	1.412	1.412	1.249

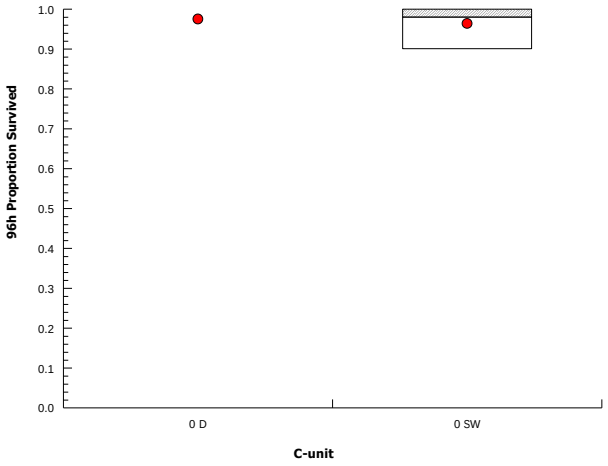
Mysidopsis 96-h Acute Survival Test **ENVIRON**

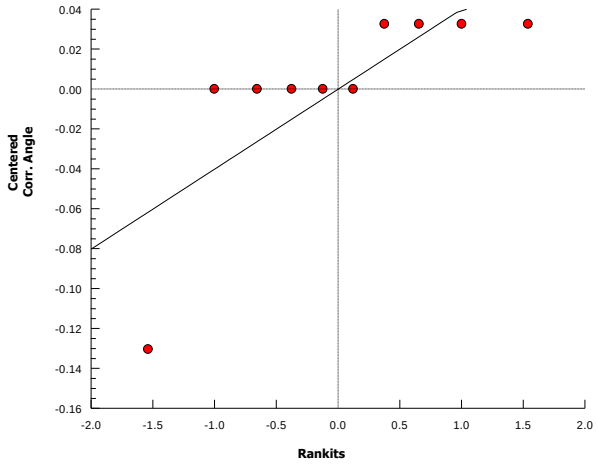
Analysis ID:	00-0435-7295	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:18	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	10/10	10/10	10/10	10/10
0	Site Water	10/10	10/10	10/10	10/10	9/10

Graphics





Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	14-4417-6079	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:18	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	16-5549-0693	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	29 Apr-15 16:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	03 May-15 15:40	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	33d 16h	**Station:**	DMMU-1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	9.41%	100	>100	NA	

Steel Many-One Rank Sum Test

Control	vs	C-unit	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		10	22.5	17	1	8	0.3045	Asymp	Non-Significant Effect
		50	25	17	1	8	0.5314	Asymp	Non-Significant Effect
		100	22.5	17	1	8	0.3045	Asymp	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03719214	0.01239738	3	1.052	0.3969	Non-Significant Effect
Error	0.1886293	0.01178933	16			
Total	0.2258214		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1.127	5.953	0.3769	Equal Variances
Variances	Levene Equality of Variance	5.868	5.292	0.0067	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8589	0.866	0.0075	Non-normal Distribution
Distribution	Kolmogorov-Smirnov D	0.25	0.2235	0.0020	Non-normal Distribution
Distribution	D'Agostino Skewness	2.8	2.576	0.0051	Non-normal Distribution
Distribution	D'Agostino Kurtosis	2.379	2.576	0.0174	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	13.5	9.21	0.0012	Non-normal Distribution
Distribution	Anderson-Darling A2 Normality	1.016	3.878	0.0114	Normal Distribution

96h Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1	1	1	1	1	1	0	0.0%	0.0%
10		5	0.92	0.7581	1	1	0.7	1	0.05831	14.17%	8.0%
50		5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	2.0%
100		5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	4.0%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
10		5	1.295	1.067	1.524	1.412	0.9912	1.412	0.08231	14.21%	8.27%
50		5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	2.31%
100		5	1.347	1.236	1.458	1.412	1.249	1.412	0.03992	6.63%	4.62%

Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	14-4417-6079	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:18	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	1	1	1
10		1	1	0.9	0.7	1
50		1	1	0.9	1	1
100		1	1	0.9	0.9	1

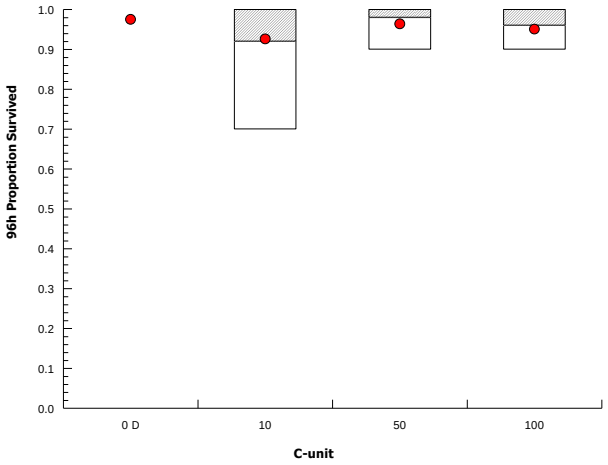
Angular (Corrected) Transformed Detail

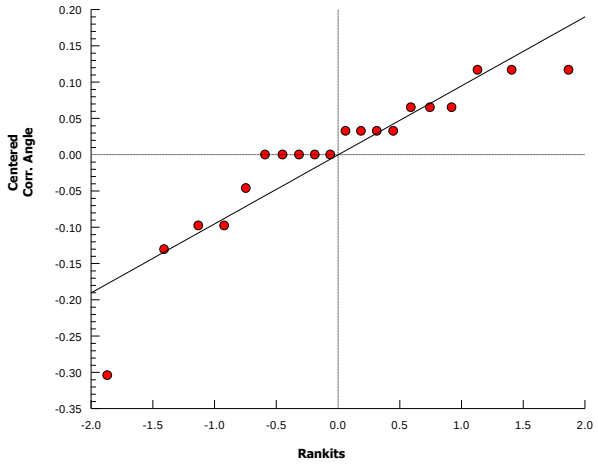
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.412	1.412	1.412	1.412	1.412
10		1.412	1.412	1.249	0.9912	1.412
50		1.412	1.412	1.249	1.412	1.412
100		1.412	1.412	1.249	1.249	1.412

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	10/10	10/10	10/10	10/10
0	Site Water	10/10	10/10	10/10	10/10	9/10
10		10/10	10/10	9/10	7/10	10/10
50		10/10	10/10	9/10	10/10	10/10
100		10/10	10/10	9/10	9/10	10/10

Graphics





Mysidopsis 96-h Acute Survival Test **ENVIRON**

Analysis ID:	07-0112-8636	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:18	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	16-5549-0693	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	29 Apr-15 16:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	03 May-15 15:40	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	33d 16h	**Station:**	DMMU-1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1563905	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	unit	95% LCL	95% UCL
EC5	>100	N/A	N/A
EC10	>100	N/A	N/A
EC15	>100	N/A	N/A
EC20	>100	N/A	N/A
EC25	>100	N/A	N/A
EC40	>100	N/A	N/A
EC50	>100	N/A	N/A

96h Proportion Survived Summary

			Calculated Variate(A/B)								
C-unit	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	5	1	1	1	0	0	0.0%	0.0%	50	50
10		5	0.92	0.7	1	0.05831	0.1304	14.17%	8.0%	46	50
50		5	0.98	0.9	1	0.02	0.04472	4.56%	2.0%	49	50
100		5	0.96	0.9	1	0.02449	0.05477	5.71%	4.0%	48	50

96h Proportion Survived Detail

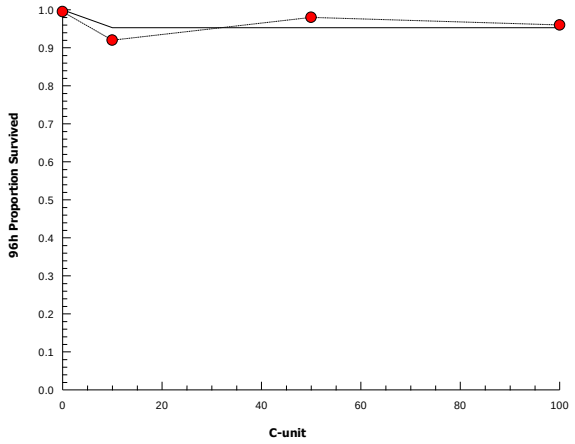
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	1	1	1
10		1	1	0.9	0.7	1
50		1	1	0.9	1	1
100		1	1	0.9	0.9	1

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	10/10	10/10	10/10	10/10
0	Site Water	10/10	10/10	10/10	10/10	9/10
10		10/10	10/10	9/10	7/10	10/10
50		10/10	10/10	9/10	10/10	10/10
100		10/10	10/10	9/10	9/10	10/10

Mysidopsis 96-h Acute Survival Test					**ENVIRON**
Analysis ID:	07-0112-8636	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:18	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Test Data Worksheet

Mysidopsis 96-h Acute Survival Test **ENVIRON**

Start Date: 29 Apr-15 16:25 **Species:** Americamysis bahia **Sample Code:** 6748B1F2
End Date: 03 May-15 15:40 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Port of Los Angeles
Sample Date: 27 Mar-15 **Material:** Sediment Sample **Sample Station:** DMMU-1

C-unit	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	15	10				10	
0	D	2	24	10				10	
0	D	3	8	10				10	
0	D	4	12	10				10	
0	D	5	9	10				10	
0	SW	1	13	10				10	
0	SW	2	17	10				10	
0	SW	3	6	10				10	
0	SW	4	20	10				10	
0	SW	5	19	10				9	
10		1	14	10				10	
10		2	21	10				10	
10		3	1	10				9	
10		4	25	10				7	
10		5	3	10				10	
50		1	22	10				10	
50		2	18	10				10	
50		3	7	10				9	
50		4	16	10				10	
50		5	4	10				10	
100		1	11	10				10	
100		2	2	10				10	
100		3	23	10				9	
100		4	10	10				9	
100		5	5	10				10	

APPENDIX B-7.8 Statistical Results: *M. beryllina* Water-Column Test

Inland Silverside 96-h Acute Survival Test — **ENVIRON**

Analysis ID:	14-5718-1142	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jul-15 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-7328-1464	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	05 Dec-14 14:25	**Protocol:**	EPA-823-B-98-004 (1998)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 13:10	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	37d 14h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	13.3%	Passes 96h proportion survived

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		Site Water	-0.4777	1.86	0.184	8	0.6772	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.005608177	0.005608177	1	0.2282	0.6456	Non-Significant Effect
Error	0.1966022	0.02457527	8			
Total	0.2022103		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.169	23.15	0.1406	Equal Variances
Variances	Mod Levene Equality of Variance	0.7267	13.75	0.4267	Equal Variances
Variances	Levene Equality of Variance	12.86	11.26	0.0071	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8692	0.7411	0.0977	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2459	0.3025	0.0880	Normal Distribution
Distribution	D'Agostino Skewness	0.952	2.576	0.3411	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.6662	3.878	0.0822	Normal Distribution

96h Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9	0.7244	1	1	0.7	1	0.06325	15.71%	0.0%
0	Site Water	5	0.94	0.872	1	0.9	0.9	1	0.02449	5.83%	-4.44%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.267	1.015	1.519	1.412	0.9912	1.412	0.09076	16.02%	0.0%
0	Site Water	5	1.314	1.203	1.425	1.249	1.249	1.412	0.03992	6.79%	-3.74%

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	0.7	1	0.8	1
0	Site Water	0.9	1	0.9	0.9	1

Angular (Corrected) Transformed Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.412	0.9912	1.412	1.107	1.412
0	Site Water	1.249	1.412	1.249	1.249	1.412

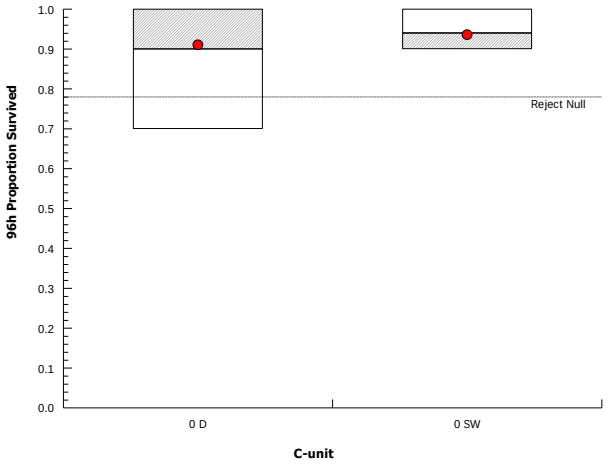
Inland Silverside 96-h Acute Survival Test **ENVIRON**

