

# **Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load 2011 Monitoring and Progress Final Report**

**Prepared for:  
California Regional Water Quality Control Board,  
San Diego Region**

**Prepared by:  
Weston Solutions, Inc.**

**In Coordination with:  
Port of San Diego**

**March 2012**



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Weston Solutions, Inc.  
2433 Impala Drive  
Carlsbad, California 92010**

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## ACRONYMS AND ABBREVIATIONS

APHA	American Public Health Association
ASTM	American Society for Testing and Materials
Basin Plan	<i>Water Quality Control Plan for the San Diego Basin – Region 9</i>
BLM	Biotic Ligand Model
BMP	best management practice
CD	compact disk
COC	chain-of-custody
CTR	California Toxics Rule
Cu	Copper
Cu-ISE	copper-ion selective electrode
Cu <sup>2+</sup>	free copper
dGPS	differential global positioning system
DO	dissolved oxygen
DOC	dissolved organic carbon
DPR	Department of Pesticide Regulation
EC <sub>50</sub>	median effective concentration
ELAP	California Environmental Laboratory Accreditation Program
FY	fiscal year
HDPE	high-density polyethylene
Implementation Plan	SIYB Dissolved Copper TMDL Implementation Plan
Investigative Order	Investigative Order No. R9-2011-0036
L <sub>h</sub>	hull cleaning annual loading
L <sub>p</sub>	passive leaching annual loading
L <sub>v</sub>	average annual loading per vessel
LC <sub>50</sub>	median lethal concentration
LOEC	lowest observed effect concentration
MAR	marine habitat
Monitoring Plan	SIYB Dissolved Copper TMDL Monitoring Plan
MSDS	material safety data sheet
N <sub>v</sub>	number of vessels
NOEC	no observed effect concentration
OAL	Office of Administrative Law
pH	hydrogen ion concentration
pMSD	percent minimum significant difference
Port	San Diego Unified Port District
QA	quality assurance
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
QC	quality control
RHMP	Regional Harbor Monitoring Program
Regional Board	San Diego Regional Water Quality Control Board
SB	Senate Bill
SIYB	Shelter Island Yacht Basin
SM	Standard Methods
SOP	standard operating procedure

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SSO	site-specific objectives
State Board	State Water Resources Control Board
SUSMP	Standard Urban Storm water Management Plan
SWAMP	Surface Water Ambient Monitoring Program
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TOC	total organic carbon
USEPA	U.S. Environmental Protection Agency
WESTON	Weston Solutions, Inc.
WILD	wildlife habitat
WQO	water quality objective

### **UNITS OF MEASURE**

°C	degrees Celsius
ft	feet or foot
kg/yr	kilogram per year
µg/L	microgram per liter
m	meter
m <sup>2</sup>	square meter
mg/L	milligram per liter
mL	milliliter
mV	millivolt
ppt	parts per thousand
psu	practical salinity unit
yr	year
%	percent

## EXECUTIVE SUMMARY

The Shelter Island Yacht Basin (SIYB) Dissolved Copper Total Maximum Daily Load (TMDL) Annual Monitoring and Progress Report was prepared in compliance with Investigative Order No. R9-2011-0036 (Investigative Order), issued by the San Diego Regional Water Quality Control Board (Regional Board) to the San Diego Unified Port District (Port) on March 11, 2011. The Investigative Order states that TMDL implementation progress is to be determined through tracking data on the number of boat hulls converted from copper-based antifouling paints to alternatives to assess required dissolved copper loading reductions and monitoring dissolved copper concentrations and toxicity in the water column to determine when water quality objectives are attained and beneficial uses restored. The Port, as the steward of San Diego Bay, is committed to continue Investigative Order-required monitoring to ensure that water quality conditions in SIYB continue to improve. The 2011 SIYB TMDL Monitoring and Progress Report provides information on vessel conversions; best management practice (BMP) implementation in SIYB, San Diego Bay, and beyond; and water quality monitoring, as required in the Investigative Order.

### *Vessel Conversions*

Annual dissolved copper loading reduction was assessed through tracking of conversions of hull paints from copper to non-copper or low-copper (i.e., <40% copper) products for vessels moored in SIYB. The transition of a vessel to non-copper hull paint was assumed to reduce annual loading by 0.9 kg/yr, based on the assumptions of the SIYB TMDL, and transition to low-copper hull paint reduced loading by 0.45 kg/yr. Vessel tracking indicates that there has been a nearly 27% (i.e., 563 kg/yr) reduction in annual dissolved copper loading from vessels to SIYB, which exceeds the required 2012 interim loading reduction target of 10%. The dissolved copper loading reduction was due primarily to a reduced occupancy (approximately 19% lower dissolved copper loading) and secondarily to transitions to non-copper and low copper hull paints (up to 8.7% loading reduction, assuming 100% occupancy).

### *Best Management Practice Implementation*

BMPs implemented by the Port and the Shelter Island Master Leaseholders TMDL Group to reduce dissolved copper loading and improve water quality included:

- Formulation of policies, regulations, and incentives to reduce copper loading, such as the San Diego Bay-wide hull cleaning permit and marina/yacht club alternative paint wait list priority and financial incentives.
- Sponsorship and implementation of alternative hull paint studies.
- Hull paint transitions to non-copper and low-copper products.
- Extensive education and outreach, such as hosting educational booths, developing brochures and educational materials, and presenting at conferences and workshops.
- Leading and participating in multi-agency activities, such as the state-wide copper sub-workgroup and the Regional Harbor Monitoring Program.

### *Water Quality Monitoring*

Water quality sampling was conducted at six stations and one reference station in the main channel of San Diego Bay adjacent to SIYB to determine dissolved copper concentrations in the

basin, test for acute and chronic toxicity, and assess water quality trends over time. Dissolved copper concentrations at all stations exceeded the numeric water quality objective (WQO) of 3.1 µg/L; however, there was very little evidence of toxicity (i.e., only one station exhibited during the October 2011 survey showed evidence of chronic toxicity to mussel larvae). The absence of acute toxicity at dissolved copper concentrations up to 11.5 µg/L and detection of chronic toxicity at only one station with a dissolved copper concentration of 8.08 µg/L underscores the importance of considering site-specific factors that regulate copper bioavailability in the TMDL. Additionally, while not shown to be statistically significant, monitoring showed that there has been an approximately 15% reduction in the average dissolved copper concentration measured in 2011 surveys (7.01 µg/L) from the baseline average dissolved copper concentration (8.28 µg/L) as described in the SIYB TMDL Monitoring Plan. Monitoring provides evidence that vacancies and vessel hull paint conversions are becoming effective in reducing dissolved copper loading and improving water quality.

In summary, the 2011 SIYB TMDL monitoring findings provide evidence that trends in both copper loading and water quality are improving from baseline conditions in SIYB. Dissolved copper loading reductions were due to a combination of vessel conversions to alternative hull paints and reduced occupancy. While dissolved copper concentrations still exceeded both acute and chronic CTR thresholds in SIYB, concentrations appear to be declining from baseline conditions. Most notably, toxicity in the basin was extremely rare, since only one station was found to have surface water that inhibited normal development of mussel larvae. There is an increasing body of evidence that the 3.1 µg/L WQO is overly protective of water quality beneficial uses in SIYB and San Diego Bay, as determined by water-effects ratio (WER) and biotic ligand model (BLM) studies, as well as reevaluations of more recent toxicity data used to establish the current numeric WQO. However, given that dissolved copper concentrations are still well above the existing WQO, further studies are needed to understand how site-specific factors affect copper bioavailability in SIYB.



## 1.0 INTRODUCTION

The Shelter Island Yacht Basin (SIYB) Dissolved Copper Total Maximum Daily Load (TMDL) annual monitoring and progress report was prepared in compliance with Investigative Order No. R9-2011-0036 (Investigative Order), issued by the San Diego Regional Water Quality Control Board (Regional Board) to the San Diego Unified Port District (Port) on March 11, 2011. The Investigative Order issued under §13225 of the Porter-Cologne Water Quality Control Act requires that the Port provide technical reports on the progress of the SIYB TMDL. TMDL implementation progress is to be determined through (1) tracking data on the number of boat hulls converted from copper-based antifouling paints to alternatives to assess required dissolved copper loading reductions and (2) monitoring dissolved copper concentrations and toxicity in the water column to determine when water quality objectives are attained and beneficial uses restored.

The SIYB TMDL Monitoring and Progress Report provides information on (1) TMDL Implementation, including an evaluation, interpretation, and tabulation of data collected by Named Parties (i.e., Dischargers) on vessel conversions and SIYB best management practice (BMP) Implementation; (2) San Diego Bay-wide BMP Implementation; and (3) SIYB TMDL Monitoring for water quality. Results of the vessel tracking program will be used to assess both interim and final compliance with the TMDL loading reduction requirements for dissolved copper into SIYB. Water quality monitoring will be used to assess annual improvements in dissolved copper concentrations and toxicity levels, while also determining progress towards final TMDL compliance numeric and narrative objectives, as defined in Resolution No. R9-2005-0019 in which the Regional Board incorporated the dissolved copper TMDL into the *Water Quality Control Plan for the San Diego Basin – Region 9* (Basin Plan; Regional Board, 2005).

### 1.1 Compliance Schedule

Under Resolution R9-2005-0019, the SIYB TMDL requires that loading of dissolved copper into the water column be reduced by 76 percent (%) to 567 kilograms per year (kg/yr) over a 17-yr period (Regional Board, 2005). Based on the official TMDL approval date<sup>1</sup> of February 9, 2005, this time period is set to end in 2022. No reductions in dissolved copper loading were required during the initial two-year orientation period (2005-2007). The subsequent 15-year period requires incremental loading reductions. A 10% reduction in dissolved copper loading is required within seven years, a 40% reduction in loading is required within 12 years, and a 76% reduction within 17 years (Table 1-1).

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<sup>1</sup> For a TMDL to be incorporated into the Basin Plan, it must be approved by the Regional Board, State Water Resources Control Board (State Board), Office of Administrative Law (OAL), and United States Environmental Protection Agency (USEPA) Region 9. The official TMDL approval date is when the OAL approves the document.

Table 1-1. Loading Targets for TMDL Attainment

Stage	Time Period	Percent Reduction from Current Estimated Loading	Reduction to be Attained by end of Year	Estimated Interim & Final Target Loading (kg/yr of Dissolved Copper)
1	2005-2007	0%	N/A	N/A
2	2007-2012	10%	7	1,900
3	2012-2017	40%	12	1,300
4	2017-2022	76%	17	567

## 1.2 Sources of Dissolved Copper

Based on the Regional Board's source analysis, the total mass load of dissolved copper to SIYB was determined to be 2,163 kg/yr, of which 98% of inputs were attributable to copper-based hull paints from recreational vessels (Table 1-2).

Table 1-2. Sources of Dissolved Copper to SIYB

Source	Mass Load (kg/yr)	Contribution (% Dissolved Copper)
Passive Leaching	2,000	93
Hull Cleaning	100	5
Urban Runoff	30	1
Background	30	1
Direct Atmospheric Deposition	3	<1
Sediment	0	0
Total	2,163	100

## 1.3 Water Quality Objective Criteria

The numeric water quality objectives (WQOs) for dissolved copper in SIYB are equal to the California Toxics Rule (CTR) water quality values for dissolved copper within seawater (U.S. Environmental Protection Agency [USEPA], 2000). Continuous or chronic exposures may not exceed 3.1 micrograms per liter ( $\mu\text{g/L}$ ) over a 4-day average, while acute exposures should not exceed 4.8  $\mu\text{g/L}$  over a 1-hour average. In addition, numeric WQOs must not be exceeded more than once every three years. Based on these numeric targets and existing monitoring data at the enactment of the TMDL, the final waste load allocation was determined to be 567 kg/yr. This includes a 10% margin of safety calculated to be 57 kg/yr. In addition to numeric WQOs, the Basin Plan established narrative WQOs for toxicity and pesticides (Regional Board, 1994):

*Toxicity Objective: All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration, or other appropriate methods as specified by the Regional Board.*

*Pesticide Objective: No individual pesticide or combination of pesticides shall be present in the water column, sediments, or biota at concentration(s) that adversely affect beneficial uses. Pesticides shall not be present at levels which will bioaccumulate in aquatic organisms to levels which are harmful to human health, wildlife or aquatic organisms.*

Beneficial uses within SIYB threatened by elevated dissolved copper concentrations include marine habitat (MAR) and wildlife habitat (WILD). The Regional Board indicated that if numeric WQOs are met for dissolved copper, then narrative WQOs will also be met. However, since numeric WQOs are not site specific, direct assessments of toxicity as well as SIYB biota provide direct indications of basin-wide attainment of beneficial uses and narrative WQOs.

## **1.4 Monitoring Purpose**

Tracking of vessel conversions from copper to non-copper or low-copper hull paints is being used to assess compliance with interim and final TMDL loading-reduction targets on a basin-wide basis. Water quality monitoring assesses long-term improvements in water quality, as measured by surface-water dissolved copper concentrations and toxicity levels. Additionally, water quality monitoring will be used to determine final compliance with both numeric and narrative WQOs throughout the basin. By conducting both vessel tracking and water quality monitoring on an annual basis, the program will be able to evaluate the relationship between load reductions and water quality improvements. Additionally, this approach will provide the data needed to assess the overall TMDL implementation effectiveness and success in attaining both loading reductions and numeric WQOs that are protective of the basin's MAR and WILD beneficial uses.

## 2.0 METHODS

This section details the methods used to track load reductions (i.e., vessel tracking) and monitor water quality.

### 2.1 Vessel Tracking

Annual reduction was assessed through tracking of conversions of hull paints from copper to non-copper or low-copper (i.e., <40% copper) products for vessels moored in SIYB since transitions from copper paints result in simultaneous reductions in copper inputs from both passive leaching and hull cleaning. Named Parties operating facilities that aggregate vessels in SIYB (i.e., marina and yacht club owners and operators) reported to the Port vessel tracking data collected from January 1 to approximately December 31, 2011. Required vessel tracking data are provided in Table 2-1.

Table 2-1. Required Vessel Tracking Data

Element	Vessel Tracking Data
1	Name of marina or yacht club
2	Date of report
3	Total number of slips or buoys in facility available to be occupied by vessels
4	Slip/mooring occupation data
4a	Percent of time unoccupied
4b	Percent of time occupied by vessel(s) with known copper hull paint
4c	Percent of time occupied by vessel(s) with documented low-copper hull paint
4d	Percent of time occupied by vessel(s) with documented non-copper hull paint
5	Vessel-specific information
5a	Document or registration numbers of vessels moored in slips/moorings
5b	Vessel type (sail, power, multi-hull, etc.)
5c	Vessel length
5d	Vessel beam width

As a data quality assurance/quality control (QA/QC) and confirmation check, additional information on paint type and application was to be provided for vessels reported to have low-copper (less than 40% copper) or non-copper hull paints (Table 2-2).

Table 2-2. Required Low-Copper and Non-Copper Hull Paint Vessel Data

Element	Low-Copper and Non-Copper Vessel Hull Paint Confirmation Data
1	Vessel document or registration number
2	Hull paint name
3	Product number
4	Name of boatyard that applied paint
5	Painting date
6	Percent copper if low-copper hull paint is indicated

Vessel tracking data from SIYB Named Parties responsible for aggregating vessels were compiled to report on the percent of time that slips were unoccupied or were occupied by vessels with copper, low-copper, non-copper, or unknown hull paints as required by the Investigative Order (Table 2-3).

A quality control (QC) check of vessel tracking data reported by Named Parties to the Port was performed with the specific purpose of confirming the category of hull paint reported. Low-copper and non-copper hull paints were considered to be confirmed if the required supporting data were reported and the material safety data sheet (MSDS) for a given paint confirmed the copper content of a reported paint type. Otherwise, the paint type was listed as either unconfirmed low copper or unconfirmed non copper. These data were used to calculate the annual dissolved copper load to SIYB from vessels, the number of vessels converted from copper to low-copper or non-copper hull paints, and the reduction in dissolved copper loading achieved annually, as described in Section 2.1.1.

Table 2-3. Investigative Order Required Vessel Tracking Data for Annual Reporting

Element	Vessel Tracking Data
1	Total number of slips or buoys in facility available to be occupied by vessels
2	Number of unoccupied slips or buoys and length of time unoccupied during each year
3	Number of vessels confirmed with copper-based hull paints and approximate length of time occupying a slip or buoy in facility each year
4	Number of vessels confirmed with alternative hull paints, by hull paint type, and approximate length of time occupying a slip or buoy in facility each year
5	Number of vessels with unconfirmed information about hull paints and approximate length of time occupying a slip or buoy in facility each year
6	Estimate of the dissolved copper load reduction achieved for the year (kg/yr and %)

### 2.1.1 Annual Dissolved Copper Load Analysis

Compliance with interim and final TMDL loading reduction goals was assessed through tracking the number of vessels with non-copper, copper, and low-copper hull paints, as well as the number of vacant slips in SIYB. The tracking program took a conservative approach to estimating loading reductions. If the hull paint name and type was unknown, the paint was assumed to be copper-based. Additionally, if the occupancy time of a slip or mooring was not reported, the slip or mooring was assumed to be occupied 100% of the time (i.e., 365 days). Paint categories for transient vessels visiting the Port-operated transient vessel dock and temporary anchorage were not collected; therefore, all vessels were assumed to have copper hull paints.

The following TMDL assumptions were used for comparisons to baseline dissolved copper loading to SIYB (Appendix 2 of Regional Board 2005).

- All 2,363 SIYB slips or buoys were occupied by vessels ( $N_v$ ).
- All 2,363 recreational vessels moored within SIYB have copper-based paints 100% of the time.

- Annual loading from passive leaching basin wide ( $L_p$ ) equals 2000 kg/year.
- Annual loading from hull cleaning ( $L_h$ ) equals 100 kg/yr.
- Avg. annual loading ( $L_v$ ) per vessel with copper hull paint equals 0.9 kg/yr. Where  $L_v = (L_p + L_h)/N_v$ .

In accordance with the TMDL, this loading reduction analysis assumed that there was an average loading reduction of 0.9 kg/yr for every vessel in SIYB that converted from copper-based to non-copper-based paints. The use of low-copper hull paints (i.e., hull coatings with less than 40% copper) also was recognized in the TMDL as a viable means of reducing copper loading to the basin. This loading reduction analysis also assumed that each vessel transitioned to low-copper hull paints on average reduced annual dissolved copper loading by 0.45 kg/yr. Thus, calculations of annual dissolved copper loading were based on the following assumptions (Table 2-4).

Table 2-4. Dissolved Copper Loading Calculation Assumptions

Dissolved Copper Loading Assumptions
1. All vessels moored in SIYB at the enactment of the TMDL had copper hull paints.
2. Average annual dissolved copper load from a vessel with copper paint equals 0.9 kg/yr.
3. Vessels with unknown hull paints were assumed to have copper.
4. Slips/moorings for which occupancy data were not provided were assumed to be 100% occupied.
5. Annual dissolved copper load from a vessel with non-copper hull paint equals 0 kg/yr.
6. Low copper hull paints include paints with less than 40% copper.
7. Average annual dissolved copper load from a vessel with low-copper paint equals 0.45 kg/yr.
8. Annual loads were normalized by the percent of time vessels are in SIYB.

Annual loading was calculated for each slip by multiplying the reported dissolved annual loading for a given hull paint category by the percent of time a slip was reported to be occupied (e.g., the product of 0.9 kg/yr for copper hull paints and 90% occupancy results in an annual loading of 0.81 kg/yr). In the case of the Port-operated anchorage, data on the number of three-day permits issued weekly were used to calculate annual occupancy and loading. For each issued permit, it was assumed that the vessel occupied the anchorage for an average of two days, and since no hull paint data were collected, all vessels were assumed to have copper paints. Therefore, annual dissolved copper loading was calculated by multiplying the annual dissolved copper load (0.9 kg/yr) by the average number of vessels occupying the anchorage weekly in 2011 and the average percentage of time slips were occupied.

## **2.2 SIYB Best Management Practice Implementation**

Named Parties selected the BMPs and other actions to be implemented that indirectly or directly contribute to dissolved copper load reductions and/or water quality improvements. Selection, implementation, and effectiveness assessments of BMPs were at the sole discretion of each Named Party. In compliance with the Investigative Order reporting requirements, Named Parties were required to submit information annually to the Port on the BMPs and actions implemented

to reduce dissolved copper loads to SIYB. The Port then compiled the list of implemented and planned BMPs into the annual monitoring report.

## 2.3 San Diego Bay-Wide BMP Implementation

The report describes BMPs or other actions that were implemented by the Port to reduce dissolved copper discharges from boat hulls into harbors or marinas within San Diego Bay. The Port also reported actions that were taken to reduce dissolved copper discharges to marinas beyond San Diego Bay, including actions with statewide or national applicability.

## 2.4 Water Quality Monitoring

Water quality sampling was conducted to determine the average concentration of dissolved copper in the basin and assess water quality trends over time. The monitoring was performed using methods consistent with prior studies conducted by the Regional Board in SIYB, as reported in the TMDL (Appendix 6 of Regional Board 2005). To be consistent with these prior studies, water quality monitoring was performed at six stations and one reference station in the main channel of San Diego Bay adjacent to SIYB. These station locations were similar to those sampled by the Regional Board and met the Investigative Order requirement of being spatially representative of dissolved copper concentrations in SIYB, as described in the SIYB Dissolved Copper TMDL Monitoring Plan (Monitoring Plan; Weston Solutions, Inc. [WESTON], 2011a).

As required in the TMDL, dissolved copper concentrations were compared to the baseline level of  $8.28 \pm 1.36$  (mean  $\pm$  standard error). This value was calculated using water quality data collected between 2005 and 2008 from stations located in the immediate vicinity of the Regional Board monitoring network (WESTON 2011a).

### 2.4.1 SIYB Sample Locations

The SIYB water quality monitoring network was comprised of six stations within SIYB (i.e., SIYB-1 to 6) and one station in the main channel of San Diego Bay outside of the mouth of the basin (SIYB-REF) (Table 2-5 and Figure 2-1).

Table 2-5. Sampling Station Coordinates

Station	Latitude	Longitude
SIYB-1	32.71821	-117.22601
SIYB-2	32.71412	-117.22921
SIYB-3	32.71550	-117.22989
SIYB-4	32.71683	-117.23203
SIYB-5	32.71217	-117.23297
SIYB-6	32.70858	-117.23514
SIYB-REF	32.70406	-117.23232



Figure 2-1. Shelter Island Yacht Basin Spatially-Representative Monitoring Network



## 2.4.2 Sampling Dates

Sampling was conducted at the seven water quality monitoring stations (six SIYB stations and one San Diego Bay reference station) on August 22, 2011. In accordance with the Monitoring Plan, sampling was performed at slack high tide during the summer. By conducting sampling in the summer, dissolved copper concentrations were expected to be at the highest level in the water column due to higher release rates of copper from antifouling paints at higher sea surface temperatures and greater frequency of hull cleaning. This sampling design provides the most conservative estimate for dissolved copper concentrations for SIYB. Due to equipment malfunction during *in situ* assessments of free copper, a second monitoring event was conducted on October 26, 2011.

## 2.4.3 Sample Collection

Discrete water samples were collected at each station using “clean hands” techniques with a Niskin bottle deployed from a sampling vessel. All stations were located using differential global positioning system (dGPS). Samples were collected within one meter (m) of the surface. Upon collection, water samples were transferred to labeled containers for analysis of total and dissolved copper, total and dissolved zinc, total organic carbon (TOC), dissolved organic carbon (DOC), and toxicity testing.

*In situ* measurements of free copper ( $\text{Cu}^{2+}$ ), salinity, and hydrogen ion concentration (pH) were performed at all stations (Table 2-6). Field measurements of pH and salinity were made using a YSI data sonde. An Orion copper-ion selective electrode (Cu-ISE) was used to measure concentrations of  $\text{Cu}^{2+}$  in surface water (i.e., within 1 m of the surface). The Cu-ISE measures pCu, where  $\text{pCu} = \log_{10}(\text{Cu}^{2+})$ , when calibrated with glycine and ethylenediamine copper buffers (Belli and Zirino, 1993; DeMarco et al., 1997). The precision of the Cu-ISE is  $\pm 0.06$  pCu units (Zirino et al., 1998), and the electrode is effective at total copper concentrations  $< 3$  nM (Zirino et al., 2002). Readings were taken three minutes apart at each station and the average of these readings was used to convert the resulting value in millivolts (mV) to pCu units, using the calibration formula:  $\text{pCu} = -0.0448 (\text{voltage in mV}) + 9.7329$ . A detailed description of the method used to measure  $\text{Cu}^{2+}$  is provided by Delgadillo-Hinojosa et al. (2008).

Table 2-6. In Situ Analytical Methods and Detection Limits

Water Quality Measurement	Method	Method Detection Limit	Reporting Limit
Free Copper	Orion Cu-ISE	<3 n/M	<3 n/M
Salinity	YSI Sonde	N/A	PSU
pH	YSI Sonde	N/A	0.2 pH unit

All water samples were logged on a chain-of-custody (COC) form and placed in a cooler on ice. Samples were stored at 4 degrees Celsius ( $^{\circ}\text{C}$ ) in the dark until shipped or delivered to the appropriate laboratory for analysis, within 24 hours of collection.

## 2.4.4 Equipment Decontamination and Cleaning

The Niskin bottle was cleaned prior to sampling using clean soapy water and thoroughly rinsing with deionized water. Upon deployment, the Niskin bottle received a site water rinse prior to sample collection. After collection, water samples were transferred from the Niskin bottle to laboratory-certified, contaminant-free, high-density, polyethylene (HDPE) bottles.

## 2.4.5 Chemical Analysis

Water samples were transferred to the laboratory for analysis of total and dissolved copper, total and dissolved zinc, TOC, and DOC, following USEPA or Standard Methods (SM; American Public Health Association [APHA], 1998) (Table 2-7). The measurement of DOC, salinity, and pH can be entered into the Biotic Ligand Model (BLM) to estimate the bioavailable fraction of dissolved copper present in SIYB and predict toxicity. Zinc is commonly used as an alternative biocide in antifouling paints and therefore total and dissolved zinc were measured to determine if concentrations are increasing as vessel hull paints are converted from copper-based to non-copper based paints.

Table 2-7. Laboratory Analytical Methods and Detection Limits

Water Quality Measurement	Method	Method Detection Limit	Reporting Limit
Total Copper	USEPA 1640	0.01 µg/L	0.02 µg/L
Dissolved Copper	USEPA 1640	0.01 µg/L	0.02 µg/L
Total Zinc	USEPA 1640	0.005 µg/L	0.01 µg/L
Dissolved Zinc	USEPA 1640	0.005 µg/L	0.01 µg/L
Total Organic Carbon	SM5310 B	0.1 mg/L	0.2 mg/L
Dissolved Organic Carbon	SM5310 B	0.1 mg/L	0.2 mg/L

## 2.4.6 Toxicity Testing

Toxicity testing consisted of a 96-hour acute bioassay test using topsmelt (*Atherinops affinis*) to be consistent with the TMDL guidance (Regional Board, 2005). Additionally, a 48-hour chronic bioassay test using the mussel (*Mytilus galloprovincialis*) was performed since previous studies have generally used the 48-hour mussel chronic test as the primary indicator of toxicity. Both tests were used to assess compliance with the narrative toxicity objective since both species have ecological relevance to the marina environment and previously have been found to be sensitive to copper.

### 2.4.6.1 Topsmelt 96-Hour Acute Bioassay

A 96-hour acute bioassay with topsmelt was performed for samples collected during the August Survey. Tests were initiated on August 23, 2011 for samples collected at SIYB-1 and SIYB-2 and August 24, 2011 for SIYB-3, SIYB-4, SIYB-5, SIYB-6, and SIYB-REF following the procedures described in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (USEPA, 2002).

Topsmelt were exposed for 96 hours to five sample concentrations (0.5 dilution series) and a control. Each concentration was run with four replicates and ten topsmelt per replicate. Water quality was conducted daily and included dissolved oxygen (DO), temperature, pH, and salinity. Test conditions are summarized in Table 2-8. After 96 hours, percent survival was calculated. The test was considered acceptable if  $\geq 90\%$  of organisms survive in the controls.

Table 2-8. Conditions for the 96-Hour Topsmelt Bioassay

Test Results			
96-Hour Acute Bioassay			
Samples Tested		SIYB-1, SIYB-2	SIYB-3, SIYB-4, SIYB-5, SIYB-6, SIYB-REF
Date Sampled		August 22, 2011	
Date Received at Weston's Laboratory		August 23, 2011	
Test Species		<i>Atherinops affinis</i>	
Test Procedures		EPA-821-R-02-012 (USEPA, 2002)	
Test Type/Duration		Acute static-renewal /96-hours	
Supplier		Aquatic Biosystems, Fort Collins, CO	
Control Water Source		Scripps Pier seawater, 3 $\mu$ m filtered, Ultra Violet (UV) sterilized	
Date Acquired		August 23, 2011	August 24, 2011
Acclimation/Holding Time		0 days	0 days
Age Class		12 days	13 days
Test Location		Carlsbad Laboratory, Room 3	
Test Dates		August 23-27, 2011	August 24-28, 2011
Water Quality Measurements	Temperature	20.9 – 22.4°C	20.6 – 22.4 °C
	Salinity	32.8 – 33.5 ppt	31.3 – 33.2 ppt
	Dissolved Oxygen	5.3 – 8.5 mg/L	5.5 – 8.4 mg/L
	pH	7.6 – 8.1	6.0 – 8.5
Replicates/Sample		4	
Concentration of Organisms per Replicate (Zero Time Range)		10	
Exposure Volume		250 mL	
Protocol Deviations		Samples SIYB-3, SIYB-4, SIYB-5, SIYB-6, and SIYB-REF were started outside of the recommended holding time due to a shortage of test organisms. Temperatures of samples SIYB-2, SIYB-3, SIYB-4, SIYB-5, SIYB-6, and SIYB-REF at receipt were above the protocol limit. Sample SIYB-5 chlorine was not measured at 48 or 72 hours due to technician error.	

A 96-hour reference toxicity test using copper sulfate was conducted concurrently with the project samples to evaluate the relative sensitivity of test organisms. Copper sulfate reference toxicant tests were conducted at concentrations of 0, 25, 50, 100, 200 and 400  $\mu$ g/L concurrently with each batch of test organisms. At test termination, the median lethal concentration (LC<sub>50</sub>) was calculated and compared to historical laboratory reference toxicant test data for this species. Test organisms were considered to be responsive and appropriately sensitive if the test LC<sub>50</sub> was within two standard deviations of the historical laboratory standard.

2.4.6.2 Bivalve 48-Hour Bioassay

The 48-hour bivalve larvae test was performed for samples collected at all stations during the August survey and at a subset of stations (i.e., SIYB-1, SIYB-3, and SIYB-5) during the October survey. Bioassay tests were performed in accordance with procedures outlined in *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (USEPA, 1995) and ASTM E724-98 (ASTM, 2009). The test was run for 48 hours to ensure development of the bivalve larvae to the D-hinge stage in the control. Bivalves were exposed to five sample concentrations and a control. Each concentration was run with four replicates and 150-300 larvae were targeted for inoculation into each replicate. Water quality included DO, temperature, pH, and salinity at test initiation and termination and temperature at 24 hours. Test conditions are summarized in Table 2-9.

Table 2-9. Conditions for the 48-Hour Mussel Bioassay

Test Results 48-Hour Chronic Bioassay			
Samples Tested	SIYB-1, SIYB-2, SIYB-3, SIYB-4, SIYB-5, SIYB-6, SIYB-REF	SIYB-1, SIYB-3, SIYB-5	
Date Sampled	August 22, 2011	October 26, 2011	
Date Received at Weston's Laboratory	August 23, 2011	October 27, 2011	
Test Species	<i>Mytilus galloprovincialis</i>		
Test Procedures	EPA/600/R-95/136 (USEPA 1995), ASTM E724-98 (ASTM 2009)		
Test Type/Duration	Bivalve Larvae – Static / 48 hours		
Supplier	Taylor Shellfish, Shelton, WA		
Sample Storage Conditions/Holding Time	4°C, dark, minimal head space/36 hours		
Date Acquired	August 23, 2011	October 27, 2011	
Acclimation/Holding Time	0 days	0 days	
Age Class	<4 hour old embryos		
Test Location	Carlsbad Laboratory, Room 2		
Test Dates	August 23 – 25, 2011	October 27 – 29, 2011	
Actual Water Quality Measurements	Temperature	14.3 – 16.6 °C	13.5 – 15.9 °C
	Salinity	30.0 – 35.5 ppt	29.8 – 33.3 ppt
	Dissolved Oxygen	7.5 – 8.3 mg/L	7.2 – 7.9 mg/L
	pH	7.9 – 8.1	8.0 – 8.2
Concentration of Organisms per Replicate (Zero Time Range)	218	211	
Protocol Deviations	Control normality for the samples run on August 23, 2011 was slightly below the acceptability criterion of ≥90 percent. Temperatures of samples SIYB-2, SIYB-3, SIYB-4, SIYB-5, SIYB-6, and SIYB-REF at receipt on August 23, 2011 were above the protocol limit. Test temperatures and salinities occasionally fell slightly outside of protocol range. The pMSD for survival for the August 23, 2011 sample SIYB-REF test was slightly above the acceptability criterion of ≤25%.		

After test termination, percent survival and percent normal development were calculated to determine if significant mortality or reduction in normality existed. The test was considered acceptable if  $\geq 50\%$  of larvae survived and  $\geq 90\%$  of the surviving larvae showed normal development in the controls.

A 48-hour reference toxicity test using copper sulfate was conducted concurrently with the project samples to evaluate the relative sensitivity of test organisms. The copper sulfate reference toxicant test was conducted at concentrations of 0, 2.5, 5.0, 10, 20 and 40  $\mu\text{g Cu}^{2+}/\text{L}$ . At test termination, the survival  $\text{LC}_{50}$  and the normality median effective concentration ( $\text{EC}_{50}$ ) were calculated and compared to historical laboratory reference toxicant test data for this species. Test organisms were considered to be responsive and appropriately sensitive if the test  $\text{LC}_{50}$  and  $\text{EC}_{50}$  were within two standard deviations of the respective historical laboratory standards.

### **2.4.7 Water Quality Analysis**

Analysis of water quality data included calculations of average dissolved copper concentrations to determine basin-wide compliance with the CTR dissolved copper chronic target (3.1  $\mu\text{g}/\text{L}$ ). 2011 monitoring data were compared to the 2005-2008 dissolved copper baseline concentration data reported in the Monitoring Plan (WESTON, 2011a) to determine whether conditions improved or degraded over the intervening period.

Determinations of toxicity using the 96-hour topsmelt and 48-hour mussel bioassays were statistically assessed using ToxCalc to compare survival (topsmelt and mussel) and normal development (mussel) of test organisms exposed to the multi-concentration dilution series of SIYB seawater (i.e., treatments) to control organisms exposed to filtered seawater. Results were used to determine No Observed Effect Concentration (NOEC), Lowest Observed Effect Concentration (LOEC),  $\text{LC}_{50}$ , and  $\text{EC}_{50}$  values. If survival and normality of the control did not differ significantly from that of the treatments and/or were greater than 90%, then conditions within were considered nontoxic at the station.

## **2.5 Quality Assurance/Quality Control Procedures**

Sampling process QA/QC included proper collection of the samples to minimize the possibility of contamination. The sampling team was trained in and followed field sampling standard operating procedures (SOPs), as described in the SIYB Quality Assurance Project Plan (QAPP) (WESTON, 2011b). Additionally, the field staff members were made aware of the significance of the project's detection limits and the requirement to avoid contamination of samples at all times. Field staff wore powder-free nitrile gloves at all times during sample collection. All samples were collected in laboratory-supplied, laboratory-certified, contaminant-free sample bottles. Field measurement equipment was checked for operation in accordance with the manufacturer's specifications, and was inspected for damage prior to use and when returned from use.

Chemistry and toxicity samples were uniquely identified with sample labels in indelible ink. All sample containers were identified with the project title, appropriate identification number, date and time of sample collection, and preservation method. All samples were kept on ice from the

time of sample collection until delivery to the analytical laboratory for analysis within method-specified holding times (Table 2-10). Duplicate samples were also analyzed to assess variability in sampling and to remain compliant with Surface Water Ambient Monitoring Program (SWAMP) protocols.

Table 2-10. Sample Holding Times

Analyte	Holding Time
<b>Field Measurements</b>	
Free Copper	-
pH	-
Salinity	-
<b>Water</b>	
Total Organic Carbon	28 days
Dissolved Organic Carbon	28 days
Total Copper	180 days
Dissolved Copper	48 hrs
Total Zinc	180 days
Dissolved Zinc	48 hrs
48-hour acute bioassay	36 hours
96-hour chronic bioassay	36 hours

Samples were analyzed by a laboratory certified by the California Environmental Laboratory Accreditation Program (ELAP) for the analyses of inorganics, toxic chemical elements, and organics in wastewater. The quality assurance (QA) objectives for chemical analysis conducted by the participating analytical laboratories are detailed in their Laboratory QA Manuals. The objectives for accuracy and precision involved all aspects of the testing process, including the following:

- Methods and SOPs;
- Calibration methods and frequency;
- Data analysis, validation, and reporting;
- Internal QC;
- Preventive maintenance; and
- Procedures to ensure data accuracy and completeness.

Results of all laboratory QC analyses are reported herein. Any QC samples that failed to meet the specified QC criteria in the methodology or QAPP were identified, and the corresponding data were appropriately qualified. All QA/QC records for the various testing programs will be kept on file for review by regulatory agency personnel.

## **2.6 Chain-of-Custody Procedures**

Chain-of-custody procedures were used for all samples throughout the collection, transport, and analytical process. The principal documents used to identify samples and to document possession were COC records, field logbooks, and field tracking forms. Chain-of-custody procedures were initiated during sample collection. A COC record was provided with each sample or group of samples. Each person who had custody of the samples signed the form and ensured that the samples were not left unattended unless properly secured. Documentation of sample handling and custody included the following:

- Sample identifier;
- Sample collection date and time;
- Any special notations on sample characteristics or analysis;
- Initials of the person collecting the sample;
- Date the sample was sent to the analytical laboratory; and
- Shipping company and waybill information.

Completed COC forms were placed into a plastic envelope and kept inside the cooler containing the samples. Upon delivery to the analytical laboratory, the COC form was signed by the person receiving the samples. Chain-of-custody records were included in the final reports prepared by the analytical laboratories.

Upon completion of analysis, any remaining sample material was stored until the holding time expired. At that point, samples were properly disposed.

## **2.7 Data Review and Management**

Field and laboratory data were reviewed for completeness and accuracy prior to analysis and reporting, and were stored in a database, as described below.

### **2.7.1 Data Review**

After each survey, field data sheets were removed from the field log books and were checked for completeness and accuracy. In the laboratory, technicians documented sample preparation activities in bound laboratory notebooks or on bench sheets. Data validation included dated and signed entries by technicians on the data sheets and logbooks used for samples, the use of sample tracking and numbering systems to track the progress of samples through the laboratory, and the use of QC criteria to reject or accept specific data. Data for laboratory analyses were entered directly onto data sheets. Data sheets were filled out in ink and signed by the technician, who was responsible for checking the sheet to ensure completeness and accuracy. The technician who generated the data had the prime responsibility for the accuracy and completeness of the data. Each technician reviewed the data to ensure the following:

- Sample description information was correct and complete.
- Analysis information was correct and complete.
- Results were correct and complete.

- Documentation was complete.

All data were reviewed and verified by participating team laboratories to determine whether data quality objectives had been met, and that appropriate corrective actions had been taken when necessary.

### **2.7.2 Data Management**

All laboratories supplied analytical results electronic formats. After completion of the data review by participating team laboratories, laboratory results were stored in WESTON's database system. Records will be maintained for at least five years or transferred according to agreement between the Port and WESTON.



## 3.0 RESULTS

This section describes SIYB TMDL implementation activities and results of water quality monitoring performed in 2011.

### 3.1 SIYB TMDL Implementation

An evaluation, interpretation, and tabulation of data and information on SIYB TMDL activities undertaken by the Named Parties including vessel conversions, SIYB BMP implementation, and San Diego Bay-wide BMP implementation are provided as follows.

#### 3.1.1 Vessel Conversions

Slip occupancy, vessel conversion, and loading reductions were based on data provided by facility operators for SIYB marinas and yacht clubs, as well as Port-maintained data for Port vessels, transient slips, and mooring buoys. The 2011 survey results showed that there were 2,328 berths available to be occupied by vessels in SIYB, inclusive of a Port-operated anchorage that holds up to 40 vessels. This was a reduction in total berth count by 35 vessels compared to the 2,363 slips and moorings reported in the TMDL. Of these slips and moorings, 253 slips were reported to be unoccupied (or vacant) year round (or at least at the time the survey was completed), leaving 2,075 berths that were occupied for at least a portion of time in 2011 (Table 3-1). On average, slips and moorings were occupied  $81.1 \pm 0.7\%$  (mean  $\pm$  standard error) of the year ( $296 \pm 3$  days). Excluding slips reported to be vacant, occupied slips were reported to contain vessels on average  $91 \pm 0.3\%$  of the year ( $332 \pm 1$  days).

There were 1,803 slips/moorings in SIYB reported to have vessels with copper or unknown (assumed to be copper) hull paints, comprising 77% of SIYB berths. One hundred forty (140) vessels were reported to have low-copper paint (confirmed + unconfirmed) (6%), and 132 berths housed vessels with either non-copper paints (confirmed + unconfirmed) or no paint at all (6%). Occupancy rates for each hull paint type are shown in Table 3-1.

The average size vessel in SIYB in 2011, based on reported lengths and beam widths, was calculated to be 38.4 feet (11.7 m, total length) by 12.2 feet (3.7 m, beam width) (Appendix A). The average wetted hull surface area of 2011 SIYB vessels was calculated to be  $36.8 \text{ m}^2$ , which was nearly equivalent to the wetted hull surface area used in loading calculations in the SIYB TMDL (i.e.,  $35.3 \text{ m}^2$ ), validating the use of the TMDL per vessel loading of 0.9 kg/yr.

The annual dissolved copper load from vessel hull paints was calculated to be of 1,537 kg/yr in 2011. The SIYB TMDL calculated annual dissolved copper loads from vessel hull paints of 2,100 kg/yr. Thus, the estimate of 2011 copper loads is 563 kg/yr (26.8%) lower than the TMDL-established loads. Vacancy and lower occupancy percentages were calculated to reduce loads by 408 kg/yr (19%), and vessel conversions to non-copper and low-copper hull paints reduced loads by 162 kg/yr (7.7%).

Since vessels can occupy slips up to 100% of the time, conversion of vessels to non-copper paints had the potential to reduce annual dissolved copper loads by up to 119 kg/yr (5.7%), which was calculated by taking the product of non-copper vessels (132) and annual loading

reduction of 0.9 kg/yr/vessel. Similarly, conversion to low-copper hull paints was calculated to reduce annual dissolved copper loads by up to 63 kg/yr (3%), which was similarly calculated by taking the product of the number of vessels reported with low-copper paints and annual loading reduction of 0.45 kg/yr. Therefore, vessel conversions to non-copper and low-copper hull paints had the potential to reduce copper loads by up to 182 kg/yr (8.7%) in SIYB when occupying berths 100% of the time.

**Table 3-1. 2011 Vessel Tracking Results Summary**

Vessel Hull Paint	Number of Vessels	Average Time Occupied (%)	Average Time Occupied (days/year)	Annual Copper Load per Vessel (kg/yr/vessel)	Annual Copper Load (kg/yr)	Annual Reduction in Copper Loading (kg/yr)
Copper	1,018	92	336	0.9	843	0
Unknown (assumed copper)	785	90	328	0.9	636	0
Low-copper	86	92	336	0.45	36	35.6
Low-copper (unconfirmed)	54	92	336	0.45	22	22.3
Non-copper	76	88	277	0	0	60.2
Non-copper (unconfirmed)	56	87	318	0	0	43.8
Total	2,075	91*	332*	—	1,537	162

\*Average is reported, not total.

### **3.1.2 SIYB BMP Implementation**

The Named Parties, including the Port and marina and yacht club owners and operators, implemented or are in the process of planning and implementing the following categories of BMPs and actions to reduce dissolved copper discharges to SIYB.

- Hull Paint Transition
- Hull Cleaning
- Structural and Mechanical
- Education and Outreach
- Alternative Hull Paint Studies
- Monitoring
- Reporting
- Lease Updates
- Policy / Regulation

The Shelter Island Master Leaseholders (SIML) TMDL Group was formed to represent the nine master leaseholder marinas and yacht clubs in SIYB. The group's purpose is to compile information from marinas and yacht clubs, as well as more than 2,000 individual boat owners and six local boatyards, for TMDL Investigative Order reporting requirements. SIML reported the following BMPs and actions as a component of their TMDL BMP Plan (Appendix B):

- Formation of the SIML TMDL group.
- Attendance of SIYB TMDL stakeholder meetings since 2005.
- All SIMLs are certified Clean Marinas or in the process of becoming certified.

- Collection and reporting of vessel hull paint tracking data as required by the Investigative Order.
- Oversee hull cleaner permit compliance at facilities, including:
  - Ensure all divers have valid Port Hull Cleaning Permits prior to entering leaseholds.
  - Report hull cleaner who arrive via boat and do not check in with Dockmaster's Office to the Port.
  - Report hull cleaners to the Port who do not use proper BMPs or create visible paint plumes during hull cleaning.
  - Post diver BMP signs on leaseholds.
- Boater Education and Outreach through newsletters, workshops, and readily available literature
- Require boaters to use only Port-permitted hull cleaners.
- Perform regular BMP effectiveness assessments.
- Provide ongoing staff training.
- Planning alternative paint incentive programs, which include wait list priority and financial incentives.

BMPs and other actions implemented by the Port to reduce dissolved copper levels are listed below and described in detail in Appendix B.

- Formulation of policies and regulations to reduce copper loading.
  - Enactment of a San Diego Bay In-water Hull Cleaning Permit.
  - Sponsoring of Copper Hull Paint Legislation – SB 623 (Kehoe).
  - Supporting Brake Pad Legislation – SB 346 (Kehoe).
- Sponsorship and implementation of alternative hull paint studies.
  - USEPA-funded “Safer Alternatives to Copper Antifouling Paints” Project.
  - Panel testing program to evaluate new and emerging coatings.
  - Hornblower Cruises testing partnership.
  - Environmental Fund sponsorship of antifouling coating research.
- Implementation and facilitation of hull paint transitions.
  - Transitioned Port fleet to non-copper hull paints.
  - Implementing 319(h) hull conversion project.
- Extensive education and outreach.
  - Partnership with California State University, San Diego Master of Business Administration (MBA) program to develop marketing strategy for encouraging boaters to transition hull paints.
  - Hosting of education and outreach booths at public events and meetings.
  - Development of brochures and educational material on copper pollution, alternative hull coatings, etc.
  - Presenting at conferences on copper reduction and alternative hull paint programs.
- Leading and participating in agency-wide activities.
  - Participation in a state-wide copper sub-workgroup led by DPR.
  - Ensure all construction projects on Port Tidelands submit SWPPPs and are in compliance with the General Stormwater Construction Permit and Municipal Stormwater Permit.

- Commercial business inspections to educate facility operators on approaches to reduce inputs of pollutants and identify potential sources and pollution prevention actions.
- Ensure all redevelopment projects on Port Tidelands comply with SUSMP requirements.
- Serve as the lead agency for the Regional Harbor Monitoring Program (RHMP) to assess conditions in San Diego Bay, Mission Bay, Oceanside Harbor, and Dana Point, and implement special studies on copper bioavailability, toxicity, and flux dynamics.

### **3.2 San Diego Bay-wide BMP Implementation**

The Port has initiated and is in the process of planning and implementing a number of BMPs and actions to reduce dissolved copper discharges into harbors or marinas beyond SIYB, including throughout San Diego Bay as well as statewide (Table ). These actions include the following:

- Enactment of a San Diego Bay In-water Hull Cleaning Permit.
- Sponsoring of Copper Hull Paint Legislation – SB 623 (Kehoe).
- Supporting Brake Pad Legislation – SB 346 (Kehoe).
- Completion of EPA-funded “Safer Alternatives to Copper Antifouling Paints” project and creation of the “How to Select an Alternative Hull Paint” brochure.
- Implementation of hull paint testing and development programs to evaluate new and emerging coatings and technologies.
- Partnership with California State University, San Diego MBA Consulting Program to develop marketing strategy for encouraging boaters to transition hull paints.
- Hosting education and outreach booths at public events and meetings.
- Development of brochures and educational material on copper pollution, alternative hull coatings, etc.
- Participation in a state-wide copper sub-workgroup led by DPR.
- Ensure all construction projects on Port Tidelands submit SWPPPs and are in compliance with the General Stormwater Construction Permit and Municipal Stormwater Permit.
- Commercial business inspections to educate facility operators on approaches to reduce inputs of pollutants and identify potential sources and pollution prevention actions in compliance with Regional Municipal Stormwater Permit R9-2007-0001.
- Ensure all redevelopment projects on Port Tidelands comply with SUSMP requirements.
- Serve as the lead agency for the RHMP to assess conditions in San Diego Bay, Mission Bay, Oceanside Harbor, and Dana Point and implement special studies on copper bioavailability, toxicity, and flux dynamics.

### **3.3 SIYB TMDL Monitoring**

Water quality monitoring was performed to assess dissolved copper concentrations and toxicity, as well as other physical and chemical water parameters that may affect toxicity.

### 3.3.1 Surface Water Chemistry

Water quality surveys were performed in August and October 2011. The Monitoring Plan specifies that annual monitoring be performed in August; however, due to an equipment malfunction during Cu<sup>2+</sup> assessments, a subsequent survey was performed in October.

#### 3.3.1.1 August 2011 Survey

Chemistry results and *in situ* water quality measurements for SIYB surface water samples collected on August 22, 2011 are presented in Table 3-2, with detailed chemistry results provided in Appendix C. Dissolved copper concentrations ranged from 7.22 to 11.48 µg/L, with an average concentration of 7.49 ± 1.05 µg/L (mean ± standard error). All stations were in exceedance of both the CTR chronic threshold of 3.1 µg/L and acute CTR threshold of 4.8 µg/L (Table 3-2). The dissolved copper concentration measured for the reference sample, collected within the main channel of San Diego Bay outside the mouth of SIYB, was 2.1 µg/L.

Dissolved zinc concentrations measured in SIYB surface waters during the August survey ranged from 23.8 to 33.6 µg/L, which were approximately three times greater than at the reference station (7.46 µg/L). While dissolved zinc concentrations were found to be higher in the basin, they were, on average, three times lower than the chronic CTR threshold of 81 µg/L.

DOC values, which are an indicator of the bioavailability of free copper, ranged from 0.21 to 0.23 mg/L. Chemistry reports indicated that TOC was detected at levels below the reporting limit for all samples.

*In situ* measurements of Cu<sup>2+</sup>, salinity, temperature, and pH were collected in addition to chemical analysis. However, due to an equipment error resulting from an inadequate connection to the Cu-ISE, voltage measurements could not be meaningfully converted to Cu<sup>2+</sup>, and, therefore, were not included in the analysis of August 2011 samples. Salinity and pH values were all highly consistent within SIYB, while surface temperatures increased slightly moving from the mouth to the head of the basin.

Table 3-2. Chemistry Results for SIYB Surface Waters, August 2011 Event.

Station	Dissolved Copper (µg/L)	Total Copper (µg/L)	Dissolved Zinc (µg/L)	Total Zinc (µg/L)	DOC (mg/L)	TOC (mg/L)	Salinity (ppt) <sup>1</sup>	Temp. (°C) <sup>1</sup>	pH <sup>1</sup>
SIYB-1	11.48	13.8	33.566	33.51	0.22	0.81	34.1	21.6	7.9
SIYB-2	7.22	10.53	22.743	25.455	0.23	0.78	34.3	21.2	8.0
SIYB-3	7.55	10.37	22.684	24.377	0.22	0.75	34.2	21.2	8.0
SIYB-4	7.81	10.7	23.842	25.028	0.21	0.74	34.2	21.1	8.0
SIYB-5	8.72	11.19	29.392	30.252	0.21	0.65	34.2	21.0	7.9
SIYB-6	7.48	9.51	23.896	24.895	0.22	0.66	34.1	20.8	7.9
SIYB-REF	2.14	3.05	7.458	8.37	0.23	0.65	34.3	20.4	7.9

<sup>1</sup> *In situ* measurements.

**3.3.1.2 October 2011 Survey**

Due to the anomalous Cu<sup>2+</sup> measurements observed during the August monitoring event, a second event was conducted on October 26, 2011. A summary of chemistry results and *in situ* water quality measurements obtained during this event is presented in Table 3-3, with detailed chemistry results provided in Appendix C. *In situ* measurements were collected at all six sampling locations and the reference location. Three of the six stations (SIYB-1, SIYB-3, and SIYB-5) were selected for chemical and toxicological analyses (48-hour mussel bioassay) to assess potential differences in dissolved copper concentrations in SIYB from the August monitoring event. Dissolved copper concentrations again were measured above both the chronic and acute CTR water quality values at each of the locations evaluated during the October event. Concentrations ranged from 5.01 to 8.08 µg/L, with an average concentration of 6.53 ± 0.89 µg/L.

Analyses of DOC and TOC of the October 2011 samples were conducted in two laboratories to assess the validity of the results of the August monitoring event. DOC results from SunStar Laboratories, Inc. ranged from 0.38 to 0.55 mg/L, and results from Calscience Environmental Laboratories, Inc. ranged from 1.2 to 1.3 mg/L. Chemistry reports from SunStar Laboratories, Inc. indicated that TOC was detected at levels below the reporting limit for all samples. DOC was also detected below the reporting limit for samples SIYB-3 and SIYB-5.

*In situ* measurements of Cu<sup>2+</sup>, salinity, temperature, and pH were collected in addition to chemical analysis. Free copper values ranged from 10.71 to 10.02 pCu; levels below 11.0 pCu are predicted to have potential toxic effects to sensitive marine organisms, such as bivalve larvae. The average free copper value measured at the reference station (10.29 pCu) was in the middle of the range of those measured within SIYB. Salinity, temperature, and pH measurements of the October survey were all lower than those of the August survey. Salinity and pH values were largely consistent among stations, while temperatures increased from the mouth to the head of the basin.

Table 3-3. Chemistry Results for SIYB Surface Waters, October 2011 Event.

Station	Dissolved Copper (µg/L)	DOC, SSL <sup>1</sup> (mg/L)	DOC, CEL <sup>2</sup> (mg/L)	TOC, SSL <sup>1</sup> (mg/L)	TOC, CEL <sup>2</sup> (mg/L)	Free Copper (pCu) <sup>3</sup>	Salinity (ppt) <sup>3</sup>	Temp.S (°C) <sup>3</sup>	pH <sup>3</sup>
SIYB-1	8.08	0.55	1.2	0.41	ND	10.47	33.6	17.6	7.7
SIYB-2						10.71	33.7	17.4	7.7
SIYB-3	6.51	0.45	1.3	0.34	1	10.22	33.6	17.4	7.3
SIYB-4						10.37	33.7	17.1	7.7
SIYB-5	5.01	0.38	1.3	0.35	ND	10.09	33.7	17.3	7.7
SIYB-6						10.02	33.7	16.8	7.6
SIYB-REF						10.29	33.6	14.4	7.4

ND Non-detect  
<sup>1</sup> SSL – SunStar Laboratories  
<sup>2</sup> CEL – Calscience Environmental Laboratory  
<sup>3</sup> In Situ measurements

### 3.3.1.3 Baseline Comparison

Average dissolved copper concentrations within SIYB were  $7.49 \pm 1.05 \mu\text{g/L}$  in August 2011 and  $6.53 \pm 0.89 \mu\text{g/L}$  in October 2011. The average 2011 dissolved copper concentration of  $7.01 \mu\text{g/L}$  was 15% lower than the baseline average concentration of  $8.28 \pm 1.36 \mu\text{g/L}$  (mean  $\pm$  standard error) (Figure 3-1), although differences were not statistically significant (one-way Analysis of Variance,  $p = 0.571$ ).

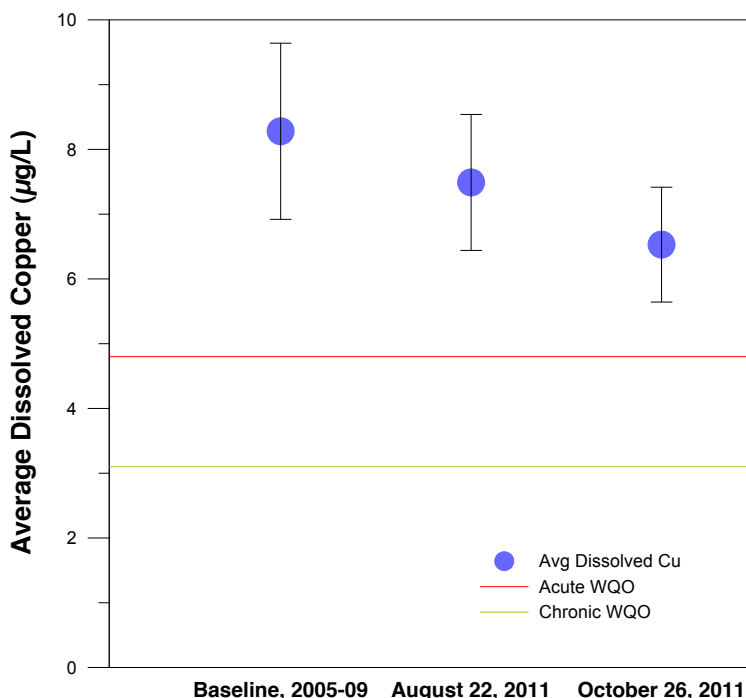


Figure 3-1. Average Dissolved Copper Concentrations in SIYB Relative to Baseline Conditions

### 3.3.2 Toxicity

Toxicity assessments included topsmelt 96-hour acute bioassays, performed for the August survey, and mussel 48-hour chronic bioassays, performed for the August and October surveys.

#### 3.3.2.1 Topsmelt 96-Hour Acute Bioassay

For the tests initiated on August 23 and August 24, survival of *A. affinis* in the control treatments was 95.0% and 97.5%, respectively (Table 3-4). Both survival values met the minimum acceptable control survival criterion of 90%.  $LC_{50}$ s were greater than 100% for all samples tested. Survival of topsmelt test organisms exposed to sample treatments ranged from 97.5 to 100%, and did not differ significantly from that of the controls, indicating that conditions within SIYB were nontoxic to *A. affinis*.

For the copper sulfate reference toxicant test initiated on August 23, 2011, the reference toxicant  $LC_{50}$  was  $116 \mu\text{g/L}$ , which was within two standard deviations ( $\pm 107 \mu\text{g/L}$ ) of the WESTON

laboratory mean of 156 µg/L. For the tests initiated on August 24, 2011, the reference toxicant LC<sub>50</sub> was 87.0 µg Cu<sup>2+</sup>/L, which also was within two standard deviations (± 111 µg/L) of the WESTON laboratory mean of 153 µg/L. These results indicate that the sensitivity of both batches of *A. affinis* used in the assessment of SIYB surface waters fell within the normal range. Test and reference toxicant test results for *A. affinis* are summarized in Table 3-4 and are detailed in Appendix C.

Table 3-4. Results of the 96-Hour *Atherinops affinis* Bioassay, August 2011

Composite Area ID	<i>Atherinops affinis</i> Results		
	% Survival	LC <sub>50</sub> for Survival (%)	NOEC / LOEC (%)
Control (Aug 23/24)	95.0 / 97.5	-	
SIYB-1	97.5	>100	>100 / >100
SIYB-2	97.5	>100	>100 / >100
SIYB-3	100	>100	>100 / >100
SIYB-4	100	>100	>100 / >100
SIYB-5	100	>100	>100 / >100
SIYB-6	97.5	>100	>100 / >100
SIYB-REF	100	>100	>100 / >100
Copper Sulfate Reference Toxicant, August 23	Concentration (µg/L)	% Survival	LC <sub>50</sub> (µg/L)
	Control	85.0	116
	25	95.0	
	50	97.5	
	100	55.0	
	200	7.50	
	400	0.00	
Copper Sulfate Reference Toxicant, August 24	Concentration (µg/L)	% Survival	
	Control	100	87.0
	25	100	
	50	100	
	100	32.5	
	200	0.00	
	400	0.00	

### 3.3.2.2 Bivalve 48-Hour Chronic Bioassay

#### August 2011 Survey

For the tests initiated on August 23, 2011, survival of *M. galloprovincialis* in the control treatment was 87.6%, which met the minimum acceptable control survival criterion of 50% (Table 3-5). Normality of the surviving larvae in the control treatment was 87.1%, which was slightly below the minimum acceptable control criterion of 90%. Survival LC<sub>50</sub>s and normality EC<sub>50</sub>s for *M. galloprovincialis* were greater than 100% for all of the August 2011 samples. Test and reference toxicant test results for *M. galloprovincialis* are summarized in Table 3-5 and are detailed in Appendix C.



Survival of mussel larvae exposed to sample treatments collected in August 2011 ranged from 71.1 to 92.3% within SIYB and did not differ significantly from that of the controls (Table 3-5). Normality of organisms exposed to SIYB sample treatments ranged from 86.0 to 97.3%, and did not differ significantly from the control. Additionally, survival and normal development of larvae exposed to SIYB-REF waters were similar to those exposed to waters collected within SIYB. These results indicate that conditions within SIYB were nontoxic with regard to *M. galloprovincialis* survival and development.

For the copper sulfate reference toxicant test initiated on August 23, 2011, the LC<sub>50</sub> was 13.5 µg/L, which was within two standard deviations (± 13.1 µg/L) of the WESTON laboratory mean of 19.6 µg/L. The EC<sub>50</sub> for normality was 7.38 µg/L, which was within two standard deviations (± 3.45 µg/L) of the WESTON laboratory mean of 7.17 µg/L. These results indicate that the sensitivity of *M. galloprovincialis* used in the assessment of SIYB surface waters fell within the normal range.

Table 3-5. Results of the 48-Hour *Mytilus galloprovincialis* Bioassay, August 2011

Composite Area ID	<i>Mytilus galloprovincialis</i> Results, August 2011				
	% Survival (in 100% concentration for test samples)	% Normal Development (in 100% concentration for test samples)	LC <sub>50</sub> for Survival / EC <sub>50</sub> for Normality (%)	Survival NOEC / LOEC (%)	Normality NOEC / LOEC (%)
Control	87.6	87.1	-	-	-
SIYB-1	81.9	86.0	>100 / >100	100 / >100	100 / >100
SIYB-2	80.1	97.3	>100 / >100	100 / >100	100 / >100
SIYB-3	71.1	95.0	>100 / >100	100 / >100	100 / >100
SIYB-4	91.2	95.0	>100 / >100	100 / >100	100 / >100
SIYB-5	85.7	93.0	>100 / >100	100 / >100	100 / >100
SIYB-6	92.3	89.9	>100 / >100	100 / >100	100 / >100
SIYB-REF	93.6	89.1	>100 / >100	100 / >100	100 / >100
Copper Sulfate Reference Toxicant, August 23	Concentration (µg/L)	% Survival	% Normal Development	LC <sub>50</sub> (µg/L)	Normality EC <sub>50</sub> (µg/L)
	Control	93.4	87.9	13.5	7.38
	2.5	90.8	86.7		
	5.0	90.6	83.8		
	10	80.5	0.00		
	20	7.11	0.00		
40	2.41	0.00			

October 2011 Survey

For the tests initiated on October 27, 2011, survival of *M. galloprovincialis* in the control treatment was 92.8%, which met the minimum acceptable control survival criterion of 50%. Normality of the surviving larvae in the control treatment was 96.6%, which also met the minimum acceptable control normal development criterion of 90%. Survival LC<sub>50</sub>s and normality EC<sub>50</sub>s for *M. galloprovincialis* were greater than 100% for all of the October 2011 samples with the exception of SIYB-1, which was determined to be 67.0%. Test and reference toxicant test results for *M. galloprovincialis* are summarized in Table 3-6 and are detailed in Appendix C.

During the October 2011 survey, bivalve survival ranged from 86.0 to 95.0% at SIYB stations, and did not differ significantly from that of controls (Table 3-6). Normal larval development ranged from 7.12 to 96.6% in SIYB. Normal larval development results for water samples collected at SIYB-1 and SIYB-3 were significantly different from the control. The statistical difference at SIYB-3, where normal development was 91.5%, was due to extremely low variability and did not meet the biological significant reduction of  $\geq 20\%$ . Normal larval development at SIYB-1 was only 7.12%, indicating that surface waters exhibited chronic toxic effects for *M. galloprovincialis*.

For the copper sulfate reference toxicant test initiated on October 27, 2011, the LC<sub>50</sub> was 13.1 µg/L, which was within two standard deviations ( $\pm 13.2$  µg/L) of the WESTON laboratory mean of 19.6 µg/L. The EC<sub>50</sub> for normality was 5.28 µg/L, which was within two standard deviations ( $\pm 3.63$  µg/L) of the WESTON laboratory mean of 7.02 µg/L. These results indicate that the sensitivity of both batches of *M. galloprovincialis* used in the assessment of SIYB surface waters fell within the normal range.

Table 3-6. Results of the 48-Hour *Mytilus galloprovincialis* Bioassay, October 2011

Composite Area ID	<i>Mytilus galloprovincialis</i> Results, October 2011				
	% Survival (in 100% concentration for test samples)	% Normal Development (in 100% concentration for test samples)	LC <sub>50</sub> for Survival / EC <sub>50</sub> for Normality (%)	Survival NOEC / LOEC (%)	Normality NOEC / LOEC (%)
Control	92.8	96.6	-	-	-
SIYB-1	86.0	7.12	>100 / 67.0	100 / >100	25 / 50
SIYB-3	91.5	91.5	>100 / >100	100 / >100	50 / 100
SIYB-5	95.4	94.8	>100 / >100	100 / >100	100 / >100
Copper Sulfate Reference Toxicant, August 23	Concentration (µg/L)	% Survival	% Normal Development	LC <sub>50</sub> (µg/L)	Normality EC <sub>50</sub> (µg/L)
	Control	93.1	95.9		
	2.5	99.8	91.7		
	5.0	93.7	64.1		
	10	85.7	0.00		
	20	1.54	0.00		
40	0.83	0.00	13.1	5.28	

## 4.0 DISCUSSION

2011 SIYB TMDL monitoring findings provide evidence that trends in both copper loading and water quality are improving from baseline conditions in SIYB. Dissolved copper loading reductions were due to a combination of vessel conversions to alternative hull paints and reduced occupancy. While dissolved copper concentrations still exceeded both acute and chronic CTR thresholds in SIYB, concentrations appear to be declining from baseline conditions. Most notably, toxicity in the basin was extremely rare, since only one station was found to have surface water that inhibited normal development of mussel larvae.

### 4.1 Copper Loading Trends

Vessel tracking indicates that there has been a nearly 27% (i.e., 563 kg/yr) reduction in annual dissolved copper loading from vessels in SIYB when compared to the TMDL assumed baseline loading of 2,100 kg/yr. These calculations demonstrate that copper loading reductions exceed the required 2012 interim loading reduction target of 10%. This reduction was due primarily to reduced occupancy (calculated to be 408 kg/yr or 19%) and vessel conversions to non-copper (104 kg/yr or 5.0%) and low-copper (58 kg/yr or 2.8%) hull paints.

Since vessels can occupy berths up to 100% of time, conversion of vessels to non-copper paints reduced annual dissolved copper loads by up to 119 kg/yr (5.7%), assuming vessels occupied slips/moorings 100% of the time. Similarly, conversion to low-copper hull paints was calculated to reduce annual dissolved copper loads by up to 63 kg/yr (3%). Therefore, vessel conversions to non-copper and low-copper hull paints reduced copper loads by up to 8.7% in SIYB.

Two caveats must be noted for the loading reduction analysis. First, loading reduction calculations were inclusive of both unconfirmed and confirmed non-copper and low-copper hull paints. Unconfirmed transitions included vessels that were reported to have non-copper or low-copper hull paints; however, required supporting information on hull paint name, product number, name of the boatyard that applied the paint, and/or painting date was not provided. Excluding unconfirmed non-copper and low-copper hull paints, confirmed vessel transitions to non-copper and low-copper hull paints reduced annual dissolved copper loading by up to 99 kg/yr (4.7%), assuming 100% occupancy. Second, reduced occupancy was the most important contribution to loading reduction. Since occupancy has the potential to vary widely from year to year based on economic conditions and other factors, vacant slips cannot be considered a permanent loading reduction, unless commitments are made to preferentially reoccupy slips with vessels with non-copper hull paints.

### 4.2 Water Quality Trends

Associated with the reduction in copper loads, while not statistically significant, there has been an approximately 15% reduction in the average dissolved copper concentration measured in 2011 surveys (7.01  $\mu\text{g/L}$ ) from the baseline average dissolved copper concentration (8.28  $\mu\text{g/L}$ ). However, further progress is needed since dissolved copper concentrations at all SIYB stations still exceeded the chronic numeric WQO of 3.1  $\mu\text{g/L}$  by at least three times in August and more

than 1.6 times in October. In contrast, the concentration at the reference station (2.14 µg/L), which was located in the main channel of San Diego Bay just outside SIYB, was below the WQO. The high density of vessels combined with the low flow environment of the basin contributes to elevated copper concentrations in SIYB relative to adjacent areas of the Bay. Continued annual water quality monitoring will be used to compare conditions in SIYB to other areas of the Bay, while providing further evidence of improving water quality conditions over time.

Although dissolved copper concentrations in SIYB consistently exceeded the WQO, evidence of toxicity was only limited to one station. Acute toxicity was not apparent for topsmelt or mussel bioassays. Additionally, there was no chronic toxicity in the August survey, while chronic toxicity was exhibited at one station (SIYB-1) during the October survey, as measured by normal development of mussel larvae during 48-hour bioassay tests. This finding is consistent with prior SIYB toxicity surveys that have observed toxicity to mussel larvae at dissolved copper concentrations of approximately 9 µg/L in SIYB (Schiff et al., 2006), chronic toxicity near the head of SIYB at only 1 of 62 samples (Capolupo et al., 2011), or no toxicity (including a 1999-2002 San Diego Bay-wide surface water toxicity study by Rosen et al., 2005 and 2011 toxicity assessment by WESTON, 2012).

The absence of acute toxicity at dissolved copper concentrations up to 11.5 µg/L and detection of chronic toxicity at only one station with a dissolved copper concentration of 8.08 µg/L underscores the importance of considering site-specific factors that regulate copper bioavailability in the TMDL. There is an increasing body of evidence that the 3.1 µg/L WQO is overly protective of water quality beneficial uses in SIYB and San Diego Bay, as determined by water-effects ratio (WER) and biotic ligand model (BLM) studies (Rosen et al., 2005; Chadwick et al., 2008; and Capolupo et al., 2011), as well as reevaluations of more recent toxicity data. However, given that dissolved copper concentrations are still well above the existing WQO, further studies are needed to understand how site-specific factors affect copper bioavailability in SIYB.

In conclusion, the 2011 monitoring program provides evidence that vacancies and vessel hull paint conversions are resulting in reduced copper loading, reduced dissolved copper concentrations relative to baseline conditions, and water quality conditions that are largely nontoxic to indicator organisms. The Port, as the steward of San Diego Bay, is committed to continue Investigative Order-required monitoring to ensure that water quality conditions in SIYB continue to improve.

## 5.0 REFERENCES

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Appendix A  
Vessel Tracking Data

**Table A-1. Shelter Island Yacht Basin 2011 Vessel Tracking Data for Slips**

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	BCM	A 1	0.99		power	28'		Cu	Pro-line	1088	Shelter Island	2/7/2011	70
	BCM	A 2	1.00					UKN					
	BCM	A 3	0.99	CF4176GZ	sail	30'	9.5'	Cu	Pro-line	1088	Shelter Island	5/18/2006	30
	BCM	A 5	1.00					UKN					
	BCM	A 6	1.00					UKN					
	BCM	A 7	1.00					UKN					
	BCM	A 8	1.00					UKN					
	BCM	A 9	1.00					UKN					
	BCM	A 10	0.99	1048410	power	36'		Cu	Pro-line	1088	Shelter Island	3/6/2007	30
	BCM	A 11	1.00					UKN					
	BCM	A 12	1.00					UKN					
	BCM	A 13	1.00					UKN					
	BCM	A 14	1.00					UKN					
	BCM	A 15	0.99		power	21'	8'	Cu	Pettit Protector		Driscoll's	4/1/2010	67
	BCM	A 16	1.00					UKN					
	BCM	B 2	1.00					UKN					
	BCM	B 3	0.98	CF 1089 RN	power	26'	8'	Cu	Interlux		Koehler Kraft	5/19/2011	
	BCM	B 4	0.96	1148921	power	32'	11'	Cu			Driscoll	2009	
	BCM	B 5	1.00					UKN					
	BCM	B 6	1.00					UKN					
	BCM	B 7	1.00					UKN					
	BCM	B 8	1.00					UKN					
	BCM	B 9	1.00					UKN					
	BCM	B 10	0.96	1225367	sail	38'	22'	Cu	Pettit Protector			Nov-11	65
	BCM	B 12	1.00					UKN					
	BCM	B 13	1.00					UKN					
	BCM	B 14	1.00					UKN					
	BCM	B 15	1.00					UKN					
	BCM	B 16	1.00					UKN					
	BCM	C 1	1.00					UKN					
	BCM	C 2	1.00		power	40'	14'1"	Cu	Pettit Trinidad Black		Vee lay Marine	2006	75
	BCM	C 3	0.97	1136010	power	48'	12'	Cu	Proline	1088	Shelter Island	2009	30
	BCM	C 4	1.00					UKN					
	BCM	C 5	1.00					UKN					
	BCM	C 6	1.00					UKN					
	BCM	C 7	1.00					UKN					
	BCM	C 8	0.92	942364	sail	44'	13.5'	Cu	Pettit Trinidad Pro		Shelter Island	5/9/2011	70
	BCM	C 9	1.00		power	42'	13'	Cu					
	BCM	C 10	1.00					UKN					
	BCM	C 11	1.00					UKN					
	BCM	C12	1.00					UKN					
	BCM	C 13	0.99		sail	30'	10'10"	Cu			Shelter Island	Apr-11	



Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	BCM	C 14	1.00	1177116	sail	35'	11'4"	Cu	Interlux		Shelter Island	1-Jun	70
	BCM	C 15	1.00					UKN					
	BCM	C 16	1.00					UKN					
	BCM	C17	1.00					UKN					
	BCM	C 18	0.99		sail	32.5'	9'3"	Cu			Shelter Island	2009	
	BCM	D 1	1.00					UKN					
	BCM	D 2	1.00					UKN					
	BCM	D 3	0.76	CF 8323 EZ	sail	41'	12'6"	Cu	Pro-line	1088	Knight & Carver	4/22/2011	67
	BCM	D 4	0.99	665596	power	46'	14'6"	Cu	Interlux Ultra	3669	Driscoll's	3/25/2009	67
	BCM	D 5	1.00					UKN					
	BCM	D 6	1.00					UKN					
	BCM	D 7	1.00					UKN					
	BCM	D 8	1.00	937213	sail	40'		Cu			Shelter Island	3/22/2011	
	BCM	D 9	1.00					UKN					
	BCM	D 10	1.00					UKN					
	BCM	D 11	1.00					UKN					
	BCM	D 12	0.97	1073828	sail	30'	10'4"	Cu	Interlux Ultra		Koehler Kraft	11/11/2008	30
	BCM	D 13	1.00					UKN					
	BCM	D 14	1.00					UKN					
	BCM	D 15	1.00					UKN					
	BCM	D 16	1.00					UKN					
	BCM	D 17	1.00					UKN					
	BCM	D 18	1.00					UKN					
	BCM	D 19	1.00					UKN					
	BCM	E 1	1.00					UKN					
	BCM	E 2	1.00					UKN					
	BCM	E 3	0.96	988785	sail	37.5'	12'	Cu	Pro-line		Shelter Island	Jan-09	70
	BCM	E 4	0.99			38'		Cu			Shelter Island	2009	70
	BCM	E 5	0.99	CF 9864 JL	sail	34'	11'	Cu	Pro-line	1088	Shelter Island	Jan-09	70
	BCM	E 6	1.00					UKN					
	BCM	E 7	1.00					UKN					
	BCM	E 8	0.94	1060951	sail	35'	11.5'	Cu	Bluewater SCX		KKMI	1-Jul	67
	BCM	E 9	1.00		power			Cu			Shelter Island	2010	70
	BCM	E 10	0.97	693017	power	42'	16'	Cu	Pro-line	1088		2008	70
	BCM	E 11	1.00					UKN					
	BCM	E 12	1.00					UKN					
	BCM	E 13	1.00	679547	sail	42'		Cu			Shelter Island	1-Apr	70
	BCM	E 14	1.00					UKN					
	BCM	E 15	1.00					UKN					
	BCM	E 16	1.00					UKN					
	BCM	E 17	1.00					UKN					
	BCM	E 18	0.99	1081634	power	45'	15'	Cu	Blue-Water	8602-Blk	Knight & Carver	9/1/2009	45
	BCM	F 1	1.00					UKN					
	BCM	F 2	1.00	1160898	sail	35'		Cu	Pro-line	1088	Shelter Island	1-Sep	67

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	BCM	F 3	1.00					UKN					
	BCM	F 4	0.93	1203907	sail	36'	11'11"	Cu	Pettit Trinidad SR		Anchors Way	Dec-10	70
	BCM	F 5	0.99	626152	sail	36'	11'	Cu	International		Shelter Island	May-09	67
	BCM	F 6	1.00					UKN					
	BCM	F 7	1.00					UKN					
	BCM	F 8	1.00					UKN					
	BCM	F 9	0.95	1130743	Sail/ cat	38'	20.5'	Cu	Interlux	YBA569	Driscoll's	Mar-11	46.5
	BCM	F 10	0.84	1037301	sail	42'	13'	Cu	Sea Hawk Sharkskin	6100	Driscoll's	9/12/2011	50
	BCM	F 11	1.00					UKN					
	BCM	F 12	1.00					UKN					
	BCM	F 13	1.00					UKN					
	BCM	F 14	1.00		sail	46'	14'	Cu	Pro-line	1088	Shelter Island	2005	30
	BCM	F 15	1.00					UKN					
	BCM	F 16	1.00					UKN					
	BCM	F 17	0.99		sail	42'		Cu	Pettit Trinidad		Shelter Island	Jun-11	70
	BCM	F 18	1.00					UKN					
	BCM	G 1	1.00					UKN					
	BCM	G 2	1.00					UKN					
	BCM	G 3	0.99	989354	sail	35'	10'	Cu	Interlux	3779	Shelter Island	7/14/2010	67
	BCM	G 4	1.00					UKN					
	BCM	G 5	1.00					UKN					
	BCM	G 6	1.00					UKN					
	BCM	G 7	0.97	CF 7340 SW	sail	30'		Cu	Pro-line	1088	Shelter Island	11-Mar	
	BCM	G 8	1.00	616622	sail	33'	9.6'	UKN			Shelter Island	6/1/2011	
	BCM	G 9	1.00	613937	sail	33'4"	11'	Cu	Pettit	1088	Shelter Island	3/18/2011	70
	BCM	G 10	1.00					UKN					
	BCM	G 11	1.00					UKN					
	BCM	G 12	1.00					UKN					
	BCM	G 13	1.00					UKN					
	BCM	G 15	1.00					UKN					
	BCM	G 16	1.00					UKN					
	BCM	G 17	0.98	907488	sail	36'	11'	Cu				2006	30
	BCM	G 18	0.99	925984	sail	36'	11'9"	Cu			Shelter Island	2008	70
	BCM	G 19	1.00					UKN					
	BCM	G 20	1.00					UKN					
	BCM	G 21	1.00					UKN					
	BCM	H 1	0.83	1113607	sail	35'	11'9"	Cu			Shelter Island	Mar-11	70
	BCM	H 2	0.99		sail	30'	8.9'	Cu	Pettit	Protector	Driscoll's	3/11/2011	67
	BCM	H 4	1.00					UKN					
	BCM	H 5	1.00					UKN					
	BCM	H 7	0.96	CF 9612HF	sail	30'	10'10"	Cu	Interlux Ultra		Shelter Island	4/7/2010	67
	BCM	H 8	1.00					UKN					
	BCM	H 9	1.00		sail	29'		UKN			Koehler Kraft	2005	
	BCM	H 10	0.94	1234631	sail	34'	11'9"	Cu	Interlux	B-90	Marina del Rey	6/23/2011	70

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	BCM	H 11	1.00					UKN					
	BCM	H 12	0.99	CF 5673FV	sail	33'	11'10"	Cu	Pro-line Interlux	1088	Driscoll MB	5/16/2011	70
	BCM	H 13	1.00					UKN					
	BCM	H 14	1.00					UKN					
	BCM	H 15	1.00					UKN					
	BCM	H 16	1.00					UKN					
	BCM	H 17	1.00					UKN					
	BCM	H 18	1.00					UKN					
	BCM	H 19	1.00	MT 8828 AW	sail	24'	8'2"	Cu	Interlux Ultra	3449	Shelter Island	2/2/2011	67
	BCM	H 20	0.89	997272	sail	32'	11'9"	Cu	Pro-line		Driscoll's	Mar-11	70
	BCM	H 21	1.00					UKN					
	BCM	M 1	0.02					UKN					
	BCM	M 2	1.00					UKN					
	BCM	M 3	0.97	CF 8640 CH	power	18'		UKN			owner	Sep-10	
	BCM	M 4	0.02					UKN					
	BCM	M5	0.02					UKN					
	BCM	M 6	0.02					UKN					
	BCM	B 1	1.00		power	40'	10'	Lcu	Bottom Pro		Koehler Kraft	2/9/2007	30
	BCM	B 11	0.99	CF 9798FW	sail	24'	7'8"	Lcu-ukn			Driscoll's	2007	30
	BCM	C 19	1.00	689972	sail	43'	12'	LCu	Interlux Micron CSC	319293	Koehler Kraft	7/1/2011	37.2
	BCM	G 22	0.98	969813	sail	38'	10'3"	Lcu-ukn	Comex		Marina San Carlo	Jul-08	30
	BCM	H 3	0.98	1215994	sail	34'	11'6"	Lcu-ukn				Feb-07	30
	BCM	H 6	1.00	4797		32'	12.5'	LCu	Interlux Bottomkote	gybb669	Marty's BY	8/1/2010	35
	BCM	A 4	1.00		sail	32'	14'	Non	NA	NA	NA	NA	0
	BCM	G 14	0.99	993410	Sail	32'	11.2'	Non	E-Paint	20-301	owner	Apr-11	0
	BCM	H 22	0.00					Vacant					
	CN	1	0.03	1148953	Navigator	56'	15'	UKN					
	CN	1	0.49	1094902	Viking Spo	72'	19.08'	UKN					
	CN	2	0.43	1118933	Hatteras	55'	17.33'	UKN					
	CN	3,5	0.08	12222692	Tiara Oper	30'	12.5'	UKN					
	CN	4,5,7,11,17	0.68	1125940	Tiara	35'	13.25'	UKN					
	CN	5	0.13	Inventory	Viking BCE	60'	18.75'	UKN					
	CN	5	0.05	1173952	Blackwell	61'	18'	UKN					
	CN	12	0.42		Tiara Oper	43'	15.17'	UKN					
	CN	13	0.30	Inventory	Contender	31'	9.33'	UKN					
	CN	15	0.58	1087701	Bayliner	47'	15.08'	UKN					
	CN	16	0.30	1109067	Hatteras C	60'	17.33'	UKN					
	CN	5,15	0.07	Inventory	Contender	25'	8.83'	UKN					
	CN	11,13,14,20	0.72	Inventory	Tidewater	21'		UKN					
	CN	1,3,4,12	0.89	Inventory	Tiara Sovra	43'	14.75'	UKN					
	CN	3,4	0.23	Inventory	Tiara	36'	13.25'	UKN					
	CN	3,5,7,21	0.56	Inventory	Tiara Oper	32'	13'	UKN					
	CN	6	0.88	Inventory	Viking Con	50'	17'	UKN					
	CN	14,20	0.31	Inventory	Contender	31'	9.33'	UKN					

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	CN	2	0.39	949662	Viking	45'	15'	Non-unconf				Dec-07	0
	CN	4	0.16	1184945	Cabo Oper	45'	15.67'	Non-unconf				Dec-07	0
	CN	5,7	0.09	1052473	Viking Spo	58'	18'	Non-unconf				Dec-07	0
	CN	5,6	0.06	DL3295AB	Viking	45'	16.33'	Non-unconf				Dec-07	0
	CN	9	1.00	1069023	Carver CM	50'	15.33'	Non-unconf				Dec-07	0
	CN	10	0.88	678325	Bertram	54'	16.92'	Non-unconf				Dec-07	0
	CN	12,14	0.32	1095497	Pursuit	30'	12'	Non-unconf				Dec-07	0
	CN	18,20	0.54		Skorgene	26'	8.5'	Non-unconf				Dec-07	0
12/12/11	GC	21	0.98		P	46	12	Non	Pacifica Plus	YBB263	NB	04/2011	0%
12/12/11	GC	3	0.98	Broker Boat	P	36	8	UKN			DR	09/2011	
12/12/11	GC	4	0.98	CF1137877	P	42	14.5	Cu	Interlux Ultra	Y3779F	DR	09/2009	67%
12/12/11	GC	7	0.98	CF1078392	P	45	14.5	Cu	Trinidad	PET-1877	DR	2007	70%
12/12/11	GC	10	0.98		P	46		Cu	Sharkskin	SH-6145	NB	05/2008	30.00%
12/12/11	GC	11	0.98	CF9354JZ	P	36	12.8	Cu	Sharkskin	SH-6145	NB	09/2008	30.00%
12/12/11	GC	14	0.98	CCHD678M84C	P	35	13	Cu	Trinidad	PET-1877	DR	2010	70%
12/12/11	GC	20	0.98	CF924440	P	50	15	Cu	Interlux Ultra	Y3779F	OTH	2008	30%
12/12/11	GC	26	0.98	CF999945	S	68	15	Cu	Proline 1088	1088	OTH	02/2010	67%
12/12/11	GC	29	0.98	BERS0581G586	P	54	17	Cu	Sharkskin	SH-6145	NB	06/2006	30.00%
12/12/11	GC	33	0.98	CF1043683	P	68	20	Cu	Bluewater	BW-810	SI	11/2009	67%
12/12/11	GC	34	0.98	OSH76025A707	P	76	19.6	Cu	Pettit Z-Spar The Pro	B-94	MG	11/2011	65%
12/12/11	GC	9	0.98		P	38	13	LCu	Calif Bottomkote	YBA143	NB	10/2009	35%
12/12/11	GC	16	0.98	CF662756	P	42	14.33	LCu	Calif Bottomkote	YBA143	NB	12/2009	35%
12/12/11	GC	19	0.99	CF1098869	P	47.7	15	LCu	Bottomkote Aqua	YBA579	NB	02/2011	35%
12/12/11	GC	22	0.98	CF1073679	P	49.3	16.5	LCu	Calif Bottomkote	YBA143	NB	2008	30%
12/12/11	GC	27	0.98	VSC651101203	P	65	16.11	NON	Hempasil X3	87500	SI	11/2011	0%
12/12/11	GC	2	0.98	LYGUA127C202	P	19.5	8	UKN			OTH	01/2010	
12/12/11	GC	8	0.98	CAR2848D505	P	28.5	10	UKN					
12/12/11	GC	12	0.98	CF1224071	S	43.3	13.6	UKN					
12/12/11	GC	18	0.98	CF945678	P	45	15	UKN					
12/12/11	GC	24	0.98	XSK02757K304	P	56	15	UKN					
12/12/11	GC	25	0.97		P	65	16	UKN					
12/12/11	GC	28	0.98	CF1187744	P	65	16	UKN					
12/12/11	GC	30	0.99	Broker Boat	P	75	18.7	UKN			OTH	05/2010	
12/12/11	GC	31	1.00	CF254463	P	81	20	UKN					
12/12/11	GC	32	0.98	Broker Boat	P	80		UKN					
12/12/11	GC	1	0.00					Vacant					
12/12/11	GC	5	0.00					Vacant					
12/12/11	GC	6	0.00					Vacant					
12/12/11	GC	13	0.00					Vacant					
12/12/11	GC	15	0.00					Vacant					
12/12/11	GC	17	0.00					Vacant					
12/12/11	GC	23	0.00					Vacant					
12/12/11	GC	35	0.00					Vacant					
12/31/11	HMM	B 80	1.00					UKN					