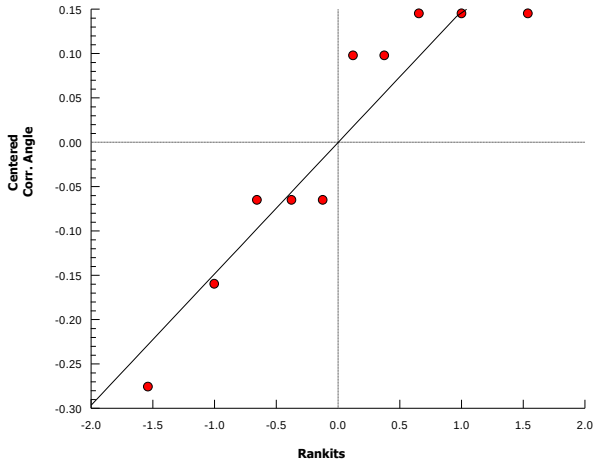
Analysis ID:	14-5718-1142	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jul-15 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	7/10	10/10	8/10	10/10
0	Site Water	9/10	10/10	9/10	9/10	10/10

Graphics





Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID:	11-3566-7546	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jul-15 9:34	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	16-7328-1464	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	05 Dec-14 14:25	**Protocol:**	EPA-823-B-98-004 (1998)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 13:10	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	37d 14h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	18.4%	50	100	70.71	

Dunnett Multiple Comparison Test

Control	vs	C-unit	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		10	1.867	2.227	0.237	8	0.0945	CDF	Non-Significant Effect
		50	1.561	2.227	0.237	8	0.1549	CDF	Non-Significant Effect
		100*	2.331	2.227	0.237	8	0.0412	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1736457	0.05788189	3	2.043	0.1484	Non-Significant Effect
Error	0.4532854	0.02833034	16			
Total	0.626931		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.398	11.34	0.7061	Equal Variances
Variances	Mod Levene Equality of Variance	0.2042	5.953	0.8915	Equal Variances
Variances	Levene Equality of Variance	0.7955	5.292	0.5142	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.968	0.866	0.7115	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1166	0.2235	0.7222	Normal Distribution
Distribution	D'Agostino Skewness	0.002226	2.576	0.9982	Normal Distribution
Distribution	D'Agostino Kurtosis	0.6922	2.576	0.4888	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	0.4792	9.21	0.7870	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.3705	3.878	0.4289	Normal Distribution

96h Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9	0.7244	1	1	0.7	1	0.06325	15.71%	0.0%
10		5	0.76	0.6184	0.9016	0.8	0.6	0.9	0.05099	15.0%	15.56%
50		5	0.78	0.5958	0.9642	0.8	0.6	1	0.06633	19.02%	13.33%
100		5	0.72	0.584	0.856	0.8	0.6	0.8	0.04899	15.21%	20.0%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.267	1.015	1.519	1.412	0.9912	1.412	0.09076	16.02%	0.0%
10		5	1.068	0.8983	1.238	1.107	0.8861	1.249	0.06117	12.81%	15.69%
50		5	1.101	0.8562	1.345	1.107	0.8861	1.412	0.08805	17.89%	13.12%
100		5	1.019	0.8684	1.169	1.107	0.8861	1.107	0.05415	11.89%	19.59%

Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID: 11-3566-7546 **Endpoint:** 96h Proportion Survived **CETIS Version:** CETISv1.8.7
Analyzed: 01 Jul-15 9:34 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	0.7	1	0.8	1
10		0.7	0.6	0.8	0.8	0.9
50		0.8	0.7	0.8	1	0.6
100		0.8	0.8	0.8	0.6	0.6

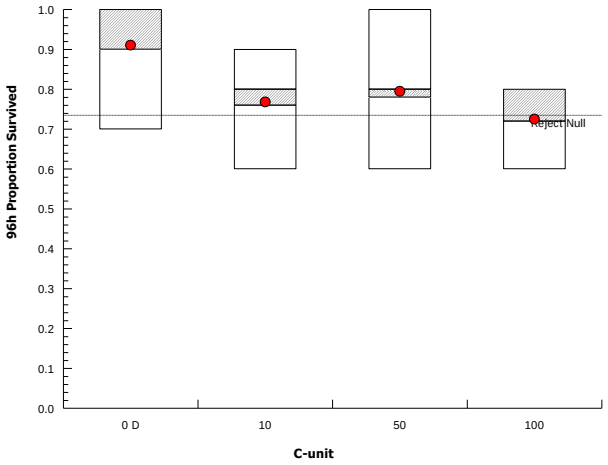
Angular (Corrected) Transformed Detail

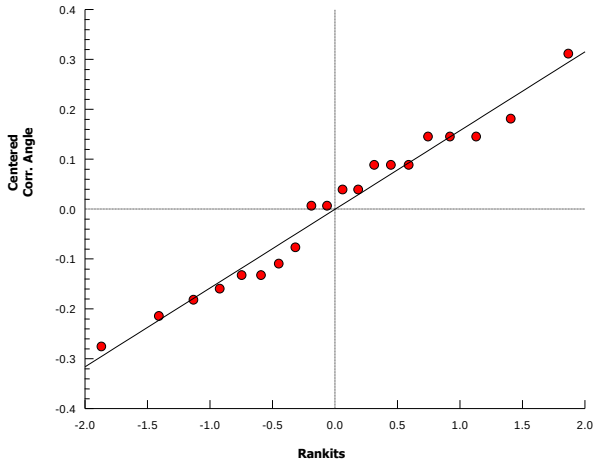
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.412	0.9912	1.412	1.107	1.412
10		0.9912	0.8861	1.107	1.107	1.249
50		1.107	0.9912	1.107	1.412	0.8861
100		1.107	1.107	1.107	0.8861	0.8861

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	7/10	10/10	8/10	10/10
0	Site Water	9/10	10/10	9/10	9/10	10/10
10		7/10	6/10	8/10	8/10	9/10
50		8/10	7/10	8/10	10/10	6/10
100		8/10	8/10	8/10	6/10	6/10

Graphics





CETIS Analytical Report

Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID:	11-0882-2653	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jul-15 9:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	16-7328-1464	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	05 Dec-14 14:25	**Protocol:**	EPA-823-B-98-004 (1998)	**Diluent:**	Laboratory Seawater
Ending Date:	09 Dec-14 13:10	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	37d 14h	**Station:**	DMMU-2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	216671	200	Yes	Two-Point Interpolation

Point Estimates

Level	unit	95% LCL	95% UCL
EC5	1.293	0.3253	126.7
EC10	4.26	0.444	N/A
EC15	53.61	N/A	N/A
EC20	100	N/A	N/A
EC25	>100	N/A	N/A
EC40	>100	N/A	N/A
EC50	>100	N/A	N/A

96h Proportion Survived Summary

			Calculated Variate(A/B)								
C-unit	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	5	0.9	0.7	1	0.06325	0.1414	15.71%	0.0%	45	50
10		5	0.76	0.6	0.9	0.05099	0.114	15.0%	15.56%	38	50
50		5	0.78	0.6	1	0.06633	0.1483	19.02%	13.33%	39	50
100		5	0.72	0.6	0.8	0.04899	0.1095	15.21%	20.0%	36	50

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	0.7	1	0.8	1
10		0.7	0.6	0.8	0.8	0.9
50		0.8	0.7	0.8	1	0.6
100		0.8	0.8	0.8	0.6	0.6

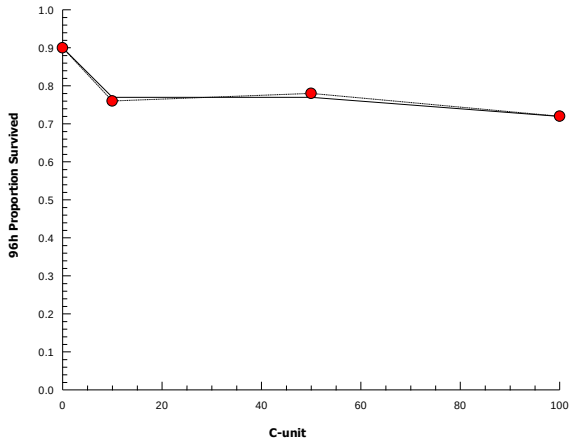
96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	7/10	10/10	8/10	10/10
0	Site Water	9/10	10/10	9/10	9/10	10/10
10		7/10	6/10	8/10	8/10	9/10
50		8/10	7/10	8/10	10/10	6/10
100		8/10	8/10	8/10	6/10	6/10

Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID:	11-0882-2653	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jul-15 9:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Test Data Worksheet

Inland Silverside 96-h Acute Survival Test **ENVIRON**

Start Date: 05 Dec-14 14:25 **Species:** Menidia beryllina **Sample Code:** DMMU-2
End Date: 09 Dec-14 13:10 **Protocol:** EPA-823-B-98-004 (1998) **Sample Source:** Port of Los Angeles
Sample Date: 29 Oct-14 **Material:** Sediment Sample **Sample Station:** DMMU-2

C-unit	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	13	10				10	
0	D	2	2	10				7	
0	D	3	6	10				10	
0	D	4	11	10				8	
0	D	5	22	10				10	
0	SW	1	18	10				9	
0	SW	2	12	10				10	
0	SW	3	3	10				9	
0	SW	4	21	10				9	
0	SW	5	25	10				10	
10		1	9	10				7	
10		2	5	10				6	
10		3	1	10				8	
10		4	20	10				8	
10		5	10	10				9	
50		1	4	10				8	
50		2	14	10				7	
50		3	7	10				8	
50		4	17	10				10	
50		5	16	10				6	
100		1	24	10				8	
100		2	23	10				8	
100		3	15	10				8	
100		4	8	10				6	
100		5	19	10				6	

Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID:	06-5052-9220	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:11	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-9038-1152	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	29 Apr-15 16:55	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	03 May-15 15:55	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	33d 17h	**Station:**	DMMU-1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.6%	Passes 96h proportion survived

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Control	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		Site Water	27.5	NA	2	8	0.7778	Exact	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.98	0.9 - NL	Yes	Passes Acceptability Criteria
Control Resp	0.98	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.04249493	0.005311866	8			
Total	0.04249493		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1	23.15	1.0000	Equal Variances
Variances	Mod Levene Equality of Variance	0	13.75	1.0000	Equal Variances
Variances	Levene Equality of Variance	0	11.26	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.5093	0.7411	<0.0001	Non-normal Distribution
Distribution	Kolmogorov-Smirnov D	0.4824	0.3025	<0.0001	Non-normal Distribution
Distribution	D'Agostino Skewness	2.495	2.576	0.0126	Normal Distribution
Distribution	Anderson-Darling A2 Normality	2.912	3.878	<0.0001	Non-normal Distribution

96h Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	0.0%
0	Site Water	5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	0.0%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	0.0%
0	Site Water	5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	0.0%

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	1	1	0.9
0	Site Water	1	1	1	0.9	1

Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID:	06-5052-9220	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:11	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

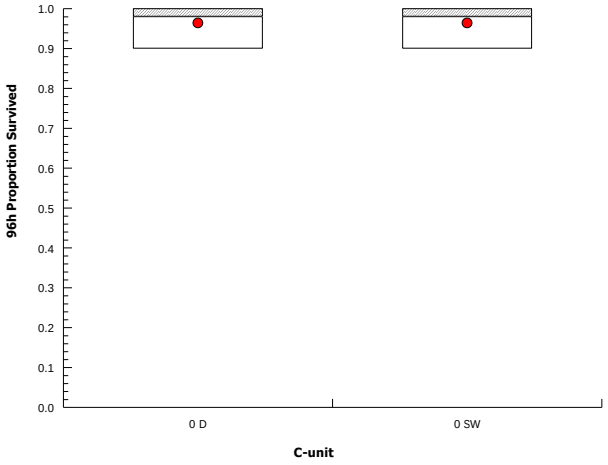
Angular (Corrected) Transformed Detail

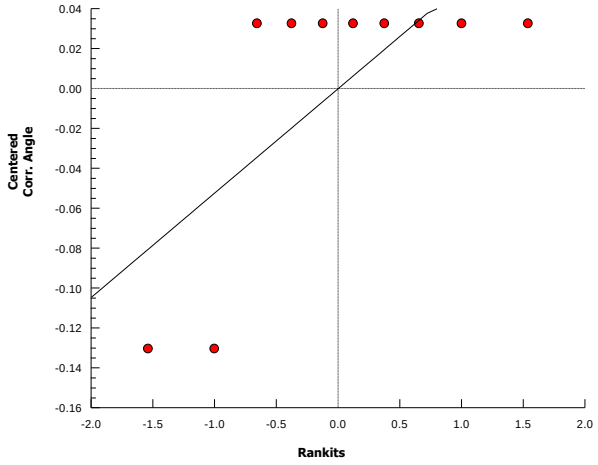
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.412	1.412	1.412	1.412	1.249
0	Site Water	1.412	1.412	1.412	1.249	1.412