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12/31/11	HMM	C 114	1.00					UKN					
12/31/11	HMM	M 206	1.00					UKN					
12/31/11	HMM	M 207	1.00					UKN					
12/31/11	HMM	M 211	1.00					UKN					
12/31/11	HMM	A 01	1.00	CF 4401 UH	P	23	9	UKN					
12/31/11	HMM	A 01A	1.00	CF 6863 RS	E	21	6	UKN					
12/31/11	HMM	A 02	1.00	CF 4378 UH	S	27	8	UKN					
12/31/11	HMM	A 03	1.00	CF 1411 SZ	S	25	8	UKN					
12/31/11	HMM	A 04	1.00	CF 2762 CP	P	25	8	UKN					
12/31/11	HMM	A 06	1.00	649606	S	39	12	UKN					
12/31/11	HMM	A 07	1.00	952646	P	50	15	UKN					
12/31/11	HMM	A 08	1.00	231002	S	58	13.5	UKN					
12/31/11	HMM	A 09	1.00	CF 6564 UX	P	38	14	UKN					
12/31/11	HMM	A 10	1.00	998413	P	44	15	UKN					
12/31/11	HMM	A 12	1.00	657594	P	47	14	UKN					
12/31/11	HMM	A 13	1.00	1195363	P	35	12	UKN					
12/31/11	HMM	A 14	1.00	1173101	S	54	16	UKN					
12/31/11	HMM	A 15	1.00	291037	S	44	12	UKN					
12/31/11	HMM	A 16	1.00	CF 9024 HJ	S	46	13	UKN					
12/31/11	HMM	A 17	1.00	530871	P	36	13	UKN					
12/31/11	HMM	A 18	1.00	962628	S	44.5	13.5	UKN					
12/31/11	HMM	A 18A	1.00	CF 7230 FR	S	32	9	UKN					
12/31/11	HMM	A 18B	1.00	976276	P	36	12	UKN					
12/31/11	HMM	A 18C	1.00	HIN WDSGG0528	S	35	12	UKN					
12/31/11	HMM	A 18D	1.00	1081807	S	37	12	UKN					
12/31/11	HMM	A 18E	1.00	CF 5742 EG	S	25	8	UKN					
12/31/11	HMM	A 19	1.00	692797	P	39	13	UKN					
12/31/11	HMM	A 21	1.00	1000188	P	42	15	UKN					
12/31/11	HMM	A 23	1.00	679906	S	41	13	UKN					
12/31/11	HMM	A 24	1.00	1041306	P	37.5	13.5	UKN					
12/31/11	HMM	A 25	1.00	1097123	P	42	14	UKN					
12/31/11	HMM	A 26	1.00	957849	S	38	12.5	UKN					
12/31/11	HMM	A 27	1.00	CF 8869 CG	P	41	13	UKN					
12/31/11	HMM	A 28	1.00	992358	P	42	15	UKN					
12/31/11	HMM	A 29	1.00	913764	P	36.5	13	UKN					
12/31/11	HMM	A 30	1.00	921503	P	41	12.5	UKN					
12/31/11	HMM	A 31	1.00	923742	P	38	15	UKN					
12/31/11	HMM	A 32	1.00	CF 3200 UC	P	40	12.5	UKN					
12/31/11	HMM	A 33	1.00	600392	S	36	11	UKN					
12/31/11	HMM	A 34	1.00	679095	S	35	11	UKN					
12/31/11	HMM	A 35	1.00	1135581	S	42	13	UKN					
12/31/11	HMM	A 36	1.00	CF 3671 GD	S	37	12	UKN					
12/31/11	HMM	A 37	1.00	CF 0829 GJ	S	38	11	UKN					
12/31/11	HMM	B 40	1.00	CF 3978 EP	S	34	10	UKN					

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12/31/11	HMM	B 41	1.00	1209631	S	36	12	UKN					
12/31/11	HMM	B 42	1.00	1026491	S	36	10.5	UKN					
12/31/11	HMM	B 43	1.00	980401	S	35	12	UKN					
12/31/11	HMM	B 44	1.00	CF 5775 CY	S	33	7	UKN					
12/31/11	HMM	B 45	1.00	1043306	S	37	12	UKN					
12/31/11	HMM	B 46	1.00	1127309	S	36	12	UKN					
12/31/11	HMM	B 47	1.00	1147247	S	35	10.5	UKN					
12/31/11	HMM	B 48	1.00	648236	S	33.5	11	UKN					
12/31/11	HMM	B 49	1.00	CF 6596 GD	S	37	12	UKN					
12/31/11	HMM	B 50	1.00	1025593	S	34	11	UKN					
12/31/11	HMM	B 51	1.00	CF 7137 HE	S	29	10	UKN					
12/31/11	HMM	B 52	1.00	517087	S	33	10	UKN					
12/31/11	HMM	B 54	1.00	CF 3517 TF	S	34	10	UKN					
12/31/11	HMM	B 56	1.00	CF 6432 GL	P	28	8	UKN					
12/31/11	HMM	B 57	1.00	CF 8019 TA	S	29	9.5	UKN					
12/31/11	HMM	B 58	1.00	606721	S	33	11	UKN					
12/31/11	HMM	B 59	1.00	CF 9477 KK	P	38	12	UKN					
12/31/11	HMM	B 60	1.00	514480	P	60	16	UKN					
12/31/11	HMM	B 62	1.00	1140361	P	32	12	UKN					
12/31/11	HMM	B 63	1.00	923308	S	35	11	UKN					
12/31/11	HMM	B 64	1.00	1117844	S	38	12	UKN					
12/31/11	HMM	B 65	1.00	664279	S	36	12	UKN					
12/31/11	HMM	B 66	1.00	529450	S	35	11	UKN					
12/31/11	HMM	B 67	1.00	CF 2623 GR	S	34	10	UKN					
12/31/11	HMM	B 68	1.00	CF 3782 GG	S	33	9.5	UKN					
12/31/11	HMM	B 69	1.00	695385	S	36	12	UKN					
12/31/11	HMM	B 70	1.00	912959	S	34	11	UKN					
12/31/11	HMM	B 71	1.00	641353	S	38	12	UKN					
12/31/11	HMM	B 72	1.00	CF 6870 KW	S	28	10	UKN					
12/31/11	HMM	B 73	1.00	1132290	S	36	12	UKN					
12/31/11	HMM	B 74	1.00	CF 3615 GK	S	36	10	UKN					
12/31/11	HMM	B 75	1.00	991615	S	36	13	UKN					
12/31/11	HMM	B 76	1.00	CF 8767 CT	S	32	8	UKN					
12/31/11	HMM	B 77	1.00	CF 1763 CK	P	38	13	UKN					
12/31/11	HMM	B 78	1.00	999719	S	35.5	10	UKN					
12/31/11	HMM	B 79	1.00	1069360	S	34	12	UKN					
12/31/11	HMM	C 100	1.00	1061286	S	30	11	UKN					
12/31/11	HMM	C 101	1.00	687501	S	32	9.5	UKN					
12/31/11	HMM	C 102	1.00	OR 112 ADG	P	30	9	UKN					
12/31/11	HMM	C 103	1.00	CF 9593 HF	S	30	10	UKN					
12/31/11	HMM	C 104	1.00	1070558	P	32	13	UKN					
12/31/11	HMM	C 105	1.00	CF 0661 CZ	S	25	9	UKN					
12/31/11	HMM	C 106	1.00	CF 3459 GR	S	30	10.5	UKN					
12/31/11	HMM	C 107	1.00	984845	S	30	11	UKN					

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12/31/11	HMM	C 108	1.00	CF 9376 FB	P	28	11	UKN					
12/31/11	HMM	C 109	1.00	1185675	S	30	11	UKN					
12/31/11	HMM	C 110	1.00	CF 2724 GD	P	30	12.5	UKN					
12/31/11	HMM	C 111	1.00	989678	S	27	8	UKN					
12/31/11	HMM	C 112	1.00	1055490	P	32	10	UKN					
12/31/11	HMM	C 113	1.00	CF 8923 SW	S	33	10	UKN					
12/31/11	HMM	C 81	1.00	CF 9978 KJ	P	21	8	UKN					
12/31/11	HMM	C 82	1.00	CF 3446 GG	P	30	8	UKN					
12/31/11	HMM	C 83	1.00	CF 4920 KL	S	25	8	UKN					
12/31/11	HMM	C 84	1.00	CF 8616 TK	S	34	10	UKN					
12/31/11	HMM	C 85	1.00	CF 7467 SC	S	27	9	UKN					
12/31/11	HMM	C 86	1.00	1129294	P	32	12	UKN					
12/31/11	HMM	C 87	1.00	CF 8912 FT	S	27	9	UKN					
12/31/11	HMM	C 88	1.00	CF 6650 GX	S	30	11	UKN					
12/31/11	HMM	C 90	1.00	CF 0536 HJ	S	25	8	UKN					
12/31/11	HMM	C 91	1.00	CF 4669 PW	S	30	11	UKN					
12/31/11	HMM	C 93	1.00	679745	S	31	11	UKN					
12/31/11	HMM	C 94	1.00	CF 4047 SS	S	29	9	UKN					
12/31/11	HMM	C 95	1.00	CF 4864 GH	S	27	8	UKN					
12/31/11	HMM	C 96	1.00	CF 6394 GB	S	27	12	UKN					
12/31/11	HMM	C 97	1.00	CF 2269 EU	S	27	8	UKN					
12/31/11	HMM	C 98	1.00	288514	P	53	15	UKN					
12/31/11	HMM	C 99	1.00	1114538	S	30	11	UKN					
12/31/11	HMM	D 114	1.00	CF 0020 JY	P	25	8.5	UKN					
12/31/11	HMM	D 115	1.00	CF 5908 HJ	S	28	9	UKN					
12/31/11	HMM	D 116	1.00	CF 0869 GC	S	24	9	UKN					
12/31/11	HMM	D 117	1.00	CF 4388 GB	S	26	7	UKN					
12/31/11	HMM	D 118	1.00	CF 2541 EC	S	25	8	UKN					
12/31/11	HMM	D 119	1.00	CF 1884 GA	S	30	11	UKN					
12/31/11	HMM	D 120	1.00	CF 3211 SP	S	35	12	UKN					
12/31/11	HMM	D 121	1.00	CF 5228 EM	S	28	8	UKN					
12/31/11	HMM	D 122	1.00	1044747	S	34	10	UKN					
12/31/11	HMM	D 123	1.00	CF 7348 EY	S	26	8	UKN					
12/31/11	HMM	D 124	1.00	990093	S	30	11	UKN					
12/31/11	HMM	D 125	1.00	CF 4742 EZ	S	30	10	UKN					
12/31/11	HMM	D 126	1.00	CF 9496 HJ	S	30	9	UKN					
12/31/11	HMM	D 127	1.00	CF 0099 HJ	S	30	9.6	UKN					
12/31/11	HMM	M 199	1.00	559393	S	38	13	UKN					
12/31/11	HMM	M 200	1.00	CF 0164 UE	S	38	12	UKN					
12/31/11	HMM	M 201	1.00	1070231	S	36	12	UKN					
12/31/11	HMM	M 202	1.00	1070231	S	36	12	UKN					
12/31/11	HMM	M 203	1.00	CF 8895 FM	P	24	9	UKN					
12/31/11	HMM	M 204	1.00	CF 9605 NG	S	27	10	UKN					
12/31/11	HMM	M 205	1.00	1090649	P	33	11	UKN					

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12/31/11	HMM	M 208	1.00	CF 0426 TY	P	27	9	UKN					
12/31/11	HMM	M 209	1.00	CF 9339 FT	S	30	11	UKN					
12/31/11	HMM	M 210	1.00	1204847	P	43.3	13.8	UKN					
12/31/11	HMM	M 220	1.00	CF 8587 GL	P	22	7	UKN					
12/31/11	HMM	M 221	1.00	CF 9142 CY	S	22	8	UKN					
12/31/11	HMM	M 222	1.00	CF 1422 HJ	S	22	7	UKN					
12/31/11	HMM	M 223	1.00	CF 5456 CV	S	22	9	UKN					
12/31/11	HMM	M 224	1.00	CF 6481 HR	S	23	8	UKN					
12/31/11	HMM	M 225	1.00	WAITING FOR IN	P	22	9	UKN					
12/31/11	HMM	M 226	1.00	CF 1936 UF	S	22	8	UKN					
12/31/11	HMM	M 227	1.00	CF 8846 EJ	S	26	8	UKN					
12/31/11	HMM	M 228	1.00	CF 8149 GL	S	27	9	UKN					
12/31/11	HMM	M 229	1.00	CF 8720 TK	P	25	10	UKN					
12/31/11	HMM	M 230	1.00	CF 5180 GP	S	24	8	UKN					
12/31/11	HMM	M 231	1.00	CF 7486 FB	S	25	8	UKN					
12/31/11	HMM	M 232	1.00	CF 1618 KK	P	15	8	UKN					
12/31/11	HMM	M 233	1.00	CF 2023 NZ	P	23	8	UKN					
12/31/11	HMM	M 234	1.00	CF 1436 UV	S	29	9	UKN					
12/31/11	HMM	M 235	1.00	CF 5262 SN	P	24	9	UKN					
12/31/11	HMM	M 236	1.00	CF 3368 SA	S	33	11	UKN					
12/31/11	HMM	M 239	1.00	974358	P	34	11	UKN					
12/31/11	HMM	M 240	1.00	CF 6347 CA	S	25	8	UKN					
12/31/11	HMM	M 241	1.00	CF 8523 SZ	P	24	9	UKN					
12/31/11	HMM	M 242	1.00	CF 9009 TK	P	32	12	UKN					
12/31/11	HMM	A 20	1.00	1224405	P	35	12.5	Lcu-ukn					
12/31/11	HMM	C 92	1.00	CF 5885 EL	S	28	8	Lcu-ukn					
12/31/11	HMM	M 216	1.00	915803	P	25	8	Lcu-ukn					
12/31/11	HMM	A 05	1.00	646723	S	55	16	Non-unconf					
12/31/11	HMM	M 213	1.00	CF 8737 SW	P	10	5	Non-unconf					
12/31/11	HMM	M 214	1.00	CF 9010 SW	S	22	8	Non-unconf					
12/31/11	HMM	M 215	1.00	CF 3798 TH	P	12	6	Non-unconf					
12/31/11	HMM	M 237	1.00	NONE (TENDER)	P	10	6	Non-unconf					
12/31/11	HMM	A 11	0.00					Vacant					
12/31/11	HMM	A 18F	0.00					Vacant					
12/31/11	HMM	A 22	0.00					Vacant					
12/31/11	HMM	A 38	0.00					Vacant					
12/31/11	HMM	B 39	0.00					Vacant					
12/31/11	HMM	B 53	0.00					Vacant					
12/31/11	HMM	B 55	0.00					Vacant					
12/31/11	HMM	B 61	0.00					Vacant					
12/31/11	HMM	C 89	0.00					Vacant					
12/31/11	HMM	M 212	0.00					Vacant					
12/31/11	HMM	M 217	0.00					Vacant					
12/31/11	HMM	M 218	0.00					Vacant					



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12/31/11	HMM	M 219	0.00					Vacant					
12/31/11	HMM	M 243	0.00					Vacant					
11-Nov	KK	A4	1.00	1090001	S	35	14	Cu	Interlux Ultra (67)		OTH	9-Mar	67
11-Dec	KK	A8	0.85	1122534		34	12	Cu	Interlux Ultra (67)		OTH	10-Oct	40
11-Dec	KK	A26	0.90	951435	P	34	12	Cu	PROLINE 1088		DR	9-May	40
11-Jan	KK	B3	0.95	1154614	P	35	13	Cu	PROLINE 1088		DR	10-Mar	40
11-Oct	KK	D45	0.90	1120409	S	42	14	Cu	Interlux Ultra (67)		SI	10-May	67
11-Oct	KK	H12	0.90	1102966	P	37	13	Cu	proline 1088		DR	10-May	40
11-Oct	KK	H22	0.90	677166	P	42	14	Cu	proline 1088		DR	11-May	40
11-Oct	KK	H63	0.95	CF0310CJ	P	36	12	Cu	Interlux Ultra (67)		SI	7-May	67
11-Dec	KK	I30	0.75	914466	P	50	16	Cu	PROLINE 1088		KC	8-Aug	
11-Oct	KK	I38	0.75	972162	P	48	17	Cu	PROLINE 1088			SI	10-Apr
11-Dec	KK	I54	0.80	1185694	S	50	15.5	Cu	Interlux Ultra (67)		SI	8-Feb	67
11-Oct	KK	I68	0.90	1185391	S	47	14	Cu	trinidad vc		SI	10-Oct	70
11-Nov	KK	A5	0.75	102667	S	34	12	Cu	proline (67)		SI	8-Nov	67
11-Nov	KK	C45	0.75	198281	P	43	15	LCu	PETIT		OTH	9-Jun	25
11-Oct	KK	F27	1.00	1022910	S	55	14	LCu	seacoat		SI	9-Apr	33
11-Nov	KK	H5	0.80	NV6370KM	S	40	12	LCu	Sea Hawk Monterey		OTH	10-Mar	33
11-Dec	KK	I25	0.80	1222994	P	34	12	LCu	PETIT		DR	10-Dec	25
11-Sep	KK	G1	1.00	CF7195TK	P	31	8	Non-unconf	HYDRO HOIST				0
11-Sep	KK	G51	1.00	CF 7812 UB	P	29	9	Non-unconf	HYDRO HOIST				0
11-Oct	KK	A53	0.90	1046088	M	35	14	Non	INTERSLEEK		DR	10-May	0
	KK	A7	0.85	CF1472RG	S	30	10	UKN					
	KK	A9	1.00	1063316	S	30	12	UKN					
	KK	A10	1.00	CF3858SC	S	31	10	UKN					
	KK	A12	1.00	1026765	P	34	14	UKN					
	KK	A13	1.00	924326	S	30	14	UKN					
	KK	A15	1.00	907489	S	32	10	UKN					
	KK	A16	1.00	CF5808PS	P	30	9	UKN					
11-Jan	KK	A19	0.95	CF0552TP	M	34	15	UKN					
	KK	A22	1.00	CF9301HB	S	36	13	UKN					
	KK	A23	1.00	692959	P	39	13	UKN			SI	8-May	
	KK	A24	1.00	1068029	P	33	12	UKN					
	KK	A25	1.00		P	34	11	UKN					
11-Jan	KK	A27	0.95	1220557	S	35	12	UKN					
	KK	A28	1.00	937661	S	34	12	UKN					
	KK	A33	1.00	919750	P	33	13	UKN					
	KK	A34	1.00	CF 0257 HF	S	36	11	UKN					
11-Nov	KK	A36	0.90	1204719	S	36	11.5	UKN			KC	7-May	
	KK	A37	1.00	937661	S	32	11.5	UKN					
11-Sep	KK	A40	1.00	CF8733SZ	M	31	11	UKN		HYDRO HOIST			0
11-Jan	KK	A41	0.85	1180377	P	31	10.5	UKN					
	KK	A42	1.00	CF4008SA	P	34	12.5	UKN					
	KK	A44	1.00	107698	P	34	12	UKN					

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	KK	A45	1.00	CF1412CD	P	30	12	UKN					
11-Jan	KK	A46	0.70	980370	S	36	13	UKN					
	KK	A48	1.00	FL 8332 MJ	P	25	8	UKN					
	KK	A49	1.00	1095074	S	36	11.5	UKN					
	KK	A50	1.00	1147455	M	33	13	UKN					
	KK	A51	1.00	CF7877CR	S	34	11	UKN					
	KK	B2	1.00	951980	P	35	13	UKN					
	KK	B4	1.00	CF9374ER	P	38	13	UKN					
	KK	B5	1.00	CF8113KL	S	30	10.5	UKN					
	KK	B8	1.00		P	40	15	UKN					
	KK	B9	1.00	1012013	P	29	11	UKN					
	KK	B11	1.00		S	28	12	UKN					
11-Jan	KK	B12	0.95	1065215	P	35	14	UKN					
11-Jan	KK	B13	0.80	CF6622GD	S	30	10	UKN					
	KK	B15	1.00	CF 6757 GM	P	24	8	UKN					
	KK	B16	1.00	114263	P	43	14	UKN			KC	7-Aug	
	KK	B17	1.00	1217038	P	32	11	UKN					
	KK	B22	1.00	948523	S	40	13	UKN					
	KK	B23	1.00	CF7092JL	S	30	11	UKN					
	KK	B27	1.00	OR 613 ACS	S	25	8.5	UKN					
	KK	B30	1.00	CF 8646 CC	P	38	11	UKN					
	KK	B33	1.00	912700	P	30	10	UKN					
	KK	B36	1.00	CF 6243 HD	S	38	12.5	UKN					
	KK	B37	1.00	1215905	P	27	7	UKN					
11-Oct	KK	B40	1.00	682954	P	40	14	UKN			DR	10-Jun	
	KK	B42	1.00		P	34	13	UKN					
	KK	B43	1.00		S	32	10	UKN					
	KK	B44	1.00	1119692	S	38	14	UKN					
	KK	B45	1.00	992971	P	25	10	UKN					
	KK	B46	1.00	1164088	P	30	11	UKN					
11-Dec	KK	B51	0.95	CF7173EV	S	30	10	UKN					
	KK	B53	1.00	CF 2540 GH	S	30	11	UKN					
	KK	B55	1.00	CF1412CD	S	30	11	UKN					
11-Sep	KK	C2	1.00	925986	P	60	15.5	UKN		HYDRO HOIST			0
	KK	C3	1.00	1207194	P	42	14	UKN					
11-Jan	KK	C5	0.90	1102121	P	36	14	UKN					
	KK	C7	1.00		P	41	12	UKN					
	KK	C10	1.00	1144720	P	55	15	UKN					
	KK	C11	1.00	1129633	P	42	14.5	UKN					
11-Oct	KK	C12	0.95	1136020	P	60	15	UKN			OTH	9-May	
	KK	C13	1.00	615436	S	41	13	UKN					
	KK	C14	1.00	1177375	P	58	18	UKN					
	KK	C15	1.00	1108003	S	46	14	UKN					
	KK	C17	1.00	1113333	S	40	14	UKN					

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11-Nov	KK	C19	0.85	1204602	S	42	12.5	UKN			DR	10-Apr	
	KK	C20	1.00	7048253	S	54	16	UKN					
	KK	C21	1.00	112419	P	42	16	UKN					
	KK	C22	1.00	173375	P	53	15	UKN					
	KK	C24	1.00	1026054	P	57	15.5	UKN					
	KK	C25	1.00	519292	P	38	13	UKN					
	KK	C26	1.00		P	60	16	UKN					
11-Nov	KK	C27	1.00	CF8640SW	S	37	10.5	UKN			SI	8-May	
	KK	C28	1.00		P	50	15	UKN					
	KK	C29	1.00	592872	P	45	14	UKN					
	KK	C32	1.00	916238	P	58	18	UKN					
	KK	C33	1.00	945187	S	42	14	UKN					
	KK	C34	1.00	1212766	S	53	16	UKN					
11-Oct	KK	C36	0.90	917401	P	40	17	UKN			OTH	10-Jun	
	KK	C37	1.00	1095496	P	42	14	UKN					
	KK	C38	1.00		P	59	15	UKN					
	KK	C39	1.00	1151006	S	42	14	UKN					
11-Dec	KK	C40	0.75	106896	M	57	24	UKN			OTH	8-May	
	KK	C43	1.00	976864	P	42	13	UKN					
	KK	C47	1.00	CF9949GD	S	41	11	UKN					
	KK	D1	1.00	1195371	P	40	16	UKN					
	KK	D2	1.00		P	50	17	UKN					
	KK	D4	1.00	1052928	P	46	15	UKN					
	KK	D6	1.00	607557	P	50	14	UKN					
	KK	D8	1.00	102591	P	44	14	UKN					
	KK	D11	1.00		P	38	15	UKN					
	KK	D12	1.00	CF4199SX	H	46	16	UKN					
	KK	D13	1.00	1041396	S	43	14	UKN					
	KK	D14	1.00	972162	P	50	15	UKN					
	KK	D16	1.00	634972	P	50	15	UKN					
	KK	D18	1.00	645789	S	44	13	UKN					
11-Dec	KK	D19	0.95	1090001	S	38	12.5	UKN					
	KK	D20	1.00	1219511	P	48	15	UKN					
	KK	D21	1.00	1181668	S	40	11.5	UKN					
11-Jan	KK	D22	0.95	1034474	S	46	13	UKN					
	KK	D24	1.00		P	47	15	UKN					
	KK	D25	1.00	1091818	S	38	12	UKN					
	KK	D26	1.00	CF8768KT	P	43	15	UKN					
	KK	D28	1.00	1162899	P	42	14	UKN					
	KK	D29	1.00	1215048	P	45	14	UKN					
	KK	D30	1.00	937661	S	52	14	UKN					
	KK	D33	1.00	CF4474SA	S	42	10	UKN					
	KK	D34	1.00	1159085	S	42	13	UKN					
	KK	D35	1.00	1036078	P	43	13.5	UKN					

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	KK	D36	1.00	185405	P	47	14	UKN					
	KK	D37	1.00	1026097	S	40	13	UKN					
	KK	D38	1.00	1038697	P	47	14	UKN					
	KK	D39	1.00	1073954	S	36	11	UKN					
	KK	D40	1.00	1193032	P	50	17	UKN					
	KK	D41	1.00	CF9394EX	S	41	13	UKN					
	KK	D47	1.00	1172350	P	50	16	UKN					
	KK	E1	1.00	1183506	P	75		UKN					
	KK	E3	1.00		P	59	14.5	UKN					
	KK	E5	1.00	1216393	P	58	18	UKN					
	KK	E10	1.00	971912	P	98	23	UKN					
	KK	E11	1.00	1020228	P	57	16	UKN					
12-Jan	KK	E12	0.90	951645	S	70		UKN			OTH	9-Aug	
	KK	E13	1.00	1159705	P	60	15	UKN					
11-Nov	KK	E14	0.80	1143212	P	58	18	UKN			OTH	10-Aug	
	KK	E16	1.00	1220643	S	58	16	UKN					
	KK	E17	1.00	CF3251SN4	P	70	17	UKN					
	KK	E18	1.00	950857	P	52	15	UKN					
	KK	E19	1.00	261353	P	60	18	UKN					
	KK	E20	1.00	679765	P	44	16	UKN					
	KK	E21	1.00	1021287	P	55	17.5	UKN					
	KK	E24	1.00	1093898	S	85	20	UKN					
	KK	E25	1.00	1166859	P	55	17	UKN					
	KK	E26	1.00	950565	P	75	20	UKN					
	KK	E27	1.00	997106	P	74	18	UKN					
	KK	E28	1.00	273333	P	96	20	UKN					
	KK	E29	1.00	644393	P	60	12	UKN					
	KK	E31	1.00	1200446	P	55	13	UKN					
	KK	E34	1.00	1138828	P	80	20	UKN					
	KK	E35	1.00	674615	S	70	18	UKN					
	KK	E37	1.00	1069708	P	64	21	UKN					
	KK	F2	1.00		P	70	20	UKN					
	KK	F3	1.00	1229511	P	64	18	UKN					
	KK	F5	1.00	5822854	P	60	14	UKN					
	KK	F6	1.00	1032693	P	62	18	UKN					
	KK	F8	1.00	1215905	S	57	16.5	UKN					
	KK	F10	1.00	1076545	S	61	17	UKN					
	KK	F14	1.00	1050242	P	80	19	UKN					
	KK	F15	1.00	966881	P	48	16	UKN					
	KK	F16	1.00		P	70	19	UKN					
	KK	F20	1.00	1035689	P	57	17	UKN					
	KK	F21	1.00	1027584	S	56	15	UKN					
	KK	F22	1.00	1195570	P	57	18	UKN					
	KK	F23	1.00	1182095	P	50	14	UKN					

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	KK	F24	1.00	1187119	P	80	20	UKN					
	KK	F25	1.00	661494	S	47	13	UKN					
	KK	F26	1.00	5812	P	63	18	UKN					
	KK	F28	1.00	1021940	P	70	18.5	UKN					
	KK	F29	1.00		P	48	14	UKN					
	KK	F30	1.00	1230889	S	57	17	UKN					
	KK	F31	1.00		S	52	12	UKN					
	KK	F33	1.00	981739	P	43	14	UKN					
	KK	F35	1.00	1431	S	50	13	UKN					
	KK	F39	1.00	639448	S	49	14	UKN					
	KK	F41	1.00	CF1451KB	S	39	12	UKN					
	KK	G2	1.00	1117973	S	45	14	UKN					
	KK	G3	1.00	104765	P	35	9	UKN					
	KK	G5	1.00	CF0639FD	S	25	8	UKN					
	KK	G6	1.00	10271789	P	44	14	UKN					
	KK	G9	1.00		P	29	8	UKN					
	KK	G10	1.00	937189	P	45	15	UKN					
	KK	G13	1.00	924326	P	29	8	UKN					
	KK	G15	1.00	CF8589EX	P	30	12	UKN					
	KK	G17	1.00	1091185	P	28	9	UKN					
	KK	G21	1.00	CF1375FB	S	27	9	UKN					
	KK	G23	1.00	CF 3986 HX	P	36	11	UKN					
	KK	G25	1.00	CF1162BA	P	26	8	UKN					
	KK	G26	1.00	920199	P	44	12	UKN					
	KK	G29	1.00	1038810	P	34	12	UKN					
	KK	G30	1.00	970854	P	45	14	UKN					
	KK	G34	1.00	1035955	S	44	11	UKN					
	KK	G35	1.00	1043434	P	32	12	UKN					
	KK	G36	1.00	693931	P	45	15	UKN					
	KK	G37	1.00	CF3526SA	S	33	10	UKN					
	KK	G38	1.00	1171051	S	40	12	UKN					
	KK	G39	1.00	CF4165EF	S	25	6	UKN					
	KK	G41	1.00	CF8684PT	P	30	11	UKN					
	KK	G43	1.00	1180652	P	28	10	UKN					
	KK	G46	1.00	1227597	P	45	16	UKN					
	KK	G47	1.00	CF 3684 JA	P	28	10	UKN					
	KK	G49	1.00	1184836	P	30	10	UKN					
	KK	G52	1.00	1030322	P	45	14	UKN					
	KK	G53	1.00	CF0299PR	P	29	9.5	UKN					
	KK	G55	1.00	1169096	P	28	10	UKN					
	KK	G57	1.00	119032	P	34	11	UKN					
	KK	G58	1.00	1077029	P	40	14.5	UKN					
	KK	G61	1.00	1186984	P	31	10	UKN					
	KK	G62	1.00	655587	P	42	14	UKN					

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	KK	G65	1.00	CF4624HE	S	30	10	UKN					
	KK	G66	1.00	1073064		46	14.5	UKN					
	KK	G69	1.00	937661	P	35	13	UKN					
	KK	G70	1.00	1201411	P	44	14	UKN					
	KK	G73	1.00	980820	P	35	12	UKN					
	KK	G76	1.00	116845	P	45	14.5	UKN					
	KK	G79	1.00	1047795	S	30	11	UKN					
	KK	G80	1.00	1225979	P	45	15	UKN					
	KK	G81	1.00	677601	P	33	11	UKN					
11-Oct	KK	G85	0.95	920767	S	30	12	UKN			OTH	8-Aug	
	KK	G89	1.00	1034961	P	32	10	UKN					
	KK	G91	1.00	1147766	P	40	12	UKN					
	KK	H1	1.00	937661	M	40	15	UKN					
11-Oct	KK	H2	0.85	WN8530RB	P	34	12	UKN			OTH	9-Oct	
	KK	H4	1.00	541191	S	32	11	UKN					
	KK	H6	1.00	91073	P	41	12	UKN					
	KK	H7	1.00		S	40	12	UKN					
	KK	H10	1.00	663039	S	38	12	UKN					
	KK	H11	1.00	1133092	S	41	13.5	UKN					
	KK	H14	1.00	109772	S	36	11	UKN					
	KK	H16	1.00	982107		41		UKN					
	KK	H17	1.00		P	38	12	UKN					
	KK	H18	1.00		P	41	13	UKN					
	KK	H19	1.00	528866	P	38	14	UKN					
	KK	H23	1.00	519292	P	38	12	UKN					
	KK	H25	1.00	CF1647ST	P	38	12	UKN					
	KK	H29	1.00	1116818	S	37	13	UKN					
12-Jan	KK	H31	0.90	1192416	S	37	12	UKN			KC	10-Aug	
	KK	H33	1.00	694636	S	36	11	UKN					
	KK	H34	1.00	1192416	S	51	16	UKN					
	KK	H35	1.00		S	38	13	UKN					
	KK	H37	1.00	1103732	S	37	11.5	UKN					
	KK	H38	1.00	945453	S	49	14	UKN					
	KK	H40	1.00	CF6566GU	P	50	15	UKN					
	KK	H41	1.00	1117010	S	41	13	UKN					
	KK	H42	1.00	659832	P	51	17	UKN					
	KK	H43	1.00	1199135	P	36	14	UKN					
	KK	H44	1.00	CF7592NB	P	47	15	UKN					
	KK	H45	1.00	613899	P	38	12.5	UKN					
	KK	H46	1.00	688755	P	40	13	UKN					
	KK	H47	1.00	1179570	P	41	14	UKN					
	KK	H50	1.00	1229189	P	41	14	UKN					
	KK	H51	1.00		S	36	11.5	UKN					
	KK	H55	1.00	1032855	P	38	13	UKN					

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	KK	H56	1.00	1032855	S	42	14	UKN					
	KK	H58	1.00	1175147	S	38	13	UKN					
	KK	H61	1.00	CF0310CJ		37		UKN					
	KK	H62	1.00	903240	S	40	14	UKN					
	KK	H66	1.00	1193032	P	42	13	UKN					
	KK	H67	1.00	CF3904KT	P	39	13	UKN					
	KK	H70	1.00	1128622	P	40	14	UKN					
	KK	H72	1.00		S	38	12	UKN					
	KK	H73	1.00	1196201	P	36	13.5	UKN					
	KK	H74	1.00		S	36	12	UKN					
	KK	H76	1.00		P	40	11	UKN					
	KK	H77	1.00	CF5912HJ	S	42	13	UKN					
	KK	H80	1.00	1093852	P	45	14	UKN					
	KK	H81	1.00	1093852	S	36	12	UKN					
	KK	H83	1.00	1126098	S	35	11.5	UKN					
	KK	I4	1.00	122569	P	50	17	UKN					
	KK	I5	1.00	908258	P	48	14	UKN					
	KK	I6	1.00	1196710	P	48	16	UKN					
11-Dec	KK	I7	0.75	907651	S	49	15	UKN			DR	10-May	
	KK	I8	1.00	1223116	P	46	14	UKN					
11-Oct	KK	I10	0.75	1069798	S	49	14	UKN			DR	9-May	
	KK	I12	0.00		P	45	16	UKN					
	KK	I13	1.00	1119718	P	48	13	UKN					
	KK	I16	1.00	1177080	P	48	15	UKN					
	KK	I17	1.00	1127623	P	47	15	UKN					
	KK	I18	1.00	1152904	P	54	15	UKN					
	KK	I20	1.00	1057894	P	50	17	UKN					
	KK	I22	1.00	512706	P	50	16	UKN					
	KK	I23	1.00	1027487	S	34	12.5	UKN					
	KK	I24	1.00	694750	P	47	15	UKN					
	KK	I26	1.00	662230	P	45	14	UKN					
	KK	I27	1.00		P	34	9.5	UKN					
	KK	I28	1.00	682212	P	42	14	UKN					
	KK	I29	1.00	1133295	P	34	13	UKN					
	KK	I31	1.00	1074525	P	33	13	UKN					
	KK	I32	1.00	904645	P	40	15	UKN					
	KK	I33	1.00	1217415	S	34	12	UKN					
11-Dec	KK	I34	0.90	109059	P	45	14	UKN				DR	9-May
	KK	I35	1.00	CF2908EF	P	35	10	UKN					
	KK	I36	1.00	943572	P	44	17	UKN					
	KK	I37	1.00	937894	P	32	10	UKN					
	KK	I39	1.00	CF4506.HG	P	27	9	UKN					
	KK	I41	1.00		P	35	9	UKN					
	KK	I42	1.00	CF6992CU	P	47	13	UKN					

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	KK	I43	1.00		P	32	12	UKN					
	KK	I44	1.00	1195363	S	51	14	UKN					
	KK	I45	1.00	653489	S	35	12	UKN					
	KK	I46	1.00		P	48	15	UKN					
	KK	I47	1.00	1193032	S	34	12	UKN					
	KK	I48	1.00		S	48	15	UKN					
	KK	I49	1.00	1213226	P	26	9	UKN					
	KK	I52	1.00	1193564	S	48	15	UKN					
	KK	I56	1.00	1219517	P	44	16	UKN					
	KK	I57	1.00	1200768	P	49	15	UKN					
	KK	I58	1.00	1147460	P	52	15	UKN					
	KK	I59	1.00	1210275	P	50	13	UKN					
	KK	I61	1.00		P	46	14	UKN					
	KK	I62	1.00		P	47	15	UKN					
	KK	I63	1.00	1216619	P	50	16	UKN					
	KK	I65	1.00	1083403	P	43	17	UKN					
	KK	I66	1.00	1099886	P	50	16	UKN					
	KK	I67	1.00	1046834	P	40	15	UKN					
	KK	I70	1.00	508097	S	50	13	UKN					
11-Nov	KK	I72	0.80	955541	P	45	15	UKN			OTH	10-Dec	
11-Oct	KK	I73	0.90	1146511	P	48	15	UKN			KC	7-Oct	
	KK	I74	1.00	554241	P	40	17	UKN					
	KK	I76	1.00	933093	P	49	17	UKN					
	KK	I79	1.00	933093	P	48	15	UKN					
	KK	I81	0.00		P	41	14	UKN					
	KK	K2	1.00	982108		75	17	UKN					
	KK	K4	1.00	739127		115	21.5	UKN					
	KK	K5A	1.00			116	25	UKN					
	KK	C1	1.00			40		UKN					
	KK	H3	1.00			39		UKN					
	KK	I9	1.00			44		UKN					
	KK	A1	0.00					Vacant					
	KK	A2	0.00					Vacant					
	KK	A3	0.00					Vacant					
	KK	A6	0.00					Vacant					
	KK	A11	0.00					Vacant					
	KK	A17	0.00					Vacant					
	KK	A18	0.00					Vacant					
	KK	A20	0.00					Vacant					
	KK	A21	0.00					Vacant					
	KK	A29	0.00					Vacant					
	KK	A30	0.00					Vacant					
	KK	A31	0.00					Vacant					
	KK	A32	0.00					Vacant					



Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	KK	A35	0.00					Vacant					
	KK	A38	0.00					Vacant					
	KK	A39	0.00					Vacant					
	KK	A43	0.00					Vacant					
	KK	A47	0.00					Vacant					
	KK	B6	0.00					Vacant					
	KK	B7	0.00					Vacant					
	KK	B10	0.00					Vacant					
	KK	B14	0.00					Vacant					
	KK	B18	0.00					Vacant					
	KK	B19	0.00					Vacant					
	KK	B20	0.00					Vacant					
	KK	B21	0.00					Vacant					
	KK	B24	0.00					Vacant					
	KK	B25	0.00					Vacant					
	KK	B26	0.00					Vacant					
	KK	B28	0.00					Vacant					
	KK	B29	0.00					Vacant					
	KK	B31	0.00					Vacant					
	KK	B32	0.00					Vacant					
	KK	B34	0.00					Vacant					
	KK	B35	0.00					Vacant					
	KK	B38	0.00					Vacant					
	KK	B39	0.00					Vacant					
	KK	B41	0.00					Vacant					
	KK	B47	0.00					Vacant					
	KK	B49	0.00					Vacant					
	KK	C4	0.00					Vacant					
	KK	C6	0.00					Vacant					
	KK	C8	0.00					Vacant					
	KK	C9	0.00					Vacant					
	KK	C16	0.00					Vacant					
	KK	C18	0.00					Vacant					
	KK	C23	0.00					Vacant					
	KK	C30	0.00					Vacant					
	KK	C31	0.00					Vacant					
	KK	C35	0.00					Vacant					
	KK	C41	0.00					Vacant					
	KK	D3	0.00					Vacant					
	KK	D5	0.00					Vacant					
	KK	D7	0.00					Vacant					
	KK	D9	0.00					Vacant					
	KK	D10	0.00					Vacant					
	KK	D15	0.00					Vacant					

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	KK	D17	0.00					Vacant					
	KK	D23	0.00					Vacant					
	KK	D27	0.00					Vacant					
	KK	D31	0.00					Vacant					
	KK	D32	0.00					Vacant					
	KK	D43	0.00					Vacant					
	KK	D44	0.00					Vacant					
	KK	E2	0.00					Vacant					
	KK	E4	0.00					Vacant					
	KK	E6	0.00					Vacant					
	KK	E7	0.00					Vacant					
	KK	E8	0.00					Vacant					
	KK	E9	0.00					Vacant					
	KK	E15	0.00					Vacant					
	KK	E22	0.00					Vacant					
	KK	E23	0.00					Vacant					
	KK	E30	0.00					Vacant					
	KK	E32	0.00					Vacant					
	KK	E33	0.00					Vacant					
	KK	F1	0.00					Vacant					
	KK	F4	0.00					Vacant					
	KK	F7	0.00					Vacant					
	KK	F9	0.00					Vacant					
	KK	F11	0.00					Vacant					
	KK	F12	0.00					Vacant					
	KK	F13	0.00					Vacant					
	KK	F17	0.00					Vacant					
	KK	F18	0.00					Vacant					
	KK	F19	0.00					Vacant					
	KK	F32	0.00					Vacant					
	KK	F37	0.00					Vacant					
	KK	G4	0.00					Vacant					
	KK	G7	0.00					Vacant					
	KK	G8	0.00					Vacant					
	KK	G11	0.00					Vacant					
	KK	G12	0.00					Vacant					
	KK	G14	0.00					Vacant					
	KK	G16	0.00					Vacant					
	KK	G18	0.00					Vacant					
	KK	G19	0.00					Vacant					
	KK	G20	0.00					Vacant					
	KK	G22	0.00					Vacant					
	KK	G24	0.00					Vacant					
	KK	G27	0.00					Vacant					

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	KK	G28	0.00					Vacant					
	KK	G31	0.00					Vacant					
	KK	G32	0.00					Vacant					
	KK	G33	0.00					Vacant					
	KK	G40	0.00					Vacant					
	KK	G42	0.00					Vacant					
	KK	G44	0.00					Vacant					
	KK	G45	0.00					Vacant					
	KK	G48	0.00					Vacant					
	KK	G50	0.00					Vacant					
	KK	G54	0.00					Vacant					
	KK	G56	0.00					Vacant					
	KK	G59	0.00					Vacant					
	KK	G60	0.00					Vacant					
	KK	G63	0.00					Vacant					
	KK	G64	0.00					Vacant					
	KK	G67	0.00					Vacant					
	KK	G68	0.00					Vacant					
	KK	G71	0.00					Vacant					
	KK	G72	0.00					Vacant					
	KK	G74	0.00					Vacant					
	KK	G75	0.00					Vacant					
	KK	G77	0.00					Vacant					
	KK	G78	0.00					Vacant					
	KK	G83	0.00					Vacant					
	KK	H8	0.00					Vacant					
	KK	H9	0.00					Vacant					
	KK	H13	0.00					Vacant					
	KK	H15	0.00					Vacant					
	KK	H20	0.00					Vacant					
	KK	H21	0.00					Vacant					
	KK	H24	0.00					Vacant					
	KK	H26	0.00					Vacant					
	KK	H27	0.00					Vacant					
	KK	H28	0.00					Vacant					
	KK	H30	0.00					Vacant					
	KK	H32	0.00					Vacant					
	KK	H36	0.00					Vacant					
	KK	H39	0.00					Vacant					
	KK	H48	0.00					Vacant					
	KK	H49	0.00					Vacant					
	KK	H52	0.00					Vacant					
	KK	H53	0.00					Vacant					
	KK	H54	0.00					Vacant					

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
	KK	H57	0.00					Vacant					
	KK	H59	0.00					Vacant					
	KK	H60	0.00					Vacant					
	KK	H64	0.00					Vacant					
	KK	H65	0.00					Vacant					
	KK	H68	0.00					Vacant					
	KK	H69	0.00					Vacant					
	KK	H71	0.00					Vacant					
	KK	H75	0.00					Vacant					
	KK	H78	0.00					Vacant					
	KK	H79	0.00					Vacant					
	KK	I1	0.00					Vacant					
	KK	I2	0.00					Vacant					
	KK	I3	0.00					Vacant					
	KK	I11	0.00					Vacant					
	KK	I14	0.00					Vacant					
	KK	I15	0.00					Vacant					
	KK	I19	0.00					Vacant					
	KK	I21	0.00					Vacant					
	KK	I40	0.00					Vacant					
	KK	I50	0.00					Vacant					
	KK	I51	0.00					Vacant					
	KK	I53	0.00					Vacant					
	KK	I55	0.00					Vacant					
	KK	I60	0.00					Vacant					
	KK	I64	0.00					Vacant					
	KK	I69	0.00					Vacant					
	KK	I71	0.00					Vacant					
	KK	I75	0.00					Vacant					
	KK	I77	0.00					Vacant					
	KK	K1	0.00					Vacant					
	KK	K3	0.00					Vacant					
	KK	K5B	0.00					Vacant					
	KK	K6A	0.00					Vacant					
	KK	K6B	0.00					Vacant					
	KK	K7A	0.00					Vacant					
	KK	K7B	0.00					Vacant					
	KK	K8A	0.00					Vacant					
	KK	K8B	0.00					Vacant					
	KK	K13	0.00					Vacant					
	KK	K14	0.00					Vacant					
	KK	K15	0.00					Vacant					
	KK	K16	0.00					Vacant					
11-Oct	KK	A14	0.80	1110094	S	36	12	Non	Seahawk MISSIONB	4005	DR	10-May	0

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
11-Jan-11	LPYC	na	1.00	CF 2818 JY	P	15	7	Cu	Interlux Super KL	UKN	DR	2005	78%
11-Jan-11	LPYC	na	1.00	CF 3326 FP	P	22	8	Cu	Ultracote	UKN	Kohlerkraft	Jun-12	67%
11-Jan-11	LPYC	na	1.00	CF 1406 pk	P	21	8	Cu	Pettit B94	UKN	DR	Feb-09	UKN
11-Jan-11	LPYC	na	1.00	CF 6560 RB	P	18	8	Non	Sea Hawk Mission Bay	UKN	DR	Mar-12	non
12/30/2011	SDYC	915	0.90	536059	Alaskan	55	17	UKN			Shelter Island Bo	May-10	
12/30/2011	SDYC	A001-A001	0.90	CF 5798 KD	Wahoo			UKN					
12/30/2011	SDYC	A002-A002	0.90	1062584	Catamaran	38	20	Cu	Sharkskin - 7			Aug-10	45
12/30/2011	SDYC	A003-A003	0.90	953048	Stephens			UKN					
12/30/2011	SDYC	A004-A004	0.90	926183	Sea Ray	22	9' 6"	Lcu-ukn	Other		SD Boat Yard	Aug-07	28
12/30/2011	SDYC	A005-A005	0.90	603396	Pacific	48	15.9	Lcu-ukn	Other		Shelter Island Bo	Mar-10	10
12/30/2011	SDYC	A006-A006	0.90	CF 7543 EG	Finistere	38	11	Cu	Proline 1088 - 6		Driscoll	Dec-06	67.6
12/30/2011	SDYC	A007-A007	0.90	CF 5370 HS	Yawl	49	11.5	Cu	Interlux Ultra		Other	Jun-04	66.5
12/30/2011	SDYC	A008-A008	0.90	910795	Sportfisher	41' 9"	13	Cu	Interlux Ultra		Shelter Island Bo	Jul-10	66.5
12/30/2011	SDYC	A009-A009	0.90	1119938	Bavaria			UKN					
12/30/2011	SDYC	A010-A010	0.90	674801	Uniflite			UKN					
12/30/2011	SDYC	A011-A011	0.90	913622	Sportfisher	40.6	14	Cu	Proline 1088 - 6		Shelter Island Bo	Apr-11	67.6
12/30/2011	SDYC	A012-A012	0.90	1175145	Grady White	41	12	LCu	Interlux Aqua		Driscoll	Aug-10	35
12/30/2011	SDYC	A013-A013	0.80	284244	Catamaran	46	18.5	Cu	Trinidad -6			Dec-10	65
12/30/2011	SDYC	A014-A014	1.00					UKN					
12/30/2011	SDYC	A015-A015	1.00	1122975	Offshore	30	10	UKN	0				
12/30/2011	SDYC	A016-A016	0.90	914980	Tiara Cruis	48	15	Cu	Proline 1088 - 6		Knight Carver	Jul-11	67.6
12/30/2011	SDYC	A017-A017	0.90	2417		36	13	Cu	Trinidad - 6		Driscoll	Dec-10	65
12/30/2011	SDYC	A018-A018	0.90	1149203	Cruiser	43	13	Lcu-ukn	Other		Driscoll	Jun-10	19
12/30/2011	SDYC	A019-A019	0.90	1182944	Jeanneau	40	13.8	Cu	Bluewater		Driscoll		67
12/30/2011	SDYC	A020-A020	0.90	1102280	Maxim	42	13.5	Cu	Petit Z-Spar Protector		Driscoll	Jul-11	60
12/30/2011	SDYC	A021-A021	0.90	1045344	Pacific Sea	38	22	Non-unconf	Other		Driscoll	Apr-08	0
12/30/2011	SDYC	A022-A022	0.90		Sea Ray	32'10"	9'10"	Cu	Proline 1088 - 6		Shelter Island Bo	Feb-08	67.6
12/30/2011	SDYC	A023-A023	0.90	CF 8613 SZ	Beneteau	32.8	7.5	Cu	Other		Driscoll	Jul-10	58
12/30/2011	SDYC	A024-A024	0.90	CF 6724 KS	Cheetah	34	11.4	Lcu-ukn	Other		Driscoll	Feb-11	35
12/30/2011	SDYC	A025-A025	0.90	CF 1640 UH	Kettenberg	29	8.5	UKN					
12/30/2011	SDYC	A026-A026	0.90	1207403	Flying Tige	32	6.5	Cu	Proline 1088 - 6		Driscoll	Nov-08	67.6
12/30/2011	SDYC	A027-A027	0.90	997365	Hunter	32.8	9	Cu	Interlux Ultra		Koehler	Jan-10	66.5
12/30/2011	SDYC	A028-A028	0.90	CF 0904 RS	Bayliner			UKN					
12/30/2011	SDYC	A029-A029	0.90	1135341	Grand Ban	30	10	Cu	Interlux Ultra				66.5
12/30/2011	SDYC	A030-A030	0.90	CF 1490 SZ	Choate	36	12	Cu	Proline 1088 - 6		Shelter Island Bo	Oct-10	67.6
12/30/2011	SDYC	A031-A031	0.90	CF 7880 HV	Dencho	33	11'4"	Cu	Trinidad SR - 6			Jul-07	70.8
12/30/2011	SDYC	A032-A032	0.90	1199088	Flying Tiger			UKN					
12/30/2011	SDYC	A033-A033	0.90	CF 9932 HF	Catalina			UKN					
12/30/2011	SDYC	A034-A034	0.90	CF 2457 KG	Adhara	29' 11"	10' 10"	Cu	Bluewater		Driscoll	Jul-08	45
12/30/2011	SDYC	A035-A035	0.90	593155	Grand Banks			UKN					
12/30/2011	SDYC	A036-A036	0.90	CF 4136 FJ	Cal 29	32	11	Cu	Interlux Ultra		Shelter Island Bo	Jul-10	66.5
12/30/2011	SDYC	A037-A037	0.90	1209798	Protector	29	8.5	Cu	Interlux Ultra		Driscoll	Apr-09	66.5
12/30/2011	SDYC	A038-A038	0.85	CF 0354 UP	Pearson			UKN					

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
12/30/2011	SDYC	A039-A039	0.90	CF 7193 AX	PC			UKN					
12/30/2011	SDYC	A040-A040	0.90	CF 8845 FN	Ericson	33	8	Cu	Interlux Ultra		Knight Carver	2009	66.5
12/30/2011	SDYC	A041-A041	0.90	CF 4746 FP	Columbiay	32	12	Cu	Interlux Ultra		Driscoll	Nov-04	66.5
12/30/2011	SDYC	A042-A042	0.90	CF 8692 JS	Hunter	34	10.6	Cu	Proline 1088 - 6		Koehler	Jul-02	67.6
12/30/2011	SDYC	A043-A043	0.90	CF 3225 HD		30	11	Cu	Interlux Ultra		Shelter Island Bo	Dec-10	66.5
12/30/2011	SDYC	A044-A044	0.90	CF 1717 GJ	Cal Pearson			UKN					
12/30/2011	SDYC	A045-A045	0.90	CF 6793 UE	Kirby			UKN					
12/30/2011	SDYC	A046-A046	0.90	CF9832 UR	PC	30	10.3	Cu	Interlux Ultra		Knight Carver	Mar-10	66.5
12/30/2011	SDYC	A047-A047	0.90	1172104	J100			UKN					
12/30/2011	SDYC	A048-A048	0.90	1193792	Albin	33	9.3	Cu	Proline 1088 - 6		Shelter Island Bo	Jun-11	67.6
12/30/2011	SDYC	A049-A049	0.90	CF 9651 HB	Catalina	32	10	Cu	Petit Z-Spar Protector		Shelter Island Bo	Mar-10	60
12/30/2011	SDYC	A050-A050	0.90	CF 3276 UC	Bayliner			UKN					
12/30/2011	SDYC	A051-A051	0.90	CF 2541 PV		34	10.9	UKN			Koehler	May-11	
12/30/2011	SDYC	A052-A052	0.90					UKN					
12/30/2011	SDYC	A053-A053	0.90	N/A Herreshoff	Edey & Du	28	9.5	UKN	0				Percent
12/30/2011	SDYC	A054-A054	0.90	111422	Mediterranean			UKN					
12/30/2011	SDYC	B001-B001	0.90	1089942	Ventura	38	11.5	Non-unconf	Other		Marine Group Sc	Oct-10	0
12/30/2011	SDYC	B002-B002	0.90	567975	Noel Stroll	37	13	Cu	Interlux Ultra		Koehler	Jan-10	66.5
12/30/2011	SDYC	B003-B003	0.90	1160369	Pearson	34'8"	13.5	Cu	Interlux Ultra		Koehler	Jul-09	66.5
12/30/2011	SDYC	B004-B004	0.90	515206	Grand Ban	41.5	13	UKN			Shelter Island Bo	Mar-10	
12/30/2011	SDYC	B005-B005	0.90	CF 6507 KS	Grand Ban	45	13	Cu	Proline 1088 - 6		Shelter Island Bo	Sep-11	67.6
12/30/2011	SDYC	B006-B006	0.90	116297	J105			UKN					
12/30/2011	SDYC	B007-B007	0.90	650827	Bertram	4		UKN	0				
12/30/2011	SDYC	B008-B008	0.90	CF 7375 BA	Atkins Ingr	38	13	Cu	Interlux Ultra		Koehler	Apr-10	66.5
12/30/2011	SDYC	B009-B009	0.90	637740	Valient	37.5	12.5	UKN			Koehler	Mar-09	
12/30/2011	SDYC	B010-B010	0.90	1177943	Catalina	39.8	12.3	LCu	Calif Bottomkote - 7		Driscoll	Jan-11	35
12/30/2011	SDYC	B011-B011	0.90	ETY39104J586	Fairweather			UKN					
12/30/2011	SDYC	B012-B012	0.90	1156273	Beneteau	39	11	Non	Pacifica - 5		Koehler	Feb-10	0
12/30/2011	SDYC	B013-B013	0.90	1226874	Bayliner	37	12.3	Cu	Sharkskin - 7		Driscoll	May-08	45
12/30/2011	SDYC	B014-B014	0.90	CF 4509 DA	Sciomache	38	14	Cu	Bluewater		Shelter Island Bo	Aug-09	67
12/30/2011	SDYC	B015-B015	0.90	903868	Trollycraft	38	13	Cu	Interlux Ultra		Driscoll	Apr-05	66.5
12/30/2011	SDYC	B016-B016	0.90	CF 7203 CY	Kettenburg	44'8"	14'10"	Non-unconf	Other		Shelter Island Bo	Apr-08	0
12/30/2011	SDYC	B017-B017	0.90	987656	Kettenburg			UKN					
12/30/2011	SDYC	B018-B018	0.90	CF 1910 HX	C & C	41	10	Cu	Other		Driscoll	Mar-08	67
12/30/2011	SDYC	B019-B019	0.90	1130562	Riviera			UKN					
12/30/2011	SDYC	B020-B020	0.90	1138799	Palm Beac	41.1	14.1	UKN	Other		Shelter Island Bo	Jan-09	Percent
12/30/2011	SDYC	B021-B021	0.90	1094888	Riviera			UKN					
12/30/2011	SDYC	B022-B022	0.90	1042468	J120	39	14.5	Non-unconf	Other		Shelter Island Bo	Oct-09	0
12/30/2011	SDYC	B023-B023	0.90	940055	Grand Ban	40	12	Cu	Petit Z-Spar Protector		Knight Carver	May-10	60
12/30/2011	SDYC	B024-B024	0.90	1151374	J Boat	42	13'7"	UKN	Other		Driscoll	Jun-09	
12/30/2011	SDYC	B025-B025	0.90	1186644	J-105			UKN					
12/30/2011	SDYC	B026-B026	0.90	1223545	Meridian			UKN					
12/30/2011	SDYC	B027-B027	0.90	608952	Hatteras	36	12.5	Cu	Petit Z-Spar Protector		Driscoll	Jul-11	60
12/30/2011	SDYC	B028-B028	0.90	1215900	Custom	60	18	Cu	Interlux Ultra		SD Boat Yard	Jun-10	66.5

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12/30/2011	SDYC	B029-B029	0.90	677732	Knight & Carver			UKN					
12/30/2011	SDYC	B030-B030	0.75	1172754	West Bay	75	20	Cu	Interlux Ultra		Knight Carver	Jul-10	66.5
12/30/2011	SDYC	B031-B031	0.75	1170745	West Bay			UKN					
12/30/2011	SDYC	B032-B032	0.90	971544	Riva Motor	42	14	Cu	Proline 1088 - 6		Koehler	May-06	67.6
12/30/2011	SDYC	B033-B033	0.90	1138909	Riviera	65	18	Cu	Interlux Ultra		Knight Carver	Jul-10	66.5
12/30/2011	SDYC	B034-B034	0.80	1196741	Catalina	80	20	LCu	Micron Extra - 2		Driscoll	Apr-10	39
12/30/2011	SDYC	B035-B035	0.80	1120655				UKN					
12/30/2011	SDYC	B036-B036	0.90	1116040	Beneteau	70	20	Cu	Petit Z-Spar Protector		Driscoll	May-10	60
12/30/2011	SDYC	B037-B037	0.90	1130812	Beneteau			UKN					
12/30/2011	SDYC	B038-B038	0.80	1152049	Beneteau	47	16'	Cu	Trinidad Pro - 7		Driscoll	Oct-10	70.8
12/30/2011	SDYC	B039-B039	0.90	964346	Catalina			UKN					
12/30/2011	SDYC	B040-B040	0.90	1051154	Beneteau			UKN					
12/30/2011	SDYC	B041-B041	0.90	953896	Ocean Alexander			UKN					
12/30/2011	SDYC	B042-B042	0.90	935918	Kanter	41	13	Cu	Petit Z-Spar Protector		Shelter Island Bo	Jul-11	60
12/30/2011	SDYC	B043-B043	0.90	668762	Contest			UKN					
12/30/2011	SDYC	B045-B045	0.90	983952	Californian	45	13.9	Cu	Interlux Ultra		Shelter Island Bo	Apr-09	66.5
12/30/2011	SDYC	B046-B046	0.90	547865	Columbia			UKN					
12/30/2011	SDYC	B047-B047	0.90	1122614	Beneteau	46	13'9"	Cu	Proline 1088 - 6		Marine Group Sc	Mar-09	67.6
12/30/2011	SDYC	B048-B048	0.90	640289	Kelly Peterson			UKN					
12/30/2011	SDYC	B049-B049	0.85	1053510	Catalina			UKN					
12/30/2011	SDYC	B050-B050	0.90	1064524	Bayliner			UKN					
12/30/2011	SDYC	B051-B051	0.90	502873	Cal 48	47.7	14.9	Cu	Interlux Ultra		Shelter Island Bo	Apr-10	66.5
12/30/2011	SDYC	B052-B052	0.90	CF 5798 KD	Gulfstar	43	13	Non-unconf	Other		Shelter Island Bo	Aug-09	0
12/30/2011	SDYC	B053-B053	0.90	902700	Brewer	41'10"	13'10"	Cu	Interlux Ultra		Shelter Island Bo	Apr-11	66.5
12/30/2011	SDYC	B054-B054	0.90	986604	Hershine	47	15	LCu	Calif Bottomkote - 7		Driscoll	May-09	35
12/30/2011	SDYC	B055-B055	0.90	1121977	Tiara	48	12	Cu	Sharkskin - 7		Driscoll	Sep-06	45
12/30/2011	SDYC	B056-B056	0.90	CF 0660 SS	Ranger			UKN					
12/30/2011	SDYC	B057-B057	0.90	982412	Tollycraft	48	13	Lcu-ukn	Other		Shelter Island Bo	Apr-06	4
12/30/2011	SDYC	B058-B058	0.90			48	16	NON	Pacifica - 5		Shelter Island Bo	Dec-10	0
12/30/2011	SDYC	B059-B059	0.90			31	11	Lcu-ukn	Other		Driscoll	Feb-07	37
12/30/2011	SDYC	B060-B060	0.90			25	8	Cu	Seaguard - 2		Driscoll	Sep-09	60
12/30/2011	SDYC	B061-B061	0.90			48	15	LCu	Calif Bottomkote - 7		The Boat Yard	Oct-08	35
12/30/2011	SDYC	C001-C001	1.00					UKN					
12/30/2011	SDYC	C002-C002	1.00	CF 6407 PR	Catalina			UKN					
12/30/2011	SDYC	C003-C003	1.00	CF 8687 RM	Sun Track			UKN					
12/30/2011	SDYC	C004-C004	0.99	CF 4988 PE	Capri			UKN					
12/30/2011	SDYC	C005-C005	0.99	CF 0096 HJ	Catalina	23	8	Cu	Sharkskin - 7		Shelter Island Bo	Mar-08	45
12/30/2011	SDYC	C006-C006	0.90			25	8'6"	UKN			SD Boat Yard	2009	
12/30/2011	SDYC	C007-C007	0.90	CF 4533 NB	Runabout	29	8'6"	UKN					
12/30/2011	SDYC	C008-C008	0.90			22	6	Cu	Interlux K91		Driscoll	Mar-07	70
12/30/2011	SDYC	C009-C009	0.90	CF 4523 RC	Catalina	26.83	8.83	NON	Pacifica - 5		Shelter Island Bo	Jan-10	0
12/30/2011	SDYC	C010-C010	0.90	CF 2046 JW	Grady White			UKN					
12/30/2011	SDYC	C011-C011	0.90	CF 7767 EL	Cal 29	16	7.5	Cu	Interlux Ultra		Driscoll	Aug-09	66.5
12/30/2011	SDYC	C012-C012	0.99	940780	D.B. Marine			UKN					

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12/30/2011	SDYC	C013-C013	0.90	CF 0423 TY	Corsair	29	10	Cu	Proline 1088 - 6		Shelter Island Bo	Feb-06	67.6
12/30/2011	SDYC	C014-C014	0.90	CF 8365 ER	Catalina			UKN					
12/30/2011	SDYC	C015-C015	0.90	CF 3522SC	Boston Wh	29	9	Cu	Proline 1088 - 6		Driscoll	Dec-10	67.6
12/30/2011	SDYC	C016-C016	0.90	CF 5901 TZ	Cobia	30	6.11	Cu	Interlux Ultra		Koehler	Aug-11	66.5
12/30/2011	SDYC	C017-C017	0.90	CF 2577 SV	Century			UKN					
12/30/2011	SDYC	C018-C018	0.90	CF 7884 SR	Rayglass	27	9	Cu	Proline 1088 - 6		Shelter Island Bo	Jul-07	67.6
12/30/2011	SDYC	C019-C019	0.90	CF 0471 TP	Carolina Skiff			UKN					
12/30/2011	SDYC	C020-C020	0.90		Cobia	23	8	Cu	Proline 1088-6		Shelter Island Bo	Dec-11	67.6
12/30/2011	SDYC	C021-C021	0.90	CF 5478 DA		21	8	Cu	Petit Z-Spar Protector		Applicator	Aug-09	60
12/30/2011	SDYC	C022-C022	0.90	CF 0912 SN	Parker			UKN					
12/30/2011	SDYC	C023-C023	0.90	DL04176Z	Pathfinder	17		LCu	Trilux33 - 3		SD Boat Yard	Jan-10	24
12/30/2011	SDYC	C024-C024	0.90	CF 6886 KW	Luders	18	8	Cu	Interlux Ultra		Shelter Island Bo	Jul-11	66.5
12/30/2011	SDYC	C025-C025	0.90	CF 3889 RA	Duffy	21	8	Cu	Proline 1088 - 6			Apr-09	67.6
12/30/2011	SDYC	C026-C026	0.90	1223438	Boston Wh	23	8	Cu	Interlux Ultra		Shelter Island Bo	Feb-10	66.5
12/30/2011	SDYC	C027-C027	0.90	CF 4748 JW	Sea swirl	26	6	Cu	Interlux Ultra		Koehler	Oct-07	66.5
12/30/2011	SDYC	C028-C028	0.90	CF 2035 GC		30	8.5	UKN	0		Shelter Island Bo	Jun-11	
12/30/2011	SDYC	C029-C029	0.90	CF 4133 FJ	Cal 29	22	8	LCu	Trilux / Biolux - 3		Driscoll	Mar-09	24
12/30/2011	SDYC	C030-C030	0.90	CF 2431 RI	Everglade	21	8	Cu	Interlux Ultra		Driscoll Mission	May-10	66.5
12/30/2011	SDYC	C031-C031	0.90	CF 1474 UH	Contender	27	8	Cu	Trinidad Pro - 7		SD Boat Yard	May-08	70.8
12/30/2011	SDYC	C032-C032	0.90	CF 0582EZ	Catalina	29.3	9.3	Cu	Interlux Ultra		Driscoll	Dec-07	66.5
12/30/2011	SDYC	C033	0.90	CF 7373 NB	Grady Whit	27	8	LCu	Trilux33 - 3		Driscoll	Jun-10	24
12/30/2011	SDYC	C034-C034	0.90	1211945	Riviera	23	7.5	Cu	Interlux Ultra		Applicator	Nov-09	66.5
12/30/2011	SDYC	C035-C035	0.90	CF7700TG	Compass			UKN					
12/30/2011	SDYC	C036-C036	0.90	902828	Tillotson	22	8	Cu	ABC 3 - 2		Shelter Island Bo	Oct-06	45
12/30/2011	SDYC	C037-C037	0.90	1080461	Santa Cruz	27	9	Cu	Proline 1088 - 6		Shelter Island Bo	Jan-09	67.6
12/30/2011	SDYC	C038-C038	0.90	1080127	Tiara			UKN					
12/30/2011	SDYC	C039-C039	0.90	665405	Driscoll Au	65	18.4	Cu	Proline 1088 - 6		Knight Carver	Jun-07	67.6
12/30/2011	SDYC	C040-C040	0.90	1224149	Legacy 32			UKN					
12/30/2011	SDYC	C041-C041	0.90	CF 4008 SA	Calatina	53	14	Cu	Proline 1088 - 6		Shelter Island Bo	Jun-09	67.6
12/30/2011	SDYC	C042-C042	0.90	CF 0719 SN	Hernandez			UKN					
12/30/2011	SDYC	C043-C043	0.90	1210588	Flying Tige	47	10'6"	LCu	Micron Extra - 2		Driscoll	Jun-10	39
12/30/2011	SDYC	C044-C044	0.90	1038317	BHM Cruiser			UKN					
12/30/2011	SDYC	C045-C045	0.90	1158940	Meridian	36	8	UKN			Outside San Dieg	2010	
12/30/2011	SDYC	C046-C046	0.90	1212759	Legacy	38	11.5	Non-unconf	Other		Shelter Island Bo	Apr-08	0
12/30/2011	SDYC	C047-C047	0.90	1091221	Beneteau	33	10	LCu	Petit Vivid - 3		Driscoll	Jul-11	25
12/30/2011	SDYC	C048-C048	0.90	594605	Pacemaker	37	12	Cu	Proline 1088 - 6		Driscoll	2009	67.6
12/30/2011	SDYC	C049-C049	0.90	CF 5577 ER	Grand Ban	35	11.8	Cu	Proline 1088 - 6		Driscoll	Jan-07	67.6
12/30/2011	SDYC	C050-C050	0.90	960281	Catalina	32	12.4	Non-unconf	0		Shelter Island Bo	Jun-08	0
12/30/2011	SDYC	C051-C051	0.90	1173921	Beneteau	39	11	Cu	Micron66 - 2		Driscoll Mission	Apr-08	45
12/30/2011	SDYC	C052-C052	0.90	677815	Blackfish	40	13.9	Cu	Proline 1088 - 6		Shelter Island Bo	Jun-10	67.6
12/30/2011	SDYC	C053-C053	0.90	622012	Morgan	32	11'6"	Cu	Jotun - 3		Driscoll	Sep-09	45
12/30/2011	SDYC	C054-C054	0.90	1032868	Cassian-Cu	36	11.5	Cu	Sharkskin - 7		Driscoll	Jun-10	45
12/30/2011	SDYC	C055-C055	0.90	CF 7573 ET	Sport Fisher			UKN					
12/30/2011	SDYC	C056-C056	0.90	1175672	Catalina			UKN					



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12/30/2011	SDYC	C057-C057	0.90	CF 0382 FN	Irwin Competition			UKN					
12/30/2011	SDYC	C058-C058	0.90	572590	Jenson			UKN					
12/30/2011	SDYC	C059-C059	0.95	CF 2405 FL	Grand Banks			UKN					
12/30/2011	SDYC	C060-C060	0.90	1136296	Grand Banks			UKN					
12/30/2011	SDYC	C061-C061	0.90	1175979	Beneteau	37	12	Cu	Interlux Ultra		Driscoll	Sep-09	66.5
12/30/2011	SDYC	C062-C062	0.90	508761	Custom			UKN					
12/30/2011	SDYC	C063-C063	0.90	572923	Kettenburg	32	7	UKN					
12/30/2011	SDYC	C064-C064	0.90	916411	Back cove	36'10"	12'8"	Cu	Interlux Ultra		Shelter Island Bo	Nov-09	66.5
12/30/2011	SDYC	C065-C065	0.90	1207993	C & C	40	13	Lcu-ukn	0		Driscoll	May-09	37
12/30/2011	SDYC	C066-C066	0.90	977064				UKN					
12/30/2011	SDYC	C067-C067	0.90			64	18	LCu	Micron Extra - 2		Shelter Island Bo	2008	39
12/30/2011	SDYC	C068-C068	0.90	922076	Golden Sta	37	10.3	Cu	Proline 1088 - 6		Shelter Island Bo	Mar-10	67.6
12/30/2011	SDYC	C069-C069	0.90	1232197	Contender	39.3	12.5	Cu	Ultrakote - 6		Shelter Island Bo	Oct-09	76
12/30/2011	SDYC	C070-C070	0.99	1041414	Offshore			UKN					
12/30/2011	SDYC	C071-C071	0.99	283405	Calkins			UKN					
12/30/2011	SDYC	D001-D001	0.90	516065	Columbia	42	15	UKN			Driscoll	Jun-10	
12/30/2011	SDYC	D002-D002	0.90	940780	D.B. Marin	47.7	14	Cu	Interlux K91		Driscoll	Apr-07	70
12/30/2011	SDYC	D003-D003	0.90	618971	Grand Ban	52	15.5	Cu	Interlux Ultra		SD Boat Yard	May-10	66.5
12/30/2011	SDYC	D004-D004	0.90	1075048	Offshore			UKN					
12/30/2011	SDYC	D005-D005	0.90	1229535	Mikelson	50	12	Cu	Interlux Ultra		Koehler	May-08	66.5
12/30/2011	SDYC	D006-D006	0.90	976270	Catalina	42	13.6	Cu	Interlux Ultra		Koehler	Aug-11	66.5
12/30/2011	SDYC	D007-D007	0.90	1141997	Beneteau	42	13'7"	Cu	Proline 1088 - 6		Driscoll	Apr-11	67.6
12/30/2011	SDYC	D008-D008	0.90	1121548	Jeanneau	48	15	Cu	Interlux Ultra		Shelter Island Bo	Jul-10	66.5
12/30/2011	SDYC	D009-D009	0.90	1063619	J120	50	16	Cu	Proline 1088 - 6		Shelter Island Bo	Jun-10	67.6
12/30/2011	SDYC	D010-D010	0.90	1077077	J120	34	11'2"	LCu	SeaHawk AF33		Driscoll	Nov-10	33
12/30/2011	SDYC	D011-D011	0.90	1187620	Chris Craft	36	12	LCu	Calif Bottomkote - 7		Driscoll	Jan-09	35
12/30/2011	SDYC	D012-D012	0.90	CF 6071 FE	CHB	46.5	14'8"	Cu	Interlux Ultra		Shelter Island Bo	May-11	66.5
12/30/2011	SDYC	D013-D013	0.90	1177732	Meridian	40	12	Cu	Proline 1088 - 6		Shelter Island Bo	Jan-09	67.6
12/30/2011	SDYC	D014-D014	0.90	941332	Albin	40	12	Cu	Proline 1088 - 6		Shelter Island Bo	Feb-11	67.6
12/30/2011	SDYC	D015-D015	0.90	1183445	Meridian			UKN					
12/30/2011	SDYC	D016-D016	0.90	674165	Silverton			UKN					
12/30/2011	SDYC	D017-D017	0.90	1073732	J120			UKN					
12/30/2011	SDYC	D018-D018	0.90	1210278	Beneteau	49	15	Cu	Proline 1088 - 6		Shelter Island Bo	Jun-07	67.6
12/30/2011	SDYC	D019-D019	0.90	1111236	McConagh	47.7	14.4	Cu	Interlux Ultra		Driscoll Mission	Jun-06	66.5
12/30/2011	SDYC	D020-D020	0.90	967973	Grand Ban	41	15	Cu	Trinidad VOC - 6		Driscoll	Jun-09	65
12/30/2011	SDYC	D021-D021	0.90	1103307	Cabo			UKN					
12/30/2011	SDYC	D022-D022	0.90	1099273	Beneteau	49	14.6	Cu	Interlux Ultra		Shelter Island Bo	May-11	66.5
12/30/2011	SDYC	D023-D023	0.90	1152753	Farr 60 Slo	50.2	14.2	NON	Petit Vivid - 3		Shelter Island Bo	Aug-09	0
12/30/2011	SDYC	D024-D024	0.90	694784	Tanton	36	11	Cu	Interlux Ultra			Feb-10	66.5
12/30/2011	SDYC	D-025.5-D-025.5	0.90	1021137	West Bay S	41	14	Cu	Interlux Ultra		Driscoll Mission	Mar-09	66.5
12/30/2011	SDYC	D025-D025	0.90	925986	Ocean Alexander			UKN					
12/30/2011	SDYC	D026-D026	0.90	1173735	Long Rang	60	16.2	NON	Petit Vivid - 3		Driscoll Mission	Sep-09	0
12/30/2011	SDYC	D027-D027	0.90	1106520	DeFever	73	15	LCu	SeaHawk AF33		SD Boat Yard	Sep-10	33

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
12/30/2011	SDYC	D028-D028	0.90	277754		30	10'8"	UKN	0		Koehler	Apr-10	Percent
12/30/2011	SDYC	D029-D029	0.90	943587	Hatteras	70	17	Cu	Proline 1088 - 6		Nielsen Beaumont	Jan-06	67.6
12/30/2011	SDYC	D030-D030	0.90	530174	Caulkins			UKN					
12/30/2011	SDYC	D031-D031	0.95	349040	Alden			UKN					
12/30/2011	SDYC	D032-D032	0.90	980106	Ocean Alexander	52	14.3	Cu	Interlux Ultra		Koehler	May-10	66.5
12/30/2011	SDYC	D033-D033	0.90	501548	Kettenburg	48	16	Cu	Super KL - 6		Shelter Island Boatworks	Aug-08	70
12/30/2011	SDYC	D034-D034	0.90	1235856	Beneteau	50	12	Cu	Interlux Ultra		Koehler	Sep-10	66.5
12/30/2011	SDYC	D035-D035	0.90	CF 8723 KN	A & R Yawl			UKN					
12/30/2011	SDYC	D036-D036	0.90	CF 9509 OS	Transpac 4	40	14	NON	E-Paint - 10		Marine Group Services	May-09	0
12/30/2011	SDYC	D037-D037	0.90	1042489	Baltic	43	11	Cu	Interlux Ultra		Koehler	May-10	66.5
12/30/2011	SDYC	D038-D038	0.90	1031227	Kettenburg	40	12'5"	Cu	Interlux Ultra		Shelter Island Boatworks	Jul-11	66.5
12/30/2011	SDYC	D039-D039	0.90	CF 7138 AX	Kettenburg	50	9	Cu	Interlux Ultra		Koehler	Jun-08	66.5
12/30/2011	SDYC	D040-D040	0.90	998164	Swan			UKN					
12/30/2011	SDYC	D041-D041	0.90	1197808	Beneteau	43	13.8	Cu	Interlux Ultra		Shelter Island Boatworks	Jan-11	66.5
12/30/2011	SDYC	D042-D042	0.90	1139412	Beneteau			UKN					
12/30/2011	SDYC	D043-D043	0.90	930479	Kong and Halvorsen			UKN					
12/30/2011	SDYC	D044-D044	0.90	1025915	Offshore			UKN					
12/30/2011	SDYC	D045-D045	0.90	225805	Custom - E	17	6.5	UKN	0		Shelter Island Boatworks	Apr-07	
12/30/2011	SDYC	D046-D046	0.90	1202534	Norseman	41	13	NON	E-Paint - 10		Driscoll	May-09	0
12/30/2011	SDYC	D047-D047	0.90	902345	Grand Ban	44	14.5	UKN	0		Applicator	Mon-09	Percent
12/30/2011	SDYC	D048-D048	0.90	1176898	Bruckmann	48' 6"	11' 7"	Cu	Proline 1088 - 6		Driscoll	May-10	67.6
12/30/2011	SDYC	D049-D049	0.90	1037354	Kettenburg	48' 6"	15' 6"	Cu	Sharkskin - 7		Other	Jun-08	45
12/30/2011	SDYC	D050-D050	0.90			48	14	Cu	Interlux Ultra		Driscoll	Nov-10	66.5
12/30/2011	SDYC	D051-D051	0.90	1137915	Tiara	42	13.67	UKN			Shelter Island Boatworks	Jun-10	
12/30/2011	SDYC	D052-D052	0.90	651247	Contess	42	11	Non-unconf	Other		Driscoll	Oct-10	0
12/30/2011	SDYC	D053-D053	0.90	1202546	Hunter	46	9	Cu	0		Knight Carver	Dec-09	67
12/30/2011	SDYC	E002-E002	0.90	1038590	Jeanneau	40	13.6	Cu	Interlux Ultra		Driscoll	Jun-10	66.5
12/30/2011	SDYC	E003-E003	0.90	913766	Harbor 20	39	12	LCu	Calif Bottomkote - 7		Driscoll	Sep-10	35
12/30/2011	SDYC	E004-E004	0.90	520081	Sparkman	44' 7"	14' 3"	Cu	Ultrakote - 6		Shelter Island Boatworks	Dec-10	76
12/30/2011	SDYC	E005-E005	0.90	975152	Skye	49	16	Cu	Micron66 - 2		Driscoll Mission	Sep-10	45
12/30/2011	SDYC	E006-E006	0.90	991919	Ericson	36	13	Cu	Interlux Ultra		Shelter Island Boatworks	Apr-08	66.5
12/30/2011	SDYC	E007-E007	0.90	1111185	Beneteau	51	12.5	Cu	Trinidad - 6		Koehler	Nov-08	65
12/30/2011	SDYC	E008-E008	0.90	1194140	Jeanneau	50.7	14	Cu	Proline 1088 - 6		Shelter Island Boatworks	Apr-09	67.6
12/30/2011	SDYC	E009-E009	0.90	944329	Nova	35	12	Cu	Petit Z-Spar Protector		Driscoll	Feb-11	60
12/30/2011	SDYC	E010-E010	0.90	631060	Peterson	47	13	NON	Mission Bay - 5		Shelter Island Boatworks	Mar-11	0
12/30/2011	SDYC	E011-E011	0.90	505229	Cal 48	42'5"	13'6"	Cu	Interlux Ultra		Shelter Island Boatworks	Jun-06	66.5
12/30/2011	SDYC	E012-E012	0.90	692078	Kelly Peterson			UKN					
12/30/2011	SDYC	E013-E013	0.90	1104563	Pearson	44	13	Cu	Sharkskin - 7		Driscoll	Apr-08	45
12/30/2011	SDYC	E014-E014	0.90	CF 2107 HT	Frers 40	48	12	UKN			Shelter Island Boatworks	2011	
12/30/2011	SDYC	E015-E015	0.90	923129	Kettenburg			UKN					
12/30/2011	SDYC	E016-E016	0.90	907919	Tayana	43	13.5	Cu	0		Driscoll	Oct-09	76
12/30/2011	SDYC	E017-E017	0.90	680268	Catalina	30	10	LCu	Calif Bottomkote - 7		Driscoll	-09	35
12/30/2011	SDYC	E018-E018	0.90	1158054	Mariner	41	10.33	Cu	Ultrakote - 6		Koehler	Feb-07	76
12/30/2011	SDYC	E019-E019	0.90	1078104	J125	42	12.6	Cu	Petit Z-Spar Protector		Driscoll	Jan-11	60

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12/30/2011	SDYC	E020-E020	0.90	964346	Catalina	38	11	Cu	Proline 1088 - 6		Shelter Island Bo	Jul-08	67.6
12/30/2011	SDYC	E021-E021	0.90	1055757	Kurt Hughs			UKN					
12/30/2011	SDYC	E022-E022	0.90	973228	Denison	41	10.5	LCu	Petit Vivid - 3		SD Boat Yard	Mar-10	25
12/30/2011	SDYC	E023-E023	0.90	525755	Hatteras	42	13'10"	Cu	Proline 1088 - 6		Shelter Island Bo	Jun-10	67.6
12/30/2011	SDYC	E024-E024	0.90	1048549	Hylas			UKN					
12/30/2011	SDYC	E025-E025	0.90	548346	Custom			UKN					
12/30/2011	SDYC	E026-E026	0.90	1168598	East Bay	119	26	Cu	Interlux Ultra		Marine Group Sc	Apr-11	66.5
12/30/2011	SDYC	E027-E027	0.90	10116	Swan Aux	74	23	Cu	Proline 1088 - 6			Jul-10	67.6
12/30/2011	SDYC	E028-E028	0.90	1208125	Hatteras			UKN					
12/30/2011	SDYC	E029-E029	0.80	1123737	J160	79	15.3	Cu	Proline 1088 - 6		Nielsen Beaumo	Sep-08	67.6
12/30/2011	SDYC	E030-E030	0.90	692846	DeFever			UKN					
12/30/2011	SDYC	E031-E031	0.80	1051733	Californian	71	18	Lcu-ukn	Other		Nielsen Beaumo	Jul-08	1
12/30/2011	SDYC	E032-E032	0.80	CF 5940 AV	Stephen Bros			UKN					
12/30/2011	SDYC	E033-E033	0.90	936953	James Bet	52.8	14.5	UKN	0		Shelter Island Bo	Jul-10	
12/30/2011	SDYC	E034-E034	0.90	677539	Spindrift	64	18	Cu	Petit Z-Spar Protector		Driscoll	Apr-07	60
12/30/2011	SDYC	E035-E035	0.90	681915	Swan			UKN					
12/30/2011	SDYC	E036-E036	0.90	1146301	Catalina			UKN					
12/30/2011	SDYC	E037-E037	0.90	1086520	Formula	52	15	LCu	Trilux		Driscoll Mission	May-10	24
12/30/2011	SDYC	E038-E038	0.80	1206973	Grady White			UKN					
12/30/2011	SDYC	E039-E039	0.90	CF 7106 GZ	Cheoy Lee	57.1	16	Cu	Proline 1088 - 6		Shelter Island Bo	Apr-10	67.6
12/30/2011	SDYC	E040-E040	0.90	971500	Catalina			UKN					
12/30/2011	SDYC	E041-E041	0.90	CF 1640 UH	Sea Ray	38	8.5	NON	Pacifica Plus		Marine Group Sc	Dec-10	0
12/30/2011	SDYC	E042-E042	0.90	1150948	J109	33'6"	11'6"	Non-unconf	Other		SD Boat Yard	Jan-11	0
12/30/2011	SDYC	E043-E043	0.90	929434	Cal 36	35	11'6	LCu	Trilux33 - 3		Driscoll	Nov-09	24
12/30/2011	SDYC	E044-E044	0.90	1070730	Hinckley	36	12	Cu	Interlux Ultra		Shelter Island Bo	Mar-09	66.5
12/30/2011	SDYC	E045-E045	0.90	1181832	Riva	33	11	Cu	Trinidad Pro - 7		Shelter Island Bo	Jul-10	70.8
12/30/2011	SDYC	E046-E046	0.90	1085029	Pursuit	36	10	Cu			SD Boat Yard	Mar-06	40
12/30/2011	SDYC	E047-E047	0.90	570436	Ranger			UKN					
12/30/2011	SDYC	E048-E048	0.90	1138277	J105	36	10	Cu	Interlux Ultra		Driscoll	Aug-10	66.5
12/30/2011	SDYC	E049-E049	0.90	1038950	J105			UKN					
12/30/2011	SDYC	E050-E050	0.90	CF 5653 JF	Catalina			UKN					
12/30/2011	SDYC	E051-E051	0.90	583277	Peterson	33'2"	9'7"	Cu	Proline 1088 - 6		Shelter Island Bo	Aug-08	67.6
12/30/2011	SDYC	E052-E052	0.90	1023306	J105	34.5	11	Cu	Proline 1088 - 6		Driscoll	Aug-11	67.6
12/30/2011	SDYC	E053-E053	0.90	CF 4855 GH	Catalina 27	34.5	11	Cu	Interlux Ultra		Shelter Island Bo	Dec-10	66.5
12/30/2011	SDYC	E054-E054	0.90	1184621	Tiara	34	11	Lcu-ukn	Other		Marine Group Sc	Jun-05	10
12/30/2011	SDYC	E055-E055	0.90	1194549	J109			UKN					
12/30/2011	SDYC	E056-E056	0.90	1101127	Ericson	34.5	11	Non-unconf	Other		Driscoll	Feb-10	0
12/30/2011	SDYC	E057-E057	0.90	1182316	Sea Ray	26	7.4	Cu	Super KL - 6		Driscoll	May-10	70
12/30/2011	SDYC	E058-E058	0.90	CF 7622 PM	Boston Wh	35	12	Cu	Petit Z-Spar Protector		Driscoll	Oct-10	60
12/30/2011	SDYC	E059-E059	0.90	CF 2642 AU	PC			UKN					
12/30/2011	SDYC	E060-E060	0.90	CF 9934 AM	Hylas	35.5	11.3	Lcu-ukn	Other		SD Boat Yard	Jun-01	10
12/30/2011	SDYC	E061-E061	0.90			33	10.4	Cu	Other		SD Boat Yard	Jan-07	100
12/30/2011	SDYC	E062-E062	0.90	CF 0111 BB	Kettenburg	21	8'4"	Cu	Proline 1088 - 6		SD Boat Yard	Sep-10	67.6
12/30/2011	SDYC	E063-E063	0.90	CF 8517 AY	Kettenburg	31' 10"	6'8"	LCu	Trilux33 - 3		Applicator	Sep-10	24

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12/30/2011	SDYC	E064-E064	0.90	CF 9653 SB	Kettenburg	36	6	Cu	Interlux Ultra		Koehler	Aug-09	66.5
12/30/2011	SDYC	E066-E066	0.90	CF 1530 AT	Kettenburg	PC		UKN					
12/30/2011	SDYC	E067-E067	0.90	1158054	Kettenburg	31	7	Cu	0			Jan-09	66
12/30/2011	SDYC	E068-E068	0.90	CF 0891 BA	Kettenburg	32	6'8"	Cu	Interlux Ultra		Koehler	Jul-07	66.5
12/30/2011	SDYC	E069-E069	0.90	CF 5088 SS	Kettenburg	31	6	Cu	Interlux Ultra			Jul-10	66.5
12/30/2011	SDYC	E070-E070	0.90	CF 5401 AV	Kettenburg	32	6' 8"	Non-unconf	Other		Koehler	Jun-08	0
12/30/2011	SDYC	E071-E071	0.90	CF 3864 BE	Kettenburg	32	6	LCu	Petit Vivid - 3		Driscoll	2008	25
12/30/2011	SDYC	E072-E072	0.90	CF 7930 AY	Kettenburg	32	7	Non-unconf	Other		The Boat Yard	May-03	0
12/30/2011	SDYC	E073-E073	0.90	CF 0577 BI	Kettenburg	PC		UKN					
12/30/2011	SDYC	E074-E074	0.90	CF 8213 AS	Kettenburg	30	6.7	Cu	Trinidad - 6		Driscoll	Dec-08	65
12/30/2011	SDYC	E075-E075	0.90		Kettenburg	32	6	Cu	Interlux Ultra			Mar-08	66.5
12/30/2011	SDYC	E076 1/2-E076 1/2	0.90	CF 8119 AH	Kettenburg	32	6	Cu	Bluewater		Driscoll	Sep-09	45
12/30/2011	SDYC	E076-E076	0.90	CF 0100 BB	Kettenburg	PC		UKN					
12/30/2011	SDYC	E077-E077	0.90	CF 4906 AN	Kettenburg	PC		UKN					
12/30/2011	SDYC	E078 1/2-E078 1/2	0.90	CF 8480 KT	Hunter	31'6"	8	UKN			SD Boat Yard		
12/30/2011	SDYC	E078-E078	0.90	906663	Californian			UKN					
12/30/2011	SDYC	E079-E079	0.90	CF 2095 GN	Catalina	40	11	Cu	Other		Shelter Island Bo	May-07	70
12/30/2011	SDYC	E080-E080	0.90	1062718	Sabre Yacht			UKN					
12/30/2011	SDYC	E081-E081	0.90	997111	Catalina	34	13	LCu	Interlux Aqua		Shelter Island Bo	Jun-08	35
12/30/2011	SDYC	E082-E082	0.90	CF 1711 UH	Alerion Exp	30	10	Cu	Proline 1088 - 6		Shelter Island Bo	Mar-07	67.6
12/30/2011	SDYC	E083-E083	0.90	CF 0131 AV	Kettenburg	36	12.5	UKN			Driscoll	Sep-10	
12/30/2011	SDYC	E084-E084	0.90	641097	DeFever	42	13	Cu	Interlux Ultra		Driscoll	Aug-10	66.5
12/30/2011	SDYC	E085-E085	0.90			33	9	Cu	Trinidad SR - 6		SD Boat Yard		70.8
12/30/2011	SDYC	E086-E086	0.90					UKN					
12/30/2011	SDYC	E087-E087	0.90					UKN					
12/30/2011	SDYC	E088-E088	1.00	687314				UKN					
12/30/2011	SDYC	E089-E089	1.00	1082735	Elite			UKN					
12/30/2011	SDYC	E090-E090	1.00	CF 5419 GF	Peterson			UKN					
12/30/2011	SDYC	E091-E091	0.90	1097724	J32			UKN					
12/30/2011	SDYC	E092-E092	0.90	CF 4207 EF	Chris Com	32	10.5	Cu	Petit Z-Spar Protector		Knight Carver	Feb-10	60
12/30/2011	SDYC	E093-E093	0.90	975012	Grand Ban	33	10.4	Non-unconf	Other		SD Boat Yard	Jan-05	0
12/30/2011	SDYC	E094-E094	0.90	CF 4674 HG	Hunter	32	11	Lcu-ukn	Other		Driscoll	Feb-11	35
12/30/2011	SDYC	E095-E095	0.90	1094890	Hunter			UKN					
12/30/2011	SDYC	E096-E096	0.90	CF 3564 GK	Santana	36	12	UKN	0		Nielsen Beaumo	2007	
12/30/2011	SDYC	E097-E097	0.90	CF 0432 TY	J105			UKN					
12/30/2011	SDYC	E098-E098	0.90	CF 1640 UH	Flying Tige	32	11	UKN					
12/30/2011	SDYC	E099-E099	0.90	1117782	J105	35	11	NON	Mission Bay - 5		Shelter Island Bo	Jun-08	0
12/30/2011	SDYC	E100-E100	0.90	1024526	Grand Banks			UKN					
12/30/2011	SDYC	E101-E101	0.90	CF 1421 OV	J34	33	8	LCu	Petit Vivid - 3		Driscoll	Mar-09	25
12/30/2011	SDYC	E102-E102	0.90	572739	Cheoy Lee			UKN					
12/30/2011	SDYC	E103-E103	0.90	1118066	Hunter	32	11.5	LCu	Micron Extra - 2		Koehler	Apr-09	39
12/30/2011	SDYC	E104-E104	0.90	1071757	J105	34	10.5	UKN	Other			Sep-11	
12/30/2011	SDYC	E105-E105	0.90	1132393	J105	35	8'10"	Cu	Proline 1088 - 6		Shelter Island Bo	Apr-10	67.6

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12/30/2011	SDYC	E106-E106	0.90	CF 8119 AH				UKN					
12/30/2011	SDYC	E107-E107	0.90	1106845	J105	34.5	11	Cu	Interlux Ultra		Driscoll	Jan-09	66.5
12/30/2011	SDYC	E108-E108	0.90		Harbor 20			UKN					
12/30/2011	SDYC	E-110.5-E-110.5	0.90	907522	Tolly Craft			UKN					
12/30/2011	SDYC	E110-E110	0.90	CF 2564 SY	Intrepid	35	11	UKN	Other		Driscoll	May-11	
12/30/2011	SDYC	F001-F001	0.90	CF 2364 GJ	Cal	30	10-12?	UKN	Other		Driscoll	May-05	Percent
12/30/2011	SDYC	F002-F002	0.90	518465S	Ranger 33			UKN					
12/30/2011	SDYC	F003-F003	0.90	653584	C&C			UKN					
12/30/2011	SDYC	F004-F004	0.90	CF 2993 GU	Aphrodite Sloop			UKN					
12/30/2011	SDYC	F005-F005	0.90					UKN					
12/30/2011	SDYC	F006-F006	0.90	1068227	Tiara			UKN					
12/30/2011	SDYC	F007-F007	0.90	CF 9485 EL	Cheoy Lee			UKN					
12/30/2011	SDYC	F008-F008	0.90	CF 7686 HR	Ranger	29	10	Cu	Proline 1088 - 6		Driscoll	Aug-06	67.6
12/30/2011	SDYC	F009-F009	0.90	1190986	Sea Ray	32	11	Non-unconf	0		SD Boat Yard	Jan-95	0
12/30/2011	SDYC	F010-F010	0.90	1211432	Pro Sport			UKN					
12/30/2011	SDYC	F011-F011	0.90	698533	Trawler	32	11	Cu	Proline 1088 - 6		Other	May-09	67.6
12/30/2011	SDYC	F012-F012	0.90	CF 6925 PW	Duffy Herre	29	9'6"	UKN					
12/30/2011	SDYC	F013-F013	0.90					UKN					
12/30/2011	SDYC	F014-F014	0.90	1204076	Beneteau	30	8.5	Non-unconf	Other		Nielsen Beaumo	Jun-02	0
12/30/2011	SDYC	F015-F015	0.90	1194152	Tartan			UKN					
12/30/2011	SDYC	F017-F017	0.90	CF 8879 FT	Ericson	34.5	11'11"	Cu	Interlux Ultra		Shelter Island Bo	May-10	66.5
12/30/2011	SDYC	F018-F018	0.90	CF 2114 EG	Cal			UKN					
12/30/2011	SDYC	F019-F019	0.90	1228727	Ericson	34	10	LCu	Calif Bottomkote - 7		SD Boat Yard	Dec-09	35
12/30/2011	SDYC	F020-F020	0.90	1147246	J boats	32	12	UKN			Shelter Island Bo	Mar-10	
12/30/2011	SDYC	F021-F021	0.90	987372	Beneteau	36	11.5	Cu	Proline 1088 - 6		Shelter Island Bo	Feb-10	67.6
12/30/2011	SDYC	F022-F022	0.90	CF 2723 GC	Ranger	29	10.5	Cu	Petit Z-Spar Protector		Driscoll	May-11	60
12/30/2011	SDYC	F023-F023	0.90	1217040	Beneteau	33	8	Cu	Proline 1088 - 6		Driscoll	Jun-11	67.6
12/30/2011	SDYC	F024-F024	0.90	CF 5620 TX	J29	35'6"	11'5"	Cu	0			Sep-08	65
12/30/2011	SDYC	F025-F025	0.90	1077930	Nordic	29	9	NON	Petit Vivid - 3		SD Boat Yard	Mon-07	0
12/30/2011	SDYC	F026-F026	0.90	CF 9759 JL	Catalina			UKN					
12/30/2011	SDYC	F027-F027	0.90	CF 5918 HJ	Catalina	34	11	Lcu-ukn	0		Shelter Island Bo	Oct-10	2
12/30/2011	SDYC	F028-F028	0.90	1097707	Catalina	30	11.5	Cu	Proline 1088 - 6		Shelter Island Bo	Mar-11	67.6
12/30/2011	SDYC	F029-F029	0.90	CF 3835 SA	Sea Ray	36	11.9	Cu	Proline 1088 - 6		Shelter Island Bo	May-08	67.6
12/30/2011	SDYC	F030-F030	0.90	CF 1659 KB	Catalina	29'8"	11	Cu	Bluewater		Shelter Island Bo	Nov-08	50
12/30/2011	SDYC	F031-F031	0.90	CF 2639 SY	Young Bro	30	10.1	Cu	Interlux Ultra		Marine Group Sc	Sep-09	66.5
12/30/2011	SDYC	F032-F032	0.90	979413	Grand Ban	30	10	LCu	Calif Bottomkote - 7		Driscoll	May-09	35
12/30/2011	SDYC	F033-F033	0.90	663868	Sabre	32	11'6"	Cu	Interlux Ultra		Shelter Island Bo	Sep-10	66.5
12/30/2011	SDYC	F034-F034	0.90	CF 4647 RI	Caribe	28'5"	9'2"	Cu	Proline 1088 - 6		Shelter Island Bo	Aug-08	67.6
12/30/2011	SDYC	F035-F035	0.90	997299	Blackfin	22	8	Cu	Proline 1088 - 6		Driscoll	May-10	67.6
12/30/2011	SDYC	F036-F036	0.90	1188034		35	12	Non-unconf	Other		Shelter Island Bo	Aug-10	0
12/30/2011	SDYC	F037-F037	0.90	CF 5252 CE	Cal 28	29	10	Lcu-ukn	Other		Shelter Island Bo	Jun-09	10
12/30/2011	SDYC	F038-F038	0.90	CF 5901 HJ	Catalina	28	11.6	Cu	Interlux Ultra			Dec-04	66.5
12/30/2011	SDYC	F039-F039	0.90	CF 8866 RC	Glacier Bay	30	11	Cu	Super KL - 6		Shelter Island Bo	Jul-08	70

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
12/30/2011	SDYC	F040-F040	0.90	CF 0255 HF	Catalina	22	8	Cu	Interlux K91		Driscoll	Dec-09	70
12/30/2011	SDYC	F041-F041	0.90	CF 8257 TK	Santana	30	10'10"	Cu	Petit Z-Spar Protector		Driscoll	Jun-10	60
12/30/2011	SDYC	F042-F042	0.90	1135896	Corsair	30		UKN	0				Percent
12/30/2011	SDYC	F043-F043	0.90	CF 8679 PT	Shamrock	31	8	UKN					
12/30/2011	SDYC	F044-F044	0.90	1111530	J105			UKN					
12/30/2011	SDYC	F045-F045	0.90	CF 7091 JL	Catalina	34.5	11	Cu	Petit Z-Spar Protector		Driscoll	Oct-10	60
12/30/2011	SDYC	F046-F046	0.90	CF 3165 FG	Grand Banks			UKN					
12/30/2011	SDYC	F047-F047	0.90	CF 0950 HZ	Hunter	32	10-6	Cu	Interlux Ultra		Driscoll Mission	Sep-09	66.5
12/30/2011	SDYC	F048-F048	0.90	1159706	Santana	21	8.4	Cu	Interlux Ultra		Driscoll Mission	May-09	66.5
12/30/2011	SDYC	F049-F049	0.90	939399	Hatteras	35	11.9	UKN	Intersleek - 8		Driscoll	Jul-11	
12/30/2011	SDYC	F050-F050	0.90	CF 7332 JB	Catalina	32	12	UKN	Other		SD Boat Yard	Mon-ar	Percent
12/30/2011	SDYC	F051-F051	0.90	CF 1235 RJ	Edgewater	29'11"	10'10"	Cu	Proline 1088 - 6		Shelter Island Bo	Feb-10	67.6
12/30/2011	SDYC	F052-F052	0.90	1082827	Grady Whit	56	15.52	UKN	Other		Driscoll	Oct-08	Percent
12/30/2011	SDYC	F053-F053	0.90	622656	Ocean	30	11	Cu	Proline 1088 - 6		Shelter Island Bo	Oct-07	67.6
12/30/2011	SDYC	F054-F054	0.90	1106745	West Bay	40	14	LCu	Calif Bottomkote - 7		Driscoll	Apr-10	35
12/30/2011	SDYC	F055-F055	0.90	1175141	Hanse	45	15	UKN	Other		Driscoll	Feb-10	Percent
12/30/2011	SDYC	F056-F056	0.90					UKN					
12/30/2011	SDYC	F058-F058	0.90	1123616	Islander			UKN					
12/30/2011	SDYC	F059-F059	0.90	1096898	Bayliner	48	7	LCu	SeaHawk AF33		Driscoll	Apr-09	33
12/30/2011	SDYC	F060-F060	0.90	CF 0973 BA	Kettenburg	38	8	UKN	0		Koehler	Aug-07	Percent
12/30/2011	SDYC	F061-F061	0.90	1077494	Ericson	40	12	Cu	Petit Z-Spar Protector		Driscoll	Aug-10	60
12/30/2011	SDYC	F062-F062	0.90	933619	Roughwater	36	11.8	Cu	Interlux K91		Koehler	Mar-09	70
12/30/2011	SDYC	F063-F063	0.90	1222872	Mikelson	59	18	Cu	Proline 1088 - 6		Shelter Island Bo	Jul-11	67.6
12/30/2011	SDYC	F064-F064	0.90	1189440	Hylas 49	49	14	Cu	Interlux Ultra			Oct-09	66.5
12/30/2011	SDYC	F065-F065	0.90	OR 812 ACF	Tiara	35'7"	11'7"	Cu	Proline 1088 - 6		Shelter Island Bo	Jul-09	67.6
12/30/2011	SDYC	F066-F066	0.90	1143089	Catalina	42	12	Cu	Petit Z-Spar Protector		Shelter Island Bo	Mar-09	60
12/30/2011	SDYC	F067-F067	0.90	1112886	San Juan			UKN					
12/30/2011	SDYC	F068-F068	0.90	994410	Grand Ban	37'	12'8"	Cu	0		Driscoll	Dec-07	65
12/30/2011	SDYC	F069-F069	0.90	508787	Cal 40	40	10'8"	Cu	Trinidad SR - 6		Driscoll	Jul-11	70.8
12/30/2011	SDYC	F070-F070	0.90	CF 7318 NA	Catalina	34	12	Cu	Proline 1088 - 6		Shelter Island Bo	Mar-09	67.6
12/30/2011	SDYC	F071-F071	0.90	1046303	Beneteau	39	12	NON	Pacifica - 5		Shelter Island Bo	2009	0
12/30/2011	SDYC	F072-F072	0.90	CF 8662 SW	Grand Ban	36	12	Cu	Trinidad SR - 6		SD Boat Yard	Jul-09	70.8
12/30/2011	SDYC	F073-F073	0.90	CF 9686 HE	Hunter			UKN					
12/30/2011	SDYC	F074-F074	0.90	697057	Newport 4	41	12'10"	Cu	Proline 1088 - 6		Shelter Island Bo	Apr-07	67.6
12/30/2011	SDYC	F075-F075	0.90	1152313	Philbrook	40	14	Cu	Interlux Ultra		Driscoll	May-09	66.5
12/30/2011	SDYC	F076-F076	0.90	1226911	Back Cove	35	11.33	Non-unconf	0		Driscoll	Mar-10	0
12/30/2011	SDYC	F077-F077	0.90	1152302	Beneteau	39.2	12	Cu	Ultrakote - 6		Driscoll	Jan-10	76
12/30/2011	SDYC	F078-F078	0.90	1120510	Beneteau	39.6	12.3	Cu	Super KL - 6		Driscoll	Feb-10	70
12/30/2011	SDYC	F079-F079	0.90	1024891	Ocean Alex	38	13	Cu	Bluewater		Driscoll	Mar-10	45
12/30/2011	SDYC	F080-F080	0.90	1102464	Beneteau	39.4	12.1	LCu	Petit Vivid - 3		Driscoll	May-08	25
12/30/2011	SDYC	F081-F081	0.90	1210284		39	12'10"	Cu	Proline 1088 - 6		Shelter Island Bo	Aug-10	67.6
12/30/2011	SDYC	F082-F082	0.90	CF 3521 GS	Charles Dic	38	12	Cu	Proline 1088 - 6		Driscoll Mission	Mar-09	67.6
12/30/2011	SDYC	F083-F083	0.90	1092002	Beneteau	38	14	Cu	Proline 1088 - 6		Driscoll	Jan-11	67.6
12/30/2011	SDYC	F084-F084	0.90	CF 3349 CW	Cal 36 by J	35.5	10.33	Cu	Interlux Ultra		Driscoll	Jan-07	66.5

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
12/30/2011	SDYC	F085-F085	0.90	653700	Ericson	29'10"	10	Cu	Proline 1088 - 6		Shelter Island Bo	Nov-07	67.6
12/30/2011	SDYC	F086-F086	0.90	CF 8884 SW	Chris Craft	38	11;4"	Lcu-ukn			Driscoll	Dec-11	4
12/30/2011	SDYC	F087-F087	0.90	937787	Californian			UKN					
12/30/2011	SDYC	G001-G001	0.90	CF 8308 GS	Tillitson Pearson			UKN					
12/30/2011	SDYC	G002-G002	0.90	1185859	Tillitson Pe	30	11	Cu	Sharkskin - 7		Driscoll	Apr-07	45
12/30/2011	SDYC	G003-G003	0.90	1167509	Beneteau	34'6"	11	LCu	Petit Vivid - 3		Driscoll Mission	Jul-10	25
12/30/2011	SDYC	G004-G004	0.90	911190	Doug Peterson			UKN					
12/30/2011	SDYC	G005-G005	0.90	CF 8139 TA	Soverel			UKN					
12/30/2011	SDYC	G006-G006	0.90	1053719	Tiara	33	11	Cu	0		Driscoll	Nov-10	58
12/30/2011	SDYC	G007-G007	0.90	CF 2370 CJ	Cal 20			UKN					
12/30/2011	SDYC	G008-G008	0.90	CF 5670 NW	Boston Wh	20	7	NON	Pacifica Plus		Shelter Island Bo	Mar-10	0
12/30/2011	SDYC	G009-G009	0.90	CF 3650 K	Duffy	17	5	Non-unconf	0		Driscoll	Feb-02	0
12/30/2011	SDYC	G010-G010	0.90	CF 3377 JE	Boston Wh	18	6	Cu	Petit Z-Spar Protector		Driscoll	2011	60
12/30/2011	SDYC	G011-G011	0.90	CF 4586 NB	Beneteau	17	6.2	Cu	Interlux Ultra		Shelter Island Bo	Jul-10	66.5
12/30/2011	SDYC	G012-G012	0.90	CF 1758	Seacraft	34.3	11.5	Cu	Interlux Ultra		Shelter Island Bo	Feb-11	66.5
12/30/2011	SDYC	G013-G013	0.90	CF 4624 NB	Boston Wh	21	7	Cu			Shelter Island Bo	Sep-09	67
12/30/2011	SDYC	G014-G014	0.90	CF 7767 RJ	Chaparral			UKN					
12/30/2011	SDYC	G015-G015	0.90	CF 3730 KN	Duffy	20	8'4"	Lcu-ukn	Other		SD Boat Yard	Jan-11	20
12/30/2011	SDYC	G016-G016	0.90	CF 2773 SY	Chris Craft			UKN					
12/30/2011	SDYC	G017-G017	0.90	CF 6564 RB	Boston Wh	17	6	Cu	Trinidad SR - 6			May-09	70.8
12/30/2011	SDYC	G018-G018	0.90	CF 4142HR	Duffi (Elect	17	7.1	Cu	Interlux Ultra		Shelter Island Bo	Sep-11	66.5
12/30/2011	SDYC	G019-G019	0.90	CF 7976 BR	Cal 20	18	5	Cu	Proline 1088 - 6		SD Boat Yard	Jun-09	67.6
12/30/2011	SDYC	G020-G020	0.90	CF 1445 NY	Grady White			UKN					
12/30/2011	SDYC	G021	0.90	1021048	Mikelson	18	7	Cu	Super KL - 6		Driscoll Mission	Jul-06	70
12/30/2011	SDYC	G022-G022	0.90	CF 2100 BB	Abeking &	50	16.5	Cu	Proline 1088 - 6		SD Boat Yard	Nov-07	67.6
12/30/2011	SDYC	G023-G023	0.90	971674	Angel	59	10	LCu	Petit Vivid - 3		Knight Carver	2009	25
12/30/2011	SDYC	G024-G024	0.90	1169431	Offshore	50	15' 5"	Cu	Proline 1088 - 6		Shelter Island Bo	Nov-10	67.6
12/30/2011	SDYC	G025-G025	0.90	1130766	Transpac 5	58	16	Cu	Super KL - 6		Shelter Island Bo	Sep-10	70
12/30/2011	SDYC	G026-G026	0.90	1117785	Nordhavn	52	13'6"	Lcu-ukn			Nielsen Beaumo	May-08	10
12/30/2011	SDYC	G027-G027	0.90	1079626	Bayliner			UKN					
12/30/2011	SDYC	G028-G028	0.90	1141235	Hylas	54	15	Cu	Proline 1088 - 6		Shelter Island Bo	Nov-10	67.6
12/30/2011	SDYC	G029-G029	0.90	928524	Transworld	54	16	Cu	Super KL - 6		Shelter Island Bo	Nov-08	70
12/30/2011	SDYC	G030-G030	0.90	1053956	Cal Yachts	38	10	LCu	SeaHawk AF33		Driscoll	Sep-08	33
12/30/2011	SDYC	G031-G031	0.90	CF 6610 AX	Kettenburg	35	11	Cu	Interlux Ultra		Shelter Island Bo	May-10	66.5
12/30/2011	SDYC	G032-G032	0.90	956166	Pacemake	38	8	LCu	Petit Vivid - 3		Driscoll	Dec-10	25
12/30/2011	SDYC	G033-G033	0.90	CF 6396 AW	Kettenburg PC			UKN					
12/30/2011	SDYC	G034-G034	0.90	934376	Ericson			UKN					
12/30/2011	SDYC	G035-G035	0.90	CF 2594 SP	Cape Cod	35	10	LCu	SeaHawk AF33		Driscoll	Sep-08	33
12/30/2011	SDYC	G036-G036	0.90	CF 4566 TZ	Chris Craft			UKN					
12/30/2011	SDYC	G037-G037	0.90	910191	Wauquiez	28	11.5	Cu	Interlux Ultra		Koehler	Nov-09	66.5
12/30/2011	SDYC	G038-G038	0.90	1188356	Chaparral			UKN					
12/30/2011	SDYC	G039-G039	0.90	656956	Deeds	37	12	Lcu-ukn	Other		Other	Feb-09	38
12/30/2011	SDYC	G040-G040	0.90	CF 2852 GU	DeFever	39	11.9	Cu	Proline 1088 - 6		SD Boat Yard	Jul-95	67.6
12/30/2011	SDYC	G041-G041	0.90	1040355	Custom	48	15	Cu	Sharkskin - 7		Driscoll	Apr-06	45

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12/30/2011	SDYC	G042-G042	0.95					UKN					
12/30/2011	SDYC	G044-G044	0.90	1147248	Navigator	52	15	Cu	Proline 1088 - 6		Nielsen Beaumont	May-08	67.6
12/30/2011	SDYC	G045-G045	0.90	942038	Marlineer	44	16	LCu	SeaHawk AF33		Driscoll Mission	Oct-08	33
12/30/2011	SDYC	G046-G046	0.90	1217481	Transpac 5	52	13	Lcu-ukn	Other		Shelter Island Boat	Dec-10	25
12/30/2011	SDYC	G047-G047	0.90	CF 7782 ND	Offshore	48	14.6	Cu	Interlux Ultra		Shelter Island Boat	Jul-10	66.5
12/30/2011	SDYC	G048-G048	0.90	1022236	Hatteras	44	12	LCu	Interlux Aqua		Other	Apr-11	35
12/30/2011	SDYC	G049-G049	0.90	CF 1845 HZ	Morri & Pa	47	12'6"	Cu	Interlux Ultra		Shelter Island Boat	Dec-09	66.5
12/30/2011	SDYC	G050-G050	0.90	*Netherlands Doc	Bavaria	46		Lcu-ukn	Other		Driscoll	May-08	5
12/30/2011	SDYC	G051-G051	0.90	1048570	Lien HWA	47	14'11"	Cu	Bluewater		Shelter Island Boat	Feb-10	45
12/30/2011	SDYC	G052-G052	0.90	1095755	Beneteau	35	12.6	NON	Pacifica - 5		Shelter Island Boat	Sep-09	0
12/30/2011	SDYC	G053-G053	0.90	1173014	Beneteau	47	14	Cu	Interlux K91		Driscoll	Jan-10	70
12/30/2011	SDYC	G054-G054	0.90	661472	Nautor	42	13	Cu	Proline 1088 - 6		Shelter Island Boat	Sep-10	67.6
12/30/2011	SDYC	G055-G055	0.90	959578	Island Pack	35	12	UKN	0		Shelter Island Boat Yard		Percent
12/30/2011	SDYC	G056-G056	0.90	1034965	Roughwater			UKN					
12/30/2011	SDYC	G057-G057	0.90	1217030	Sea Ray S	40	12	Cu	Proline 1088 - 6		Shelter Island Boat Yard		67.6
12/30/2011	SDYC	G058-G058	0.90	1120448	Beneteau	48	14.5	Lcu-ukn	Other		Driscoll	Jun-09	20
12/30/2011	SDYC	G059-G059	0.90	1054231	CHB	48	15	UKN	Other		Shelter Island Boat	Mar-09	Percent
12/30/2011	SDYC	G060-G060	0.90	1043147	Bertram			UKN					
12/30/2011	SDYC	H001-H001	0.90	1209638	Riviera	50	16	Cu	Interlux Ultra		Shelter Island Boat	Dec-10	66.5
12/30/2011	SDYC	H002-H002	0.90	1231971	Sea Ray S	51	14.8	LCu	Calif Bottomkote - 7		Driscoll	Apr-09	35
12/30/2011	SDYC	H003-H003	0.90	615464	DeFever	43	14	Lcu-ukn	Other		SD Boat Yard	Jan-06	10
12/30/2011	SDYC	H004-H004	0.90	1100247	J Boat			UKN					
12/30/2011	SDYC	H005-H005	0.90	972833	Nordhavn	46	15.5	UKN			Shelter Island Boat	Sep-09	
12/30/2011	SDYC	H006-H006	0.85	1024700	J120	40	12	Cu	Interlux Ultra		Driscoll	Sep-09	66.5
12/30/2011	SDYC	H007-H007	0.90	669444	Amel			UKN					
12/30/2011	SDYC	H008-H008	0.90	1091378	Catalina	36	11.9	Cu	Interlux Ultra		Shelter Island Boat	Jan-11	66.5
12/30/2011	SDYC	H009-H009	0.90	610797	Kettenburg	52	13	Cu	Interlux Ultra		Driscoll	Oct-09	66.5
12/30/2011	SDYC	H010-H010	0.90	962333	Tolly Craft	39	12.5	Cu	Sharkskin - 7		Driscoll	May-10	45
12/30/2011	SDYC	H011-H011	0.90	1080447	Hatteras	39	13.7	Cu	Interlux Ultra		Shelter Island Boat	Jul-10	66.5
12/30/2011	SDYC	H012-H012	0.90	510146	Cal	40	12	Cu	Ultrakote - 6		Shelter Island Boat	Aug-09	76
12/30/2011	SDYC	H013-H013	0.90	962486	Bayliner	38	13.5	Cu	Other		Driscoll	Apr-03	45
12/30/2011	SDYC	H014-H014	0.90	1083073	Olympic Ac	47	14	Cu	Proline 1088 - 6		Shelter Island Boat	Jun-07	67.6
12/30/2011	SDYC	H015-H015	0.90	CF 8655 GM	Albin	38	15	Cu	Proline 1088 - 6		Shelter Island Boat	Jun-10	67.6
12/30/2011	SDYC	H016-H016	0.90	1208775	Jeanneau	36	12	Cu	Interlux Ultra		Shelter Island Boat	Jun-10	66.5
12/30/2011	SDYC	H017-H017	0.90	997332	Taswell	43	13.7	Cu	Proline 1088 - 6		Shelter Island Boat	Jan-09	67.6
12/30/2011	SDYC	H018-H018	0.90	1106522	J120	40	12	Cu	Proline 1088 - 6		Shelter Island Boat	Jan-09	67.6
12/30/2011	SDYC	H019-H019	0.90	CF 1130 JD	New York 3	36	9	UKN	Other		Shelter Island Boat	Feb-07	
12/30/2011	SDYC	H020-H020	0.90	1109702	Fleming	60'9"	16	NON	Pacifica - 5		Shelter Island Boat	Mar-09	0
12/30/2011	SDYC	H021-H021	0.90	1131732	Catalina	42	14	Cu	Super KL - 6		Outside San Diego	Nov-07	70
12/30/2011	SDYC	H022-H022	0.90	1208872	Sabre			UKN					
12/30/2011	SDYC	H024-H024	0.90			30	10	Non-unconf	Other			Jul-04	0
12/30/2011	SDYC	H025-H025	0.90	1079060	Pilot	29	S	UKN	Other		Shelter Island Boat	2008	
12/30/2011	SDYC	H026-H026	0.90	1101126	Sea Eagle			UKN					
12/30/2011	SDYC	H027-H027	0.90	1082038	Mainship Cruiser			UKN					



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12/30/2011	SDYC	H028-H028	0.90	CF 5904 HJ	Catalina	27	9	Cu	Proline 1088 - 6		Shelter Island Bo	Oct-07	67.6
12/30/2011	SDYC	H029-H029	0.90	CF 2408 GE	Catalina	32.8	6.5	Cu	Interlux Ultra		Koehler	Jun-10	66.5
12/30/2011	SDYC	H030-H030	0.90	1096449	Kettenburg	48		Cu	Interlux Ultra		Driscoll	Jan-11	66.5
12/30/2011	SDYC	H031-H031	0.90	1096449	Trojan Cruiser			UKN					
12/30/2011	SDYC	H032-H032	0.90	1080087	Sea Ray			UKN					
12/30/2011	SDYC	H033-H033	0.90	CF 0232 EJ	Cal 29 Jensen			UKN					
12/30/2011	SDYC	H034-H034	0.90	CF 7472 HV	Freedom	36	12	LCu	Interlux Aqua		Shelter Island Bo	Feb-11	35
12/30/2011	SDYC	H035-H035	0.90	923302	Catalina	34.5	11	Cu	Interlux Ultra		Shelter Island Bo	Jul-10	66.5
12/30/2011	SDYC	H036-H036	0.90	1111938	J105			UKN					
12/30/2011	SDYC	H037-H037	0.90	1074740				UKN					
12/30/2011	SDYC	H038-H038	0.90	1065803	J120	42	13	Cu	Petit Z-Spar Protector		Driscoll	Aug-11	60
12/30/2011	SDYC	H039-H039	0.90	CF 2743 KL	Catalina	37	9	Cu	Interlux Ultra		Koehler	Apr-09	66.5
12/30/2011	SDYC	H040-H040	0.90	CF 7701 GY	Bayliner	42	14	Cu	Petit Z-Spar Protector		Driscoll	Oct-10	60
12/30/2011	SDYC	H041-H041	0.90	1116122	Catalina	39	12	Cu	Sharkskin - 7		Shelter Island Bo	Jul-09	45
12/30/2011	SDYC	H042-H042	0.90	1146194	Packet Cra	32	11.5	Cu	Interlux Ultra		Koehler	Apr-09	66.5
12/30/2011	SDYC	H043-H043	0.90	698533	Grand Ban	40	13	Cu	Interlux Ultra		Shelter Island Bo	May-09	66.5
12/30/2011	SDYC	H044-H044	0.90	1043839	Catalina	37	10'10"	Cu	Interlux Ultra		Shelter Island Bo	Apr-09	66.5
12/30/2011	SDYC	H045-H045	0.90	907329	Pacific Sea	38	13	Cu	Bluewater		Shelter Island Bo	Jan-10	45
12/30/2011	SDYC	H046-H046	0.90	1130542	Grand Banks			UKN					
12/30/2011	SDYC	H047-H047	0.90	1045777	Hunter	35	12	Non-unconf	Other		SD Boat Yard	Dec-95	0
12/30/2011	SDYC	H048-H048	0.90	1124504	J105			UKN					
12/30/2011	SDYC	H049-H049	0.90	CF 9784 NC	Sport Craft	38	12'6"	Cu	Petit Z-Spar Protector		Driscoll	May-10	60
12/30/2011	SDYC	H050-H050	0.90	1098253	Newport	44	15	Non-unconf	Other		SD Boat Yard	Apr-09	0
12/30/2011	SDYC	I001-I001	0.90	530911	Pacific	28	18	UKN			Driscoll	Aug-10	
12/30/2011	SDYC	I002-I002	0.90	1142786	Corsair Trimaran			UKN					
12/30/2011	SDYC	I003-I003	0.90	CF 3640 RH	Trophy			UKN					
12/30/2011	SDYC	I004-I004	0.90	CF 1841 PF	Bayliner			UKN					
12/30/2011	SDYC	I005-I005	0.90	CF 1693 RJ	Cuddy	22	7	Cu	Sharkskin - 7		Driscoll	Jul-10	45
12/30/2011	SDYC	I006-I006	0.90	CF 4021 RB	Sea Pro	19	6	Cu	Interlux Ultra		Marine Group Sc	Sep-10	66.5
12/30/2011	SDYC	I007-I007	0.90	CF 1184 ND	Wellcraft	22.6	8.5	Cu	Bluewater		Shelter Island Bo	Jul-09	67
12/30/2011	SDYC	I008-I008	0.90	CF 0760 SN	Crownline	18		UKN	0		Driscoll	Jan-09	Percent
12/30/2011	SDYC	I009-I009	0.90	CF 8032 SW	Stringari			UKN					
12/30/2011	SDYC	I010-I010	0.90	CF 2507 RS	Robalo	30	9'6'	LCu	Micron Extra - 2		Driscoll	Mar-10	39
12/30/2011	SDYC	I011-I011	0.80	CF 9013 TK	Hunter			UKN					
12/30/2011	SDYC	I012-I012	0.90	CF 2254 SG	Columbia			UKN					
12/30/2011	SDYC	I014-I014	0.90	CF 3479 JG	Hunter	25	8	LCu	Calif Bottomkote - 7		Driscoll	Jan-10	35
12/30/2011	SDYC	I015-I015	0.90	CF 9211 SU	Harbor 20	29	8	LCu	Interlux Aqua		Driscoll	Jan-02	35
12/30/2011	SDYC	I016-I016	0.90	CF 2086 CW	Cal Jensen	19	7	UKN			Driscoll	Feb-08	
12/30/2011	SDYC	I017-I017	0.90	9016986	Cal 2-29			UKN					
12/30/2011	SDYC	I018-I018	0.90	CF 0129 NV	Grady Whit	25	8	Cu	Trinidad - 6			Sep-05	65
12/30/2011	SDYC	I019-I019	0.90	CF 1943 PF	Bayliner	24' 7"	9' 2"	Cu	Trinidad - 6		Nielsen Beaumo	Nov-06	65
12/30/2011	SDYC	I020-I020	0.90	CF 9027 FL	Cal 25 Jen	28	9.5	LCu	Trilux33 - 3		Knight Carver	Aug-09	24
12/30/2011	SDYC	I021-I021	0.90	CF 4987 KT	Capri			UKN					
12/30/2011	SDYC	I022-I022	0.90	CF 6152 PW	Bayliner	29	9.3	Cu	Interlux K91		Outside San Dieg	Jun-09	70

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12/30/2011	SDYC	I023-I023	0.90	CF 4206 SX	Apex			UKN					
12/30/2011	SDYC	I024-I024	0.90	CF 4736 FW	Ca 29 Jensen Marine			UKN					
12/30/2011	SDYC	I025-I025	0.90	CF 6574 ET	Ranger 26	47'7"	14'9"	LCu	VC17 - 8		SD Boat Yard	Jan-05	20.35
12/30/2011	SDYC	I026-I026	0.90	CF 0186 PG	Boston Wh	17	5	Cu	Proline 1088 - 6			Jul-09	67.6
12/30/2011	SDYC	I027-I027	0.90					UKN					
12/30/2011	SDYC	I028-I028	0.90	CF 9202 KD	Laser 28	28	9.5	UKN	Cerakote - 8			Mar-10	
12/30/2011	SDYC	I029-I029	0.90	CF 4564 SJ	Hobie	33	8	Cu	Sharkskin - 7		Driscoll	May-08	45
12/30/2011	SDYC	I030-I030	0.90	1152837	Catamaran	39	23	Cu	Trinidad SR - 6		Driscoll	Sep-09	70.8
	SGYC	A10	0.00	1173359				Vacant					
	SGYC	A18	0.00	CF1229FA				Vacant					
	SGYC	C11	0.00	983208	S			Vacant					
	SGYC	D10	0.00	900508				Vacant					
	SGYC	E11	0.00	535237	S			Vacant					
	SGYC	F04	0.00	1086743				Vacant					
	SGYC	F14	0.00	CF8668GM	S			Vacant					
	SGYC	F17	0.00	CF2030JV	P			Vacant					
	SGYC	G13	0.00	CF6857JE	S			Vacant					
	SGYC	H09	0.00	CF3106HC				Vacant					
12/9/2011	SGYC	A08	0.95	CF4535UH	S	28	11	Cu	INTERLUX	ULTRA	SI	12/2010	66
11/12/2011	SGYC	A20	0.40	CF3565HL	P	28	9.5	Cu	PROLINE	1088	KC	04/2009	67
11/11/2011	SGYC	B16	1.00	CF2821SY	S	22	8	Cu	TRINIDAD	1877	KC	08/2008	70
12/8/2011	SGYC	C03	1.00	CF3920FS	S	30	10	UKN	UKN	UKN	UKN	UKN	UKN
12/12/2011	SGYC	C08	0.95	CF2082GN	S	34	11.5	Cu	PROLINE	1033	SI	01/2011	67
11/15/2011	SGYC	C12	0.90	1086408	S	36	11.11	Cu	PROLINE	1088	SI	09/2007	30
11/14/2011	SGYC	C13	0.99	1227809	S	26.6	9.3	Cu	TRINIDAD	SR BLUE	OTH	06/2007	70
11/13/2011	SGYC	C14	0.95	1100276	S	36	12	Cu	INTERLUX	UKN	UKN	UKN	66
12/21/2011	SGYC	C18	1.00	1029959	S	34	11	Cu	PROLINE	1088	UKN	03/2009	67
11/29/2011	SGYC	D02	0.90	958348	S	33	12.6	Cu	BLUEWATER	PROCATE	SI	09/2009	67
12/14/2011	SGYC	D04	0.90	1204058	S	38.5	12.11	Cu	PROLINE	1088	SI	06/2007	30
12/3/2011	SGYC	D07	0.90	1109596	S	31	10.6	Cu	PROLINE	1088	SI	1/2009	67
12/2/2011	SGYC	D08	1.00	1191896	P	35	11.5	Cu	INTERLUX ULTRA	UKN	SI	08/2011	67
12/5/2011	SGYC	D09	0.94	CF1994HZ	S	30	10	Cu	INTERLUX	UKN	SI	06/2010	55
12/5/2011	SGYC	D11	1.00	CF210BL	S	26	9.5	UKN	PETIT	UKN	OTH	11/2010	UKN
12/14/2011	SGYC	D15	1.00	CF4986FF	S	30	10	Cu	PROLINE	1088	SI	05/2007	30
12/15/2011	SGYC	E07	0.80	CF334FL	S	40	12	Cu	PROLINE	1088	KC	06/2008	30
11/19/2011	SGYC	E10	0.85	1037051	S	45	12	Cu	PROLINE	1088	SI	06/2007	30
12/18/2011	SGYC	E13	1.00	979321	S	35	11	UKN	UKN	UKN	UKN	UKN	UKN
11/16/2011	SGYC	E14	0.80	1204753	S	42	13	Cu	INTERLUX	YBA140	DR	04/2010	45
12/14/2011	SGYC	E19	0.85	CF4731GG	S	42	12.5	Cu	PROLINE	1088	SI	06/2007	30
11/13/2011	SGYC	E20	0.95	576781	S	43	14	Cu	PROLINE	1088	UKN	UKN	67
12/14/2011	SGYC	F02	0.90	1102447	S	36	12.5	Cu	INTERLUX		SI	06/2011	66
11/12/2011	SGYC	F03	0.90	991292	S	34	11.9	Cu	PROLINE	1088	SI	07/2009	67
12/14/2011	SGYC	F05	0.90	993616	S	34	10	Cu	PROLINE	1088	SI	03/2008	30
11/15/2011	SGYC	F06	0.83	578895	S	37	10	Cu	PROLINE	1088	UKN	12/2010	67

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12/23/2011	SGYC	F09	1.00	1061589	S	43	12	UKN	PETIT VIVID	UKN	SI	01/2010	UKN
12/13/2011	SGYC	F15	1.00	CF14142BL	S	37	6	Cu	PROLINE	1088	SI	11/2010	67
12/14/2011	SGYC	F22	0.85	611232	S	35.5		Cu	TRINIDAD	UKN	SI	09/2008	70
12/7/2011	SGYC	G02	0.99	978635	S	42	15	Cu	INTERLUX	UKN	SI	11/2011	67
11/11/2011	SGYC	G03	0.95	1028449	S	42.5	12.5	Cu	PROLINE	1088	SI	04/2011	63
12/14/2011	SGYC	G04	0.95	288467	S	40		Cu	PETIT	UNK	SI	06/2011	55
11/11/2011	SGYC	G05	0.95	931776	P	42	13.7	Cu	PROLINE	1088	DR	02/2011	67
12/14/2011	SGYC	G06	0.75	641206	S	43		Cu	PROLINE	1088	SI	03/2009	67
11/22/2011	SGYC	G07	0.20	1063201	S	40	6	Cu	PROLINE	1088	SI	07/2008	30
12/14/2011	SGYC	G11	1.00	619140	S	36	11.4	Cu	PROLINE	1088	KK	06/2007	30
12/14/2011	SGYC	G15	0.95	664729	S	38	12.5	Cu	PETTE TRINIDAD	UKN	SI	05/2011	72
11/19/2011	SGYC	G17	0.95	1020713	P	42	15	Cu	PROLINE	1088	SI	09/2011	67
11/16/2011	SGYC	G18	1.00	961860	S	43	12.9	Cu	TRINIDAD	UKN	KC	02/2007	70
12/2/2011	SGYC	H01	0.85	1026666	S	36	12.5	Cu	PROLINE	1088	SI	01/2008	30
12/15/2011	SGYC	H03	1.00	1031551	P	42	14	UKN	UKN	UKN	UKN	UKN	UKN
11/12/2011	SGYC	H04	0.85	1107150	P	50	15.8	Cu	PROLINE	1088	SI	03/2010	67
11/13/2011	SGYC	H05	1.00	646273	S	39.8	12.8	Cu	INTERLUX	UKN	SI	06/2010	67
12/6/2011	SGYC	H06	0.99	CF8644NR	S	42	13.8	Cu	PROLINE	1088	SI	06/2008	30
11/14/2011	SGYC	H15	0.90	595942	S	33	11	Cu	PROLINE	1088	UKN	UKN	67
12/1/2011	SGYC	H18	1.00	CF3142CN	S	37	10.1	Cu	PROLINE	1088	SI	11/2011	67
12/14/2011	SGYC	F11	0.95	297422	S	43	10.5	Cu	PROLINE	1088	UKN	03/2006	30
11/14/2011	SGYC	A02	0.95	CF3288SM	S	32	9	Lcu-ukn	UKN	UKN	UKN	06/2006	30
11/26/2011	SGYC	A04	0.90	CF0719SN	S	32	10.5	Lcu-ukn	UKN	UKN	SI	05/2008	30
12/2/2011	SGYC	A12	0.90	CF6415PR	S	28	9	Lcu-ukn	UKN	UKN	DR	09/2008	30
11/16/2011	SGYC	A22	1.00	AZ6418AH	S	28.7	9.3	Lcu-ukn	UKN	UKN	DR	08/2008	30
12/2/2011	SGYC	B02	0.70	CF3541KA	S	25	9	Lcu-ukn	UKN	UKN	SI	05/2007	30
11/19/2011	SGYC	B06	0.90	9369GF	S	30	10.1	LCu	CERAKOTE	M99	SI	12/2008	30
11/27/2011	SGYC	B18	0.85	6807JG	S	30	10.1	Lcu-ukn	UKN	UKN	SI	06/2008	30
12/14/2011	SGYC	C02	0.99	CF1470FX	S	35	9	Lcu-ukn	UKN	UKN	SI	11/2007	30
12/16/2011	SGYC	C04	1.00	1150454	S	38	12	Lcu-ukn	UNK	UKN	SI	03/2008	30
11/19/2011	SGYC	C06	1.00	1034601	S	36	11.2	Lcu-ukn	UKN	UKN	DR	10/2004	30
11/15/2011	SGYC	C07	0.80	CF4200GX	S	30	10.6	Lcu-ukn	UKN	UKN	SI	06/2007	30
11/11/2011	SGYC	C09	0.95	CF9328RK	S	32	12	Lcu-ukn	UKN	UKN	UKN	5/2008	30
11/23/2011	SGYC	C10	0.99	CF0558GM	S	30	10	LCu	INTERLUX	CSC	SI	UKN	37
11/15/2011	SGYC	C20	0.99	CF9760JL	S	34		Lcu-ukn	UKN	UKN	UKN	06/2005	30
12/14/2011	SGYC	C21	1.00	651978	S	30	9	LCu	INTERLUX	UNK	SI	01/2007	30
12/14/2011	SGYC	D01	1.00	CF2716ST	P	28	10	Lcu-ukn	UKN	UKN	UKN	02/2008	30
12/17/2011	SGYC	D03	0.95	CF5429HR	S	30	10	LCu	INTERLUX	UNK	SI	05/2006	30
12/14/2011	SGYC	D13	1.00	CF7856CG	S	25		Lcu-ukn	UNK	UNK	SI	11/2007	30
11/19/2011	SGYC	D16	1.00	CF3192ER	S	34	10	Lcu-ukn	UNK	UNK	SI	06/2003	30
11/11/2011	SGYC	D17	0.85	8323611	P	30	10	Lcu-ukn	UNK	UNK	UKN	UKN	0
12/14/2011	SGYC	D20	0.90	667195	S	34		Lcu-ukn	UNK	UNK	SI	05/2008	30
11/22/2011	SGYC	D21	0.99	CF1154GN	S	34	10	LCu	BLUEWATER	PROCATE	KC	12/2008	30

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12/4/2011	SGYC	E03	0.90	950902	S	44	14	LCu	CAL BOTTOM KOTE	UKN	SI	10/2010	33
12/14/2011	SGYC	E06	0.99	923010	S	43	15	LCu	PETIT	UKN	SI	03/2006	30
12/2/2011	SGYC	E08	0.80	1125745	S	42	13.1	Lcu-ukn	UKN	U	UKN	01/2008	30
11/11/2011	SGYC	E09	0.70	100974	S	46	14	Lcu-ukn	UKN	UKN	UKN	05/2008	30
12/15/2011	SGYC	E12	0.90	903011	S	35.7	11.5	Lcu-ukn	UKN	UKN	KC	10/2008	30
11/25/2011	SGYC	E15	0.90	CF7066HJ	S	36	12	LCu	INTERLUX	UKN	KK	01/2007	30
12/14/2011	SGYC	E15	0.50	654291	S	44	12.6	LCu	SEA HAWK	UKN	OTH	06/2008	30
12/13/2011	SGYC	E17	1.00	1091723	P	42	15	LCu	RED HAWK	UNK	OTH	06/2010	33
12/14/2011	SGYC	F01	1.00	933839	P	40		Lcu-ukn	UKN	UNK	SI	05/2007	30
11/25/2011	SGYC	F07	1.00	624104	S	38	12.5	Lcu-ukn	UKN	UKN	SI	12/2007	30
11/13/2011	SGYC	F08	0.99	1105978	S	42	10.3	LCu	INTERLUX	SUPER KL	SI	11/2008	30
11/14/2011	SGYC	F10	0.83	1042260	S	44	13.6	LCu	CAL BOTTOM KOTE	UKN	SI	05/2011	35
11/18/2011	SGYC	G09	0.99	CF2884HW	S	40	12	LCu	INTERLUX	UKN	BAJA	02/2007	30
11/11/2011	SGYC	G10	0.95	900619	S	52	15	Lcu-ukn	UKN	UKN	UKN	05/2006	30
12/5/2011	SGYC	G12	0.95	1033835	S	49	13	LCu	INTERLUX	UKN	SI	11/2006	30
11/5/2011	SGYC	G14	1.00	7558P	P	44	14.5	Lcu-ukn	UKN	UKN	UKN	03/2007	30
12/14/2011	SGYC	H02	1.00	536182	P	30	10	Lcu-ukn	UKN	UKN	SI	01/2008	30
12/14/2011	SGYC	H13	0.85	1065080	S	41		Lcu-ukn	UKN	UKN	SI	03/2011	32
11/15/2011	SGYC	H14	0.90	653810	S	46	14.8	Lcu-ukn	UKN	UKN	UKN	05/2008	30
12/14/2011	SGYC	H16	1.00	DON'T HAVE	P	57	14.6	LCU	PETIT	UKN	SI	07/2006	30
12/9/2011	SGYC	A06	1.00	CF1641UN	S	32.6	9.15	Non	NON	N/A	N/A	N/A	0
11/11/2011	SGYC	F13	1.00	6821JG	S	34	12	Non	N/A	N/A	N/A	N/A	0
11/25/2011	SGYC	G16	1.00	1133651	S	41	12	Non	No Paint	N/A	N/A	N/A	0
12/12/2011	SGYC	B22	0.95	CF6627GX	S	29.1	10.1	NON	INTERSLEEK	900	SI	10/2009	0
12/14/2011	SGYC	C19	0.95	1909591	S	33		Non-unconf	N/A	N/A	N/A	N/A	0
11/9/2011	SGYC	E16	0.75	DON'T HAVE	S	40	11.8	NON	VC	UKN	SELF	01/2008	0
12/14/2011	SGYC	A16	0.85	CF4650FR	S	30	8.5	UKN	UKN	UKN	OTH	UKN	UKN
12/3/2011	SGYC	A24	0.90	CF0384GN	S	27		UKN	UKN	U	SI	06/2010	UKN
12/11/2011	SGYC	A26	1.00	CF9174EE			UKN	UKN	UKN	UKN	UKN	UKN	UKN
11/12/2011	SGYC	A28	0.90	964572	P	34	11.5	UKN	UKN	UKN	SI	UKN	UKN
11/22/2011	SGYC	B-04	0.90	1098705	S	31	11.5	UKN	UKN	UKN	UKN	UKN	UKN
12/7/2011	SGYC	B08	1.00	1183140				UKN	UKN	UKN	UKN	UKN	UKN
11/19/2011	SGYC	B10	0.50	CF0275UW	UKN	25	8.5	UKN	UKN	UKN	SI	06/2011	UKN
12/12/2011	SGYC	B12	0.99	CF0850DJ	S	28	6.5	UKN	UKN	UKN	SI	10/2011	UKN
11/25/2011	SGYC	B14	1.00	NM5164BC	S	30	10	UKN	UKN	UKN	UKN	UKN	UKN
11/14/2011	SGYC	B20	0.90	1101523	S	32	10.4	UKN	UKN	UKN	UKN	UKN	UKN
11/11/2011	SGYC	C01	1.00	CF2174UH	S	35	10	UKN	UKN	UKN	UKN	09/2009	UKN
12/14/2011	SGYC	C04	1.00	1150454	S	31	10.5	UKN	UKN	UKN	UKN	UKN	UKN
11/20/2011	SGYC	C-05	0.97	1031950	S	32	11.9	UKN	UKN	UKN	UKN	UKN	UKN
11/12/2011	SGYC	C15	0.92	CF6572FZ	S	30	11	UKN	UKN	UKN	KK	UKN	UKN
11/11/2011	SGYC	C16	0.85	DON'T HAVE	S	41	11.4	UKN	UKN	UKN	SI	05/2010	UKN
12/2/2011	SGYC	D05	0.80	CF6642GX	S	27	8.1	UKN	UKN	UKN	SI	01/2009	UKN

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
11/13/2011	SGYC	D06	0.82	1107977	S	41.8	13	UKN	UKN	UKN	UKN	UKN	UKN
11/14/2011	SGYC	D12	0.85	1226818	S	36	11.11	UKN	UKN	UKN	UKN	05/2010	UKN
12/8/2011	SGYC	D14	0.99	1081522	S	36	12	UKN	TRINIDAD	UKN	SI	05/2010	72
11/21/2011	SGYC	D18	0.95	0200VE	S	32	6	UKN	INTERLUX	ULTRA	KK	07/2011	66
11/19/2011	SGYC	D19	0.99	927205	S	32.6	11	UKN	CAL BOTTOM KOTE	UKN	DR	03/2010	UKN
11/13/2011	SGYC	E01	0.95	615841	S	37	12	UKN	UKN	UKN	DR	03/2010	UKN
11/19/2011	SGYC	E02	0.95	1128494	P	36	14	UKN	PETIT	UKN	DR	09/2010	72
12/14/2011	SGYC	E04	0.90	930939	P	42	14.6	UKN	UNK	UKN	SI	03/2011	UKN
11/14/2011	SGYC	E05	0.92	1058850	S	40	12.11	UKN	UKN	UKN	UKN	UKN	UKN
12/2/2011	SGYC	E18	0.90	625808	P	35	12	UKN	PETIT	UKN	DR	06/2011	UKN
11/21/2011	SGYC	F12	0.80	599094	S	40	12	UKN	PETIT	UKN	KC	08/2011	72
11/18/2011	SGYC	F16	0.96	900408	S	36	12.5	UKN	UKN	UKN	UKN	UKN	UKN
12/5/2011	SGYC	F18	1.00	1109768	P			UKN	UKN	UKN	UKN	UKN	UKN
12/14/2011	SGYC	F19	1.00	AZ6194BN	P	47		UKN	UKN	UKN	DR	03/2010	UKN
11/14/2011	SGYC	F20	0.95	CF9843SH	P	30	12	UKN	UKN	UKN	UKN	06/2010	UKN
12/14/2011	SGYC	G01	1.00	461660	P	36	13	UKN	UKN	UKN	SI	09/2010	UKN
11/17/2011	SGYC	H07	0.95	1127697	P	31	12	UKN	UKN	UKN	UKN	04/2011	UKN
12/14/2011	SGYC	H08	0.95	CF7503FS	P	38		UKN	INTERLUX	UNK	KC	08/2011	UNK
11/16/2011	SGYC	H10	1.00	672657	S	48	15	UKN	UKN	UKN	SI	06/2011	UKN
12/3/2011	SGYC	H11	0.90	681563	S	39	14.5	UKN	UKN	UKN	SI	06/10	UKN
11/18/2011	SGYC	H12	0.99	CF4574NW	S	42	13	UKN	UKN	UKN	UKN	UKN	UKN
12/7/2011	SGYC	H17	1.00	539568	S	34.11	34.11	UKN	UKN	UKN	KK	09/2011	UKN
12/14/2011	SGYC	F-21	0.95	966464	S	34		UKN	UKN	UNK	SI	09/2010	UNK
12/24/09	SIM	002	1.00	CF 0373 UE	P	21.0	8.6	Cu	INTERLUX ULTRA		SI	12/24/09	59
08/06/11	SIM	005	0.93	CF 7403 PB	P	14.1	6.0	Cu	PETIT PROTECTOR	ZSPAR B9	DR	06/04/10	
11/23/11	SIM	113	0.91	1221423	S	46.0	13.0	Cu	Proline 1088			10/20/11	67
11/20/11	SIM	126B	1.00	901967	S	49.0	12.7	Cu	Proline 1088			02/01/10	67
12/20/11	SIM	210	0.99	CF 5499 EG	P	32.0	9.8	Cu	Interlux Ultra with Bid	y3559F		12/15/09	67
12/22/11	SIM	212	0.99	CF 7694 FG	S	27.0	9.0	Cu	Interlux ultra				
11/21/11	SIM	214	1.00	1157280	S	33.0	10.8	Cu	UNKNOWN			05/01/11	67
11/22/11	SIM	228	0.83	1162903	S	32.7	6.3	Cu	PRO-LINE 1088			11/13/09	67
12/01/11	SIM	304	0.86	AZ 4189 BF	P	38.0	10.0	Cu	INTERLUX ULTRA			02/01/11	66
11/10/11	SIM	306	0.81	IL 507 JN	S	39.3	12.3	Cu	UNKNOWN			11/01/11	
09/21/11	SIM	312	0.95	980990	P	38.3	13.2	Cu	PETTIT PROTECTOR	ZSPAR B91			
11/26/11	SIM	408	1.00	919804	S	29.9	10.9	Cu	8 year old paint		SI	06/01/03	
12/16/11	SIM	419	0.80	1186984	P	25.0	9.5	Cu	INTERLUX ULTRA V	3779		12/12/11	67
11/23/11	SIM	501	1.00	982814	S	41.0	13.1	Cu	INTERLUX ULTRA W/BIO	LUX		10/01/11	67
12/09/11	SIM	507	0.94	930574	S	39.0	11.1	Cu	VOC TRINIDAD REQ	PET 1678		06/17/11	65
11/28/11	SIM	510	1.00	1196712	S	35.9	12.1	Cu	PROLINE 1088 W/ORGANIC BIOCIDE			01/01/10	67
11/28/11	SIM	600 B	1.00	CF 8700 HV	P	30.0	11.3	Cu	6 year old paint			12/31/05	
06/30/10	SIM	003	0.99	CF 8406 RT	P	19.0	1.0	LCu	PETIT VIVID WHITE		SI	01/16/07	25
11/11/11	SIM	101	1.00	545417	P	37.4	6.3	LCu	ULTRA FAST W/BIO	Y3669FG			
11/14/11	SIM	207	0.99	1077114	S	40.0	13.6	LCu	PETTIT HYDROCOA	PET-124OG		11/01/09	40

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
11/14/11	SIM	209	0.99	1041963	S	40.6	13.5	LCu	PETTIT HYDROCOAT	PET-124OG		03/01/10	40
08/01/11	SIM	415	0.97	CF 6434 EU	S	26.0	8.0	LCu	INTERLUX MICRON VOC ULTRA	KC		07/01/11	37
08/22/10	SIM	427	0.99	1236015	S	30.0	10.1	LCu	INTERLUX MICROS CSC		OTH	08/22/10	37
10/08/10	SIM	432	0.93	1070415	P	30.2	11.0	LCu	INTERLUX CA BOTTOM	94-YBB263	OTH	10/08/10	35
11/14/11	SIM	009	0.84	CF 3154 PU	P	16.0	6.5	Non	NO PAINT				0
12/06/11	SIM	117	0.94	1155230	S	38.3	12.0	NON	INTERSLEEK 900			06/01/11	
12/06/11	SIM	220	0.94	CF 1034 JT	S	32.0	11.0	NON	INTERSLEEK 900			06/01/11	
07/14/10	SIM	600 A	1.00	999448	S	55.1	15.3	NON	INTERLUX PERFORMANCE EP		OTH	07/14/10	0
11/22/11	SIM	618 C	1.00	662836	P	70.0	23.6	Non-unconf				01/25/09	0
06/30/10	SIM	001	1.00	CF 3286 TF	P	23.0	0.0	UKN					
12/17/10	SIM	004	1.00	CF 0581 HJ	P	15.0	6.0	UKN					
08/04/11	SIM	006	0.80	CF 6646 RM	E	18.0	6.0	UKN					
06/30/10	SIM	007	0.98	595405	S	24.0	8.1	UKN					
06/30/10	SIM	008	1.00	CF 1165 GH	S	24.0	8.1	UKN					
06/30/10	SIM	011	1.00	CF 8810 RC	P	16.0	6.6	UKN					
06/12/11	SIM	011	0.98	CF 6654 RS	P	14.0	6.0	UKN					
06/30/10	SIM	012	0.80	CF 2439 JU	P	16.0	6.5	UKN					
	SIM	013	0.86					UKN					
06/30/10	SIM	014	0.97	CF 2564 NX	P	22.0	8.0	UKN					
06/30/10	SIM	015	1.00	CF 1930 UN	P	29.0	8.0	UKN					
06/30/10	SIM	016	0.99	CF 9560 RL	P	24.0	9.0	UKN					
06/30/10	SIM	017	0.95	CF 6794 TH	P	28.0	9.2	UKN					
06/30/10	SIM	018	1.00	CF 1498 UV	P	24.0	8.6	UKN					
07/01/11	SIM	019	0.99	CF 0416 UP	P	26.0	8.0	UKN					
12/06/11	SIM	020	0.93	CF 1838 UN	P	21.0	8.0	UKN			SI	08/24/10	
06/30/10	SIM	021	1.00	AZ 5673 AH	P	28.0	11.0	UKN					
06/30/10	SIM	100	1.00	1188611	P	44.0	13.0	UKN					
10/07/11	SIM	102	0.66	33768	P	47.0	13.9	UKN					
02/28/11	SIM	103	1.00	942584	P	42.2	15.0	UKN					
06/30/10	SIM	104	1.00	1197732	S	49.5	14.8	UKN					
06/30/10	SIM	105	0.96	909331	P	41.9	13.0	UKN					
11/06/11	SIM	106	1.00	993274	S	44.8	13.1	UKN				12/01/08	
	SIM	107	0.62					UKN					
05/03/10	SIM	108	0.96	902618	P	53.0	15.3	UKN					
06/30/10	SIM	109	0.99	1122003	S	37.8	12.5	UKN					
06/30/10	SIM	110	0.98	680355	S	52.0	12.5	UKN					
01/11/11	SIM	111	1.00	1150461	S	46.0	14.0	UKN					
02/28/11	SIM	112	0.67	1127638	P	43.4	15.7	UKN					
06/30/10	SIM	114	0.97	1114571	S	48.6	14.2	UKN					
12/09/11	SIM	115	0.66	931889	S	44.0	13.5	UKN					
05/03/11	SIM	116	0.99	1141781	S	45.5	14.7	UKN					
12/18/11	SIM	118	0.59					UKN					
11/01/11	SIM	119	0.48	new build	S	46.0	15.0	UKN					
06/30/10	SIM	120	0.99	978492	S	42.1	14.3	UKN					

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12/05/11	SIM	121	0.99	1131036	S	46.3	13.8	UKN			SI	04/01/11	
11/20/11	SIM	122	0.88	1202905	P	48.0	15.0	UKN	UNKNOWN				
06/30/10	SIM	123	1.00	CF 5329 JC	S	41.0	12.1	UKN					
06/30/10	SIM	124	1.00	665239	P	45.0	15.0	UKN					
06/30/10	SIM	125	0.96	1108628	S	46.4	14.7	UKN					
06/30/10	SIM	126A	0.99	1021619	P	45.9	14.9	UKN					
08/01/11	SIM	200	0.94	1226290	P	29.7	10.4	UKN					
	SIM	201	0.83					UKN					
	SIM	202	0.68					UKN					
	SIM	203	0.66					UKN					
06/30/10	SIM	204	0.96	CF 2777 GC	S	33.0	9.7	UKN					
11/14/11	SIM	205	1.00	1122860	S	40.0	13.0	UKN	ABLATIVE				
06/30/10	SIM	208	1.00	CF 4467 GC	S	30.0	11.0	UKN					
06/30/10	SIM	211	0.99	544986	S	39.0	13.3	UKN					
06/30/10	SIM	213	0.90	693583	P	38.1	13.4	UKN					
09/20/11	SIM	215	0.99	690358	P	38.0	11.4	UKN					
06/11/11	SIM	216	0.90	CF 0854 ST	P	30.0	11.1	UKN					
06/30/10	SIM	217	1.00	1036303	S	39.7	12.1	UKN					
	SIM	218	0.66					UKN					
06/30/10	SIM	219	1.00	944526	S	41.0	13.8	UKN					
06/30/10	SIM	221	0.99	661497	S	36.6	11.5	UKN					
04/01/11	SIM	222	0.95	CF 8655 TK	S	30.0	11.0	UKN					
06/30/10	SIM	223	0.99	967050	S	39.5	12.6	UKN					
06/30/10	SIM	224	0.99	968888	S	29.9	10.9	UKN					
06/30/10	SIM	225	1.00	940781	S	39.6	12.7	UKN					
	SIM	226	0.51					UKN					
06/30/10	SIM	230	0.95	1104412	S	30.9	4.7	UKN					
06/30/10	SIM	232	1.00	CF 9886 FW	S	27.0	9.0	UKN					
	SIM	233	0.55					UKN					
06/30/10	SIM	300	0.96	1092569	P	34.5	13.0	UKN					
06/30/10	SIM	301	1.00	912629	P	37.4	12.3	UKN					
06/30/10	SIM	302	0.87	1214310	P	34.5	12.0	UKN					
	SIM	303	0.60					UKN					
06/30/10	SIM	305	0.99	665299	P	34.9	12.9	UKN					
	SIM	307	0.23					UKN					
11/22/11	SIM	308	0.83	CF 0549 JS	P	38.0	12.3	UKN	UNKNOWN				
06/30/10	SIM	309	0.81	1065387	P	43.0	13.0	UKN					
11/12/11	SIM	310	0.83	1160373	S	43.0	12.9	UKN	UNKNOWN				
11/08/11	SIM	311	0.95	GUEST	S	40.0	12.8	UKN					
06/30/10	SIM	313	0.98	944820	P	38.8	13.9	UKN					
12/27/10	SIM	314	0.99	728692	P	36.0	12.6	UKN					
06/30/10	SIM	315	0.97	1086620	P	35.5	6.2	UKN					
06/30/10	SIM	316	0.99	905565	P	36.2	12.5	UKN					
02/28/11	SIM	317	1.00	1080127	P	35.2	13.2	UKN					

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11/14/11	SIM	318	0.76	1163851	P	37.0	12.0	UKN					
07/06/11	SIM	319	0.87	939675	S	41.9	12.5	UKN					
06/30/10	SIM	320	0.99	590059	S	43.8	9.5	UKN					
11/22/11	SIM	321	1.00	918781	S	36.4	12.5	UKN			SI	05/01/09	
05/07/11	SIM	322	0.87	1025476	P	41.4	12.8	UKN					
11/27/11	SIM	323	0.55	1073732	P	40.0	12.0	UKN					
12/12/10	SIM	324	0.83	947856	P	40.3	14.4	UKN					
09/30/10	SIM	325	0.99	CF 3624 HG	S	37.0	12.0	UKN					
01/15/11	SIM	326	0.98	1143085	S	42.0	12.0	UKN					
06/30/10	SIM	327	0.97	1094489	P	44.0	15.0	UKN					
11/15/11	SIM	400	0.99	996797	P	27.8	10.0	UKN	UNKNOWN				
06/30/10	SIM	401	1.00	599092	S	29.9	10.9	UKN					
06/30/10	SIM	402	0.82	CF 0655 TP	P	34.5	11.0	UKN					
	SIM	403	0.54					UKN					
06/15/10	SIM	404	0.83	CF 2586 FN	S	28.0	7.7	UKN					
06/30/10	SIM	405	0.97	1195366	S	33.1	11.5	UKN					
06/30/10	SIM	406	0.86	1183335	P	28.3	9.3	UKN					
06/30/10	SIM	407	0.91	1223484	P	24.6	8.5	UKN					
06/30/10	SIM	409	1.00	CF 4854 GH	S	30.0	10.0	UKN					
	SIM	410	0.62					UKN					
01/31/11	SIM	411	0.84	CF 5854 TZ	P	28.0	9.5	UKN					
04/01/11	SIM	412	0.99	CF 7957 TG	P	25.0	9.5	UKN					
06/30/10	SIM	413	0.99	CF 6109 GZ	P	30.0	11.0	UKN					
12/01/11	SIM	416	0.99	CF 8166 EM	S	29.1	9.1	UKN					
06/30/10	SIM	417	0.98	122648	S	30.0	10.0	UKN					
06/30/10	SIM	418	0.99	CF 8674 SH	S	30.0	11.0	UKN					
10/22/10	SIM	420	0.99	1182676	P	31.0	10.5	UKN					
06/30/10	SIM	421	0.88	CF 7779 FG	S	29.0	9.6	UKN					
05/03/11	SIM	422	0.97	CF 0031 UW	P	30.0	10.0	UKN					
06/30/10	SIM	423	0.99	1202539	P	28.3	9.3	UKN					
06/30/10	SIM	424	0.99	CF 6754 RS	P	23.0	7.6	UKN					
01/03/11	SIM	425	1.00	CF 8024 PJ	P	26.0		UKN					
11/17/10	SIM	428	1.00	CF 8783 KP	S	30.0	9.6	UKN					
01/07/11	SIM	429	1.00	CF 0407 SG	P	33.0	10.5	UKN					
06/30/10	SIM	430	1.00	664278	P	27.2	9.8	UKN					
06/10/11	SIM	431	1.00	CF 3653 JZ	P	28.0	8.5	UKN					
06/30/10	SIM	433	1.00	CF 2527 SS	S	30.0	7.0	UKN					
09/01/11	SIM	434	0.88	1025672	P	60.0	16.0	UKN					
06/30/10	SIM	500	1.00	CF 0394 GJ	P	50.0	15.0	UKN					
11/15/11	SIM	502	0.99	1086407	P	29.9	11.5	UKN					
06/30/10	SIM	503	0.99	1228244	S	35.0	10.0	UKN					
12/20/11	SIM	504	1.00	1136766	P	33.0	12.0	UKN			DR	09/25/09	
	SIM	505	0.72					UKN					
06/30/10	SIM	506	1.00	1206686	P	33.2	10.4	UKN					



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06/30/10	SIM	508	1.00	CF 5319 JA	S	36.0	12.5	UKN					
12/22/11	SIM	509	1.00	1220560	S	38.7	13.3	UKN					
09/01/11	SIM	511	0.76	YW75837	S	39.0	12.7	UKN					
10/18/10	SIM	512	0.99	1118512	P	34.0	13.3	UKN					
03/12/10	SIM	513	0.97	1226671	S	42.5	13.6	UKN					
06/30/10	SIM	514	0.94	1090576	S	34.5	11.0	UKN					
10/14/11	SIM	515	0.94	1099191	P	41.0	13.8	UKN					
06/30/10	SIM	516	0.98	813499	S	34.0	11.3	UKN					
06/30/10	SIM	517	1.00	656960	S	39.7	12.2	UKN					
01/19/07	SIM	518	1.00	1118878	S	34.5	11.0	UKN					
06/30/10	SIM	519	0.97	1049769	S	40.2	13.2	UKN					
02/28/11	SIM	520	0.85	1130755	S	35.1	11.4	UKN					
06/30/10	SIM	521	0.97	693116	S	43.7	12.4	UKN					
06/30/10	SIM	522	0.99	942540	S	35.9	13.0	UKN					
09/01/11	SIM	523	0.68	1167984	S	36.0	12.0	UKN					
06/30/10	SIM	524	1.00	1045230	P	34.0	11.7	UKN					
06/26/10	SIM	525	0.98	1180878	S	37.0	12.1	UKN					
06/30/10	SIM	526	0.99	954794	P	63.5	17.0	UKN					
	SIM	600	0.70					UKN					
06/30/10	SIM	600 C	1.00	1140191	P	44.1	13.8	UKN					
	SIM	600 D	1.00					UKN					
09/12/11	SIM	600 E	1.00	1200466	P	55.0	17.3	UKN					
	SIM	600 F	1.00					UKN					
08/31/11	SIM	601	0.71	Guest	S	109.0	24.0	UKN					
08/31/11	SIM	602	0.64	Guest	S	85.0	24.0	UKN					
10/03/11	SIM	603	0.75	Guest	S	106.0	28.0	UKN					
06/30/10	SIM	604	0.74	941448	P	85.1	21.1	UKN					
	SIM	605	0.57					UKN					
05/31/11	SIM	606	0.74	1207179	P	115.0	26.0	UKN					
12/05/11	SIM	607	0.76	1063394	P	84.8	21.2	UKN					
08/31/11	SIM	608	0.39	Guest	M	140.0	30.0	UKN					
08/31/11	SIM	609	0.42	Guest	M	210.0	30.0	UKN					
06/30/10	SIM	609 A	1.00	360231	P	50.5	15.4	UKN					
06/30/10	SIM	610	0.77	912165	P	84.1	20.0	UKN					
10/31/11	SIM	611	0.74	GUEST	P	102.0	28.0	UKN					
09/18/11	SIM	612	0.63	Guest	P	92.0	21.6	UKN					
09/29/11	SIM	613	0.65	Guest	P	110.6	23.8	UKN					
	SIM	614	0.53					UKN					
	SIM	615	0.51		P			UKN					
	SIM	615	0.57					UKN					
	SIM	617	0.46					UKN					
	SIM	618	0.65					UKN					
	SIM	618 A	0.00					Vacant					

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	SIM	618 B	0.00					Vacant					
	SIM	618 D	0.00					Vacant					
	SIM	618 E	0.00					Vacant					
	SIM	618 F	0.00					Vacant					
08/29/11	SIM	010	0.96	CF 3423 EU	P	22.0	8.6	NON	INTERLUX PACIFICA		SI	08/29/11	0
08/11/09	SIM	206	1.00	CF 8685 JS	S	31.0	10.1	NON	INTERLUX PACIFICA		SI	08/11/09	
01/29/08	SIM	414	0.95	971746	S	30.0	9.0	NON	SEAHAWK MISSION BAY BLUE		SI	01/29/08	
08/02/10	SIM	426	1.00	NV 9722 KV	P	30.0	90.0	NON	INTERLUX PACIFIC	94-YBB263	OTH	04/06/10	
	SWYC	A1	1.00	CG 1124266	Sail	47'	12'	Cu	Pro Line 1800	1800		Mar-11	67%
	SWYC	A2	1.00	984899	Power	42'	13'	Cu	Blue Water ABZ 45	8801	Driscoll	Feb-09	45%
	SWYC	A3	0.98	CG 942555	Power	44'	13'11"	Cu	proline	1088	Marine Group	Jun-10	67%
	SWYC	A4	1.00	1065434	Power	45'	14'	Cu	Proline	1088	Shelter Island	May-09	58%
	SWYC	A5	0.10	1077877	Sail			Cu					50+
	SWYC	A6	1.00	1181715	Sail	47'	13'	Cu					50+
	SWYC	A7	1.00	CG 512010	Sail	49'	9'	Cu					50+
	SWYC	A8	0.90	CG 946222	Sail	46'	13'	Cu			Driscoll		50+
	SWYC	A9	0.89	CF 5880 GP	Sail	47'	13'	UKN			Koehler Kraft	Sep-09	
	SWYC	A11	0.85	1206414	Power	47'	14'	Cu	Interlux		shelter island	Mar-10	39%
	SWYC	A13	1.00	CG 937057	Power	44'	14'	Cu					50+
	SWYC	A14	0.95	CG 652880	Sail	42'	12'10"	Cu	Proline	1088	Shelter Island	Apr-06	67%
	SWYC	A15	0.95	695659	Power	44'	15'	Cu	Proline	1088	Shelter Island	May-10	67
	SWYC	A16	1.00	CG1154575	Power	46'	13'	Cu					50+
	SWYC	A17	0.95	CF 279880	Sail	49'	11'	Cu	Trinidad		Self	Jul-07	70%
	SWYC	A19	0.90	697064	Sail	34'	12'	Cu	Interlux Ultra	3669G	Koehler Kraft	Sep-11	60%
	SWYC	A20	0.98	CG 996248	Power	39'	13'7"	Cu	Interlux Ultra		shelter island	Feb-10	57%
	SWYC	A21	1.00	1152268	Power	30'	10'	Cu					50+
	SWYC	A22	0.98	CG 1135679	Sail	30'	29'	Cu	Proline	1088	shelter island	Mar-08	67%
	SWYC	A23	0.95	CF 0253 GH	Sail	35"	10'	Cu					50+
	SWYC	A25	1.00	CG 588713	Sail	30'	11'	Cu					50+
	SWYC	A26	1.00	CF 2444 JM	Sail	30'	11'	Cu					50+
	SWYC	A27	1.00	CF 5556 ER	Power	32'	11'6"	Cu			Shelter Island	May-09	67%
	SWYC	A28	0.95	558187	Sail	33'	9'6"	Cu			Driscoll	Nov-11	50+
	SWYC	A29	0.90	CG 1150621	Sail	34'5"	11"	Cu			Driscoll	Nov-09	50+
	SWYC	A30	1.00	CG1108873	Sail	28'	10'	Cu					50+
	SWYC	A31	1.00	CF 629095	Sail	32'	8'	Cu					50+
	SWYC	A32	1.00	CF 0678 JS	Sail	29'11"	10'10"	Cu	Proline	1088	Shelter Island	Mar-08	67%
	SWYC	A33	1.00	CG 1087119	Sail	30'	11'	UKN					
	SWYC	A34	0.95	CF 9264 HJ	Sail	28'4"	9'4"	Cu	Pettit		Shelter Island	Jan-11	65%
	SWYC	A36	1.00	CF 5900 HJ	Sail	31'	10'	Cu					50+
	SWYC	A37	1.00	CF 7142 AV	Power	26'	10'5"	Cu	Proline	1088	Koehler Kraft	1-Oct	67%
	SWYC	A38	1.00	CF 4465 CV	Power	28'	9'	Cu					50+
	SWYC	A39	1.00	1029112	Power	30'	10'5"	Cu	Pettit		Koehler Kraft	Sep-09	67%
	SWYC	A40	1.00	CF4757 HJ	Sail	33'	11'	Cu					50+
	SWYC	A41	1.00	CF3419 GL	Sail	29'	10'	Cu					50+

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	SWYC	A42	1.00	CF8934 SW	Sail	30'	11'	Cu					50+
	SWYC	A43	1.00	1037287	Sail	33'	11'	Cu	Interlux	Ultra	Shelter Island	Oct-11	67%
	SWYC	A45	1.00		Sail	35'	11'	UKN					
	SWYC	A46	0.93	CG581984	Sail	32'	10'6"	Cu	Proline	1088	Driscolls	Jul-10	67%
	SWYC	A49	0.90	CF8545KH	Sail	28'	9'6"	Cu	Interlux Ultra	3669	Driscoll	Feb-11	67%
	SWYC	A50	1.00	1050588	Sail	24'	10'	Cu					50+
	SWYC	A51	0.20	125941	Power	31'	10'	Cu					50+
	SWYC	A53	0.10	1092755	Sail	28'	10'	Cu					50+
	SWYC	A54	0.50	CF 5904 NM	Sail	24'	8'	Cu					50+
	SWYC	A56	1.00	CG1100932	Sail	30'8"	10'5"	Cu	Interlux	Ultra	shelter island	Nov-10	67%
	SWYC	A57	1.00		Sail	26'	7'	Cu					50+
	SWYC	A58	1.00	CF0845 GJ	Sail	28'	8'	Cu	Interlux	Ultra			67%
	SWYC	A61	1.00	CF7040 FY	Sail	30'	9'	Cu					50+
	SWYC	A62	1.00	CF8954 TK	Sail	30'	10'10"	Cu			Shelter Island	Aug-09	50+
	SWYC	A63	0.95	CF7147 RH	Power	26'	8'	UKN			Himself	Apr-09	
	SWYC	A65	1.00	CF6837 TH	Power	31'	8'	Cu					50+
	SWYC	A67	1.00	CF5092 VC	Power	32'	11'	Cu					50+
	SWYC	A68	1.00	CG 684658	Power			UKN					
	SWYC	A70	0.98	916726	Sail	32'	10'11"	Cu	Z Spar Pettit	B-91	Driscolls	Jun-10	65%
	SWYC	A71	1.00	CF7453 JW	Sail	30'	9'	Cu	Interlux Ultra		Koehler Kraft	Feb-11	50%
	SWYC	A72	1.00	CF2086 TX	Sail	30'	10'	Cu					50+
	SWYC	A73	1.00		Power	35'	10'	Cu					50+
	SWYC	A75	1.00	CF6181TK	Sail	31'	10'	Cu					50+
	SWYC	A76	1.00	CF4197SX	Sail	30'	11'	Cu					50+
	SWYC	A77	1.00	CG1031221	Sail	34'	12'	Cu					50+
	SWYC	A78	0.98	1111052	Sail	34'5"	11'	Cu	Interlux Ultra w/ Biolu	3779G Bla	Shelter Island	Mar-11	67%
	SWYC	A86	0.90	CF8718 TK	Power	31'	10'4"	Cu				Jan-11	50+
	SWYC	A88	1.00	CF5034 HN	Sail	30'6"	10'8"	Cu				Jul-10	50+
	SWYC	A90	0.99	4307FY	Sail	26'9"	9'	Cu	Interlux	Ultra	Shelter Island	Jan-10	67%
	SWYC	A92	1.00		Sail	31'	10'	Cu					50+
	SWYC	A94	1.00	1123344	Sail	38'2"	11'2"	Cu			Newport Beach	Mar-08	50+
	SWYC	A95	1.00	CF8136 EM	Sail	36'	12'	Cu					50+
	SWYC	B1	1.00	CG936537	Power	40'	14'	Cu					50+
	SWYC	B2	1.00	CG909278	Power	47'	14'	Cu					50+
	SWYC	B3	1.00	CG1117786	Power	37'	12'	Cu					50+
	SWYC	B4	1.00		Power	41'	13'	Cu					50+
	SWYC	B5	0.90	CG1167923	Power	44'	13'8"	Cu	Interlux Ultra		Shelter Island	Sep-10	67%
	SWYC	B6	1.00	10866	Sail	42'	13'	Cu			Driscoll	Aug-07	50+
	SWYC	B7	1.00	CG106065	Power	44'	14'	Cu	Pro Gold Anti06/Expy				50+
	SWYC	B8	0.98	683455	Sail	40'	12'	Cu	Proline Vinyl	1088	Shelter Island	Nov-09	56%
	SWYC	B10	0.85	CG684720	Sail	41'	11'10'	Cu	Interlux Ultra		Koehler Kraft	Sep-11	67%
	SWYC	B11	0.96	959661	Sail	45'	14'	Cu	Proline	1088	Shelter Island	Aug-06	67%
	SWYC	B12	1.00	SD105DZ	Power	36'	12'	Cu					50+
	SWYC	B13	0.98	CG926942	Sail	39'	12'	Cu	Proline	1088	Shelter Island	Jun-10	67%

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	SWYC	B14	0.98	512123	Sail	38'6"	11'9"	Cu			Shelter Island	Aug-10	50+
	SWYC	B16	0.98	CG1113568	Sail	36'	11'	Cu			Koehler Kraft	Nov-07	50+
	SWYC	B17	1.00	CG1034612	Sail	40'	13'	Cu	Proline	1088	Shelter Island	Feb-11	67%
	SWYC	B18	1.00	CG 909675	Sail	42'	13'	Cu					50+
	SWYC	B19	0.88	1172036	Sail	43'	14'6"	Cu			Shelter Island	Mar-11	50+
	SWYC	B20	1.00	CF1058 KC	Sail	38'	12'	UKN					
	SWYC	B21	0.95	CG1061438	Sail	37'6"	12'6"	Cu	Proline	1088	Shelter Island	Oct-09	67%
	SWYC	B22	0.80	CG 915080	Sail	40'	12'2"	UKN			Ventura	Aug-09	
	SWYC	B23	0.95	CF382055	Power	40'	12'6"	Cu	Interlux	3559	Shelter Island	Mar-10	67%
	SWYC	B24	1.00	CF3820SS	Sail	37'	12'	Cu					50+
	SWYC	B25	0.96	1220152	Sail	40'	13'10"	Cu	Proline	1088	Shelter Island	Jun-10	67%
	SWYC	B26	0.95	CG1060852	Sail	37'1"	12'4"	Cu	Interlux	1088	shelter island	May-07	68%
	SWYC	C2	1.00	CF3841HK	Power	40'	13'	Cu	Interlux w/ biolux				67%
	SWYC	C3	1.00	CF5444HT	Power	38'	13'	Cu					50+
	SWYC	C4	0.95	CG 600070	Power	33'	13'3"	Cu	Proline	1088	Shelter Island	Dec-11	67%
	SWYC	C5	1.00	STNAA2401102	Power	39'	13'6"	Cu	Proline	1088	Shelter Island	Oct-09	67%
	SWYC	C6	1.00	CG1091296	Power			Cu					50+
	SWYC	C7	1.00	689650	Power			Cu					50+
	SWYC	C8	0.90	974065	Power	39'4"	13'	Cu	Proline	1088	Shelter Island	Apr-09	67%
	SWYC	C9	1.00	CG919608	Sail			Cu					50+
	SWYC	C10	1.00	CG1132779	Power			Cu					50+
	SWYC	C11	0.95	CG 665625	Power	50'	15'	Cu	Interlux w/ Biolux		Koehler Kraft	Jun-08	67%
	SWYC	C12	0.99	919132	Power	47'	16'	Cu	Interlux w/ Biolux		Balboa Boatyard	Oct-09	67%
	SWYC	C13	1.00	1213425	Sail	53'	16'	Cu	Pettit	1661	Shelter Island	Mar-11	13.10%
	SWYC	C14	0.88	1156703	Sail	40'	13'6"	Cu	Proline	1088C	Shelter Island	Oct-11	56%
	SWYC	C15	1.00	1163852	Sail	43'10"	14'2"	Cu	Proline	1088	Shelter Island	Jun-08	67%
	SWYC	C16	0.95	1070791	Sail	45'	15'	Cu	Proline	1088	Shelter Island	Oct-11	67%
	SWYC	C17	1.00	982110	Power	48'	14'	Cu					50+
	SWYC	C18	1.00					Cu					50+
	SWYC	C21	1.00	5181JE	Sail	34'	9'	Cu	Interlux	Ultra Plus	Driscoll	Apr-10	67%
	SWYC	C23	1.00	1057797	Sail	33'	11'6"	Cu					50+
	SWYC	C24	0.98	1139746	Sail	37'3"	12'9"	Cu			Shelter Island	Aug-09	
	SWYC	C25	0.95	680805	Sail	38'	12'6"	Cu	Interlux Ultra	3669	driscoll	Mar-10	>40
	SWYC	C26	0.98	CF8883GY				Cu					50+
	SWYC	C27	1.00	1202317	Power	38'	12'	Cu					50+
	SWYC	C28	0.90	1181355	Sail	33'3"	10'8"	Cu	Proline	1088	Driscoll	Jun-11	67%
	SWYC	C29	0.95	119675	Sail	34'	10'8"	Cu			Driscoll	2010	50+
	SWYC	C30	1.00	CF2773HL	Sail	30'	10'	Cu					50+
	SWYC	C32	1.00	1086325	Power	33'	10'6"	Cu	Pettit Trinidad SR	1088	Shelter Island	Jan-11	70%
	SWYC	C33	0.97	623343	Power	36'	12'4"	Cu	Proline	1088	Driscoll	May-10	67%
	SWYC	C34	0.77	1200281	Sail	37'1"	12'	Cu	Proline	1088	Shelter Island	Oct-11	67%
	SWYC	C35	1.00	CG992670	Sail	34'	12'	Cu					50+
	SWYC	C36	1.00	1168844	Sail	40'	12'	Cu					50+
	SWYC	C37	1.00	1117010	Power	34'	12'	Cu					50+

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	SWYC	D3	1.00	1103323	Sail	32'	11'	Cu					50+
	SWYC	D5	0.95		sail	34'	11'9"	Cu			Driscoll	Jun-11	50+
	SWYC	D6	1.00	1021087	Sail	40'	11'8"	Cu					50+
	SWYC	D7	0.98	1031909	Power	40'	13'	Cu	Interlux	Ultra	Shelter Island	Nov-11	67%
	SWYC	D8	1.00	CF0278FG	Sail	38'	13'	Cu					50+
	SWYC	D9	0.85	118022	Power	40'	13'	Cu	Interlux Ultra Kote		Driscoll	Jun-10	78%
	SWYC	D10	0.90	1121778	Sail	39'3"	12'	Cu					50+
	SWYC	D11	0.95	1166584	Sail	36'	11'4"	Cu	Proline	1088	Shelter Island	May-10	67%
	SWYC	D12	0.90	CF3478	Sail	32'	12'	Cu			Driscoll	Mar-08	50+
	SWYC	D13	0.92	1080149	Sail	33'9"	11'8"	Cu	Pettit Z Spar		Driscoll		65%
	SWYC	D14	0.90	974779	Sail	35'	11'4"	Cu	Interlux Ultra w/ Biolux		Koehler Kraft	Oct-10	67%
	SWYC	D15	1.00	CF7366JB	Sail	34'	12'	Cu	Proline	1088		2007	67%
	SWYC	D16	1.00	CF9770JL	Sail	36'	12'	Cu					50+
	SWYC	D18	1.00	1076969	Sail	36'1"	12'5"	Cu	Pettit		Driscoll	Jun-11	67%
	SWYC	D19	1.00	1084367	Power	34'	11'	Cu					50+
	SWYC	D20	1.00	952160	Power	32'	12'	Cu					50+
	SWYC	D21	1.00	1030197	Power	31'	10'	Cu					50+
	SWYC	D22	1.00	1060603	Sail	38'5"	12'	UKN			Shelter Island	Mar-09	
	SWYC	D23	0.95	1072764	Sail	36'	9'	Cu	Interlux		Driscoll	Nov-09	67%
	SWYC	D25	1.00	922977	Sail	35'	11'	Cu					50+
%	SWYC	D27	0.85	922803	Sail	38'	34'	Cu	Proline	1088	Shelter Island	Aug-07	50+
	SWYC	D28	1.00	976008	Sail	33'	11'	Cu					50+
	SWYC	D29	0.89	CF9634HB	Sail	36'	11'8"	Cu			Knight & Carver	Jun-11	30%
	SWYC	D30	1.00	592923	Power	42'	15'	Cu					50+
	SWYC	D31	1.00	CF4667JB	Power	40'	13'	Cu					50+
	SWYC	D32	1.00	978575	Sail	36'	12'	Cu					50+
	SWYC	D33	1.00	CF3684HL	Sail	41'	13'	Cu	Proline	1088		2008	67%
	SWYC	D34	0.95	907988	Power	42'	13'	Cu	Interlux Ultra w/ Biolux	3669	Shelter Island	Jun-10	67%
	SWYC	D35	1.00	1231443	Sail	37'	12'8"	Cu	Proline	1088C	Shelter Island	2009	59%
	SWYC	D36	0.98	289-465	Power	38'	13'	Cu	Interlux		Koehler	Oct-09	45%
	SWYC	D37	1.00	CG1094657	Sail	41'	9'	Cu			Shelter Island	Feb-09	50+
	SWYC	D38	1.00	1162928	Sail	42'	13'	Cu					50+
	SWYC	D39	0.92	947542	Power	38'	12'5"	Cu	West Marine CPP	5436936	Latitude 48	Aug-09	27%
	SWYC	D40	0.85	1195102	Sail	42'	13'	Cu			Driscoll	Nov-06	50+
	SWYC	D41	1.00	CF0612HJ	Sail	40'	15'	Cu					50+
	SWYC	D42	1.00	591563	Sail	40'		Cu	Proline 1088			Jun-07	67%
	SWYC	D44	1.00	1080336	Sail	48'	14'	Cu					50+
	SWYC	D45	0.98	CG645341	Sail	41'	12'	Cu	Trinidad	u/k	Koehler Kraft	Jun-08	60%
	SWYC	D46	0.98	1120492	sail	47'	14'8"	Cu	Interlux Ultra Blue	3669	Shelter Island	Nov-09	67%
	SWYC	D47	1.00	945537	Sail	49'	15'	Cu	Interlux			Feb-06	50+
	SWYC	D48	0.90	1109050	Sail	45'	14'	Cu	International Paint w/ Biolux		Shelter Island	May-11	67%
	SWYC	D49	1.00	705498	Power	45'	13'6"	Cu			Shelter Island	May-09	50+
	SWYC	D50	1.00	CF2064FH	Sail			Cu					50+
	SWYC	D52	1.00	1050044	Power	43'	14'	Cu					50+