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	10/10	10/10	10/10	9/10
0	Site Water	10/10	10/10	10/10	9/10	10/10

Graphics





Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID:	19-7347-0918	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:11	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	20-9038-1152	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	29 Apr-15 16:55	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	03 May-15 15:55	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	33d 17h	**Station:**	DMMU-1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	5.77%	100	>100	NA	

Steel Many-One Rank Sum Test

Control	vs	C-unit	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		10	27.5	17	2	8	0.7500	Asymp	Non-Significant Effect
		50	30	17	1	8	0.8988	Asymp	Non-Significant Effect
		100	27.5	17	2	8	0.7500	Asymp	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.98	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0039839	0.001327967	3	0.3333	0.8014	Non-Significant Effect
Error	0.0637424	0.0039839	16			
Total	0.0677263		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	0.3333	5.953	0.8015	Equal Variances
Variances	Levene Equality of Variance	2.37	5.292	0.1089	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.5875	0.866	<0.0001	Non-normal Distribution
Distribution	Kolmogorov-Smirnov D	0.35	0.2235	<0.0001	Non-normal Distribution
Distribution	D'Agostino Skewness	3.199	2.576	0.0014	Non-normal Distribution
Distribution	D'Agostino Kurtosis	1.781	2.576	0.0749	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	13.41	9.21	0.0012	Non-normal Distribution
Distribution	Anderson-Darling A2 Normality	4.156	3.878	<0.0001	Non-normal Distribution

96h Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	0.0%
10		5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	0.0%
50		5	1	1	1	1	1	1	0	0.0%	-2.04%
100		5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	0.0%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	0.0%
10		5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	0.0%
50		5	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	-2.36%
100		5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	0.0%

Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID:	19-7347-0918	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:11	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

96h Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	1	1	0.9
10		1	0.9	1	1	1
50		1	1	1	1	1
100		0.9	1	1	1	1

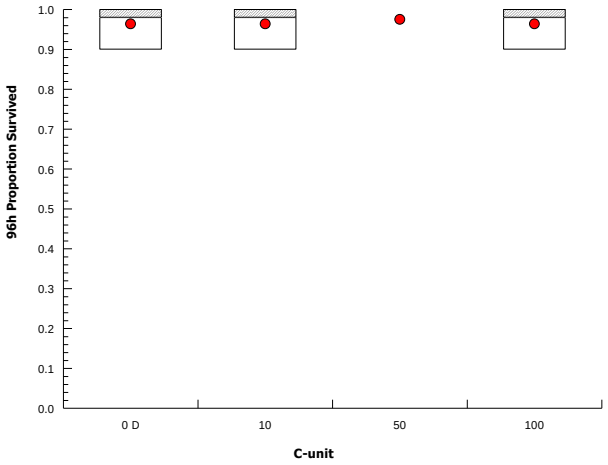
Angular (Corrected) Transformed Detail

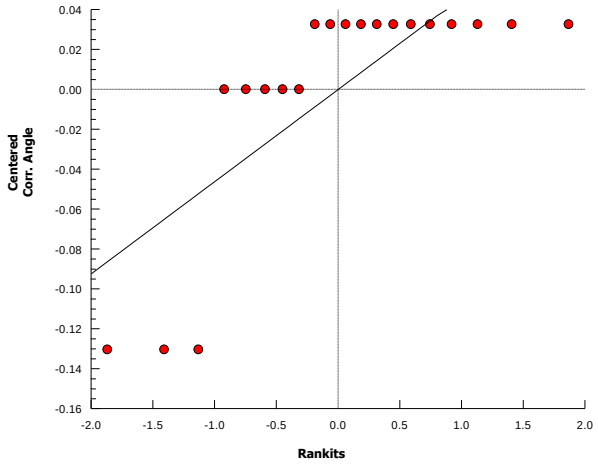
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.412	1.412	1.412	1.412	1.249
10		1.412	1.249	1.412	1.412	1.412
50		1.412	1.412	1.412	1.412	1.412
100		1.249	1.412	1.412	1.412	1.412

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	10/10	10/10	10/10	9/10
0	Site Water	10/10	10/10	10/10	9/10	10/10
10		10/10	9/10	10/10	10/10	10/10
50		10/10	10/10	10/10	10/10	10/10
100		9/10	10/10	10/10	10/10	10/10

Graphics





Inland Silverside 96-h Acute Survival Test **ENVIRON**

Analysis ID:	07-7687-1923	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	20-9038-1152	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	29 Apr-15 16:55	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	03 May-15 15:55	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	33d 17h	**Station:**	DMMU-1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	81188	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.98	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	unit	95% LCL	95% UCL
EC5	>100	N/A	N/A
EC10	>100	N/A	N/A
EC15	>100	N/A	N/A
EC20	>100	N/A	N/A
EC25	>100	N/A	N/A
EC40	>100	N/A	N/A
EC50	>100	N/A	N/A

96h Proportion Survived Summary

			Calculated Variate(A/B)								
C-unit	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	5	0.98	0.9	1	0.02	0.04472	4.56%	0.0%	49	50
10		5	0.98	0.9	1	0.02	0.04472	4.56%	0.0%	49	50
50		5	1	1	1	0	0	0.0%	-2.04%	50	50
100		5	0.98	0.9	1	0.02	0.04472	4.56%	0.0%	49	50

96h Proportion Survived Detail

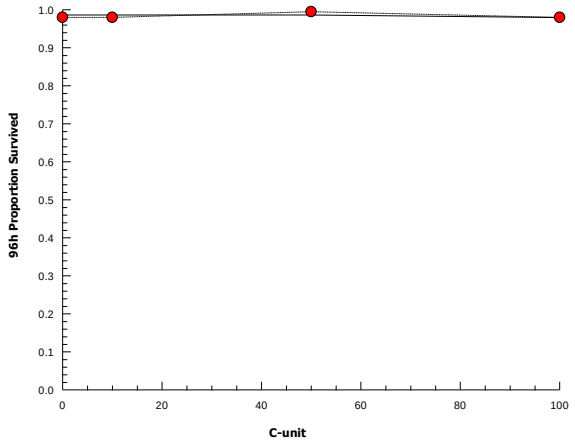
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	1	1	0.9
10		1	0.9	1	1	1
50		1	1	1	1	1
100		0.9	1	1	1	1

96h Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	10/10	10/10	10/10	10/10	9/10
0	Site Water	10/10	10/10	10/10	9/10	10/10
10		10/10	9/10	10/10	10/10	10/10
50		10/10	10/10	10/10	10/10	10/10
100		9/10	10/10	10/10	10/10	10/10

Inland Silverside 96-h Acute Survival Test					**ENVIRON**
Analysis ID:	07-7687-1923	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Test Data Worksheet

Inland Silverside 96-h Acute Survival Test **ENVIRON**

Start Date: 29 Apr-15 16:55 **Species:** Menidia beryllina **Sample Code:** 6748B1F2
End Date: 03 May-15 15:55 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** Port of Los Angeles
Sample Date: 27 Mar-15 **Material:** Sediment Sample **Sample Station:** DMMU-1

C-unit	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	9	10				10	
0	D	2	18	10				10	
0	D	3	22	10				10	
0	D	4	19	10				10	
0	D	5	5	10				9	
0	SW	1	8	10				10	
0	SW	2	16	10				10	
0	SW	3	14	10				10	
0	SW	4	23	10				9	
0	SW	5	4	10				10	
10		1	25	10				10	
10		2	15	10				9	
10		3	3	10				10	
10		4	11	10				10	
10		5	2	10				10	
50		1	12	10				10	
50		2	10	10				10	
50		3	7	10				10	
50		4	1	10				10	
50		5	20	10				10	
100		1	17	10				9	
100		2	24	10				10	
100		3	6	10				10	
100		4	13	10				10	
100		5	21	10				10	

APPENDIX B-7.9 Statistical Results: *Mytilus* sp. Water-Column Test

Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	09-4324-6162	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	01-7488-9669	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	19 Nov-14 17:45	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	21 Nov-14 17:00	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Taylor Shellfish	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	21d 18h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.78%	Passes combined proportion normal

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		Site Water	-1.053	1.86	0.146	8	0.8384	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
PMSD	0.05782	NL - 0.25	No	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01707235	0.01707235	1	1.108	0.3232	Non-Significant Effect
Error	0.1232282	0.01540352	8			
Total	0.1403005		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.372	23.15	0.7665	Equal Variances
Variances	Mod Levene Equality of Variance	0.2948	13.75	0.6067	Equal Variances
Variances	Levene Equality of Variance	1.134	11.26	0.3180	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9285	0.7411	0.4333	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2014	0.3025	0.3250	Normal Distribution
Distribution	D'Agostino Skewness	0.5204	2.576	0.6028	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.4016	3.878	0.3641	Normal Distribution

Combined Proportion Normal Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9574	0.9083	1	0.9373	0.9185	1	0.01767	4.13%	0.0%
0	Site Water	5	0.9824	0.9379	1	1	0.9185	1	0.01603	3.65%	-2.62%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.398	1.233	1.564	1.318	1.281	1.545	0.0597	9.55%	0.0%
0	Site Water	5	1.481	1.34	1.623	1.543	1.281	1.546	0.05096	7.69%	-5.91%

Combined Proportion Normal Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.931	0.9185	1	0.9373	1
0	Site Water	1	0.9937	1	1	0.9185

Angular (Corrected) Transformed Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.305	1.281	1.545	1.318	1.543
0	Site Water	1.544	1.492	1.546	1.543	1.281

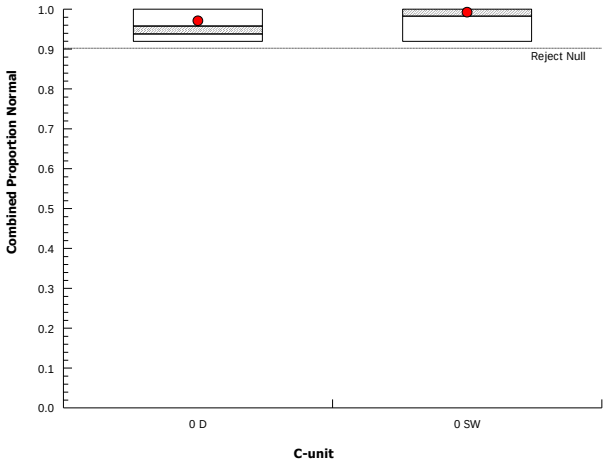
Bivalve Larval Survival and Development Test **ENVIRON**

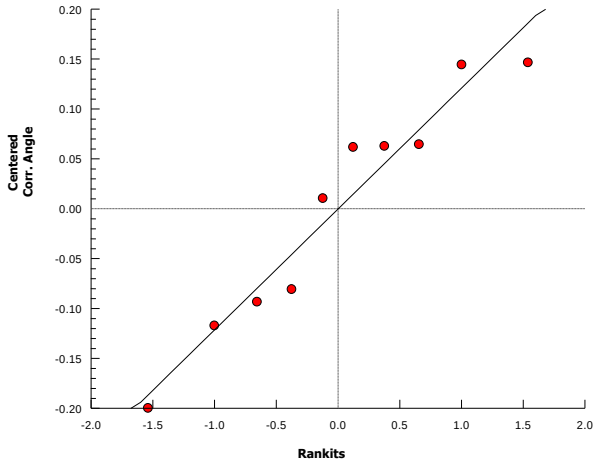
Analysis ID:	09-4324-6162	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Combined Proportion Normal Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	297/319	293/319	375/375	299/319	320/320
0	Site Water	344/344	317/319	393/393	320/320	293/319

Graphics





Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	01-5435-9583	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:38	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	01-7488-9669	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	19 Nov-14 17:45	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	21 Nov-14 17:00	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Taylor Shellfish	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	21d 18h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	8.97%	100	>100	NA	

Dunnett Multiple Comparison Test

Control	vs	C-unit	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		1	-1.412	2.305	0.194	8	0.9921	CDF	Non-Significant Effect
		10	-0.6726	2.305	0.194	8	0.9467	CDF	Non-Significant Effect
		50	-0.1017	2.305	0.194	8	0.8314	CDF	Non-Significant Effect
		100	0.804	2.305	0.194	8	0.4666	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
PMSD	0.08969	NL - 0.25	No	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09657729	0.02414432	4	1.36	0.2831	Non-Significant Effect
Error	0.3550821	0.0177541	20			
Total	0.4516594		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.686	13.28	0.4502	Equal Variances
Variances	Mod Levene Equality of Variance	0.9451	4.893	0.4651	Equal Variances
Variances	Levene Equality of Variance	2.174	4.431	0.1090	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9579	0.8877	0.3739	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1431	0.2018	0.2043	Normal Distribution
Distribution	D'Agostino Skewness	0.4491	2.576	0.6533	Normal Distribution
Distribution	D'Agostino Kurtosis	1.262	2.576	0.2069	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	1.795	9.21	0.4076	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.5028	3.878	0.2093	Normal Distribution

Combined Proportion Normal Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9574	0.9083	1	0.9373	0.9185	1	0.01767	4.13%	0.0%
1		5	0.995	0.9811	1	1	0.9749	1	0.005016	1.13%	-3.93%
10		5	0.9755	0.9322	1	1	0.9248	1	0.01562	3.58%	-1.9%
50		5	0.9555	0.8766	1	0.9843	0.8495	1	0.02843	6.65%	0.2%
100		5	0.9241	0.8309	1	0.9248	0.8119	1	0.03359	8.13%	3.47%

Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID: 01-5435-9583 **Endpoint:** Combined Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 14 Jul-15 10:38 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.398	1.233	1.564	1.318	1.281	1.545	0.0597	9.55%	0.0%
1		5	1.517	1.444	1.591	1.543	1.412	1.544	0.02639	3.89%	-8.51%
10		5	1.455	1.303	1.607	1.543	1.293	1.544	0.05489	8.44%	-4.05%
50		5	1.407	1.211	1.603	1.445	1.172	1.543	0.07045	11.2%	-0.61%
100		5	1.331	1.124	1.537	1.293	1.122	1.544	0.07427	12.48%	4.85%

Combined Proportion Normal Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.931	0.9185	1	0.9373	1
1		1	1	1	0.9749	1
10		0.953	1	1	1	0.9248
50		0.8495	1	1	0.9843	0.9436
100		1	0.8997	0.9843	0.9248	0.8119

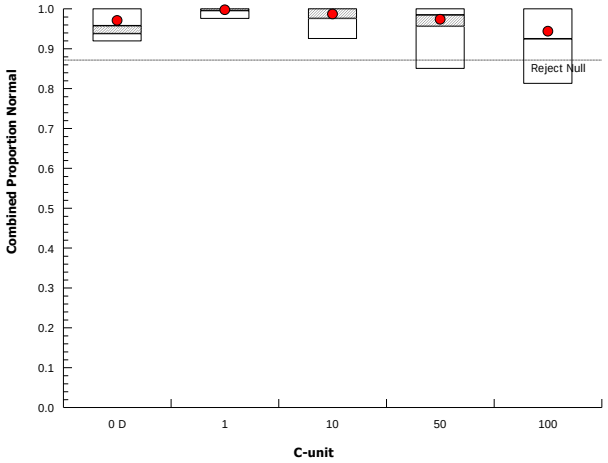
Angular (Corrected) Transformed Detail

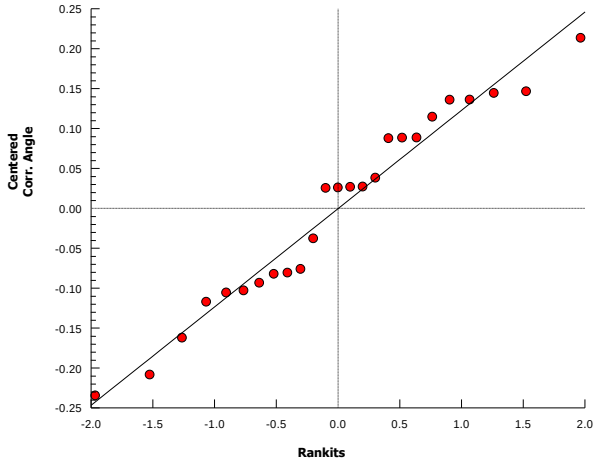
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.305	1.281	1.545	1.318	1.543
1		1.544	1.543	1.544	1.412	1.543
10		1.352	1.544	1.543	1.544	1.293
50		1.172	1.543	1.543	1.445	1.331
100		1.544	1.249	1.445	1.293	1.122

Combined Proportion Normal Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	297/319	293/319	375/375	299/319	320/320
0	Site Water	344/344	317/319	393/393	320/320	293/319
1		353/353	320/320	361/361	311/319	333/333
10		304/319	336/336	321/321	341/341	295/319
50		271/319	326/326	323/323	314/319	301/319
100		352/352	287/319	314/319	295/319	259/319

Graphics





Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	07-2826-4812	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	01-7488-9669	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	19 Nov-14 17:45	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	21 Nov-14 17:00	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Taylor Shellfish	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	21d 18h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.41%	Passes proportion normal

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		Site Water	1.852	1.86	0.033	8	0.0506	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9436	0.9 - NL	Yes	Passes Acceptability Criteria
Control Resp	0.9575	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002696368	0.002696368	1	3.429	0.1012	Non-Significant Effect
Error	0.006289913	0.0007862391	8			
Total	0.008986281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.423	23.15	0.7409	Equal Variances
Variances	Mod Levene Equality of Variance	0.00035	13.75	0.9857	Equal Variances
Variances	Levene Equality of Variance	0.002352	11.26	0.9625	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8864	0.7411	0.1542	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2061	0.3025	0.2882	Normal Distribution
Distribution	D'Agostino Skewness	1.367	2.576	0.1715	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.5379	3.878	0.1718	Normal Distribution

Proportion Normal Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9575	0.9415	0.9736	0.9591	0.9357	0.9674	0.005781	1.35%	0.0%
0	Site Water	5	0.9436	0.9288	0.9584	0.947	0.9269	0.9556	0.005323	1.26%	1.45%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.365	1.327	1.403	1.367	1.314	1.389	0.01359	2.23%	0.0%
0	Site Water	5	1.332	1.3	1.364	1.338	1.297	1.358	0.01139	1.91%	2.41%

Proportion Normal Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.9674	0.967	0.9591	0.9583	0.9357
0	Site Water	0.9556	0.9269	0.947	0.9524	0.9361

Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	07-2826-4812	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

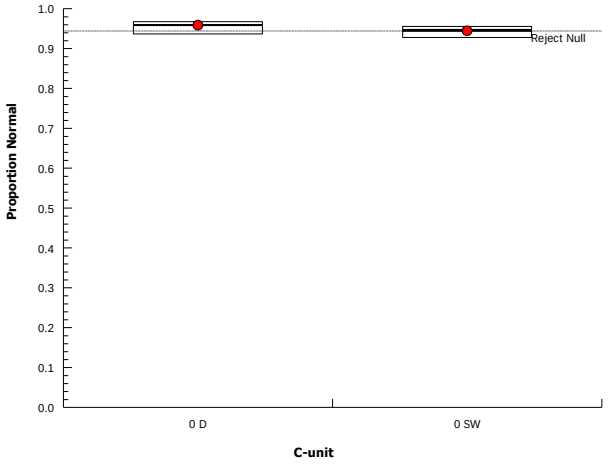
Angular (Corrected) Transformed Detail

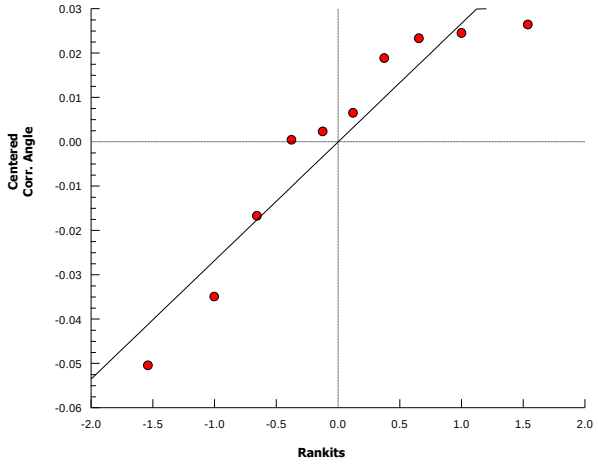
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.389	1.388	1.367	1.365	1.314
0	Site Water	1.358	1.297	1.338	1.351	1.315

Proportion Normal Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	297/307	293/303	375/391	299/312	320/342
0	Site Water	344/360	317/342	393/415	320/336	293/313

Graphics





Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	02-3898-3415	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	01-7488-9669	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	19 Nov-14 17:45	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	21 Nov-14 17:00	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Taylor Shellfish	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	21d 18h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	2.3%	Passes proportion survived

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		Site Water	-1.602	1.86	0.087	8	0.9261	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9962	0.5 - NL	Yes	Passes Acceptability Criteria
Control Resp	0.9781	0.5 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01415022	0.01415022	1	2.568	0.1477	Non-Significant Effect
Error	0.04408751	0.005510938	8			
Total	0.05823773		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.589	23.15	0.2435	Equal Variances
Variances	Mod Levene Equality of Variance	3.784	13.75	0.0997	Equal Variances
Variances	Levene Equality of Variance	4.703	11.26	0.0620	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9038	0.7411	0.2410	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2229	0.3025	0.1806	Normal Distribution
Distribution	D'Agostino Skewness	0.1078	2.576	0.9142	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.5162	3.878	0.1942	Normal Distribution

Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9781	0.9503	1	0.9781	0.9498	1	0.01001	2.29%	0.0%
0	Site Water	5	0.9962	0.9858	1	1	0.9812	1	0.003762	0.84%	-1.86%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.446	1.33	1.561	1.422	1.345	1.543	0.04152	6.42%	0.0%
0	Site Water	5	1.521	1.46	1.582	1.543	1.433	1.543	0.02192	3.22%	-5.2%

Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.9624	0.9498	1	0.9781	1
0	Site Water	1	1	1	1	0.9812

Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	02-3898-3415	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

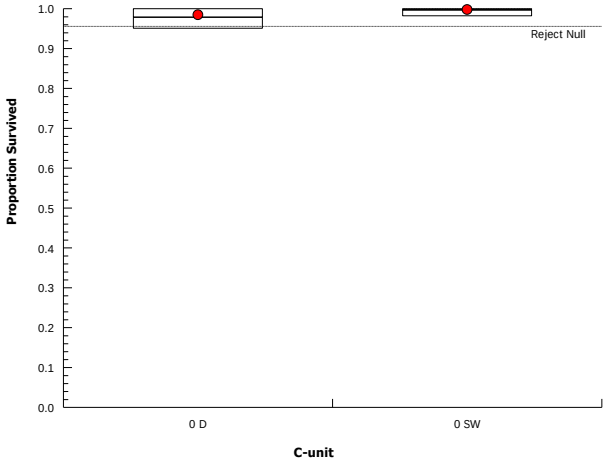
Angular (Corrected) Transformed Detail

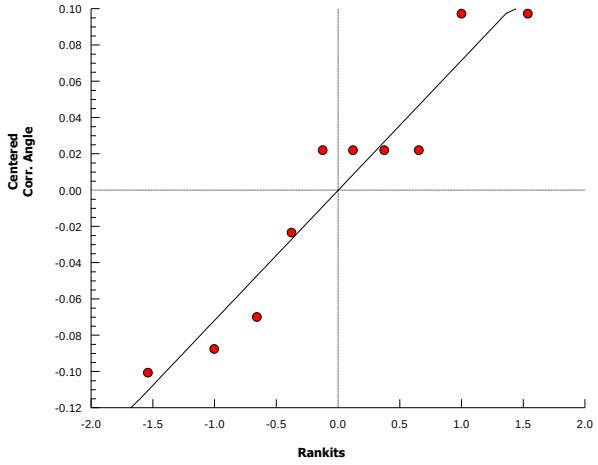
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.376	1.345	1.543	1.422	1.543
0	Site Water	1.543	1.543	1.543	1.543	1.433

Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	307/319	303/319	319/319	312/319	319/319
0	Site Water	319/319	319/319	319/319	319/319	313/319

Graphics





Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	18-1152-8657	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:41	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	01-7488-9669	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	19 Nov-14 17:45	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	21 Nov-14 17:00	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Taylor Shellfish	**Age:**	

Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	21d 18h	**Station:**	DMMU-2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1344415	200	Yes	Two-Point Interpolation

Point Estimates

Level	unit	95% LCL	95% UCL
EC5	94.39	N/A	N/A
EC10	>100	N/A	N/A
EC15	>100	N/A	N/A
EC20	>100	N/A	N/A
EC25	>100	N/A	N/A
EC40	>100	N/A	N/A
EC50	>100	N/A	N/A