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	SWYC	D53	1.00	635392	Sail	58'	20'	Cu					50+
	SWYC	D54	1.00	1165523	Sail	51'	14'	Cu					50+
	SWYC	D55	1.00	CF8600EX	sail	49'	15'	Cu					50+
	SWYC	D56	0.97	616345	Power	44'	14'5"	Cu	Pettit	Protector	Driscolls	Mar-11	67%
	SWYC	D57	1.00	1140929	Sail	50'	13'	Cu					50+
	SWYC	D58	0.95	654645	Power	51'7"	17'	Cu	Pettit Trinidad		Shelter Island	May-10	70%
	SWYC	D59	0.90	CG905101	Power	57'	46'	Cu	Pettit		Shelter Island	Jun-09	
	SWYC	D60	1.00	977464	Sail	55'	15'	Cu					50+
	SWYC	D61	1.00		Power	55'	16'	Cu					50+
	SWYC	D62	1.00	1100698	Power	64'	16'	Cu					50+
	SWYC	D63	0.50	505534	Power	60'	17'	Cu	Tropikote	2145	Baja Naval	Oct-11	75%
	SWYC	D64	0.95	69336C	Sail	70'	13'	Cu	Proline	1088	Koehler Kraft	Mar-10	67%
	SWYC	D66	1.00	981661	Power	67'	17'	Cu					50+
	SWYC	D67	0.95	CG 925539	Power	63'	15'5"	Cu	Pettit		Koehler Kraft		67%
	SWYC	D68	1.00	1113164	Power	58'	11'	Cu					50+
	SWYC	D69	0.85	906692	Power	57'	15'6"	Cu	Pettit Protector		Driscoll	Aug-11	67%
	SWYC	D70	0.90	639824	Sail	35'2"	12'4"	Cu	Proline	1088	Shelter Island	Feb-07	67%
	SWYC	D72	1.00	CF2709GC	Sail	33'	11'	Cu					50+
	SWYC	D73	1.00	1054321	Sail	34'	11'	Cu					50+
	SWYC	D74	1.00	CF6499TH	Sail	32'	10'	Cu					50+
	SWYC	D75	1.00		Sail	33'	11'	Cu					50+
	SWYC	D77	1.00	987098	Sail	35'	11'	Cu					50+
	SWYC	D78	0.90	CF4568HR	Sail	38'3"	12'6"	Cu	Proline		Shelter Island	Apr-10	67%
	SWYC	D79	0.95	904887	Sail	36'6"	12'	Cu	Proline	1088	Shelter Island	May-10	67%
	SWYC	D80	1.00	1092282	Sail	37'	12'	Cu					50+
	SWYC	D81	1.00		Sail	31'	10'	Cu					50+
	SWYC	D83	1.00		Sail	47'	15'	Cu					50+
	SWYC	D84	1.00		Sail	41'	13'	Cu					50+
	SWYC	D85	0.95	CG931306	Power	36'	13'5"	Cu			Shelter Island		50+
	SWYC	D86	0.90	1053865	Power	41'	14'11"	Cu	Interlux	CA Bottom	Driscoll	Sep-08	35%
	SWYC	D87	0.97	1069486	Power	36'	12'	Cu	Pro-Line		Shelter Island	Mar-11	67%
	SWYC	D88	1.00					Cu					50+
	SWYC	D89	1.00	CF9793SF	Sail	28'	6'	Cu					50+
	SWYC	D90	0.97		Power	24'	6'	Cu					50+
	SWYC	D91	0.90	1231129	Sail	28'	10'	Cu			Driscolls	Nov-10	40%
	SWYC	D93	1.00	CF3035KH	Sail	34'	13'	Cu	Pettit	1245	Marine Group	Aug-13	45.70%
	SWYC	D94	0.90	CF8505FK	Power	29'	10'	Cu			Shelter Island	Jul-09	50+
	SWYC	E2	0.98	970496	sail	35'2"	28'6"	Cu	Pettit Z Spar	B-91 Blue	Driscoll	Sep-09	65%
	SWYC	E3	1.00	CF2671SY	Sail	35'	11'	Cu					50+
	SWYC	E4	1.00	1168850	Sail	34'	11'	Cu	Interlux Ultra Blue	3669	Shelter Island	Dec-09	67%
	SWYC	E5	0.85	1095110	Sail	38'	12'	Cu	White Label Sea-Coat	45 ABL 862	Shelter Island	Feb-11	39.97%
	SWYC	E6	1.00	CF6100KB	Power	34'	11'11"	Cu	Seahawk Sharkskin		Driscoll	May-07	45%
	SWYC	E7	0.98	1034547	Power	37'	13'	Cu	Interlux	Ultra	shelter island	Jun-11	67%
	SWYC	E8	1.00	118725	Sail	38'	11'	Cu					50+

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	SWYC	E9	1.00	947591	Sail	37'	12'	Cu					50+
	SWYC	E10	1.00	1045658	Sail	38'	12'	Cu					50+
	SWYC	E12	1.00	CF6403JA	Sail	30'	10'	Cu					50+
	SWYC	E13	1.00	CF8851AR	Sail	32'	9'	Cu	Proline	1088			67%
	SWYC	E14	1.00	CG9651125	Sail	36'	12'	Cu	Proline	1088	Shelter Island	Jan-11	67%
	SWYC	E15	0.95	CF7228SX	Sail	33'	11'	Cu	Interlux	ultra	Shelter Island	Jun-09	67%
	SWYC	E16	0.90	908708	Power	36'	13'	Cu	Pettit		shelter island	Apr-09	67%
	SWYC	E18	1.00	1135431	Sail	41'	12'	Cu					50+
	SWYC	E19	1.00	CF6373CY	Sail	44'	12'	Cu					50+
	SWYC	E20	0.88	679695	Sail	38'	12'6"	Cu			Shelter Island	Jul-10	50+
	SWYC	E21	1.00		Sail	42'	13'	Cu					50+
	SWYC	E22	1.00	1049467	Sail	39'	11'	Cu					50+
	SWYC	E23	0.95	1197802	Sail	35'2"	12'9"	Cu	Interlux		Shelter Island	Apr-10	100%
	SWYC	E24	1.00	1030948	Sail	39'	11'	Cu					50+
	SWYC	E25	0.95	CF0461SN	Power	44'	30'	Cu	ProLine	Y1088 C	Driscoll MB	Jul-09	59.40%
	SWYC	E27	0.85	954080	Sail	38'	12'	Cu	Interlux		Shelter Island	Jun-11	20%
	SWYC	E28	1.00	941443	Power	41'	14'	Cu					50+
	SWYC	E29	1.00	1022028	Sail	41'	12'	Cu					50+
	SWYC	E30	0.90	1222479	Sail	45'	14'	Cu	ProLine	1088		Aug-09	67%
	SWYC	E31	1.00	1049886	Sail	40'	13'	Cu					50+
	SWYC	E32	1.00	1047379	Sail	34'	12'	Cu					50+
	SWYC	E33	0.85	976415	Power	48'	14'6"	Cu	Proline	1088	Shelter Island	Oct-10	67%
	SWYC	E35	1.00	947145	Sail	39'	12'	Cu					50+
	SWYC	E36	1.00		Sail	36'	12'	Cu					50+
	SWYC	E37	1.00					Cu					50+
	SWYC	E38	0.98	CF1855UN	Sail	35'	11'9"	Cu			shelter island	Dec-10	50+
	SWYC	E39	0.95		sail	35'8"	11'9"	Cu	Intenational		shelter island	Jan-11	67%
	SWYC	E41	0.95	CG1039978	Sail	36'	12'	Cu	Interlux		Driscoll	Jan-10	41%
	SWYC	E42	0.98	987114	Sail	34'4"	11'	Cu	Interlux	3779	Shelter Island	Oct-11	67%
	SWYC	E43	0.98	CF8746HR	Sail	30'	10'8"	Cu	Proline	1088			57%
	SWYC	E44	1.00	1227991	Sail	32'	11'	Cu			Catalina Yachts	2010	50+
	SWYC	E46	1.00	690846	Sail	34'	11'	Cu					50+
	SWYC	E47	0.98	1055545	Power	36'	10'6"	Cu			Shelter Island	Aug-09	50+
	SWYC	E48	1.00	1096120	Sail	34'	12'	Cu					50+
	SWYC	E49	1.00	CF1591GH	Sail	34'	11'	Cu					50+
	SWYC	E50	0.98	CG928770	sail	28'	10'	Cu	Biolux	928770	Koehler Kraft	Jul-10	65%
	SWYC	E52	1.00	3449G2	sail	27'5"	10'	Cu	Proline	1088C	Shelter Island	Aug-11	66%
	SWYC	E53	0.98	VF9536JZ	Power	25'	10'	Cu	Interlux	YBA143	Marine Group	Apr-10	35%
	SWYC	E54	1.00	CF18589PY	Power	21'	8'	Cu					50+
	SWYC	E55	0.98	CF6216PW	Power	24'	8'	UKN				Aug-09	
	SWYC	E57	1.00	CF6602CL	Sail	24'	7'	Cu					50+
	SWYC	E58	1.00	CF1311SZ	Power	27'	6'	Cu					50+
	SWYC	E60	0.90	CF1024BC	Sail	21'	8'	UKN			Shelter Island	2010	
	SWYC	E61	0.95	CF8659GK	Power	23'	7'9"	Cu	Proline	1088	Driscolls	Sep-09	38%

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	SWYC	E63	1.00	CF8975RC	Power	25'	8'	Cu					50+
	SWYC	E65	1.00	CF7296SD	Power	22'4"	8'	Cu			Hipp Marine	Oct-05	50+
	SWYC	E68	1.00	1160783	Power	25'	8'	Cu			Shelter Island		50+
	SWYC	E69	1.00	1147766	Power	39'	15'	Cu					50+
	SWYC	E70	1.00		Sail	28'	10'	Cu					50+
	SWYC	F1	1.00	CF5475EG	Sail	35'	12'	Cu					50+
	SWYC	F2	0.85	1134526	Sail	35'4"	11'8"	Cu	Interlux Ultra	3779	Driscolls	Jun-10	67%
	SWYC	F4	1.00	99740				Cu					50+
	SWYC	F5	0.95	CG1104410	Sail	38'	13'	Cu	Interlux Ultra	3669	Shelter Island	Jan-11	67%
	SWYC	F6	1.00	985912				Cu					50+
	SWYC	F8	1.00	1031121	Sail	38'	13'	Cu					50+
	SWYC	F9	1.00	1052458		35'	12'	Cu					50+
	SWYC	F10	1.00		Power	35'	11'	Cu					50+
	SWYC	F11	1.00	1036888	Sail	39'	14'	Cu					50+
	SWYC	F12	0.95	1125399	sail	34'	11'	Cu	Interlux		Driscoll	Mar-11	67%
	SWYC	F13	1.00	CF9866HB	Sail	39'	12'	Cu					50+
	SWYC	F14	1.00					Cu					50+
	SWYC	F15	1.00	911291	sail	36'	12'	Cu	Interlux Ultra w/ Biolu	Ultra	Kohler Krafts	Jun-08	67%
	SWYC	F16	1.00	1151468	sail	35'	11'6"	Cu	Interlux		shelter island	Nov-11	67%
	SWYC	F17	1.00	912885	Sail	36'	12'	Cu					50+
	SWYC	F19	1.00	CF8683JS	Sail	34'	11'	Cu					50+
	SWYC	F20	0.98	CF6994HC	Sail	41'	12'	Cu	Proline	1099	Shelter Island	Oct-10	67%
	SWYC	F21	0.99	661977	Sail	39'5"	12'8"	Cu	Bottom Pro Gold		South Bay CA M	Jul-06	
	SWYC	F22	0.98	1166236	Sail	32'	10'9"	Cu	Interlux	Ulra (black	Shelter Island	Jul-11	67%
	SWYC	F23	1.00	CF7989GB	Power	36'	11'	Cu					50+
	SWYC	F24	1.00	CF2413HW	Sail	41'	12'	Cu					50+
	SWYC	F25	0.95	1039324	sail	36'	11'	Cu			Shelter Island	Aug-09	50+
	SWYC	F27	0.95	1081682	Power	42'	14'	Cu	Interlux Ultra	3779	Shelter Island	Mar-10	67%
	SWYC	F28	1.00	CF4406PX	Power	24'6"	8'5"	Cu	Pettit	1881	Driscoll	Dec-09	40%
	SWYC	F29	1.00	CF9314HN	Sail	34'	10'	Cu					50+
	SWYC	F30	0.95	648745	Power	41'	13'11"	Cu	Interlux		shelter island	Aug-11	67%
	SWYC	F32	0.95	CF4751 SB	sail	28'6"	9'5"	Cu			shelter island	Jan-08	50+
	SWYC	F35	1.00	676964	sail	25'	9'	Cu			shelter island	Jun-10	50+
	SWYC	F36	1.00	CF0269HF	sail	27'	8'	Cu	Proline	1088	Shelter Island	Feb-08	67%
	SWYC	F38	1.00	CF77594B	Sail	26'	7'	Cu					50+
	SWYC	F39	1.00	CF2944KL	Power	20'	7'	Cu	Pettit	B91 Blue	Driscoll	Jul-10	65%
	SWYC	F40	1.00					Cu					50+
	SWYC	F41	1.00		Sail	24'	7'	Cu					50+
	SWYC	F42	1.00	CF7395NB	Power	21'	8'	Cu	Proline		Shelter Island	Jan-07	67%
	SWYC	F45	0.97	44825A	Power	24'	8'	Cu	Interlux Ultra		Shelter Island	Mar-10	67%
	SWYC	F48	1.00		sail	24'	6'	Cu					50+
	SWYC	F49	1.00	CF5339GZ	Sail	24'	6'	Cu					50+
	SWYC	F50	1.00	CF6661	sail	27'	6'	Cu					75%
	SWYC	F51	1.00	CF5014SS	Sail	24'	6'	Cu	Interlux Ultra			Jul-11	50%



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	SWYC	F52	1.00	CF2602GR	Sail	27'	8'	UKN					
	SWYC	F53	1.00	CF7886HV	Sail	25'	8'	Cu	Pettit Trinidad SR	1277	CA Marine Servi	Jan-07	70%
	SWYC	F54	1.00					Cu					50+
	SWYC	F55	1.00	CF5333PN	Power	22'	5'	Cu					50+
	SWYC	F56	1.00		Power	24'	8'	Cu					50+
	SWYC	F57	1.00	CF5014SS	sail	19'	7'	Cu	Interlux Ultra	Ultra	Shelter Island	Feb-11	67%
	SWYC	F58	1.00					Cu					50+
	SWYC	F59	1.00	CF9327	sail	21'	6"	Cu					50+
	SWYC	F61	0.98	CF3136	Power	22'	8'	Cu	Zspar B-90	60061-49	Aquarius		65%
	SWYC	F62	1.00					UKN					
	SWYC	A80	1.00		Sail	33'	10'	CU					50+
	SWYC	A82	1.00	CF4200 HE	Sail	30'	11'	Cu					50+
	SWYC	A24	0.87	CF1972AV	Sail	33'	6'7"	LCu	Interlux Trilux 33	3734316	Koehler Kraft	Jun-11	24%
	SWYC	A55	0.88	1088393	Sail	30'	10'3"	LCu	Pettit Vivid	1161	Driscoll	Dec-10	25%
	SWYC	D4	0.95	1123615	Sail	35'	9'8"	LCu	Seahawk	af-33	Knight + Barver	Jul-07	33%
	SWYC	A10	1.00	CF 1585 GP	Power	48'	15'	Non-unconf			Koehler Kraft	Apr-10	0
	SWYC	A12	1.00	CG 1059878	Power	50'	16'	Non-unconf					0
	SWYC	A18	0.95	CF 0547 TP	Sail	44'	13'	Non-unconf					0
	SWYC	B9	1.00	CG958030	Power	38'	14'	Non-unconf					0
	SWYC	C22	1.00	CG1125756	Power	36'	13'	Non-unconf			koehler	2008	0
	SWYC	C31	1.00	CF42133SS	35'	11'		Non-unconf					0
	SWYC	D1	1.00	CF1237GH	Sail	30'	12'	Non-unconf					0
	SWYC	D17	0.90	1083695	Sail	33'4"	12'3"	Non-unconf				2008	0
	SWYC	D71	1.00		Sail	36'	13'	Non-unconf					0
	SWYC	D76	1.00	CG925991	Power	37'	13'	Non-unconf			Baumont	Feb-10	0
	SWYC	E11	1.00	967216		38'	13'	Non-unconf					0
	SWYC	E34	0.95	688067	Sail	34'	11'	Non-unconf					0
	SWYC	E40	1.00	744268	Sail	30'	10'8"	Non-unconf					0%
	SWYC	E51	0.95	1210094	Power	28'	8'5"	Non-unconf			P & K Marine	Mar-10	0
	SWYC	F3	1.00	CF2086HR	Sail	33'	11'	Non-unconf					0
	SWYC	F7	1.00	CG908254	Sail	36'	11'	Non-unconf			Shelter Island	Feb-07	0
	SWYC	F33	1.00	CF1193NJ	Sail	36'3"	8'3"	NON	EP 2000		Shelter Island	Aug-08	0
	SWYC	F43	0.95	8988GT	Sail	27'	5'4"	Non-unconf			Driscoll	2009	0
	SWYC	A44	0.00					Vacant					
	SWYC	A47	0.00					Vacant					
	SWYC	A52	0.00					Vacant					
	SWYC	A60	0.00					Vacant					
	SWYC	A84	0.00					Vacant					
	SWYC	A85	0.00					Vacant					
	SWYC	A87	0.00					Vacant					
	SWYC	A89	0.00					Vacant					
	SWYC	A91	0.00					Vacant					
	SWYC	A93	0.00					Vacant					
	SWYC	A96	0.00					Vacant					

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	SWYC	D2	0.00					Vacant					
	SWYC	D92	0.00					Vacant					
	SWYC	E1	0.00					Vacant					
	SWYC	E56	0.00					Vacant					
	SWYC	E59	0.00					Vacant					
	SWYC	E66	0.00					Vacant					
	SWYC	F18	0.00					Vacant					
	SWYC	F31	0.00					Vacant					
	SWYC	F37	0.00					Vacant					
	SWYC	F46	0.00					Vacant					
	SWYC	F47	0.00					Vacant					
	SWYC	F60	0.00					Vacant					
	SWYC	A35	0.95	CF 8947 HB	Sail	30'	10'10"	NON	Interlux Pacifica			2008	0
	SWYC	A48	0.98	1209167	Power	30'1"	9'6"	NON	Interlux Pacifica	Ultra-Black	Shelter Island Bo	Oct-10	0
	SWYC	A59	1.00	CF7776 FX	Power	29'	8'6"	NON	Interlux Pacifica		Koehler Kraft	Feb-10	0
	SWYC	A64	1.00	CF2353 GJ	Sail	30'	11'	NON	Interlux Pacifica				0
	SWYC	A69	1.00	1232431	Sail	28'	10'	NON	Interlux Pacifica			Jun-07	0
	SWYC	A74	1.00	5222	Power	26'	3'	NON-unconf	I				0
	SWYC	A79	1.00	CF0138 HY	Sail	32'	6'5"	NON	Interlux Pacifica		Driscolls		0
	SWYC	A81	0.90	CG1027487	Sail	24'	8'	NON	Interlux Pacifica		Shelter Island	2010	0
	SWYC	A83	0.95	1186905	Sail	30'6"	11'4"	NON	Interlux Pacifica		Shelter Island	Oct-10	0
	SWYC	B15	0.95	CG969802	Sail	41'5"	12'	NON	Interlux Pacifica		Shelter Island	Mar-10	0
	SWYC	C1	1.00	1193337	Power	34'5"	13'	NON	Interlux Pacifica		Driscoll	Oct-09	0
	SWYC	C19	1.00	1190038	Power	45'	15'	NON	Interlux Pacifica			Dec-10	0
	SWYC	C20	1.00	1151268	Power	36'	11'11"	NON	Interlux Pacifica		Koehler Kraft	Jul-09	0
	SWYC	D24	0.99	1142416	Power	33'	10'5"	NON	Interlux Pacifica	YBA163	Shelter Island	Jun-08	0
	SWYC	D26	1.00		Sail	34'	11'9"	NON	Interlux Pacifica		Ventra Marina	Sep-09	0%
	SWYC	D43	0.95	1093696	Power	51'	15'	NON	Interlux Pacifica		Shelter Island	Apr-11	0
	SWYC	D51	1.00	1020736	Power	42'	15'6"	NON	Interlux Pacifica		shelter island		0
	SWYC	D65	0.90	546129	Power	54'	17'	NON	Interlux Pacifica		Shelter Island	May-10	0
	SWYC	D82	0.95	CG1226672	Sail	36'9"	11'10"	NON	Interlux Pacifica		Shelter Island	Apr-10	0
	SWYC	E17	1.00	688885	Power	39'	13'8"	NON	Interlux Pacifica		Koehler Kraft	Jun-07	0
	SWYC	E26	0.95	1143453	Sail	43'	14'2"	NON	Interlux Pacifica		shelter island	Feb-10	0
	SWYC	E45	0.95	CF8755JA	Sail	34'	13'	NON	Interlux Pacifica		Koehler Kraft	May-11	0
	SWYC	E62	0.98	CF9001TK	Power	22'	6'	NON	Interlux Pacifica		Shelter Island	Jan-10	0
	SWYC	E64	1.00	CF5324JA	Sail	25'	8'	NON	Interlux Pacifica		Driscoll	2006	0
	SWYC	E67	1.00	NV6617-KY	Power	19'	8'	NON	Interlux Pacifica		Shelter Island	Jan-11	0
	SWYC	F26	1.00	1086107	Power	36'	12'6"	NON	Interlux Pacifica		shelter island	Feb-11	0
	SWYC	F34	1.00	4545	sail	27'	8'	NON	Interlux Pacifica		shelter island		0
	SWYC	F44	0.90	CF2139UH	Power	23'	7'6"	NON	Interlux Pacifica		Nexus Marine	Jun-09	0
12/20/11	TON	1	0.99	Broker Boat	P	34	13	LCu	Hydrocoat		OTH		40%
12/20/11	TON	2	0.98	Broker Boat	P	34	13	LCu	Hydrocoat		OTH		40%
12/20/11	TON	3	0.99	Broker Boat	P	35	9.75	LCu	Hydrocoat		OTH		40%

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12/20/11	TON	4	0.98	Broker Boat	P	33	11	LCu	Hydrocoat		OTH		40%
12/20/11	TON	5	0.98	Broker Boat	P	42	14.5	LCu	Hydrocoat		OTH		40%
12/20/11	TON	6	0.99	Broker Boat	P	68	19	LCu	Hydrocoat		OTH		40%
12/20/11	TON	7	0.99	Broker Boat	P	34	13	LCu	Hydrocoat		OTH		40%
12/20/11	TON	8	0.00					Vacant					
12/20/11	TON	9	0.00					Vacant					
12/20/11	TON	10	0.00					Vacant					
12/20/11	TON	11	0.00					Vacant					
	Trans	1	0.42					UKN					
	Trans	2	0.42					UKN					
	Trans	3	0.68					UKN					
	Trans	4	0.78					UKN					
	Trans	5	0.71					UKN					
	Trans	6	0.65					UKN					
	Trans	7	0.70					UKN					
	Trans	8	0.62					UKN					
	Trans	9	0.75					UKN					
	Trans	10	0.48					UKN					
	Trans	11	0.59					UKN					
	Trans	12	0.59					UKN					
	Trans	13	0.42					UKN					
	Trans	14	0.59					UKN					
	Trans	15	0.58					UKN					
	Trans	16	0.74					UKN					
	Trans	18	0.29					UKN					
	Trans	19	0.76					UKN					
	Trans	20	0.85					UKN					
	Trans	21	0.69					UKN					
	Trans	22	0.66					UKN					
	Trans	23	0.86					UKN					
	Trans	24	0.70					UKN					
	Trans	25	0.47					UKN					
	Trans	26	0.27					UKN					
	Trans	27	0.37					UKN					
	Trans	28	0.75					UKN					
	Trans	29	0.42					UKN					
	Trans	30	0.04					UKN					
	Trans	33	0.55					UKN					
	Trans	?	0.27					UKN					
	Trans	0-2	0.04					UKN					
	Trans	29X	0.05					UKN					
	Trans	3X	0.12					UKN					
1/31/12	HPD	N/A	0.30	Port ID #7716	P	32	12	Cu	UKN	UKN		2006	UKN
1/31/12	HPD	N/A	0.50	Port ID #7717	P	32	12	Non	HEMPEL	Hempasil X	Shelter Island	Jun-11	0

Date	Facility	Slip/ Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
1/31/12	HPD	N/A	0.50	Port ID #7718	P	32	12	Non	International	Intersleek	Shelter Island	Jun-11	0
1/31/12	HPD	N/A	0.50	Port ID #7719	P	32	12	Non	International	Intersleek	Shelter Island	Dec-10	0
1/31/12	HPD	N/A	0.50	Port ID #7762	P	31	10	Non	Epaint	SN-1	UKN	2008	0
1/31/12	HPD	N/A	0.50	Port ID #7763	P	31	10	Non	Epaint	SN-1	UKN	2009	0
1/31/12	HPD	N/A	0.85	Port ID #9066	P	36	10	Non	Epaint	SN-1	UKN	2009	0
1/31/12	HPD	N/A	0.30	Port ID #9138	P	39.1	13	Non	Epaint	Sunwave	Manufacturer	2010	0
1/31/12	HPD	N/A	0.30	Port ID #9139	P	39.1	13	Non	Epaint	Sunwave	Manufacturer	2010	0
1/31/12	HPD	N/A	0.60	Port ID #7708	P	40	14	Non	International	Intersleek	Shelter Island	Jun-11	0
1/31/12	HPD	N/A	0.60	Port ID #7730	P	34	8	Non	International	Intersleek	Shelter Island	Jun-11	0
1/31/12	HPD	N/A	0.80	Port ID #7750	P	23	8	Non	International	Intersleek	Shelter Island	Jun-11	0
1/31/12	GST	03-01	0.90	Port ID #7720	P	20	7	Non	International	Intersleek	Shelter Island	Jun-11	0
1/31/12	GST	03-02	0.60	Port ID #9144	M	20	8	Non	International	Intersleek	Manufacturer	2011	0

**Table A-2. Shelter Island Yacht Basin 2011 Vessel Tracking Data for Port-Operated Anchorage**

<b>Date</b>	<b>Vessels</b>	<b>% Occupancy of 40 Moorings</b>	<b># of Moored Days per 3- day Permit</b>
1/7/2011	8	20	2
1/14/2011	32	80	2
1/21/2011	6	15	2
1/28/2011	17	43	2
2/4/2011	12	30	2
2/11/2011	22	55	2
2/18/2011	27	68	2
2/25/2011	4	10	2
3/4/2011	13	33	2
3/11/2011	11	28	2
3/18/2011	7	18	2
3/25/2011	19	48	2
4/1/2011	23	58	2
4/8/2011	9	23	2
4/15/2011	22	55	2
4/22/2011	19	48	2
4/29/2011	21	53	2
5/6/2011	24	60	2
5/13/2011	15	38	2
5/20/2011	26	65	2
5/27/2011	41	103	2
6/3/2011	13	33	2
6/10/2011	38	95	2
6/17/2011	19	48	2
6/24/2011	37	93	2
7/1/2011	55	138	2
7/8/2011	21	53	2
7/15/2011	38	95	2
7/22/2011	17	43	2
7/29/2011	41	103	2
8/5/2011	31	78	2
8/12/2011	27	68	2
8/19/2011	27	68	2
8/26/2011	38	95	2
9/2/2011	38	95	2
9/9/2011	16	40	2
9/16/2011	24	60	2
9/23/2011	18	45	2
9/30/2011	17	43	2
10/7/2011	44	110	2
10/14/2011	40	100	2
10/21/2011	38	95	2
10/28/2011	40	100	2
11/4/2011	18	45	2
11/11/2011	27	68	2
11/18/2011	12	30	2
11/24/2011	18	45	2
12/2/2011	13	33	2
12/9/2011	15	38	2
12/16/2011	10	25	2
12/23/2011	10	25	2
12/30/2011	44	110	2

# Shelter Island Yacht Basin Master Leaseholders, Hull Coating Data Compiled Jan15, 2012

	Average Yearly Occupancy Percentage	Number of Slips	Number of Vacant Slips	Number of Non-copper Painted Hulls	Number of Hulls not loading copper into basin	Number of Low Copper Hulls
Bay Club Marina	96	156	6	2	8	14
Kona Kai	61	526	206	2	208	16
Shelter Isl Marina	86	135	19	9	28	9
Half Moon Marina	92	178	14	5	19	3
Crow's Nest	41	26	15	0	15	8
Gold Coast	76	35	8	2	10	9
SDYC	90	572	57	37	94	138
SGYC	83	141	24	3	27	58
SWYC	90	383	38	48	86	42
Tonga Landing	73	11	3	0	3	7
La Playa YC	100	4	0	1	1	1
<b>TOTALS</b>				109	500	305
<b>Loading Reduction</b>						<b>30%</b>

Appendix B  
Best Management Practice Plans



# Shelter Island Master Leaseholders TMDL Group

## **BMP Plan And TMDL Compliance**



# Table of Contents

- 1. Overview of BMP Plan
- 2. Compliance Items in Place

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## Overview of Our Commitment

It is the intention of the Shelter Island Master Leaseholders TMDL Group to be committed in doing its part, to the fullest extent possible, to comply with TMDL requirements, loading allocations, and schedules for achieving required copper loading reductions. The following BMP plan is intended to help us achieve these goals.

## Compliance Items in Place

- Formation of the Shelter Island Master Leaseholders (SIML) TMDL Group
  - Unanimous and voluntary participation by all SIML's
- SIML's began attendance of TMDL stakeholder meetings in 2005.
- All SIML's are certified Clean Marinas or in the process of becoming certified.
- All SIML's are collecting vessel hull paint information and tracking as required by the Port of San Diego and the TMDL.
- Hull Cleaner Compliance
  - Check to ensure all divers have valid Port of San Diego Hull Cleaning Permits prior to entry of leasehold.
  - Report hull cleaners who arrive via boat and do not check in with the Dockmaster's Office to the Port of San Diego.
  - Report hull cleaners to the port of San Diego that do not use proper BMP's or who create visible paint plumes during hull cleaning.
  - Posted diver BMP signs on leasehold.
- Boater Education
  - Committed to ongoing TMDL education using the following tools:
    - Newsletters
    - Workshops
    - Readily available literature
- Require boaters to use only Port permitted hull cleaner's

- Regular BMP Assessments
- Ongoing Staff Training
- Alternative Paint Incentive Programs planned to include:
  - Wait List Priority
  - Financial Incentives
  - Regular BMP Assessments

Table B-1. Best Management Practices and Other Actions Implemented by the Port to Reduce Dissolved Copper Loads

BMP TYPE	DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	PARTNER
Defined Projects for Stage 2 (2007-2012)							
Policy/ Regulation	In-water Hull Cleaning Permit: An ordinance was developed to reduce or eliminate copper loading from in-water hull cleaning activities. The ordinance requires that all in-water hull cleaning be conducted in a manner that does not produce a visible paint plume or cloud, and that all hull cleaning businesses operating on Port tidelands obtain a Port permit.	SIYB Bay-wide	The objective of the In-Water Hull Cleaning regulation is to reduce or eliminate copper pollution caused by hull cleaning activities in San Diego Bay.	Load reduction: All hull cleaning businesses operating on Port Tidelands have obtained permits and follow industry standard BMPs.	# of permitted in-water hull cleaning businesses/ total in-water hull cleaning businesses	<p>Start Date: Fiscal Year (FY) 10 Completion Date: Ongoing. Permits are to be reissued two years following initial date of issuance.</p> <p>Status: Implementation of the two-year permit is complete. The Port conducted a thorough public outreach process to gather input and hear concerns about the proposed hull cleaning regulations. The Port conducted three public workshops during this reporting period to seek input from the boating community, professional divers, marinas, and others in order to better understand the in-water hull cleaning industry and identify environmental impacts and solutions to minimize those impacts. The Port issued press releases and used other media sources to advertise workshops and communicate key project milestones. The Board of Port Commissioners approved the Permit and Code Amendment during this reporting period and the permit became effective on November 1, 2011.</p> <p>As of December 31, 2011, 50 in-water hull cleaning companies obtained permits.</p>	
Policy/ Regulation	<p>Copper Hull Paint Legislation Senate Bill (SB) 623 (Kehoe): The Port is involved in the development of state legislation that will phase out the use of copper paints on most recreational vessels in California</p> <p>Port staff began working as a co-sponsor of SB 623 regarding regulation of copper hull paints with Senator Kehoe's office, San Diego Coastkeeper, and Sacramento</p>	SIYB Bay-wide Statewide	This bill supports the Port's efforts to reduce copper pollution in San Diego Bay marinas by controlling copper loading throughout the state.	Load reduction: Approval of SB 623		<p>Start Date: FY11 Completion Date: FY11</p> <p>Status: Port staff traveled to Sacramento to testify at the Senate Environmental Quality Policy Committee on May 2, 2011, and participated in a stakeholder forum on May 19, 2011. In August 2011, SB 623 became a two-year bill. Since then it has passed out of the Senate and currently is being held in Assembly Appropriations. This committee will not discuss SB 623 until July or August 2012. Port is continuing outreach efforts to stakeholders.</p>	Senator Christine Kehoe, San Diego Coastkeeper

BMP TYPE	DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	PARTNER
	legislative consultants.						
Policy/ Regulation	Brake Pad Legislation: The project involves providing support for SB 346 (Kehoe) which requires for brake pads sold in California to contain no more than 0.5% copper by 2025. In addition, the bill will: 1) creates limits for other brake pad materials; 2) establishes a certification process by a third party testing agency and requires Department of Toxic Substances Control to charge a fee to cover the costs; 3) establishes civil penalties for violations; and 4) creates a Brake Friction Materials Water Pollution Fund.	Bay-wide Statewide	The Port supported Sustainable Conservation's Brake Pad Partnership technical efforts legislatively this reporting period by providing letters of support. The Port's support was critical in obtaining Senator Kristine Kehoe's sponsorship of SB 346 (Kehoe).	Load reduction: reduction of copper in brake pad materials.	Support of Sustainable Conservation; Approval of Senate Bill 346 (Kehoe)	Start Date: FY09 Completion Date: FY11  Status: Complete. The bill was signed by Governor Schwarzenager in September 2010.	
Alternative Hull Paint Studies	USEPA-funded "Safer Alternatives to Copper Antifouling Paints" Project: The grant presented a platform to test the effectiveness of several types of alternative non-copper paints and allow comparisons between emerging paint products. Testing occurred in two phases: panel and boat testing.	SIYB Bay-wide Statewide	The objective of the project was to identify and promote the use of effective non-copper antifouling paints.	Completeness: Development of a standardized protocol for testing the effectiveness of new coatings and a viable alternatives list.	Completed study and final report was prepared by the Port and Dr. Katy Wolf (Institute for Research and Technical Assistance).	Start Date: FY07 Completion Date: FY11  Status: Complete Final report was submitted January 31, 2011. The project was determined to be successful in achieving its goal of identifying viable alternative hull paints to copper hull paint.	
Alternative Hull Paint Studies: Long- term Hull Paint Testing Program	Development: Development of a panel testing program to evaluate new and emerging coatings and technologies	SIYB Bay-wide Statewide	The objective of the project was to identify effective non-copper antifouling paints through panel testing.	Completeness/Change in Awareness	A standardized protocol for testing the effectiveness of new coatings has been developed.	Start Date: FY09 Completion Date: On-going  Status: Tested 22 new alternative hull paints from August 2009 – August 2010. Tested 18 new alternative hull paints from August	Paint manufacturers, Boatyards, Marinas/yacht clubs

BMP TYPE	DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	PARTNER
						2010 – August 2011. No testing occurred during FY 12, but additional testing will occur in the future.	
Alternative Hull Paint Studies: Long-term Hull Paint Testing Program	Hornblower Cruises Paint Testing Partnership	SIYB Bay-wide Statewide	The objective of the project was to test alternative hull paints and spread awareness of the alternative hull paint options. The project is proving to be extremely beneficial in educating the public and spreading the Port's message on hull paint transition	Change in Awareness	Completed Study/ Boater surveys	Start Date: FY09 Completion Date: On-going  Status: Tested 10 alternative hull paints from 2009-2011. Continued partnership by testing 10 alternative hull paints from 2011-2013.	Hornblower Cruises
Alternative Hull Paint Studies: Long-term Hull Paint Testing Program	Alternative Product Development  Financial support for this research was provided by the Port's Environmental Fund.	SIYB Bay-wide Statewide	The Port continued to support new product development by funding research projects to develop alternative hull paints and/or associated technologies.	Completeness: Development of new viable alternative hull paints	Completed study and final report	Start Date: FY11 Completion Date: FY13  Status: There are three funded projects that are designed to be completed within two years.	Paint manufacturers, Academia
Alternative Hull Paint Studies: Long-term Hull Paint Testing Program	San Diego State University MBA Consulting Program's Antifouling Paint Contacts Project	Bay-wide	Identify alternative hull paint products available world-wide and develop a contact list	Completeness: Database of contacts and an understanding of global efforts	Completed study and final report	Start Date: FY09 Completion Date: FY09  Status: Complete	
Hull Paint Transition	Transition of Port Fleet to Non-copper Hull Paints by 2012	SIYB	To facilitate the reduction of copper loading to SIYB in compliance with interim and final loading reduction targets	Load reduction: 100% of fleet transitioned to non-copper hull paints	# converted/ total	Start Date: FY09 Completion Date: FY11  Status: Complete. All Port boats have been converted.	
Hull Paint Transition/ Grant Funding/ Incentives	319(h) Hull Paint Conversion Project: The project is designed to reduce the levels of copper in SIYB by encouraging boaters to switch from copper to non-biocide hull paint. The project consists of three primary components: 1) education and outreach, 2) load reduction via hull paint conversion, and 3) long-term tracking of vessel conversion using a web-based system.	SIYB	The purpose of the project is to convert SIYB boats to non-copper hull paints. This is consistent with the implementation strategy identified in the SIYB TMDL Technical Report.	Load reduction: ~200 vessels converted to non-toxic hull paints	# of vessels converted and tracking size of vessels to determine loading reduction	Start Date: FY11 Completion Date: FY14  Status: <ul style="list-style-type: none"> <li>43 Boat Owner Interest Forms have been submitted to date</li> <li>Five boat owners have submitted signed agreements and slip location verification documentation</li> <li>One task authorization form was sent to boatyard</li> <li>Completed consultant selection, contracting and initiated the development of the conceptual design of vessel tracking database</li> <li>Developed an outreach approach for the SIYB Copper Hull Paint Conversion Project and drafted associated outreach materials by working with stakeholders and consultants. Meetings</li> </ul>	Paint manufacturers, Boatyards

BMP TYPE	DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	PARTNER
	The Port initiated work on the SIYB Copper Hull Paint Conversion Project on February 15, 2011.					<p>were held with project stakeholders to discuss appropriate outreach approaches to effectively reach the boating community. During these meetings, each party's role in the outreach efforts was identified.</p> <ul style="list-style-type: none"> <li>• Developed the process and procedures for implementing the hull paint conversion project</li> <li>• Met with participating boatyards</li> <li>• Met with project stakeholders five times to discuss appropriate outreach approaches that will effectively reach the boating community</li> <li>• Established a new web domain dedicated for the Port's Copper Reduction Program web page to make it easier for boat owners to reach grant-related information, as well as general copper pollution information</li> </ul>	
Education/ Outreach	San Diego State University MBA Consulting Program's Copper Reduction Program Marketing Strategy	Bay-wide	The Port partnered with the San Diego State University's MBA Business Consulting Program to develop a marketing strategy that identified the most effective approaches to reach boaters and change hull paint behaviors.	Completeness/Change in Awareness	Completed study and final report	<p>Start and Completion Date: FY11</p> <p>Status: Project completed in May 2011. The Port began to coordinate internally to initiate some of the approaches identified in the strategy during this reporting period.</p>	San Diego State University
Education/ Outreach	Booths at major events	SIYB Bay-wide	Distribution of brochures and other educational materials for the public of the copper pollution issue, available non-biocide hull paint options, or of the Grant funds available to assist in transitioning to non-biocide hull paints.	Change in Awareness/Change in Behavior	# of posted advertisements or pamphlets distributed; # of people applying for 319h Hull Paint Conversion Project funds at the events; Results from public opinion/awareness or applicant surveys (as applicable)	<p>On-going</p> <p>Status: Booths at six events</p> <ul style="list-style-type: none"> <li>• Sun Road Boat Show on 1/27/10 – 1/30/11. Estimated 13,300 in attendance over the timeframe of the event. No surveys distributed.</li> <li>• Day at the Docks on April 17, 2011. Estimated 1,000 in attendance. No survey distributed.</li> <li>• Boater Safety Day at Shelter Island Marina – May 21, 2011. Approx. 20 people in attendance. No survey distributed.</li> <li>• 319h Hull Paint Conversion Project Public Workshop / Media Event on August 6, 2011. More information on this event below.</li> <li>• World Trade Center Peace and Prosperity event on September 10, 2011. No survey distributed.</li> <li>• America's Cup World Series (AC World Series) event on November 12-20, 2011. No survey distributed.</li> </ul>	
Education/ Outreach	Workshops/seminars for Boaters	SIYB Bay-wide	Conduct educational workshops for the public to provide information on non-	Change in Awareness/Change in	# of people attending; # of	On-going	All Named Parties



BMP TYPE	DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	PARTNER
			copper hull paints.	Behavior	people applying for 319h Hull Paint Conversion Project funds as a result of the event; results from applicant surveys; pre/post-tests; sign-in sheets from workshops	Status: 319h Hull Paint Conversion Project Public Workshop / Media Event (August 6, 2011): <ul style="list-style-type: none"> <li>Approximately 150 people attended.</li> <li>Announcement published in three local boating publications (Latitude 38, Bluesky News and The Log)</li> <li>Five boatyards, five paint manufacturers, UC Coastal Resources Program, and the Port were present and had booths</li> </ul>	
Education/ Outreach	Education brochures/outreach materials/press releases	SIYB Baywide	Development of brochures and other educational materials for the public of the copper pollution issue, available non-biocide hull paint options, or of the grant funds available to assist in transitioning to non-biocide hull paints. The Port worked with stakeholders and consultants to finalize outreach materials.	Change in awareness	# of brochures, pamphlets, or press releases distributed; # of people applying for 319h Hull Paint Conversion Project funds; results from applicant surveys; pre/post-tests	On-going  Status: Completed several outreach materials: <ul style="list-style-type: none"> <li>"How to Select an Alternative Hull Paint brochure</li> <li>319h Hull Paint Conversion Project advertisement flier</li> <li>319h Hull Paint Conversion Project's Frequently Asked Questions flier</li> <li>Posters, postcards, ecards for 319h Hull Paint Conversion Project Public Workshop / Media Event and remind boaters following media event</li> <li>Eleven press releases over the reporting period on different projects within the Copper Reduction Program</li> </ul>	All Named Parties
Education/ Outreach	Presentations at Conferences	Bay-wide State-wide	Presented information on the Copper Reduction Program and on non-copper hull paint alternative hull paints.	Change in awareness	# of brochures or pamphlets distributed/people attending	On-going  Status: Presented at two conferences <ul style="list-style-type: none"> <li>California Stormwater Quality Association (September 26-28, 2011)</li> <li>Marine Recreation Association Conference (November 2 – 4, 2011)</li> </ul>	
Education/ Outreach	Participation in state-wide copper sub-workgroup	Bay-wide State-wide	The Port participates in a state-wide copper sub-workgroup, led by the Department of Pesticide Regulation (DPR), to increase overall understanding of copper impacts statewide	Change in Awareness/Change in Behavior	# of meetings/people participating	On-going  Status: The workgroup met four times: March 9, 2011, June 8, 2011, August 7, 2011, and December 7, 2011.	All Named Parties, Paint Manufacturers, Boatyards, Hull Cleaners
Agency Wide Activities	Construction Site Inspections	SIYB Bay-wide	All construction projects on Port tidelands that meet certain criteria are required to submit a storm water pollution prevention plan (SWPPP) for the Port's approval. If the project is	Change in Behavior	Total # Inspections; # of follow up inspections	On-going  Status: Three construction projects required inspections in SIYB in 2011	

BMP TYPE	DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	PARTNER
			subject to the General Stormwater Construction Permit, then the SWPPP is prepared in accordance with the conditions stated within that permit. If the project is not subject to the General Construction Stormwater Permit, but will disturb either 100 square feet or more of soil or will occur over or within a waterbody, a mini-SWPPP is required. The mini-SWPPP includes a project description and site maps, identifies responsible parties for SWPPP implementation, BMPs, employee training and inspection. Corrective actions may be taken if these requirements are not followed.			One of the construction projects required follow-up inspections	
Agency Wide Activities	Commercial Business Inspections	SIYB Bay-wide	The Port inspects prioritized commercial facilities per the Municipal Permit in the SIYB and bay-wide. One particular component, the Port's marina inspection program, has been an effort to educate boat owners about pollution prevention, focusing on visual observations designed to identify sources of pollution, both actual and potential, and to identify the pollution prevention practices being implemented at the marinas.	Change in Behavior	Total # Inspections; # of follow up inspections	On-going  Status: 14 inspections occurred in SIYB in 2011. <ul style="list-style-type: none"> <li>• 2 municipal</li> <li>• 12 commercial facilities (including marinas/yacht clubs)</li> </ul> Landside BMPs were determined to be properly implemented.  No follow-up inspections were required for these facilities	
Structural and Mechanical BMP Implementation	SUSMP and Development Regulations	SIYB Bay-wide	The Port incorporates standard urban storm water mitigation plan (SUSMP) requirements on applicable development and redevelopment projects bay-wide. Depending on the type and size of the projects, SUSMP requirements could include site design, source controls, and treatment controls such as low-impact development.	Change in Behavior: Compliance	# of projects submitted subject to SUSMP	On-going  Status: Two construction projects in SIYB submitted in 2011 were subject to SUSMP requirements.	
Monitoring	Regional Harbor Monitoring Program (RHMP): Core Monitoring Program	SIYB Bay-wide RHMP Harbors	Assesses conditions found in San Diego Bay based on comparisons to historical data and comparisons to contaminant concentrations to known surface water and sediment thresholds.	Completeness	Report on findings of the study results completed by Weston for RHMP	Start Date: FY08 Completion Date: FY10 Status: Complete	City of San Diego, City of Oceanside, County of Orange
Monitoring/	RHMP Special Study #1	Bay-wide	Provide a review of the existing data	Completeness	Report on	Start Date: FY10	City of San Diego,

BMP TYPE	DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	PARTNER
Reporting	Copper Literature Review	RHMP Harbors	and literature on the extent and magnitude of copper contamination in RHMP harbors; identify and determine the relative importance of copper sources; and use the BLM to predict SSOs based on site-specific water quality data.		findings of the study results completed by WESTON for RHMP	Completion Date: FY12 Status: Complete	City of Oceanside, County of Orange
Monitoring/ Reporting	RHMP Special Study #2 Toxicity Assessments	Bay-wide RHMP Harbors	Toxicity assessments were performed at stations previously shown to have sediment toxicity, with the intention of performing toxicity identification evaluations.	Completeness	Report on findings of the study results by WESTON for RHMP	Start Date: FY11 Completion Date: FY13 Status:	City of San Diego, City of Oceanside, County of Orange
Monitoring/ Reporting	RHMP Special Study #3 Copper Flux Study	SIYB RHMP Harbors	Laboratory assessment will be used to test flux of dissolved copper between sediments and the water column under static and mixing conditions at marina locations in RHMP harbors.	Completeness	Report on findings of the study results by Weston for RHMP	Start Date: FY11 Completion Date: FY13 Status:	City of San Diego, City of Oceanside, County of Orange

Appendix C  
Water Quality Results



September 19, 2011

Matt Wartian  
Weston Solutions, Inc.  
2433 Impala Dr.  
Carlsbad, CA 92010-

Project Name: Shelter Island Yacht Basin  
Physis Project ID: 1108003-001

Dear Matt,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 08/22/2011. A total of 7 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Elements
Total & Dissolved Trace Metals by EPA 1640
Subcontract
Total Organic Carbon by SM 5310 B
Dissolved Organic Carbon by SM 5310 B

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier  
Extension 202  
714-335-5918 cell  
mistymercier@physislabs.com

## ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

## QUALITY ASSURANCE SUMMARY

**LABORATORY BATCH:** Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and are used to assess the validity of the sample analyses.

**PROCEDURAL BLANK:** Laboratory contamination introduced during method use was assessed through the analysis of procedural blanks at a minimum frequency of one per batch. Physis' QM requires that all procedural blanks be below 10 times the MDL and all detectable constituents in the procedural blanks be flagged in the project sample results with a B qualifier.

**ACCURACY:** Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

**PRECISION:** Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS<sub>1</sub>/MS<sub>2</sub>, BS<sub>1</sub>/BS<sub>2</sub>, LCS<sub>1</sub>/LCS<sub>2</sub>, LCM<sub>1</sub>/LCM<sub>2</sub>, CRM<sub>1</sub>/CRM<sub>2</sub>, surrogate spikes and/or replicate project sample analysis (R<sub>1</sub>/R<sub>2</sub>) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

**MATRIX SPIKES:** MS samples were employed to assess the effect a particular project sample matrix has on the accuracy of a measurement. It is prepared by adding a known amount of the target analyte(s) to an aliquot of the project sample. Matrix spikes indicate the bias of analytical measurements due to chemical interferences inherent in the sample matrix. If the matrix spike recovery does not fall within the specified acceptance limits, it may be an indication of sample matrix interference in the specific project sample used for the MS. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

**BLANK SPIKES:** BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

**CERTIFIED REFERENCE MATERIALS:** CRMs are pre-homogenized materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of a preparation and analytical method. CRMs are analyzed to provide evidence that the laboratory method produces results that are comparable to those obtained by an independent organization.

**SURROGATES:** Where CRMs are unavailable, target analyte recovery can be assessed by monitoring added surrogate compounds/elements. A surrogate is a pure analyte unlikely to be found in any project sample and most often used with organic analytical procedures. Percent recovery is calculated for each surrogate and is used to monitor method performance within each discrete sample and is indicative of the procedure's ability to recover the actual analytes of interest.

**HOLDING TIME:** Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's

concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes. Physis' QM requires that all samples analyzed beyond the method recommended holding time be flagged in the sample results with an H qualifier.

**TOTAL/DISSOLVED FRACTION:** In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

**PHYSIS QUALIFIER CODES**

<b>CODE</b>	<b>DEFINITION</b>
<b>*</b>	see Case Narrative
<b>ND</b>	analyte not detected at or above the MDL
<b>B</b>	analyte was detected in the procedural blank greater than 10 times the MDL
<b>E</b>	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
<b>H</b>	sample received and/or analyzed past the recommended holding time
<b>J</b>	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
<b>N</b>	insufficient sample, analysis could not be performed
<b>M</b>	analyte was outside the specified recovery and/or RPD acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
<b>SH</b>	analyte concentration in the project sample exceeded the spike concentration, therefore MS recovery and/or RPD acceptance limits do not apply
<b>SL</b>	analyte results for R1 and/or R2 were lower than 10 times the MDL, therefore RPD acceptance limits do not apply
<b>NH</b>	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore RPD was outside the specified acceptance limits
<b>R</b>	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples



# PHYSIS

**PANALYTICAL**  
**REPORT**

TERRA AURA  
ENVIRONMENTAL LABORATORIES, INC.

*Innovative Solutions for Nature*



1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

## Trace Metals

## ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	BATCH ID	PREPARED	ANALYZED	METHOD	QA CODE	
<b>Physis Sample ID: 8443-R1</b>		<b>SIYB-1</b>				<b>Seawater</b>	<b>Sampled: 22-Aug-11</b>	<b>16:35</b>	<b>Received: 23-Aug-11</b>		
Copper (Cu)	Total	14.36	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Copper (Cu)	Dissolved	11.32	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Total	35.968	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Dissolved	33.126	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
<b>Physis Sample ID: 8444-R1</b>		<b>SIYB-2</b>				<b>Seawater</b>	<b>Sampled: 22-Aug-11</b>	<b>16:25</b>	<b>Received: 23-Aug-11</b>		
Copper (Cu)	Total	10.53	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Copper (Cu)	Dissolved	7.22	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Total	25.455	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Dissolved	22.743	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
<b>Physis Sample ID: 8445-R1</b>		<b>SIYB-3</b>				<b>Seawater</b>	<b>Sampled: 22-Aug-11</b>	<b>16:15</b>	<b>Received: 23-Aug-11</b>		
Copper (Cu)	Total	10.37	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Copper (Cu)	Dissolved	7.55	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Total	24.377	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Dissolved	22.684	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
<b>Physis Sample ID: 8446-R1</b>		<b>SIYB-4</b>				<b>Seawater</b>	<b>Sampled: 22-Aug-11</b>	<b>16:10</b>	<b>Received: 23-Aug-11</b>		
Copper (Cu)	Total	10.7	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Copper (Cu)	Dissolved	7.81	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Total	25.028	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Dissolved	23.842	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
<b>Physis Sample ID: 8447-R1</b>		<b>SIYB-5</b>				<b>Seawater</b>	<b>Sampled: 22-Aug-11</b>	<b>16:00</b>	<b>Received: 23-Aug-11</b>		
Copper (Cu)	Total	11.19	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Copper (Cu)	Dissolved	8.72	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Total	30.252	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
Zinc (Zn)	Dissolved	29.392	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640		
<b>Physis Sample ID: 8448-R1</b>		<b>SIYB-6</b>				<b>Seawater</b>	<b>Sampled: 22-Aug-11</b>	<b>15:40</b>	<b>Received: 23-Aug-11</b>		



1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

## Trace Metals

## ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	BATCH ID	PREPARED	ANALYZED	METHOD	QA CODE
Copper (Cu)	Total	9.51	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640	
Copper (Cu)	Dissolved	7.48	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640	
Zinc (Zn)	Total	24.895	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640	
Zinc (Zn)	Dissolved	23.896	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640	
<b>Physis Sample ID: 8449-R1</b>		<b>SIYB-REF</b>		<b>Seawater</b>		<b>Sampled: 22-Aug-11 15:25</b>		<b>Received: 23-Aug-11</b>		
Copper (Cu)	Total	3.05	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640	
Copper (Cu)	Dissolved	2.14	0.01	0.02	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640	
Zinc (Zn)	Total	8.37	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640	
Zinc (Zn)	Dissolved	7.458	0.005	0.01	µg/L	E-2137	8/29/2011	9/3/2011	EPA 1640	

# PHYSICS

## QUALITY CONTROL

## REPORT

TERRA FUSION AQUA AURA  
ENVIRONMENTAL LABORATORIES, INC.

*Innovative Solutions for Nature*



1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

<h1>Trace Metals</h1>	<h1>QUALITY CONTROL REPORT</h1>
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Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
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Lab Blank		8442-B1	QAQC Procedural Blank DI Water				Prepared 8/29/2011			Analyzed 03-Sep-11					
Copper (Cu)	Total	E-2137	ND	0.01	0.02	µg/L									
Copper (Cu)	Dissolved	E-2137	ND	0.01	0.02	µg/L									
Zinc (Zn)	Total	E-2137	ND	0.005	0.01	µg/L									
Zinc (Zn)	Dissolved	E-2137	ND	0.005	0.01	µg/L									

Lab Dup		8443-R2	SIYB-1 Seawater				Prepared 8/29/2011			Analyzed 03-Sep-11		
Copper (Cu)	Total	E-2137	13.8	0.01	0.02	µg/L				4	30	PASS
Copper (Cu)	Dissolved	E-2137	11.48	0.01	0.02	µg/L				1	30	PASS
Zinc (Zn)	Total	E-2137	33.51	0.005	0.01	µg/L				7	30	PASS
Zinc (Zn)	Dissolved	E-2137	33.566	0.005	0.01	µg/L				1	30	PASS

Lab Control Mate		8450-LCM1	QAQC LCM - Physis Seawater Seawater				Prepared 8/29/2011			Analyzed 03-Sep-11		
Copper (Cu)	Total	E-2137	0.12	0.01	0.02	µg/L						
Zinc (Zn)	Total	E-2137	0.566	0.005	0.01	µg/L						

Lab Control Spik		8450-LCS1	QAQC LCM - Physis Seawater Seawater				Prepared 8/29/2011			Analyzed 03-Sep-11		
Copper (Cu)	Total	E-2137	16.89	0.01	0.02	µg/L	20	0.12	84	75 - 125%	PASS	
Zinc (Zn)	Total	E-2137	23.166	0.005	0.01	µg/L	20	0.566	113	75 - 125%	PASS	

Lab Control Spik		8450-LCS2	QAQC LCM - Physis Seawater Seawater				Prepared 8/29/2011			Analyzed 03-Sep-11				
Copper (Cu)	Total	E-2137	16.28	0.01	0.02	µg/L	20	0.12	81	75 - 125%	PASS	4	30	PASS
Zinc (Zn)	Total	E-2137	22.928	0.005	0.01	µg/L	20	0.566	112	75 - 125%	PASS	1	30	PASS

# **SUBCONTRACT**

# **REPORT**



TERRA R AG A AURA  
ENVIRONMENTAL LABORATORIES, INC.

*Innovative Solutions for Nature*



25712 Commercentre Drive  
Lake Forest, California 92630  
949.297.5020 Phone  
949.297.5027 Fax

29 August 2011

Misty Mercier  
PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim, CA 92806  
RE: 1108003-001

Enclosed are the results of analyses for samples received by the laboratory on 08/23/11 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Daniel Chavez  
Project Manager



25712 Commercentre Drive  
Lake Forest, California 92630  
949.297.5020 Phone  
949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim CA, 92806

Project: 1108003-001  
Project Number: 1108003  
Project Manager: Misty Mercier

**Reported:**  
08/29/11 14:50

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SIYB-1	T111152-01	Water	08/22/11 16:35	08/23/11 16:00
SIYB-2	T111152-02	Water	08/22/11 16:25	08/23/11 16:00
SIYB-3	T111152-03	Water	08/22/11 16:15	08/23/11 16:00
SIYB-4	T111152-04	Water	08/22/11 16:10	08/23/11 16:00
SIYB-5	T111152-05	Water	08/22/11 16:00	08/23/11 16:00
SIYB-6	T111152-06	Water	08/22/11 15:40	08/23/11 16:00
SIYB-REF	T111152-07	Water	08/22/11 15:25	08/23/11 16:00

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 Lake Forest, California 92630  
 949.297.5020 Phone  
 949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 08/29/11 14:50
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**SIYB-1**  
**T111152-01(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.81</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	
<b>Total Organic Carbon</b>	<b>0.22</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	J

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 949.297.5020 Phone  
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PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 08/29/11 14:50
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**SIYB-2**  
**T111152-02(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.78</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	
<b>Total Organic Carbon</b>	<b>0.23</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	J

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 949.297.5020 Phone  
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PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 08/29/11 14:50
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**SIYB-3**  
**T111152-03(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.75</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	
<b>Total Organic Carbon</b>	<b>0.22</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	J

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 949.297.5020 Phone  
 949.297.5027 Fax

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**SIYB-4**  
**T111152-04(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.74</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	
<b>Total Organic Carbon</b>	<b>0.21</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	J

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 949.297.5020 Phone  
 949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 08/29/11 14:50
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**SIYB-5**  
**T111152-05(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.65</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	
<b>Total Organic Carbon</b>	<b>0.21</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	J

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 Lake Forest, California 92630  
 949.297.5020 Phone  
 949.297.5027 Fax

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**SIYB-6**  
**T111152-06(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.66</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	
<b>Total Organic Carbon</b>	<b>0.22</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	J

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 949.297.5020 Phone  
 949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 08/29/11 14:50
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**SIYB-REF**  
**T111152-07(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.65</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	
<b>Total Organic Carbon</b>	<b>0.23</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	J

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 949.297.5020 Phone  
 949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc.  
 1904 E. Wright Circle  
 Anaheim CA, 92806

Project: 1108003-001  
 Project Number: 1108003  
 Project Manager: Misty Mercier

**Reported:**  
 08/29/11 14:50

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods - Quality Control**  
**SunStar Laboratories, Inc.**

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 1081914 - General Preparation**

<b>Blank (1081914-BLK1)</b>		Prepared: 08/19/11 Analyzed: 08/25/11									
Total Organic Carbon	0.209	0.062	0.50	mg/l							J

<b>Duplicate (1081914-DUP1)</b>		Source: T111159-10 Prepared: 08/19/11 Analyzed: 08/26/11									
Total Organic Carbon	7.72	0.062	0.50	mg/l		7.38			4.60	20	

**Batch 1082412 - General Preparation**

<b>Blank (1082412-BLK1)</b>		Prepared: 08/24/11 Analyzed: 08/25/11									
Dissolved Organic Carbon	ND	0.062	0.50	mg/l							

<b>Duplicate (1082412-DUP1)</b>		Source: T111152-01 Prepared: 08/24/11 Analyzed: 08/25/11									
Dissolved Organic Carbon	0.686	0.062	0.50	mg/l		0.814			17.1	20	

SunStar Laboratories, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





25712 Commercentre Drive  
Lake Forest, California 92630  
949.297.5020 Phone  
949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim CA, 92806

Project: 1108003-001  
Project Number: 1108003  
Project Manager: Misty Mercier

**Reported:**  
08/29/11 14:50

### Notes and Definitions

- J Detected but below the Standard Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

SunStar Laboratories, Inc.

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## SAMPLE RECEIVING REVIEW SHEET

BATCH # T11152

Client Name: PHYSIS

Project: 1108003-001

Received by: DAN

Date/Time Received: 8/23/11 1600

Delivered by:  Client  SunStar Courier  GSO  FedEx  Other

Total number of coolers received 0 Temp criteria = 6°C > 0°C (no frozen containers)

Temperature: cooler #1 3.8 °C +/- the CF (-0.2°C) = 3.6 °C corrected temperature

cooler #2 \_\_\_\_\_ °C +/- the CF (-0.2°C) = \_\_\_\_\_ °C corrected temperature

cooler #3 \_\_\_\_\_ °C +/- the CF (-0.2°C) = \_\_\_\_\_ °C corrected temperature

Samples outside temp. but received on ice, w/in 6 hours of final sampling.  Yes  No\*  N/A

Custody Seals Intact on Cooler/Sample  Yes  No\*  N/A

Sample Containers Intact  Yes  No\*

Sample labels match COC ID's  Yes  No\*

Total number of containers received match COC  Yes  No\*

Proper containers received for analyses requested on COC  Yes  No\*

Proper preservative indicated on COC/containers for analyses requested  Yes  No\*  N/A

Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times.  Yes  No\*

\* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date BC 8/23/11

Comments:

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**CHAIN OF  
CUSTODY**

**PREPARED BY**

TERRA FUTURE ENERGY SOLUTIONS AURA  
ENVIRONMENTAL LABORATORIES, INC.

*Innovative Solutions for Nature*



2433 Impala Drive • Carlsbad, CA 92010 • (760) 795-6900, FAX 931-1580  
 1440 Broadway, Ste. 910 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710

1108003-001

# CHAIN OF CUSTODY

DATE 8/23/11 32228 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER					CONTAINER TYPE / VOLUME	TOTAL NUMBER OF CONTAINER	ANALYSIS/TEST REQUESTED			FOR WESTON USE ONLY		
PROJECT MANAGER / CONTACT							TCC / DOC	Total/Dissolved Cu	Total/Dissolved Zn	PRESERVED HOW	SAMPLE TEMP (°C) UPON RECEIPT	WESTON LAB ID
COMPANY / CLIENT												
Shelter Island Yacht Basin												
Matt Wartian (760) 809-1959												
Weston												
See above												
PHONE / FAX / EMAIL												
" "												
SITE ID (Location)	SAMPLE ID	DATE	TIME	MATRIX								
SIYB	SIYB-1	8/22/11	1635	SLT	PIL	1	X	X			Ice 4°C	
	SIYB-1		1635		G 100ml	4	X					
	SIYB-2		1625		PIL	1	X	X				
	SIYB-2		1625		G 100ml	4	X					
	SIYB-3		1615		PIL	1	X	X				
	SIYB-3		1615		G 100ml	4	X					
	SIYB-4		1610		PIL	1	X	X				
	SIYB-4		1610		G 100ml	4	X					
	SIYB-5		1600		PIL	1	X	X				
	SIYB-5		1600		G 100ml	4	X					
	SIYB-6		1546		PIL	1	X	X				
	SIYB-6		1540		G 100ml	4	X					
	SIYB-REF		1525		PIL	1	X	X				
	SIYB-REF		1525		G 100ml	4	X					

Sample Matrix Codes: FW=fresh water GW=ground water SLT=salt water SW=storm water WW=waste water  
 SED=sediment A=air BIO=biologic SB=sol T=tissue O=other (specify) \_\_\_\_\_

Container Code: G=glass P=plastic B=bags O=other \_\_\_\_\_

Shipped By:  Courier  UPS  FedEx  USPS  Client drop off  Other \_\_\_\_\_

Turnaround Time:  2-day  5-day  7-day  10-day  14-day  Standard  Other \_\_\_\_\_

Reporting Requirements:  PDF  EDD  Hard Copy  Email  Other \_\_\_\_\_

SAMPLED BY: PRINT

SIGNATURE

Chris Clark

COMMENTS / SPECIAL INSTRUCTIONS

See attached analyte list

RELINQUISHED BY

RECEIVED BY

Print Name	Signature	Firm	Date/Time	Print Name	Signature	Firm	Date/Time
1. Chris Clark		Weston	8/23/11 11:55	Kevin Lawro		Physis	8/23/11 11:55
2.							
3.							
4.							
5.							
6.							

Analyte	Method	Method Detection Limit	Reporting Limit	Units
<b>Chemistry Laboratory Measurements</b>				
Total Organic Carbon	USEPA 9060	0.1	0.2	mg/L
Dissolved Organic Carbon	USEPA 9060	0.1	0.2	mg/L
Total Copper	USEPA 1640	0.01	0.02	ug/L
Dissolved Copper	USEPA 1640	0.01	0.02	ug/L
Total Zinc	USEPA 1640	0.005	0.01	ug/L
Dissolved Zinc	USEPA 1640	0.005	0.01	ug/L

## SAMPLE RECEIPT SUMMARY

CLIENT: Weston Date Received: 8/23/11 Received By: kl Inspected By: kl

**COURIER**

PHYSIS  CLIENT  FEDEX  UPS

OTHER: \_\_\_\_\_

**COOLER**

COOLER  BOX total #

OTHER: \_\_\_\_\_ 1

**TEMPERATURE**

8 °C  WET ICE  BLUE ICE

DRY ICE  NONE

**SAMPLE INTEGRITY UPON RECEIPT**

1. COC(s) included and completely filled out..... YES
2. All sample containers arrived intact..... YES
3. All samples listed on COC(s) are present..... YES
4. Information on containers consistent with information on COC(s)..... YES
5. Correct containers and volume for all analyses indicated..... YES
6. All samples received within method holding time..... YES
7. Correct preservation used for all analyses indicated..... YES

**NOTES**



November 23, 2011

Matt Wartian  
Weston Solutions, Inc.  
2433 Impala Dr.  
Carlsbad, CA 92010-

Project Name: Shelter Island Yacht Basin  
Physis Project ID: 1108003-002

Dear Matt,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 10/27/2011. A total of 3 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Elements
Dissolved Copper by EPA 1640
Subcontract
Total Organic Carbon by SM 5310 B
Dissolved Organic Carbon by SM 5310 B

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier  
Extension 202  
714-335-5918 cell  
mistymercier@physislabs.com



## ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

## QUALITY ASSURANCE SUMMARY

**LABORATORY BATCH:** Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and are used to assess the validity of the sample analyses.

**PROCEDURAL BLANK:** Laboratory contamination introduced during method use was assessed through the analysis of procedural blanks at a minimum frequency of one per batch. Physis' QM requires that all procedural blanks be below 10 times the MDL and all detectable constituents in the procedural blanks be flagged in the project sample results with a B qualifier.

**ACCURACY:** Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

**PRECISION:** Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS<sub>1</sub>/MS<sub>2</sub>, BS<sub>1</sub>/BS<sub>2</sub>, LCS<sub>1</sub>/LCS<sub>2</sub>, LCM<sub>1</sub>/LCM<sub>2</sub>, CRM<sub>1</sub>/CRM<sub>2</sub>, surrogate spikes and/or replicate project sample analysis (R<sub>1</sub>/R<sub>2</sub>) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

**MATRIX SPIKES:** MS samples were employed to assess the effect a particular project sample matrix has on the accuracy of a measurement. It is prepared by adding a known amount of the target analyte(s) to an aliquot of the project sample. Matrix spikes indicate the bias of analytical measurements due to chemical interferences inherent in the sample matrix. If the matrix spike recovery does not fall within the specified acceptance limits, it may be an indication of sample matrix interference in the specific project sample used for the MS. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

**BLANK SPIKES:** BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

**CERTIFIED REFERENCE MATERIALS:** CRMs are pre-homogenized materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of a preparation and analytical method. CRMs are analyzed to provide evidence that the laboratory method produces results that are comparable to those obtained by an independent organization.

**SURROGATES:** Where CRMs are unavailable, target analyte recovery can be assessed by monitoring added surrogate compounds/elements. A surrogate is a pure analyte unlikely to be found in any project sample and most often used with organic analytical procedures. Percent recovery is calculated for each surrogate and is used to monitor method performance within each discrete sample and is indicative of the procedure's ability to recover the actual analytes of interest.

**HOLDING TIME:** Method recommended holding times are the length of time a project sample can be stored

under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes. Physis' QM requires that all samples analyzed beyond the method recommended holding time be flagged in the sample results with an H qualifier.

**TOTAL/DISSOLVED FRACTION:** In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

**PHYSIS QUALIFIER CODES**

<b>CODE</b>	<b>DEFINITION</b>
*	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified recovery and/or RPD acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore MS recovery and/or RPD acceptance limits do not apply
SL	analyte results for R1 and/or R2 were lower than 10 times the MDL, therefore RPD acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore RPD was outside the specified acceptance limits
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

# PHYSIS

# **PANALYTICAL**

# **REPORT**

TERRA    R    AGA    AURA

ENVIRONMENTAL LABORATORIES, INC.

*Innovative Solutions for Nature*



1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

<h2>Trace Metals</h2>	<h2>ANALYTICAL REPORT</h2>
-----------------------	----------------------------

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	BATCH ID	PREPARED	ANALYZED	METHOD	QA CODE
<b>Physis Sample ID: 9665-R1</b>		<b>SIYB-1</b>		<b>Seawater</b>		<b>Sampled: 26-Oct-11 8:50</b>		<b>Received: 27-Oct-11</b>		
copper (Cu)	Dissolved	8.08	0.01	0.02	µg/L	E-3030	11/15/2011	11/18/2011	EPA 1640	
<b>Physis Sample ID: 9666-R1</b>		<b>SIYB-3</b>		<b>Seawater</b>		<b>Sampled: 26-Oct-11 9:05</b>		<b>Received: 27-Oct-11</b>		
copper (Cu)	Dissolved	6.51	0.01	0.02	µg/L	E-3030	11/15/2011	11/18/2011	EPA 1640	
<b>Physis Sample ID: 9667-R1</b>		<b>SIYB-5</b>		<b>Seawater</b>		<b>Sampled: 26-Oct-11 9:20</b>		<b>Received: 27-Oct-11</b>		
copper (Cu)	Dissolved	5.01	0.01	0.02	µg/L	E-3030	11/15/2011	11/18/2011	EPA 1640	

# PHYSICS

## QUALITY CONTROL REPORT

TERRA FUSION AQUA AURA  
ENVIRONMENTAL LABORATORIES, INC.

*Innovative Solutions for Nature*



1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

<b>Trace Metals</b>	<b>QUALITY CONTROL REPORT</b>
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Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
<b>Lab Blank 9664-B1</b>			<b>QAQC Procedural Blank DI Water</b>				<b>Prepared 11/15/2011</b>			<b>Analyzed 18-Nov-11</b>					
copper (Cu)	Dissolved	E-3030	ND	0.01	0.02	µg/L									
<b>Lab Dup 9665-R2</b>			<b>SIYB-1 Seawater</b>				<b>Prepared 11/15/2011</b>			<b>Analyzed 18-Nov-11</b>					
copper (Cu)	Dissolved	E-3030	7.05	0.01	0.02	µg/L						14	30	PASS	
<b>Lab Control Mate 9668-LCM1</b>			<b>QAQC LCM - Physis Seawater Seawater</b>				<b>Prepared 11/15/2011</b>			<b>Analyzed 18-Nov-11</b>					
copper (Cu)	Dissolved	E-3030	0.75	0.01	0.02	µg/L									
<b>Lab Control Spik 9668-LCS1</b>			<b>QAQC LCM - Physis Seawater Seawater</b>				<b>Prepared 11/15/2011</b>			<b>Analyzed 18-Nov-11</b>					
copper (Cu)	Dissolved	E-3030	18.66	0.01	0.02	µg/L	20	0.75	90	75 - 125%	PASS				
<b>Lab Control Spik 9668-LCS2</b>			<b>QAQC LCM - Physis Seawater Seawater</b>				<b>Prepared 11/15/2011</b>			<b>Analyzed 18-Nov-11</b>					
copper (Cu)	Dissolved	E-3030	19	0.01	0.02	µg/L	20	0.75	91	75 - 125%	PASS	1	30	PASS	

# **SUBCONTRACT**

# **REPORT**

PHYSICS

TERRA AURA

ENVIRONMENTAL LABORATORIES, INC.

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25712 Commercentre Drive  
Lake Forest, California 92630  
949.297.5020 Phone  
949.297.5027 Fax

04 November 2011

Misty Mercier  
PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim, CA 92806  
RE: 1108003-002

Enclosed are the results of analyses for samples received by the laboratory on 10/28/11 08:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Daniel Chavez  
Project Manager



25712 Commercentre Drive  
Lake Forest, California 92630  
949.297.5020 Phone  
949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim CA, 92806

Project: 1108003-002  
Project Number: 1108003-002  
Project Manager: Misty Mercier

**Reported:**  
11/04/11 15:47

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SIYB-1	T111590-01	Water	10/26/11 08:50	10/28/11 08:30
SIYB-3	T111590-02	Water	10/26/11 09:05	10/28/11 08:30
SIYB-5	T111590-03	Water	10/26/11 09:20	10/28/11 08:30

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 Lake Forest, California 92630  
 949.297.5020 Phone  
 949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-002 Project Number: 1108003-002 Project Manager: Misty Mercier	<b>Reported:</b> 11/04/11 15:47
---	---	------------------------------------

**SIYB-1**  
**T111590-01(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	-----	-----------------	-------	----------	-------	----------	----------	--------	-------

SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.55</b>	0.062	0.50	mg/l	1	1102818	10/28/11	10/31/11	SM 5310 B	
<b>Total Organic Carbon</b>	<b>0.41</b>	0.062	0.50	"	"	1102819	10/28/11	10/29/11	"	J

SunStar Laboratories, Inc.

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 Lake Forest, California 92630  
 949.297.5020 Phone  
 949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-002 Project Number: 1108003-002 Project Manager: Misty Mercier	<b>Reported:</b> 11/04/11 15:47
---	---	------------------------------------

**SIYB-3**  
**T111590-02(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	-----	-----------------	-------	----------	-------	----------	----------	--------	-------

SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.45</b>	0.062	0.50	mg/l	1	1102818	10/28/11	10/31/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.34</b>	0.062	0.50	"	"	1102819	10/28/11	10/29/11	"	J

SunStar Laboratories, Inc.

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 Lake Forest, California 92630  
 949.297.5020 Phone  
 949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-002 Project Number: 1108003-002 Project Manager: Misty Mercier	<b>Reported:</b> 11/04/11 15:47
---	---	------------------------------------

**SIYB-5**  
**T111590-03(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.38</b>	0.062	0.50	mg/l	1	1102818	10/28/11	10/31/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.35</b>	0.062	0.50	"	"	1102819	10/28/11	10/29/11	"	J

SunStar Laboratories, Inc.

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 949.297.5020 Phone  
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PHYSIS Environmental Laboratories, Inc.  
 1904 E. Wright Circle  
 Anaheim CA, 92806

Project: 1108003-002  
 Project Number: 1108003-002  
 Project Manager: Misty Mercier

**Reported:**  
 11/04/11 15:47

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods - Quality Control**  
**SunStar Laboratories, Inc.**

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch 1102818 - General Preparation**

**Blank (1102818-BLK1)** Prepared & Analyzed: 10/28/11

Dissolved Organic Carbon	ND	0.062	0.50	mg/l							
--------------------------	----	-------	------	------	--	--	--	--	--	--	--

**Duplicate (1102818-DUP1)** Source: T111565-14 Prepared & Analyzed: 10/28/11

Dissolved Organic Carbon	9.52	0.062	0.50	mg/l		8.76			8.31	20	
--------------------------	------	-------	------	------	--	------	--	--	------	----	--

**Batch 1102819 - General Preparation**

**Blank (1102819-BLK1)** Prepared: 10/28/11 Analyzed: 10/29/11

Total Organic Carbon	ND	0.062	0.50	mg/l							
----------------------	----	-------	------	------	--	--	--	--	--	--	--

**Duplicate (1102819-DUP1)** Source: T111591-07 Prepared: 10/28/11 Analyzed: 10/29/11

Total Organic Carbon	13.8	0.062	0.50	mg/l		14.0			1.64	20	
----------------------	------	-------	------	------	--	------	--	--	------	----	--

SunStar Laboratories, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



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Lake Forest, California 92630  
949.297.5020 Phone  
949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim CA, 92806

Project: 1108003-002  
Project Number: 1108003-002  
Project Manager: Misty Mercier

**Reported:**  
11/04/11 15:47

### Notes and Definitions

- J Detected but below the Standard Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

SunStar Laboratories, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





## SAMPLE RECEIVING REVIEW SHEET

BATCH # T111590

Client Name: PHYSIS

Project: 1108003-002

Received by: DAN

Date/Time Received: 10-28-11 8:30

Delivered by:  Client  SunStar Courier  GSO  FedEx  Other \_\_\_\_\_

Total number of coolers received 0 Temp criteria = 6°C > 0°C (no frozen containers)

Temperature: cooler #1 3.4 °C +/- the CF (-0.2°C) = 3.2 °C corrected temperature

cooler #2 \_\_\_\_\_ °C +/- the CF (-0.2°C) = \_\_\_\_\_ °C corrected temperature

cooler #3 \_\_\_\_\_ °C +/- the CF (-0.2°C) = \_\_\_\_\_ °C corrected temperature

Samples outside temp. but received on ice, w/in 6 hours of final sampling.  Yes  No\*  N/A

Custody Seals Intact on Cooler/Sample  Yes  No\*  N/A

Sample Containers Intact  Yes  No\*

Sample labels match COC ID's  Yes  No\*

Total number of containers received match COC  Yes  No\*

Proper containers received for analyses requested on COC  Yes  No\*

Proper preservative indicated on COC/containers for analyses requested  Yes  No\*  N/A

Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times.  Yes  No\*

\* Complete Non-Conformance Receiving Sheet if checked Cooler/Sample Review - Initials and date BC 10-28-11

Comments:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**CHAIN OF  
CUSTODY**

**PRETESTS**

TERRA FUTURE AURA  
ENVIRONMENTAL LABORATORIES, INC.

*Innovative Solutions for Nature*



2433 Impala Drive • Carlsbad, CA 92010 • (760) 795-6900, FAX 931-1580  
 1440 Broadway, Ste. 910 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710

1108003-002  
**CHAIN OF CUSTODY**  
 30193  
 DATE 10/27/11 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER					CONTAINER TYPE / VOLUME	TOTAL NUMBER OF CONTAINER	ANALYSIS/TEST REQUESTED				FOR WESTON USE ONLY		
PROJECT MANAGER / CONTACT							TOC	DOC	Dissolved Copper				SAMPLE TEMP. (°C) UPON RECEIPT
Shelter Island Yacht Basin													
Matt Wartian													
Weston													
see above													
11 11													
SITE ID (Location)	SAMPLE ID	DATE	TIME	MATRIX							PRESERVED HOW		
Shelter Island	SIYB-1	10/26/11	0850	SLT	100ml G	4	X				Ice 4°C		
	↓	↓	↓	↓	250ml G	2	X						
	↓	↓	↓	↓	1L P	1		X					
	SIYB-3	10/26/11	0905	SLT	100ml G	4	X						
	↓	↓	↓	↓	250ml G	2		X					
	↓	↓	↓	↓	1L P	1			X				
	SIYB-5	10/26/11	0920	SLT	100ml G	4	X						
	↓	↓	↓	↓	250ml G	2		X					
	↓	↓	↓	↓	1L P	1			X				

Sample Matrix Codes: FW=fresh water GW=ground water SLT=salt water SW=storm water WW=waste water  
 SED=sediment A=air BIO=biologic SS=soil T=tissue O=other (specify) \_\_\_\_\_

Container Code: G=glass P=plastic B=bags  O=other \_\_\_\_\_

Shipped By:  Courier  UPS  FedEx  USPS  Client drop off  Other \_\_\_\_\_

Turnaround Time:  2-day  5-day  7-day  10-day  14-day  Standard  Other \_\_\_\_\_

Reporting Requirements:  PDF  EDD  Hard Copy  Email  Other \_\_\_\_\_

SAMPLED BY: PRINT Chris Clark SIGNATURE [Signature]

COMMENTS / SPECIAL INSTRUCTIONS  
 see attached analyte list

RELINQUISHED BY				RECEIVED BY			
Print Name	Signature	Firm	Date/Time	Print Name	Signature	Firm	Date/Time
1. Chris Clark	[Signature]	Weston	10/27/11	Eduardo Vaz	[Signature]	PHMS	10/27/11 12:50
2.							
3.							
4.							
5.							
6.							



## SAMPLE RECEIPT SUMMARY

CLIENT: WESTON Date Received: 10/27/11 Received By: EV Inspected By: EV

**COURIER**

PHYSIS  CLIENT  FEDEX  UPS  
 OTHER: \_\_\_\_\_

**COOLER**

COOLER  BOX total #  
 OTHER: \_\_\_\_\_ 1

**TEMPERATURE**

3.9 °C  WET ICE  BLUE ICE  
 DRY ICE  NONE

**SAMPLE INTEGRITY UPON RECEIPT**

1. COC(s) included and completely filled out..... **YES**
2. All sample containers arrived intact..... **YES**
3. All samples listed on COC(s) are present..... **NO; see notes below**
4. Information on containers consistent with information on COC(s)..... **YES**
5. Correct containers and volume for all analyses indicated..... **YES**
6. All samples received within method holding time..... **YES**
7. Correct preservation used for all analyses indicated..... **YES**

**NOTES**

for sample SIYB-1, received no TOC bottle (amber glass w/H2SO4)  
instead, received 2 DOC bottles (amber glass unpreserved)  
used extra DOC bottle for TOC (added H2SO4)

Weston Solutions, Inc.

Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	23 Aug 11
Client Sample ID:	SIYB-1	Date Test Ended:	27 Aug 11
Weston Test ID:	C110823.0162	Matrix:	Liquid

96 Hour Acute Effluent Toxicity Bioassay

Weston Testing Protocol No. BIO 062  
EPA-821-R-02-012

Test Organism: *Atherinops affinis*  
Age: 12 days old

Concentration (%)	Number of Test Organisms at Start of Test	Number of Test Organisms at End of Test	Percent Survival
Control	40	38	95.0
6.25	40	40	100
12.5	40	37	92.5
25	40	39	97.5
50	40	40	100
100	40	39	97.5

Acute Toxicity Statement for Sample SIYB-1

Distribution Method	Result	Variance Method	Result
Shapiro-Wilk's Test	Normal; $p > 0.01$	N/A	Could Not Be Confirmed

Hypothesis Method	NOEC	LOEC	TUa	Point Estimation Method	EC <sub>50</sub>
Steel's Many-One Rank Test	100%	>100%	0.23	Linear Interpolation	>100%

EC <sub>15</sub>	EC <sub>25</sub>	EC <sub>40</sub>	Mean Mortality in 100%
>100%	>100%	>100%	2.50%


**Acute Toxicity Statement:** Test substance SIYB-1 produced 97.5 percent survival in the 100 percent test concentration at 96 hours. The LC<sub>50</sub> at 96 hours was estimated to be >100 percent test substance.

Toxicity, expressed as toxic units acute (TUa), was 0.23.

Protocol Deviations: none

  
QA Officer

1/3/12  
Date

  
Approved

1/5/12  
Date

**Weston Solutions, Inc.**

**Analytical Report**

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	23 Aug 11
Client Sample ID:	SIYB-1	Date Test Ended:	27 Aug 11
Weston Test ID:	C110823.0162	Matrix:	Liquid

**96 Hour Acute Effluent Toxicity Bioassay**

Weston Testing Protocol No.: BIO 062  
EPA-821-R-02-012

**Test Organism: *Atherinops affinis***

**Test Solution Physical and Chemical Data**

Total Chlorine (mg/L)			
Concentration (%)	Initial	Renewal	Final
Control	0.00	*	*
100	0.00	*	*

\*Chlorine not detected in initial measurement of sample

Concentration (%)	Statistic	D.O. (mg/L)	Temp.(°C)	Salinity (ppt)	pH
Control	Mean	6.3	21.6	32.9	7.8
	Minimum	5.6	20.9	32.8	7.6
	Maximum	7.2	22.4	33.1	8.0
6.25	Mean	5.7	21.4	32.9	7.8
	Minimum	5.7	21.1	32.8	7.6
	Maximum	7.2	22.0	33.1	8.0
12.5	Mean	6.5	21.6	33.0	7.8
	Minimum	5.6	21.1	32.8	7.6
	Maximum	7.3	22.4	33.5	8.0
25	Mean	6.6	21.5	33.0	7.8
	Minimum	5.7	21.0	32.8	7.6
	Maximum	7.3	22.1	33.1	8.0
50	Mean	6.7	21.6	33.0	7.8
	Minimum	5.3	21.0	32.8	7.6
	Maximum	7.6	22.4	33.2	8.0
100	Mean	6.9	21.6	33.0	7.8
	Minimum	5.4	21.1	32.9	7.6
	Maximum	8.5	22.4	33.1	8.0

## Weston Solutions, Inc.

### Analytical Report

Client: Port of San Diego Date Received: 23 Aug 11  
Project: Shelter Island Yacht Basin Date Test Started: 23 Aug 11  
Client Sample ID: SIYB-1 Date Test Ended: 27 Aug 11  
Weston Test ID: C110823.0162 Matrix: Liquid

**TEST:** 96 Hour Acute Effluent Toxicity Bioassay, Weston Protocol No. BIO 062, EPA-821-R-02-012

**LAB CONTROL WATER:** Seawater collected from Scripps Institution of Oceanography.  
Dissolved Oxygen 6.5 mg/L  
Temperature 21.5 °C  
pH 8.0

**TEST ORGANISM:** Topsmelt, *Atherinops affinis* Age: 12 days old  
Supplier: Aquatic BioSystems  
Feeding: Fed *Artemia* nauplii *ad libitum* daily prior to testing.

**TEST CHAMBER:** Half liter containers, 4 replicate samples, 5 concentrations, and 4 replicate controls, brought to a 250mL final volume.

**EXPERIMENTAL DESIGN:**

1. Sample was collected by Weston Solutions personnel on August 22, 2011 at 1635 hours. The sample arrived at the Weston Solutions laboratory on the following day at 0920 hours in one 10L container. Temperature upon arrival was 5.8°C.
2. The temperature of the effluent was adjusted to 21±1°C.
3. 10 test organisms were placed in each test container.
4. Test chambers were held at 21±1°C for 96 hours with a photoperiod of 16 hours light: 8 hours darkness.
5. Test chambers were renewed daily.
6. Each test chamber was fed 1000 freshly hatched *Artemia* nauplii daily for the duration of the test.