Combined Proportion Normal Summary

			Calculated Variate(A/B)								
C-unit	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Dilution Water	5	0.9574	0.9185	1	0.01767	0.0395	4.13%	0.0%	1584	1652
1		5	0.995	0.9749	1	0.005016	0.01122	1.13%	-3.93%	1678	1686
10		5	0.9755	0.9248	1	0.01562	0.03494	3.58%	-1.9%	1597	1636
50		5	0.9555	0.8495	1	0.02843	0.06357	6.65%	0.2%	1535	1606
100		5	0.9241	0.8119	1	0.03359	0.07512	8.13%	3.47%	1507	1628

Combined Proportion Normal Detail

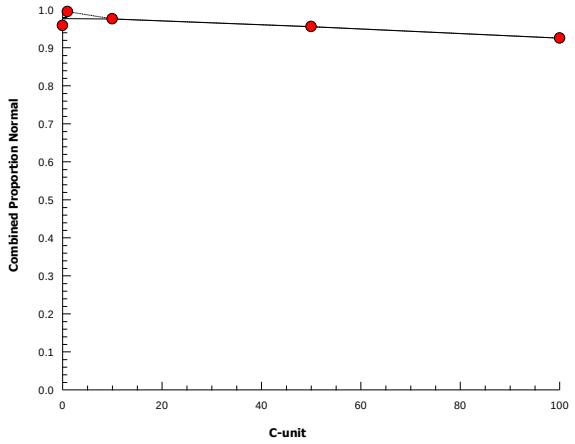
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.931	0.9185	1	0.9373	1
1		1	1	1	0.9749	1
10		0.953	1	1	1	0.9248
50		0.8495	1	1	0.9843	0.9436
100		1	0.8997	0.9843	0.9248	0.8119

Combined Proportion Normal Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	307/319	303/319	319/319	312/319	319/319
0	Site Water	319/319	319/319	319/319	319/319	313/319
1		319/319	319/319	319/319	319/319	319/319
10		319/319	319/319	319/319	319/319	311/319
50		290/319	319/319	319/319	319/319	319/319
100		319/319	307/319	319/319	318/319	277/319

Bivalve Larval Survival and Development Test					ENVIRON
Analysis ID:	18-1152-8657	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:41	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test **ENVIRON**

Start Date: 19 Nov-14 17:45 **Species:** Mytilus galloprovincialis **Sample Code:** DMMU-2
End Date: 21 Nov-14 17:00 **Protocol:** EPA/600/R-95/136 (1995) **Sample Source:** Port of Los Angeles
Sample Date: 29 Oct-14 **Material:** Sediment Sample **Sample Station:** DMMU-2

C-unit	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	11	319	307	307	297	
0	D	2	18	319	303	303	293	
0	D	3	29	319	391	391	375	
0	D	4	1	319	312	312	299	
0	D	5	5	319	342	342	320	
0	SW	1	10	319	360	360	344	
0	SW	2	21	319	342	342	317	
0	SW	3	13	319	415	415	393	
0	SW	4	23	319	336	336	320	
0	SW	5	9	319	313	313	293	
1		1	12	319	375	375	353	
1		2	20	319	333	333	320	
1		3	17	319	375	375	361	
1		4	25	319	328	328	311	
1		5	24	319	353	353	333	
10		1	7	319	320	320	304	
10		2	6	319	347	347	336	
10		3	2	319	340	340	321	
10		4	22	319	354	354	341	
10		5	4	319	311	311	295	
50		1	19	319	290	290	271	
50		2	27	319	344	344	326	
50		3	14	319	337	337	323	
50		4	3	319	334	334	314	
50		5	28	319	322	322	301	
100		1	15	319	371	371	352	
100		2	30	319	307	307	287	
100		3	8	319	339	339	314	
100		4	16	319	318	318	295	
100		5	26	319	277	277	259	

CETIS Analytical Report

Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	02-4275-3077	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:28	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-1495-5716	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	30 Apr-15 18:04	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	02 May-15 17:05	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Taylor Shellfish	**Age:**	
Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	34d 18h	**Station:**	DMMU-1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	4.02%	100	>100	NA	

Steel Many-One Rank Sum Test

Control	vs	C-unit	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		1	28	17	1	8	0.8326	Asymp	Non-Significant Effect
		10	25	17	1	8	0.5912	Asymp	Non-Significant Effect
		50	27	17	1	8	0.7639	Asymp	Non-Significant Effect
		100	27	17	1	8	0.7639	Asymp	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
PMSD	0.04024	NL - 0.25	No	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.008121288	0.002030322	4	0.1776	0.9473	Non-Significant Effect
Error	0.2286443	0.01143222	20			
Total	0.2367656		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.431	13.28	0.3508	Equal Variances
Variances	Mod Levene Equality of Variance	0.1852	4.893	0.9425	Equal Variances
Variances	Levene Equality of Variance	0.8689	4.431	0.4997	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6917	0.8877	<0.0001	Non-normal Distribution
Distribution	Kolmogorov-Smirnov D	0.3337	0.2018	<0.0001	Non-normal Distribution
Distribution	D'Agostino Skewness	3.136	2.576	0.0017	Non-normal Distribution
Distribution	D'Agostino Kurtosis	1.433	2.576	0.1519	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	11.89	9.21	0.0026	Non-normal Distribution
Distribution	Anderson-Darling A2 Normality	3.776	3.878	<0.0001	Non-normal Distribution

Combined Proportion Normal Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9871	0.9514	1	1	0.9356	1	0.01288	2.92%	0.0%
1		5	0.997	0.9886	1	1	0.9848	1	0.003031	0.68%	-1.0%
10		5	0.9795	0.9326	1	1	0.9129	1	0.01692	3.86%	0.77%
50		5	0.978	0.917	1	1	0.8902	1	0.02197	5.02%	0.92%
100		5	0.9848	0.9428	1	1	0.9242	1	0.01515	3.44%	0.23%

Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID: 02-4275-3077 **Endpoint:** Combined Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 14 Jul-15 11:28 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.495	1.37	1.621	1.54	1.314	1.541	0.04525	6.77%	0.0%
1		5	1.522	1.47	1.574	1.541	1.447	1.541	0.01864	2.74%	-1.79%
10		5	1.468	1.323	1.614	1.54	1.271	1.541	0.05248	7.99%	1.81%
50		5	1.48	1.308	1.651	1.541	1.233	1.542	0.06166	9.32%	1.05%
100		5	1.491	1.353	1.63	1.54	1.292	1.542	0.04982	7.47%	0.27%

Combined Proportion Normal Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	0.9356	1	1
1		1	1	1	1	0.9848
10		0.9848	1	1	0.9129	1
50		1	1	1	0.8902	1
100		1	1	1	0.9242	1

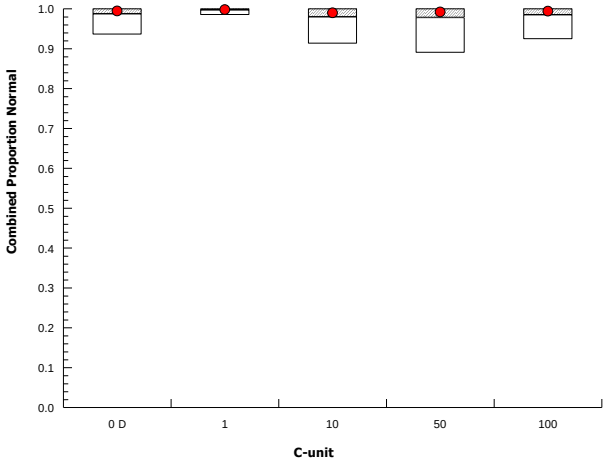
Angular (Corrected) Transformed Detail

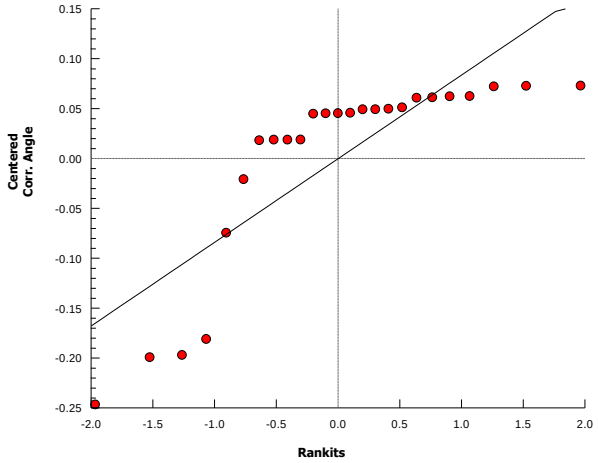
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.54	1.541	1.314	1.541	1.54
1		1.541	1.541	1.541	1.54	1.447
10		1.447	1.54	1.541	1.271	1.541
50		1.542	1.542	1.54	1.233	1.541
100		1.542	1.54	1.541	1.292	1.54

Combined Proportion Normal Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	271/271	281/281	247/264	273/273	264/264
0	Site Water	277/277	269/269	291/291	265/265	275/275
1		276/276	276/276	278/278	265/265	260/264
10		260/264	270/270	284/284	241/264	281/281
50		302/302	298/298	270/270	235/264	278/278
100		309/309	271/271	281/281	244/264	272/272

Graphics





Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	07-3194-5287	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:28	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-1495-5716	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	30 Apr-15 18:04	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	02 May-15 17:05	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Taylor Shellfish	**Age:**	
Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	34d 18h	**Station:**	DMMU-1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	0.94%	Passes proportion survived

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Control	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		Site Water	30	NA	1	8	1.0000	Exact	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.5 - NL	Yes	Passes Acceptability Criteria
Control Resp	0.9909	0.5 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003388254	0.003388254	1	1	0.3466	Non-Significant Effect
Error	0.02710603	0.003388254	8			
Total	0.03049428		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	13.75	0.3559	Equal Variances
Variances	Levene Equality of Variance	7.111	11.26	0.0285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6247	0.7411	0.0001	Non-normal Distribution
Distribution	Kolmogorov-Smirnov D	0.4	0.3025	<0.0001	Non-normal Distribution
Distribution	D'Agostino Skewness	3.335	2.576	0.0009	Non-normal Distribution
Distribution	Anderson-Darling A2 Normality	1.796	3.878	<0.0001	Non-normal Distribution

Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	0.9909	0.9657	1	1	0.9545	1	0.009091	2.05%	0.0%
0	Site Water	5	1	1	1	1	1	1	0	0.0%	-0.92%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	5	1.503	1.401	1.605	1.54	1.356	1.54	0.03681	5.48%	0.0%
0	Site Water	5	1.54	1.54	1.54	1.54	1.54	1.54	0	0.0%	-2.45%

Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	0.9545	1	1
0	Site Water	1	1	1	1	1

Angular (Corrected) Transformed Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.54	1.54	1.356	1.54	1.54
0	Site Water	1.54	1.54	1.54	1.54	1.54

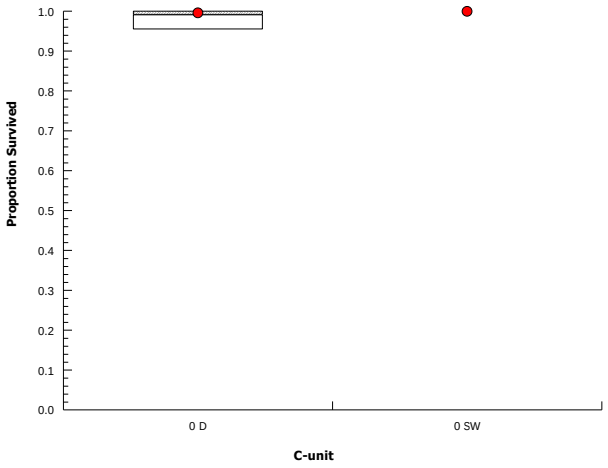
Bivalve Larval Survival and Development Test **ENVIRON**

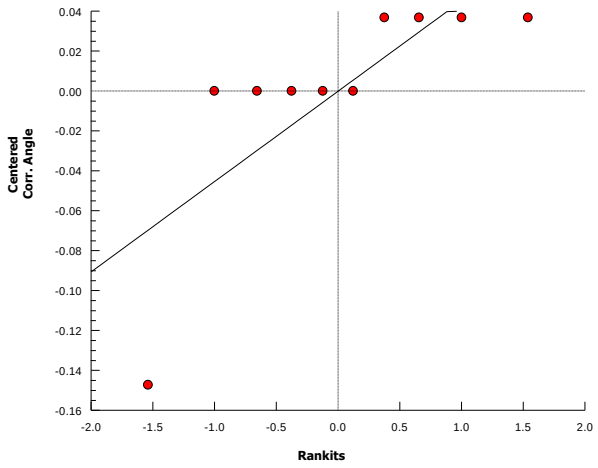
Analysis ID:	07-3194-5287	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:28	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	264/264	264/264	252/264	264/264	264/264
0	Site Water	264/264	264/264	264/264	264/264	264/264

Graphics





Bivalve Larval Survival and Development Test **ENVIRON**

Analysis ID:	07-7076-7286	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	06-1495-5716	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	30 Apr-15 18:04	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	02 May-15 17:05	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Taylor Shellfish	**Age:**	

Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	34d 18h	**Station:**	DMMU-1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1247226	200	Yes	Two-Point Interpolation

Point Estimates

Level	unit	95% LCL	95% UCL
EC5	>100	N/A	N/A
EC10	>100	N/A	N/A
EC15	>100	N/A	N/A
EC20	>100	N/A	N/A
EC25	>100	N/A	N/A
EC40	>100	N/A	N/A
EC50	>100	N/A	N/A

Combined Proportion Normal Summary

			Calculated Variate(A/B)								
C-unit	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Dilution Water	5	0.9871	0.9356	1	0.01288	0.0288	2.92%	0.0%	1336	1353
1		5	0.997	0.9848	1	0.003031	0.006776	0.68%	-1.0%	1355	1359
10		5	0.9795	0.9129	1	0.01692	0.03784	3.86%	0.77%	1336	1363
50		5	0.978	0.8902	1	0.02197	0.04913	5.02%	0.92%	1383	1412
100		5	0.9848	0.9242	1	0.01515	0.03388	3.44%	0.23%	1377	1397

Combined Proportion Normal Detail

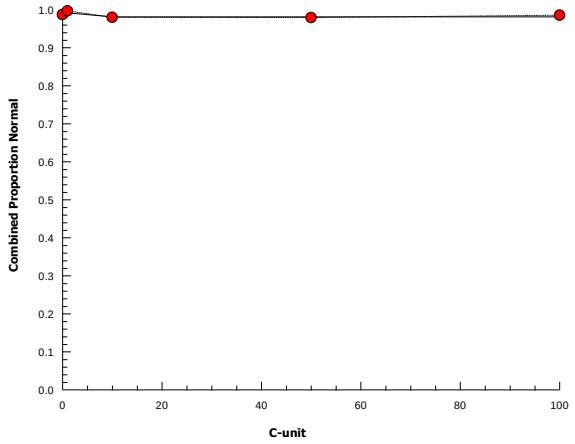
C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	0.9356	1	1
1		1	1	1	1	0.9848
10		0.9848	1	1	0.9129	1
50		1	1	1	0.8902	1
100		1	1	1	0.9242	1

Combined Proportion Normal Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	264/264	264/264	252/264	264/264	264/264
0	Site Water	264/264	264/264	264/264	264/264	264/264
1		264/264	264/264	264/264	264/264	261/264
10		264/264	264/264	264/264	247/264	264/264
50		264/264	264/264	264/264	240/264	264/264
100		264/264	264/264	264/264	251/264	264/264

Bivalve Larval Survival and Development Test					**ENVIRON**
Analysis ID:	07-7076-7286	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test **ENVIRON**

Start Date: 30 Apr-15 18:04 **Species:** Mytilus galloprovincialis **Sample Code:** 6748B1F2
End Date: 02 May-15 17:05 **Protocol:** EPA/600/R-95/136 (1995) **Sample Source:** Port of Los Angeles
Sample Date: 27 Mar-15 **Material:** Sediment Sample **Sample Station:** DMMU-1

C-unit	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	4	264	280	280	271	
0	D	2	7	264	286	286	281	
0	D	3	27	264	252	252	247	
0	D	4	1	264	277	277	273	
0	D	5	25	264	267	267	264	
0	SW	1	24	264	283	283	277	
0	SW	2	23	264	271	271	269	
0	SW	3	18	264	296	296	291	
0	SW	4	2	264	269	269	265	
0	SW	5	30	264	281	281	275	
1		1	10	264	282	282	276	
1		2	5	264	283	283	276	
1		3	11	264	285	285	278	
1		4	22	264	267	267	265	
1		5	8	264	261	261	260	
10		1	9	264	264	264	260	
10		2	6	264	276	276	270	
10		3	28	264	287	287	284	
10		4	3	264	247	247	241	
10		5	17	264	282	282	281	
50		1	16	264	304	304	302	
50		2	29	264	298	298	298	
50		3	14	264	274	274	270	
50		4	15	264	240	240	235	
50		5	19	264	284	284	278	
100		1	12	264	312	312	309	
100		2	13	264	275	275	271	
100		3	20	264	285	285	281	
100		4	21	264	251	251	244	
100		5	26	264	276	276	272	

APPENDIX B-7.10 Statistical Results: Benthic Tests

Ampelisca 10-d Survival Sediment Test **ENVIRON**

Analysis ID:	18-5954-8579	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jul-15 9:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-3974-1136	**Test Type:**	Survival	**Analyst:**	
Start Date:	14 Nov-14	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	24 Nov-14	**Species:**	Ampelisca abdita	**Brine:**	Not Applicable
Duration:	10d 0h	**Source:**	Brezina and Associates	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	16d 0h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.21%	Fails proportion survived

Equal Variance t Two-Sample Test

Control	vs	C-unit	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Reference Sed		100*	3.877	1.86	0.11	8	0.0023	CDF	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1312886	0.1312886	1	15.03	0.0047	Significant Effect
Error	0.06987451	0.008734314	8			
Total	0.2011631		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.317	23.15	0.7958	Equal Variances
Variances	Mod Levene Equality of Variance	0.06124	13.75	0.8128	Equal Variances
Variances	Levene Equality of Variance	0.9571	11.26	0.3566	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8824	0.7411	0.1389	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2194	0.3025	0.2001	Normal Distribution
Distribution	D'Agostino Skewness	0.09742	2.576	0.9224	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.6226	3.878	0.1057	Normal Distribution

Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference Sed	5	0.94	0.8881	0.9919	0.95	0.9	1	0.01871	4.45%	0.0%
100		5	0.79	0.688	0.892	0.85	0.7	0.85	0.03674	10.4%	15.96%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference Sed	5	1.329	1.222	1.437	1.345	1.249	1.459	0.03883	6.53%	0.0%
100		5	1.1	0.9766	1.224	1.173	0.9912	1.173	0.04457	9.06%	17.24%

Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Reference Sed	0.9	1	0.95	0.95	0.9
100		0.85	0.85	0.7	0.85	0.7

Angular (Corrected) Transformed Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Reference Sed	1.249	1.459	1.345	1.345	1.249
100		1.173	1.173	0.9912	1.173	0.9912

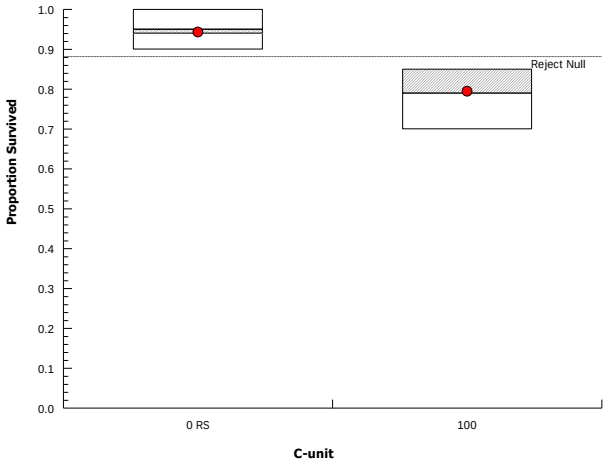
Ampelisca 10-d Survival Sediment Test **ENVIRON**

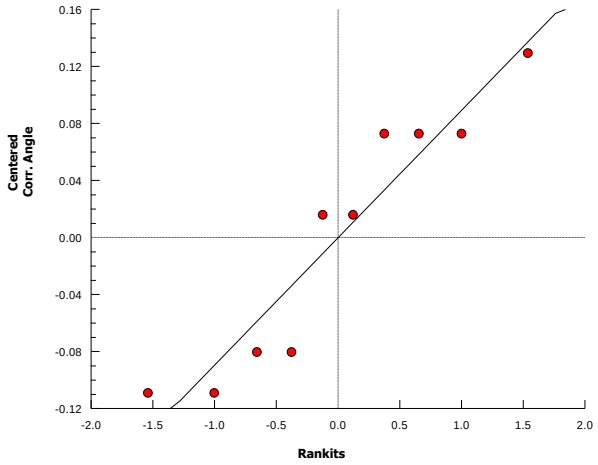
Analysis ID:	18-5954-8579	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jul-15 9:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Control Sed	20/20	20/20	19/20	19/20	19/20
0	Reference Sed	18/20	20/20	19/20	19/20	18/20
100		17/20	17/20	14/20	17/20	14/20

Graphics





CETIS Test Data Worksheet

Ampelisca 10-d Survival Sediment Test **ENVIRON**

Start Date: 14 Nov-14 **Species:** Ampelisca abdita **Sample Code:** DMMU-2
End Date: 24 Nov-14 **Protocol:** EPA/600/R-94/025 (1994) **Sample Source:** Port of Los Angeles
Sample Date: 29 Oct-14 **Material:** Sediment Sample **Sample Station:** DMMU-2

C-unit	Code	Rep	Pos	# Exposed	# Survived	Notes
0	CS	1	14	20	20	
0	CS	2	6	20	20	
0	CS	3	12	20	19	
0	CS	4	15	20	19	
0	CS	5	7	20	19	
0	RS	1	1	20	18	
0	RS	2	3	20	20	
0	RS	3	13	20	19	
0	RS	4	11	20	19	
0	RS	5	9	20	18	
100		1	4	20	17	
100		2	5	20	17	
100		3	2	20	14	
100		4	10	20	17	
100		5	8	20	14	

Ampelisca 10-d Survival Sediment Test **ENVIRON**

Analysis ID:	06-8090-6972	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	13-6179-2543	**Test Type:**	Survival	**Analyst:**	
Start Date:	09 Apr-15 12:40	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	19 Apr-15 15:00	**Species:**	Ampelisca abdita	**Brine:**	Not Applicable
Duration:	10d 2h	**Source:**	Aquatic Research Organisms, NH	**Age:**	
Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	13d 13h	**Station:**	DMMU-1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.34%	Passes proportion survived

Equal Variance t Two-Sample Test

Control	vs	C-unit	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Reference Sed		100	-0.7855	1.86	0.108	8	0.7726	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.96	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0051507	0.0051507	1	0.617	0.4548	Non-Significant Effect
Error	0.06678144	0.00834768	8			
Total	0.07193214		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.113	23.15	0.9195	Equal Variances
Variances	Mod Levene Equality of Variance	0.2306	13.75	0.6481	Equal Variances
Variances	Levene Equality of Variance	0.007662	11.26	0.9324	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8503	0.7411	0.0586	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2868	0.3025	0.0193	Normal Distribution
Distribution	D'Agostino Skewness	1.58	2.576	0.1141	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.7949	3.878	0.0391	Normal Distribution

Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference Sed	5	0.96	0.9081	1	0.95	0.9	1	0.01871	4.36%	0.0%
100		5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	-2.08%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference Sed	5	1.371	1.261	1.482	1.345	1.249	1.459	0.03975	6.48%	0.0%
100		5	1.417	1.3	1.533	1.459	1.249	1.459	0.04194	6.62%	-3.31%

Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Reference Sed	0.95	1	0.9	0.95	1
100		0.9	1	1	1	1

Angular (Corrected) Transformed Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Reference Sed	1.345	1.459	1.249	1.345	1.459
100		1.249	1.459	1.459	1.459	1.459

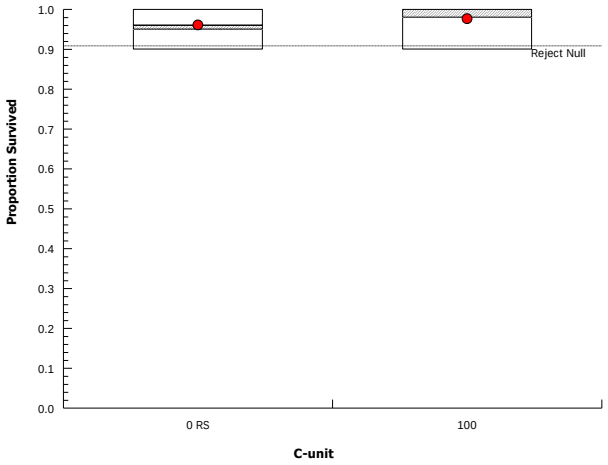
Ampelisca 10-d Survival Sediment Test **ENVIRON**