**MORTALITY CRITERIA:** Lack of respiratory movement and lack of reaction to gentle prodding

**ACCEPTIBILITY CRITERIA:** ≥ 90% survival in controls. Evaluation of the concentration-response relationship indicated that the data presented in this report are reliable.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No.: 2008506, Received: 7/13/11, Opened:  
(Control Chart Included) 7/28/11, Expires: 8/31/12.  
96 Hour LC<sub>50</sub>: 116.12 ppb NOEC: 100 ppb  
96 Hour LC<sub>25</sub>: 91.74 ppb LOEC: 200 ppb  
Laboratory Mean: 155.99 ppb  
Test Date: 8/23/2011 Within 95 % Confidence Limits

**STUDY DIRECTOR:** S. Hasan  
**INVESTIGATORS:** K. Curry, B. Griffith, J. Hansen, S. Hasan



**Acute Fish Test-96 Hr Survival**

Start Date: 8/23/2011 16:30 · Test ID: C110823.0162 · Sample ID: SIYB-1  
 End Date: 8/27/2011 16:05 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:35 · Protocol: EPAA 02-EPA Acute · Test Species: AA-Atherinops affinis  
 Comments:

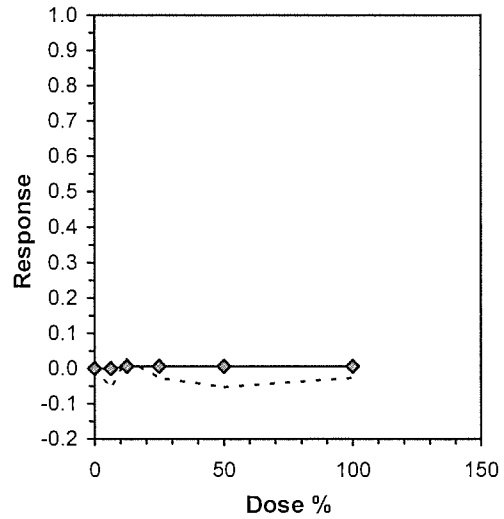
Conc-%	1	2	3	4
Control	0.9000	0.9000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	0.8000	0.9000	1.0000
25	1.0000	1.0000	0.9000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	0.9000

Conc-%	Mean	N-Mean	Transform: Untransformed					Rank Sum	1-Tailed Critical	Isotonic	
			Mean	Min	Max	CV%	N			Mean	N-Mean
Control	0.9500	1.0000	0.9500	0.9000	1.0000	6.077	4			0.9750	1.0000
6.25	1.0000	1.0526	1.0000	1.0000	1.0000	0.000	4	22.00	10.00	0.9750	1.0000
12.5	0.9250	0.9737	0.9250	0.8000	1.0000	10.351	4	17.00	10.00	0.9688	0.9936
25	0.9750	1.0263	0.9750	0.9000	1.0000	5.128	4	20.00	10.00	0.9688	0.9936
50	1.0000	1.0526	1.0000	1.0000	1.0000	0.000	4	22.00	10.00	0.9688	0.9936
100	0.9750	1.0263	0.9750	0.9000	1.0000	5.128	4	20.00	10.00	0.9688	0.9936

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91922	0.884	-0.8155	0.8829
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

*TU<sub>a</sub> = 0.23*



Test: AC-Acute Fish Test      Test ID: C110823.01 *62*  
 Species: AA-Atherinops affinis      Protocol: EPAA 02-EPA Acute  
 Sample ID: SIYB-1      Sample Type: AMB1-Ambient water  
 Start Date: 8/23/2011 16:30      End Date: 8/27/2011 16:05      Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				9	
	2	2	Control	10				9	
	3	3	Control	10				10	
	4	4	Control	10				10	
	5	1	6.250	10				10	
	6	2	6.250	10				10	
	7	3	6.250	10				10	
	8	4	6.250	10				10	
	9	1	12.500	10				10	
	10	2	12.500	10				8	
	11	3	12.500	10				9	
	12	4	12.500	10				10	
	13	1	25.000	10				10	
	14	2	25.000	10				10	
	15	3	25.000	10				9	
	16	4	25.000	10				10	
	17	1	50.000	10				10	
	18	2	50.000	10				10	
	19	3	50.000	10				10	
	20	4	50.000	10				10	
	21	1	100.000	10				10	
	22	2	100.000	10				10	
	23	3	100.000	10				10	
	24	4	100.000	10				9	

Comments:



Topsmelt 96-Hour Acute Toxicity Test

BIO062

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Client	Western Port of San Diego
Project	Shelter Island Yacht Basin
Client Sample ID:	SIYB-1
Weston Test ID:	C110823.0102
Species	Atherinops affinis

Date Received:	8/23/11
Date Test Started:	8/23/11
Date Test Ended:	8/27/11
Study Director:	J. Hasan
Organisms/Chamber:	10

	Conc.	Meter #	D.O. (mg/L)	Meter #	Temp (°C)	Meter #	Salinity (ppt)	Meter #	pH	Total Chlorine (mg/L)
Day 0 (0 Hours) Date: 8/23/11 Sample ID: C110823.01 Dilutions (Tech): KC WQ Time: 1415 Technician: Bca	Control	3	6.5	3	21.5	5	33.0	4	8.0	0.00
	6.25		6.7		21.4		33.0		8.0	
	12.5		6.8		21.5		33.0		8.0	
	25		6.9		21.8		33.0		8.0	
	50		7.3		21.5		32.9		8.0	
	100		7.9		21.7		32.9		8.0	
	Rep: 3									
24 Hours (OLD) Date: 8/24/11 WQ Time: 1055 Technician: Bca	Control	2	5.9	2	22.4	6	33.0	4	7.6	
	6.25		5.7		21.9		33.1		7.6	
	12.5		5.6		21.6		32.9		7.6	
	25		5.7		22.1		33.1		7.6	
	50		5.3		22.4		33.2		7.6	
	100		5.4		22.0		33.0		7.6	
	Rep: 1									
24 Hours (Renewal Water) Date: 8/24/11 Sample ID: C110823.01 Dilutions (Tech): KC WQ Time: 1740 Technician: Bca	Control	3	7.2	3	21.0	5	32.8	3	7.9	
	6.25		7.2		21.1		32.8		7.9	
	12.5		7.3		21.2		32.8		8.0	
	25		7.3		21.1		32.8		8.0	
	50		7.4		21.1		32.9		8.0	
	100		7.6		21.2		33.0		8.0	
	Rep: 3									
48 Hours (OLD) Date: 8/25/11 WQ Time: 1005 Technician: Bca	Control	3	5.6	3	20.9	5	32.8	3	7.7	
	6.25		5.7		21.1		32.9		7.7	
	12.5		5.8		21.2		33.5		7.7	
	25		5.9		21.1		32.9		7.8	
	50		5.9		21.2		32.8		7.8	
	100		5.6		22.4		33.0		7.8	
	Rep: 2									
48 Hours (Renewal Water) Date: 8/25/11 Sample ID: C110823.01 Dilutions (Tech): KC WQ Time: 0955 Technician: Bca	Control	3	6.8	3	21.5	5	32.8	3	7.9	② JH
	6.25		6.9		21.3		32.8		7.9	
	12.5		7.1		21.3		32.8		7.9	
	25		7.2		21.3		32.8		7.9	
	50		7.6		21.3		32.8		7.9	
	100		8.5		21.3		32.9		7.9	
	Rep: 3									
72 Hours (OLD) Date: 8/26/11 WQ Time: 1000 Technician: Bca	Control	2	6.0	2	22.4	6	33.1	3	7.7	
	6.25		6.3		21.1		33.1		7.6	
	12.5		6.1		22.4		33.0		7.7	
	25		6.3		22.0		33.1		7.7	
	50		6.2		22.2		33.1		7.7	
	100		6.2		21.5		33.1		7.7	
	Rep: 3									
72 Hours (Renewal Water) Date: 8/26/11 Sample ID: C110823.01 Dilutions (Tech): Bca WQ Time: 1045 Technician: JH	Control	3	6.0	3	21.1	5	32.8	4	7.9	
	6.25		6.0		21.1		32.8		7.9	
	12.5		6.5		21.1		32.8		7.9	
	25		7.0		21.0		32.8		7.9	
	50		7.2		21.0		32.8		8.0	
	100		8.0		21.1		32.9		8.0	
	Rep: 3									
96 Hours Date: 8/27/11 WQ Time: 1555 Technician: KC	Control	3	6.3	3	22.0	5	32.9	4	7.7	② JH
	6.25		6.3		22.0		32.9		7.7	
	12.5		6.2		22.1		33.0		7.7	
	25		6.2		21.8		33.1		7.6	
	50		6.3		22.3		33.1		7.7	
	100		6.3		21.9		33.1		7.7	
	Rep: 4									

- ① WC 8/27/11 KC
- ② Chlorine not detected at test initiation 8/24/11 JH
- ③ IE 8/30/11 KC



Weston Test ID: C110823.0142	Client: Port of San Diego <del>Weston</del>	Client Sample ID: S1YB-1
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Survival Data									
Conc.	Rep	24 Hours		48 Hours		72 Hours		96 Hours	
		Date: 8/24/11		Date: 8/25/11		Date: 8/26/11		Date: 8/27/11	
		Renewal Time: 1730		Renewal Time: 1020		Renewal Time: 1450		End Time: 1605	
		Technician: BG		Technician: BG		Technician: BG		Technician: KC	
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead
Control	1	9	1	9	0	9	0	9	0
	2	9	1	9	0	9	0	9	0
	3	10	0	10	0	10	0	10	0
	4	10	0	10	0	10	0	10	0
4.25	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
12.5	1	10	0	10	0	10	0	10	0
	2	8	2	8	0	8	0	8	0
	3	9	1	9	0	9	0	9	0
	4	10	0	10	0	10	0	10	0
25	1	10	0	10	0	10	0	10	0
	2	10	0	10	0	10	0	10	0
	3	9	1	9	0	9	0	9	0
	4	10	0	10	0	10	0	10	0
50	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
100	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	9	1
	4	9	1	9	0	9	0	9	0
	1	N/A							
	2								
	3								
	4								

Feeding Information	Day 0	24 Hours	48 Hours	72 Hours
Feed Time*:	1650	0830	0830	0845
Technician:	KC	KC	KC	KC

\*Topsmelt should be fed at test initiation and approximately 2 hours before renewal at 24, 48, and 72 hours.

Start Time:	1630 KC/BG
End Time:	1605 KC
Supplier:	Aquatic Bio Systems
Organism Batch:	ABS 8453 Age: 12 days

Dilution Water Batch:	S10072511
Hobo Temp. No.:	71437
Test Location:	Room 3
Test Acceptability:	<input checked="" type="checkbox"/> ≥ 90% Survival in Control

- ① IE 8/24/11 BG
- ② WC 8/27/11 KC
- ③ IE 8/30/11 KC
- ④ WC 9/27/11 BG

Weston Solutions, Inc.

Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	23 Aug 11
Client Sample ID:	SIYB-2	Date Test Ended:	27 Aug 11
Weston Test ID:	C110823.0262	Matrix:	Liquid

**96 Hour Acute Effluent Toxicity Bioassay**  
 Weston Testing Protocol No. BIO 062  
 EPA-821-R-02-012

Test Organism: *Atherinops affinis*  
 Age: 12 days old

Concentration (%)	Number of Test Organisms at Start of Test	Number of Test Organisms at End of Test	Percent Survival
Control	40	38	95.0
6.25	40	39	97.5
12.5	40	38	95.0
25	40	39	97.5
50	40	40	100
100	40	39	97.5

**Acute Toxicity Statement for Sample SIYB-2**

Distribution Method	Result	Variance Method	Result
Shapiro-Wilk's Test	Non-normal; $p \leq 0.01$	N/A	Could Not Be Confirmed

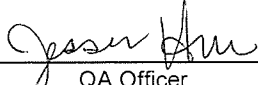

Hypothesis Method	NOEC	LOEC	TUa	Point Estimation Method	EC <sub>50</sub>
Steel's Many-One Rank Test	100%	>100%	0.23	Linear Interpolation	>100%

EC <sub>15</sub>	EC <sub>25</sub>	EC <sub>40</sub>	Mean Mortality in 100%
>100%	>100%	>100%	2.50%

**Acute Toxicity Statement:** Test substance SIYB-2 produced 97.5 percent survival in the 100 percent test concentration at 96 hours. The LC<sub>50</sub> at 96 hours was estimated to be >100 percent test substance.

Toxicity, expressed as toxic units acute (TUa), was 0.23.

**Protocol Deviations:** Sample arrived at 9.9°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity.

 QA Officer	1/3/12 Date	 Approved	1/5/12 Date
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Weston Solutions, Inc.

Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	23 Aug 11
Client Sample ID:	SIYB-2	Date Test Ended:	27 Aug 11
Weston Test ID:	C110823.0262	Matrix:	Liquid

96 Hour Acute Effluent Toxicity Bioassay

Weston Testing Protocol No.: BIO 062

EPA-821-R-02-012

Test Organism: *Atherinops affinis*

Test Solution Physical and Chemical Data

Total Chlorine (mg/L)			
Concentration (%)	Initial	Renewal	Final
Control	0.00	*	*
100	0.02	*	*

\*Chlorine not detected in initial measurement of sample

Concentration (%)	Statistic	D.O. (mg/L)	Temp.(°C)	Salinity (ppt)	pH
Control	Mean	6.3	21.6	32.9	7.8
	Minimum	5.6	20.9	32.8	7.6
	Maximum	7.2	22.4	33.1	8.0
6.25	Mean	5.7	21.5	33.0	7.9
	Minimum	5.6	21.1	32.8	7.6
	Maximum	7.2	22.1	33.3	8.0
12.5	Mean	6.4	21.5	32.9	7.9
	Minimum	5.5	21.1	32.8	7.6
	Maximum	7.4	22.0	33.2	8.0
25	Mean	6.5	21.6	33.0	7.9
	Minimum	5.5	21.1	32.8	7.7
	Maximum	7.4	22.4	33.4	8.0
50	Mean	6.6	21.5	33.0	7.9
	Minimum	5.8	21.0	32.8	7.7
	Maximum	7.6	22.4	33.2	8.0
100	Mean	6.9	21.6	33.0	7.9
	Minimum	5.4	21.1	32.8	7.7
	Maximum	8.3	22.4	33.2	8.1

# Weston Solutions, Inc.

## Analytical Report

Client: Port of San Diego Date Received: 23 Aug 11  
Project: Shelter Island Yacht Basin Date Test Started: 23 Aug 11  
Client Sample ID: SIYB-2 Date Test Ended: 27 Aug 11  
Weston Test ID: C110823.0262 Matrix: Liquid

**TEST:** 96 Hour Acute Effluent Toxicity Bioassay, Weston Protocol No. BIO 062, EPA-821-R-02-012

**LAB CONTROL WATER:** Seawater collected from Scripps Institution of Oceanography.  
Dissolved Oxygen 6.5 mg/L  
Temperature 21.5 °C  
pH 8.0

**TEST ORGANISM:** Topsmelt, *Atherinops affinis* Age: 12 days old  
Supplier: Aquatic BioSystems  
Feeding: Fed *Artemia* nauplii *ad libitum* daily prior to testing.

**TEST CHAMBER:** Half liter containers, 4 replicate samples, 5 concentrations, and 4 replicate controls, brought to a 250mL final volume.

**EXPERIMENTAL DESIGN:**

1. Sample was collected by Weston Solutions personnel on August 22, 2011 at 1625 hours. The sample arrived at the Weston Solutions laboratory on the following day at 0920 hours in one 10L container. Temperature upon arrival was 9.9°C.
2. The temperature of the effluent was adjusted to 21±1°C.
3. 10 test organisms were placed in each test container.
4. Test chambers were held at 21±1°C for 96 hours with a photoperiod of 16 hours light: 8 hours darkness.
5. Test chambers were renewed daily.
6. Each test chamber was fed 1000 freshly hatched *Artemia* nauplii daily for the duration of the test.

**MORTALITY CRITERIA:** Lack of respiratory movement and lack of reaction to gentle prodding

**ACCEPTIBILITY CRITERIA:** ≥ 90% survival in controls. Evaluation of the concentration-response relationship indicated that the data presented in this report are reliable.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No.: 2008506, Received: 7/13/11, Opened:  
(Control Chart Included) 7/28/11, Expires: 8/31/12.  
96 Hour LC<sub>50</sub>: 116.12 ppb NOEC: 100 ppb  
96 Hour LC<sub>25</sub>: 91.74 ppb LOEC: 200 ppb  
Laboratory Mean: 155.99 ppb  
Test Date: 8/23/2011 Within 95 % Confidence Limits

**STUDY DIRECTOR:** S. Hasan  
**INVESTIGATORS:** K. Curry, B. Griffith, J. Hansen, S. Hasan

**Acute Fish Test-96 Hr Survival**

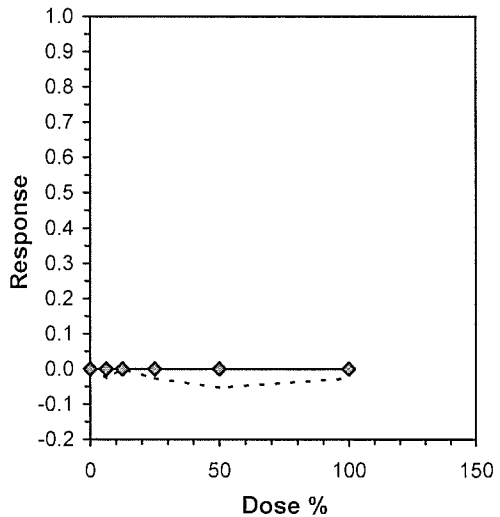
Start Date: 8/23/2011 16:30 Test ID: C110823.0262 Sample ID: SIYB-2  
 End Date: 8/27/2011 16:40 Lab ID: CCA-Weston, Carlsbad Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:25 Protocol: EPAA 02-EPA Acute Test Species: AA-Atherinops affinis  
 Comments:

Conc-%	1	2	3	4
Control	0.9000	0.9000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	0.9000
12.5	1.0000	1.0000	0.8000	1.0000
25	1.0000	0.9000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	1.0000	0.9000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Untransformed					Rank Sum	1-Tailed Critical	Isotonic	
			Mean	Min	Max	CV%	N			Mean	N-Mean
Control	0.9500	1.0000	0.9500	0.9000	1.0000	6.077	4			0.9708	1.0000
6.25	0.9750	1.0263	0.9750	0.9000	1.0000	5.128	4	20.00	10.00	0.9708	1.0000
12.5	0.9500	1.0000	0.9500	0.8000	1.0000	10.526	4	19.00	10.00	0.9708	1.0000
25	0.9750	1.0263	0.9750	0.9000	1.0000	5.128	4	20.00	10.00	0.9708	1.0000
50	1.0000	1.0526	1.0000	1.0000	1.0000	0.000	4	22.00	10.00	0.9708	1.0000
100	0.9750	1.0263	0.9750	0.9000	1.0000	5.128	4	20.00	10.00	0.9708	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01) Equality of variance cannot be confirmed	0.81429	0.884	-1.3812	1.52338
<b>Hypothesis Test (1-tail, 0.05)</b>	<b>NOEC</b>	<b>LOEC</b>	<b>ChV</b>	<b>TU</b>
Steel's Many-One Rank Test	100	>100		1

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



*TU<sub>a</sub> = 0.23*



Test: AC-Acute Fish Test      Test ID: C110823.02 *W2*  
 Species: AA-Atherinops affinis      Protocol: EPAA 02-EPA Acute  
 Sample ID: SIYB-2      Sample Type: AMB1-Ambient water  
 Start Date: 8/23/2011 16:30      End Date: 8/27/2011 16:40      Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				9	
	2	2	Control	10				9	
	3	3	Control	10				10	
	4	4	Control	10				10	
	5	1	6.250	10				10	
	6	2	6.250	10				10	
	7	3	6.250	10				10	
	8	4	6.250	10				9	
	9	1	12.500	10				10	
	10	2	12.500	10				10	
	11	3	12.500	10				8	
	12	4	12.500	10				10	
	13	1	25.000	10				10	
	14	2	25.000	10				9	
	15	3	25.000	10				10	
	16	4	25.000	10				10	
	17	1	50.000	10				10	
	18	2	50.000	10				10	
	19	3	50.000	10				10	
	20	4	50.000	10				10	
	21	1	100.000	10				10	
	22	2	100.000	10				9	
	23	3	100.000	10				10	
	24	4	100.000	10				10	

Comments:



Topsmelt 96-Hour Acute Toxicity Test

BIO062

KC ⑤ ⑦

Client	Western Port of San Diego
Project	Shelter Island Yacht Basin
Client Sample ID:	SIYB-2
Weston Test ID:	C110823.0202
Species	Atherinops affinis

Date Received:	8/23/11
Date Test Started:	8/23/11
Date Test Ended:	8/29/11
Study Director:	S. Hashim
Organisms/Chamber:	ID

	Conc.	Meter #	D.O. (mg/L)	Meter #	Temp (°C)	Meter #	Salinity (ppt)	Meter #	pH	Total Chlorine (mg/L)
Day 0 (0 Hours) Date: 8/23/11 Sample ID: C110823.02 Dilutions (Tech): KC WQ Time: 1435 Technician: BG	Control	3	6.5	3	21.5	5	33.0	4	8.0	0.07
	0.25		6.8		21.1		33.0		8.0	
	12.5		6.8		21.3		33.0		8.0	
	25		6.8		21.5		33.0		8.0	
	50		7.1		21.3		32.9		8.0	
	100		7.4		21.4		32.9		8.1	0.002 (S)H
24 Hours (OLD) Date: 8/24/11 WQ Time: 1110 Technician: BG	Control	3	25.4	3	21.9	5	33.0	4	7.6	7.6
	0.25		5.6		21.9		33.3		7.6	7.6
	12.5		5.5		21.9		33.2		7.6	7.7
	25		5.8		21.9		33.4		7.7	7.7
	50		5.9		21.6		33.2		7.7	7.7
	100		5.4		21.8		33.1		7.7	7.7
24 Hours (Renewal Water) Date: 8/24/11 Sample ID: C110823.02 Dilutions (Tech): KC WQ Time: 1745 Technician: BG	Control	3	7.2	3	21.0	5	32.8	3	7.9	
	0.25		7.2		21.3		32.8		8.0	
	12.5		7.4		21.2		32.8		8.0	
	25		7.4		21.2		32.8		8.0	
	50		7.3		21.2		32.9		8.0	
	100		7.7		21.1		33.0		8.0	
48 Hours (OLD) Date: 8/25/11 WQ Time: 1010 Technician: BG	Control	3	5.6	3	20.9	5	32.8	3	7.7	
	0.25		5.8		21.7		32.9		7.8	
	12.5		5.9		21.2		32.9		7.8	
	25		5.5		22.4		32.9		7.8	
	50		5.8		21.6		32.9		7.8	
	100		5.5		22.4		32.9		7.8	
48 Hours (Renewal Water) Date: 8/25/11 Sample ID: C110823.02 Dilutions (Tech): BG WQ Time: 1000 Technician: BG	Control	3	6.8	3	21.5	5	32.8	3	7.9	(S)H
	0.25		7.0		21.3		32.8		7.9	
	12.5		7.1		21.3		32.8		7.9	
	25		7.2		21.3		32.8		8.0	
	50		7.6		21.1		32.8		8.0	
	100		8.3		21.1		32.8		8.0	(S)H
72 Hours (OLD) Date: 8/26/11 WQ Time: 1010 Technician: BG	Control	2	6.0	2	22.4	6	33.1	3	7.7	
	0.25		6.0		21.7		33.0		7.7	
	12.5		6.1		21.9		33.1		7.8	
	25		6.2		21.3		33.1		7.8	
	50		5.8		22.4		33.2		7.8	
	100		6.0		22.3		33.2		7.8	
72 Hours (Renewal Water) Date: 8/26/11 Sample ID: C110823.02 Dilutions (Tech): BG WQ Time: 1050 Technician: JH	Control	3	6.6	3	21.1	5	32.8	4	7.9	
	0.25		6.6		21.1		33.0		8.0	
	12.5		6.8		21.1		32.8		8.0	
	25		6.6		21.1		32.8		8.0	
	50		7.5		21.0		32.8		8.0	
	100		6.2		21.3		32.8		8.0	
96 Hours Date: 8/27/11 WQ Time: 1525 Technician: KC	Control	3	6.5	3	22.2	5	32.9	4	7.7	(S)H
	0.25		6.8		22.0		33.0		7.8	
	12.5		6.9		22.0		32.9		7.8	
	25		6.9		21.9		32.9		7.8	
	50		7.2		22.0		33.1		7.9	
	100		7.4		21.6		33.2		7.8	(S)H

- ① WC, 8/24/11 BG
  - ② IE 8/25/11 BG
  - ③ WP 8/27/11 KC
  - ④ IE 8/27/11 KC
  - ⑤ WP 8/29/11 JH
  - ⑥ Chlorine not detected at test initiation 8/29/11 JH
  - ⑦ IE 8/30/11 KC
- Page 1 of 2
- ↳ WQ done on wrong test. KC



Topsmelt 96-Hour Acute Toxicity Test

BIO062

Weston Test ID: C110823.0262	Client: Port of San Diego ② <del>WESTON</del>	Client Sample ID: S1YB-2
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Survival Data									
Conc.	Rep	24 Hours		48 Hours		72 Hours		96 Hours	
		Date: 8/24/11		Date: 8/25/11		Date: 8/26/11		Date: 8/27/11	
		Renewal Time: 1750		Renewal Time: 1055		Renewal Time: 1510		End Time: 1640	
		Technician: BG/KC		Technician: BG		Technician: BG		Technician: KC	
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead
Control	1	9	1	9	0	9	0	9	0
	2	9	1	9	0	9	0	9	0
	3	10	10	10	0	10	0	10	0
	4	10	10	10	0	10	0	10	0
0.25	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	9	1	9	0	9	0	9	0
12.5	1	10	0	10	0	10	0	10	0
	2	10	0	10	0	10	0	10	0
	3	8	2	8	0	8	0	8	0
	4	10	0	10	0	10	0	10	0
25	1	10	0	10	0	10	0	10	0
	2	9	1	9	0	9	0	9	0
	3	10	0	10	0	10	0	10	0
	4	10	0	10	0	10	0	10	0
50	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
100	1	10	0	10	0	10	0	10	0
	2	9	1	9	0	9	0	9	0
	3	10	0	10	0	10	0	10	0
	4	10	0	10	0	10	0	10	0
	1								
	2								
	3								
	4								

Feeding Information	Day 0	24 Hours	48 Hours	72 Hours
Feed Time*:	1650	0830	0830	0845
Technician:	KC	KC	KC	KC

\*Topsmelt should be fed at test initiation and approximately 2 hours before renewal at 24, 48, and 72 hours.

Start Time:	1630	KC/BG
End Time:	1640	KC
Supplier:	Aquatic Bio Systems	
Organism Batch:	ABS 8683	Age: 12 days

Dilution Water Batch:	S10072511
Hobo Temp. No.:	71637
Test Location:	Room 3
Test Acceptability:	X ≥ 90% Survival in Control

① IE 8/24/11 BG  
② IE 8/30/11 KC

Weston Solutions, Inc.

Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-3	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0362	Matrix:	Liquid

96 Hour Acute Effluent Toxicity Bioassay

Weston Testing Protocol No. BIO 062  
EPA-821-R-02-012

Test Organism: *Atherinops affinis*  
Age: 13 days old

Concentration (%)	Number of Test Organisms at Start of Test	Number of Test Organisms at End of Test	Percent Survival
Control	40	39	97.5
6.25	40	39	97.5
12.5	40	40	100
25	40	39	97.5
50	40	40	100
100	40	40	100

Acute Toxicity Statement for Sample SIYB-3

Distribution Method	Result	Variance Method	Result
Shapiro-Wilk's Test	Non-normal; $p \leq 0.01$	N/A	Could Not Be Confirmed

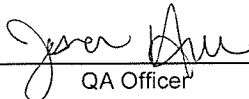
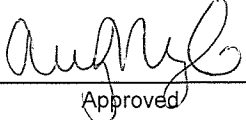
Hypothesis Method	NOEC	LOEC	TUa	Point Estimation Method	EC <sub>50</sub>
Steel's Many-One Rank Test	100%	>100%	0	Linear Interpolation	>100%

EC <sub>15</sub>	EC <sub>25</sub>	EC <sub>40</sub>	Mean Mortality in 100%
>100%	>100%	>100%	0.00%

**Acute Toxicity Statement:** Test substance SIYB-3 produced 100 percent survival in the 100 percent test concentration at 96 hours. The LC<sub>50</sub> at 96 hours was estimated to be >100 percent test substance.

Toxicity, expressed as toxic units acute (TUa), was 0.

**Protocol Deviations:** Due to a shortage of organisms available on 8/23/11 the test was started within 48 Hrs of sampling rather than 36 Hrs. Sample arrived at 10.3°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity.

 QA Officer	1/3/12 Date	 Approved	1/5/12 Date
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Weston Solutions, Inc.

Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-3	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0362	Matrix:	Liquid

96 Hour Acute Effluent Toxicity Bioassay

Weston Testing Protocol No.: BIO 062  
EPA-821-R-02-012

Test Organism: *Atherinops affinis*

Test Solution Physical and Chemical Data

Total Chlorine (mg/L)			
Concentration (%)	Initial	Renewal	Final
Control	0.02	*	*
100	0.00	*	*

\*Chlorine not detected in initial measurement of sample

Concentration (%)	Statistic	D.O. (mg/L)	Temp.(°C)	Salinity (ppt)	pH
Control	Mean	6.5	21.9	32.6	7.8
	Minimum	6.0	21.3	31.3	7.5
	Maximum	7.2	22.4	33.0	8.0
6.25	Mean	5.9	21.8	32.8	7.6
	Minimum	5.6	21.3	32.6	6.0
	Maximum	7.4	22.3	33.0	8.0
12.5	Mean	6.8	21.6	32.9	7.8
	Minimum	6.0	21.1	32.7	7.6
	Maximum	7.5	22.0	33.1	8.0
25	Mean	6.8	21.6	33.0	7.8
	Minimum	5.8	21.3	32.7	7.5
	Maximum	7.6	22.1	33.1	8.0
50	Mean	7.1	21.4	33.1	7.8
	Minimum	6.0	20.6	32.9	7.6
	Maximum	7.6	21.9	33.2	8.0
100	Mean	7.3	21.7	33.0	7.8
	Minimum	5.8	21.2	32.8	7.6
	Maximum	8.2	22.2	33.2	8.0

# Weston Solutions, Inc.

## Analytical Report

Client: Port of San Diego Date Received: 23 Aug 11  
Project: Shelter Island Yacht Basin Date Test Started: 24 Aug 11  
Client Sample ID: SIYB-3 Date Test Ended: 28 Aug 11  
Weston Test ID: C110823.0362 Matrix: Liquid

**TEST:** 96 Hour Acute Effluent Toxicity Bioassay, Weston Protocol No. BIO 062, EPA-821-R-02-012

**LAB CONTROL WATER:** Seawater collected from Scripps Institution of Oceanography.  
Dissolved Oxygen 7.2 mg/L  
Temperature 21.9 °C  
pH 8.0

**TEST ORGANISM:** Topsmelt, *Atherinops affinis* Age: 13 days old  
Supplier: Aquatic BioSystems  
Feeding: Fed *Artemia* nauplii *ad libitum* daily prior to testing.

**TEST CHAMBER:** Half liter containers, 4 replicate samples, 5 concentrations, and 4 replicate controls, brought to a 250mL final volume.

**EXPERIMENTAL DESIGN:**

1. Sample was collected by Weston Solutions personnel on August 22, 2011 at 1615 hours. The sample arrived at the Weston Solutions laboratory on the following day at 0920 hours in one 10L container. Temperature upon arrival was 10.3°C.
2. The temperature of the effluent was adjusted to 21±1°C.
3. 10 test organisms were placed in each test container.
4. Test chambers were held at 21±1°C for 96 hours with a photoperiod of 16 hours light: 8 hours darkness.
5. Test chambers were renewed daily.
6. Each test chamber was fed 1000 freshly hatched *Artemia* nauplii daily for the duration of the test.

**MORTALITY CRITERIA:** Lack of respiratory movement and lack of reaction to gentle prodding

**ACCEPTIBILITY CRITERIA:** ≥ 90% survival in controls. Evaluation of the concentration-response relationship indicated that the data presented in this report are reliable.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No.: 2008506, Received: 7/13/11, Opened:  
(Control Chart Included) 7/28/11, Expires: 8/31/12.  
96 Hour LC<sub>50</sub>: 87.04 ppb NOEC: 50 ppb  
96 Hour LC<sub>25</sub>: 68.52 ppb LOEC: 100 ppb  
Laboratory Mean: 153.08 ppb  
Test Date: 8/24/2011 Within 95 % Confidence Limits

**STUDY DIRECTOR:** S. Hasan  
**INVESTIGATORS:** K. Curry, B. Griffith, J. Hansen, S. Hasan

**Acute Fish Test-96 Hr Survival**

Start Date: 8/24/2011 15:50 · Test ID: C110823.0362 · Sample ID: SIYB-3  
 End Date: 8/28/2011 14:30 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:15 · Protocol: EPAA 02-EPA Acute · Test Species: AA-Atherinops affinis  
 Comments:

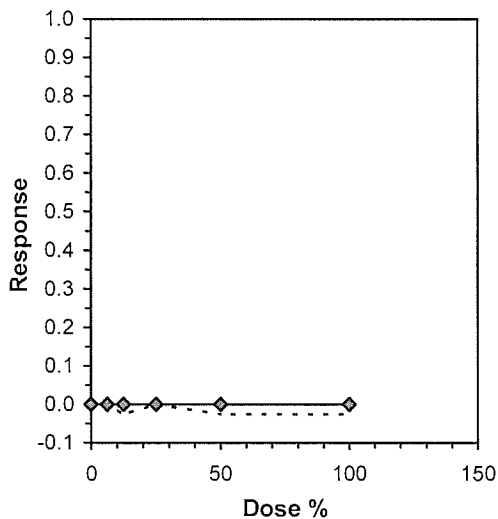
Conc-%	1	2	3	4
Control	0.9000	1.0000	1.0000	1.0000
6.25	1.0000	0.9000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	0.9000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Untransformed					Rank Sum	1-Tailed Critical	Isotonic	
			Mean	Min	Max	CV%	N			Mean	N-Mean
Control	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4			0.9875	1.0000
6.25	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4	18.00	10.00	0.9875	1.0000
12.5	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9875	1.0000
25	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4	18.00	10.00	0.9875	1.0000
50	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9875	1.0000
100	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9875	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01) Equality of variance cannot be confirmed	0.66831	0.884	-1.7439	2.37302
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

*TUa = φ*



Test: AC-Acute Fish Test      Test ID: C110823.03 2  
 Species: AA-Atherinops affinis      Protocol: EPAA 02-EPA Acute  
 Sample ID: SIYB-3      Sample Type: AMB1-Ambient water  
 Start Date: 8/24/2011 15:50      End Date: 8/28/2011 14:30      Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				9	
	2	2	Control	10				10	
	3	3	Control	10				10	
	4	4	Control	10				10	
	5	1	6.250	10				10	
	6	2	6.250	10				9	
	7	3	6.250	10				10	
	8	4	6.250	10				10	
	9	1	12.500	10				10	
	10	2	12.500	10				10	
	11	3	12.500	10				10	
	12	4	12.500	10				10	
	13	1	25.000	10				10	
	14	2	25.000	10				10	
	15	3	25.000	10				9	
	16	4	25.000	10				10	
	17	1	50.000	10				10	
	18	2	50.000	10				10	
	19	3	50.000	10				10	
	20	4	50.000	10				10	
	21	1	100.000	10				10	
	22	2	100.000	10				10	
	23	3	100.000	10				10	
	24	4	100.000	10				10	

Comments:





Topsmelt 96-Hour Acute Toxicity Test

BIO062

kc ③

Client	Weston Port of San Diego
Project	Shelter Island Yacht Basin
Client Sample ID:	SINB-3
Weston Test ID:	C110823.03W2
Species	Atherinops affinis

Date Received:	8/23/11
Date Test Started:	8/24/11
Date Test Ended:	8/28/11
Study Director:	S. Hassan
Organisms/Chamber:	10

	Conc.	Meter #	D.O. (mg/L)	Meter #	Temp (°C)	Meter #	Salinity (ppt)	Meter #	pH	Total Chlorine (mg/L)
<b>Day 0 (0 Hours)</b>	Control <sub>2</sub>	3	7.2	3	21.9	5	32.6	3	8.0	0.02
Date: 8/24/11	6.25		7.4		22.0		32.7		8.0	
Sample ID: C110823.03	12.5		7.5		21.8		32.7		8.0	
Dilutions (Tech): KC	25		7.6		21.7		32.6		8.0	
WQ Time: 1505	50		7.6		21.2		33.1		8.0	
Technician: JH	100		7.9		21.2		32.8		8.0	0.00
Rep: JH										
<b>24 Hours (OLD)</b>	Control <sub>1</sub>	2	6.0	2	22.4	6	31.3	4	7.8	
Date: 8/25/11	6.25		5.7		22.1		32.6		6.0	
WQ Time: 0935	12.5		6.0		21.7		32.7		7.6	
Technician: SH	25		6.0		21.7		32.7		7.5	
Rep: 1	50		6.0		20.6		33.2		7.6	
	100		5.8		21.5		32.8		7.6	
<b>24 Hours (Renewal Water)</b>	Control <sub>2</sub>	2	6.7	2	21.3	6	33.0	4	8.0	
Date: 8/25/11	6.25		6.9		21.3		33.0		8.0	
Sample ID: C110823.03	12.5		6.9		21.5		33.0		8.0	
Dilutions (Tech): KC/BG	25		7.1		21.4		33.6		8.0	
WQ Time: 1115	50		7.3		21.4		32.9		8.0	
Technician: SH	100		8.0		21.4		33.1		8.0	
Rep: SH										
<b>48 Hours (OLD)</b>	Control <sub>2</sub>	2	6.1	2	22.3	6	32.8	3	7.7	
Date: 8/26/11	6.25		5.6		21.9		32.9		7.7	
WQ Time: 1030	12.5		6.5		21.1		32.9		7.8	
Technician: BG	25		5.9		21.8		33.0		7.8	
Rep: 2	50		6.2		21.7		33.1		7.8	
	100		6.1		22.2		33.1		7.8	
<b>48 Hours (Renewal Water)</b>	Control <sub>2</sub>	2	6.6	2	21.5	6	32.9	3	7.5	②NH
Date: 8/26/11	6.25		6.9		21.4		33.0		7.5	
Sample ID: C110823.03	12.5		6.9		21.3		33.0		7.6	
Dilutions (Tech): BG	25		7.1		21.3		33.0		7.7	
WQ Time: 1110	50		7.5		21.3		33.1		7.7	
Technician: BG	100		8.2		21.4		33.1		7.7	②NH
Rep: SH										
<b>72 Hours (OLD)</b>	Control <sub>2</sub>	3	6.8	3	22.2	5	32.6	4	7.7	
Date: 8/27/11	6.25		5.8		22.0		32.7		7.8	
WQ Time: 1055	12.5		5.9		21.4		32.9		7.7	
Technician: KC	25		6.9		21.7		33.1		7.7	
Rep: 3	50		7.2		21.9		33.1		7.8	
	100		7.1		22.0		33.2		7.7	
<b>72 Hours (Renewal Water)</b>	Control <sub>2</sub>	3	6.6	3	21.3	5	33.0	4	7.8	
Date: 8/27/11	6.25		6.8		21.5		33.0		7.9	
Sample ID: C110823.03	12.5		6.9		21.8		33.1		7.7	
Dilutions (Tech): KC	25		7.0		21.4		33.0		7.8	
WQ Time: 1200	50		7.6		21.3		33.1		7.9	
Technician: KC	100		8.1		21.6		33.1		7.9	
Rep: SH										
<b>96 Hours</b>	Control <sub>2</sub>	3	6.4	3	21.9	5	32.7	4	7.6	②NH
Date: 8/28/11	6.25		6.8		22.3		32.7		7.7	
WQ Time: 1210	12.5		6.7		22.0		32.8		7.7	
Technician: KC	25		6.8		22.1		33.0		7.8	
Rep: 4	50		7.0		21.6		32.9		7.8	
	100		6.9		22.2		33.1		7.9	②NH

① IE 8/27/11 KC

② Chlorine not detected at test initiation 8/29/11 JH

③ IE 8/30/11 KC



Topsmelt 96-Hour Acute Toxicity Test

BIO062

Weston Test ID: C110823.0362	Client: Port of San Diego Weston	Client Sample ID: S14B-3
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Survival Data									
Conc.	Rep	24 Hours		48 Hours		72 Hours		96 Hours	
		Date: 8/25/11		Date: 8/26/11		Date: 8/27/11		Date: 8/28/11	
		Renewal Time: 1240		Renewal Time: 1420		Renewal Time: 1310		End Time: 1430	
		Technician: SH		Technician: SH		Technician: KC		Technician: KC	
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead
Control	1	9	1	9	0	9	0	9	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
6.25	1	10	0	10	0	10	0	10	0
	2	10	0	9	1 NR	9	0	9	0
	3	10	0	10	0	10	0	10	0
	4	10	0	10	0	10	0	10	0
12.5	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
25	1	10	0	10	0	10	0	10	0
	2	10	0	10	0	10	0	10	0
	3	9	1	9	0	9	0	9	0
	4	10	0	10	0	10	0	10	0
50	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
100	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
	1								
	2								
	3								
	4								

Feeding Information	Day 0	24 Hours	48 Hours	72 Hours
Feed Time*:	1545	0400 KC 0845	0900	0830
Technician:	SH	KC	KC	KC

\*Topsmelt should be fed at test initiation and approximately 2 hours before renewal at 24, 48, and 72 hours.  
 ① WC 8/25/11 SH

Start Time:	1550 JH / KC
End Time:	1430 KC
Supplier:	Aquatic Bio Systems
Organism Batch:	ABS 0915 Age: 13 days

Dilution Water Batch:	S10092411
Hobo Temp. No.:	778891
Test Location:	Rm 3
Test Acceptability:	≥ 90% Survival in Control

① IE 8/30/11 KC

Weston Solutions, Inc.

Analytical Report

Client: Port of San Diego Date Received: 23 Aug 11  
 Project: Shelter Island Yacht Basin Date Test Started: 24 Aug 11  
 Client Sample ID: SIYB-4 Date Test Ended: 28 Aug 11  
 Weston Test ID: C110823.0462 Matrix: Liquid

96 Hour Acute Effluent Toxicity Bioassay  
 Weston Testing Protocol No. BIO 062  
 EPA-821-R-02-012

Test Organism: *Atherinops affinis*  
 Age: 13 days old

Concentration (%)	Number of Test Organisms at Start of Test	Number of Test Organisms at End of Test	Percent Survival
Control	40	39	97.5
6.25	40	40	100
12.5	40	40	100
25	40	40	100
50	40	40	100
100	40	40	100

Acute Toxicity Statement for Sample SIYB-4

Distribution Method	Result	Variance Method	Result
Shapiro-Wilk's Test	Non-normal; $p \leq 0.01$	N/A	Could Not Be Confirmed

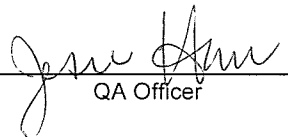
Hypothesis Method	NOEC	LOEC	TUa	Point Estimation Method	EC <sub>50</sub>
Steel's Many-One Rank Test	100%	>100%	0	Linear Interpolation	>100%

EC <sub>15</sub>	EC <sub>25</sub>	EC <sub>40</sub>	Mean Mortality in 100%
>100%	>100%	>100%	0.00%

**Acute Toxicity Statement:** Test substance SIYB-4 produced 100 percent survival in the 100 percent test concentration at 96 hours. The LC<sub>50</sub> at 96 hours was estimated to be >100 percent test substance.

Toxicity, expressed as toxic units acute (TUa), was 0.

**Protocol Deviations:** Due to a shortage of organisms available on 8/23/11 the test was started within 48 Hrs of sampling rather than 36 Hrs. Sample arrived at 8.4°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity.

  
 QA Officer

12/22/11  
 Date

  
 Approved

1/5/12  
 Date

# Weston Solutions, Inc.

## Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-4	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0462	Matrix:	Liquid

### 96 Hour Acute Effluent Toxicity Bioassay

Weston Testing Protocol No.: BIO 062

EPA-821-R-02-012

**Test Organism: *Atherinops affinis***

### Test Solution Physical and Chemical Data

Total Chlorine (mg/L)			
Concentration (%)	Initial	Renewal	Final
Control	0.02	*	*
100	0.01	*	*

\*Chlorine not detected in initial measurement of sample

Concentration (%)	Statistic	D.O. (mg/L)	Temp.(°C)	Salinity (ppt)	pH
Control	Mean	6.5	21.9	32.6	7.8
	Minimum	6.0	21.3	31.3	7.5
	Maximum	7.2	22.4	33.0	8.0
6.25	Mean	5.8	21.5	32.9	7.9
	Minimum	5.6	21.1	32.7	7.7
	Maximum	7.4	21.9	33.0	8.0
12.5	Mean	6.6	21.7	32.8	7.9
	Minimum	5.9	21.2	32.6	7.8
	Maximum	7.5	22.2	33.0	8.0
25	Mean	6.8	21.5	32.9	7.9
	Minimum	6.2	21.2	32.7	7.8
	Maximum	7.5	22.0	33.0	8.0
50	Mean	6.8	21.6	32.9	7.9
	Minimum	5.6	20.8	32.6	7.8
	Maximum	8.0	22.3	33.1	8.0
100	Mean	7.1	21.6	33.0	7.9
	Minimum	5.7	20.9	32.8	7.3
	Maximum	8.4	22.1	33.1	8.1

**Weston Solutions, Inc.**

**Analytical Report**

Client:	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-4	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0462	Matrix:	Liquid

**TEST:** 96 Hour Acute Effluent Toxicity Bioassay, Weston Protocol No. BIO 062, EPA-821-R-02-012

**LAB CONTROL WATER:** Seawater collected from Scripps Institution of Oceanography.  
Dissolved Oxygen 7.2 mg/L  
Temperature 21.9 °C  
pH 8.0

**TEST ORGANISM:** Topsmelt, *Atherinops affinis* Age: 13 days old  
Supplier: Aquatic BioSystems  
Feeding: Fed *Artemia* nauplii *ad libitum* daily prior to testing.

**TEST CHAMBER:** Half liter containers, 4 replicate samples, 5 concentrations, and 4 replicate controls, brought to a 250mL final volume.

**EXPERIMENTAL DESIGN:**

1. Sample was collected by Weston Solutions personnel on August 22, 2011 at 1610 hours. The sample arrived at the Weston Solutions laboratory on the following day at 0920 hours in one 10L container. Temperature upon arrival was 8.4°C.
2. The temperature of the effluent was adjusted to 21±1°C.
3. 10 test organisms were placed in each test container.
4. Test chambers were held at 21±1°C for 96 hours with a photoperiod of 16 hours light: 8 hours darkness.
5. Test chambers were renewed daily.
6. Each test chamber was fed 1000 freshly hatched *Artemia* nauplii daily for the duration of the test.

**MORTALITY CRITERIA:** Lack of respiratory movement and lack of reaction to gentle prodding

**ACCEPTIBILITY CRITERIA:** ≥ 90% survival in controls. Evaluation of the concentration-response relationship indicated that the data presented in this report are reliable.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No.: 2008506, Received: 7/13/11, Opened: 7/28/11, Expires: 8/31/12.  
(Control Chart Included)

96 Hour LC <sub>50</sub> :	87.04 ppb	NOEC:	50 ppb
96 Hour LC <sub>25</sub> :	68.52 ppb	LOEC:	100 ppb
Laboratory Mean:	153.08 ppb		
Test Date:	8/24/2011		Within 95 % Confidence Limits

**STUDY DIRECTOR:** S. Hasan  
**INVESTIGATORS:** K. Curry, B. Griffith, J. Hansen, S. Hasan

**Acute Fish Test-96 Hr Survival**

Start Date: 8/24/2011 15:50 . Test ID: C110823.0462 . Sample ID: SIYB-4 .  
 End Date: 8/28/2011 14:50 . Lab ID: CCA-Weston, Carlsbad . Sample Type: AMB1-Ambient water .  
 Sample Date: 8/22/2011 16:10 . Protocol: EPAA 02-EPA Acute . Test Species: AA-Atherinops affinis .  
 Comments:

Conc-%	1	2	3	4
Control	0.9000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000

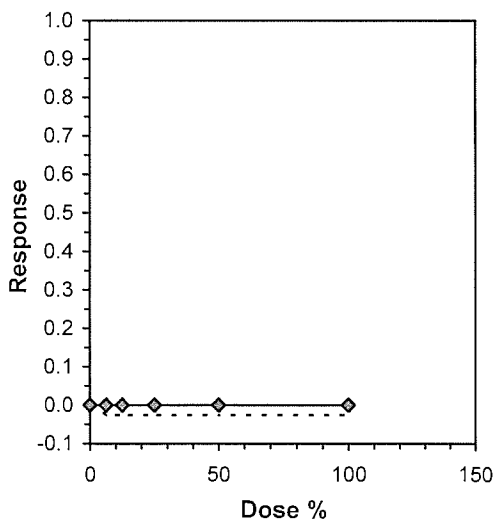
Conc-%	Mean	N-Mean	Transform: Untransformed					Rank Sum	1-Tailed Critical	Isotonic	
			Mean	Min	Max	CV%	N			Mean	N-Mean
Control	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4			0.9958	1.0000
6.25	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9958	1.0000
12.5	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9958	1.0000
25	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9958	1.0000
50	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9958	1.0000
100	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9958	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.46508	0.884	-3.0206	13.9892
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

**Linear Interpolation (200 Resamples)**

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

$TU = \phi$



Test: AC-Acute Fish Test  
 Species: AA-Atherinops affinis  
 Sample ID: SIYB-4  
 Start Date: 8/24/2011 15:50

Test ID: C110823.04 62  
 Protocol: EPAA 02-EPA Acute  
 Sample Type: AMB1-Ambient water  
 End Date: 8/28/2011 14:50  
 Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				9	
	2	2	Control	10				10	
	3	3	Control	10				10	
	4	4	Control	10				10	
	5	1	6.250	10				10	
	6	2	6.250	10				10	
	7	3	6.250	10				10	
	8	4	6.250	10				10	
	9	1	12.500	10				10	
	10	2	12.500	10				10	
	11	3	12.500	10				10	
	12	4	12.500	10				10	
	13	1	25.000	10				10	
	14	2	25.000	10				10	
	15	3	25.000	10				10	
	16	4	25.000	10				10	
	17	1	50.000	10				10	
	18	2	50.000	10				10	
	19	3	50.000	10				10	
	20	4	50.000	10				10	
	21	1	100.000	10				10	
	22	2	100.000	10				10	
	23	3	100.000	10				10	
	24	4	100.000	10				10	

Comments:



Topsmelt 96-Hour Acute Toxicity Test

BIO062

kc ③

Client	Western Port of San Diego
Project	Shelton Island Yacht Basin
Client Sample ID:	SIVB-4
Weston Test ID:	C110823.0462
Species	Atherinops affinis

Date Received:	8/23/11
Date Test Started:	8/24/11
Date Test Ended:	8/28/11
Study Director:	S. HASKIN
Organisms/Chamber:	10

	Conc.	Meter #	D.O. (mg/L)	Meter #	Temp (°C)	Meter #	Salinity (ppt)	Meter #	pH	Total Chlorine (mg/L)
Day 0 (0 Hours) Date: 8/24/11 Sample ID: C110823.04 Dilutions (Tech): KC WQ Time: 1370 Rep: JH Technician: JH	Control	3	7.2	3	21.4	5	32.8	3	8.0	0.02
	6.25		7.4		21.6		33.0		8.0	
	12.5		7.5		21.6		32.8		8.0	
	25		7.5		21.3		32.7		8.0	
	50		8.0		20.8		32.7		8.0	
	100		8.4		20.9		32.8		8.0	0.01
24 Hours (OLD) Date: 8/25/11 WQ Time: 0935 Rep: 1 Technician: SH	Control	2	6.0	2	22.4	6	31.3	4	7.8	
	6.25		5.6		21.8		32.8		7.7	
	12.5		5.9		22.2		32.6		7.8	
	25		6.2		21.5		32.7		7.8	
	50		5.6		21.9		32.6		7.8	
	100		5.7		21.9		32.8		7.3	
24 Hours (Renewal Water) Date: 8/25/11 Sample ID: C110823.04 Dilutions (Tech): KC/RS WQ Time: 1045 Rep: JH Technician: SH	Control	2	6.7	2	21.3	6	33.0	4	8.0	
	6.25		6.7		21.3		32.8		8.0	
	12.5		6.9		21.3		32.8		8.0	
	25		7.1		21.3		33.0		8.0	
	50		7.4		21.3		33.1		8.0	
	100		8.1		21.4		33.1		8.1	
48 Hours (OLD) Date: 8/26/11 WQ Time: 1045 Rep: 2 Technician: BR	Control	2	6.1	2	22.3	6	32.8	3	7.7	
	6.25		6.1		21.9		32.9		7.8	
	12.5		6.1		21.8		32.9		7.8	
	25		6.2		21.7		33.0		7.8	
	50		6.2		21.7		32.8		7.8	
	100		6.1		22.1		32.9		7.8	
48 Hours (Renewal Water) Date: 8/26/11 Sample ID: C110823.04 Dilutions (Tech): KC WQ Time: 1115 Rep: SH Technician: BR	Control	2	6.6	2	21.5	6	32.9	3	7.5	0.11
	6.25		7.0		21.2		33.0		7.8	
	12.5		6.9		21.2		33.0		7.9	
	25		7.1		21.2		33.0		7.9	
	50		7.5		21.2		33.0		7.9	
	100		8.2		21.2		33.1		8.0	0.11
72 Hours (OLD) Date: 8/27/11 WQ Time: 1110 Rep: 3 Technician: KC	Control	3	6.5	3	22.2	5	32.6	4	7.7	
	6.25		6.2		21.6		32.7		7.8	
	12.5		6.4		21.9		32.7		7.8	
	25		6.4		22.0		32.9		7.9	
	50		5.9		22.1		33.0		7.9	
	100		5.8		21.9		33.0		7.9	
72 Hours (Renewal Water) Date: 8/27/11 Sample ID: C110823.04 Dilutions (Tech): KC WQ Time: 1210 Rep: SH Technician: KC	Control	3	6.6	3	21.3	5	33.0	4	7.8	
	6.25		7.0		21.1		33.0		7.9	
	12.5		6.9		21.3		33.0		7.9	
	25		7.0		21.2		33.0		8.0	
	50		7.3		21.2		33.1		7.9	
	100		8.0		21.4		33.1		8.0	
96 Hours Date: 8/28/11 WQ Time: 1220 Rep: 4 Technician: KC	Control	3	6.4	3	21.9	5	32.7	4	7.6	0.11
	6.25		6.2		21.6		32.7		7.8	
	12.5		6.4		22.0		32.9		7.9	
	25		6.5		22.0		32.8		7.8	
	50		6.1		22.3		32.8		7.9	
	100		6.2		21.9		32.9		7.9	0.11

- ① W 8/29/11 JH
- ② Chlorine not detected at test initiation 8/29/11 JH
- ③ IE 8/30/11 KC





Topsmelt 96-Hour Acute Toxicity Test

BIO062

Weston Test ID: C110823 0462	Client: Port of San Diego Weston	Client Sample ID: SIYB-4
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Survival Data									
Conc.	Rep	24 Hours		48 Hours		72 Hours		96 Hours	
		Date: 8/25/11		Date: 8/26/11		Date: 8/27/11		Date: 8/28/11	
		Renewal Time: 1315		Renewal Time: 1430		Renewal Time: 1330		End Time: 1450	
		Technician: BA		Technician: BG		Technician: KC		Technician: KC	
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead
Control	1	9	1	9	0	9	0	9	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
4.25	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
12.5	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
25	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
50	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
100	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
	1								
	2								
	3								
	4								

Feeding Information	Day 0	24 Hours	48 Hours	72 Hours
Feed Time*:	1545	0845	0900	0830
Technician:	SH	KC	KC	KC

\*Topsmelt should be fed at test initiation and approximately 2 hours before renewal at 24, 48, and 72 hours.

Start Time:	1530 JH / KC
End Time:	1450 KC
Supplier:	Aquatic BioSystems
Organism Batch:	ABS 8915 Age: 13 days

Dilution Water Batch:	SI0082411
Hobo Temp. No.:	778891
Test Location:	Km 3
Test Acceptability:	✓ ≥ 90% Survival in Control

① IE 8/30/11 KC

Weston Solutions, Inc.

Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-5	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0562	Matrix:	Liquid

96 Hour Acute Effluent Toxicity Bioassay

Weston Testing Protocol No. BIO 062  
EPA-821-R-02-012

Test Organism: *Atherinops affinis*  
Age: 13 days old

Concentration (%)	Number of Test Organisms at Start of Test	Number of Test Organisms at End of Test	Percent Survival
Control	40	39	97.5
6.25	40	40	100
12.5	40	38	95.0
25	40	40	100
50	40	39	97.5
100	40	40	100

Acute Toxicity Statement for Sample SIYB-5

Distribution Method	Result	Variance Method	Result
Shapiro-Wilk's Test	Non-normal; $p \leq 0.01$	N/A	Could Not Be Confirmed

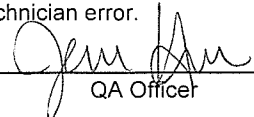
Hypothesis Method	NOEC	LOEC	TUa	Point Estimation Method	EC <sub>50</sub>
Steel's Many-One Rank Test	100%	>100%	0	Linear Interpolation	>100%

EC <sub>15</sub>	EC <sub>25</sub>	EC <sub>40</sub>	Mean Mortality in 100%
>100%	>100%	>100%	0.00%

**Acute Toxicity Statement:** Test substance SIYB-5 produced 100 percent survival in the 100 percent test concentration at 96 hours. The LC<sub>50</sub> at 96 hours was estimated to be >100 percent test substance.

Toxicity, expressed as toxic units acute (TUa), was 0.

**Protocol Deviations:** Due to a shortage of organisms available on 8/23/11 the test was started within 48 Hrs of sampling rather than 36 Hrs. Sample arrived at 10.1°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity. Chlorine not re-checked at 48 or 72 Hours due to technician error.

  
QA Officer

1/5/12  
Date

  
Approved

1/5/12  
Date

# Weston Solutions, Inc.

## Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-5	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0562	Matrix:	Liquid

### 96 Hour Acute Effluent Toxicity Bioassay

Weston Testing Protocol No.: BIO 062

EPA-821-R-02-012

**Test Organism: *Atherinops affinis***

### Test Solution Physical and Chemical Data

Total Chlorine (mg/L)			
Concentration (%)	Initial	Renewal	Final
Control	0.02	*	*
100	0.03	**	**

\* Chlorine not detected in initial measurement of sample.

\*\* Chlorine not taken due to technician error.

Concentration (%)	Statistic	D.O. (mg/L)	Temp.(°C)	Salinity (ppt)	pH
Control	Mean	6.5	21.9	32.6	7.8
	Minimum	6.0	21.3	31.3	7.5
	Maximum	7.2	22.4	33.0	8.0
6.25	Mean	5.8	21.7	32.8	7.9
	Minimum	5.9	21.1	32.7	7.7
	Maximum	7.3	22.1	33.1	8.2
12.5	Mean	6.8	21.7	32.9	8.0
	Minimum	6.0	21.0	32.6	7.8
	Maximum	7.7	22.4	33.2	8.2
25	Mean	6.9	21.5	32.9	8.0
	Minimum	6.0	21.2	32.7	7.8
	Maximum	8.2	22.1	33.2	8.2
50	Mean	7.0	21.5	32.9	8.0
	Minimum	6.1	21.0	32.7	7.8
	Maximum	7.9	22.4	33.2	8.2
100	Mean	7.1	21.5	32.9	8.0
	Minimum	5.8	20.8	32.1	7.8
	Maximum	8.3	22.0	33.2	8.2

**Weston Solutions, Inc.**

**Analytical Report**

Client:	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-5	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0562	Matrix:	Liquid

**TEST:** 96 Hour Acute Effluent Toxicity Bioassay, Weston Protocol No. BIO 062, EPA-821-R-02-012

**LAB CONTROL WATER:** Seawater collected from Scripps Institution of Oceanography.  
Dissolved Oxygen 7.2 mg/L  
Temperature 21.9 °C  
pH 8.0

**TEST ORGANISM:** Topsmelt, *Atherinops affinis* Age: 13 days old  
Supplier: Aquatic BioSystems  
Feeding: Fed *Artemia* nauplii *ad libitum* daily prior to testing.

**TEST CHAMBER:** Half liter containers, 4 replicate samples, 5 concentrations, and 4 replicate controls, brought to a 250mL final volume.

**EXPERIMENTAL DESIGN:**

1. Sample was collected by Weston Solutions personnel on August 22, 2011 at 1600 hours. The sample arrived at the Weston Solutions laboratory on the following day at 0920 hours in one 10L container. Temperature upon arrival was 10.1°C.
2. The temperature of the effluent was adjusted to 21±1°C.
3. 10 test organisms were placed in each test container.
4. Test chambers were held at 21±1°C for 96 hours with a photoperiod of 16 hours light: 8 hours darkness.
5. Test chambers were renewed daily.
6. Each test chamber was fed 1000 freshly hatched *Artemia* nauplii daily for the duration of the test.

**MORTALITY CRITERIA:** Lack of respiratory movement and lack of reaction to gentle prodding

**ACCEPTIBILITY CRITERIA:** ≥ 90% survival in controls. Evaluation of the concentration-response relationship indicated that the data presented in this report are reliable.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No.: 2008506, Received: 7/13/11, Opened: 7/28/11, Expires: 8/31/12.  
(Control Chart Included)

96 Hour LC <sub>50</sub> :	87.04 ppb	NOEC:	50 ppb
96 Hour LC <sub>25</sub> :	68.52 ppb	LOEC:	100 ppb
Laboratory Mean:	153.08 ppb		
Test Date:	8/24/2011		Within 95 % Confidence Limits

**STUDY DIRECTOR:** S. Hasan  
**INVESTIGATORS:** K. Curry, B. Griffith, J. Hansen, S. Hasan



Test: AC-Acute Fish Test  
 Species: AA-Atherinops affinis  
 Sample ID: SIYB-5  
 Start Date: 8/24/2011 15:50

Test ID: C110823.05 *62*  
 Protocol: EPAA 02-EPA Acute  
 Sample Type: AMB1-Ambient water  
 Lab ID: CCA-Weston, Carlsbad  
 End Date: 8/28/2011 15:05

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				9	
	2	2	Control	10				10	
	3	3	Control	10				10	
	4	4	Control	10				10	
	5	1	6.250	10				10	
	6	2	6.250	10				10	
	7	3	6.250	10				10	
	8	4	6.250	10				10	
	9	1	12.500	10				10	
	10	2	12.500	10				10	
	11	3	12.500	10				10	
	12	4	12.500	10				8	
	13	1	25.000	10				10	
	14	2	25.000	10				10	
	15	3	25.000	10				10	
	16	4	25.000	10				10	
	17	1	50.000	10				10	
	18	2	50.000	10				10	
	19	3	50.000	10				10	
	20	4	50.000	10				9	
	21	1	100.000	10				10	
	22	2	100.000	10				10	
	23	3	100.000	10				10	
	24	4	100.000	10				10	

Comments:



Topsmelt 96-Hour Acute Toxicity Test

BIO062

kc(2)

Client	<del>Weston</del> Port of San Diego
Project	Shelter Island Yacht Basin
Client Sample ID:	SIVB-5
Weston Test ID:	C110823.0562
Species	Atherinops affinis

Date Received:	8/23/11
Date Test Started:	8/24/11
Date Test Ended:	8/28/11
Study Director:	S. Passan
Organisms/Chamber:	10

	Conc.	Meter #	D.O. (mg/L)	Meter #	Temp (°C)	Meter #	Salinity (ppt)	Meter #	pH	Total Chlorine (mg/L)
<b>Day 0 (0 Hours)</b>	Control	3	7.2	3	21.4	5	32.8	3	8.0	0.02
Date: 8/24/11	6.25		7.3		22.0		32.8		8.0	
Sample ID: C110823.05	12.5		7.4		21.5		32.8		8.0	
Dilutions (Tech): KC	25		7.4		21.3		32.7		8.0	
WQ Time: 1515	50		7.8		21.0		32.7		8.0	
Technician: JH	100		8.0		20.8		32.9		8.0	0.03
<b>24 Hours (OLD)</b>	Control	2	6.0	2	22.4	6	31.3	4	7.8	
Date: 8/25/11	6.25		6.0		22.1		32.7		7.8	
WQ Time: 0935	12.5		6.0		22.4		33.1		7.9	
Technician: SH	25		6.0		21.4		32.7		7.8	
	50		6.1		22.4		32.7		7.9	
	100		5.8		21.8		32.1		7.8	
<b>24 Hours (Renewal Water)</b>	Control	2	6.7	2	21.3	6	33.0	4	8.0	
Date: 8/25/11	6.25		7.0		21.4		32.9		7.7	
Sample ID: C110823.05	12.5		6.9		21.4		33.0		8.0	
Dilutions (Tech): KC/SH	25		7.1		21.5		33.0		8.0	
WQ Time: 1051	50		7.4		21.5		33.1		8.0	
Technician: SH	100		8.0		21.5		33.2		8.0	
<b>48 Hours (OLD)</b>	Control	2	6.1	2	22.3	6	32.8	3	7.7	
Date: 8/26/11	6.25		5.9		21.8		32.8		7.8	
WQ Time: 1040	12.5		6.1		21.8		32.8		7.8	
Technician: BL	25		6.2		21.7		32.9		7.8	
	50		6.2		21.0		32.8		7.8	
	100		6.1		21.6		33.1		7.8	
<b>48 Hours (Renewal Water)</b>	Control	2	6.6	2	21.5	6	32.9	3	7.5	QNH
Date: 8/26/11	6.25		6.9		21.3		33.0		8.0	
Sample ID: C110823.05	12.5		7.7		21.3		33.1		8.1	
Dilutions (Tech): KC	25		8.2		21.3		33.1		8.1	
WQ Time: 1120	50		7.6		21.4		33.1		8.1	
Technician: BL	100		8.3		21.4		33.1		8.2	QNH
<b>72 Hours (OLD)</b>	Control	3	6.5	3	22.2	5	32.6	4	7.7	
Date: 8/27/11	6.25		6.1		22.1		32.7		7.9	
WQ Time: 1120	12.5		6.3		22.1		32.7		7.8	
Technician: KC	25		6.3		21.8		32.9		7.9	
	50		6.3		22.0		32.9		7.9	
	100		6.3		21.7		33.0		7.9	
<b>72 Hours (Renewal Water)</b>	Control	3	6.6	3	21.3	5	33.0	4	7.8	
Date: 8/27/11	6.25		6.8		21.1		33.1		8.2	
Sample ID: C110823.05	12.5		7.4		21.0		33.2		8.2	
Dilutions (Tech): KC	25		8.0		21.2		33.2		8.2	
WQ Time: 1220	50		7.9		21.2		33.2		8.2	
Technician: KC	100		8.1		21.1		33.2		8.2	
<b>96 Hours</b>	Control	3	6.4	3	21.9	5	32.7	4	7.6	QNH
Date: 8/28/11	6.25		6.3		21.8		32.7		7.8	
WQ Time: 1230	12.5		6.3		22.4		32.6		7.8	
Technician: KC	25		6.2		22.1		32.7		7.8	
	50		6.3		21.8		32.9		7.8	
	100		6.3		22.0		32.9		7.8	QNH

- ① Chlorine not detected at test initiation 8/24/11 JH
- ② Due to tech error Chlorine not taken 8/29/11 JH
- ③ IE 8/30/11 KC



Topsmelt 96-Hour Acute Toxicity Test

BIO062

Weston Test ID: C110823.0562	Client: Port of San Diego Weston	Client Sample ID: S1YB-5
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Survival Data									
Conc.	Rep	24 Hours		48 Hours		72 Hours		96 Hours	
		Date: 8/25/11		Date: 8/26/11		Date: 8/27/11		Date: 8/28/11	
		Renewal Time: 1330		Renewal Time: 1450		Renewal Time: 1345		End Time: 1505	
		Technician: B/S		Technician: B/S		Technician: KC		Technician: KC	
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead
Control	1	9	1 <del>2</del>	9	0	9	0	9	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
4.25	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
12.5	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	9	1	9	0	9	0	8	1
25	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
50	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	9	1	9	0	9	0
100	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
	1								
	2								
	3								
	4								

Feeding Information	Day 0	24 Hours	48 Hours	72 Hours
Feed Time*:	1545	0845	0900	0830
Technician:	SH	KC	KC	KC

\*Topsmelt should be fed at test initiation and approximately 2 hours before renewal at 24, 48, and 72 hours.

Start Time:	1550 JH / KC
End Time:	1505 KC
Supplier:	Aquatic Bio Systems
Organism Batch:	ABS 8915 Age: 13 days

Dilution Water Batch:	S10082411
Hobo Temp. No.:	778891
Test Location:	Rm 3
Test Acceptability:	✓ ≥ 90% Survival in Control

- ① IE 8/25/11 B/S
- ② IE 8/28/11 KC
- ③ IE 8/30/11 KC



Weston Solutions, Inc.

Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-6	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0662	Matrix:	Liquid

**96 Hour Acute Effluent Toxicity Bioassay**  
 Weston Testing Protocol No. BIO 062  
 EPA-821-R-02-012

Test Organism: *Atherinops affinis*  
 Age: 13 days old

Concentration (%)	Number of Test Organisms at Start of Test	Number of Test Organisms at End of Test	Percent Survival
Control	40	39	97.5
6.25	40	40	100
12.5	40	40	100
25	40	40	100
50	40	39	97.5
100	40	39	97.5

**Acute Toxicity Statement for Sample SIYB-6**

Distribution Method	Result	Variance Method	Result
Shapiro-Wilk's Test	Non-normal; $p \leq 0.01$	N/A	Could Not Be Confirmed

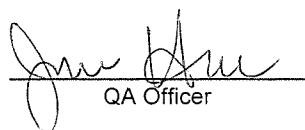
Hypothesis Method	NOEC	LOEC	TUa	Point Estimation Method	EC <sub>50</sub>
Steel's Many-One Rank Test	100%	>100%	0.23	Linear Interpolation	>100%

EC <sub>15</sub>	EC <sub>25</sub>	EC <sub>40</sub>	Mean Mortality in 100%
>100%	>100%	>100%	2.50%

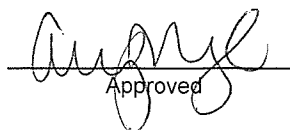
**Acute Toxicity Statement:** Test substance SIYB-6 produced 97.5 percent survival in the 100 percent test concentration at 96 hours. The LC<sub>50</sub> at 96 hours was estimated to be >100 percent test substance.

Toxicity, expressed as toxic units acute (TUa), was 0.23.

**Protocol Deviations:** Due to a shortage of organisms available on 8/23/11 the test was started just outside 48 Hrs of sampling rather than within 36 Hrs. Sample arrived at 7.3°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity.

  
 QA Officer

12/22/11  
 Date

  
 Approved

1/5/12  
 Date

**Weston Solutions, Inc.**

**Analytical Report**

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-6	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0662	Matrix:	Liquid

**96 Hour Acute Effluent Toxicity Bioassay**

Weston Testing Protocol No.: BIO 062  
EPA-821-R-02-012

**Test Organism: *Atherinops affinis***

**Test Solution Physical and Chemical Data**

Total Chlorine (mg/L)			
Concentration (%)	Initial	Renewal	Final
Control	0.02	*	*
100	0.00	*	*

\*Chlorine not detected in initial measurement of sample

Concentration (%)	Statistic	D.O. (mg/L)	Temp.(°C)	Salinity (ppt)	pH
Control	Mean	6.5	21.9	32.6	7.8
	Minimum	6.0	21.3	31.3	7.5
	Maximum	7.2	22.4	33.0	8.0
6.25	Mean	5.7	21.7	32.8	7.9
	Minimum	5.7	21.2	32.6	7.7
	Maximum	7.2	22.3	33.0	8.3
12.5	Mean	6.5	21.7	32.9	8.0
	Minimum	5.6	21.2	32.7	7.8
	Maximum	7.4	22.3	33.1	8.3
25	Mean	6.6	21.5	32.8	8.0
	Minimum	5.7	21.1	32.6	7.8
	Maximum	7.4	21.8	33.0	8.3
50	Mean	6.7	21.7	32.9	8.0
	Minimum	5.5	20.9	32.7	7.8
	Maximum	7.6	22.2	33.1	8.3
100	Mean	7.1	21.6	32.9	8.0
	Minimum	5.9	20.6	32.7	7.8
	Maximum	8.3	22.3	33.1	8.4

# Weston Solutions, Inc.

## Analytical Report

Client: Port of San Diego Date Received: 23 Aug 11  
Project: Shelter Island Yacht Basin Date Test Started: 24 Aug 11  
Client Sample ID: SIYB-6 Date Test Ended: 28 Aug 11  
Weston Test ID: C110823.0662 Matrix: Liquid

**TEST:** 96 Hour Acute Effluent Toxicity Bioassay, Weston Protocol No. BIO 062, EPA-821-R-02-012

**LAB CONTROL WATER:** Seawater collected from Scripps Institution of Oceanography.  
Dissolved Oxygen 7.2 mg/L  
Temperature 21.9 °C  
pH 8.0

**TEST ORGANISM:** Topsmelt, *Atherinops affinis* Age: 13 days old  
Supplier: Aquatic BioSystems  
Feeding: Fed *Artemia* nauplii *ad libitum* daily prior to testing.

**TEST CHAMBER:** Half liter containers, 4 replicate samples, 5 concentrations, and 4 replicate controls, brought to a 250mL final volume.

**EXPERIMENTAL DESIGN:**

1. Sample was collected by Weston Solutions personnel on August 22, 2011 at 1540 hours. The sample arrived at the Weston Solutions laboratory on the following day at 0920 hours in one 10L container. Temperature upon arrival was 7.3°C.
2. The temperature of the effluent was adjusted to 21±1°C.
3. 10 test organisms were placed in each test container.
4. Test chambers were held at 21±1°C for 96 hours with a photoperiod of 16 hours light: 8 hours darkness.
5. Test chambers were renewed daily.
6. Each test chamber was fed 1000 freshly hatched *Artemia* nauplii daily for the duration of the test.

**MORTALITY CRITERIA:** Lack of respiratory movement and lack of reaction to gentle prodding

**ACCEPTIBILITY CRITERIA:** ≥ 90% survival in controls. Evaluation of the concentration-response relationship indicated that the data presented in this report are reliable.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No.: 2008506, Received: 7/13/11, Opened:  
(Control Chart Included) 7/28/11, Expires: 8/31/12.  
96 Hour LC<sub>50</sub>: 87.04 ppb NOEC: 50 ppb  
96 Hour LC<sub>25</sub>: 68.52 ppb LOEC: 100 ppb  
Laboratory Mean: 153.08 ppb  
Test Date: 8/24/2011 Within 95 % Confidence Limits

**STUDY DIRECTOR:** S. Hasan  
**INVESTIGATORS:** K. Curry, B. Griffith, J. Hansen, S. Hasan

**Acute Fish Test-96 Hr Survival**

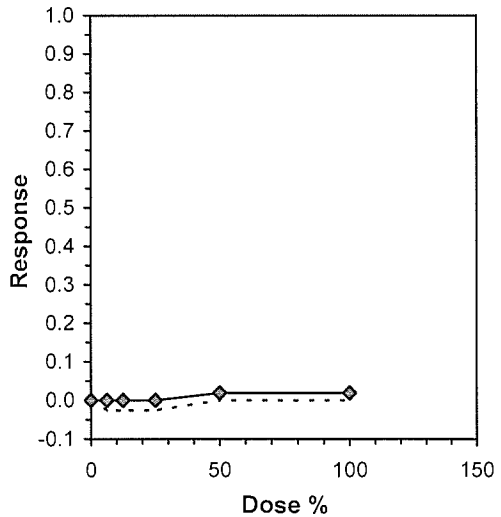
Start Date: 8/24/2011 15:50 · Test ID: C110823.0662 · Sample ID: SIYB-6  
 End Date: 8/28/2011 15:20 · Lab ID: CCA-Weston, Carlsbad ✓ · Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 15:40 · Protocol: EPAA 02-EPA Acute · Test Species: AA-Atherinops affinis  
 Comments:

Conc-%	1	2	3	4
Control	0.9000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	0.9000
100	1.0000	1.0000	0.9000	1.0000

Conc-%	Mean	N-Mean	Transform: Untransformed					Rank Sum	1-Tailed Critical	Isotonic	
			Mean	Min	Max	CV%	N			Mean	N-Mean
Control	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4			0.9938	1.0000
6.25	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9938	1.0000
12.5	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9938	1.0000
25	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9938	1.0000
50	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4	18.00	10.00	0.9750	0.9811
100	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4	18.00	10.00	0.9750	0.9811

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01) Equality of variance cannot be confirmed	0.66831	0.884	-1.7439	2.37302
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



*TUa = 0.23*

Test: AC-Acute Fish Test Species: AA-Atherinops affinis Sample ID: SIYB-6 Start Date: 8/24/2011 15:50	Test ID: C110823.06 <i>62</i> Protocol: EPAA 02-EPA Acute Sample Type: AMB1-Ambient water Lab ID: CCA-Weston, Carlsbad End Date: 8/28/2011 15:20
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Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				9	
	2	2	Control	10				10	
	3	3	Control	10				10	
	4	4	Control	10				10	
	5	1	6.250	10				10	
	6	2	6.250	10				10	
	7	3	6.250	10				10	
	8	4	6.250	10				10	
	9	1	12.500	10				10	
	10	2	12.500	10				10	
	11	3	12.500	10				10	
	12	4	12.500	10				10	
	13	1	25.000	10				10	
	14	2	25.000	10				10	
	15	3	25.000	10				10	
	16	4	25.000	10				10	
	17	1	50.000	10				10	
	18	2	50.000	10				10	
	19	3	50.000	10				10	
	20	4	50.000	10				9	
	21	1	100.000	10				10	
	22	2	100.000	10				10	
	23	3	100.000	10				9	
	24	4	100.000	10				10	

Comments:



Topsmelt 96-Hour Acute Toxicity Test

BIO062

kc ③

Client	Western Port of San Diego
Project	Swallow Island Yacht Basin
Client Sample ID:	SIVB-6
Weston Test ID:	C110823.06.02
Species	Atherinops affinis

Date Received:	8/23/11
Date Test Started:	8/24/11
Date Test Ended:	8/28/11
Study Director:	S. Prasad
Organisms/Chamber:	10

	Conc.	Meter #	D.O. (mg/L)	Meter #	Temp (°C)	Meter #	Salinity (ppt)	Meter #	pH	Total Chlorine (mg/L)
Day 0 (0 Hours) Date: 8/24/11 Sample ID: C110823.06 Dilutions (Tech): KC WQ Time: 1520 Rep: STW Technician: JH	Control	3	7.2	3	21.9	5	32.9	3	8.0	0.02
	6.25		7.2		21.5		32.7		8.0	
	12.5		7.4		21.4		32.7		8.0	
	25		7.4		21.3		32.7		8.0	
	50		7.6		20.9		32.7		8.0	
	100		8.3		20.4		32.6		8.0	
24 Hours (OLD) Date: 8/25/11 WQ Time: 0935 Rep: JH Technician: SH	Control	2	6.0	2	22.4	6	31.3	4	7.8	
	6.25		6.0		21.2		32.8		7.7	
	12.5		5.6		21.4		32.9		7.8	
	25		5.7		21.8		32.7		7.8	
	50		5.5		22.0		32.9		7.8	
	100		6.0		22.3		32.8		7.8	
24 Hours (Renewal Water) Date: 8/25/11 Sample ID: C110823.06 Dilutions (Tech): KC/STW WQ Time: 1057 Rep: STW Technician: SH	Control	2	6.7	2	21.3	6	33.0	4	8.0	
	6.25		6.9		21.6		32.9		8.0	
	12.5		7.0		21.6		33.0		8.0	
	25		7.1		21.6		33.0		8.0	
	50		7.4		21.6		33.0		8.0	
	100		8.1		21.6		33.1		8.0	
48 Hours (OLD) Date: 8/26/11 WQ Time: 1050 Rep: JH Technician: BCG	Control	2	6.1	2	22.3	6	32.8	3	7.7	
	6.25		5.7		21.8		32.8		7.7	
	12.5		5.9		22.3		32.8		7.8	
	25		6.2		21.1		32.8		7.8	
	50		5.9		22.2		33.0		7.8	
	100		5.9		21.4		33.0		7.8	
48 Hours (Renewal Water) Date: 8/26/11 Sample ID: C110823.06 Dilutions (Tech): KC WQ Time: 1125 Rep: STW Technician: BCG	Control	2	6.6	2	21.5	6	32.9	3	7.5	@JH
	6.25		6.9		21.4		32.9		8.2	
	12.5		6.9		21.4		33.0		8.2	
	25		7.1		21.5		33.0		8.2	
	50		7.5		21.5		33.1		8.3	
	100		8.2		21.6		33.1		8.3	
72 Hours (OLD) Date: 8/27/11 WQ Time: 1130 Rep: JH Technician: KC	Control	3	6.5	3	22.2	5	32.6	4	7.7	
	6.25		6.1		22.3		32.6		7.7	
	12.5		6.2		21.8		32.7		7.8	
	25		6.4		21.7		32.6		7.8	
	50		6.1		22.0		32.8		7.8	
	100		6.1		22.1		32.8		7.9	
72 Hours (Renewal Water) Date: 8/27/11 Sample ID: C110823.06 Dilutions (Tech): KC WQ Time: 1230 Rep: STW Technician: KC	Control	3	6.6	3	21.3	5	33.0	4	7.8	
	6.25		6.8		21.2		33.0		8.3	
	12.5		6.9		21.2		33.1		8.3	
	25		7.0		21.3		33.0		8.3	
	50		7.5		21.2		33.1		8.3	
	100		8.3		21.3		33.1		8.4	
96 Hours Date: 8/28/11 WQ Time: 1240 Rep: JH Technician: KC	Control	3	6.4	3	21.9	5	32.7	4	7.6	@JH
	6.25		6.0		22.2		32.6		7.8	
	12.5		5.9		22.1		32.7		7.8	
	25		6.8		21.7		32.7		7.9	
	50		6.1		22.1		32.7		7.9	
	100		6.0		22.0		32.7		7.9	

OIE 8/25/11 SH  
 ② Chlorine not detected at test initiation 8/24/11 SH  
 ③ IE 8/30/11 KC



**Topsmelt 96-Hour Acute Toxicity Test**

BIO062

Weston Test ID: C110823.0662	Client: Port of San Diego ① Weston	Client Sample ID: S1YB-6
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Survival Data									
Conc.	Rep	24 Hours		48 Hours		72 Hours		96 Hours	
		Date: 8/25/11		Date: 8/26/11		Date: 8/27/11		Date: 8/28/11	
		Renewal Time: 1345		Renewal Time: 1445		Renewal Time: 1400		End Time: 1520	
		Technician: BG		Technician: SH		Technician: KC		Technician: KC	
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead
Control	1	9	1	9	0	9	0	9	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
6.25	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
12.5	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
25	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
50	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	9	1
100	1	10	0	10	0	10	0	10	0
	2	10	0	10	0	10	0	10	0
	3	9	1	9	0	9	0	9	0
	4	10	0	10	0	10	0	10	0
	1								
	2								
	3								
	4								

Feeding Information	Day 0	24 Hours	48 Hours	72 Hours
Feed Time*:	1745	0845	0900	0830
Technician:	SH	KC	KC	KC

\*Topsmelt should be fed at test initiation and approximately 2 hours before renewal at 24, 48, and 72 hours.

Start Time:	1550H / KC
End Time:	1520 KC
Supplier:	Aquatic Bio Systems
Organism Batch:	ABS 8915 Age: 13 days

Dilution Water Batch:	S10082411
Hobo Temp. No.:	778891
Test Location:	Rm 3
Test Acceptability:	✓ ≥ 90% Survival in Control

① IE 8/30/11 KC

Weston Solutions, Inc.

Analytical Report

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-REF	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0762	Matrix:	Liquid

96 Hour Acute Effluent Toxicity Bioassay

Weston Testing Protocol No. BIO 062  
EPA-821-R-02-012

Test Organism: *Atherinops affinis*  
Age: 13 days old

Concentration (%)	Number of Test Organisms at Start of Test	Number of Test Organisms at End of Test	Percent Survival
Control	40	39	97.5
6.25	40	39	97.5
12.5	40	40	100
25	40	40	100
50	40	40	100
100	40	40	100

Acute Toxicity Statement for Sample SIYB-REF

Distribution Method	Result	Variance Method	Result
Shapiro-Wilk's Test	Non-normal; $p \leq 0.01$	N/A	Could Not Be Confirmed

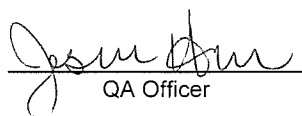
Hypothesis Method	NOEC	LOEC	TUa	Point Estimation Method	EC <sub>50</sub>
Steel's Many-One Rank Test	100%	>100%	0	Linear Interpolation	>100%

EC <sub>15</sub>	EC <sub>25</sub>	EC <sub>40</sub>	Mean Mortality in 100%
>100%	>100%	>100%	0.00%

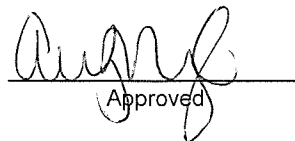
**Acute Toxicity Statement:** Test substance SIYB-REF produced 100 percent survival in the 100 percent test concentration at 96 hours. The LC<sub>50</sub> at 96 hours was estimated to be >100 percent test substance.

Toxicity, expressed as toxic units acute (TUa), was 0.

**Protocol Deviations:** Due to a shortage of organisms available on 8/23/11 the test was started just outside 48 Hrs of sampling rather than within 36 Hrs. Sample arrived at 6.7°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity.

  
QA Officer

12/27/11  
Date

  
Approved

1/5/12  
Date



**Weston Solutions, Inc.**

**Analytical Report**

Client	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-REF	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0762	Matrix:	Liquid

**96 Hour Acute Effluent Toxicity Bioassay**

Weston Testing Protocol No.: BIO 062  
EPA-821-R-02-012

**Test Organism: *Atherinops affinis***

**Test Solution Physical and Chemical Data**

Total Chlorine (mg/L)			
Concentration (%)	Initial	Renewal	Final
Control	0.02	*	*
100	0.00	*	*

\*Chlorine not detected in initial measurement of sample

Concentration (%)	Statistic	D.O. (mg/L)	Temp.(°C)	Salinity (ppt)	pH
Control	Mean	6.5	21.9	32.6	7.8
	Minimum	6.0	21.3	31.3	7.5
	Maximum	7.2	22.4	33.0	8.0
6.25	Mean	5.7	21.7	32.9	8.0
	Minimum	5.6	21.3	32.8	7.7
	Maximum	7.2	22.2	33.0	8.5
12.5	Mean	6.4	21.7	32.9	8.0
	Minimum	5.7	21.1	32.8	7.8
	Maximum	7.2	22.3	33.0	8.5
25	Mean	6.5	21.7	32.9	8.0
	Minimum	5.7	21.4	32.5	7.7
	Maximum	7.3	22.0	33.1	8.5
50	Mean	6.9	21.5	32.9	8.0
	Minimum	5.8	21.0	32.6	7.8
	Maximum	8.1	21.9	33.1	8.4
100	Mean	7.1	21.6	33.1	8.0
	Minimum	5.9	20.8	32.9	7.5
	Maximum	8.3	22.3	33.2	8.5

**Weston Solutions, Inc.**

**Analytical Report**

Client:	Port of San Diego	Date Received:	23 Aug 11
Project:	Shelter Island Yacht Basin	Date Test Started:	24 Aug 11
Client Sample ID:	SIYB-REF	Date Test Ended:	28 Aug 11
Weston Test ID:	C110823.0762	Matrix:	Liquid

**TEST:** 96 Hour Acute Effluent Toxicity Bioassay, Weston Protocol No. BIO 062, EPA-821-R-02-012

**LAB CONTROL WATER:** Seawater collected from Scripps Institution of Oceanography.  
Dissolved Oxygen 7.2 mg/L  
Temperature 21.9 °C  
pH 8.0

**TEST ORGANISM:** Topsmelt, *Atherinops affinis* Age: 13 days old  
Supplier: Aquatic BioSystems  
Feeding: Fed *Artemia* nauplii *ad libitum* daily prior to testing.

**TEST CHAMBER:** Half liter containers, 4 replicate samples, 5 concentrations, and 4 replicate controls, brought to a 250mL final volume.

**EXPERIMENTAL DESIGN:**

1. Sample was collected by Weston Solutions personnel on August 22, 2011 at 1525 hours. The sample arrived at the Weston Solutions laboratory on the following day at 0920 hours in one 10L container. Temperature upon arrival was 6.7°C.
2. The temperature of the effluent was adjusted to 21±1°C.
3. 10 test organisms were placed in each test container.
4. Test chambers were held at 21±1°C for 96 hours with a photoperiod of 16 hours light: 8 hours darkness.
5. Test chambers were renewed daily.
6. Each test chamber was fed 1000 freshly hatched *Artemia* nauplii daily for the duration of the test.