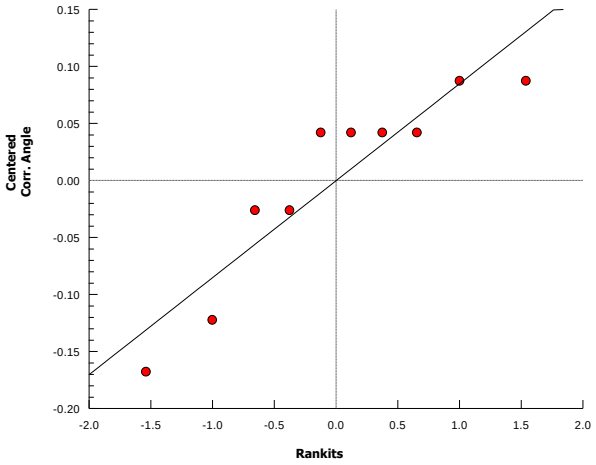
Analysis ID:	06-8090-6972	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Control Sed	20/20	20/20	20/20	19/20	18/20
0	Reference Sed	19/20	20/20	18/20	19/20	20/20
100		18/20	20/20	20/20	20/20	20/20

Graphics





CETIS Test Data Worksheet

Ampelisca 10-d Survival Sediment Test **ENVIRON**

Start Date: 09 Apr-15 12:40 **Species:** Ampelisca abdita **Sample Code:** 6748B1F2
End Date: 19 Apr-15 15:00 **Protocol:** EPA/600/R-94/025 (1994) **Sample Source:** Port of Los Angeles
Sample Date: 27 Mar-15 **Material:** Sediment Sample **Sample Station:** DMMU-1

C-unit	Code	Rep	Pos	# Exposed	# Survived	Notes
0	CS	1	6	20	20	
0	CS	2	7	20	20	
0	CS	3	3	20	20	
0	CS	4	15	20	19	
0	CS	5	1	20	18	
0	RS	1	12	20	19	
0	RS	2	14	20	20	
0	RS	3	5	20	18	
0	RS	4	13	20	19	
0	RS	5	11	20	20	
100		1	10	20	18	
100		2	2	20	20	
100		3	4	20	20	
100		4	9	20	20	
100		5	8	20	20	

Neanthes 10-d Survival and Growth Sediment Test **ENVIRON**

Analysis ID:	20-8749-2178	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	04-7804-9166	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	05 Dec-14	**Protocol:**	ASTM E1611-00 (2000)	**Diluent:**	Laboratory Seawater
Ending Date:	15 Dec-14	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Duration:	10d 0h	**Source:**	Aquatic Toxicology Support	**Age:**	
Sample ID:	09-3333-5597	**Code:**	DMMU-2	**Client:**	Port of Los Angeles
Sample Date:	29 Oct-14	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	31 Oct-14	**Source:**	Port of Los Angeles		
Sample Age:	37d 0h	**Station:**	DMMU-2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	7.28%	Passes proportion survived

Equal Variance t Two-Sample Test

Control	vs	C-unit	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Reference Sed		100	1.521	1.86	0.114	8	0.0834	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02188721	0.02188721	1	2.312	0.1669	Non-Significant Effect
Error	0.07572903	0.009466128	8			
Total	0.09761624		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	2.534	13.75	0.1625	Equal Variances
Variances	Levene Equality of Variance	19.86	11.26	0.0021	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8159	0.7411	0.0226	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.3	0.3025	0.0111	Normal Distribution
Distribution	D'Agostino Skewness	1.902	2.576	0.0571	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.9468	3.878	0.0167	Normal Distribution

Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference Sed	5	1	1	1	1	1	1	0	0.0%	0.0%
100		5	0.94	0.8289	1	1	0.8	1	0.04	9.52%	6.0%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference Sed	5	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
100		5	1.318	1.148	1.489	1.412	1.107	1.412	0.06153	10.44%	6.63%

Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Reference Sed	1	1	1	1	1
100		0.8	1	1	1	0.9

Angular (Corrected) Transformed Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Reference Sed	1.412	1.412	1.412	1.412	1.412
100		1.107	1.412	1.412	1.412	1.249

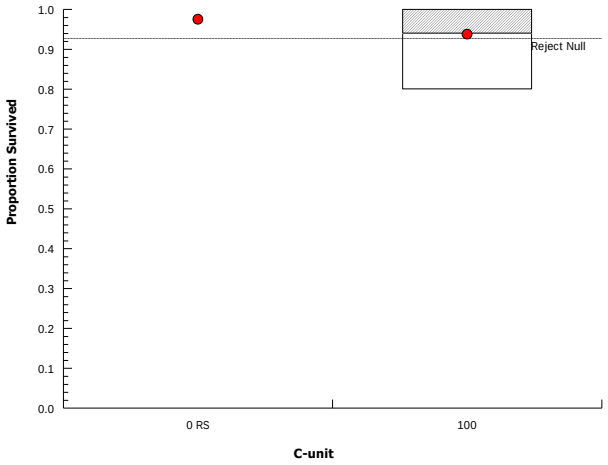
Neanthes 10-d Survival and Growth Sediment Test **ENVIRON**

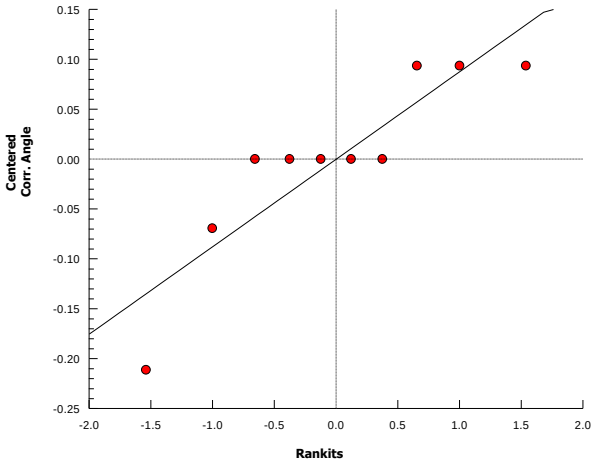
Analysis ID:	20-8749-2178	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 10:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Control Sed	10/10	10/10	10/10	10/10	1/10
0	Reference Sed	10/10	10/10	10/10	10/10	10/10
100		8/10	10/10	10/10	10/10	9/10

Graphics





CETIS Test Data Worksheet

Neanthes 10-d Survival and Growth Sediment Test **ENVIRON**

Start Date: 05 Dec-14 **Species:** Neanthes arenaceodentata **Sample Code:** DMMU-2
End Date: 15 Dec-14 **Protocol:** ASTM E1611-00 (2000) **Sample Source:** Port of Los Angeles
Sample Date: 29 Oct-14 **Material:** Sediment Sample **Sample Station:** DMMU-2

C-unit	Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	Notes
0	CS	1	4	10	10		0			
0	CS	2	5	10	10		0			
0	CS	3	6	10	10		0			
0	CS	4	13	10	10		0			
0	CS	5	2	10	1		0			
0	RS	1	10	10	10		0			
0	RS	2	7	10	10		0			
0	RS	3	8	10	10		0			
0	RS	4	9	10	10		0			
0	RS	5	11	10	10		0			
100		1	14	10	8		0			
100		2	3	10	10		0			
100		3	12	10	10		0			
100		4	1	10	10		0			
100		5	15	10	9		0			

Neanthes 10-d Survival and Growth Sediment Test **ENVIRON**

Analysis ID:	19-5505-6124	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-4574-3705	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	24 Apr-15	**Protocol:**	ASTM E1611-00 (2000)	**Diluent:**	Laboratory Seawater
Ending Date:	04 May-15	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Duration:	10d 0h	**Source:**	Aquatic Toxicology Support	**Age:**	
Sample ID:	17-3281-7394	**Code:**	6748B1F2	**Client:**	Port of Los Angeles
Sample Date:	27 Mar-15	**Material:**	Sediment Sample	**Project:**	Everport Container Terminal
Receive Date:	28 Mar-15	**Source:**	Port of Los Angeles		
Sample Age:	28d 0h	**Station:**	DMMU-1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.44%	Passes proportion survived

Equal Variance t Two-Sample Test

Control	vs	C-unit	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Reference Sed		100	0.5051	1.86	0.136	8	0.3136	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003387206	0.003387206	1	0.2551	0.6271	Non-Significant Effect
Error	0.1062265	0.01327831	8			
Total	0.1096137		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.333	23.15	0.4321	Equal Variances
Variances	Mod Levene Equality of Variance	0.00346	13.75	0.9550	Equal Variances
Variances	Levene Equality of Variance	0.2665	11.26	0.6196	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8036	0.7411	0.0160	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.3127	0.3025	0.0063	Non-normal Distribution
Distribution	D'Agostino Skewness	1.962	2.576	0.0498	Normal Distribution
Distribution	Anderson-Darling A2 Normality	1.003	3.878	0.0123	Normal Distribution

Proportion Survived Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference Sed	5	0.96	0.8489	1	1	0.8	1	0.04	9.32%	0.0%
100		5	0.94	0.872	1	0.9	0.9	1	0.02449	5.83%	2.08%

Angular (Corrected) Transformed Summary

C-unit	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference Sed	5	1.351	1.182	1.52	1.412	1.107	1.412	0.06097	10.09%	0.0%
100		5	1.314	1.203	1.425	1.249	1.249	1.412	0.03992	6.79%	2.72%

Proportion Survived Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Reference Sed	1	1	1	0.8	1
100		1	0.9	0.9	1	0.9

Angular (Corrected) Transformed Detail

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Reference Sed	1.412	1.412	1.412	1.107	1.412
100		1.412	1.249	1.249	1.412	1.249

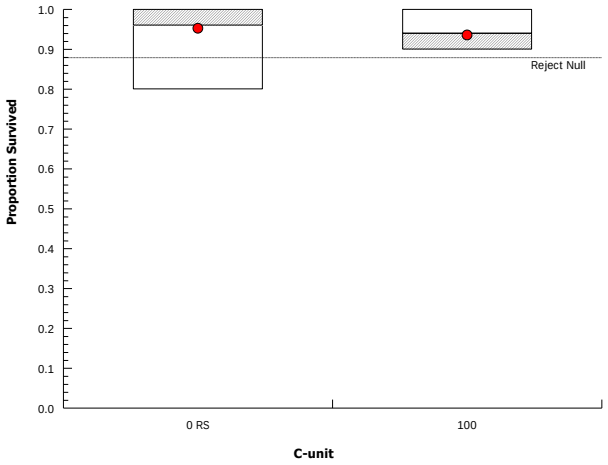
Neanthes 10-d Survival and Growth Sediment Test **ENVIRON**

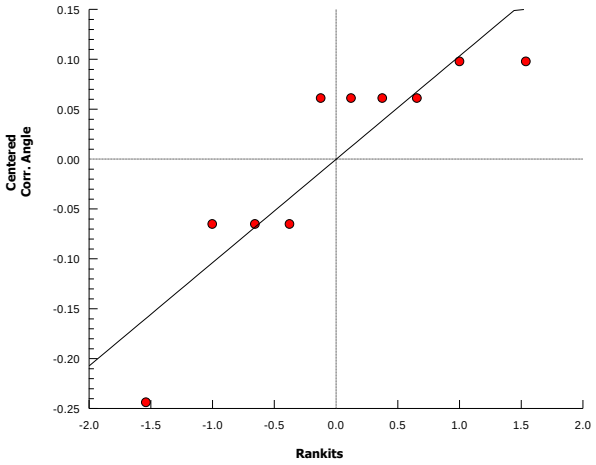
Analysis ID:	19-5505-6124	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jul-15 11:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Proportion Survived Binomials

C-unit	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Control Sed	9/10	10/10	10/10	9/10	10/10
0	Reference Sed	10/10	10/10	10/10	8/10	10/10
100		10/10	9/10	9/10	10/10	9/10

Graphics





CETIS Test Data Worksheet

Neanthes 10-d Survival and Growth Sediment Test **ENVIRON**

Start Date: 24 Apr-15 **Species:** Neanthes arenaceodentata **Sample Code:** 6748B1F2
End Date: 04 May-15 **Protocol:** ASTM E1611-00 (2000) **Sample Source:** Port of Los Angeles
Sample Date: 27 Mar-15 **Material:** Sediment Sample **Sample Station:** DMMU-1