**MORTALITY CRITERIA:** Lack of respiratory movement and lack of reaction to gentle prodding

**ACCEPTIBILITY CRITERIA:** ≥ 90% survival in controls. Evaluation of the concentration-response relationship indicated that the data presented in this report are reliable.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No.: 2008506, Received: 7/13/11, Opened: 7/28/11, Expires: 8/31/12.  
(Control Chart Included)

96 Hour LC <sub>50</sub> :	87.04 ppb	NOEC:	50 ppb
96 Hour LC <sub>25</sub> :	68.52 ppb	LOEC:	100 ppb
Laboratory Mean:	153.08 ppb		
Test Date:	8/24/2011		Within 95 % Confidence Limits

**STUDY DIRECTOR:** S. Hasan  
**INVESTIGATORS:** K. Curry, B. Griffith, J. Hansen, S. Hasan

**Acute Fish Test-96 Hr Survival**

Start Date: 8/24/2011 15:50 · Test ID: C110823.0762 · Sample ID: SIYB-REF  
 End Date: 8/28/2011 15:35 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 15:25 · Protocol: EPAA 02-EPA Acute · Test Species: AA-Atherinops affinis  
 Comments:

Conc.-%	1	2	3	4
Control	0.9000	1.0000	1.0000	1.0000
6.25	0.9000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000

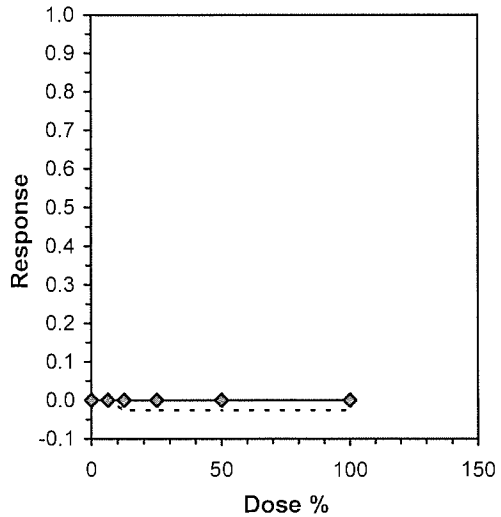
Conc.-%	Mean	N-Mean	Transform: Untransformed					Rank Sum	1-Tailed Critical	Isotonic	
			Mean	Min	Max	CV%	N			Mean	N-Mean
Control	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4			0.9917	1.0000
6.25	0.9750	1.0000	0.9750	0.9000	1.0000	5.128	4	18.00	10.00	0.9917	1.0000
12.5	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9917	1.0000
25	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9917	1.0000
50	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9917	1.0000
100	1.0000	1.0256	1.0000	1.0000	1.0000	0.000	4	20.00	10.00	0.9917	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01) Equality of variance cannot be confirmed	0.61382	0.884	-2.1359	5.27706

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

*TU<sub>a</sub> = 0*



Test: AC-Acute Fish Test  
 Species: AA-Atherinops affinis  
 Sample ID: SIYB-REF  
 Start Date: 8/24/2011 15:50

Test ID: C110823.07 *u2*  
 Protocol: EPAA 02-EPA Acute  
 Sample Type: AMB1-Ambient water  
 Lab ID: CCA-Weston, Carlsbad  
 End Date: 8/28/2011 15:35

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				9	
	2	2	Control	10				10	
	3	3	Control	10				10	
	4	4	Control	10				10	
	5	1	6.250	10				9	
	6	2	6.250	10				10	
	7	3	6.250	10				10	
	8	4	6.250	10				10	
	9	1	12.500	10				10	
	10	2	12.500	10				10	
	11	3	12.500	10				10	
	12	4	12.500	10				10	
	13	1	25.000	10				10	
	14	2	25.000	10				10	
	15	3	25.000	10				10	
	16	4	25.000	10				10	
	17	1	50.000	10				10	
	18	2	50.000	10				10	
	19	3	50.000	10				10	
	20	4	50.000	10				10	
	21	1	100.000	10				10	
	22	2	100.000	10				10	
	23	3	100.000	10				10	
	24	4	100.000	10				10	

Comments:



Topsmelt 96-Hour Acute Toxicity Test

BIO062

KC 3

Client	<del>Weston</del> Port of San Diego
Project	Shelter Island Wacht Basin
Client Sample ID:	SLYB-Rep
Weston Test ID:	C110823.0762
Species	Atherinops affinis

Date Received:	8/23/11
Date Test Started:	8/24/11
Date Test Ended:	8/28/11
Study Director:	S. HANSEN
Organisms/Chamber:	10

	Conc.	Meter #	D.O. (mg/L)	Meter #	Temp (°C)	Meter #	Salinity (ppt)	Meter #	pH	Total Chlorine (mg/L)
Day 0 (0 Hours) Date: 8/24/11 Sample ID: C110823.07 Dilutions (Tech): KC WQ Time: 1525 Rep: SJW Technician: JH	Control	3	7.2	3	21.9	5	32.4	3	8.0	0.02
	6.25		7.2		21.6		32.4		8.0	
	12.5		7.2		21.5		32.4		8.0	
	25		7.3		21.4		32.7		8.0	
	50		7.4		21.0		32.7		8.0	
	100		8.3		20.8		32.9		8.1	
24 Hours (OLD) Date: 8/25/11 WQ Time: 0935 Rep: V Technician: SA	Control	2	6.0	2	22.4	6	31.3	4	7.8	
	6.25		5.9		21.3		32.9		7.8	
	12.5		5.8		21.1		32.8		7.8	
	25		5.7		22.0		32.5		7.8	
	50		6.2		21.3		32.6		7.9	
	100		5.4		21.4		32.9		7.8	
24 Hours (Renewal Water) Date: 8/25/11 Sample ID: C110823.07 Dilutions (Tech): KC/BCA WQ Time: 1103 Rep: SJW Technician: SA	Control	2	6.7	2	21.3	6	33.0	4	8.0	
	6.25		6.9		21.6		32.9		8.0	
	12.5		7.6		21.6		33.0		8.0	
	25		7.2		21.6		33.0		8.0	
	50		8.1		21.6		33.0		8.0	
	100		8.1		21.6		33.1		7.5	
48 Hours (OLD) Date: 8/26/11 WQ Time: 1030 Rep: Z Technician: BC	Control	2	6.1	2	22.3	6	32.3	3	7.7	
	6.25		5.6		21.9		32.9		7.8	
	12.5		5.7		21.8		32.9		7.8	
	25		5.8		21.7		33.0		7.8	
	50		5.8		21.6		33.0		7.8	
	100		5.9		21.4		33.0		7.8	
48 Hours (Renewal Water) Date: 8/26/11 Sample ID: C110823.07 Dilutions (Tech): BC WQ Time: 1130 Rep: SJW Technician: BC	Control	2	6.6	2	21.5	6	32.9	3	7.5	(2)H
	6.25		6.8		21.6		33.0		8.3	
	12.5		6.9		21.6		33.0		8.3	
	25		7.1		21.6		33.0		8.4	
	50		7.5		21.6		33.0		8.4	
	100		8.2		21.7		33.1		8.4	
72 Hours (OLD) Date: 8/27/11 WQ Time: 1145 Rep: 3 Technician: KC	Control	3	6.5	3	22.2	5	32.6	4	7.7	
	6.25		6.0		21.6		32.8		7.8	
	12.5		5.9		22.1		32.8		7.8	
	25		6.0		22.0		33.1		7.9	
	50		6.1		21.9		33.1		7.9	
	100		6.1		22.3		33.2		7.9	
72 Hours (Renewal Water) Date: 8/27/11 Sample ID: C110823.07 Dilutions (Tech): KC WQ Time: 1240 Rep: Stock Technician: KC	Control	3	6.6	3	21.3	5	33.0	4	7.8	
	6.25		6.7		21.5		33.0		8.5	
	12.5		6.8		21.6		33.0		8.5	
	25		6.9		21.4		33.0		8.5	
	50		7.4		21.4		32.9		8.4	
	100		7.9		21.5		33.0		8.5	
96 Hours Date: 8/28/11 WQ Time: 1250 Rep: 4 Technician: KC	Control	3	6.4	3	21.9	5	32.7	4	7.6	(2)H
	6.25		5.9		22.2		32.9		7.7	
	12.5		5.9		22.3		32.8		7.8	
	25		5.9		22.0		33.0		7.7	
	50		6.2		21.7		33.0		7.8	
	100		6.1		22.0		33.2		7.9	

- ① IE 8/26/11 BC
- ② Chlorine not detected at test initiation 8/24/11 JH
- ③ IE 8/30/11 KC



**Topsmelt 96-Hour Acute Toxicity Test**

BIO062

Weston Test ID: C110823-0762	Client: Port of San Diego Weston	Client Sample ID: S14B-Ref
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Survival Data											
Conc.	Rep	24 Hours		48 Hours		72 Hours		96 Hours			
		Date: 8/25/11	Renewal Time: 1400	Technician: BG	Date: 8/26/11	Renewal Time: 1445	Technician: BGZ	Date: 8/27/11	Renewal Time: 1415	Technician: KC	Date: 8/28/11
		# Alive	# Dead	# Alive	# Dead	# Alive	# Dead	# Alive	# Dead		
Control	1	9	1	9	0	9	0	9	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		
6.25	1	9	1	9	0	9	0	9	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		
12.5	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		
25	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		
50	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		
100	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		
	1										
	2										
	3										
	4										

Feeding Information	Day 0	24 Hours	48 Hours	72 Hours
Feed Time*:	1745	0845	0900	0830
Technician:	KC/SH	KC	KC	KC

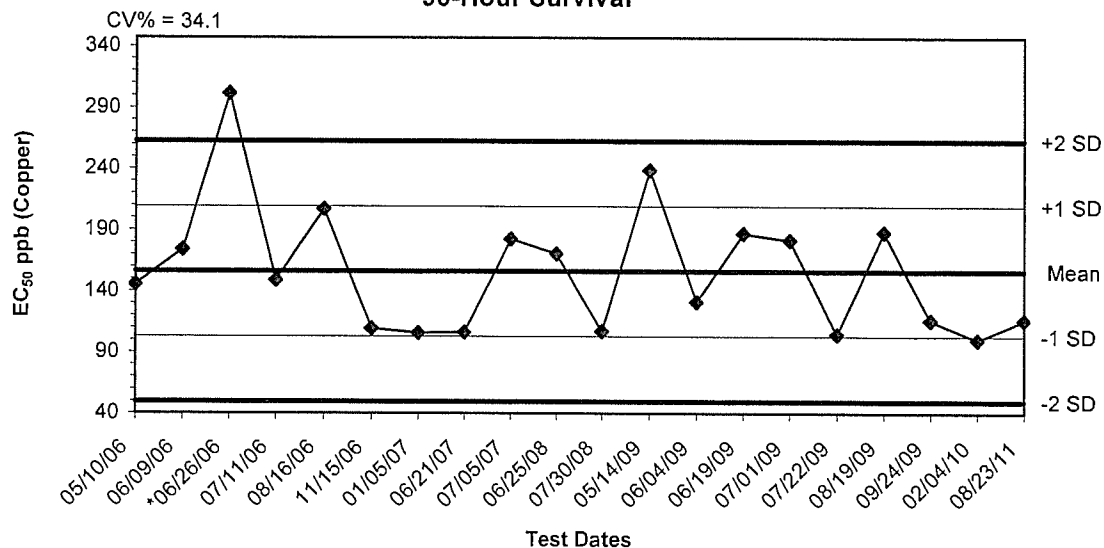
\*Topsmelt should be fed at test initiation and approximately 2 hours before renewal at 24, 48, and 72 hours.

Start Time:	1530JH
End Time:	1535 KC
Supplier:	Aquatic Bio Systems
Organism Batch:	ABS 8915 Age: 13 days

Dilution Water Batch:	S10082411
Hobo Temp. No.:	778891
Test Location:	Room 3
Test Acceptability:	X ≥ 90% Survival in Control

① IE 8/30/11 KC

**Atherinops affinis Reference Toxicant Control Chart:  
96-Hour Survival**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/10/06	145.3200	155.9936	102.7388	49.4841	209.2484	262.5031
06/09/06	174.0000	155.9936	102.7388	49.4841	209.2484	262.5031
*06/26/06	301.4970	155.9936	102.7388	49.4841	209.2484	262.5031
07/11/06	148.8500	155.9936	102.7388	49.4841	209.2484	262.5031
08/16/06	206.7660	155.9936	102.7388	49.4841	209.2484	262.5031
11/15/06	109.2980	155.9936	102.7388	49.4841	209.2484	262.5031
01/05/07	105.6200	155.9936	102.7388	49.4841	209.2484	262.5031
06/21/07	106.0580	155.9936	102.7388	49.4841	209.2484	262.5031
07/05/07	182.6330	155.9936	102.7388	49.4841	209.2484	262.5031
06/25/08	170.5600	155.9936	102.7388	49.4841	209.2484	262.5031
07/30/08	106.9980	155.9936	102.7388	49.4841	209.2484	262.5031
05/14/09	238.8521	155.9936	102.7388	49.4841	209.2484	262.5031
06/04/09	130.8960	155.9936	102.7388	49.4841	209.2484	262.5031
06/19/09	186.8720	155.9936	102.7388	49.4841	209.2484	262.5031
07/01/09	181.3600	155.9936	102.7388	49.4841	209.2484	262.5031
07/22/09	104.3930	155.9936	102.7388	49.4841	209.2484	262.5031
08/19/09	187.9400	155.9936	102.7388	49.4841	209.2484	262.5031
09/24/09	115.8400	155.9936	102.7388	49.4841	209.2484	262.5031
02/04/10	100.0000	155.9936	102.7388	49.4841	209.2484	262.5031
08/23/11	116.1190	155.9936	102.7388	49.4841	209.2484	262.5031

\*Value was out of 95% CI range at time of testing.  
Updated 9/26/11 KC

**Acute Fish Test-96 Hr Survival**

Start Date: 8/23/2011 16:35 , Test ID: C110713.09 , Sample ID: REF-Ref Toxicant  
 End Date: 8/27/2011 17:15 , Lab ID: CCA-Weston, Carlsbad , Sample Type: CUSO-Copper sulfate  
 Sample Date: Protocol: EPAA 02-EPA Acute , Test Species: AA-Atherinops affinis  
 Comments:

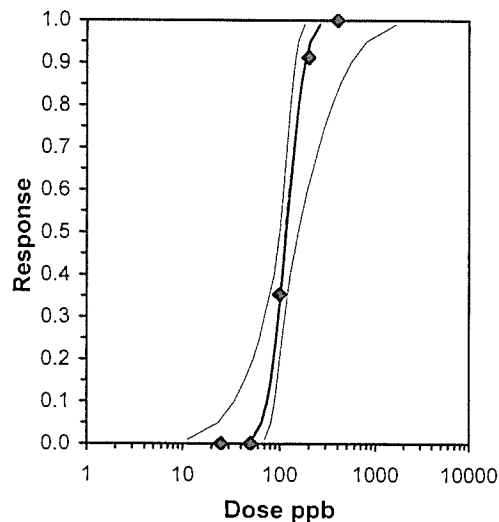
Conc-ppb	1	2	3	4
Control	0.8000	0.8000	0.9000	0.9000
25	1.0000	1.0000	1.0000	0.8000
50	1.0000	0.9000	1.0000	1.0000
100	0.4000	0.4000	0.8000	0.6000
200	0.0000	0.1000	0.1000	0.1000
400	0.0000	0.0000	0.0000	0.0000

Conc-ppb	Mean	N-Mean	Transform: Untransformed				N	Rank Sum	1-Tailed Critical	Mean	N-Mean
			Mean	Min	Max	CV%					
Control	0.8500	1.0000	0.8500	0.8000	0.9000	6.792	4			0.8500	0.0000
25	0.9500	1.1176	0.9500	0.8000	1.0000	10.526	4	23.00	10.00	0.9500	-0.1176
50	0.9750	1.1471	0.9750	0.9000	1.0000	5.128	4	25.00	10.00	0.9750	-0.1471
100	0.5500	0.6471	0.5500	0.4000	0.8000	34.816	4	11.00	10.00	0.5500	0.3529
*200	0.0750	0.0882	0.0750	0.0000	0.1000	66.667	4	10.00	10.00	0.0750	0.9118
400	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4			0.0000	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.85449	0.868	0.37937	1.76807
Bartlett's Test indicates equal variances (p = 0.09)	8.06948	13.2767		
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	200	141.421	

Parameter	Value	SE	95% Fiducial Limits		Maximum Likelihood-Probit						
			Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter		
Slope	6.59074	2.25373	2.17342	11.0081	0	6.36558	7.81473	0.1	2.0649	0.15173	12
Intercept	-8.6092	4.57491	-17.576	0.35757							
TSCR											

Point	Probits	ppb	95% Fiducial Limits	
EC01	2.674	51.5147	11.5118	70.3604
EC05	3.355	65.3632	23.479	81.8949
EC10	3.718	74.2089	34.1767	89.2002
EC15	3.964	80.8439	43.8461	94.8881
EC20	4.158	86.5378	53.1946	100.14
EC25	4.326	91.7412	62.4035	105.522
EC40	4.747	106.283	87.7966	127.969
EC50	5.000	116.119	100.395	154.329
EC60	5.253	126.865	110.133	194.011
EC75	5.674	146.975	123.774	294.537
EC80	5.842	155.812	128.962	349.452
EC85	6.036	166.786	135.038	427.292
EC90	6.282	181.698	142.836	551.302
EC95	6.645	206.288	154.887	806.072
EC99	7.326	261.743	179.634	1649.93





Test: AC-Acute Fish Test  
 Species: AA-Atherinops affinis  
 Sample ID: REF-Ref Toxicant  
 Start Date: 8/23/2011 16:35

Test ID: C110713.09  
 Protocol: EPAA 02-EPA Acute  
 Sample Type: CUSO-Copper sulfate  
 End Date: 8/27/2011 17:15  
 Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				8	
	2	2	Control	10				8	
	3	3	Control	10				9	
	4	4	Control	10				9	
	5	1	25.000	10				10	
	6	2	25.000	10				10	
	7	3	25.000	10				10	
	8	4	25.000	10				8	
	9	1	50.000	10				10	
	10	2	50.000	10				9	
	11	3	50.000	10				10	
	12	4	50.000	10				10	
	13	1	100.000	10				4	
	14	2	100.000	10				4	
	15	3	100.000	10				8	
	16	4	100.000	10				6	
	17	1	200.000	10				0	
	18	2	200.000	10				1	
	19	3	200.000	10				1	
	20	4	200.000	10				1	
	21	1	400.000	10				0	
	22	2	400.000	10				0	
	23	3	400.000	10				0	
	24	4	400.000	10				0	

Comments:



## 96 Hour Topsmelt Reference Toxicant Test

Test ID: <b>C110713.09</b>		Replicates: 4		Study Director: <b>K. Curry</b>		Location: <b>Rm. 3</b>	
Dilution Water Batch: <b>S10072511</b>		Organism Batch: <b>A658683</b>		Associated Test(s): <b>51YB</b>		No. of Organisms: 10	
Toxicant: Copper Sulfate (0.509gCu/LCuSO <sub>4</sub> )		Lot #: <b>2008506</b>	Date Prepared: <b>7/13/11</b>		Initials: <b>ke</b>		
Target Concentrations: <b>400 ppb</b>		Quantity of Stock: Target: <b>1.572 mL</b>		Quantity of Diluent: Target: <b>2000 mL</b>			
<b>400 ppb</b>		Actual: <b>1.5724 mL</b>		Actual: <b>2000.0 mL</b>			
Serial Dilute by 1/2 to obtain concentrations of 200, 100, 50, and 25 ppb.							
<b>0 Hours</b>		Date: <b>8/23/11</b>		WQ Time: <b>1500</b>		Start Time: <b>1635 ke</b> Initials: <b>BG</b>	
<b>STOCK</b>							
	Control	25	50	100	200	400	
D.O. (mg/L)	<b>6.5</b>	<b>6.4</b>	<b>6.3</b>	<b>6.4</b>	<b>6.4</b>	<b>6.3</b>	
Temperature	<b>22.0</b>	<b>22.3</b>	<b>22.4</b>	<b>21.9</b>	<b>22.1</b>	<b>21.9</b>	
Salinity	<b>33.0</b>	<b>33.0</b>	<b>33.0</b>	<b>32.9</b>	<b>33.0</b>	<b>32.9</b>	
pH	<b>8.0</b>	<b>8.0</b>	<b>8.0</b>	<b>8.0</b>	<b>8.0</b>	<b>8.0</b>	
<b>24 Hours</b>		Date: <b>8/24/11</b>		Time: <b>1235</b>		Initials: <b>ke</b>	
<b>Renewal Information</b>		Toxicant Amount: <b>1.5722</b>		Diluent Amount: <b>2000.0</b>		Initials: <b>BG</b>	
	Control	25	50	100	200	400	
No. Alive Rep 1	<b>9(1)</b>	<b>10</b>	<b>10</b>	<b>7(3)</b>	<b>10</b>	<b>10</b>	
No. Alive Rep 2	<b>8(2)</b>	<b>10</b>	<b>9(1)</b>	<b>9(1)</b>	<b>10</b>	<b>9(1)</b>	
No. Alive Rep 3	<b>9(1)</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>8(2)</b>	
No. Alive Rep 4	<b>9(1)</b>	<b>8(2)</b>	<b>10</b>	<b>10</b>	<b>9(1)</b>	<b>10</b>	
<b>48 Hours</b>		Date: <b>8/25/11</b>		Time: <b>1110</b>		Initials: <b>ke</b>	
<b>Renewal Information</b>		Toxicant Amount: <b>0.7864</b>		Diluent Amount: <b>1000.0</b>		Initials: <b>ke</b>	
	Control	25	50	100	200	400	
No. Alive Rep 1	<b>9</b>	<b>10</b>	<b>10</b>	<b>7</b>	<b>1(9)</b>	<b>1(9)</b>	
No. Alive Rep 2	<b>8</b>	<b>10</b>	<b>9</b>	<b>8(1)</b>	<b>3(7)</b>	<b>0(9)</b>	
No. Alive Rep 3	<b>9</b>	<b>10</b>	<b>10</b>	<b>8(2)</b>	<b>0(4)</b>	<b>1(7)</b>	
No. Alive Rep 4	<b>9</b>	<b>8</b>	<b>10</b>	<b>9(1)</b>	<b>4(5)</b>	<b>1(9)</b>	



**96 Hour Topsmelt  
Reference Toxicant Test**

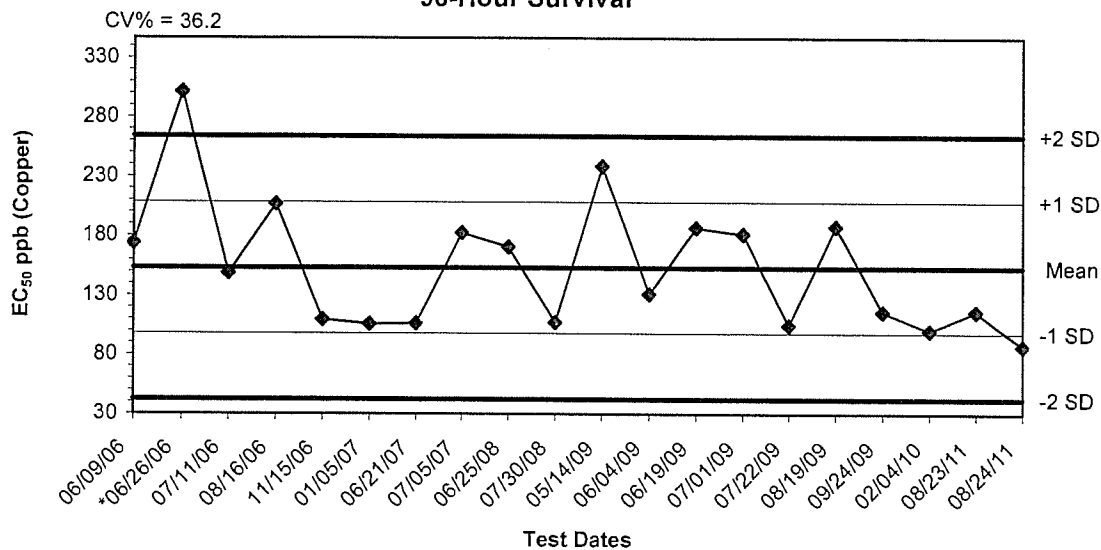
<b>72 Hours</b>		Date: 8/26/11	Time: 1340	Initials: JH		
<b>Renewal Information</b>		Toxicant Amount: 0.7665	Diluent Amount: 1000.0	Initials: ke		
	Control	25	50	100	200	400
No. Alive Rep 1	9	10	10	4(3)	1	1
No. Alive Rep 2	8	10	9	4(4)	1(2)	-
No. Alive Rep 3	9	10	10	8	2(4)	0(1)
No. Alive Rep 4	9	8	10	6(3)	2(2)	1
<b>96 Hours</b>		Date: 8/27/11	WQ Time: 1650	Replicate: 4	Initials: ke	
STOCK						
	Control	25	50	100	200	400
D.O. (mg/L)	6.7	6.4	6.4	6.4	6.4	6.4
Temperature	21.8	22.0	21.6	21.6	21.7	21.9
Salinity	32.8	32.7	32.7	32.8	32.7	32.6
pH	8.0	8.0	8.0	8.0	8.0	7.9
<b>96 Hour Survival Data</b>		End Time: 1715			Initials: ke	
	Control	25	50	100	200	400
No. Alive Rep 1	8(1)	10	10	4	0(1)	0(1)
No. Alive Rep 2	8	10	9	4	1	-
No. Alive Rep 3	9	10	10	8	1(1)	-
No. Alive Rep 4	9	8	10	6	1(1)	0(1)

Pass

Fail

Notes:

**Atherinops affinis Reference Toxicant Control Chart:  
96-Hour Survival**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/09/06	174.0000	153.0795	97.6593	42.2390	208.4997	263.9199
*06/26/06	301.4970	153.0795	97.6593	42.2390	208.4997	263.9199
07/11/06	148.8500	153.0795	97.6593	42.2390	208.4997	263.9199
08/16/06	206.7660	153.0795	97.6593	42.2390	208.4997	263.9199
11/15/06	109.2980	153.0795	97.6593	42.2390	208.4997	263.9199
01/05/07	105.6200	153.0795	97.6593	42.2390	208.4997	263.9199
06/21/07	106.0580	153.0795	97.6593	42.2390	208.4997	263.9199
07/05/07	182.6330	153.0795	97.6593	42.2390	208.4997	263.9199
06/25/08	170.5600	153.0795	97.6593	42.2390	208.4997	263.9199
07/30/08	106.9980	153.0795	97.6593	42.2390	208.4997	263.9199
05/14/09	238.8521	153.0795	97.6593	42.2390	208.4997	263.9199
06/04/09	130.8960	153.0795	97.6593	42.2390	208.4997	263.9199
06/19/09	186.8720	153.0795	97.6593	42.2390	208.4997	263.9199
07/01/09	181.3600	153.0795	97.6593	42.2390	208.4997	263.9199
07/22/09	104.3930	153.0795	97.6593	42.2390	208.4997	263.9199
08/19/09	187.9400	153.0795	97.6593	42.2390	208.4997	263.9199
09/24/09	115.8400	153.0795	97.6593	42.2390	208.4997	263.9199
02/04/10	100.0000	153.0795	97.6593	42.2390	208.4997	263.9199
08/23/11	116.1190	153.0795	97.6593	42.2390	208.4997	263.9199
08/24/11	87.0370	153.0795	97.6593	42.2390	208.4997	263.9199

\*Value was out of 95% CI range at time of testing.

Updated 9/26/11 KC

**Acute Fish Test-96 Hr Survival**

Start Date: 8/24/2011 17:18 , Test ID: C110713.12 , Sample ID: REF-Ref Toxicant  
 End Date: 8/28/2011 15:55 , Lab ID: CCA-Weston, Carlsbad , Sample Type: CUSO-Copper sulfate  
 Sample Date: Protocol: EPAA 02-EPA Acute , Test Species: AA-Atherinops affinis  
 Comments:

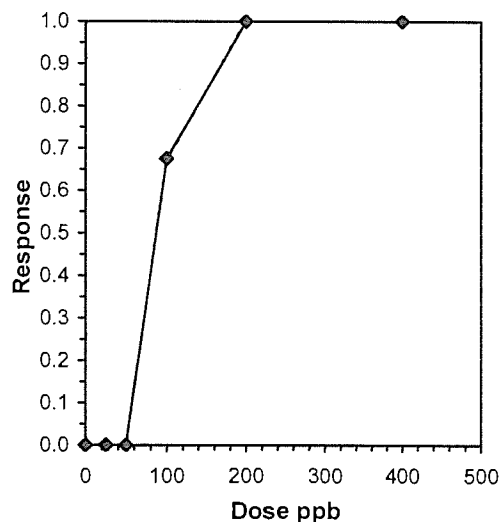
Conc-ppb	1	2	3	4
Control	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	0.3000	0.4000	0.2000	0.4000
200	0.0000	0.0000	0.0000	0.0000
400	0.0000	0.0000	0.0000	0.0000

Conc-ppb	Mean	N-Mean	Transform: Untransformed				Rank Sum	1-Tailed Critical	Isotonic		
			Mean	Min	Max	CV%			N	Mean	N-Mean
Control	1.0000	1.0000	1.0000	1.0000	1.0000	0.000	4		1.0000	1.0000	
25	1.0000	1.0000	1.0000	1.0000	1.0000	0.000	4	18.00	10.00	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000	0.000	4	18.00	10.00	1.0000	1.0000
*100	0.3250	0.3250	0.3250	0.2000	0.4000	29.459	4	10.00	10.00	0.3250	0.3250
200	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4			0.0000	0.0000
400	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4			0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01) Equality of variance cannot be confirmed	0.65314	0.844	-1.0919	5.41572

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	50	100	70.7107	

Point	ppb	SD	Linear Interpolation (200 Resamples)		Skew
			95% CL(Exp)	Skew	
IC05	53.704	0.212	53.107	54.444	0.0412
IC10	57.407	0.423	56.214	58.889	0.0412
IC15	61.111	0.635	59.320	63.333	0.0412
IC20	64.815	0.846	62.427	67.778	0.0412
IC25	68.519	1.058	65.534	72.222	0.0412
IC40	79.630	1.693	74.854	85.556	0.0412
IC50	87.037	2.116	81.068	94.444	0.0412



Test: AC-Acute Fish Test      Test ID: C110713.12  
 Species: AA-Atherinops affinis      Protocol: EPAA 02-EPA Acute  
 Sample ID: REF-Ref Toxicant      Sample Type: CUSO-Copper sulfate  
 Start Date: 8/24/2011 17:18      End Date: 8/28/2011 15:55      Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	10				10	
	2	2	Control	10				10	
	3	3	Control	10				10	
	4	4	Control	10				10	
	5	1	25.000	10				10	
	6	2	25.000	10				10	
	7	3	25.000	10				10	
	8	4	25.000	10				10	
	9	1	50.000	10				10	
	10	2	50.000	10				10	
	11	3	50.000	10				10	
	12	4	50.000	10				10	
	13	1	100.000	10				3	
	14	2	100.000	10				4	
	15	3	100.000	10				2	
	16	4	100.000	10				4	
	17	1	200.000	10				0	
	18	2	200.000	10				0	
	19	3	200.000	10				0	
	20	4	200.000	10				0	
	21	1	400.000	10				0	
	22	2	400.000	10				0	
	23	3	400.000	10				0	
	24	4	400.000	10				0	

Comments:



## 96 Hour Topsmelt Reference Toxicant Test

Test ID: <u>C110713.12</u>		Replicates: 4		Study Director: <u>K. Curry</u>		Location: <u>Rm. 3</u>	
Dilution Water Batch: <u>510082411</u>		Organism Batch: <u>ABS 8915</u>		Associated Test(s): <u>3178</u>		No. of Organisms: 10	
Toxicant: Copper Sulfate (0.509gCu/LCuSO <sub>4</sub> )		Lot #: <u>2008506</u>	Date Prepared: <u>8/24/11</u>			Initials: <u>BG</u>	
Target Concentrations: <u>400 ppb</u>		Quantity of Stock: Target: <u>1.572 mL</u>			Quantity of Diluent: Target: <u>2000 mL</u>		
<u>400 ppb</u>		Actual: <u>1.5722</u>			Actual: <u>2000.0 mL</u>		
Serial Dilute by 1/2 to obtain concentrations of 200, 100, 50, and 25 ppb.							
<b>0 Hours</b> Date: <u>8/24/11</u> WQ Time: <u>1645</u> Start Time: <u>1718</u> Initials: <u>SH</u>							
<b>STOCK</b>							
	Control	25	50	100	200	400	
D.O. (mg/L)	<u>7.1</u>	<u>6.9</u>	<u>7.0</u>	<u>6.9</u>	<u>7.1</u>	<u>7.0</u>	
Temperature	<u>21.6</u>	<u>21.3</u>	<u>21.4</u>	<u>21.4</u>	<u>21.4</u>	<u>21.4</u>	
Salinity	<u>32.7</u>	<u>32.8</u>	<u>32.8</u>	<u>32.8</u>	<u>32.7</u>	<u>32.7</u>	
pH	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	
<b>24 Hours</b> Date: <u>8/25/11</u> Time: <u>1215</u> Initials: <u>BG</u>							
<b>Renewal Information</b> Toxicant Amount: <u>0.7860 mL</u> Diluent Amount: <u>1000 mL</u> Initials: <u>BG</u>							
	Control	25	50	100	200	400	
No. Alive Rep 1	<u>10</u>	<u>10</u>	<u>10</u>	<u>9(1)</u>	<u>3(7)</u>	<u>0(10)</u>	
No. Alive Rep 2	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>7(3)</u>	<u>0(10)</u>	
No. Alive Rep 3	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>7(3)</u>	<u>0(10)</u>	
No. Alive Rep 4	<u>10</u>	<u>10</u>	<u>10</u>	<u>8(2)</u>	<u>2(8)</u>	<u>0(10)</u>	
<b>48 Hours</b> Date: <u>8/26/11</u> Time: <u>1400</u> Initials: <u>SH</u>							
<b>Renewal Information</b> Toxicant Amount: <u>0.3930 mL</u> Diluent Amount: <u>1000 mL</u> Initials: <u>JH</u>							
	Control	25	50	100	200	400	
No. Alive Rep 1	<u>10</u>	<u>10</u>	<u>10</u>	<u>6(3)</u>	<u>1(2)</u>	/	
No. Alive Rep 2	<u>10</u>	<u>10</u>	<u>10</u>	<u>4(6)</u>	<u>0(7)</u>		
No. Alive Rep 3	<u>10</u>	<u>10</u>	<u>10</u>	<u>2(8)</u>	<u>3(4)</u>		
No. Alive Rep 4	<u>10</u>	<u>10</u>	<u>10</u>	<u>4(4)</u>	<u>0(2)</u>		



## 96 Hour Topsmelt Reference Toxicant Test

<b>72 Hours</b>		Date: 8/27/11	Time: 1440	Initials: <i>KE</i>		
<b>Renewal Information</b>		Toxicant Amount: 0.3931	Diluent Amount: <del>0.3931</del> <sup>1000.8</sup>	Initials: <i>KE</i>		
	Control	25	50	100	200	400
No. Alive Rep 1	10	10	10	6	0 (1)	/
No. Alive Rep 2	10	10	10	4	—	
No. Alive Rep 3	10	10	10	2	1 (2)	
No. Alive Rep 4	10	10	10	4	—	
<b>96 Hours</b>		Date: 8/28/11	WQ Time: 1400	Replicate: 3	Initials: <i>KE</i>	
STOCK						
	Control	25	50	100	200	400
D.O. (mg/L)	6.8	6.6	6.7	6.6	6.8	6.8
Temperature	22.4	22.1	22.1	22.2	22.3	22.2
Salinity	32.6	32.6	32.7	32.7	32.6	32.5
pH	8.1	8.0	8.0	8.0	8.0	8.1
<b>96 Hour Survival Data</b>		End Time: 1555		Initials: <i>KE</i>		
	Control	25	50	100	200	400
No. Alive Rep 1	10	10	10	3 (3)	—	/
No. Alive Rep 2	10	10	10	4	—	
No. Alive Rep 3	10	10	10	2	0 (1)	
No. Alive Rep 4	10	10	10	4	—	

① IE 8/27/11 *KE*

Pass

Fail

Notes:



Weston Solutions, Inc.

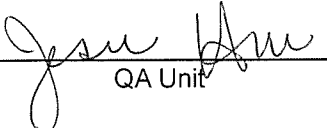
Client: Port of San Diego  
Project: Shelter Island Yacht Basin  
Sample Matrix: Liquid  
Sample Name/ID: SIYB-1

Date Received: 23 Aug 11  
Date Test Started: 23 Aug 11  
Date Test Ended: 25 Aug 11  
Test ID No.: C110823.0142

**Bivalve Larvae Chronic 48-Hour Bioassay**  
Weston Testing Protocol No. BIO042  
EPA/600/R-95/136  
Test Organism: *Mytilus galloprovincialis*

Results

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	87.1	87.6
6.25%	87.6	91.4
12.5%	93.8	90.3
25%	94.5	86.6
50%	95.8	83.4
100%	86.0	81.9

  
\_\_\_\_\_  
QA Unit

1/3/12  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Approved

1/5/12  
\_\_\_\_\_  
Date

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-1

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0142

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Chronic Toxicity - Development**

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.36$ ). Dunnett's Multiple-Comparison Test provided a NOEC (No Observed Effect Concentration) of 100 percent and a LOEC (Lowest Observed Effect Concentration) of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Chronic Toxicity - Survival**

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.70$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Summary of Results**

Species	Exposure	Development		Survival		Tested Substance
		NOEC	$EC_{50}$	NOEC	$LC_{50}$	
<i>Mytilus galloprovincialis</i>	48 hrs	100%	>100%	100%	>100%	SIYB-1

**Protocol Deviations:** Control normality was slightly below the protocol limit of  $\geq 90$  percent for the test and the associated Reference Toxicant test. The salinity of the 100 percent concentration was above the protocol limit of  $30 \pm 2$  ppt.

**Weston Solutions, Inc.**

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-1

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0142

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	16.0	30.0	8.0
6.25	7.6	15.9	30.2	8.0
12.5	7.5	15.8	30.5	8.0
25	7.6	16.1	30.9	8.0
50	7.7	16.3	31.6	8.0
100	8.0	16.4	33.1	8.0
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.5		
6.25		14.5		
12.5		14.5		
25		14.5		
50		14.5		
100		14.4		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.8	15.3	30.1	7.9
6.25	7.7	14.9	30.6	7.9
12.5	7.9	14.9	30.7	7.9
25	8.0	14.9	31.4	8.0
50	8.0	15.0	31.8	8.0
100	8.0	14.8	33.7	8.0

\*Water quality measured on surrogate chambers.

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-1

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0142

**APPENDIX**  
Pertinent Test Data

**TEST:** Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

**DILUTION WATER:** Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	30.0 ppt
pH	8.0
Dissolved Oxygen	7.5 mg/L
Temperature	16.0°C

**TEST ORGANISM:** Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

**TEST CHAMBER:** Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

**EXPERIMENTAL DESIGN:**

1. Weston Solutions personnel collected a sample on August 22, 2011, at 1635 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0920 hours. The temperature of the sample upon receipt was 5.8°C.
2. The temperature of the test substance was adjusted to  $15 \pm 1$  °C.
3. Approximately 218 test organisms were placed into each chamber.
4. Test chambers were held at  $15 \pm 1$  °C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

**MORTALITY CRITERIA:** Absence of larvae, or completely developed shells without meat.

**ACCEPTABILITY CRITERIA:**  $\geq 50\%$  survival of controls;  $\geq 90\%$  normal shell development in surviving controls; minimum significant difference  $< 25\%$ .

**REFERENCE TOXICITY:**

Toxicant:	CuSO <sub>4</sub> , Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.
(control chart included) Species:	<i>Mytilus galloprovincialis</i> , larvae
48 hr EC <sub>25</sub> :	11.42 ppb survival, 6.07 ppb proportion normal
48 hr EC <sub>50</sub> :	13.47 ppb survival, 7.38 ppb proportion normal
Laboratory Mean (EC <sub>50</sub> ):	19.65 ppb survival, 7.17 ppb proportion normal
Test Date:	8/23/11 (within 95% confidence limits)

**STUDY DIRECTOR:** K. Skrivseth

**INVESTIGATORS:** K. Skrivseth, S. Hasan, K. Curry, B. Griffith, J. Hansen

**Bivalve Larval Survival and Development Test-Proportion Normal**

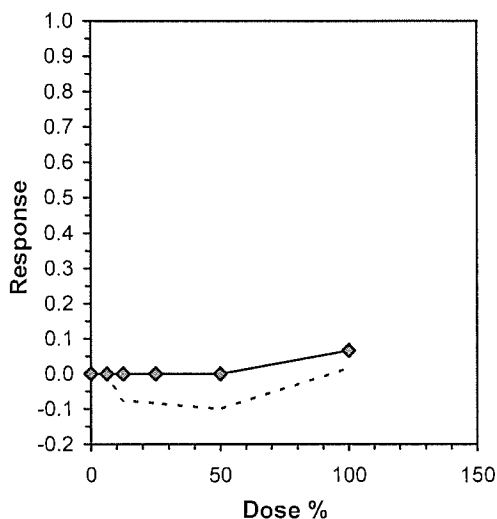
Start Date: 8/23/2011 18:45 . Test ID: C110823.0142 . Sample ID: SIYB -1 .  
 End Date: 8/25/2011 17:45 . Lab ID: CCA-Weston, Carlsbad . Sample Type: AMB1-Ambient water .  
 Sample Date: 8/22/2011 16:35 . Protocol: EPAW 95-EPA West Coast . Test Species: MG-Mytilus galloprovincialis .  
 Comments:

Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.8600	0.9029	0.8889	0.8533
12.5	0.9126	0.9436	0.9465	0.9497
25	0.9326	0.9231	0.9519	0.9709
50	0.9660	0.9357	0.9593	0.9719
100	0.8021	0.8606	0.8686	0.9097

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%					Mean	N-Mean
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4				0.9179	1.0000
6.25	0.8763	1.0057	1.2125	1.1777	1.2539	2.975	4	-0.286	2.410	0.0714	0.9179	1.0000
12.5	0.9381	1.0767	1.3210	1.2707	1.3447	2.571	4	-3.947	2.410	0.0714	0.9179	1.0000
25	0.9446	1.0842	1.3368	1.2898	1.3995	3.645	4	-4.482	2.410	0.0714	0.9179	1.0000
50	0.9582	1.0998	1.3675	1.3144	1.4024	2.788	4	-5.516	2.410	0.0714	0.9179	1.0000
100	0.8603	0.9873	1.1908	1.1098	1.2656	5.364	4	0.443	2.410	0.0714	0.8571	0.9338

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97704	0.884	-0.1708	0.05185						
Bartlett's Test indicates equal variances (p = 0.36)	5.47937	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.05144	0.05904	0.02437	0.00176	1.2E-05	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	87.756			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Alive**

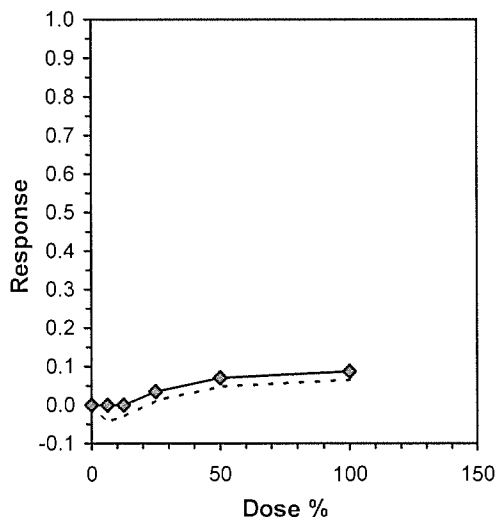
Start Date: 8/23/2011 18:45 · Test ID: C110823.0142 · Sample ID: SIYB -1 ·  
 End Date: 8/25/2011 17:45 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water ·  
 Sample Date: 8/22/2011 16:35 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis ·  
 Comments:

Conc-%	1	2	3	4
Control	0.9266	0.7661	0.9587	0.8532
6.25	0.9174	0.9450	0.9495	0.8440
12.5	0.9450	0.8945	0.8578	0.9128
25	0.8853	0.8349	0.9541	0.7890
50	0.9450	0.7844	0.7890	0.8165
100	0.8578	0.9541	0.8028	0.6606

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8761	1.0000	1.2265	1.0659	1.3662	10.793	4				0.8976	1.0000	
6.25	0.9140	1.0432	1.2806	1.1648	1.3442	6.424	4	-0.650	2.410	0.2003	0.8976	1.0000	
12.5	0.9025	1.0301	1.2573	1.1841	1.3340	4.972	4	-0.370	2.410	0.2003	0.8976	1.0000	
25	0.8658	0.9882	1.2065	1.0935	1.3549	9.339	4	0.241	2.410	0.2003	0.8658	0.9647	
50	0.8337	0.9516	1.1609	1.0879	1.3340	10.057	4	0.790	2.410	0.2003	0.8337	0.9289	
100	0.8188	0.9346	1.1496	0.9488	1.3549	14.658	4	0.925	2.410	0.2003	0.8188	0.9123	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98248	0.884	0.18513	-0.3685						
Bartlett's Test indicates equal variances (p = 0.70)	2.96989	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.15449	0.17435	0.01079	0.01382	0.57659	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	35.238			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Test: BV-Bivalve Larval Survival and Development Test      Test ID: C110823.01<sup>42</sup>  
 Species: MG-Mytilus galloprovincialis      Protocol: EPAW 95-EPA West Coast  
 Sample ID: SIYB -1      Sample Type: AMB1-Ambient water  
 Start Date: 8/23/2011 18:45      End Date: 8/25/2011 17      Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
1	1	1	Control	218	202	202	177	
2	2	2	Control	218	167	167	145	
3	3	3	Control	218	209	209	184	
4	4	4	Control	218	186	186	160	
5	1	1	6.250	218	200	200	172	
6	2	2	6.250	218	206	206	186	
7	3	3	6.250	218	207	207	184	
8	4	4	6.250	218	184	184	157	
9	1	1	12.500	218	206	206	188	
10	2	2	12.500	218	195	195	184	
11	3	3	12.500	218	187	187	177	
12	4	4	12.500	218	199	199	189	
13	1	1	25.000	218	193	193	180	
14	2	2	25.000	218	182	182	168	
15	3	3	25.000	218	208	208	198	
16	4	4	25.000	218	172	172	167	
17	1	1	50.000	218	206	206	199	
18	2	2	50.000	218	171	171	160	
19	3	3	50.000	218	172	172	165	
20	4	4	50.000	218	178	178	173	
21	1	1	100.000	218	187	187	150	
22	2	2	100.000	218	208	208	179	
23	3	3	100.000	218	175	175	152	
24	4	4	100.000	218	144	144	131	

Comments:

## Bivalve Counts Worksheet

Test ID: C110823.01 SIYB - 1

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	177	25	202
	2	145	22	167
	3	184	25	209
	4	160	26	186
6.25	1	172	28	200
	2	186	20	206
	3	184	23	207
	4	157	27	184
12.5	1	188	18	206
	2	184	11	195
	3	177	10	187
	4	189	10	199
25	1	180	13	193
	2	168	14	182
	3	198	10	208
	4	167	5	172
50	1	199	7	206
	2	160	11	171
	3	165	7	172
	4	173	5	178
100	1	150	37	187
	2	179	29	208
	3	152	23	175
	4	131	13	144
	1	0	0	0
	2	0	0	0
	3	0	0	0
	4	0	0	0





## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

CLIENT: <i>Port of San Diego</i>
PROJECT: <i>Shelter Island Yacht Basin</i>
CLIENT SAMPLE ID: <i>SIYB-1</i>
WESTON TEST ID: <i>C110823.0142</i>
SPECIES: <i>M. galloprovincialis</i>

DATE RECEIVED: <i>8/23/11</i>
DATE TEST STARTED: <i>8/23/11</i>
DATE TEST ENDED: <i>8/25/11</i>
WESTON SOP NO.: <i>BIO 042</i>
STUDY DIRECTOR: <i>K. Skirseth</i>

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: <i>8/23/11</i> Sample ID: <i>C110823.01</i> Dilutions (Tech): <i>KC</i> WQ Time: <i>1800</i> Technician: <i>BG</i>	Control	<i>2</i>	<i>7.5</i>	<i>2</i>	<i>16.0</i>	<i>6</i>	<i>30.0</i>	<i>3</i>	<i>8.0</i>
	Brine-Control		—		—		—		—
	<i>6.25</i>		<i>7.6</i>		<i>15.9</i>		<i>30.2</i>		<i>8.0</i>
	<i>12.5</i>		<i>7.5</i>		<i>15.8</i>		<i>30.5</i>		<i>8.0</i>
	<i>25</i>		<i>7.6</i>		<i>16.1</i>		<i>30.9</i>		<i>8.0</i>
	<i>50</i>		<i>7.7</i>		<i>16.3</i>		<i>31.6</i>		<i>8.0</i>
	<i>100</i>		<i>8.0</i>		<i>16.4</i>		<i>33.1</i> <sup>0.4</sup>		<i>8.0</i>
<b>24 Hours</b> Date: <i>8/24/11</i> WQ Time: <i>1030</i> Technician: <i>BG</i>	Control			<i>6B</i>	<i>14.5</i>				
	Brine-Control				—				
	<i>6.25</i>				<i>14.5</i>				
	<i>12.5</i>				<i>14.5</i>				
	<i>25</i>				<i>14.5</i>				
	<i>50</i>				<i>14.5</i>				
	<i>100</i>				<i>14.4</i>				
<b>48 Hours</b> Date: <i>8/25/11</i> WQ Time: <i>1420</i> Technician: <i>SH/BG</i>	Control	<i>2</i>	<i>7.8</i>	<i>2</i>	<i>15.3</i>	<i>6</i>	<i>30.1</i>	<i>4</i>	<i>7.9</i>
	Brine-Control		—		—		—		—
	<i>6.25</i>		<i>7.7</i>		<i>14.9</i>		<i>30.6</i>		<i>7.9</i>
	<i>12.5</i>		<i>7.9</i>		<i>14.9</i>		<i>30.7</i>		<i>7.9</i>
	<i>25</i>		<i>8.0</i>		<i>14.9</i>		<i>31.4</i>		<i>8.0</i>
	<i>50</i>		<i>8.0</i>		<i>15.0</i>		<i>31.8</i>		<i>8.0</i>
	<i>100</i>		<i>8.0</i>		<i>14.8</i>		<i>33.7</i> <sup>0.4</sup>		<i>8.0</i>

\*Water quality measurements taken in surrogate water quality chambers. <sup>0</sup> Salinity is above the test protocol range of 30 ± 2 ppt. 1/3/12 BS

START TIME: <i>1845</i>	Initials: <i>SH</i>
END TIME: <i>1745</i>	Initials: <i>KE</i>
ORGANISM BATCH: <i>TSF 5708</i>	
HOBO TEMP. NO.: <i>2296</i>	
TEST LOCATION: <i>Room 2</i>	

DILUTION WATER BATCH: <i>S10072511</i>
TEST ACCEPTABILITY:
<input checked="" type="checkbox"/> ≥70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS
<input type="checkbox"/> ≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS
<input checked="" type="checkbox"/> MSD < 25%



## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BI0042

Weston Test ID: C110823.0142 <del>Port of San Diego OCS</del>	Client: Port of San Diego <del>Shoemaker Island Yacht Basin</del>	Client Sample ID: <sup>OKS</sup> <del>SIYB-1-7 &amp; SIYB-2-6</del>
--	--	--

SPAWNING DATA				
Initial Spawning Time: 1600	Final Spawning Time: 1700	Fertilization Time: 1701	No. of Females: 2	No. of Males: 3
Embryo Density (count/mL):	1. 98 / 77	2. 81 / 86	3. 91 / 99	Average: 88.7
Stocking Volume Calculation: $2700 / (88.7 \times 50) = .608$ or 6/ml				

ZERO TIME COUNTS					
1. 186	2. 203	3. 209	4. 269	5. 203	6. 238
Average Count: 218			Technician: YS		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control	177	25	145	22	184	25	160	26			8/31/11	YS
Brine												
6.25	172	28	186	20	184	23	157	27			9/16/11	YS
12.5	188	18	184	11	177	10	189	10			↓	↓
25	180	13	168	14	198	10	167	5				
50	199	7	160	11	165	7	173	5				
100	150	37	179	29	152	23	131	13			9/20/11	↓

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	6.25 / 3	50 / 4	1	1
Total #	206	179		
# Normal	182	171	177 <sup>OKS</sup>	
Date / Initials	10/13/11 / SH	10/13/11 / SH	1	1
QA Check Acceptability: <input checked="" type="checkbox"/> <5% difference in means of QA & orig. counts				

① WP 9/16/11 KS  
② WP 10/13/11 SH

Weston Solutions, Inc.

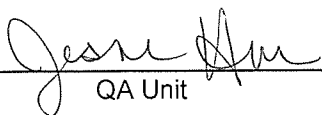
Client: Port of San Diego  
Project: Shelter Island Yacht Basin  
Sample Matrix: Liquid  
Sample Name/ID: SIYB-2

Date Received: 23 Aug 11  
Date Test Started: 23 Aug 11  
Date Test Ended: 25 Aug 11  
Test ID No.: C110823.0242

**Bivalve Larvae Chronic 48-Hour Bioassay**  
Weston Testing Protocol No. BIO042  
EPA/600/R-95/136  
Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	87.1	87.6
6.25%	87.3	96.4
12.5%	89.7	91.6
25%	90.8	93.9
50%	89.4	89.0
100%	97.3	80.1

  
QA Unit

1/3/12  
Date

  
Approved

1/5/12  
Date

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-2

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0242

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Chronic Toxicity - Development**

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.15$ ). Dunnett's Multiple-Comparison Test provided a NOEC (No Observed Effect Concentration) of 100 percent and a LOEC (Lowest Observed Effect Concentration) of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Chronic Toxicity - Survival**

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.90$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Summary of Results**

Species	Exposure	Development		Survival		Tested Substance
		NOEC	EC <sub>50</sub>	NOEC	LC <sub>50</sub>	
<i>Mytilus galloprovincialis</i>	48 hrs	100%	>100%	100%	>100%	SIYB-2

**Protocol Deviations:** Control normality was slightly below the protocol limit of  $\geq 90$  percent for the test and the associated Reference Toxicant test. Sample arrived at 9.9°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity. The salinity of the 100 percent concentration was above the protocol limit of  $30 \pm 2$  ppt. Temperature in the water quality surrogate on Day 0 for the 100% concentration was above the protocol limit of  $15^\circ\text{C} \pm 1$ .

**Weston Solutions, Inc.**

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-2

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0242

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	16.0	30.0	8.0
6.25	7.5	16.1	30.2	8.0
12.5	7.5	16.0	30.5	8.0
25	7.6	16.2	30.9	8.0
50	7.7	16.4	31.6	8.0
100	8.0	16.6	33.1	8.1
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.5		
6.25		14.5		
12.5		14.3		
25		14.6		
50		14.5		
100		14.5		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.8	15.3	30.1	7.9
6.25	7.7	14.8	30.7	7.9
12.5	7.9	14.7	31.0	7.9
25	7.9	15.0	31.1	8.0
50	8.0	14.8	31.8	8.0
100	8.2	14.6	34.0	8.0

\*Water quality measured on surrogate chambers.

**Weston Solutions, Inc.**

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-2

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0242

**APPENDIX**  
Pertinent Test Data

**TEST:** Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*.), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

**DILUTION WATER:** Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	30.0 ppt
pH	8.0
Dissolved Oxygen	7.5 mg/L
Temperature	16.0°C

**TEST ORGANISM:** Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

**TEST CHAMBER:** Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

**EXPERIMENTAL DESIGN:**

1. Weston Solutions personnel collected a sample on August 22, 2011, at 1625 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0920 hours. The temperature of the sample upon receipt was 9.9°C.
2. The temperature of the test substance was adjusted to 15 ± 1 °C.
3. Approximately 218 test organisms were placed into each chamber.
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

**MORTALITY CRITERIA:** Absence of larvae, or completely developed shells without meat.

**ACCEPTABILITY CRITERIA:** ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

**REFERENCE TOXICITY:**

Toxicant:	CuSO <sub>4</sub> , Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.
Species:	<i>Mytilus galloprovincialis</i> , larvae
48 hr EC <sub>25</sub> :	11.42 ppb survival, 6.07 ppb proportion normal
48 hr EC <sub>50</sub> :	13.47 ppb survival, 7.38 ppb proportion normal
Laboratory Mean (EC <sub>50</sub> ):	19.65 ppb survival, 7.17 ppb proportion normal
Test Date:	8/23/11 (within 95% confidence limits)

(control chart included)

**STUDY DIRECTOR:** K. Skrivseth

**INVESTIGATORS:** K. Skrivseth, S. Hasan, K. Curry, B. Griffith, J. Hansen

**Bivalve Larval Survival and Development Test-Proportion Normal**

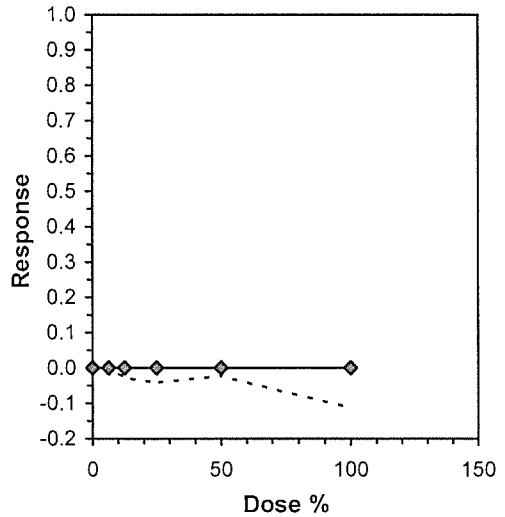
Start Date: 8/23/2011 18:45 · Test ID: C110823.0242 · Sample ID: SIYB - 2  
 End Date: 8/25/2011 17:45 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:25 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.8713	0.8898	0.8476	0.8815
12.5	0.8750	0.8708	0.9369	0.9034
25	0.9191	0.8685	0.9502	0.8930
50	0.8693	0.8462	0.9299	0.9290
100	0.9659	0.9669	0.9728	0.9844

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4				0.9020	1.0000	
6.25	0.8726	1.0015	1.2064	1.1698	1.2324	2.241	4	-0.072	2.410	0.0799	0.9020	1.0000	
12.5	0.8965	1.0290	1.2461	1.2031	1.3169	4.214	4	-1.269	2.410	0.0799	0.9020	1.0000	
25	0.9077	1.0419	1.2664	1.1998	1.3459	4.960	4	-1.884	2.410	0.0799	0.9020	1.0000	
50	0.8936	1.0256	1.2432	1.1677	1.3028	5.572	4	-1.182	2.410	0.0799	0.9020	1.0000	
100	0.9725	1.1162	1.4058	1.3849	1.4455	1.985	4	-6.089	2.410	0.0799	0.9020	1.0000	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97365	0.884	0.22078	-0.4713						
Bartlett's Test indicates equal variances (p = 0.15)	8.14602	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.058	0.06656	0.02222	0.0022	9.8E-05	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Alive**

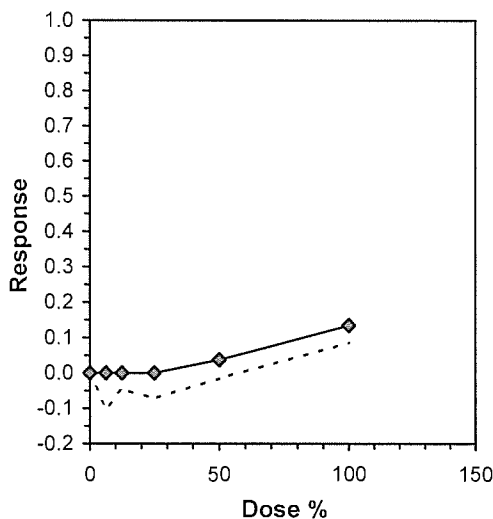
Start Date: 8/23/2011 18:45 Test ID: C110823.0242 Sample ID: SIYB - 2  
 End Date: 8/25/2011 17:45 Lab ID: CCA-Weston, Carlsbad Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:25 Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.9266	0.7661	0.9587	0.8532
6.25	0.9266	1.0000	0.9633	0.9679
12.5	0.9541	0.9587	0.9450	0.8073
25	1.0000	0.9771	0.9220	0.8578
50	0.9128	0.9541	0.9817	0.7110
100	0.9404	0.8303	0.8440	0.5872

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8761	1.0000	1.2265	1.0659	1.3662	10.793	4				0.9240	1.0000	
6.25	0.9644	1.1008	1.4005	1.2965	1.5369	7.145	4	-1.638	2.410	0.2560	0.9240	1.0000	
12.5	0.9163	1.0458	1.2929	1.1164	1.3662	9.159	4	-0.624	2.410	0.2560	0.9240	1.0000	
25	0.9392	1.0720	1.3569	1.1841	1.5369	11.326	4	-1.227	2.410	0.2560	0.9240	1.0000	
50	0.8899	1.0157	1.2661	1.0032	1.4349	14.813	4	-0.372	2.410	0.2560	0.8899	0.9631	
100	0.8005	0.9136	1.1270	0.8730	1.3241	16.613	4	0.937	2.410	0.2560	0.8005	0.8663	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94758	0.884	-0.5116	-0.5649						
Bartlett's Test indicates equal variances (p = 0.90)	1.62468	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.20516	0.23153	0.03763	0.02257	0.19342	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	56.755			
IC10	82.580			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			





Test: BV-Bivalve Larval Survival and Development Test · Test ID: C110823.02 42 ·  
 Species: MG-Mytilus galloprovincialis · Protocol: EPAW 95-EPA West Coast ·  
 Sample ID: SIYB - 2 · Sample Type: AMB1-Ambient water ·  
 Start Date: 8/23/2011 18:45 · End Date: 8/25/2011 17 Lab ID: CCA-Weston, Carlsbad ·

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	218	202	202	177	
	2	2	Control	218	167	167	145	
	3	3	Control	218	209	209	184	
	4	4	Control	218	186	186	160	
	5	1	6.250	218	202	202	176	
	6	2	6.250	218	245	245	218	
	7	3	6.250	218	210	210	178	
	8	4	6.250	218	211	211	186	
	9	1	12.500	218	208	208	182	
	10	2	12.500	218	209	209	182	
	11	3	12.500	218	206	206	193	
	12	4	12.500	218	176	176	159	
	13	1	25.000	218	235	235	216	
	14	2	25.000	218	213	213	185	
	15	3	25.000	218	201	201	191	
	16	4	25.000	218	187	187	167	
	17	1	50.000	218	199	199	173	
	18	2	50.000	218	208	208	176	
	19	3	50.000	218	214	214	199	
	20	4	50.000	218	155	155	144	
	21	1	100.000	218	205	205	198	
	22	2	100.000	218	181	181	175	
	23	3	100.000	218	184	184	179	
	24	4	100.000	218	128	128	126	

Comments:



## Bivalve Counts Worksheet

Test ID: C110823.02 SIYB - 2

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	177	25	202
	2	145	22	167
	3	184	25	209
	4	160	26	186
6.25	1	176	26	202
	2	218	27	245
	3	178	32	210
	4	186	25	211
12.5	1	182	26	208
	2	182	27	209
	3	193	13	206
	4	159	17	176
25	1	216	19	235
	2	185	28	213
	3	191	10	201
	4	167	20	187
50	1	173	26	199
	2	176	32	208
	3	199	15	214
	4	144	11	155
100	1	198	7	205
	2	175	6	181
	3	179	5	184
	4	126	2	128
	1	0	0	0
	2	0	0	0
	3	0	0	0
	4	0	0	0



# BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

CLIENT:	Port of San Diego
PROJECT:	Shelter Island Yacht Basin
CLIENT SAMPLE ID:	STVB-2
WESTON TEST ID:	C110823.0242
SPECIES:	<i>M. galloprovincialis</i>

DATE RECEIVED:	8/23/11
DATE TEST STARTED:	8/23/11
DATE TEST ENDED:	8/25/11
WESTON SOP NO.:	BIO 042
STUDY DIRECTOR:	K. Skrivseth

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: 8/23/11 Sample ID: C110823.02 Dilutions (Tech): KC WQ Time: 1810 Technician: BCG	Control	2	7.5	2	16.0	6	30.0	3	8.0
	Brine-Control		—		—		—		—
	6.25		7.5		16.1		30.2		8.0
	12.5		7.5		16.0		30.5		8.0
	25		7.6		16.2		30.9		8.0
	50		7.7		16.4		31.6		8.0
	100		8.0		16.6		33.1		8.1
<b>24 Hours</b> Date: 8/24/11 WQ Time: 1035 Technician: BCG	Control			6B	14.5				
	Brine-Control				—				
	6.25				14.5				
	12.5				14.3				
	25				14.6				
	50				14.5				
	100				14.5				
<b>48 Hours</b> Date: 8/25/11 WQ Time: 1420 Technician: SH/BCG	Control	2	7.8	2	15.3	6	30.1	3	7.9
	Brine Control		—		—		—		—
	6.25		7.7		14.8		30.7		7.9
	12.5		7.9		14.7		31.0		7.9
	25		7.9		15.0		31.1		8.0
	50		8.0		14.8		31.8		8.0
	100		8.2		14.6		34.0		8.0

\*Water quality measurements taken in surrogate water quality chambers.

START TIME:	1845	Initials:	SH
END TIME:	1745	Initials:	KE
ORGANISM BATCH:	TSF 5708		
HOBOTEMP. NO.:	2296		
TEST LOCATION:	ROOM 2		

DILUTION WATER BATCH:	S10072511
TEST ACCEPTABILITY:	
<input checked="" type="checkbox"/>	≥70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS
<input type="checkbox"/>	≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS
<input checked="" type="checkbox"/>	MSD < 25%

① IE 8/23/11 SH ② IE 8/25/11 ③ Salinity is above the test protocol limit of 30 ± 2 ppt 7/3/12 KS  
 ④ temperature above protocol limit of 15°C ± 1 7/3/12 KS



# BIVALVE 48-HOUR<sup>®</sup> CHRONIC TOXICITY TEST

BIO042

Weston Test ID: C110823.0242	Client: Port of San Diego Shelter Island Yacht Basin <sup>2</sup> <sub>2</sub>	Client Sample ID: SIYB -2
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SPAWNING DATA				
Initial Spawning Time: 1600	Final Spawning Time: 1700	Fertilization Time: 1701	No. of Females: 2	No. of Males: 3
Embryo Density (count/mL):	1. 98/77	2. 81/86	3. 91/99	Average: 88.7
Stocking Volume Calculation: $2700 / (88.7 \times 50) = 0.608$				

ZERO TIME COUNTS					
1. 186	2. 203	3. 209	4. 269	5. 203	6. 238
Average Count: 218			Technician: YS		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control												
Brine												
6.25	176	26	218	27	178	32	186	25			9/27/11	SH
12.5 <sup>SH</sup>	218 <sup>182</sup>	27 <sup>26</sup>	182	27	193	13	159	17			↓	↓
25 <sup>SH</sup>	178 <sup>216</sup>	32 <sup>19</sup>	185	28	191	10	167	20			↓	↓
50	173	26	176	32	199	15	144	11			↓	↓
100	198	7	175	6	179	5	126	2			9/20/11	YS

① WC 9/27/11 SH

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	12.5 / 2	50 <sup>SH</sup> / 3	1	1
Total #	207	193 <sup>200</sup>		
# Normal	182	193 <sup>193</sup>		
Date / Initials	10/12/11 / YS	10/12/11 / YS	1	1
QA Check Acceptability: <input checked="" type="checkbox"/> <5% difference in means of QA & orig. counts				

② IE 10/12/11 YS

③ IE 11/3/12 JH

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-3

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0342

**Bivalve Larvae Chronic 48-Hour Bioassay**

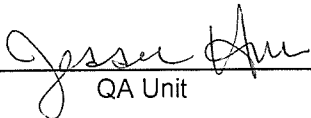
Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	87.1	87.6
6.25%	92.4	93.9
12.5%	90.7	88.5
25%	93.9	82.2
50%	94.7	80.6
100%	95.0	71.1

  
QA Unit

1/5/12  
Date

  
Approved

1/6/12  
Date

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-3  
**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0342

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042  
EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Chronic Toxicity - Development**

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.42$ ). Bonferroni t Test provided a NOEC (No Observed Effect Concentration) of 100 percent and a LOEC (Lowest Observed Effect Concentration) of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Chronic Toxicity - Survival**

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.06$ ). Bonferroni t Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Summary of Results**

Species	Exposure	Development		Survival		Tested Substance
		NOEC	EC <sub>50</sub>	NOEC	LC <sub>50</sub>	
<i>Mytilus galloprovincialis</i>	48 hrs	100%	>100%	100%	>100%	SIYB-3

**Protocol Deviations:** Control normality was slightly below the protocol limit of  $\geq 90$  percent for the test and the associated Reference Toxicant test. Sample arrived at 10.3°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity. The salinity of the 100 percent concentration was above the protocol limit of  $30 \pm 2$  ppt. Replicate 3 of the 100 percent concentration was found to be an outlier and was therefore excluded from statistical analysis.

Weston Solutions, Inc.

Client: Port of San Diego  
 Project: Shelter Island Yacht Basin  
 Sample Matrix: Liquid  
 Sample Name/ID: SIYB-3

Date Received: 23 Aug 11  
 Date Test Started: 23 Aug 11  
 Date Test Ended: 25 Aug 11  
 Test ID No.: C110823.0342

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	16.0	30.0	8.0
6.25	7.6	16.3	30.2	8.0
12.5	7.5	16.2	30.5	8.0
25	7.5	16.4	30.9	8.0
50	7.6	16.4	31.6	8.0
100	7.7	16.4	33.2	8.1
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.5		
6.25		14.6		
12.5		14.5		
25		14.7		
50		14.5		
100		14.5		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.8	15.3	30.1	7.9
6.25	7.9	15.0	30.2	8.0
12.5	8.0	14.9	30.5	8.0
25	8.0	15.1	31.2	8.0
50	8.0	14.9	32.0	8.0
100	8.1	14.8	33.7	8.0

\*Water quality measured on surrogate chambers.

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-3  
**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0342

**APPENDIX**

Pertinent Test Data

**TEST:** Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

**DILUTION WATER:** Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	30.0 ppt
pH	8.0
Dissolved Oxygen	7.5 mg/L
Temperature	16.0°C

**TEST ORGANISM:** Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

**TEST CHAMBER:** Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

**EXPERIMENTAL DESIGN:**

1. Weston Solutions personnel collected a sample on August 22, 2011, at 1615 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0920 hours. The temperature of the sample upon receipt was 10.3°C.
2. The temperature of the test substance was adjusted to 15 ± 1 °C.
3. Approximately 218 test organisms were placed into each chamber.
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

**MORTALITY CRITERIA:** Absence of larvae, or completely developed shells without meat.

**ACCEPTABILITY CRITERIA:** ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.

(control chart included) Species: *Mytilus galloprovincialis*, larvae

48 hr EC <sub>25</sub> :	11.42 ppb survival, 6.07 ppb proportion normal
48 hr EC <sub>50</sub> :	13.47 ppb survival, 7.38 ppb proportion normal
Laboratory Mean (EC <sub>50</sub> ):	19.65 ppb survival, 7.17 ppb proportion normal
Test Date:	8/23/11 (within 95% confidence limits)

**STUDY DIRECTOR:** K. Skrivseth

**INVESTIGATORS:** K. Skrivseth, S. Hasan, K. Curry, B. Griffith, J. Hansen



**Bivalve Larval Survival and Development Test-Proportion Normal**

Start Date: 8/23/2011 18:45 Test ID: C110823.0342 Sample ID: SIYB-3  
 End Date: 8/25/2011 17:45 Lab ID: CCA-Weston, Carlsbad Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:15 Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments:

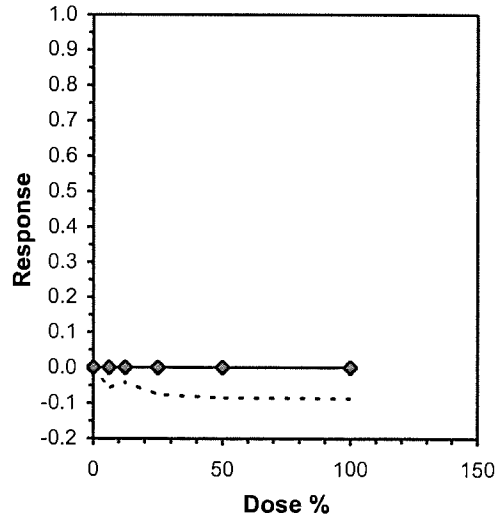
Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.9031	0.9440	0.8904	0.9572
12.5	0.8976	0.9274	0.9289	0.8757
25	0.9483	0.9222	0.9213	0.9622
50	0.9588	0.9731	0.9415	0.9148
100	0.9353	0.9416	0.9716	

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4				0.9230	1.0000	
6.25	0.9237	1.0601	1.2955	1.2334	1.3625	4.753	4	-2.765	2.567	0.0849	0.9230	1.0000	
12.5	0.9074	1.0414	1.2636	1.2105	1.3009	3.460	4	-1.802	2.567	0.0849	0.9230	1.0000	
25	0.9385	1.0772	1.3228	1.2865	1.3750	3.263	4	-3.590	2.567	0.0849	0.9230	1.0000	
50	0.9471	1.0870	1.3434	1.2745	1.4061	4.186	4	-4.214	2.567	0.0849	0.9230	1.0000	
100	0.9495	1.0898	1.3473	1.3136	1.4016	3.524	3	-4.009	2.567	0.0917	0.9230	1.0000	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9567	0.881	0.05312	-1.154
Bartlett's Test indicates equal variances (p = 0.42)	4.9424	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test	100	>100		1	0.06731	0.07725	0.01154	0.00219	0.00419	5, 17

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Normal**

Start Date: 8/23/2011 18:45 Test ID: C110823.0342 Sample ID: SIYB-3  
 End Date: 8/25/2011 17:45 Lab ID: CCA-Weston, Carlsbad Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:15 Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments:

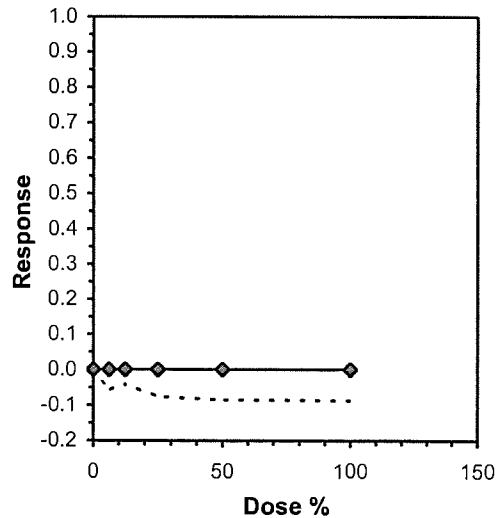
Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.9031	0.9440	0.8904	0.9572
12.5	0.8976	0.9274	0.9289	0.8757
25	0.9483	0.9222	0.9213	0.9622
50	0.9588	0.9731	0.9415	0.9148
100	0.9353	0.9416	0.9716	

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4				0.9230	1.0000	
6.25	0.9237	1.0601	1.2955	1.2334	1.3625	4.753	4	-2.765	2.567	0.0849	0.9230	1.0000	
12.5	0.9074	1.0414	1.2636	1.2105	1.3009	3.460	4	-1.802	2.567	0.0849	0.9230	1.0000	
25	0.9385	1.0772	1.3228	1.2865	1.3750	3.263	4	-3.590	2.567	0.0849	0.9230	1.0000	
50	0.9471	1.0870	1.3434	1.2745	1.4061	4.186	4	-4.214	2.567	0.0849	0.9230	1.0000	
100	0.9495	1.0898	1.3473	1.3136	1.4016	3.524	3	-4.009	2.567	0.0917	0.9230	1.0000	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ( $p > 0.01$ )	0.9567	0.881	0.05312	-1.154
Bartlett's Test indicates equal variances ( $p = 0.42$ )	4.9424	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test	100	>100		1	0.06731	0.07725	0.01154	0.00219	0.00419	5, 17

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Alive**

Start Date: 8/23/2011 18:45 \* Test ID: C110823.0342 \* Sample ID: SIYB-3  
 End Date: 8/25/2011 17:45 \* Lab ID: CCA-Weston, Carlsbad \* Sample Type: AMB1-Ambient water \*  
 Sample Date: 8/22/2011 16:15 \* Protocol: EPAW 95-EPA West Coast \* Test Species: MG-Mytilus galloprovincialis  
 Comments:

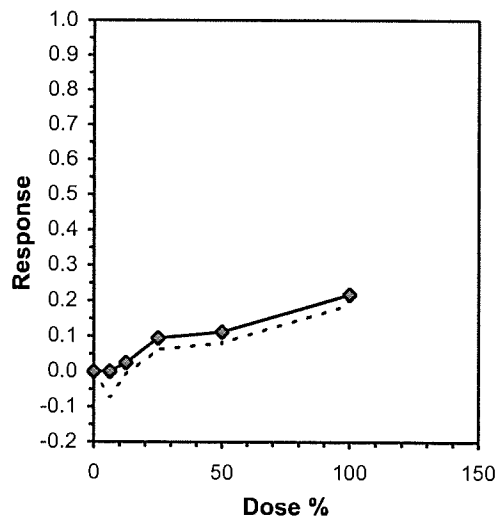
Conc-%	1	2	3	4
Control	0.9266	0.7661	0.9587	0.8532
6.25	0.8991	1.0000	1.0000	0.8578
12.5	0.9404	0.8211	0.9679	0.8119
25	0.7982	0.8257	0.8165	0.8486
50	0.7798	0.8532	0.7844	0.8073
100	0.7798	0.7064	0.6468	

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8761	1.0000	1.2265	1.0659	1.3662	10.793	4				0.9077	1.0000	
6.25	0.9392	1.0720	1.3764	1.1841	1.5369	13.600	4	-1.816	2.567	0.2118	0.9077	1.0000	
12.5	0.8853	1.0105	1.2428	1.1222	1.3906	10.877	4	-0.196	2.567	0.2118	0.8853	0.9754	
25	0.8222	0.9385	1.1361	1.1049	1.1712	2.430	4	1.097	2.567	0.2118	0.8222	0.9059	
50	0.8062	0.9202	1.1161	1.0824	1.1776	3.911	4	1.339	2.567	0.2118	0.8062	0.8882	
100	0.7110	0.8115	1.0050	0.9344	1.0824	7.386	3	2.486	2.567	0.2288	0.7110	0.7833	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9646	0.881	-0.0521	-0.7616						
Bartlett's Test indicates equal variances (p = 0.06)	10.4232	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test	100	>100		1	0.18007	0.20322	0.05831	0.01362	0.01054	5, 17

**Linear Interpolation (200 Resamples)**

Point	%	SD	95% CL(Exp)	Skew
IC05	17.063	5.839	3.959 32.903	1.4653
IC10	33.304	16.461	0.000 87.871	0.4439
IC15	68.208			
IC20	92.048			
IC25	>100			
IC40	>100			
IC50	>100			



Test: BV-Bivalve Larval Survival and Development Test · Test ID: C110823.03<sup>42</sup> ·  
 Species: MG-Mytilus galloprovincialis · Protocol: EPAW 95-EPA West Coast ·  
 Sample ID: SIYB-3 · Sample Type: AMB1-Ambient water ·  
 Start Date: 8/23/2011 18:45 · End Date: 8/25/2011 17 Lab ID: CCA-Weston, Carlsbad ·

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	218	202	202	177	
	2	2	Control	218	167	167	145	
	3	3	Control	218	209	209	184	
	4	4	Control	218	186	186	160	
	5	1	6.250	218	196	196	177	
	6	2	6.250	218	250	250	236	
	7	3	6.250	218	219	219	195	
	8	4	6.250	218	187	187	179	
	9	1	12.500	218	205	205	184	
	10	2	12.500	218	179	179	166	
	11	3	12.500	218	211	211	196	
	12	4	12.500	218	177	177	155	
	13	1	25.000	218	174	174	165	
	14	2	25.000	218	180	180	166	
	15	3	25.000	218	178	178	164	
	16	4	25.000	218	185	185	178	
	17	1	50.000	218	170	170	163	
	18	2	50.000	218	186	186	181	
	19	3	50.000	218	171	171	161	
	20	4	50.000	218	176	176	161	
	21	1	100.000	218	170	170	159	
	22	2	100.000	218	154	154	145	
	23	3	100.000	218	141	141	137	

Comments:

## Grubb's Test for Detecting Outliers

$$Z = \frac{|\text{mean} - \text{value}|}{\text{SD}}$$

suspected outlier

Data Set (# Alive)
15
137
145
159

Mean	Standard Deviation	Z
114	66.62331924	1.485966192

**Instructions:** Look up the critical value of Z in the table below, where N is the number of values in the group. If your value of Z is higher than the tabulated value, the P value is less than 0.05. If P value is less than 0.05, the number is an outlier.

N	Critical Z
3	1.15
4	1.48
5	1.71
6	1.89
7	2.02
8	2.13
9	2.21
10	2.29



## Bivalve Counts Worksheet

Test ID: C110823.03 SIYB - 3

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	177	25	202
	2	145	22	167
	3	184	25	209
	4	160	26	186
6.25	1	177	19	196
	2	236	14	250
	3	195	24	219
	4	179	8	187
12.5	1	184	21	205
	2	166	13	179
	3	196	15	211
	4	155	22	177
25	1	165	9	174
	2	166	14	180
	3	164	14	178
	4	178	7	185
50	1	163	7	170
	2	181	5	186
	3	161	10	171
	4	161	15	176
100	1	159	11	170
	2	145	9	154
	3	137	4	141
	4	0	0	0
	1	0	0	0
	2	0	0	0
	3	0	0	0
	4	0	0	0



## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

CLIENT:	Port of San Diego
PROJECT:	Shelter Island Yacht Basin
CLIENT SAMPLE ID:	SIYB-3
WESTON TEST ID:	C110823.03
SPECIES:	<i>M. galloprovincialis</i>

DATE RECEIVED:	8/23/11
DATE TEST STARTED:	8/23/11
DATE TEST ENDED:	8/25/11
WESTON SOP NO.:	1310 042
STUDY DIRECTOR:	K. Skrivseth

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: 8/23/11 Sample ID: C110823.03 Dilutions (Tech): KC WQ Time: 1815 Technician: BG	Control	2	7.5	2	16.6	6	30.0	3	8.0
	Brine Control		—		—		—		—
	6.25		7.6		16.3		30.2		8.0
	12.5		7.5		16.2		30.5		8.0
	25		7.5		16.4		30.9		8.0
	50		7.6		16.4		31.6		8.0
	100		7.7		16.4		33.2 <sup>0.3</sup>		8.1
<b>24 Hours</b> Date: 8/24/11 WQ Time: 1040 Technician: BG	Control			6B	14.5				
	Brine Control				—				
	6.25				14.6				
	12.5				14.5				
	25				14.7				
	50				14.5				
	100				14.5				
<b>48 Hours</b> Date: 8/25/11 WQ Time: 1420 Technician: SH/BG	Control	2	7.8	2	15.3	6	30.1	3	7.9
	Brine Control		—		—		—		—
	6.25		7.9		15.0		30.2		8.0
	12.5		8.0		14.9		30.5		8.0
	25		8.0		15.1		31.2		8.0
	50		8.0		14.9		32.0		8.0
	100		8.1		14.8		33.7 <sup>0.3</sup>		8.0

\*Water quality measurements taken in surrogate water quality chambers. <sup>Ⓢ</sup> salinity is above the test protocol range of 30 ± 2 ppt. 1/5/12 vs

START TIME:	1845	Initials:	SH
END TIME:	1745	Initials:	BG
ORGANISM BATCH:	TSF 5708		
HOBO TEMP. NO.:	2296		
TEST LOCATION:	ROOM 2		

DILUTION WATER BATCH:	S100725 11
TEST ACCEPTABILITY:	
<input checked="" type="checkbox"/>	≥ 70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS
<input type="checkbox"/>	≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS
<input checked="" type="checkbox"/>	MSD < 25%



## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

Weston Test ID: <i>C110823.0342</i>	Client: <i>Port of San Diego <del>Shelter Island Yacht Basin</del> @JH</i>	Client Sample ID: <i>SIYB-3</i>
--	--	------------------------------------

SPAWNING DATA				
Initial Spawning Time: <i>1600</i>	Final Spawning Time: <i>1700</i>	Fertilization Time: <i>1701</i>	No. of Females: <i>2</i>	No. of Males: <i>3</i>
Embryo Density (count/mL):	1. <i>98/77</i>	2. <i>81/86</i>	3. <i>91/99</i>	Average: <i>88.7</i>
Stocking Volume Calculation: <i>2700 (88.7 x 50) = 0.608</i>				

ZERO TIME COUNTS					
1. <i>186</i>	2. <i>203</i>	3. <i>209</i>	4. <i>269</i>	5. <i>203</i>	6. <i>238</i>
Average Count: <i>218</i>			Technician: <i>KS</i>		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control												
Brine												
<i>6.25</i>	<i>177</i>	<i>19</i>	<i>236</i>	<i>14</i>	<i>195</i>	<i>24</i>	<i>179</i>	<i>8</i>			<i>9/20/11</i>	<i>KS</i>
<i>12.5</i>	<i>184</i>	<i>21</i>	<i>166</i>	<i>13</i>	<i>196</i>	<i>15</i>	<i>155</i>	<i>22</i>			<i>↓</i>	<i>↓</i>
<i>25</i>	<i>165</i>	<i>9</i>	<i>166</i>	<i>14</i>	<i>164</i>	<i>14</i>	<i>178</i>	<i>7</i>			<i>↓</i>	<i>↓</i>
<i>50</i>	<i>163</i>	<i>7</i>	<i>181</i>	<i>5</i>	<i>161</i>	<i>10</i>	<i>161</i>	<i>15</i>			<i>9/20/11</i>	<i>KS</i>
<i>100</i>	<i>159</i>	<i>11</i>	<i>145</i>	<i>9</i>	<i>15</i>	<i>158</i>	<i>137</i>	<i>4</i>			<i>9/20/11</i>	<i>KS</i>

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	<i>6.25   2</i>	<i>25   1</i>	<i>1</i>	<i>1</i>
Total #	<i>254</i>	<i>170</i>		
# Normal	<i>54① 250</i>	<i>240</i>		
Date / Initials	<i>10/13/11   1 SH</i>	<i>10/13/11   1 SH</i>	<i>1</i>	<i>1</i>

QA Check Acceptability:  <5% difference in means of QA & orig. counts

① IE 10/13/11 SH

② IE 1/5/12 JH





Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-4

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0442

**Bivalve Larvae Chronic 48-Hour Bioassay**

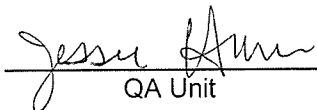
Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	87.1	87.6
6.25%	87.7	90.3
12.5%	87.9	90.3
25%	92.3	96.9
50%	88.1	93.8
100%	95.0	91.2

  
\_\_\_\_\_  
QA Unit

1/5/12  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Approved

1/5/12  
\_\_\_\_\_  
Date

**Weston Solutions, Inc.**

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-4

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0442

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Chronic Toxicity - Development**

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.08$ ). Dunnett's Multiple-Comparison Test provided a NOEC (No Observed Effect Concentration) of 100 percent and a LOEC (Lowest Observed Effect Concentration) of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Chronic Toxicity - Survival**

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.80$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Summary of Results**

Species	Exposure	Development		Survival		Tested Substance
		NOEC	$EC_{50}$	NOEC	$LC_{50}$	
<i>Mytilus galloprovincialis</i>	48 hrs	100%	>100%	100%	>100%	SIYB-4

**Protocol Deviations:** Control normality was slightly below the protocol limit of  $\geq 90$  percent for the test and the associated Reference Toxicant test. Sample arrived at  $8.4^{\circ}C$  which is outside of the temperature protocol limits of  $0-6^{\circ}C$ . It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity. The salinity of the 100 percent concentration was above the protocol limit of  $30 \pm 2$  ppt.

Weston Solutions, Inc.

Client: Port of San Diego  
 Project: Shelter Island Yacht Basin  
 Sample Matrix: Liquid  
 Sample Name/ID: SIYB-4

Date Received: 23 Aug 11  
 Date Test Started: 23 Aug 11  
 Date Test Ended: 25 Aug 11  
 Test ID No.: C110823.0442

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	16.0	30.0	8.0
6.25	7.6	16.3	30.2	8.0
12.5	7.5	16.4	30.5	8.0
25	7.6	16.4	30.9	8.0
50	7.7	16.4	31.6	8.0
100	8.2	16.2	33.1	8.1
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.5		
6.25		14.5		
12.5		14.8		
25		15.0		
50		15.0		
100		15.0		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.8	15.3	30.1	7.9
6.25	7.8	14.9	31.0	8.0
12.5	7.7	15.0	30.9	8.0
25	7.8	15.2	31.2	8.0
50	7.8	15.1	31.8	8.0
100	7.9	15.2	33.5	8.0

\*Water quality measured on surrogate chambers.

**Weston Solutions, Inc.**

<b>Client:</b>	Port of San Diego	<b>Date Received:</b>	23 Aug 11
<b>Project:</b>	Shelter Island Yacht Basin	<b>Date Test Started:</b>	23 Aug 11
<b>Sample Matrix:</b>	Liquid	<b>Date Test Ended:</b>	25 Aug 11
<b>Sample Name/ID:</b>	SIYB-4	<b>Test ID No.:</b>	C110823.0442

**APPENDIX**  
Pertinent Test Data

TEST: Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

DILUTION WATER: Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	30.0 ppt
pH	8.0
Dissolved Oxygen	7.5 mg/L
Temperature	16.0°C

TEST ORGANISM: Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

TEST CHAMBER: Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

EXPERIMENTAL DESIGN: 

1. Weston Solutions personnel collected a sample on August 22, 2011, at 1610 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0920 hours. The temperature of the sample upon receipt was 8.4°C.
2. The temperature of the test substance was adjusted to 15 ± 1 °C.
3. Approximately 218 test organisms were placed into each chamber.
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

MORTALITY CRITERIA: Absence of larvae, or completely developed shells without meat.

ACCEPTABILITY CRITERIA: ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

REFERENCE TOXICITY: Toxicant: CuSO<sub>4</sub>, Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.

(control chart included) Species: *Mytilus galloprovincialis*, larvae

48 hr EC <sub>25</sub> :	11.42 ppb survival, 6.07 ppb proportion normal
48 hr EC <sub>50</sub> :	13.47 ppb survival, 7.38 ppb proportion normal
Laboratory Mean (EC <sub>50</sub> ):	19.65 ppb survival, 7.17 ppb proportion normal
Test Date:	8/23/11 (within 95% confidence limits)

STUDY DIRECTOR: K. Skrivseth

INVESTIGATORS: K. Skrivseth, S. Hasan, K. Curry, B. Griffith, J. Hansen

**Bivalve Larval Survival and Development Test-Proportion Normal**

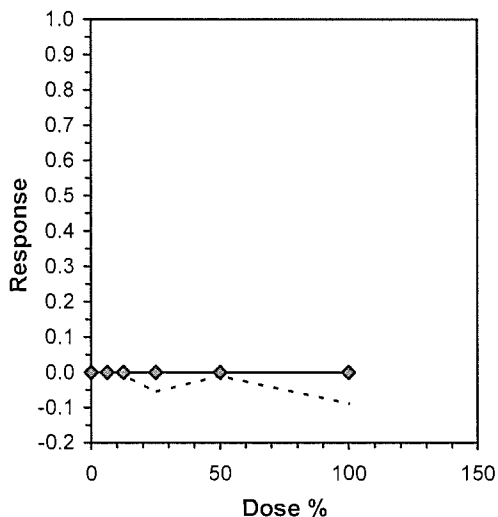
Start Date: 8/23/2011 18:45 Test ID: C110823.0442 Sample ID: SIYB - 4  
 End Date: 8/25/2011 17:45 Lab ID: CCA-Weston, Carlsbad Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:10 Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.8744	0.8684	0.8557	0.9101
12.5	0.8597	0.8571	0.9077	0.8906
25	0.9476	0.9360	0.9439	0.8631
50	0.9052	0.8848	0.8889	0.8462
100	0.9950	0.9556	0.9246	0.9259

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4				0.8962	1.0000	
6.25	0.8771	1.0067	1.2139	1.1812	1.2662	3.023	4	-0.251	2.410	0.0950	0.8962	1.0000	
12.5	0.8788	1.0086	1.2165	1.1832	1.2621	3.134	4	-0.317	2.410	0.0950	0.8962	1.0000	
25	0.9226	1.0590	1.2946	1.1917	1.3399	5.356	4	-2.297	2.410	0.0950	0.8962	1.0000	
50	0.8813	1.0115	1.2203	1.1677	1.2578	3.104	4	-0.413	2.410	0.0950	0.8962	1.0000	
100	0.9503	1.0907	1.3616	1.2927	1.5000	7.138	4	-3.996	2.410	0.0950	0.8962	1.0000	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96092	0.884	0.45442	1.82867						
Bartlett's Test indicates equal variances (p = 0.08)	9.81343	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.06995	0.08027	0.01588	0.00311	0.00435	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Alive**

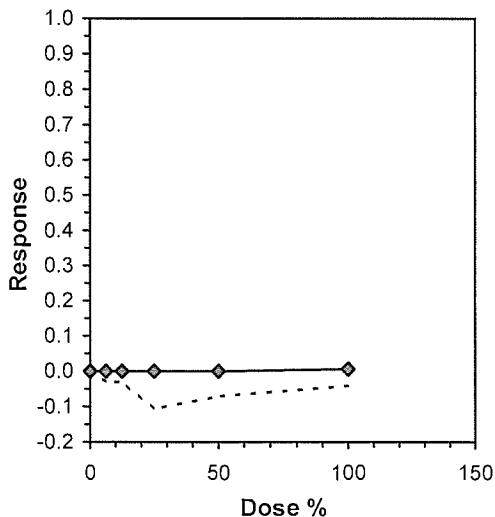
Start Date: 8/23/2011 18:45 · Test ID: C110823.0442 · Sample ID: SIYB - 4 ·  
 End Date: 8/25/2011 17:45 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water ·  
 Sample Date: 8/22/2011 16:10 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis ·  
 Comments:

Conc-%	1	2	3	4
Control	0.9266	0.7661	0.9587	0.8532
6.25	0.9495	0.8716	0.9220	0.8670
12.5	1.0000	0.8349	0.8945	0.8807
25	0.9633	0.9312	0.9817	1.0000
50	0.9679	0.8761	0.9083	1.0000
100	0.9174	0.8257	0.9128	0.9908

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	N				Mean	N-Mean
Control	0.8761	1.0000	1.2265	1.0659	1.3662	10.793	4				0.9177	1.0000
6.25	0.9025	1.0301	1.2584	1.1975	1.3442	5.596	4	-0.347	2.410	0.2215	0.9177	1.0000
12.5	0.9025	1.0301	1.2869	1.1523	1.5369	13.275	4	-0.656	2.410	0.2215	0.9177	1.0000
25	0.9690	1.1060	1.4138	1.3054	1.5369	6.911	4	-2.037	2.410	0.2215	0.9177	1.0000
50	0.9381	1.0707	1.3504	1.2112	1.5369	10.767	4	-1.348	2.410	0.2215	0.9177	1.0000
100	0.9117	1.0406	1.2914	1.1401	1.4749	10.684	4	-0.705	2.410	0.2215	0.9117	0.9935

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94877	0.884	0.57063	-0.4997						
Bartlett's Test indicates equal variances (p = 0.80)	2.3137	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.17347	0.19577	0.0182	0.0169	0.40592	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Test: BV-Bivalve Larval Survival and Development Test . Test ID: C110823.0442 .  
 Species: MG-Mytilus galloprovincialis . Protocol: EPAW 95-EPA West Coast .  
 Sample ID: SIYB - 4 . Sample Type: AMB1-Ambient water .  
 Start Date: 8/23/2011 18:45 . End Date: 8/25/2011 17 Lab ID: CCA-Weston, Carlsbad .

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	218	202	202	177	
	2	2	Control	218	167	167	145	
	3	3	Control	218	209	209	184	
	4	4	Control	218	186	186	160	
	5	1	6.250	218	207	207	181	
	6	2	6.250	218	190	190	165	
	7	3	6.250	218	201	201	172	
	8	4	6.250	218	189	189	172	
	9	1	12.500	218	221	221	190	
	10	2	12.500	218	182	182	156	
	11	3	12.500	218	195	195	177	
	12	4	12.500	218	192	192	171	
	13	1	25.000	218	210	210	199	
	14	2	25.000	218	203	203	190	
	15	3	25.000	218	214	214	202	
	16	4	25.000	218	241	241	208	
	17	1	50.000	218	211	211	191	
	18	2	50.000	218	191	191	169	
	19	3	50.000	218	198	198	176	
	20	4	50.000	218	234	234	198	
	21	1	100.000	218	200	200	199	
	22	2	100.000	218	180	180	172	
	23	3	100.000	218	199	199	184	
	24	4	100.000	218	216	216	200	

Comments:

## Bivalve Counts Worksheet

Test ID: C110823.04 SIYB - 4

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	177	25	202
	2	145	22	167
	3	184	25	209
	4	160	26	186
6.25	1	181	26	207
	2	165	25	190
	3	172	29	201
	4	172	17	189
12.5	1	190	31	221
	2	156	26	182
	3	177	18	195
	4	171	21	192
25	1	199	11	210
	2	190	13	203
	3	202	12	214
	4	208	33	241
50	1	191	20	211
	2	169	22	191
	3	176	22	198
	4	198	36	234
100	1	199	1	200
	2	172	8	180
	3	184	15	199
	4	200	16	216
	1	0	0	0
	2	0	0	0
	3	0	0	0
	4	0	0	0





## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

CLIENT: <i>Port of San Diego</i>
PROJECT: <i>Shelter Island Yacht Basin</i>
CLIENT SAMPLE ID: <i>SIYB-4</i>
WESTON TEST ID: <i>C110823.0442</i>
SPECIES: <i>M. galloprovincialis</i>

DATE RECEIVED: <i>8/23/11</i>
DATE TEST STARTED: <i>8/23/11</i>
DATE TEST ENDED: <i>8/25/11</i>
WESTON SOP NO.: <i>BIO 042</i>
STUDY DIRECTOR: <i>K. Skirveth</i>

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: <i>8/23/11</i> Sample ID: <i>C110823.041</i> Dilutions (Tech): <i>BL</i> WQ Time: <i>1825</i> Technician: <i>BL</i>	Control	2	7.5	2	16.0	6	30.0	3	8.0
	Brine-Control		—		—		—		—
	6.25		7.6		16.3		30.2		8.0
	12.5		7.5		16.4		30.5		8.0
	25		7.6		16.4		30.9		8.0
	50		7.7		16.4		31.6		8.0
	100		8.2		16.2		33.1 <sup>DB</sup>		8.1
<b>24 Hours</b> Date: <i>8/24/11</i> WQ Time: <i>1042</i> Technician: <i>BG</i>	Control			<i>GB</i>	14.5				
	Brine-Control				—				
	6.25				14.5				
	12.5				14.8				
	25				15.0				
	50				15.0				
	100				15.0				
<b>48 Hours</b> Date: <i>8/25/11</i> WQ Time: <i>1426</i> Technician: <i>SH/BG</i>	Control	2	7.8	2	15.3	6	30.1	3	7.9
	Brine-Control		—		—		—		—
	6.25		7.8		14.9		31.0		8.0
	12.5		7.7		15.0		30.9		8.0
	25		7.8		15.2		31.2		8.0
	50		7.8		15.1		31.8		8.0
	100		7.9		15.2		33.5 <sup>DB</sup>		8.0

\*Water quality measurements taken in surrogate water quality chambers. <sup>①</sup> salinity is above the test protocol range of 30 ± 2 ppt. 1/5/12 KS

START TIME: <i>1845</i>	Initials: <i>SH</i>
END TIME: <i>1745</i>	Initials: <i>KE</i>
ORGANISM BATCH: <i>TSE 5700</i>	
HOBO TEMP. NO.: <i>2296</i>	
TEST LOCATION: <i>ROOM 2</i>	

DILUTION WATER BATCH: <i>S10072511</i>
TEST ACCEPTABILITY:
<input checked="" type="checkbox"/> ≥70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS
<input type="checkbox"/> ≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS
<input checked="" type="checkbox"/> MSD < 25%



**- BIVALVE 48-HOUR -  
CHRONIC TOXICITY TEST**

BIO042

Weston Test ID: C110823.0442	Client: Port of San Diego <del>Shelter Island Yacht Basin</del> QM	Client Sample ID: SIYB-4
---------------------------------	--	-----------------------------

SPAWNING DATA				
Initial Spawning Time: 1600	Final Spawning Time: 1700	Fertilization Time: 1701	No. of Females: 2	No. of Males: 3
Embryo Density (count/mL):	1. 98/77	2. 81/86	3. 91/99	Average: 88.7
Stocking Volume Calculation: 2700 (88.7 x 50) = 0.608				

ZERO TIME COUNTS					
1.	2.	3.	4.	5.	6.
Average Count:			Technician:		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control												
Brine												
6.25	181	26	165	25	172	29	172	17			9/27/11	SH
12.5	196	31	156	26	177	18	171	21			↓	↓
25	199	11	190	13	202	12	208	33			9/30/11	↓
50	191	20	169	22	176	22	198	36			↓	↓
100	199	1	172	8	184	15	200	16			9/20/11	PS

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	6.25 / 1	50 / 4	1	1
Total #	206	229		
# Normal	179	198		
Date / Initials	10/12/11 / KS	10/12/11 / KS	1	1
QA Check Acceptability: <input checked="" type="checkbox"/> <5% difference in means of QA & orig. counts				

DIE 1/5/12 JH

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-5

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0542

**Bivalve Larvae Chronic 48-Hour Bioassay**

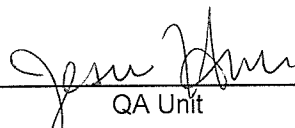
Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	87.1	87.6
6.25%	88.4	93.1
12.5%	87.7	92.2
25%	90.8	89.7
50%	92.5	88.2
100%	93.0	85.7

  
\_\_\_\_\_  
QA Unit

1/5/12  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Approved

1/5/12  
\_\_\_\_\_  
Date

## Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-5

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0542

### Bivalve Larvae Chronic 48-Hour Bioassay

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

#### Chronic Toxicity - Development

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.72$ ). Bonferroni t Test provided a NOEC (No Observed Effect Concentration) of 100 percent and a LOEC (Lowest Observed Effect Concentration) of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

#### Chronic Toxicity - Survival

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.25$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

#### Summary of Results

Species	Exposure	Development		Survival		Tested Substance
		NOEC	$EC_{50}$	NOEC	$LC_{50}$	
<i>Mytilus galloprovincialis</i>	48 hrs	100%	>100%	100%	>100%	SIYB-5

**Protocol Deviations:** Control normality was slightly below the protocol limit of  $\geq 90$  percent for the test and the associated Reference Toxicant test. Sample arrived at  $10.1^{\circ}\text{C}$  which is outside of the temperature protocol limits of  $0-6^{\circ}\text{C}$ . It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity. The salinity of the 100 percent concentration was above the protocol limit of  $30 \pm 2$  ppt. Replicate 3 of the 12.5 percent concentration was shown to be an outlier and was therefore removed from statistical analysis for normality.

Weston Solutions, Inc.

Client: Port of San Diego  
 Project: Shelter Island Yacht Basin  
 Sample Matrix: Liquid  
 Sample Name/ID: SIYB-5

Date Received: 23 Aug 11  
 Date Test Started: 23 Aug 11  
 Date Test Ended: 25 Aug 11  
 Test ID No.: C110823.0542

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042  
 EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	16.0	30.0	8.0
6.25	7.6	16.3	30.2	8.0
12.5	7.6	15.8	30.6	8.0
25	7.5	16.4	30.9	8.0
50	7.6	16.3	31.6	8.0
100	7.8	15.9	33.2	8.0
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.5		
6.25		15.0		
12.5		15.0		
25		15.2		
50		15.0		
100		14.9		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.8	15.3	30.1	7.9
6.25	7.9	15.3	30.2	8.0
12.5	7.7	15.4	30.7	7.9
25	7.7	15.4	31.1	8.0
50	7.8	15.4	32.1	8.0
100	7.7	15.3	33.7	8.0

\*Water quality measured on surrogate chambers.

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-5  
**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0542

**APPENDIX**  
Pertinent Test Data

**TEST:** Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

**DILUTION WATER:** Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	30.0 ppt
pH	8.0
Dissolved Oxygen	7.5 mg/L
Temperature	16.0°C

**TEST ORGANISM:** Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

**TEST CHAMBER:** Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

**EXPERIMENTAL DESIGN:**

1. Weston Solutions personnel collected a sample on August 22, 2011, at 1600 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0920 hours. The temperature of the sample upon receipt was 10.1°C.
2. The temperature of the test substance was adjusted to 15 ± 1 °C.
3. Approximately 218 test organisms were placed into each chamber.
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

**MORTALITY CRITERIA:** Absence of larvae, or completely developed shells without meat.

**ACCEPTABILITY CRITERIA:** ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.

(control chart included) Species: *Mytilus galloprovincialis*, larvae

48 hr EC <sub>25</sub> :	11.42 ppb survival, 6.07 ppb proportion normal
48 hr EC <sub>50</sub> :	13.47 ppb survival, 7.38 ppb proportion normal
Laboratory Mean (EC <sub>50</sub> ):	19.65 ppb survival, 7.17 ppb proportion normal
Test Date:	8/23/11 (within 95% confidence limits)

**STUDY DIRECTOR:** K. Skrivseth

**INVESTIGATORS:** K. Skrivseth, S. Hasan, K. Curry, B. Griffith, J. Hansen

**Bivalve Larval Survival and Development Test-Proportion Normal**

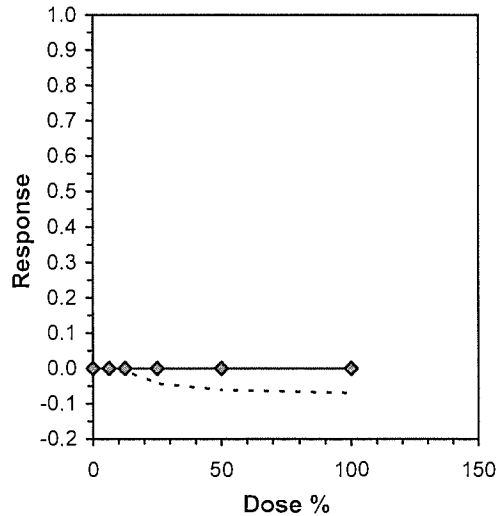
Start Date: 8/23/2011 18:45 · Test ID: C110823.0542 · Sample ID: SIYB - 5  
 End Date: 8/25/2011 17:45 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 16:00 · Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments: Removed replicate 3 of 12.5% as an outlier for Proportion Normal only

Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.9040	0.8899	0.8876	0.8527
12.5	0.8750	0.9050	0.8515	
25	0.8838	0.9312	0.9053	0.9122
50	0.9109	0.9149	0.9282	0.9444
100	0.9381	0.9462	0.9333	0.9032

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4				0.8994	1.0000	
6.25	0.8836	1.0141	1.2236	1.1769	1.2558	2.724	4	-0.872	2.567	0.0576	0.8994	1.0000	
12.5	0.8772	1.0068	1.2140	1.1752	1.2575	3.405	3	-0.414	2.567	0.0623	0.8994	1.0000	
25	0.9081	1.0423	1.2641	1.2230	1.3054	2.690	4	-2.677	2.567	0.0576	0.8994	1.0000	
50	0.9246	1.0612	1.2937	1.2677	1.3329	2.277	4	-3.995	2.567	0.0576	0.8994	1.0000	
100	0.9302	1.0677	1.3051	1.2545	1.3367	2.723	4	-4.502	2.567	0.0576	0.8994	1.0000	

Auxiliary Tests					Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.95022	0.881	-0.2363	-0.6909						
Bartlett's Test indicates equal variances (p = 0.72)					2.8454	15.0863								
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test					100	>100		1	0.04097	0.04702	0.00712	0.00101	9.7E-04	5, 17

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Alive**

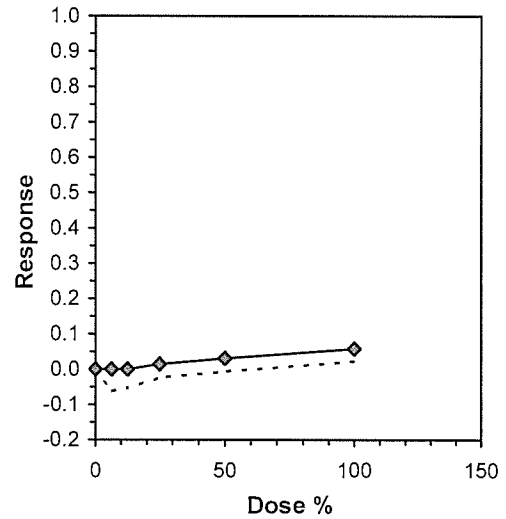
Start Date: 8/23/2011 18:45 · Test ID: C110823.0542 · Sample ID: SIYB - 5 ·  
 End Date: 8/25/2011 17:45 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water ·  
 Sample Date: 8/22/2011 16:00 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis ·  
 Comments:

Conc-%	1	2	3	4
Control	0.9266	0.7661	0.9587	0.8532
6.25	0.9083	1.0000	0.8165	1.0000
12.5	0.8440	0.9174	1.0000	0.9266
25	0.9083	0.8670	0.8716	0.9404
50	0.9266	0.8624	0.8303	0.9083
100	0.8899	1.0000	0.8257	0.7110

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8761	1.0000	1.2265	1.0659	1.3662	10.793	4				0.9098	1.0000	
6.25	0.9312	1.0628	1.3663	1.1281	1.5369	14.977	4	-1.279	2.410	0.2633	0.9098	1.0000	
12.5	0.9220	1.0524	1.3194	1.1648	1.5369	11.851	4	-0.850	2.410	0.2633	0.9098	1.0000	
25	0.8968	1.0236	1.2472	1.1975	1.3241	4.740	4	-0.189	2.410	0.2633	0.8968	0.9857	
50	0.8819	1.0065	1.2241	1.1462	1.2965	5.568	4	0.022	2.410	0.2633	0.8819	0.9693	
100	0.8567	0.9777	1.2282	1.0032	1.5369	18.429	4	-0.015	2.410	0.2633	0.8567	0.9416	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97746	0.884	0.33815	-0.0805						
Bartlett's Test indicates equal variances (p = 0.25)	6.68492	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.21196	0.23921	0.01436	0.02387	0.69939	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	84.848			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			





Test: BV-Bivalve Larval Survival and Development Test    Test ID: C110823.05A2  
 Species: MG-Mytilus galloprovincialis    Protocol: EPAW 95-EPA West Coast  
 Sample ID: SIYB - 5    Sample Type: AMB1-Ambient water  
 Start Date: 8/23/2011 18:45    End Date: 8/25/2011 17 Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	218	202	202	177	
	2	2	Control	218	167	167	145	
	3	3	Control	218	209	209	184	
	4	4	Control	218	186	186	160	
	5	1	6.250	218	198	198	179	
	6	2	6.250	218	218	218	194	
	7	3	6.250	218	178	178	158	
	8	4	6.250	218	224	224	191	
	9	1	12.500	218	184	184	161	
	10	2	12.500	218	200	200	181	
	11	3	12.500	218	202	202	172	
	12	1	25.000	218	198	198	175	
	13	2	25.000	218	189	189	176	
	14	3	25.000	218	190	190	172	
	15	4	25.000	218	205	205	187	
	16	1	50.000	218	202	202	184	
	17	2	50.000	218	188	188	172	
	18	3	50.000	218	181	181	168	
	19	4	50.000	218	198	198	187	
	20	1	100.000	218	194	194	182	
	21	2	100.000	218	223	223	211	
	22	3	100.000	218	180	180	168	
	23	4	100.000	218	155	155	140	

Comments: Removed 12.5% Replicate 3 as an outlier for Proportion Normal

Test: BV-Bivalve Larval Survival and Development Test    Test ID: C110823.0542  
 Species: MG-Mytilus galloprovincialis    Protocol: EPAW 95-EPA West Coast  
 Sample ID: SIYB - 5    Sample Type: AMB1-Ambient water  
 Start Date: 8/23/2011 18:45    End Date: 8/25/2011 17 Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	218	202	202	177	
	2	2	Control	218	167	167	145	
	3	3	Control	218	209	209	184	
	4	4	Control	218	186	186	160	
	5	1	6.250	218	198	198	179	
	6	2	6.250	218	218	218	194	
	7	3	6.250	218	178	178	158	
	8	4	6.250	218	224	224	191	
	9	1	12.500	218	184	184	161	
	10	2	12.500	218	200	200	181	
	11	3	12.500	218	223	223	0	
	12	4	12.500	218	202	202	172	
	13	1	25.000	218	198	198	175	
	14	2	25.000	218	189	189	176	
	15	3	25.000	218	190	190	172	
	16	4	25.000	218	205	205	187	
	17	1	50.000	218	202	202	184	
	18	2	50.000	218	188	188	172	
	19	3	50.000	218	181	181	168	
	20	4	50.000	218	198	198	187	
	21	1	100.000	218	194	194	182	
	22	2	100.000	218	223	223	211	
	23	3	100.000	218	180	180	168	
	24	4	100.000	218	155	155	140	

Comments:

## Bivalve Counts Worksheet

Test ID: C110823.05 SIYB - 5

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	177	25	202
	2	145	22	167
	3	184	25	209
	4	160	26	186
6.25	1	179	19	198
	2	194	24	218
	3	158	20	178
	4	191	33	224
12.5	1	161	23	184
	2	181	19	200
	3	0	223	223
	4	172	30	202
25	1	175	23	198
	2	176	13	189
	3	172	18	190
	4	187	18	205
50	1	184	18	202
	2	172	16	188
	3	168	13	181
	4	187	11	198
100	1	182	12	194
	2	211	12	223
	3	168	12	180
	4	140	15	155
	1	0	0	0
	2	0	0	0
	3	0	0	0
	4	0	0	0

## Dixon's Outlier Test

ordered data (increasing or decreasing values)	Bivalve # Normal	
	0	<--suspected outlier
	161	
	172	
	181	

$$C = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}} \text{ for } 3 \leq n \leq 7$$

$$C = 0.889503$$

**Table of critical values of Q**

N	Q <sub>crit</sub> (CL:90%)	Q <sub>crit</sub> (CL:95%)	Q <sub>crit</sub> (CL:99%)
3	0.941	0.970	0.994
4	0.765	0.823	0.926
5	0.642	0.710	0.821
6	0.560	0.625	0.740
7	0.507	0.568	0.680
8	0.468	0.526	0.634
9	0.437	0.493	0.598
10	0.412	0.466	0.568

If the C exceeds the critical value from Table for the specified significance level  $\alpha$ ,  $X_{(1)}$  is an outlier and should be further investigated. C should be compared to Q<sub>crit</sub> (CL:95%) column.



# BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

CLIENT:	Port of San Diego
PROJECT:	Shelter Island Yacht Basin
CLIENT SAMPLE ID:	STYB-5
WESTON TEST ID:	010823.0542
SPECIES:	M. galloprovincialis

DATE RECEIVED:	8/23/11
DATE TEST STARTED:	8/23/11
DATE TEST ENDED:	8/25/11
WESTON SOP NO.:	BIO042
STUDY DIRECTOR:	K. Skirseth

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: 8/23/11 Sample ID: 010823.0542 Dilutions (Tech): BG DJH WQ Time: 1835 Technician: BG	Control	2	7.5	2	16.0	6	30.0	3	8.0
	Brine Control		—		—		—		—
	6.25		7.6		16.3		30.2		8.0
	12.5		7.6		15.8		30.6		8.0
	25		7.5		16.4		30.9		8.0
	50		7.6		16.3		31.6		8.0
	100		7.8		15.9		33.2 <sup>(2) vs</sup>		8.0
<b>24 Hours</b> Date: 8/24/11 WQ Time: 1044 Technician: BG	Control			6B	14.5				
	Brine Control				—				
	6.25				15.0				
	12.5				15.0				
	25				15.2				
	50				15.0				
	100				14.9				
<b>48 Hours</b> Date: 8/25/11 WQ Time: 1120 Technician: SH/BG	Control	2	7.6	2	15.3	6	30.1	3	7.9
	Brine Control		—		7.5		—		8.0
	6.25		7.9		15.3		30.2		8.0
	12.5		7.7		15.4		30.7		7.9
	25		7.7		15.4		31.1		8.0
	50		7.8		15.4		32.1		8.0
	100		7.7		15.3		33.7 <sup>(2) vs</sup>		8.0

\*Water quality measurements taken in surrogate water quality chambers.

START TIME:	1845	Initials:	SH
END TIME:	1745 <sup>re</sup>	Initials:	re
ORGANISM BATCH:	TSF 5708		
HOBO TEMP. NO.:	2296		
TEST LOCATION:	ROOM 2		

DILUTION WATER BATCH:	S100725/11
TEST ACCEPTABILITY:	<input checked="" type="checkbox"/> ≥70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS <input type="checkbox"/> ≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS <input checked="" type="checkbox"/> MSD < 25%

① IE 8/30/11 JH      ② salinity is above the test protocol range of 30±2 ppt, 1/5/12 ks



## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

Weston Test ID: <b>C110823.0542</b>	Client: <i>Port of San Diego</i> <del>Shelter Island Yacht Basin</del>	Client Sample ID: <b>SIYB-5</b>
--	---	------------------------------------

*DJH*

SPAWNING DATA				
Initial Spawning Time: <b>1600</b>	Final Spawning Time: <b>1700</b>	Fertilization Time: <b>1701</b>	No. of Females: <b>2</b>	No. of Males: <b>3</b>
Embryo Density (count/mL):	1. <b>98/77</b>	2. <b>81/86</b>	3. <b>91/99</b>	Average: <b>88.7</b>
Stocking Volume Calculation: <b>2700 (88.7 × 50) = 0.608</b>				

ZERO TIME COUNTS					
1. <b>186</b>	2. <b>203</b>	3. <b>207</b>	4. <b>269</b>	5. <b>203</b>	6. <b>238</b>
Average Count: <b>218</b>			Technician: <b>YS</b>		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control												
<del>Brine</del>												
6.25	179	19	194	24	158	20	191	33			9/30/11	SH
12.5	161	23	181	19	0	223	172	30			9/30/11	SH
25	175	23	176	13	172	18	187	18			10/10/11	YS
50	184	18	172	16	168	13	187	11			↓	↓
100	182	12	211	12	168	12	140	15			9/20/11	YS

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	6.25 / 4	25 / 1	1	1
Total #	209	206		
# Normal	182	180		
Date / Initials	10/12/11 / YS	10/13/11 / SH	1	1
QA Check Acceptability: <input type="checkbox"/> <5% difference in means of QA & orig. counts				

① IE 1/5/12 SH

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-6

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0642

**Bivalve Larvae Chronic 48-Hour Bioassay**

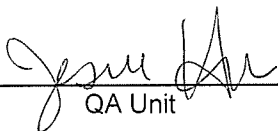
Weston Testing Protocol No. BIO042

EPA/600/R-95/136

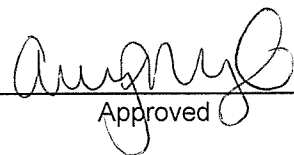
Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	87.1	87.6
6.25%	90.5	94.2
12.5%	92.3	93.4
25%	88.3	95.6
50%	91.6	94.3
100%	89.9	92.3

  
QA Unit

1/5/12  
Date

  
Approved

1/5/12  
Date

## Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-6

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0642

### Bivalve Larvae Chronic 48-Hour Bioassay

Weston Testing Protocol No. BIO042  
EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

#### Chronic Toxicity - Development

Development data did not meet the assumptions of normality (Shapiro-Wilk's Test,  $p \leq 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.05$ ). Steel's Many-One Rank Test provided a NOEC (No Observed Effect Concentration) of 100 percent and a LOEC (Lowest Observed Effect Concentration) of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

#### Chronic Toxicity - Survival

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.77$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

#### Summary of Results

Species	Exposure	Development		Survival		Tested Substance
		NOEC	$EC_{50}$	NOEC	$LC_{50}$	
<i>Mytilus galloprovincialis</i>	48 hrs	100%	>100%	100%	>100%	SIYB-6

**Protocol Deviations:** Control normality was slightly below the protocol limit of  $\geq 90$  percent for the test and the associated Reference Toxicant test. Sample arrived at 7.3°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity. pMSD for survival was slightly above upper bound limit of <25%. The salinity of the 100 percent concentration was above the protocol limit of  $30 \pm 2$  ppt.



Weston Solutions, Inc.

Client: Port of San Diego  
 Project: Shelter Island Yacht Basin  
 Sample Matrix: Liquid  
 Sample Name/ID: SIYB-6

Date Received: 23 Aug 11  
 Date Test Started: 23 Aug 11  
 Date Test Ended: 25 Aug 11  
 Test ID No.: C110823.0642

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042  
 EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	16.0	30.0	8.0
6.25	7.5	16.4	30.2	8.0
12.5	7.5	16.4	30.5	8.0
25	7.6	16.4	30.9	8.0
50	7.7	16.4	31.6	8.0
100	8.0	16.3	33.1	8.1
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.5		
6.25		15.0		
12.5		15.0		
25		15.4		
50		15.0		
100		15.0		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.8	15.3	30.1	7.9
6.25	7.5	15.6	30.4	8.0
12.5	7.6	15.5	31.2	7.9
25	7.5	15.6	31.2	8.0
50	7.8	15.6	32.1	8.0
100	7.8	15.2	35.5	8.0

\*Water quality measured on surrogate chambers.

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-6  
**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0642

**APPENDIX**  
Pertinent Test Data

**TEST:** Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

**DILUTION WATER:** Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	30.0 ppt
pH	8.0
Dissolved Oxygen	7.5 mg/L
Temperature	16.0°C

**TEST ORGANISM:** Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

**TEST CHAMBER:** Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

**EXPERIMENTAL DESIGN:**

1. Weston Solutions personnel collected a sample on August 22, 2011, at 1540 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0920 hours. The temperature of the sample upon receipt was 7.3°C.
2. The temperature of the test substance was adjusted to 15 ± 1 °C.
3. Approximately 218 test organisms were placed into each chamber.
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

**MORTALITY CRITERIA:** Absence of larvae, or completely developed shells without meat.

**ACCEPTABILITY CRITERIA:** ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.

(control chart included) Species: *Mytilus galloprovincialis*, larvae

48 hr EC <sub>25</sub> :	11.42 ppb survival, 6.07 ppb proportion normal
48 hr EC <sub>50</sub> :	13.47 ppb survival, 7.38 ppb proportion normal
Laboratory Mean (EC <sub>50</sub> ):	19.65 ppb survival, 7.17 ppb proportion normal
Test Date:	8/23/11 (within 95% confidence limits)

**STUDY DIRECTOR:** K. Skrivseth

**INVESTIGATORS:** K. Skrivseth, S. Hasan, K. Curry, B. Griffith, J. Hansen

**Bivalve Larval Survival and Development Test-Proportion Normal**

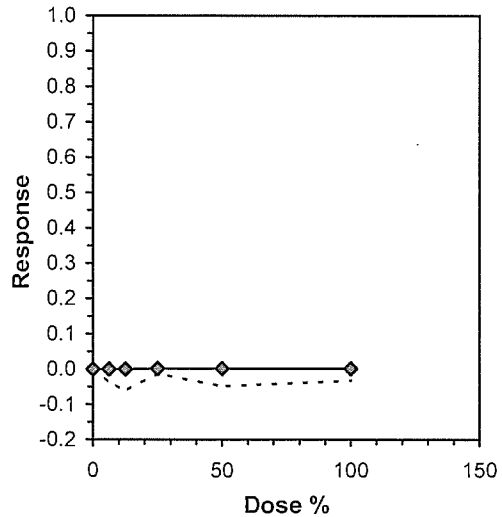
Start Date: 8/23/2011 18:45 · Test ID: C110823.0642 · Sample ID: SIYB - 6  
 End Date: 8/25/2011 17:45 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 15:40 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.9063	0.9135	0.8811	0.9200
12.5	0.9378	0.9390	0.8962	0.9200
25	0.8945	0.8778	0.8969	0.8622
50	0.8393	0.9369	0.9319	0.9538
100	0.9073	0.9086	0.8750	0.9052

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Rank Sum	1-Tailed Critical	Isotonic	
			Mean	Min	Max	CV%	N			Mean	N-Mean
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4			0.9003	1.0000
6.25	0.9052	1.0389	1.2587	1.2187	1.2840	2.261	4	26.00	10.00	0.9003	1.0000
12.5	0.9232	1.0596	1.2916	1.2427	1.3212	2.845	4	26.00	10.00	0.9003	1.0000
25	0.8828	1.0133	1.2220	1.1905	1.2438	2.039	4	22.00	10.00	0.8986	0.9982
50	0.9155	1.0508	1.2841	1.1583	1.3543	6.721	4	22.00	10.00	0.8986	0.9982
100	0.8990	1.0319	1.2481	1.2094	1.2637	2.075	4	24.00	10.00	0.8986	0.9982

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.87169	0.884	-1.5395	4.40559
Bartlett's Test indicates equal variances (p = 0.05)	11.1315	15.0863		
<b>Hypothesis Test (1-tail, 0.05)</b>	<b>NOEC</b>	<b>LOEC</b>	<b>ChV</b>	<b>TU</b>
Steel's Many-One Rank Test	100	>100		1

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Normal**

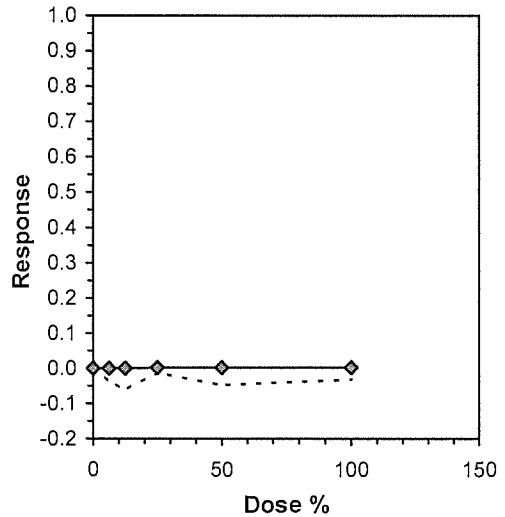
Start Date: 8/23/2011 18:45 . Test ID: C110823.0642 . Sample ID: SIYB - 6  
 End Date: 8/25/2011 17:45 . Lab ID: CCA-Weston, Carlsbad . Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 15:40 . Protocol: EPAW 95-EPA West Coast . Test Species: MG-Mytilus galloprovincialis  
 Comments: For pMSD only .

Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.9063	0.9135	0.8811	0.9200
12.5	0.9378	0.9390	0.8962	0.9200
25	0.8945	0.8778	0.8969	0.8622
50	0.8393	0.9369	0.9319	0.9538
100	0.9073	0.9086	0.8750	0.9052

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4				0.9003	1.0000	
6.25	0.9052	1.0389	1.2587	1.2187	1.2840	2.261	4	-1.800	2.410	0.0732	0.9003	1.0000	
12.5	0.9232	1.0596	1.2916	1.2427	1.3212	2.845	4	-2.885	2.410	0.0732	0.9003	1.0000	
25	0.8828	1.0133	1.2220	1.1905	1.2438	2.039	4	-0.593	2.410	0.0732	0.8986	0.9982	
50	0.9155	1.0508	1.2841	1.1583	1.3543	6.721	4	-2.637	2.410	0.0732	0.8986	0.9982	
100	0.8990	1.0319	1.2481	1.2094	1.2637	2.075	4	-1.452	2.410	0.0732	0.8986	0.9982	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.87169	0.884	-1.5395	4.40559						
Bartlett's Test indicates equal variances (p = 0.05)	11.1315	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.05283	0.06062	0.00469	0.00185	0.06573	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Alive**

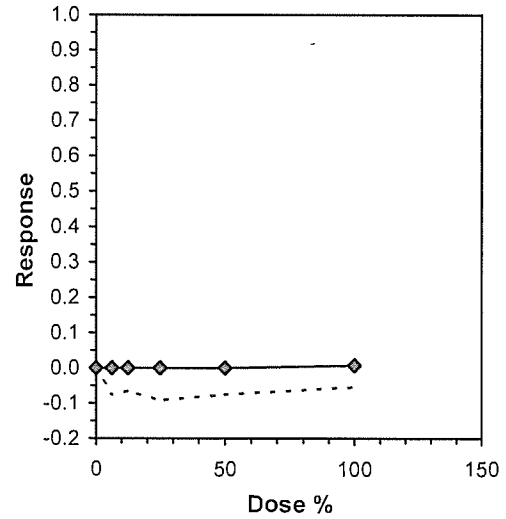
Start Date: 8/23/2011 18:45 , Test ID: C110823.0642 , Sample ID: SIYB - 6 ,  
 End Date: 8/25/2011 17:45 , Lab ID: CCA-Weston, Carlsbad - Sample Type: AMB1-Ambient water ,  
 Sample Date: 8/22/2011 15:40 , Protocol: EPAW 95-EPA West Coast , Test Species: MG-Mytilus galloprovincialis ,  
 Comments:

Conc-%	1	2	3	4
Control	0.9266	0.7661	0.9587	0.8532
6.25	1.0000	0.8486	1.0000	0.9174
12.5	1.0000	0.9771	0.8394	0.9174
25	1.0000	0.8257	1.0000	1.0000
50	1.0000	1.0000	0.8761	0.8945
100	0.9404	0.9037	0.8807	0.9679

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8761	1.0000	1.2265	1.0659	1.3662	10.793	4				0.9300	1.0000	
6.25	0.9415	1.0746	1.3811	1.1712	1.5369	13.416	4	-1.353	2.410	0.2753	0.9300	1.0000	
12.5	0.9335	1.0654	1.3484	1.1585	1.5369	12.210	4	-1.067	2.410	0.2753	0.9300	1.0000	
25	0.9564	1.0916	1.4377	1.1401	1.5369	13.801	4	-1.849	2.410	0.2753	0.9300	1.0000	
50	0.9427	1.0759	1.3812	1.2112	1.5369	13.042	4	-1.354	2.410	0.2753	0.9300	1.0000	
100	0.9232	1.0537	1.2970	1.2182	1.3906	5.882	4	-0.617	2.410	0.2753	0.9232	0.9926	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91852	0.884	-0.4453	-1.0559						
Bartlett's Test indicates equal variances (p = 0.77)	2.54492	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.22328	0.25198	0.02204	0.0261	0.53585	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Test: BV-Bivalve Larval Survival and Development Test      Test ID: C110823.06 42  
 Species: MG-Mytilus galloprovincialis                      Protocol: EPAW 95-EPA West Coast  
 Sample ID: SIYB - 6    Sample Type: AMB1-Ambient water  
 Start Date: 8/23/2011 18:45                      End Date: 8/25/2011 17      Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	218	202	202	177	
	2	2	Control	218	167	167	145	
	3	3	Control	218	209	209	184	
	4	4	Control	218	186	186	160	
	5	1	6.250	218	224	224	203	
	6	2	6.250	218	185	185	169	
	7	3	6.250	218	227	227	200	
	8	4	6.250	218	200	200	184	
	9	1	12.500	218	241	241	226	
	10	2	12.500	218	213	213	200	
	11	3	12.500	218	183	183	164	
	12	4	12.500	218	200	200	184	
	13	1	25.000	218	218	218	195	
	14	2	25.000	218	180	180	158	
	15	3	25.000	218	223	223	200	
	16	4	25.000	218	225	225	194	
	17	1	50.000	218	224	224	188	
	18	2	50.000	218	222	222	208	
	19	3	50.000	218	191	191	178	
	20	4	50.000	218	195	195	186	
	21	1	100.000	218	205	205	186	
	22	2	100.000	218	197	197	179	
	23	3	100.000	218	192	192	168	
	24	4	100.000	218	211	211	191	

Comments:

## Bivalve Counts Worksheet

Test ID: C110823.06 SIYB - 6

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	177	25	202
	2	145	22	167
	3	184	25	209
	4	160	26	186
6.25	1	203	21	224
	2	169	16	185
	3	200	27	227
	4	184	16	200
12.5	1	226	15	241
	2	200	13	213
	3	164	19	183
	4	184	16	200
25	1	195	23	218
	2	158	22	180
	3	200	23	223
	4	194	31	225
50	1	188	36	224
	2	208	14	222
	3	178	13	191
	4	186	9	195
100	1	186	19	205
	2	179	18	197
	3	168	24	192
	4	191	20	211
	1	0	0	0
	2	0	0	0
	3	0	0	0
	4	0	0	0



# BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BI0042

CLIENT:	Port of San Diego
PROJECT:	Shelter Island Yacht Basin
CLIENT SAMPLE ID:	SIYB-6
WESTON TEST ID:	C110823.0642
SPECIES:	M. galaprovincialis

DATE RECEIVED:	8/23/11
DATE TEST STARTED:	8/23/11
DATE TEST ENDED:	8/25/11
WESTON SOP NO.:	BI0042
STUDY DIRECTOR:	K. SKRIVGETH

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: 8/23/11 Sample ID: C110823.06 Dilutions (Tech): KC WQ Time: 1840 Technician: BG	Control	2	7.5	2	16.0	6	30.0	3	8.0
	Brine-Control		—		—		—		—
	6.25		7.5		16.4		30.2		8.0
	12.5		7.5		16.4		30.5		8.0
	25		7.6		16.4		30.9		8.0
	50		7.7		16.4		31.6		8.0
	100		8.0		16.3		33.1 <sup>DPB</sup>		8.1
<b>24 Hours</b> Date: 8/24/11 WQ Time: 1046 Technician: BG	Control			6B	14.5				
	Brine-Control				—				
	6.25				15.0				
	12.5				15.0				
	25				15.4				
	50				15.0				
	100				15.0				
<b>48 Hours</b> Date: 8/25/11 WQ Time: 1420 Technician: SH (BG)	Control	2	7.8	2	15.3	6	30.1	7	7.9
	Brine-Control		—		—		—		—
	6.25		7.5		15.6		30.4		8.0
	12.5		7.6		15.5		31.2		7.9
	25		7.5		15.6		31.2		8.0
	50		7.8		15.6		32.1		8.0
	100		7.8		15.2		35.5 <sup>DPB</sup>		8.0

\*Water quality measurements taken in surrogate water quality chambers.  
 0 salinity is above the test protocol range of 20 ± 2 ppt 1/5/12 ks

START TIME:	1845	Initials:	SH
END TIME:	1745	Initials:	KC
ORGANISM BATCH:	TSF 570B		
HOBO TEMP. NO.:	2296		
TEST LOCATION:	ROOM 2		

DILUTION WATER BATCH:	S10072511
TEST ACCEPTABILITY:	
<input checked="" type="checkbox"/>	≥70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS
<input type="checkbox"/>	≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS
<input type="checkbox"/>	MSD < 25%





## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

Weston Test ID: C110823.0642	Client: Port of San Diego Shelter Island Yacht Basin D/H	Client Sample ID: SIYB-6
---------------------------------	--	-----------------------------

SPAWNING DATA				
Initial Spawning Time: 1600	Final Spawning Time: 1700	Fertilization Time: 1701	No. of Females: 2	No. of Males: 3
Embryo Density (count/mL):	1. 98/77	2. 81/86	3. 91/99	Average: 88.7
Stocking Volume Calculation: $2700 / (88.7 \times 50) = 0.608$				

ZERO TIME COUNTS					
1. 186	2. 203	3. 209	4. 269	5. 203	6. 238
Average Count: 218			Technician: KS		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control												
Brine												
6.25	203	21	169	16	200	27	184	16			10/10/11	KS
12.5	226	15	200	13	164	19	184	16			10/12/11	
25	195	23	158	22	200	23	194	31			↓	↓
50	188	36	208	14	178	13	186	9			↓	↓
100	186	19	179	18	168	24	191	20			9/20/11	KS

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	6.25 1 3	50 1 1	1	1
Total #	227	223		
# Normal	197	187		
Date / Initials	10/13/11 1 SH	10/13/11 1 SH	1	1
QA Check Acceptability: <input checked="" type="checkbox"/> <5% difference in means of QA & orig. counts				

① IE 1/5/12 JH

Weston Solutions, Inc.

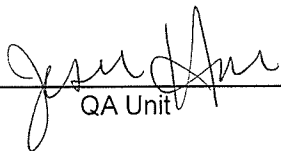
**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-REF

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0742

**Bivalve Larvae Chronic 48-Hour Bioassay**  
Weston Testing Protocol No. BIO042  
EPA/600/R-95/136  
Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	87.1	87.6
6.25%	87.7	85.8
12.5%	88.4	94.4
25%	87.7	97.7
50%	87.7	95.4
100%	89.1	93.6

  
QA Unit

1/5/12  
Date

  
Approved

1/6/12  
Date

## Weston Solutions, Inc.

<b>Client:</b>	Port of San Diego	<b>Date Received:</b>	23 Aug 11
<b>Project:</b>	Shelter Island Yacht Basin	<b>Date Test Started:</b>	23 Aug 11
<b>Sample Matrix:</b>	Liquid	<b>Date Test Ended:</b>	25 Aug 11
<b>Sample Name/ID:</b>	SIYB-REF	<b>Test ID No.:</b>	C110823.0742

### Bivalve Larvae Chronic 48-Hour Bioassay

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

#### Chronic Toxicity - Development

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.16$ ). Dunnett's Multiple-Comparison Test provided a NOEC (No Observed Effect Concentration) of 100 percent and a LOEC (Lowest Observed Effect Concentration) of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUC), was 1.

#### Chronic Toxicity - Survival

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.95$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUC), was 1.

#### Summary of Results

Species	Exposure	Development		Survival		Tested Substance
		NOEC	$EC_{50}$	NOEC	$LC_{50}$	
<i>Mytilus galloprovincialis</i>	48 hrs	100%	>100%	100%	>100%	SIYB-REF

**Protocol Deviations:** Control normality was slightly below the protocol limit of  $\geq 90$  percent for the test and the associated Reference Toxicant test. Sample arrived at 6.7°C which is outside of the temperature protocol limits of 0-6°C. It should be noted that insufficient cooling of a sample may result in an underestimation of sample toxicity. pMSD for survival was above upper bound limit of <25%. The salinity of the 100 percent concentration was above the protocol limit of 30±2ppt.

**Weston Solutions, Inc.**

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-REF

**Date Received:** 23 Aug 11  
**Date Test Started:** 23 Aug 11  
**Date Test Ended:** 25 Aug 11  
**Test ID No.:** C110823.0742

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042  
 EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	16.0	30.0	8.0
6.25	7.6	16.4	30.2	8.0
12.5	7.6	16.4	30.5	8.0
25	7.6	16.4	30.9	8.0
50	7.8	16.4	31.6	8.1
100	8.3	16.2	33.1	8.1
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.5		
6.25		15.0		
12.5		15.0		
25		15.4		
50		15.5		
100		15.3		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.8	15.3	30.1	7.9
6.25	7.7	15.6	30.7	7.9
12.5	7.7	15.5	31.2	7.9
25	7.6	15.8	31.0	8.0
50	7.8	15.9	31.6	8.0
100	7.8	15.8	33.2	8.0

\*Water quality measured on surrogate chambers.

**Weston Solutions, Inc.**

<b>Client:</b>	Port of San Diego	<b>Date Received:</b>	23 Aug 11
<b>Project:</b>	Shelter Island Yacht Basin	<b>Date Test Started:</b>	23 Aug 11
<b>Sample Matrix:</b>	Liquid	<b>Date Test Ended:</b>	25 Aug 11
<b>Sample Name/ID:</b>	SIYB-REF	<b>Test ID No.:</b>	C110823.0742

**APPENDIX**  
Pertinent Test Data

**TEST:** Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

**DILUTION WATER:** Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	30.0 ppt
pH	8.0
Dissolved Oxygen	7.5 mg/L
Temperature	16.0°C

**TEST ORGANISM:** Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

**TEST CHAMBER:** Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

**EXPERIMENTAL DESIGN:**

1. Weston Solutions personnel collected a sample on August 22, 2011, at 1525 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0920 hours. The temperature of the sample upon receipt was 6.7°C.
2. The temperature of the test substance was adjusted to 15 ± 1 °C.
3. Approximately 218 test organisms were placed into each chamber.
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

**MORTALITY CRITERIA:** Absence of larvae, or completely developed shells without meat.

**ACCEPTABILITY CRITERIA:** ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.

(control chart included) Species: *Mytilus galloprovincialis*, larvae

48 hr EC <sub>25</sub> :	11.42 ppb survival, 6.07 ppb proportion normal
48 hr EC <sub>50</sub> :	13.47 ppb survival, 7.38 ppb proportion normal
Laboratory Mean (EC <sub>50</sub> ):	19.65 ppb survival, 7.17 ppb proportion normal
Test Date:	8/23/11 (within 95% confidence limits)

**STUDY DIRECTOR:** K. Skrivseth

**INVESTIGATORS:** K. Skrivseth, S. Hasan, K. Curry, B. Griffith, J. Hansen

**Bivalve Larval Survival and Development Test-Proportion Normal**

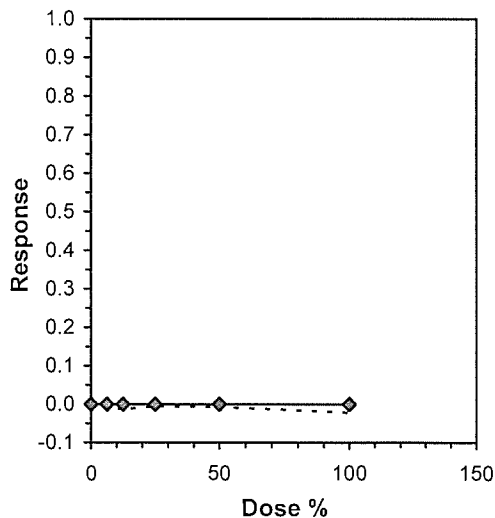
Start Date: 8/23/2011 18:45 Test ID: C110823.0742 Sample ID: SIYB - REF  
 End Date: 8/25/2011 17:45 Lab ID: CCA-Weston, Carlsbad Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 15:25 Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.8762	0.8683	0.8804	0.8602
6.25	0.8909	0.8563	0.8942	0.8678
12.5	0.8889	0.8839	0.8688	0.8939
25	0.8750	0.9120	0.8821	0.8371
50	0.8619	0.8930	0.8761	0.8772
100	0.9352	0.8718	0.8876	0.8676

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8713	1.0000	1.2040	1.1876	1.2176	1.104	4				0.8798	1.0000	
6.25	0.8773	1.0069	1.2136	1.1820	1.2395	2.289	4	-0.409	2.410	0.0566	0.8798	1.0000	
12.5	0.8839	1.0145	1.2233	1.2001	1.2391	1.372	4	-0.824	2.410	0.0566	0.8798	1.0000	
25	0.8766	1.0061	1.2137	1.1553	1.2697	3.865	4	-0.413	2.410	0.0566	0.8798	1.0000	
50	0.8771	1.0066	1.2129	1.1900	1.2376	1.605	4	-0.378	2.410	0.0566	0.8798	1.0000	
100	0.8906	1.0221	1.2364	1.1984	1.3134	4.288	4	-1.378	2.410	0.0566	0.8798	1.0000	

Auxiliary Tests		Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)		0.96353	0.884	0.62067	1.29764						
Bartlett's Test indicates equal variances (p = 0.16)		7.96332	15.0863								
Hypothesis Test (1-tail, 0.05)		NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test		100	>100		1	0.0402	0.04613	0.0005	0.0011	0.80639	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



**Bivalve Larval Survival and Development Test-Proportion Alive**

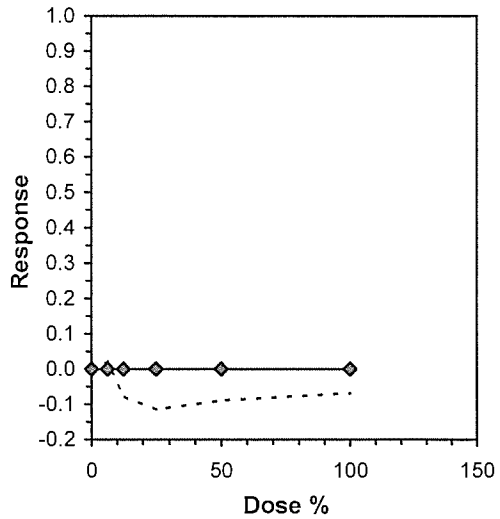
Start Date: 8/23/2011 18:45 · Test ID: C110823.0742 · Sample ID: SIYB - REF  
 End Date: 8/25/2011 17:45 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 8/22/2011 15:25 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.9266	0.7661	0.9587	0.8532
6.25	1.0000	0.7661	0.8670	0.7982
12.5	0.8670	1.0000	1.0000	0.9083
25	0.9174	0.9908	1.0000	1.0000
50	0.8303	0.9862	1.0000	1.0000
100	0.9908	1.0000	0.8165	0.9358

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.8761	1.0000	1.2265	1.0659	1.3662	10.793	4				0.9241	1.0000	
6.25	0.8578	0.9791	1.2263	1.0659	1.5369	17.476	4	0.002	2.410	0.2938	0.9241	1.0000	
12.5	0.9438	1.0772	1.3836	1.1975	1.5369	12.942	4	-1.288	2.410	0.2938	0.9241	1.0000	
25	0.9771	1.1152	1.4570	1.2793	1.5369	8.374	4	-1.891	2.410	0.2938	0.9241	1.0000	
50	0.9541	1.0890	1.4183	1.1462	1.5369	13.091	4	-1.573	2.410	0.2938	0.9241	1.0000	
100	0.9358	1.0681	1.3636	1.1281	1.5369	13.407	4	-1.125	2.410	0.2938	0.9241	1.0000	

Auxiliary Tests				Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution ( $p > 0.01$ )				0.95778	0.884	-0.0816	-0.8377						
Bartlett's Test indicates equal variances ( $p = 0.95$ )				1.17365	15.0863								
Hypothesis Test (1-tail, 0.05)				NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test				100	>100		1	0.24084	0.2718	0.0383	0.02972	0.31191	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Test: BV-Bivalve Larval Survival and Development Test . Test ID: C110823.07A2  
 Species: MG-Mytilus galloprovincialis . Protocol: EPAW 95-EPA West Coast  
 Sample ID: SIYB - REF Sample Type: AMB1-Ambient water  
 Start Date: 8/23/2011 18:45 End Date: 8/25/2011 17 Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	218	202	202	177	
	2	2	Control	218	167	167	145	
	3	3	Control	218	209	209	184	
	4	4	Control	218	186	186	160	
	5	1	6.250	218	220	220	196	
	6	2	6.250	218	167	167	143	
	7	3	6.250	218	189	189	169	
	8	4	6.250	218	174	174	151	
	9	1	12.500	218	189	189	168	
	10	2	12.500	218	224	224	198	
	11	3	12.500	218	221	221	192	
	12	4	12.500	218	198	198	177	
	13	1	25.000	218	200	200	175	
	14	2	25.000	218	216	216	197	
	15	3	25.000	218	229	229	202	
	16	4	25.000	218	221	221	185	
	17	1	50.000	218	181	181	156	
	18	2	50.000	218	215	215	192	
	19	3	50.000	218	226	226	198	
	20	4	50.000	218	228	228	200	
	21	1	100.000	218	216	216	202	
	22	2	100.000	218	234	234	204	
	23	3	100.000	218	178	178	158	
	24	4	100.000	218	204	204	177	

Comments:



## Bivalve Counts Worksheet

Test ID: C110823.07 SIYB - REF

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	177	25	202
	2	145	22	167
	3	184	25	209
	4	160	26	186
6.25	1	196	24	220
	2	143	24	167
	3	169	20	189
	4	151	23	174
12.5	1	168	21	189
	2	198	26	224
	3	192	29	221
	4	177	21	198
25	1	175	25	200
	2	197	19	216
	3	202	27	229
	4	185	36	221
50	1	156	25	181
	2	192	23	215
	3	198	28	226
	4	200	28	228
100	1	202	14	216
	2	204	30	234
	3	158	20	178
	4	177	27	204
	1	0	0	0
	2	0	0	0
	3	0	0	0
	4	0	0	0



# BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BI0042

CLIENT:	Port of San Diego
PROJECT:	Shelter Island Yacht Basin
CLIENT SAMPLE ID:	JLYB - Ref
WESTON TEST ID:	C110823.0742
SPECIES:	M. galloprovincialis

DATE RECEIVED:	8/23/11
DATE TEST STARTED:	8/23/11
DATE TEST ENDED:	8/25/11
WESTON SOP NO.:	BI0042
STUDY DIRECTOR:	K. Skrivseth

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: 8/23/11 Sample ID: C110823.07 Dilutions (Tech): BG WQ Time: 1845 Technician: BG	Control	2	7.5	2	16.0	6	30.0	3	8.0
	Brine-Control		—		—		—		—
	6.25		7.6		16.4		30.2		8.0
	12.5		7.6		16.4		30.5		8.0
	25		7.6		16.4		30.9		8.0
	50		7.8		16.4		31.6		8.1
	100		8.3		16.2		33.1 <sup>DB</sup>		8.1
<b>24 Hours</b> Date: 8/24/11 WQ Time: 1048 Technician: BG	Control			6B	14.5				
	Brine-Control				—				
	6.25				15.0				
	12.5				15.0				
	25				15.4				
	50				15.5				
	100				15.3				
<b>48 Hours</b> Date: 8/25/11 WQ Time: 1420 Technician: SH	Control	2	7.8	2	15.3	6	30.1	3	7.9
	Brine Control		—		—		—		—
	6.25		7.7		15.6		30.7		7.9
	12.5		7.7		15.5		31.2		7.9
	25		7.6		15.8		31.0		8.0
	50		7.8		15.9		31.6		8.0
	100		7.8		15.8		33.2 <sup>DB</sup>		8.0

\*Water quality measurements taken in surrogate water quality chambers  
 ◊ Salinity is above the test protocol range of 30±2 ppt 1/5/12 KS

START TIME:	1845	Initials:	SH
END TIME:	1745	Initials:	KE
ORGANISM BATCH:	TSF 5708		
HOBO TEMP. NO.:	2296		
TEST LOCATION:	Room 2		

DILUTION WATER BATCH:	S10072511
TEST ACCEPTABILITY:	
<input checked="" type="checkbox"/>	≥70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS
<input type="checkbox"/>	≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS
<input type="checkbox"/>	MSD < 25%



## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

Weston Test ID: C110823.074Z	Client: Port of San Diego <del>Shelter Island Yacht Basin</del> DJH	Client Sample ID: SIYB-Ref
---------------------------------	--	-------------------------------

SPAWNING DATA				
Initial Spawning Time: 1600	Final Spawning Time: 1700	Fertilization Time: 1700	No. of Females: 2	No. of Males: 3
Embryo Density (count/mL):	1. 98 / 77	2. 81 / 86	3. 21 / 99	Average: 88.7
Stocking Volume Calculation: $2700 / (88.7 \times 50) = 0.608$				

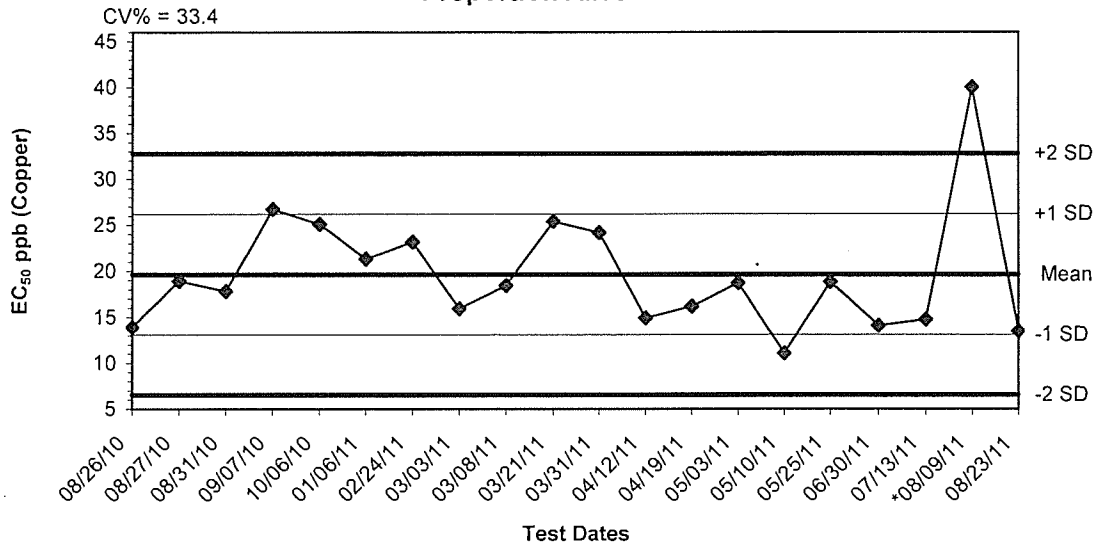
ZERO TIME COUNTS					
1. 186	2. 203	3. 209	4. 269	5. 203	6. 238
Average Count: 218			Technician: KS		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control												
<del>Brine</del>												
6.25	196	24	143	24	169	20	151	23			10/12/11	KS
12.5	168	21	198	26	192	29	177	21				
25	175	25	197	19	202	27	185	36				
50	156	25	192	23	198	28	200	28				
100	202	14	204	30	158	20	177	27			9/20/11	KS

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	12.5   4	50   1   1	1	1
Total #	203	180		
# Normal	181	153		
Date / Initials	10/13/11   1 SH	10/13/11   1 SH	1	1
QA Check Acceptability: <input checked="" type="checkbox"/> <5% difference in means of QA & orig. counts				

DIE 1/5/12 JH

**Mytilus galloprovincialis Reference Toxicant Control Chart:  
Proportion Alive**

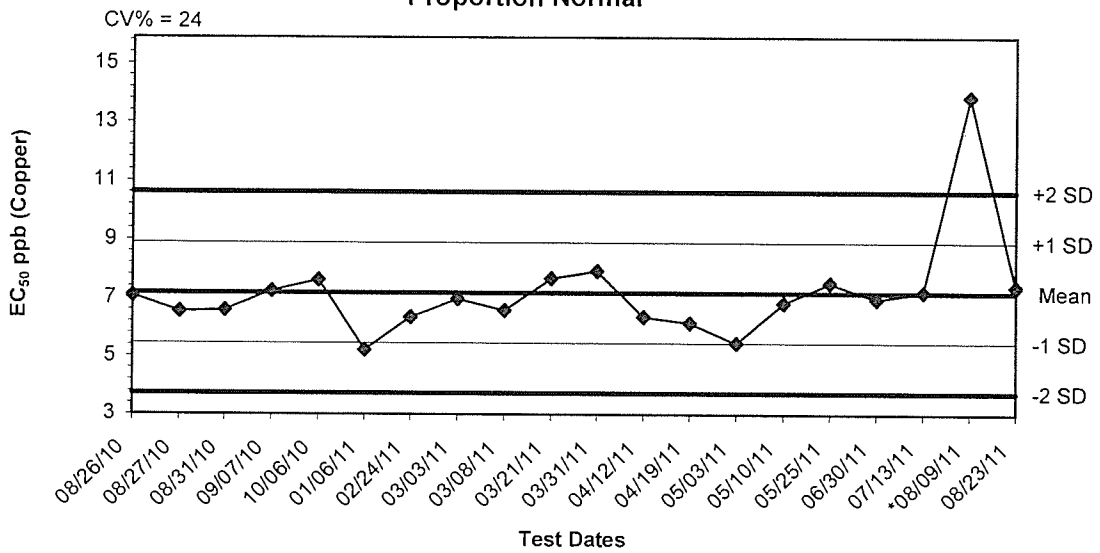


Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
08/26/10	13.9020	19.6450	13.0862	6.5274	26.2039	32.7627
08/27/10	18.9430	19.6450	13.0862	6.5274	26.2039	32.7627
08/31/10	17.8030	19.6450	13.0862	6.5274	26.2039	32.7627
09/07/10	26.7381	19.6450	13.0862	6.5274	26.2039	32.7627
10/06/10	25.0730	19.6450	13.0862	6.5274	26.2039	32.7627
01/06/11	21.3210	19.6450	13.0862	6.5274	26.2039	32.7627
02/24/11	23.1600	19.6450	13.0862	6.5274	26.2039	32.7627
03/03/11	15.9270	19.6450	13.0862	6.5274	26.2039	32.7627
03/08/11	18.4500	19.6450	13.0862	6.5274	26.2039	32.7627
03/21/11	25.3810	19.6450	13.0862	6.5274	26.2039	32.7627
03/31/11	24.1720	19.6450	13.0862	6.5274	26.2039	32.7627
04/12/11	14.9140	19.6450	13.0862	6.5274	26.2039	32.7627
04/19/11	16.1650	19.6450	13.0862	6.5274	26.2039	32.7627
05/03/11	18.7380	19.6450	13.0862	6.5274	26.2039	32.7627
05/10/11	11.0648	19.6450	13.0862	6.5274	26.2039	32.7627
05/25/11	18.8430	19.6450	13.0862	6.5274	26.2039	32.7627
06/30/11	14.0890	19.6450	13.0862	6.5274	26.2039	32.7627
07/13/11	14.7460	19.6450	13.0862	6.5274	26.2039	32.7627
*08/09/11	40.0000	19.6450	13.0862	6.5274	26.2039	32.7627
08/23/11	13.4710	19.6450	13.0862	6.5274	26.2039	32.7627

\*Value was out of 95% CI range at time of testing.

Updated 10/3/11 KC

***Mytilus galloprovincialis* Reference Toxicant Control Chart:  
Proportion Normal**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
08/26/10	7.0762	7.1714	5.4484	3.7253	8.8945	10.6176
08/27/10	6.5364	7.1714	5.4484	3.7253	8.8945	10.6176
08/31/10	6.5794	7.1714	5.4484	3.7253	8.8945	10.6176
09/07/10	7.2430	7.1714	5.4484	3.7253	8.8945	10.6176
10/06/10	7.6168	7.1714	5.4484	3.7253	8.8945	10.6176
01/06/11	5.2082	7.1714	5.4484	3.7253	8.8945	10.6176
02/24/11	6.3415	7.1714	5.4484	3.7253	8.8945	10.6176
03/03/11	6.9707	7.1714	5.4484	3.7253	8.8945	10.6176
03/08/11	6.5694	7.1714	5.4484	3.7253	8.8945	10.6176
03/21/11	7.6651	7.1714	5.4484	3.7253	8.8945	10.6176
03/31/11	7.9275	7.1714	5.4484	3.7253	8.8945	10.6176
04/12/11	6.3555	7.1714	5.4484	3.7253	8.8945	10.6176
04/19/11	6.1428	7.1714	5.4484	3.7253	8.8945	10.6176
05/03/11	5.4518	7.1714	5.4484	3.7253	8.8945	10.6176
05/10/11	6.8235	7.1714	5.4484	3.7253	8.8945	10.6176
05/25/11	7.5181	7.1714	5.4484	3.7253	8.8945	10.6176
06/30/11	6.9573	7.1714	5.4484	3.7253	8.8945	10.6176
07/13/11	7.2116	7.1714	5.4484	3.7253	8.8945	10.6176
*08/09/11	13.8550	7.1714	5.4484	3.7253	8.8945	10.6176
08/23/11	7.3790	7.1714	5.4484	3.7253	8.8945	10.6176

\*Value out of 95% CI range at time of testing.

Updated 10/3/11 KC

**Bivalve Larval Survival and Development Test-Proportion Alive**

Start Date: 8/23/2011 19:05. Test ID: C110713.10. Sample ID: REF-Ref Toxicant.  
 End Date: 8/25/2011 18:10. Lab ID: CCA-Weston, Carlsbad. Sample Type: CUSO-Copper sulfate.  
 Sample Date: Protocol: EPAW 95-EPA West Coast. Test Species: MG-Mytilus galloprovincialis.  
 Comments:

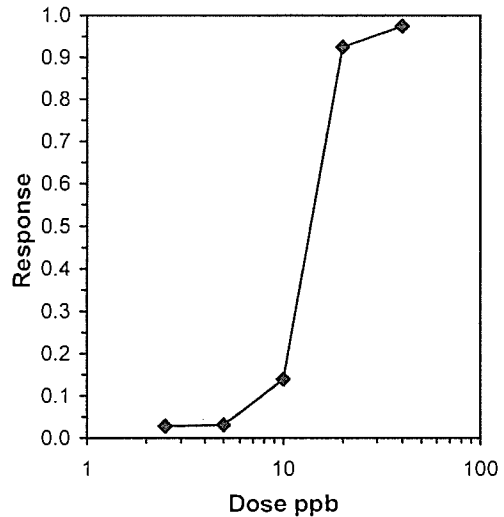
Conc-ppb	1	2	3	4
Control	0.8761	0.9817	0.9817	0.8991
2.5	0.9862	0.8165	0.8761	0.9541
5	0.8991	0.9862	0.8440	0.8945
10	0.7890	0.8807	0.8119	0.7385
20	0.0688	0.0734	0.0872	0.0550
40	0.0183	0.0275	0.0229	0.0275

Conc-ppb	Mean	N-Mean	Transform: Arcsin Square Root					N	Number Resp	Total Number
			Mean	Min	Max	CV%				
Control	0.9346	1.0000	1.3321	1.2112	1.4349	8.979	4	57	872	
2.5	0.9083	0.9718	1.2869	1.1281	1.4532	11.282	4	80	872	
5	0.9060	0.9693	1.2764	1.1648	1.4532	9.688	4	82	872	
10	0.8050	0.8613	1.1170	1.0341	1.2182	6.876	4	170	872	
20	0.0711	0.0761	0.2691	0.2368	0.2997	9.640	4	810	872	
40	0.0241	0.0258	0.1553	0.1359	0.1667	9.453	4	851	872	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96487	0.884	0.35037	-0.1853
Bartlett's Test indicates equal variances (p = 0.02)	14.0127	15.0863		

**Trimmed Spearman-Kärber**

Trim Level	EC50	95% CL	
0.0%			
5.0%	13.494	13.203	13.791
10.0%	13.686	13.341	14.040
20.0%	13.757	13.575	13.941
Auto-2.8%	13.471	13.152	13.797



**Bivalve Larval Survival and Development Test-Proportion Alive**

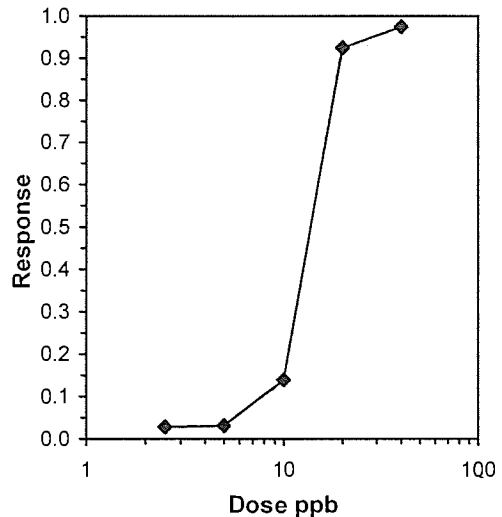
Start Date: 8/23/2011 19:05	Test ID: C110713.10	Sample ID: REF-Ref Toxicant
End Date: 8/25/2011 18:10	Lab ID: CCA-Weston, Carlsbad	Sample Type: CUSO-Copper sulfate
Sample Date:	Protocol: EPAW 95-EPA West Coast	Test Species: MG-Mytilus galloprovincialis
Comments: For PMSD only		

Conc-ppb	1	2	3	4
Control	0.8761	0.9817	0.9817	0.8991
2.5	0.9862	0.8165	0.8761	0.9541
5	0.8991	0.9862	0.8440	0.8945
10	0.7890	0.8807	0.8119	0.7385
20	0.0688	0.0734	0.0872	0.0550
40	0.0183	0.0275	0.0229	0.0275

Conc-ppb	Transform: Arcsin Square Root							t-Stat	1-Tailed Critical	MSD	Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N					
Control	0.9346	1.0000	1.3321	1.2112	1.4349	8.979	4				57	872
2.5	0.9083	0.9718	1.2869	1.1281	1.4532	11.282	4	0.654	2.410	0.1668	80	872
5	0.9060	0.9693	1.2764	1.1648	1.4532	9.688	4	0.806	2.410	0.1668	82	872
*10	0.8050	0.8613	1.1170	1.0341	1.2182	6.876	4	3.109	2.410	0.1668	170	872
*20	0.0711	0.0761	0.2691	0.2368	0.2997	9.640	4	15.362	2.410	0.1668	810	872
*40	0.0241	0.0258	0.1553	0.1359	0.1667	9.453	4	17.006	2.410	0.1668	851	872

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96487	0.884	0.35037	-0.1853						
Bartlett's Test indicates equal variances (p = 0.02)	14.0127	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	5	10	7.07107		0.09968	0.10558	1.18205	0.00958	2.8E-13	5, 18

Trimmed Spearman-Kärber			
Trim Level	EC50	95% CL	
0.0%			
5.0%	13.494	13.203	13.791
10.0%	13.686	13.341	14.040
20.0%	13.757	13.575	13.941
Auto-2.8%	13.471	13.152	13.797



**Bivalve Larval Survival and Development Test-Proportion Alive**

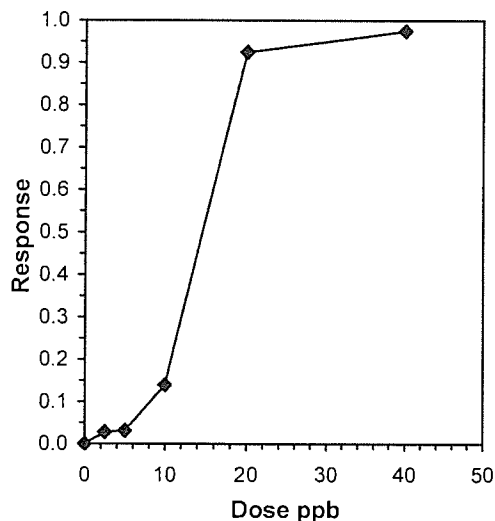
Start Date: 8/23/2011 19:05 Test ID: C110713.10 Sample ID: REF-Ref Toxicant  
 End Date: 8/25/2011 18:10 Lab ID: CCA-Weston, Carlsbad Sample Type: CUSO-Copper sulfate  
 Sample Date: Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments: For IC25 only

Conc-ppb	1	2	3	4
Control	0.8761	0.9817	0.9817	0.8991
2.5	0.9862	0.8165	0.8761	0.9541
5	0.8991	0.9862	0.8440	0.8945
10	0.7890	0.8807	0.8119	0.7385
20	0.0688	0.0734	0.0872	0.0550
40	0.0183	0.0275	0.0229	0.0275

Conc-ppb	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.9346	1.0000	1.3321	1.2112	1.4349	8.979	4				0.9346	1.0000	
2.5	0.9083	0.9718	1.2869	1.1281	1.4532	11.282	4	0.654	2.410	0.1668	0.9083	0.9718	
5	0.9060	0.9693	1.2764	1.1648	1.4532	9.688	4	0.806	2.410	0.1668	0.9060	0.9693	
*10	0.8050	0.8613	1.1170	1.0341	1.2182	6.876	4	3.109	2.410	0.1668	0.8050	0.8613	
*20	0.0711	0.0761	0.2691	0.2368	0.2997	9.640	4	15.362	2.410	0.1668	0.0711	0.0761	
*40	0.0241	0.0258	0.1553	0.1359	0.1667	9.453	4	17.006	2.410	0.1668	0.0241	0.0258	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96487	0.884	0.35037	-0.1853						
Bartlett's Test indicates equal variances (p = 0.02)	14.0127	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	5	10	7.07107		0.09968	0.10558	1.18205	0.00958	2.8E-13	5, 18

Point	ppb	SD	95% CL(Exp)		Skew
			Lower	Upper	
IC05	5.895	1.896	0.000	8.931	-0.5803
IC10	8.210	1.708	1.762	11.545	-0.8184
IC15	10.145	0.894	6.115	11.326	-1.5034
IC20	10.781	0.473	8.834	11.885	-1.2328
IC25	11.418	0.389	9.982	12.444	-0.3691
IC40	13.328	0.308	12.179	14.121	-0.3729
IC50	14.602	0.254	13.642	15.239	-0.3775





**Bivalve Larval Survival and Development Test-Proportion Normal**

Start Date: 8/23/2011 19:05 · Test ID: C110713.10 · Sample ID: REF-Ref Toxicant ·  
 End Date: 8/25/2011 18:10 · Lab ID: CCA-Weston, Carlsbad · Sample Type: CUSO-Copper sulfate ·  
 Sample Date: Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis ·  
 Comments:

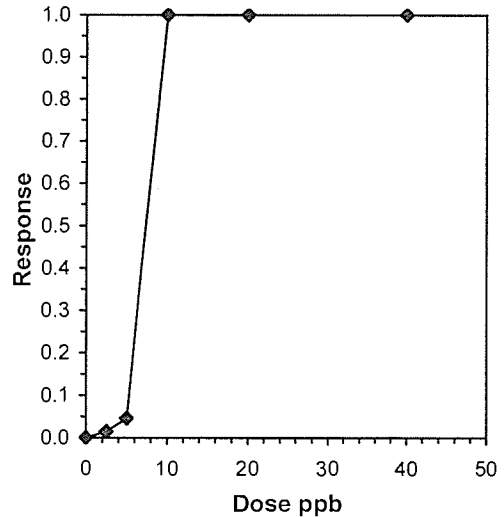
Conc-ppb	1	2	3	4
Control	0.8901	0.8879	0.8598	0.8776
2.5	0.8744	0.8820	0.8586	0.8510
5	0.7551	0.8465	0.8696	0.8821
10	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000
40	0.0000	0.0000	0.0000	0.0000

Conc-ppb	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
Control	0.8788	1.0000	1.2156	1.1870	1.2328	1.716	4	0.8785	1.0000
2.5	0.8665	0.9860	1.1971	1.1744	1.2202	1.749	4	0.8662	0.9859
5	0.8383	0.9539	1.1607	1.0531	1.2202	6.452	4	0.8380	0.9538
10	0.0000	0.0000	0.0378	0.0361	0.0394	3.640	4	0.0000	0.0000
20	0.0000	0.0000	0.1286	0.1150	0.1448	9.639	4	0.0000	0.0000
40	0.0000	0.0000	0.2223	0.2056	0.2527	10.034	4	0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.88819	0.805	-1.4433	3.56652
Bartlett's Test indicates equal variances (p = 0.05)	5.86119	9.21034		

**Linear Interpolation (200 Resamples)**

Point	ppb	SD	95% CL(Exp)		Skew
IC05	5.0201	0.6390	2.3347	5.3277	-0.7181
IC10	5.2822	0.2006	4.2710	5.5736	-1.8846
IC15	5.5443	0.1428	4.9917	5.8195	-0.5467
IC20	5.8064	0.1344	5.2863	6.0654	-0.5467
IC25	6.0685	0.1260	5.5809	6.3113	-0.5467
IC40	6.8548	0.1008	6.4647	7.0491	-0.5467
IC50	7.3790	0.0840	7.0539	7.5409	-0.5467



**Bivalve Larval Survival and Development Test-Proportion Normal**

Start Date: 8/23/2011 19:05 Test ID: C110713.10 Sample ID: REF-Ref Toxicant  
 End Date: 8/25/2011 18:10 Lab ID: CCA-Weston, Carlsbad Sample Type: CUSO-Copper sulfate  
 Sample Date: Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments: For PMSD only

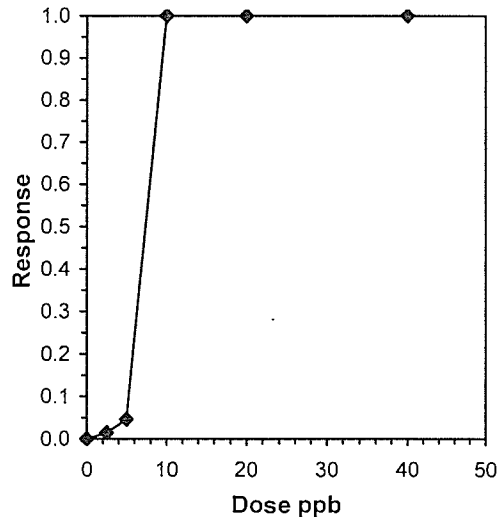
Conc-ppb	1	2	3	4
Control	0.8901	0.8879	0.8598	0.8776
2.5	0.8744	0.8820	0.8586	0.8510
5	0.7551	0.8465	0.8696	0.8821
10	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000
40	0.0000	0.0000	0.0000	0.0000

Conc-ppb	Mean	N-Mean	Transform: Arcsin Square Root					N	1-Tailed			Isotonic	
			Mean	Min	Max	CV%	t-Stat		Critical	MSD	Mean	N-Mean	
Control	0.8788	1.0000	1.2156	1.1870	1.2328	1.716	4				0.8785	1.0000	
2.5	0.8665	0.9860	1.1971	1.1744	1.2202	1.749	4	0.562	2.180	0.0716	0.8662	0.9859	
5	0.8383	0.9539	1.1607	1.0531	1.2202	6.452	4	1.670	2.180	0.0716	0.8380	0.9538	
10	0.0000	0.0000	0.0378	0.0361	0.0394	3.640	4				0.0000	0.0000	
20	0.0000	0.0000	0.1286	0.1150	0.1448	9.639	4				0.0000	0.0000	
40	0.0000	0.0000	0.2223	0.2056	0.2527	10.034	4				0.0000	0.0000	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.88819	0.805	-1.4433	3.56652						
Bartlett's Test indicates equal variances (p = 0.05)	5.86119	9.21034								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	5	10	7.07107		0.05045	0.05739	0.00312	0.00216	0.28566	2, 9

**Linear Interpolation (200 Resamples)**

Point	ppb	SD	95% CL(Exp)		Skew
IC05	5.0201	0.6219	2.1664	5.3224	-1.2589
IC10	5.2822	0.2405	4.1053	5.5686	-3.2307
IC15	5.5443	0.1457	4.9603	5.8148	-1.2107
IC20	5.8064	0.1372	5.2568	6.0609	-1.2107
IC25	6.0685	0.1286	5.5532	6.3071	-1.2107
IC40	6.8548	0.1029	6.4426	7.0457	-1.2107
IC50	7.3790	0.0857	7.0355	7.5381	-1.2107



Test: BV-Bivalve Larval Survival and Development Test · Test ID: C110713.10 ·  
 Species: MG-Mytilus galloprovincialis · Protocol: EPAW 95-EPA West Coast ·  
 Sample ID: REF-Ref Toxicant · Sample Type: CUSO-Copper sulfate ·  
 Start Date: 8/23/2011 19:05 · End Date: 8/25/2011 18 Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	218	191	191	170	
	2	2	Control	218	214	214	190	
	3	3	Control	218	214	214	184	
	4	4	Control	218	196	196	172	
	5	1	2.500	218	215	215	188	
	6	2	2.500	218	178	178	157	
	7	3	2.500	218	191	191	164	
	8	4	2.500	218	208	208	177	
	9	1	5.000	218	196	196	148	
	10	2	5.000	218	215	215	182	
	11	3	5.000	218	184	184	160	
	12	4	5.000	218	195	195	172	
	13	1	10.000	218	172	172	0	
	14	2	10.000	218	192	192	0	
	15	3	10.000	218	177	177	0	
	16	4	10.000	218	161	161	0	
	17	1	20.000	218	15	15	0	
	18	2	20.000	218	16	16	0	
	19	3	20.000	218	19	19	0	
	20	4	20.000	218	12	12	0	
	21	1	40.000	218	4	4	0	
	22	2	40.000	218	6	6	0	
	23	3	40.000	218	5	5	0	
	24	4	40.000	218	6	6	0	

Comments:



## Bivalve Counts Worksheet

Test ID: C110713.10 Copper RT

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	170	21	191
	2	190	24	214
	3	184	30	214
	4	172	24	196
2.5	1	188	27	215
	2	157	21	178
	3	164	27	191
	4	177	31	208
5	1	148	48	196
	2	182	33	215
	3	160	24	184
	4	172	23	195
10	1	0	172	172
	2	0	192	192
	3	0	177	177
	4	0	161	161
20	1	0	15	15
	2	0	16	16
	3	0	19	19
	4	0	12	12
40	1	0	4	4
	2	0	6	6
	3	0	5	5
	4	0	6	6



## 48 Hour Bivalve Development Reference Toxicant Test

Test ID: <u>PC110713.16</u>		Replicates: 4		Study Director: <u>R. Curry</u>		Location: <u>Rm 2</u>			
Dilution Water Batch: <u>S10072511</u>		Organism Batch: <u>TSF 5708</u>		Associated Test(s): <u>S14B</u>		Organism: <u>Mytilus galloprovincialis</u>			
Toxicant: Copper Sulfate (0.509gCu/LCuSO <sub>4</sub> )		Lot #: <u>2008506</u>		Date Prepared: <u>8/23/11</u>		Initials: <u>BG</u>			
Target Concentrations: <u>40 ppb</u>		Quantity of Stock: Target: <u>0.039 mL</u>		Quantity of Diluent: Target: <u>500 mL</u>					
<u>40 ppb</u>		Actual: <u>0.0390</u>		Actual: <u>500.0</u>					
Serial Dilute by 1/2 to obtain concentrations of 20, 10, 5, and 2.5 ppb.									
<b>0 Hours</b>		Date: <u>8/23/11</u>		WQ Time: <u>1750</u>		Start Time: <u>1905</u>			
						Initials: <u>BG</u>			
STOCK									
	Control	2.5	5	10	20	40			
D.O. (mg/L)	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>			
Temperature	<u>16.4</u>	<u>16.3</u>	<u>16.4</u>	<u>16.4</u>	<u>16.3</u>	<u>16.3</u>			
Salinity	<u>30.2</u>	<u>30.1</u>	<u>30.1</u>	<u>30.2</u>	<u>30.2</u>	<u>30.2</u>			
pH	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>			
<b>48 Hours</b>		Date: <u>8/25/11</u>		WQ Time: <u>1820</u>		End Time: <u>1810</u>			
						Initials: <u>JK</u>			
STOCK									
	Control	2.5	5	10	20	40			
D.O. (mg/L)	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>			
Temperature	<u>16.4</u>	<u>16.3</u>	<u>16.2</u>	<u>16.3</u>	<u>16.3</u>	<u>16.4</u>			
Salinity	<u>30.2</u>	<u>30.2</u>	<u>30.2</u>	<u>30.2</u>	<u>30.3</u>	<u>30.3</u>			
pH	<u>7.8</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>			
COUNTS									
Zero Times	<u>186</u>	<u>203</u>	<u>209</u>	<u>269</u>	<u>203</u>	<u>238</u>	Initials: <u>JK</u>		
	Rep 1		Rep 2		Rep 3		Rep 4	Initials	
Conc.	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Initials
Control	<u>170</u>	<u>21</u>	<u>190</u>	<u>24</u>	<u>184</u>	<u>30</u>	<u>172</u>	<u>24</u>	<u>BG</u>
2.5	<u>188</u>	<u>27</u>	<u>157</u>	<u>21</u>	<u>164</u>	<u>27</u>	<u>177</u>	<u>31</u>	<u>BG</u>
5	<u>148</u>	<u>48</u>	<u>182</u>	<u>33</u>	<u>160</u>	<u>24</u>	<u>172</u>	<u>23</u>	<u>BG</u>
10	<u>0</u>	<u>172</u>	<u>0</u>	<u>192</u>	<u>0</u>	<u>177</u>	<u>0</u>	<u>161</u>	<u>BG</u>
20	<u>0</u>	<u>155</u>	<u>0</u>	<u>168</u>	<u>0</u>	<u>195</u>	<u>0</u>	<u>124</u>	<u>BG</u>
40	<u>0</u>	<u>41</u>	<u>0</u>	<u>614</u>	<u>0</u>	<u>510</u>	<u>0</u>	<u>640</u>	<u>BG</u>

① WLC 8/30/11 BG

Pass

Fail

② Concentrations were recounted after QA check. 9/20/11 BG

AVG: 218

QA 9/12/11

Rep 2 188/23

Rep 3 0/173



Bivavlve RT  
8/23/11

	1	9
	2	11
0	3	6
	4	10
	5	19
2.5	6	14
	7	3
	8	21
	9	22
5	10	17
	11	5
	12	18
	13	23
10	14	12
	15	20
	16	8
	17	4
20	18	13
	19	15
	20	7
40	21	16
	22	1
	23	2
	24	24

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-1

**Date Received:** 27 Oct 11  
**Date Test Started:** 27 Oct 11  
**Date Test Ended:** 29 Oct 11  
**Test ID No.:** C111027.0142

**Bivalve Larvae Chronic 48-Hour Bioassay**

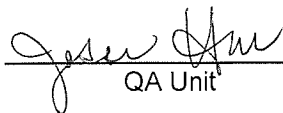
Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	96.6	92.8
6.25%	97.0	97.2
12.5%	97.2	92.1
25%	96.7	94.3
50%	83.0	91.7
100%	7.12	86.0

  
\_\_\_\_\_  
QA Unit

1/5/12  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Approved

1/5/12  
\_\_\_\_\_  
Date

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-1

**Date Received:** 27 Oct 11  
**Date Test Started:** 27 Oct 11  
**Date Test Ended:** 29 Oct 11  
**Test ID No.:** C111027.0142

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042  
EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Chronic Toxicity - Development**

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.15$ ). Dunnett's Multiple-Comparison Test provided a NOEC (No Observed Effect Concentration) of 25 percent and a LOEC (Lowest Observed Effect Concentration) of 50 percent test substance.