C-unit	Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	Notes
0	CS	1	6	10	9		0			
0	CS	2	1	10	10		0			
0	CS	3	7	10	10		0			
0	CS	4	2	10	9		0			
0	CS	5	11	10	10		0			
0	RS	1	12	10	10		0			
0	RS	2	8	10	10		0			
0	RS	3	10	10	10		0			
0	RS	4	9	10	8		0			
0	RS	5	13	10	10		0			
100		1	4	10	10		0			
100		2	14	10	9		0			
100		3	3	10	9		0			
100		4	15	10	10		0			
100		5	5	10	9		0			

APPENDIX C
DATA VALIDATION REPORT

RAMBOLL

ENVIRONMENT
& HEALTH

Port of Los Angeles
San Pedro, California

VALIDATION OF ANALYTICAL DATA FROM EUROFINS CALSCIENCE, INC. FOR BERTHS 226-232 IN SUPPORT OF THE EVERPORT CONTAINER TERMINAL IMPROVEMENTS PROJECT LOS ANGELES HARBOR

Date July 31, 2015

Ramboll Environ
3000 South Berry Road
Suite 150
Norman, OK 73072
USA

T +1 405 801 6020
www.ramboll-environ.com

Ramboll Environ US Corporation (Ramboll Environ) reviewed analytical data for sediment, sea water, and tissue samples collected from dredged material in support of the Berths 226-236 Everport Container Terminal Improvements Project. This data validation summery presents the results of the data review and validation process for samples collected during October 2014 and May 2015. The following samples and matrices were evaluated as part of this review:

Sediment

- DMMU-2
- REF-DMMU-2
- DMMU-1
- DMMU-1-REF

Sea Water Elutriate

- DMMU-2-DRET
- REF-DMMU-2-DRET
- DMMU-1 (DRET)

Tissue

- M.n. Pre-test (12/10/14)
- N.v. Pre-test (12/10/14)
- M.n. Ref-DMMU-2 Rep. 1, 2, 3, 4, 5
- M.n. DMMU-2 Rep. 1, 2, 3, 4, 5
- N.v. Ref-DMMU-2 Rep. 1, 2, 3, 4, 5
- N.v. DMMU-2 Rep. 1, 2, 3, 4, 5
- Mn Pretest (5/1/15)

- Nv Pretest (5/1/15)
- Mn DMMU-1 REF Rep 1, 2, 3, 4, 5
- Mn DMMU-1 Rep 1, 2, 3, 4, 5
- Nv DMMU-1 REF Rep 1, 2, 3, 4, 5
- Nv DMMU-1 Rep 1, 2, 3, 4, 5

The sediment samples were analyzed for the following parameters:

- Grain Size by American Society for Testing and Materials (ASTM) D4464 modified
- Specific Gravity by Standard Method (SM) 2710F
- Atterberg Limits by ASTM D4318
- Total Organic Carbon by United States Environmental Protection Agency (EPA) 9060A
- Total Solids by SM 2540 B modified
- Total Volatile Solids by EPA 160.4 modified
- Ammonia by SM 4500-NH3 B/C modified
- Total Sulfides by EPA 376.2 modified
- Dissolved Sulfides by EPA 376.2 modified
- Oil and Grease by EPA 1664A modified
- Total Recoverable Petroleum Hydrocarbons (TRPH) EPA 418.1 modified
- Metals by EPA 6020/7471A
- Organochlorine Pesticides by EPA 8270C SIM and 8081
- Pyrethroids by EPA 8270D GC/TQ
- PCB Congeners by EPA 8270C SIM
- Semivolitile Organics by EPA 8270C
- Organotins by Krone et al. (1989)

Eurofins Calscience (Eurofins), located in Garden Grove, California performed all of the analyses with the exception of the analyses for Atterburg Limits and specific gravity, which were subcontracted to PTS Laboratories in Santa Fe Springs, California. Sediment sample results were reported in laboratory reports 14-10-2457, 14-10-2458, 15-03-2201, and 15-03-2206.

Sea water samples were analyzed by Eurofins for the following analyses:

- Metals by EPA 1640/7470A
- Organochlorine Pesticides by EPA 8270C SIM and 8081A
- PCB Congeners by EPA 8270C SIM
- Polynuclear Aromatic Hydrocarbons (PAHs) by EPA 8270C SIM
- Organotins by Krone et al. (1989)

Water sample results were reported in laboratory reports 14-12-0473, and 15-04-0583.

Tissue samples were analyzed by Eurofins for the following analyses:

- PCB Congeners by EPA 8270C SIM and EPA 1668C
- Lipids by Gravimetric Method (NOAA 1993a)

The tissue samples collected in May 2015 were analyzed at the Eurofins location in Lancaster, Pennsylvania because of a reorganization within Eurofins. The results for tissue samples were reported in laboratory reports 15-01-0624 and 15-06-0194.

The data were evaluated in general conformance of project objectives specified in the *Sampling and Analysis Plan for Berths 226-232 in Support of the Everport Container Terminal Improvements Project Los Angeles Harbor* (Environ 2014) [SAP].

Ramboll Environ's validation review was based on procedures published by the EPA Contract Laboratory Program in the National Functional Guidelines for both organic and inorganic data review (EPA 2014). The guidelines provide the criteria to review laboratory and field quality control information and apply the appropriate data qualifiers to the laboratory data. The Quality Control (QC) information checked by Ramboll Environ included case narratives, chain-of-custody (COC) forms, holding times, reporting limits, blank spikes, laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses, matrix spike/matrix spike duplicate (MS/MSD) samples, surrogate recoveries, internal standards, laboratory duplicates, and blanks.

All samples were submitted to the laboratory under proper chain-of-custody. No sample receipt issues were noted by the laboratory with one exception: the COC form submitted with tissue samples collected on January 7, 2015 contained errors for samples that were labeled N.v.DMMU-1 Rep. 1-5. The laboratory noted the error in the lab report and used the sample identification indicated on the sample labels after contacting the project team.

The following sections summarize the findings for each analysis based on the data review.

Physical/Conventional Tests

MS/MSDs were prepared from sediment samples DMMU-2 and DMMU-1 for TOC and TRPH analyses. The recoveries were within the control limits. The MS/MSD recoveries for TOC were below the control limits in the MS/MSD prepared from sediment sample DMMU-1-REF. The result for TOC in sample DMMU-1-REF is qualified "J-" for a potential low bias.

Metals

Molybdenum was detected in the method blank associated with sea water samples DMMU-2-DRET and REF-DMMU-2-DRET. The concentrations in the samples were above ten times the concentration in the method blank; therefore, the data is not expected to be biased due to laboratory contamination and no data are qualified.

The metals cobalt, copper, nickel, thallium, iron, and manganese were detected below the reporting limit in the method blank associated with water sample DMMU-1 (DRET). The concentrations of these metals were all greater than ten times the concentrations in the method blank; therefore, no data are qualified.

The recovery for iron was above the control limit in the MS and MSD prepared from water sample DMMU-1 (DRET). The result for iron in the sample is qualified "J+" for a potential high bias.

Pesticides

The recoveries for 4,4-DDE and 4,4-DDT were below the control limits in the MS and MSD prepared from sediment sample DMMU-1. The result for 4,4-DDE was qualified "J-" for a potential low bias. 4,4-DDT was not detected in DMMU-1 and the result is qualified "UJ" to indicate the reporting limit is estimated due to a potential matrix interference. The MS/MSD relative percent difference (RPD) for endrin ketone and gamma-BHC were also above the control limits for the MS/MSD prepared from sediment sample DMMU-1. The percent recoveries were within the control limits and the compounds were not detected in the sample; therefore, no data are qualified.

The recoveries for beta-BHC, 4,4'-DDT, endosulfan sulfate, endrin, endrin ketone, and methoxychlor were below the control limits in the MS and MSD prepared from sediment sample DMMU-1-REF. The RPDs for these compounds were also above the control limit. The compounds were not detected in sample DMMU-1-REF and the results are qualified "UJ" as non-detect at estimated reporting limits for a potential matrix interference. The RPD for endosulfan I in this MS/MSD also exceeded the control limit; however, both the MS and MSD recoveries were within control limits and endosulfan I was not detected in the sample. The result is not qualified.

Several pesticides were detected below the laboratory control limit in sediment sample DMMU-1. The concentrations are considered estimated and are qualified "J".

Pyrethroids

Bifenthrin was detected below the reporting limit in the method blank associated with sediment samples DMMU-2 and REF-DMMU-2, collected in October 2014. The concentration was flagged "J" as estimated by the laboratory. The compound were also detected below the reporting limit in the associated samples. The concentration was within five times the concentration detected in the method blank and is qualified "U" as non-detect at the reporting limit.

An MS/MSD was prepared from sample REF-DMMU-2 by the laboratory. The recoveries for deltamethrin/tralomethrin were above the control limits in the MS and MSD. Deltamethrin/tralomethrin were not detected in the sample; therefore, no data are qualified for a potential high bias. An MS/MSD was prepared from sediment sample DMMU-1-REF the recoveries were all within the control limits.

Several pyrethroids were detected below the laboratory control limit in sediment sample DMMU-1. The concentrations are considered estimated and are qualified "J".

PCBs

The PCB-101 was detected below the reporting limit in the method blank associated with tissue samples collected on January 7, 2015. Eight associated samples had concentrations that were with five times the concentration in the method blank. The concentrations for PCB-101 detected in samples in M.n. Ref-DMMU-2 Rep. 1,2,3,4,5; and N.v. Ref-DMMU-2 Rep. 1,3,5 were below the reporting limit and were flagged "J" by the laboratory as estimated. The results are qualified "U" as non-detect at the reporting limit because the results are likely due to laboratory contamination. PCB-101 was detected in N.v. DMMU-2 Rep. 5 above the reporting limit within five times the concentration in the method blank. PCB-101 was also detected in N.V. DMMU-2 Rep 1,2,3, and 4, but the concentrations were above five times the concentration in the method blank. Concentrations above five times the concentration in the method blank are not likely biased due to laboratory contamination. Since Rep. 5 is a replicate and results are comparable, it is not likely this result was biased from lab contamination either. The result is not qualified.

The recoveries for p-Terphenyl, one of the surrogates used in the PCB congener analysis, were below the control in several of the tissue samples collected on January 7, 2015. The laboratory re-extracted and re-analyzed the samples for confirmation. When applicable, the re-analysis was reported and if surrogates were still below the control limit, the laboratory flagged the surrogate results associated with matrix interference. The recoveries for the other surrogate used in the analysis, 2-fluorobiphenyl, were within the control limits in all the samples.

The MS/MSD RPD for PCB-170 was above the control limit for the MS/MSD prepared from sediment sample DMMU-1. Both the MS and MSD recoveries were within the control limits; therefore, no data are qualified.

MS/MSDs were prepared from tissue samples N.v. Pre-test collected on December 10, 2014 and M.n. Dmmu-2 Rep. 2 collected on January 7, 2015 for PCB congener analysis. The recoveries were all within the control limits.

Tissue samples collected in May 2015 were analyzed for PCB congeners by EPA Method 1668C. The analyte list varied slightly from the list in the SAP for Method 8270C SIM and there were some differences between the aroclors that co-eluted.

Results for EPA Method 8270C were evaluated to the method detection limit (MDL). PCB detections reported between the MDL and reporting limit are qualified "J" as estimated. PCBs reported by EPA 1668C were evaluated to the estimated detection limit (EDL). PCB detections by this method reported between the EDL and minimum level are qualified "J" as estimated. The minimum levels were similar to the reporting limits specified in the SAP.

Semivolatile Organics

The semivolatile compound di-n-butyl phthalate was detected below the reporting limits in the method blank associated with sediment sample DMMU-2, collected on October 29, 2014. Di-n-butyl phthalate was detected in the associated sample above the reporting limit and within five times the concentration in the method blank. The result is qualified "J" as estimated because it may be partially biased due to laboratory contamination.

Benzoic acid was reported for sediment samples DMMU-2 and REF-DMMU-2 analyzed in 2014, but was dropped from the target reporting list in 2015 because of poor recovery issues. The project team determined that the analyte was not critical to report.

Organotins

Monobutyltin was detected below the reporting limit in sediment sample DMMU-1. The concentration is considered estimated and is qualified "J".

Summary

Based on Ramboll Environ's evaluation, the analytical data included in this data set are usable as qualified. Data evaluated for this report were qualified for method blank contamination, MS/MSD recoveries, and when concentrations were detected between the method detection limit and reporting limit.

References

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USEPA 2014. National Functional Guidelines for Superfund Organic Methods Data Review. OSWER 9355.0-132. EPA-540-R-014-002. August.

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