The Maximum Likelihood-Probit Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  was estimated to be 55.64 percent test substance and  $EC_{50}$  was estimated to be 67.04 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 4.

**Chronic Toxicity - Survival**

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.06$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Maximum Likelihood-Probit Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

**Summary of Results**

Species	Exposure	Development		Survival		Tested Substance
		NOEC	$EC_{50}$	NOEC	$LC_{50}$	
<i>Mytilus galloprovincialis</i>	48 hrs	25%	67.04%	100%	>100%	SIYB-1

**Protocol Deviations:** The salinity of the 100 percent concentration was above the protocol limit of 30±2ppt. In the associated Reference Toxicant test replicate 4 of the control, replicate 1 of the 2.5ppb concentration and replicate 4 of the 5ppb concentration were found to be outliers and were therefore excluded from statistical analysis.



Weston Solutions, Inc.

Client: Port of San Diego  
 Project: Shelter Island Yacht Basin  
 Sample Matrix: Liquid  
 Sample Name/ID: SIYB-1

Date Received: 27 Oct 11  
 Date Test Started: 27 Oct 11  
 Date Test Ended: 29 Oct 11  
 Test ID No.: C111027.0142

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.2	15.7	29.8	8.2
6.25	7.2	15.2	30.1	8.2
12.5	7.3	15.2	30.3	8.2
25	7.3	15.3	30.7	8.0
50	7.3	15.3	31.4	8.1
100	7.7	15.1	32.8	8.0
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.7		
6.25		14.5		
12.5		14.8		
25		14.5		
50		14.3		
100		14.6		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	15.3	30.0	8.0
6.25	7.9	14.5	30.5	8.0
12.5	7.8	14.7	30.4	8.0
25	7.8	14.7	31.2	8.0
50	7.9	14.5	31.9	8.0
100	7.8	14.8	32.8	8.0

\*Water quality measured on surrogate chambers.

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-1

**Date Received:** 27 Oct 11  
**Date Test Started:** 27 Oct 11  
**Date Test Ended:** 29 Oct 11  
**Test ID No.:** C111027.0142

**APPENDIX**  
Pertinent Test Data

**TEST:** Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

**DILUTION WATER:** Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity 29.8 ppt  
pH 8.2  
Dissolved Oxygen 7.2 mg/L  
Temperature 15.7°C

**TEST ORGANISM:** Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

**TEST CHAMBER:** Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

**EXPERIMENTAL DESIGN:**

1. Weston Solutions personnel collected a sample on October 26, 2011, at 0850 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0945 hours. The temperature of the sample upon receipt was 6.0°C.
2. The temperature of the test substance was adjusted to 15 ± 1 °C.
3. Approximately 211 test organisms were placed into each chamber.
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

**MORTALITY CRITERIA:** Absence of larvae, or completely developed shells without meat.

**ACCEPTABILITY CRITERIA:** ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

**REFERENCE TOXICITY:** Toxicant: CuSO<sub>4</sub>, Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.

(control chart included) Species: *Mytilus galloprovincialis*, larvae

48 hr EC<sub>25</sub>: 11.59 ppb survival, 4.88 ppb proportion normal

48 hr EC<sub>50</sub>: 13.06 ppb survival, 5.28 ppb proportion normal

Laboratory Mean (EC<sub>50</sub>): 19.61 ppb survival, 7.02 ppb proportion normal

Test Date: 10/27/11 (within 95% confidence limits)

**STUDY DIRECTOR:** K. Skrivseth

**INVESTIGATORS:** K. Skrivseth, S. Hasan, K. Curry, B. Griffith

**Bivalve Larval Survival and Development Test-Proportion Normal**

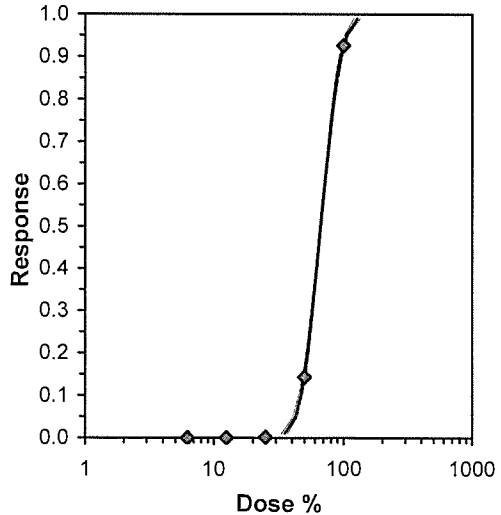
Start Date: 10/27/2011 15:10 Test ID: C111027.0142 Sample ID: SIYB-1  
 End Date: 10/29/2011 13:15 Lab ID: CCA-Weston, Carlsbad Sample Type: AMB1-Ambient water  
 Sample Date: 10/26/2011 08:50 Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.9290	0.9747	0.9909	0.9688
6.25	0.9724	0.9684	0.9638	0.9760
12.5	0.9945	0.9765	0.9725	0.9425
25	0.9457	0.9728	0.9684	0.9816
50	0.8902	0.8476	0.8230	0.7582
100	0.1264	0.0549	0.0924	0.0112

Conc-%	Transform: Arcsin Square Root							t-Stat	1-Tailed Critical	MSD	Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N					
Control	0.9658	1.0000	1.3951	1.3011	1.4751	5.152	4				26	817
6.25	0.9701	1.0045	1.3976	1.3794	1.4151	1.098	4	-0.051	2.410	0.1197	25	836
12.5	0.9715	1.0059	1.4116	1.3287	1.4964	4.865	4	-0.332	2.410	0.1197	22	786
25	0.9671	1.0014	1.3919	1.3356	1.4346	2.982	4	0.064	2.410	0.1197	27	812
*50	0.8298	0.8591	1.1490	1.0568	1.2330	6.386	4	4.954	2.410	0.1197	132	774
*100	0.0712	0.0738	0.2538	0.1062	0.3634	43.840	4	22.979	2.410	0.1197	674	726

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95419	0.884	-0.4525	0.28546						
Bartlett's Test indicates equal variances (p = 0.15)	8.19426	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	25	50	35.3553	4	0.0542	0.05591	0.8399	0.00493	1.7E-14	5, 18

Parameter	Value	SE	95% Fiducial Limits		Maximum Likelihood-Probit						
			Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter		
Slope	8.3321	0.31265	7.71931	8.9449	0.03182	0.36618	7.81473	0.95	1.82631	0.12002	3
Intercept	-10.217	0.57366	-11.341	-9.0927							
TSCR	0.03071	0.00303	0.02477	0.03665							
Point	Probits	%	95% Fiducial Limits								
EC01	2.674	35.2461	33.251	37.0957							
EC05	3.355	42.5503	40.6611	44.3019							
EC10	3.718	47.0441	45.2375	48.7284							
EC15	3.964	50.3412	48.5942	51.982							
EC20	4.158	53.1256	51.4235	54.7384							
EC25	4.326	55.6369	53.9672	57.2347							
EC40	4.747	62.504	60.8615	64.1336							
EC50	5.000	67.0369	65.3455	68.7632							
EC60	5.253	71.8985	70.0869	73.8036							
EC75	5.674	80.7727	78.5732	83.1915							
EC80	5.842	84.5908	82.1684	87.2939							
EC85	6.036	89.2697	86.5377	92.3634							
EC90	6.282	95.5262	92.3283	99.2036							
EC95	6.645	105.615	101.568	110.353							
EC99	7.326	127.502	121.316	134.926							



Dose response relationships are considered reliable.

**Bivalve Larval Survival and Development Test-Proportion Alive**

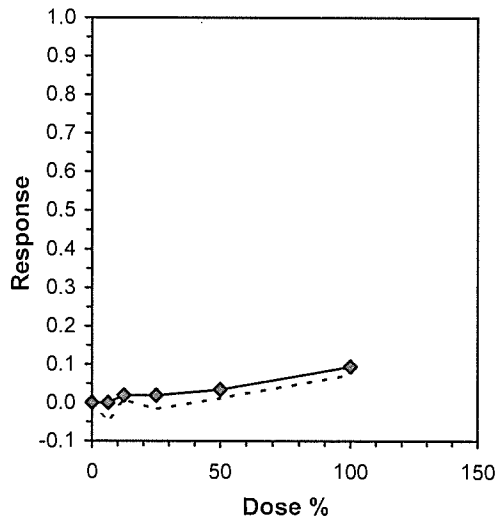
Start Date: 10/27/2011 15:10 · Test ID: C111027.0142 · Sample ID: SIYB-1  
 End Date: 10/29/2011 13:15 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 10/26/2011 08:50 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.8009	1.0000	1.0000	0.9100
6.25	1.0000	0.9005	1.0000	0.9858
12.5	0.8578	1.0000	1.0000	0.8246
25	1.0000	0.8720	0.9005	1.0000
50	0.8199	0.9953	0.9905	0.8626
100	0.8626	0.8626	0.8720	0.8436

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				CV%	N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	Mean						N-Mean	
Control	0.9277	1.0000	1.3618	1.1083	1.5364	15.541	4				0.9496	1.0000	
6.25	0.9716	1.0473	1.4435	1.2498	1.5364	9.364	4	-0.669	2.410	0.2942	0.9496	1.0000	
12.5	0.9206	0.9923	1.3489	1.1387	1.5364	16.106	4	0.105	2.410	0.2942	0.9319	0.9813	
25	0.9431	1.0166	1.3819	1.2050	1.5364	12.976	4	-0.165	2.410	0.2942	0.9319	0.9813	
50	0.9171	0.9885	1.3247	1.1325	1.5019	14.342	4	0.304	2.410	0.2942	0.9171	0.9657	
100	0.8602	0.9272	1.1878	1.1642	1.2050	1.435	4	1.425	2.410	0.2942	0.8602	0.9058	

Auxiliary Tests					Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.89144	0.884	-0.1845	-1.529						
Bartlett's Test indicates equal variances (p = 0.06)					10.582	15.0863								
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test					100	>100		1	0.18949	0.19802	0.02912	0.0298	0.45812	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	63.099			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Dose response relationships are considered reliable.

Test: BV-Bivalve Larval Survival and Development Test      Test ID: C111027.0142  
 Species: MG-Mytilus galloprovincialis                      Protocol: EPAW 95-EPA West Coast  
 Sample ID: SIYB-1    Sample Type: AMB1-Ambient water  
 Start Date: 10/27/2011 15:10                      End Date: 10/29/2011      Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	211	169	169	157	
	2	2	Control	211	237	237	231	
	3	3	Control	211	219	219	217	
	4	4	Control	211	192	192	186	
	5	1	6.250	211	217	217	211	
	6	2	6.250	211	190	190	184	
	7	3	6.250	211	221	221	213	
	8	4	6.250	211	208	208	203	
	9	1	12.500	211	181	181	180	
	10	2	12.500	211	213	213	208	
	11	3	12.500	211	218	218	212	
	12	4	12.500	211	174	174	164	
	13	1	25.000	211	221	221	209	
	14	2	25.000	211	184	184	179	
	15	3	25.000	211	190	190	184	
	16	4	25.000	211	217	217	213	
	17	1	50.000	211	173	173	154	
	18	2	50.000	211	210	210	178	
	19	3	50.000	211	209	209	172	
	20	4	50.000	211	182	182	138	
	21	1	100.000	211	182	182	23	
	22	2	100.000	211	182	182	10	
	23	3	100.000	211	184	184	17	
	24	4	100.000	211	178	178	2	

Comments:



## Bivalve Counts Worksheet

Test ID: C111027.01 SIYB - 1

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	157	12	169
	2	231	6	237
	3	217	2	219
	4	186	6	192
6.25	1	211	6	217
	2	184	6	190
	3	213	8	221
	4	203	5	208
12.5	1	180	1	181
	2	208	5	213
	3	212	6	218
	4	164	10	174
25	1	209	12	221
	2	179	5	184
	3	184	6	190
	4	213	4	217
50	1	154	19	173
	2	178	32	210
	3	172	37	209
	4	138	44	182
100	1	23	159	182
	2	10	172	182
	3	17	167	184
	4	2	176	178

JA



# BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

27 DJH

CLIENT:	Port of San Diego
PROJECT:	SIYB - 10s+ (Skeller Island Yacht Basin)
CLIENT SAMPLE ID:	SIYB - 1
WESTON TEST ID:	C11027.0142
SPECIES:	Mytilus galloprovincialis

DATE RECEIVED:	10/26/11
DATE TEST STARTED:	10/27/11
DATE TEST ENDED:	10/29/11
WESTON SOP NO.:	BIO042
STUDY DIRECTOR:	K. SKINSETH

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: 10/27/11 Sample ID: C11027.01 Dilutions (Tech): KC WQ Time: 1410 Technician: KC/SJH	Control	3	7.2	3	15.7	5	29.8	2	8.2
	Brine Control		7.2		15.2		30.1		8.2
	6.25		↓		↓		↓		↓
	12.5		7.3		15.2		30.3		8.2
	25		7.3		15.3		30.7		8.0
	50		7.3		15.3		31.4		8.1
	100		7.7		15.1		32.8 <sup>ⓑ</sup>		8.0
<b>24 Hours</b> Date: 10/28/11 WQ Time: 1045 Technician: KC	Control			7B	14.7				
	Brine Control								
	6.25				14.5				
	12.5				14.8				
	25				14.5				
	50				14.3				
	100				14.6				
<b>48 Hours</b> Date: 10/29/11 WQ Time: 1220 Technician: BG	Control	3	7.5	3	15.3	5	30.0	4	8.0
	Brine Control		—		—		—		—
	6.25		7.9		14.5		30.5		8.0
	12.5		7.8		14.7		30.4		8.0
	25		7.8		14.7		31.2		8.0
	50		7.9		14.5		31.9		8.0
	100		7.8		14.8		32.8 <sup>ⓑ</sup>		8.0

\*Water quality measurements taken in surrogate water quality chambers.

START TIME:	1510	Initials:	SH
END TIME:	1315	Initials:	BG
ORGANISM BATCH:	TSF 9788		
HOBO TEMP. NO.:	119279		
TEST LOCATION:	Rm 2		

DILUTION WATER BATCH:	S10 102411
TEST ACCEPTABILITY:	
<input checked="" type="checkbox"/>	≥70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS
<input checked="" type="checkbox"/>	≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS
<input checked="" type="checkbox"/>	MSD < 25%

ⓐ WQC 10/27/11 SH  
 ⓑ WQC 10/27/11 KC  
 ⓒ WQC 11/5/12 JH  
 ⓓ salinity above protocol limit of 30±2 ppt 1/3/12 KS



## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BI0042

Weston Test ID: <i>C111027.0142</i>	Client: <i>port of San Diego</i>	Client Sample ID: <i>SITB-1</i>
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SPAWNING DATA				
Initial Spawning Time: <i>1115</i>	Final Spawning Time: <i>1310</i>	Fertilization Time: <i>1312</i>	No. of Females: <i>3</i>	No. of Males: <i>3</i>
Embryo Density (count/mL):	1. <i>116 / 86</i>	2. <i>95 / 102</i>	3. <i>89 / 117</i>	Average: <i>100.8</i>
Stocking Volume Calculation: <i>2700 / (100.8 x 50) = 0.5357 or 53.6 ml</i>				

ZERO TIME COUNTS					
1. <i>208</i>	2. <i>217</i>	3. <i>231</i>	4. <i>219</i>	5. <i>190</i>	6. <i>203</i>
Average Count: <i>211</i>			Technician: <i>YS</i>		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control	<i>157</i>	<i>12</i>	<i>231</i>	<i>6</i>	<i>217</i>	<i>2</i>	<i>186</i>	<i>6</i>			<i>10/31/11</i>	<i>YS</i>
Brine	<i>211</i>	<i>6</i>	<i>—</i>	<i>—</i>	<i>—</i>	<i>—</i>	<i>—</i>	<i>—</i>	<i>—</i>	<i>—</i>		
0.25	<i>211</i>	<i>6</i>	<i>184</i>	<i>6</i>	<i>213</i>	<i>8</i>	<i>203</i>	<i>5</i>			<i>11/16/11</i>	<i>B6</i>
12.5	<i>180</i>	<i>1</i>	<i>208</i>	<i>5</i>	<i>212</i>	<i>6</i>	<i>164</i>	<i>10</i>			<i>11/17/11</i>	<i>B6</i>
25	<i>209</i>	<i>12</i>	<i>179</i>	<i>5</i>	<i>184</i>	<i>6</i>	<i>213</i>	<i>4</i>			↓	↓
50	<i>154</i> <del><i>162</i></del>	<i>19</i> <del><i>11</i></del>	<i>178</i> <del><i>192</i></del>	<i>32</i> <del><i>13</i></del>	<i>172</i> <del><i>185</i></del>	<i>37</i> <del><i>24</i></del>	<i>138</i> <del><i>164</i></del>	<i>44</i> <del><i>19</i></del>			↓	↓
100	<i>23</i> <del><i>43</i></del>	<i>15</i> <del><i>13</i></del>	<i>10</i> <del><i>29</i></del>	<i>172</i> <del><i>158</i></del>	<i>17</i> <del><i>29</i></del>	<i>107</i> <del><i>150</i></del>	<i>2</i> <del><i>7</i></del>	<i>176</i> <del><i>171</i></del>			↓	↓

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	<i>12.5 / 2</i>	<i>50 / 3</i>	<i>100 / 1</i>	<i>1</i>
Total #	<i>211</i>	<i>210</i>	<i>183</i>	
# Normal	<i>207</i>	<i>174</i>	<i>19</i>	
Date / Initials	<i>11/29/11 / YS</i>	<i>11/18/11 / YS</i>	<i>11/18/11 / YS</i>	<i>1</i>
QA Check Acceptability: <input checked="" type="checkbox"/> <5% difference in means of QA & orig. counts				

① WC 11/16/11 B6

② 50 and 100 concentrations counted again after QA, 11/28/11 B6



Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-3

**Date Received:** 27 Oct 11  
**Date Test Started:** 27 Oct 11  
**Date Test Ended:** 29 Oct 11  
**Test ID No.:** C111027.0242

**Bivalve Larvae Chronic 48-Hour Bioassay**

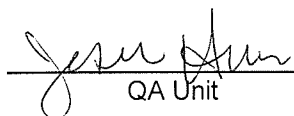
Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	96.6	92.8
6.25%	98.2	94.4
12.5%	97.4	94.7
25%	95.4	91.5
50%	96.1	93.1
100%	91.5	91.5

  
QA Unit

1/5/12  
Date

  
Approved

1/5/12  
Date

## Weston Solutions, Inc.

<b>Client:</b>	Port of San Diego	<b>Date Received:</b>	27 Oct 11
<b>Project:</b>	Shelter Island Yacht Basin	<b>Date Test Started:</b>	27 Oct 11
<b>Sample Matrix:</b>	Liquid	<b>Date Test Ended:</b>	29 Oct 11
<b>Sample Name/ID:</b>	SIYB-3	<b>Test ID No.:</b>	C111027.0242

### Bivalve Larvae Chronic 48-Hour Bioassay

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

#### Chronic Toxicity - Development

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.55$ ). Dunnett's Multiple-Comparison Test provided a NOEC (No Observed Effect Concentration) of 50 percent and a LOEC (Lowest Observed Effect Concentration) of 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 2.

#### Chronic Toxicity - Survival

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.99$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUc), was 1.

#### Summary of Results

Species	Exposure	Development		Survival		Tested Substance
		NOEC	EC <sub>50</sub>	NOEC	LC <sub>50</sub>	
<i>Mytilus galloprovincialis</i>	48 hrs	50%	>100%	100%	>100%	SIYB-3

**Protocol Deviations:** The salinity of the 100 percent concentration was above the protocol limit of  $30 \pm 2$  ppt. In the associated Reference Toxicant test replicate 4 of the control, replicate 1 of the 2.5ppb concentration and replicate 4 of the 5ppb concentration were found to be outliers and were therefore excluded from statistical analysis.

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-3

**Date Received:** 27 Oct 11  
**Date Test Started:** 27 Oct 11  
**Date Test Ended:** 29 Oct 11  
**Test ID No.:** C111027.0242

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042  
 EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.2	15.7	29.8	8.2
6.25	7.3	15.5	30.1	8.2
12.5	7.3	15.4	30.3	8.2
25	7.3	15.6	30.7	8.2
50	7.4	13.5	31.4	8.1
100	7.5	15.4	32.8	8.0
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.7		
6.25		14.5		
12.5		14.3		
25		14.5		
50		14.8		
100		14.9		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	15.3	30.0	8.0
6.25	7.8	14.8	30.4	8.0
12.5	7.8	14.7	30.7	8.0
25	7.9	14.9	31.1	8.0
50	7.8	14.9	31.7	8.0
100	7.8	15.0	32.8	8.0

\*Water quality measured on surrogate chambers.

**Weston Solutions, Inc.**

<b>Client:</b>	Port of San Diego	<b>Date Received:</b>	27 Oct 11
<b>Project:</b>	Shelter Island Yacht Basin	<b>Date Test Started:</b>	27 Oct 11
<b>Sample Matrix:</b>	Liquid	<b>Date Test Ended:</b>	29 Oct 11
<b>Sample Name/ID:</b>	SIYB-3	<b>Test ID No.:</b>	C111027.0242

**APPENDIX**  
Pertinent Test Data

TEST: Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

DILUTION WATER: Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	29.8 ppt
pH	8.2
Dissolved Oxygen	7.2 mg/L
Temperature	15.7°C

TEST ORGANISM: Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

TEST CHAMBER: Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

EXPERIMENTAL DESIGN: 1. Weston Solutions personnel collected a sample on October 26, 2011, at 0905 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0945 hours. The temperature of the sample upon receipt was 6.0°C.  
2. The temperature of the test substance was adjusted to 15 ± 1 °C.  
3. Approximately 211 test organisms were placed into each chamber.  
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.  
5. Test substance was not renewed.

MORTALITY CRITERIA: Absence of larvae, or completely developed shells without meat.

ACCEPTABILITY CRITERIA: ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

REFERENCE TOXICITY: Toxicant: CuSO<sub>4</sub>, Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.  
(control chart included) Species: *Mytilus galloprovincialis*, larvae  
48 hr EC<sub>25</sub>: 11.59 ppb survival, 4.88 ppb proportion normal  
48 hr EC<sub>50</sub>: 13.06 ppb survival, 5.28 ppb proportion normal  
Laboratory Mean (EC<sub>50</sub>): 19.61 ppb survival, 7.02 ppb proportion normal  
Test Date: 10/27/11 (within 95% confidence limits)

STUDY DIRECTOR: K. Skrivseth

INVESTIGATORS: K. Skrivseth, S. Hasan, K. Curry, B. Griffith

**Bivalve Larval Survival and Development Test-Proportion Normal**

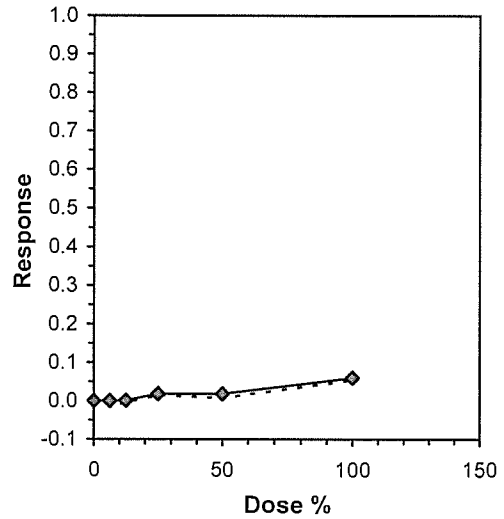
Start Date: 10/27/2011 15:10 Test ID: C111027.0242 Sample ID: SIYB-3  
 End Date: 10/29/2011 13:15 Lab ID: CCA-Weston, Carlsbad Sample Type: AMB1-Ambient water  
 Sample Date: 10/26/2011 09:05 Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.9290	0.9747	0.9909	0.9688
6.25	0.9545	0.9840	0.9904	1.0000
12.5	0.9665	0.9645	0.9835	0.9816
25	0.9514	0.9701	0.9543	0.9384
50	0.9851	0.9670	0.9192	0.9717
100	0.9231	0.9585	0.9299	0.8495

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.9658	1.0000	1.3951	1.3011	1.4751	5.152	4				0.9748	1.0000	
6.25	0.9822	1.0170	1.4518	1.3559	1.5345	5.114	4	-1.265	2.410	0.1080	0.9748	1.0000	
12.5	0.9740	1.0085	1.4111	1.3812	1.4421	2.241	4	-0.359	2.410	0.1080	0.9739	0.9991	
25	0.9535	0.9873	1.3552	1.3200	1.3972	2.352	4	0.889	2.410	0.1080	0.9571	0.9819	
50	0.9607	0.9947	1.3802	1.2826	1.4483	5.072	4	0.331	2.410	0.1080	0.9571	0.9819	
*100	0.9152	0.9476	1.2827	1.1723	1.3658	6.291	4	2.507	2.410	0.1080	0.9161	0.9398	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92309	0.884	-0.5256	-0.201						
Bartlett's Test indicates equal variances (p = 0.55)	4.02706	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	50	100	70.7107	2	0.04781	0.04932	0.01314	0.00402	0.02826	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	87.911			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Dose response relationships are considered reliable.

**Bivalve Larval Survival and Development Test-Proportion Alive**

Start Date: 10/27/2011 15:10 · Test ID: C111027.0242 · Sample ID: SIYB-3  
 End Date: 10/29/2011 13:15 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 10/26/2011 09:05 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis  
 Comments:

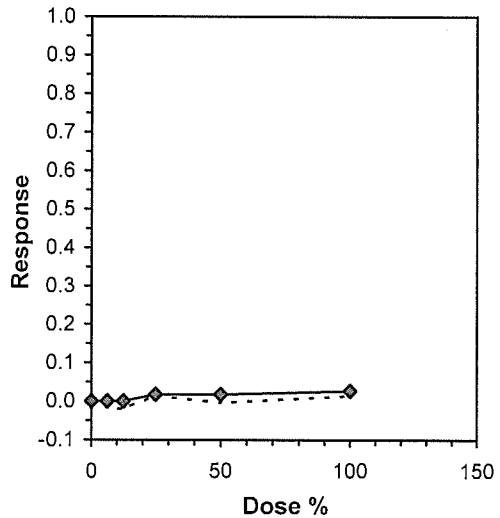
Conc-%	1	2	3	4
Control	0.8009	1.0000	1.0000	0.9100
6.25	1.0000	0.8863	0.9905	0.9005
12.5	0.9905	0.9336	0.8626	1.0000
25	0.8768	0.9526	0.8294	1.0000
50	0.9526	0.8626	0.9100	1.0000
100	0.8626	0.9147	1.0000	0.8815

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	1-Tailed			Isotonic	
			Mean	Min	Max	CV%	t-Stat		Critical	MSD	Mean	N-Mean	
Control	0.9277	1.0000	1.3618	1.1083	1.5364	15.541	4				0.9396	1.0000	
6.25	0.9443	1.0179	1.3716	1.2268	1.5364	11.395	4	-0.082	2.410	0.2875	0.9396	1.0000	
12.5	0.9467	1.0204	1.3777	1.1910	1.5364	11.378	4	-0.134	2.410	0.2875	0.9396	1.0000	
25	0.9147	0.9860	1.3112	1.1450	1.5364	13.192	4	0.424	2.410	0.2875	0.9230	0.9823	
50	0.9313	1.0038	1.3362	1.1910	1.5364	11.126	4	0.215	2.410	0.2875	0.9230	0.9823	
100	0.9147	0.9860	1.3053	1.1910	1.5364	12.096	4	0.474	2.410	0.2875	0.9147	0.9735	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92154	0.884	0.18471	-1.3733						
Bartlett's Test indicates equal variances (p = 0.99)	0.48006	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.18385	0.19212	0.00388	0.02846	0.98169	5, 18

**Linear Interpolation (200 Resamples)**

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Dose response relationships are considered reliable.

Test: BV-Bivalve Larval Survival and Development Test    Test ID: C111027.02 ~~12~~  
 Species: MG-Mytilus galloprovincialis    Protocol: EPAW 95-EPA West Coast  
 Sample ID: SIYB-3    Sample Type: AMB1-Ambient water  
 Start Date: 10/27/2011 15:10    End Date: 10/29/2011    Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	211	169	169	157	
	2	2	Control	211	237	237	231	
	3	3	Control	211	219	219	217	
	4	4	Control	211	192	192	186	
	5	1	6.250	211	220	220	210	
	6	2	6.250	211	187	187	184	
	7	3	6.250	211	209	209	207	
	8	4	6.250	211	190	190	190	
	9	1	12.500	211	209	209	202	
	10	2	12.500	211	197	197	190	
	11	3	12.500	211	182	182	179	
	12	4	12.500	211	217	217	213	
	13	1	25.000	211	185	185	176	
	14	2	25.000	211	201	201	195	
	15	3	25.000	211	175	175	167	
	16	4	25.000	211	211	211	198	✓
	17	1	50.000	211	201	201	198	
	18	2	50.000	211	182	182	176	
	19	3	50.000	211	192	192	182	
	20	4	50.000	211	212	212	206	
	21	1	100.000	211	182	182	168	
	22	2	100.000	211	193	193	185	
	23	3	100.000	211	214	214	199	
	24	4	100.000	211	186	186	158	

Comments:



## Bivalve Counts Worksheet

Test ID: C111027.02 SIYB - 3

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	157	12	169
	2	231	6	237
	3	217	2	219
	4	186	6	192
6.25	1	210	10	220
	2	184	3	187
	3	207	2	209
	4	190	0	190
12.5	1	202	7	209
	2	190	7	197
	3	179	3	182
	4	213	4	217
25	1	176	9	185
	2	195	6	201
	3	167	8	175
	4	198	13	211
50	1	198	3	201
	2	176	6	182
	3	182	10	192
	4	206	6	212
100	1	168	14	182
	2	185	8	193
	3	199	15	214
	4	158	28	186





# BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

CLIENT: Port of San Diego  
 PROJECT: SIYB (Skatter Island Yacht Basin)  
 CLIENT SAMPLE ID: SIYB-3  
 WESTON TEST ID: C111027.0242  
 SPECIES: mytilus galloprovincialis

27 <sup>(3)</sup> JH

DATE RECEIVED: 10/26/11  
 DATE TEST STARTED: 10/27/11  
 DATE TEST ENDED: 10/29/11  
 WESTON SOP NO.: BI0042  
 STUDY DIRECTOR: K. SKINSETH

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: _____ Sample ID: <u>C111027.02</u> Dilutions (Tech): <u>KC</u> WQ Time: <u>1416</u> Technician: <u>SH/KC</u>	Control	3	7.2	3	15.7	5	29.8	2	8.2
	Brine Control		—		—		—		—
	6.25		7.3		15.5		30.1		8.2
	12.5		7.3		15.4		30.3		8.2
	25		7.3		15.6		30.7		8.2
	50		7.4		13.5		31.4		8.1
	100		7.5		15.4		32.8 <sup>(2)</sup> vs		8.0
<b>24 Hours</b> Date: <u>10/28/11</u> WQ Time: <u>1050</u> Technician: <u>KC</u>	Control			9B	14.7				
	Brine Control				—				
	6.25				14.5				
	12.5				14.3				
	25				14.5				
	50				14.8				
	100				14.9				
<b>48 Hours</b> Date: <u>10/29/11</u> WQ Time: <u>1215</u> Technician: <u>BG</u>	Control	3	7.5	3	15.3	5	30.0 <sup>(2)</sup> vs 30.4	4	8.0
	Brine Control		—		—		—		—
	6.25		7.8		14.8		30.4		8.0
	12.5		7.8		14.7		30.7		8.0
	25		7.9		14.9		31.1		8.0
	50		7.8		14.9		31.7		8.0
	100		7.8		15.0		32.8 <sup>(2)</sup> vs		8.0

\*Water quality measurements taken in surrogate water quality chambers.  
 OWC 10/29/11 BG <sup>(2)</sup> salinity above protocol limit of 30 ± 2 ppt. 1/5/12 vs <sup>(3)</sup> WD 1/5/12 JH

START TIME: 1510 Initials: SH  
 END TIME: 1315 Initials: BG  
 ORGANISM BATCH: TSF 9788  
 HOBO TEMP. NO.: 119279  
 TEST LOCATION: Rm 2

DILUTION WATER BATCH: S10 1024/11  
 TEST ACCEPTABILITY:  
 ≥ 70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS  
 ≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS  
 MSD < 25%



## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

Weston Test ID: <b>C111027.0742</b>	Client: <b>port of San Diego</b>	Client Sample ID: <b>SIYB-3</b>
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SPAWNING DATA				
Initial Spawning Time: <b>1115</b>	Final Spawning Time: <b>1310</b>	Fertilization Time: <b>1312</b>	No. of Females: <b>3</b>	No. of Males: <b>3</b>
Embryo Density (count/mL):	1. <b>116 / 88</b>	2. <b>95 / 102</b>	3. <b>89 / 117</b>	Average: <b>100.8</b>
Stocking Volume Calculation: <b>2700 / (100 x 50) = 0.5357 or 53.6 ml</b>				

ZERO TIME COUNTS					
1. <b>208</b>	2. <b>217</b>	3. <b>231</b>	4. <b>219</b>	5. <b>190</b>	6. <b>203</b>
Average Count: <b>211</b>			Technician: <b>KS</b>		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control	157	12	231	6	217	2	186	6			11/31/11	KS
<del>Brine</del>												
0.25	210	10	184	3	207	2	190	0			11/17/11	BG
12.5	202	7	190	7	179	3	213	4				
25	176	9	195	6	167	8	198	13				
50	198	3	176	6	182	10	206	6				
100	168	14	185	8	199	15	158	28				

QA COUNT CHECKS				
	QA Check #1	QA Check #2	QA Check #3	QA Check #4
Concentration / Replicate	<b>12.5 / 2</b>	<b>50 / 3</b>	<b>100 / 1</b>	<b>1</b>
Total #	<b>197</b>	<b>202</b>	<b>184</b>	
# Normal	<b>192</b>	<b>191</b>	<b>165</b>	
Date / Initials	<b>11/28/11 / KS</b>	<b>11/28/11 / KS</b>	<b>11/28/11 / KS</b>	<b>1</b>
QA Check Acceptability: <input checked="" type="checkbox"/> <5% difference in means of QA & orig. counts				

Weston Solutions, Inc.

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-5

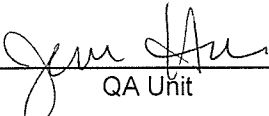
**Date Received:** 27 Oct 11  
**Date Test Started:** 27 Oct 11  
**Date Test Ended:** 29 Oct 11  
**Test ID No.:** C111027.0342

**Bivalve Larvae Chronic 48-Hour Bioassay**

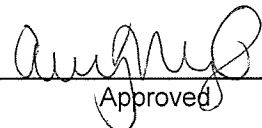
Weston Testing Protocol No. BIO042  
EPA/600/R-95/136  
Test Organism: *Mytilus galloprovincialis*

**Results**

Concentration	Average Proportion Normal (%)	Average Proportion Alive (%)
Control	96.6	92.8
6.25%	95.6	94.6
12.5%	96.7	99.9
25%	95.7	99.1
50%	96.9	94.4
100%	94.8	95.4

  
\_\_\_\_\_  
QA Unit

1/5/12  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Approved

1/5/12  
\_\_\_\_\_  
Date

**Weston Solutions, Inc.**

<b>Client:</b>	Port of San Diego	<b>Date Received:</b>	27 Oct 11
<b>Project:</b>	Shelter Island Yacht Basin	<b>Date Test Started:</b>	27 Oct 11
<b>Sample Matrix:</b>	Liquid	<b>Date Test Ended:</b>	29 Oct 11
<b>Sample Name/ID:</b>	SIYB-5	<b>Test ID No.:</b>	C111027.0342

**Bivalve Larvae Chronic 48-Hour Bioassay**

Weston Testing Protocol No. BIO042

EPA/600/R-95/136

Test Organism: *Mytilus galloprovincialis*

**Chronic Toxicity - Development**

Development data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.10$ ). Dunnett's Multiple-Comparison Test provided a NOEC (No Observed Effect Concentration) of 100 percent and a LOEC (Lowest Observed Effect Concentration) of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in normal development. The  $EC_{25}$  and  $EC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUC), was 1.

**Chronic Toxicity - Survival**

Survival data met the assumptions of normality (Shapiro-Wilk's Test,  $p > 0.01$ ). Variances were equal (Bartlett's Test,  $p = 0.04$ ). Dunnett's Multiple-Comparison Test provided a NOEC of 100 percent test substance and a LOEC of greater than 100 percent test substance.

The Linear Interpolation Method was used to calculate a point estimate for the concentrations causing 5, 10, 15, 20, 25, 40 and 50 percent reductions in survival. The  $LC_{25}$  and  $LC_{50}$  were both estimated to be greater than 100 percent test substance.

Toxicity, expressed as Toxic Units Chronic (TUC), was 1.

**Summary of Results**

Species	Exposure	Development		Survival		Tested Substance
		NOEC	EC <sub>50</sub>	NOEC	LC <sub>50</sub>	
<i>Mytilus galloprovincialis</i>	48 hrs	100%	>100%	100%	>100%	SIYB-5

**Protocol Deviations:** The salinity of the 100 percent concentration was above the protocol limit of  $30 \pm 2$  ppt. In the associated Reference Toxicant test replicate 4 of the control, replicate 1 of the 2.5ppb concentration and replicate 4 of the 5ppb concentration were found to be outliers and were therefore excluded from statistical analysis.

**Weston Solutions, Inc.**

**Client:** Port of San Diego  
**Project:** Shelter Island Yacht Basin  
**Sample Matrix:** Liquid  
**Sample Name/ID:** SIYB-5

**Date Received:** 27 Oct 11  
**Date Test Started:** 27 Oct 11  
**Date Test Ended:** 29 Oct 11  
**Test ID No.:** C111027.0342

**Bivalve Larvae Chronic 48-Hour Bioassay**  
 Weston Testing Protocol No. BIO042  
 EPA/600/R-95/136  
 Test Organism: *Mytilus galloprovincialis*.

**Test Solution Physical and Chemical Data**

Initial				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.2	15.7	29.8	8.2
6.25	7.2	15.9	30.1	8.2
12.5	7.3	15.7	30.3	8.2
25	7.4	15.9	30.7	8.2
50	7.5	15.8	31.4	8.1
100	7.7	15.5	32.8	8.0
24 Hours				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control		14.7		
6.25		14.5		
12.5		14.5		
25		14.8		
50		15.0		
100		14.9		
Final				
Concentration (%)	D.O. (mg/L)*	Temp. (°C)*	Salinity (ppt)*	pH*
Control	7.5	15.3	30.0	8.0
6.25	7.6	15.3	30.4	8.0
12.5	7.8	15.2	30.7	8.0
25	7.7	15.2	31.1	8.0
50	7.8	15.3	31.5	8.0
100	7.8	15.2	33.3	8.0

\*Water quality measured on surrogate chambers.

**Weston Solutions, Inc.**

<b>Client:</b>	Port of San Diego	<b>Date Received:</b>	27 Oct 11
<b>Project:</b>	Shelter Island Yacht Basin	<b>Date Test Started:</b>	27 Oct 11
<b>Sample Matrix:</b>	Liquid	<b>Date Test Ended:</b>	29 Oct 11
<b>Sample Name/ID:</b>	SIYB-5	<b>Test ID No.:</b>	C111027.0342

**APPENDIX**

Pertinent Test Data

TEST: Chronic 48-Hour Survival/Growth Bioassay with Bivalve Larvae (*Mytilus galloprovincialis*), EPA/600/R-95/136, Weston Testing Protocol No. BIO042

DILUTION WATER: Control water (zero time). Treated Seawater, Scripps Institution of Oceanography, La Jolla, CA.

Salinity	29.8 ppt
pH	8.2
Dissolved Oxygen	7.2 mg/L
Temperature	15.7°C

TEST ORGANISM: Mussel larvae, *Mytilus galloprovincialis*. Source: Taylor Shellfish, Shelton, WA.

TEST CHAMBER: Four replicates, concentrations of 6.25, 12.5, 25, 50, and 100 percent, plus a seawater control. Test substance volume per replicate = 10 mL.

EXPERIMENTAL DESIGN: 

1. Weston Solutions personnel collected a sample on October 26, 2011, at 0920 hours. The sample was received in one 10-liter plastic cubitainer at the Weston Solutions, Inc. laboratory on the following day at 0945 hours. The temperature of the sample upon receipt was 6.0°C.
2. The temperature of the test substance was adjusted to 15 ± 1 °C.
3. Approximately 211 test organisms were placed into each chamber.
4. Test chambers were held at 15 ± 1°C for 48 hours with a photoperiod of 16 hours light, 8 hours darkness.
5. Test substance was not renewed.

MORTALITY CRITERIA: Absence of larvae, or completely developed shells without meat.

ACCEPTABILITY CRITERIA: ≥50% survival of controls; ≥90% normal shell development in surviving controls; minimum significant difference < 25%.

REFERENCE TOXICITY: Toxicant: CuSO<sub>4</sub>, Lot No. 2008506, received 07/13/11, opened 07/28/11, expires 08/31/12.

(control chart included) Species: *Mytilus galloprovincialis*, larvae

48 hr EC <sub>25</sub> :	11.59 ppb survival, 4.88 ppb proportion normal
48 hr EC <sub>50</sub> :	13.06 ppb survival, 5.28 ppb proportion normal
Laboratory Mean (EC <sub>50</sub> ):	19.61 ppb survival, 7.02 ppb proportion normal
Test Date:	10/27/11 (within 95% confidence limits)

STUDY DIRECTOR: K. Skrivseth

INVESTIGATORS: K. Skrivseth, S. Hasan, K. Curry, B. Griffith

**Bivalve Larval Survival and Development Test-Proportion Normal**

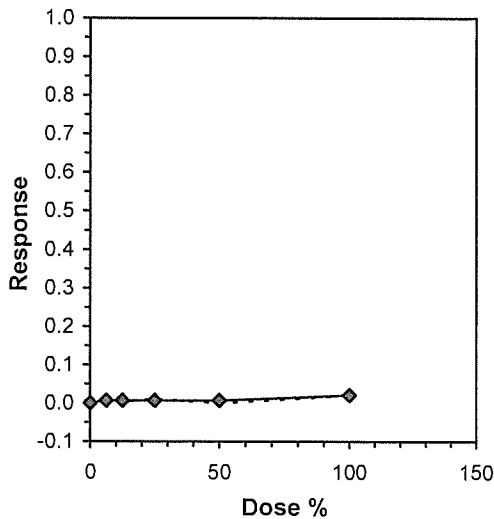
Start Date: 10/27/2011 15:10 · Test ID: C111027.0342 · Sample ID: SIYB-5  
 End Date: 10/29/2011 13:15 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water  
 Sample Date: 10/26/2011 09:20 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis  
 Comments:

Conc-%	1	2	3	4
Control	0.9290	0.9747	0.9909	0.9688
6.25	0.9901	0.9417	0.9326	0.9583
12.5	0.9696	0.9714	0.9670	0.9583
25	0.9493	0.9463	0.9522	0.9811
50	0.9671	0.9895	0.9521	0.9662
100	0.9515	0.9437	0.9412	0.9565

Conc-%	Transform: Arcsin Square Root							1-Tailed			Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	0.9658	1.0000	1.3951	1.3011	1.4751	5.152	4				0.9682	1.0000
6.25	0.9557	0.9895	1.3679	1.3083	1.4711	5.322	4	0.757	2.410	0.0866	0.9620	0.9937
12.5	0.9666	1.0008	1.3874	1.3652	1.4010	1.132	4	0.213	2.410	0.0866	0.9620	0.9937
25	0.9572	0.9911	1.3660	1.3370	1.4330	3.294	4	0.809	2.410	0.0866	0.9620	0.9937
50	0.9687	1.0030	1.3982	1.3502	1.4683	3.567	4	-0.088	2.410	0.0866	0.9620	0.9937
100	0.9482	0.9818	1.3416	1.3258	1.3607	1.197	4	1.489	2.410	0.0866	0.9480	0.9791

Auxiliary Tests					Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.94303	0.884	0.51867	0.70947						
Bartlett's Test indicates equal variances (p = 0.10)					9.33479	15.0863								
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test					100	>100		1	0.03667	0.03783	0.00187	0.00258	0.61376	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Dose response relationships are considered reliable.

**Bivalve Larval Survival and Development Test-Proportion Alive**

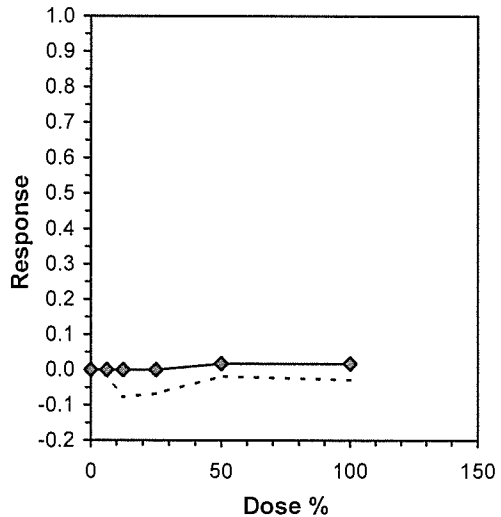
Start Date: 10/27/2011 15:10 · Test ID: C111027.0342 - Sample ID: SIYB-5 -  
 End Date: 10/29/2011 13:15 · Lab ID: CCA-Weston, Carlsbad · Sample Type: AMB1-Ambient water -  
 Sample Date: 10/26/2011 09:20 · Protocol: EPAW 95-EPA West Coast · Test Species: MG-Mytilus galloprovincialis ·  
 Comments:

Conc-%	1	2	3	4
Control	0.8009	1.0000	1.0000	0.9100
6.25	0.9573	1.0000	0.9147	0.9100
12.5	1.0000	0.9953	1.0000	1.0000
25	1.0000	0.9716	0.9905	1.0000
50	1.0000	0.9052	0.8910	0.9810
100	0.9763	1.0000	0.9668	0.8720

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
Control	0.9277	1.0000	1.3618	1.1083	1.5364	15.541	4				0.9656	1.0000	
6.25	0.9455	1.0192	1.3599	1.2660	1.5364	9.231	4	0.020	2.410	0.2250	0.9656	1.0000	
12.5	0.9988	1.0766	1.5278	1.5019	1.5364	1.128	4	-1.778	2.410	0.2250	0.9656	1.0000	
25	0.9905	1.0677	1.4868	1.4014	1.5364	4.324	4	-1.340	2.410	0.2250	0.9656	1.0000	
50	0.9443	1.0179	1.3653	1.2343	1.5364	10.572	4	-0.038	2.410	0.2250	0.9491	0.9828	
100	0.9538	1.0281	1.3863	1.2050	1.5364	9.882	4	-0.263	2.410	0.2250	0.9491	0.9828	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95035	0.884	-0.1072	-0.3612						
Bartlett's Test indicates equal variances (p = 0.04)	11.728	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.13377	0.13979	0.02163	0.01743	0.33117	5, 18

Point	%	SD	Linear Interpolation (200 Resamples)	
			95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Dose response relationships are considered reliable. \*



Test: BV-Bivalve Larval Survival and Development Test    Test ID: C111027.034z  
 Species: MG-Mytilus galloprovincialis    Protocol: EPAW 95-EPA West Coast  
 Sample ID: SIYB-5    Sample Type: AMB1-Ambient water  
 Start Date: 10/27/2011 15:10    End Date: 10/29/2011    Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	211	169	169	157	
	2	2	Control	211	237	237	231	
	3	3	Control	211	219	219	217	
	4	4	Control	211	192	192	186	
	5	1	6.250	211	202	202	200	
	6	2	6.250	211	223	223	210	
	7	3	6.250	211	193	193	180	
	8	4	6.250	211	192	192	184	
	9	1	12.500	211	230	230	223	
	10	2	12.500	211	210	210	204	
	11	3	12.500	211	212	212	205	
	12	4	12.500	211	216	216	207	
	13	1	25.000	211	217	217	206	
	14	2	25.000	211	205	205	194	
	15	3	25.000	211	209	209	199	
	16	4	25.000	211	212	212	208	
	17	1	50.000	211	213	213	206	
	18	2	50.000	211	191	191	189	
	19	3	50.000	211	188	188	179	
	20	4	50.000	211	207	207	200	
	21	1	100.000	211	206	206	196	
	22	2	100.000	211	213	213	201	
	23	3	100.000	211	204	204	192	
	24	4	100.000	211	184	184	176	

Comments:



## Bivalve Counts Worksheet

Test ID: C111027.03 SIYB - 5

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	157	12	169
	2	231	6	237
	3	217	2	219
	4	186	6	192
6.25	1	200	2	202
	2	210	13	223
	3	180	13	193
	4	184	8	192
12.5	1	223	7	230
	2	204	6	210
	3	205	7	212
	4	207	9	216
25	1	206	11	217
	2	194	11	205
	3	199	10	209
	4	208	4	212
50	1	206	7	213
	2	189	2	191
	3	179	9	188
	4	200	7	207
100	1	196	10	206
	2	201	12	213
	3	192	12	204
	4	176	8	184



# BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

27 @ JH

CLIENT:	Port of San Diego
PROJECT:	SIYB (Shelter Island Yacht Basin)
CLIENT SAMPLE ID:	SIYB-5
WESTON TEST ID:	C11027-0342
SPECIES:	mytilus galloprovincialis

DATE RECEIVED:	10/26/11
DATE TEST STARTED:	10/27/11
DATE TEST ENDED:	10/29/11
WESTON SOP NO.:	BIO042
STUDY DIRECTOR:	

	Concentration	meter #	DO* (mg/l)	meter #	Temp* (°C)	meter #	Salinity* (ppt)	meter #	pH*
<b>Day 0 (0 Hours)</b> Date: 10/27/11 Sample ID: C11027-03 Dilutions (Tech): KC WQ Time: 1425 Technician: SH/KC	Control	3	7.2	3	15.7	5	29.8	2	8.2
	Brine Control		-		-		-		-
	6.25		7.2		15.9		30.1		8.2
	12.5		7.3		15.7		30.3		8.2
	25		7.4		15.9		30.7		8.2
	50		7.5		15.8		31.4		8.1
	100		7.7		15.5		32.8 <sup>0.45</sup>		8.0
<b>24 Hours</b> Date: 10/28/11 WQ Time: 1040 Technician: KC	Control			78	14.7				
	Brine Control								
	6.25				14.5				
	12.5				14.5				
	25				14.8				
	50				15.0				
	100				14.9				
<b>48 Hours</b> Date: 10/29/11 WQ Time: 1210 Technician: Bk	Control	3	7.5	3	15.3	5	30.0	4	8.0
	Brine Control		-		-		-		-
	6.25		7.6		15.3		30.4		8.0
	12.5		7.8		15.2		30.7		8.0
	25		7.7		15.2		31.1		8.0
	50		7.8		15.3		31.5		8.0
	100		7.8		15.2		33.3 <sup>0.45</sup>		8.0

\*Water quality measurements taken in surrogate water quality chambers.

① Salinity above protocol limit of 30±1 ppt. 1/3/12 Ks      ② WD 1/9/12 JH

START TIME:	1510	Initials:	SH
END TIME:	1315	Initials:	Bk
ORGANISM BATCH:	TSF 9788		
HOBO TEMP. NO.:	119279		
TEST LOCATION:	Rm 2		

DILUTION WATER BATCH:	S10 1024/11
TEST ACCEPTABILITY:	
<input checked="" type="checkbox"/>	≥70% SURVIVAL IN CONTROL (oysters) or 50% SURVIVAL FOR MUSSELS
<input checked="" type="checkbox"/>	≥ 90% NORMAL SHELL DEVELOPMENT IN SURVIVING CONTROLS
<input checked="" type="checkbox"/>	MSD < 25%



## BIVALVE 48-HOUR CHRONIC TOXICITY TEST

BIO042

Weston Test ID: <b>C111027-0342</b>	Client: <b>port of San Diego</b>	Client Sample ID: <b>SIYB-5</b>
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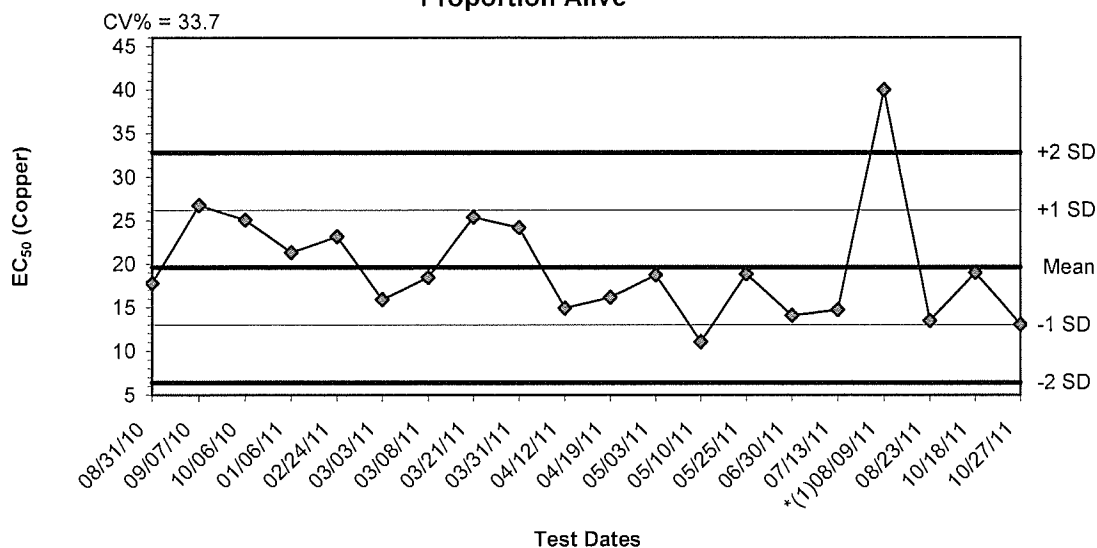
SPAWNING DATA				
Initial Spawning Time: <b>1115</b>	Final Spawning Time: <b>1310</b>	Fertilization Time: <b>1312</b>	No. of Females: <b>3</b>	No. of Males: <b>3</b>
Embryo Density (count/mL):	1. <b>116 / 86</b>	2. <b>95 / 102</b>	3. <b>89 / 117</b>	Average: <b>100.8</b>
Stocking Volume Calculation:		<b><math>2700 / (1008 \times 50) = 0.5357</math> or <b>53.6 ml</b></b>		

ZERO TIME COUNTS					
1. <b>208</b>	2. <b>217</b>	3. <b>231</b>	4. <b>219</b>	5. <b>190</b>	6. <b>203</b>
Average Count: <b>211</b>			Technician: <b>YS</b>		

LARVAL COUNT DATA												
Conc.	Rep 1		Rep 2		Rep 3		Rep 4		Rep 5		Date	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal		
Control	157	12	231	6	217	2	186	6			10/31/11	YS
Brine												
6.25	200	2	210	13	180	13	184	8			11/17/11	BGT
12.5	223	7	204	6	205	7	207	9			11/23/11	BGT
25	206	11	194	11	199	10	208	4				
50	206	7	189	2	179	9	200	7				
100	196	10	201	12	192	12	176	8				

QA COUNT CHECKS								
	QA Check #1		QA Check #2		QA Check #3		QA Check #4	
Concentration / Replicate	6.25	1	25	1	100	1		1
Total #	205		204		201			
# Normal	203		201		195			
Date / Initials	11/29/11	1	YS	11/28/11	1	YS	11/28/11	1
QA Check Acceptability: <input checked="" type="checkbox"/> <5% difference in means of QA & orig. counts								

**Mytilus galloprovincialis Reference Toxicant Control Chart:  
Proportion Alive**



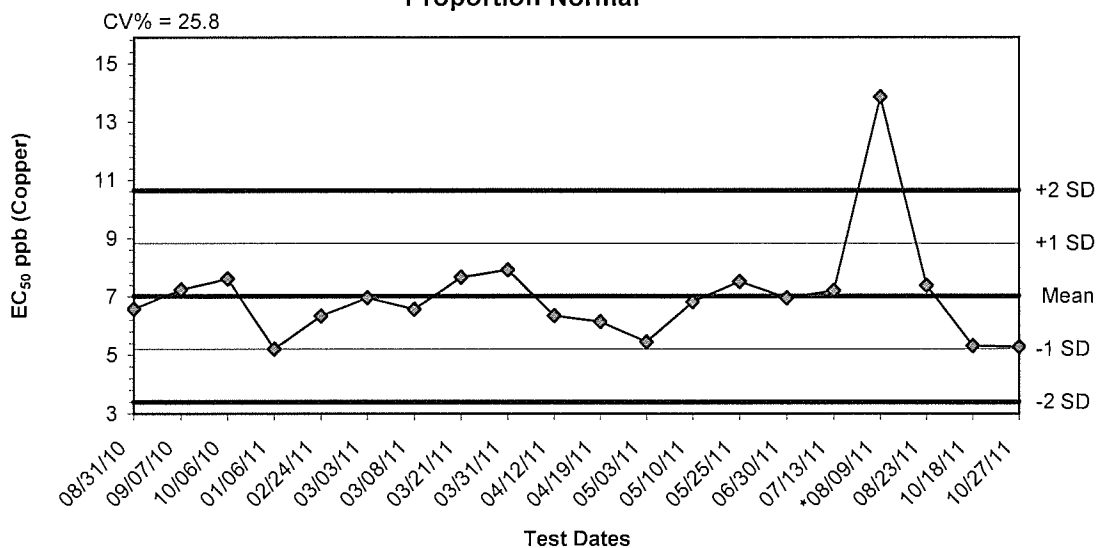
Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
08/31/10	17.8030	19.6051	13.0051	6.4051	26.2051	32.8051
09/07/10	26.7381	19.6051	13.0051	6.4051	26.2051	32.8051
10/06/10	25.0730	19.6051	13.0051	6.4051	26.2051	32.8051
01/06/11	21.3210	19.6051	13.0051	6.4051	26.2051	32.8051
02/24/11	23.1600	19.6051	13.0051	6.4051	26.2051	32.8051
03/03/11	15.9270	19.6051	13.0051	6.4051	26.2051	32.8051
03/08/11	18.4500	19.6051	13.0051	6.4051	26.2051	32.8051
03/21/11	25.3810	19.6051	13.0051	6.4051	26.2051	32.8051
03/31/11	24.1720	19.6051	13.0051	6.4051	26.2051	32.8051
04/12/11	14.9140	19.6051	13.0051	6.4051	26.2051	32.8051
04/19/11	16.1650	19.6051	13.0051	6.4051	26.2051	32.8051
05/03/11	18.7380	19.6051	13.0051	6.4051	26.2051	32.8051
05/10/11	11.0648	19.6051	13.0051	6.4051	26.2051	32.8051
05/25/11	18.8430	19.6051	13.0051	6.4051	26.2051	32.8051
06/30/11	14.0890	19.6051	13.0051	6.4051	26.2051	32.8051
07/13/11	14.7460	19.6051	13.0051	6.4051	26.2051	32.8051
* <sup>(1)</sup> 08/09/11	40.0000	19.6051	13.0051	6.4051	26.2051	32.8051
08/23/11	13.4710	19.6051	13.0051	6.4051	26.2051	32.8051
10/18/11	18.9860	19.6051	13.0051	6.4051	26.2051	32.8051
10/27/11	13.0600	19.6051	13.0051	6.4051	26.2051	32.8051

\*Value out of 95% CI range at time of testing.

<sup>(1)</sup>NOEC used since IC50 gave >40 as a result

Updated 12/19/11 BG

**Mytilus galloprovincialis Reference Toxicant Control Chart:  
Proportion Normal**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
08/31/10	6.5794	7.0206	5.2059	3.3913	8.8352	10.6499
09/07/10	7.2430	7.0206	5.2059	3.3913	8.8352	10.6499
10/06/10	7.6168	7.0206	5.2059	3.3913	8.8352	10.6499
01/06/11	5.2082	7.0206	5.2059	3.3913	8.8352	10.6499
02/24/11	6.3415	7.0206	5.2059	3.3913	8.8352	10.6499
03/03/11	6.9707	7.0206	5.2059	3.3913	8.8352	10.6499
03/08/11	6.5694	7.0206	5.2059	3.3913	8.8352	10.6499
03/21/11	7.6651	7.0206	5.2059	3.3913	8.8352	10.6499
03/31/11	7.9275	7.0206	5.2059	3.3913	8.8352	10.6499
04/12/11	6.3555	7.0206	5.2059	3.3913	8.8352	10.6499
04/19/11	6.1428	7.0206	5.2059	3.3913	8.8352	10.6499
05/03/11	5.4518	7.0206	5.2059	3.3913	8.8352	10.6499
05/10/11	6.8235	7.0206	5.2059	3.3913	8.8352	10.6499
05/25/11	7.5181	7.0206	5.2059	3.3913	8.8352	10.6499
06/30/11	6.9573	7.0206	5.2059	3.3913	8.8352	10.6499
07/13/11	7.2116	7.0206	5.2059	3.3913	8.8352	10.6499
*08/09/11	13.8550	7.0206	5.2059	3.3913	8.8352	10.6499
08/23/11	7.3790	7.0206	5.2059	3.3913	8.8352	10.6499
10/18/11	5.3130	7.0206	5.2059	3.3913	8.8352	10.6499
10/27/11	5.2822	7.0206	5.2059	3.3913	8.8352	10.6499

\*Value out of 95% CI range at time of testing.  
Updated 12/19/11 BG

**Bivalve Larval Survival and Development Test-Proportion Normal**

Start Date: 10/27/2011 15:27 Test ID: C110713.27 Sample ID: REF-Ref Toxicant  
 End Date: 10/29/2011 13:30 Lab ID: CCA-Weston, Carlsbad Sample Type: CUSO-Copper sulfate  
 Sample Date: Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments: Rep 4 of Control, rep 1 of 2.5ppb, rep 4 of 5ppb were found to be outliers using Dixon's Outlier Test and were dropped from stats.

Conc-ppb	1	2	3	4
Control	0.9695	0.9545	0.9536	
2.5	0.9283	0.8785	0.9429	
5	0.6878	0.6528	0.5819	
10	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000
40	0.0000	0.0000	0.0000	0.0000

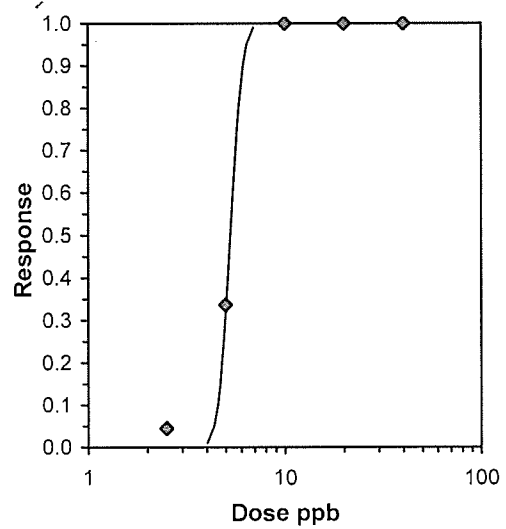
Conc-ppb	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Number Resp	Total Number
			Mean	Min	Max	CV%							
Control	0.9592	1.0000	1.3683	1.3537	1.3954	1.713	3				24	589	
2.5	0.9165	0.9555	1.2813	1.2148	1.3294	4.644	3	2.171	2.340	0.0938	55	661	
*5	0.6409	0.6681	0.9288	0.8677	0.9780	6.041	3	10.961	2.340	0.0938	223	614	
10	0.0000	0.0000	0.0375	0.0349	0.0420	8.663	4				723	723	
20	0.0000	0.0000	0.3237	0.2255	0.5236	42.060	4				13	13	
40	0.0000	0.0000	0.4019	0.3614	0.5236	20.182	4				7	7	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.90905	0.764	-0.563	-0.8498
Bartlett's Test indicates equal variances (p = 0.51)	1.35809	9.21034		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	2.5	5	3.53553		0.04482	0.04671	0.16252	0.00241	7.7E-05	2, 6

Parameter	Value	SE	95% Fiducial Limits		Maximum Likelihood-Probit						
			Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter		
Slope	19.5904	84.4453	-145.92	185.103	0.04075	4.46904	7.81473	0.22	0.72281	0.05105	50
Intercept	-9.1602	59.0249	-124.85	106.529							
TSCR	0.0632	0.00688	0.04971	0.07669							

Point	Probits	ppb	95% Fiducial Limits
EC01	2.674	4.01848	
EC05	3.355	4.3536	
EC10	3.718	4.54353	
EC15	3.964	4.67634	
EC20	4.158	4.78465	
EC25	4.326	4.87957	
EC40	4.747	5.12718	
EC50	5.000	5.28215	
EC60	5.253	5.44181	
EC75	5.674	5.71795	
EC80	5.842	5.83139	
EC85	6.036	5.96645	
EC90	6.282	6.14085	
EC95	6.645	6.40875	
EC99	7.326	6.94321	



**Bivalve Larval Survival and Development Test-Proportion Alive**

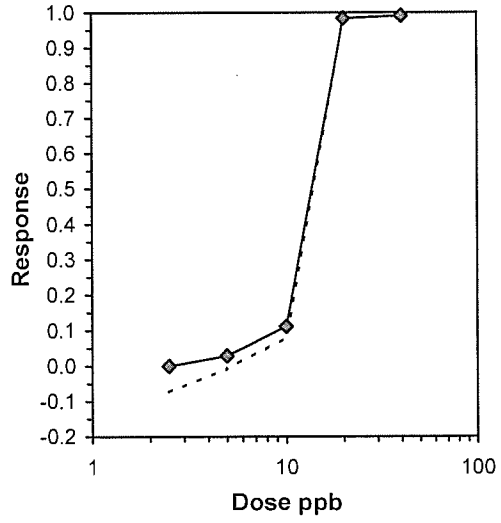
Start Date: 10/27/2011 15:27 Test ID: C110713.27 Sample ID: REF-Ref Toxicant  
 End Date: 10/29/2011 13:30 Lab ID: CCA-Weston, Carlsbad Sample Type: CUSO-Copper sulfate  
 Sample Date: Protocol: EPAW 95-EPA West Coast Test Species: MG-Mytilus galloprovincialis  
 Comments: Rep 4 of Control, rep 1 of 2.5ppb, rep 4 of 5ppb were found to be outliers using Dixon's Outlier Test and were

Conc-ppb	1	2	3	4	
Control	0.9336	0.9384	0.9194		dropped from stats.
2.5	1.0000	1.0000	0.9953		
5	0.8957	0.9147	1.0000		
10	0.9716	0.9526	0.8294	0.6730	
20	0.0190	0.0142	0.0237	0.0047	
40	0.0047	0.0095	0.0095	0.0095	

Conc-ppb	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed Critical	MSD	Number Resp	Total Number
			Mean	Min	Max	CV%							
Control	0.9305	1.0000	1.3044	1.2830	1.3200	1.469	3				44	633	
2.5	0.9984	1.0730	1.5249	1.5019	1.5364	1.305	3	-2.461	2.602	0.2332	1	633	
5	0.9368	1.0068	1.3509	1.2420	1.5364	11.948	3	-0.519	2.602	0.2332	40	633	
10	0.8566	0.9206	1.2149	0.9620	1.4014	16.613	4	1.068	2.602	0.2181	121	844	
*20	0.0154	0.0166	0.1203	0.0689	0.1546	30.863	4	14.130	2.602	0.2181	831	844	
*40	0.0083	0.0089	0.0904	0.0689	0.0975	15.834	4	14.487	2.602	0.2181	837	844	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.88072	0.873	-0.1916	2.3193						
Bartlett's Test indicates unequal variances (p = 2.69E-04)	23.518	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test	10	20	14.1421		0.14763	0.15862	1.54044	0.01204	9.5E-12	5, 15

Trimmed Spearman-Kärber			
Trim Level	EC50	95% CL	
0.0%			
5.0%	13.398	13.162	13.638
10.0%	13.605	13.258	13.961
20.0%	13.614	13.478	13.751
Auto-0.9%	13.060	12.816	13.309







Test: BV-Bivalve Larval Survival and Development Test    Test ID: C110713.27  
 Species: MG-Mytilus galloprovincialis    Protocol: EPAW 95-EPA West Coast  
 Sample ID: REF-Ref Toxicant    Sample Type: CUSO-Copper sulfate  
 Start Date: 10/27/2011 15:27    End Date: 10/29/2011    Lab ID: CCA-Weston, Carlsbad

Pos	ID	Rep	Group	Initial Density	Final Density	Total Counted	Number Normal	Notes
	1	1	Control	211	197	197	191	
	2	2	Control	211	198	198	189	
	3	3	Control	211	194	194	185	
	4	1	2.500	211	237	237	220	
	5	2	2.500	211	214	214	188	
	6	3	2.500	211	210	210	198	
	7	1	5.000	211	189	189	130	
	8	2	5.000	211	193	193	126	
	9	3	5.000	211	232	232	135	
	10	1	10.000	211	205	205	0	
	11	2	10.000	211	201	201	0	
	12	3	10.000	211	175	175	0	
	13	4	10.000	211	142	142	0	
	14	1	20.000	211	4	4	0	
	15	2	20.000	211	3	3	0	
	16	3	20.000	211	5	5	0	
	17	4	20.000	211	1	1	0	
	18	1	40.000	211	1	1	0	
	19	2	40.000	211	2	2	0	
	20	3	40.000	211	2	2	0	
	21	4	40.000	211	2	2	0	

Comments: Rep 4 of Control, rep 1 of 2.5ppb, rep 4 of 5ppb were found to be outliers using Dixon's Outlier Test and were dropped from stats ✓

## Dixon's Outlier Test

ordered data (increasing or decreasing values)	<b>Bivalve # Normal</b>	<--suspected outlier
	62	
	126	
	130	
	135	

$$C = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}} \text{ for } 3 \leq n \leq 7 \qquad C = 0.876712$$

**Table of critical values of Q**

N	Q <sub>crit</sub> (CL:90%)	Q <sub>crit</sub> (CL:95%)	Q <sub>crit</sub> (CL:99%)
3	0.941	0.970	0.994
4	0.765	0.829	0.926
5	0.642	0.710	0.821
6	0.561	0.625	0.740
7	0.507	0.568	0.680
8	0.465	0.526	0.634
9	0.437	0.493	0.598
10	0.412	0.466	0.568

If the C exceeds the critical value from Table for the specified significance level  $\alpha$ ,  $X_{(1)}$  is an outlier and should be further investigated. C should be compared to Qcrit (CL:95%) column.

## Dixon's Outlier Test

ordered data (increasing or decreasing values)	<b>Bivalve # Normal</b>	<--suspected outlier
	0	
	188	
	198	
	220	

$$C = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}} \text{ for } 3 \leq n \leq 7 \qquad C = 0.854545$$

**Table of critical values of Q**

N	Q <sub>crit</sub> (CL:90%)	Q <sub>crit</sub> (CL:95%)	Q <sub>crit</sub> (CL:99%)
3	0.941	0.970	1.004
4	0.766	0.829	1.026
5	0.642	0.710	1.021
6	0.560	0.625	1.040
7	0.507	0.568	1.060
8	0.466	0.526	1.034
9	0.437	0.493	1.098
10	0.412	0.466	1.068

If the C exceeds the critical value from Table for the specified significance level  $\alpha$ ,  $X_{(1)}$  is an outlier and should be further investigated. C should be compared to Q<sub>crit</sub> (CL:95%) column.

## Dixon's Outlier Test

ordered data (increasing or decreasing values)	Bivalve # Normal	<--suspected outlier
	6	
	185	
	189	
	191	

$$C = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}} \text{ for } 3 \leq n \leq 7$$

$$C = 0.967568$$

**Table of critical values of Q**

N	Q <sub>crit</sub> (CL:90%)	Q <sub>crit</sub> (CL:95%)	Q <sub>crit</sub> (CL:99%)
3	0.941	0.970	0.994
4	0.765	0.829	0.926
5	0.642	0.710	0.821
6	0.560	0.625	0.740
7	0.507	0.568	0.680
8	0.465	0.526	0.634
9	0.437	0.493	0.598
10	0.412	0.466	0.568

If the C exceeds the critical value from Table for the specified significance level  $\alpha$ ,  $X_{(1)}$  is an outlier and should be further investigated. C should be compared to Qcrit (CL:95%) column.

## Bivalve Counts Worksheet

Test ID: C110713.27 Copper RT

Concentration	Replicate	Number Normal	Number Abnormal	Total Counted
Control	1	191	6	197
	2	189	9	198
	3	185	9	194
	4	6	201	207
2.5	1	0	113	113
	2	220	17	237
	3	188	26	214
	4	198	12	210
5	1	130	59	189
	2	126	67	193
	3	135	97	232
	4	62	123	185
10	1	0	205	205
	2	0	201	201
	3	0	175	175
	4	0	142	142
20	1	0	4	4
	2	0	3	3
	3	0	5	5
	4	0	1	1
40	1	0	1	1
	2	0	2	2
	3	0	2	2
	4	0	2	2

→ dropped from stats since found to be an outlier



## 48 Hour Bivalve Development Reference Toxicant Test

Test ID: <u>2110713-27</u>		Replicates: 4	Study Director: <u>R. Corrigan</u>	Location: <u>Rm 2</u>
Dilution Water Batch: <u>510102411</u>		Organism Batch: <u>TSF 9788</u>	Associated Test(s): <u>SYB</u>	Organism: <u>Mytilus galloprovincialis</u>
Toxicant: Copper Sulfate (0.509gCu/LCuSO <sub>4</sub> )	Lot #: <u>2008506</u>	Date Prepared: <u>9/1/11</u>	Initials: <u>KS</u>	
Target Concentrations: <u>40 ppb</u>		Quantity of Stock: Target: <u>0.039 mL</u>	Quantity of Diluent: Target: <u>500 mL</u>	
<u>40 ppb</u>		Actual: <u>0.0392 mL</u>	Actual: <u>500.0 mL</u> <i>KS</i>	

Serial Dilute by 1/2 to obtain concentrations of 20, 10, 5, and 2.5 ppb.

**0 Hours**    Date: 10/27/11    WQ Time: 1430    Start Time: 1527    Initials: SH  
**STOCK**

	Control	2.5	5	10	20	40
D.O. (mg/L)	<u>7.1</u>	<u>7.2</u>	<u>7.2</u>	<u>7.2</u>	<u>7.2</u>	<u>7.3</u>
Temperature	<u>16.1</u>	<u>16.1</u>	<u>15.9</u>	<u>16.0</u>	<u>16.2</u>	<u>15.4</u>
Salinity	<u>29.8</u>	<u>30.0</u>	<u>30.0</u>	<u>30.0</u>	<u>30.0</u>	<u>30.0</u>
pH	<u>8.3</u>	<u>8.3</u>	<u>8.3</u>	<u>8.3</u>	<u>8.3</u>	<u>8.3</u>

**48 Hours**    Date: 10/29/11    WQ Time: 1225    End Time: 1330    Initials: BG  
**STOCK**

	Control	2.5	5	10	20	40
D.O. (mg/L)	<u>7.8</u>	<u>7.8</u>	<u>7.8</u>	<u>7.8</u>	<u>7.8</u>	<u>7.8</u>
Temperature	<u>15.3</u>	<u>16.3</u>	<u>15.0</u>	<u>15.2</u>	<u>15.4</u>	<u>15.2</u>
Salinity	<u>30.1</u>	<u>30.3</u>	<u>31.1</u>	<u>30.6</u>	<u>30.1</u>	<u>30.6</u>
pH	<u>8.1</u>	<u>8.1</u>	<u>8.0</u>	<u>8.0</u>	<u>8.1</u>	<u>8.0</u>

### COUNTS

Zero Times	<u>208</u>	<u>217</u>	<u>231</u>	<u>219</u>	<u>190</u>	<u>203</u>	Initials <u>KS</u>	
Conc.	Rep 1		Rep 2		Rep 3		Rep 4	Initials
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	
Control	<u>191</u>	<u>6</u>	<u>189</u>	<u>9</u>	<u>185</u>	<u>9</u>	<u>201</u> <del>179</del>	<u>BG</u>
2.5	<u>∅</u>	<u>113</u>	<u>220</u>	<u>17</u>	<u>188</u>	<u>26</u>	<u>198</u>	<u>12</u> <i>KS</i>
5	<u>130</u>	<u>59</u>	<u>126</u>	<u>67</u>	<u>135</u>	<u>97</u>	<u>62</u>	<u>123</u>
10	<u>∅</u>	<u>205</u>	<u>∅</u>	<u>201</u>	<u>∅</u>	<u>175</u>	<u>∅</u>	<u>142</u>
20	<u>∅</u>	<u>4</u>	<u>∅</u>	<u>3</u>	<u>∅</u>	<u>5</u>	<u>∅</u>	<u>1</u> <i>BG</i>
40	<u>∅</u>	<u>1</u>	<u>∅</u>	<u>2</u>	<u>∅</u>	<u>2</u>	<u>∅</u>	<u>2</u> <i>BG</i>

① Rep counted again after QA 11/28/11 *BG*

Pass

Fail

*Aug: 211*

*QA 11/28/11 + S  
Rep H 4/2011*

# Addendum 1

## Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load 2011 Monitoring and Progress Final Report

Prepared for:  
California Regional Water Quality Control Board,  
San Diego Region

Prepared by:  
Weston Solutions, Inc.

In Coordination with:  
Port of San Diego

March 2012





## **Addendum 1**

# **Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load 2011 Monitoring and Progress Final Report**

**Prepared for:  
California Regional Water Quality Control Board,  
San Diego Region**

**In Coordination with:  
  
Port of San Diego**

**Prepared by:  
  
Weston Solutions, Inc.  
2433 Impala Drive  
Carlsbad, California 92010**

March 2012

The purpose of this Addendum is to clarify water quality methods and results reported in the March 2012 Shelter Island Yacht Basin (SIYB) Dissolved Copper Total Maximum Daily Load (TMDL) Annual Monitoring and Progress Report that was prepared in compliance with Investigative Order No. R9-2011-0036. The addendum also provides corrections to the list of references. It should be noted that the information presented in this addendum does not affect the validity of the TMDL-required water quality data (i.e., dissolved copper) or vessel conversion data.

## 2.0 METHODS

The method detection and reporting limits for total organic carbon (TOC) and dissolved organic carbon (DOC) in Table 2-7 were revised to be consistent with the SunStar Laboratories, Inc. September 29, 2011 Analytical Report (included as Appendix 1).

Table 2-7. Laboratory Analytical Methods and Detection Limits

Water Quality Measurement	Method	Method Detection Limit	Reporting Limit
Total Copper	USEPA 1640	0.01 µg/L	0.02 µg/L
Dissolved Copper	USEPA 1640	0.01 µg/L	0.02 µg/L
Total Zinc	USEPA 1640	0.005 µg/L	0.01 µg/L
Dissolved Zinc	USEPA 1640	0.005 µg/L	0.01 µg/L
Total Organic Carbon	SM5310 B	0.062 mg/L	0.5 mg/L
Dissolved Organic Carbon	SM5310 B	0.062 mg/L	0.5 mg/L

## 3.0 RESULTS

Results section 3.3.1, entitled Surface Water Chemistry, was revised to include replicate water quality data for station SIYB-1 for dissolved and total copper and dissolved and total zinc for the August 2011 survey (Table 3-2) and dissolved copper for the October 2011 survey (Table 3-3). Replicate 2 water quality data for SIYB-1 were included in the final report, and were used to calculate averages and report ranges in dissolved copper and zinc values. The use of SIYB-1 replicate 1 data would slightly reduce the reported dissolved copper average concentration for the August 2011 survey to  $7.46 \pm 1.03$  µg/L (mean  $\pm$  standard error).

The revision of the TOC reporting limit from 0.2 mg/L to 0.5 mg/L (Table 2-7) required that the second sentence of the third paragraph of the results discussion in section 3.3.1.1 be modified to read, "TOC ranged from 0.65 to 0.81 mg/L." because TOC was not detected below the correct reporting limit.

TOC and DOC values for the August 2011 survey were originally misreported in the SunStar Laboratories, Inc. Analytical Report that was a component of the Physis Environmental Laboratories, Inc. September 19, 2011 Analytical Report (included in Appendix C of the 2011 SIYB TMDL Final Progress and Monitoring Report). The SunStar Laboratories, Inc. September 29, 2011 Analytical Report corrects the original transcription error and is consistent with the data

presented in the Final Report (revised laboratory reports and relevant communications are included as Appendix 1).

It is noteworthy that the DOC values reported by SunStar Laboratories for the October 2011 survey were greater than TOC values at the three SIYB stations that were assessed. While this finding is consistent with the Analytical Report, DOC levels are typically below TOC for a given station since DOC is a component of TOC. Thus, it is possible that DOC and TOC may have been misreported, as originally occurred in the August 2011 survey. It is important to note that DOC and TOC are not considered primary analytes for tracking improvements in water quality in compliance with the TMDL.

Table 3-2. Chemistry Results for SIYB Surface Waters, August 2011 Event.

Station	Dissolved Copper (µg/L)	Total Copper (µg/L)	Dissolved Zinc (µg/L)	Total Zinc (µg/L)	DOC (mg/L)	TOC (mg/L)	Salinity (ppt) <sup>1</sup>	Temp. (°C) <sup>1</sup>	pH <sup>1</sup>
SIYB-1-Rep 1	11.32	14.36	33.126	35.968	0.22	0.81	34.1	21.6	7.9
SIYB-1-Rep 2	11.48	13.8	33.566	33.51					
SIYB-2	7.22	10.53	22.743	25.455	0.23	0.78	34.3	21.2	8.0
SIYB-3	7.55	10.37	22.684	24.377	0.22	0.75	34.2	21.2	8.0
SIYB-4	7.81	10.7	23.842	25.028	0.21	0.74	34.2	21.1	8.0
SIYB-5	8.72	11.19	29.392	30.252	0.21	0.65	34.2	21.0	7.9
SIYB-6	7.48	9.51	23.896	24.895	0.22	0.66	34.1	20.8	7.9
SIYB-REF	2.14	3.05	7.458	8.37	0.23	0.65	34.3	20.4	7.9

<sup>1</sup> *In situ* measurements.

Table 3-3. Chemistry Results for SIYB Surface Waters, October 2011 Event.

Station	Dissolved Copper (µg/L)	DOC, SSL <sup>1</sup> (mg/L)	DOC, CEL <sup>2</sup> (mg/L)	TOC, SSL <sup>1</sup> (mg/L)	TOC, CEL <sup>2</sup> (mg/L)	Free Copper (pCu) <sup>3</sup>	Salinity (ppt) <sup>3</sup>	Temp. (°C) <sup>3</sup>	pH <sup>3</sup>
SIYB-1-Rep 1	8.08	0.55	1.2	0.41	ND	10.47	33.6	17.6	7.7
SIYB-1-Rep 2	7.05								
SIYB-2						10.71	33.7	17.4	7.7
SIYB-3	6.51	0.45	1.3	0.34	1	10.22	33.6	17.4	7.3
SIYB-4						10.37	33.7	17.1	7.7
SIYB-5	5.01	0.38	1.3	0.35	ND	10.09	33.7	17.3	7.7
SIYB-6						10.02	33.7	16.8	7.6
SIYB-REF						10.29	33.6	14.4	7.4

ND Non-detect  
<sup>1</sup> SSL – SunStar Laboratories  
<sup>2</sup> CEL – Calscience Environmental Laboratory  
<sup>3</sup> In Situ measurements

## 5.0 REFERENCES

The References section excluded the citation for Chadwick et al. 2008, which is provided below. The reference list incorrectly included citations for Neira et al. 2011 and Zirino and Seligman 2002.

Chadwick DB, Rivera-Duarte I, Wang PF, Santore RC, Ryan AC, Paquin PR, Hafner SD, Choi W. 2008. Demonstration of an integrated compliance model for predicting copper fate and effects in DoD harbors. Environmental Security Technology Certification Program (ESTCP) Project ER-0523. Technical Report 1973. SSC Pacific, San Diego, CA.

## Appendix 1

SunStar Laboratories, Inc.  
September 29, 2011 Analytical Report

The following excerpt from email correspondence between Dan Chavez of SunStar Laboratories and Misty Mercier of Physis Laboratories on September 29, 2011 documents that a re-analysis of the original water samples provided evidence of a data entry error for total organic carbon (TOC) and dissolved organic carbon (DOC).

*I had our chemist re-run these samples. It looks like there may have been a data entry error initially, due to the fact that the results for the TOCs are consistently higher than the results for the DOCs (like it should be). I've gone ahead and revised the report, and have attached it to this email.*

The revised analytical report is provided as follows.



25712 Commercentre Drive  
Lake Forest, California 92630  
949.297.5020 Phone  
949.297.5027 Fax

29 September 2011

Misty Mercier  
PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim, CA 92806  
RE: 1108003-001

Enclosed are the results of analyses for samples received by the laboratory on 08/23/11 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Daniel Chavez  
Project Manager



25712 Commercentre Drive  
Lake Forest, California 92630  
949.297.5020 Phone  
949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim CA, 92806

Project: 1108003-001  
Project Number: 1108003  
Project Manager: Misty Mercier

**Reported:**  
09/29/11 14:06

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SIYB-1	T111152-01	Water	08/22/11 16:35	08/23/11 16:00
SIYB-2	T111152-02	Water	08/22/11 16:25	08/23/11 16:00
SIYB-3	T111152-03	Water	08/22/11 16:15	08/23/11 16:00
SIYB-4	T111152-04	Water	08/22/11 16:10	08/23/11 16:00
SIYB-5	T111152-05	Water	08/22/11 16:00	08/23/11 16:00
SIYB-6	T111152-06	Water	08/22/11 15:40	08/23/11 16:00
SIYB-REF	T111152-07	Water	08/22/11 15:25	08/23/11 16:00

SunStar Laboratories, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





25712 Commercentre Drive  
 Lake Forest, California 92630  
 949.297.5020 Phone  
 949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 09/29/11 14:06
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**SIYB-1**  
**T111152-01(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.22</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.81</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	

SunStar Laboratories, Inc.

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PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 09/29/11 14:06
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**SIYB-2**  
**T111152-02(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.23</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.78</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	

SunStar Laboratories, Inc.

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PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 09/29/11 14:06
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**SIYB-3**  
**T111152-03(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.22</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.75</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	

SunStar Laboratories, Inc.

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PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 09/29/11 14:06
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**SIYB-4**  
**T111152-04(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.21</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.74</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	

SunStar Laboratories, Inc.

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PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 09/29/11 14:06
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**SIYB-5**  
**T111152-05(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.21</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.65</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	

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PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 09/29/11 14:06
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**SIYB-6**  
**T111152-06(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.22</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.66</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	

SunStar Laboratories, Inc.

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PHYSIS Environmental Laboratories, Inc. 1904 E. Wright Circle Anaheim CA, 92806	Project: 1108003-001 Project Number: 1108003 Project Manager: Misty Mercier	<b>Reported:</b> 09/29/11 14:06
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**SIYB-REF**  
**T111152-07(Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SunStar Laboratories, Inc.

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods**

<b>Dissolved Organic Carbon</b>	<b>0.23</b>	0.062	0.50	mg/l	1	1082412	08/24/11	08/25/11	SM 5310 B	J
<b>Total Organic Carbon</b>	<b>0.65</b>	0.062	0.50	"	"	1081914	08/25/11	08/26/11	"	

SunStar Laboratories, Inc.

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PHYSIS Environmental Laboratories, Inc.  
 1904 E. Wright Circle  
 Anaheim CA, 92806

Project: 1108003-001  
 Project Number: 1108003  
 Project Manager: Misty Mercier

**Reported:**  
 09/29/11 14:06

**Conventional Chemistry Parameters by APHA/EPA/ASTM Methods - Quality Control**  
**SunStar Laboratories, Inc.**

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	Limit	RPD	RPD Limit	Notes
<b>Batch 1081914 - General Preparation</b>											
<b>Blank (1081914-BLK1)</b>						Prepared: 08/19/11 Analyzed: 08/25/11					
Total Organic Carbon	ND	0.062	0.50	mg/l							
<b>Duplicate (1081914-DUP1)</b>						Source: T111159-10 Prepared: 08/19/11 Analyzed: 08/26/11					
Total Organic Carbon	7.72	0.062	0.50	mg/l		7.38			4.60	20	
<b>Batch 1082412 - General Preparation</b>											
<b>Blank (1082412-BLK1)</b>						Prepared: 08/24/11 Analyzed: 08/25/11					
Dissolved Organic Carbon	ND	0.062	0.50	mg/l							
<b>Duplicate (1082412-DUP1)</b>						Source: T111152-01 Prepared: 08/24/11 Analyzed: 08/25/11					
Dissolved Organic Carbon	0.246	0.062	0.50	mg/l		0.220			11.2	20	J

SunStar Laboratories, Inc.

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949.297.5020 Phone  
949.297.5027 Fax

PHYSIS Environmental Laboratories, Inc.  
1904 E. Wright Circle  
Anaheim CA, 92806

Project: 1108003-001  
Project Number: 1108003  
Project Manager: Misty Mercier

**Reported:**  
09/29/11 14:06

### Notes and Definitions

- J Detected but below the Standard Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

SunStar Laboratories, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

## CHAIN OF CUSTODY

SEND TO: SunStar

COMPANY NAME: **PHYSIS Environmental Laboratories, Inc.** E-MAIL: **sc@physislabs.com**

PROJECT MANAGER: **Misty Mercier** FAX: **714 602-5321**

COMPANY ADDRESS: **1904 E. Wright Circle** PHONE: **714 602-5320 X202** OFFICE: **714 335-5918**

ANALYST: **Anaheim, CA 92806** CELL: **714 335-5918**

TURNAROUND TIME:  NORMAL  RUSH BUSINESS DAYS

REPORT FORMAT:  PDF/EEDD  SWAMP EEDD  OTHER

SPECIAL INSTRUCTIONS: **please report down to MDL**

PROJECT NAME / NUMBER: **1108003-001** COC PAGE: **1** of **1**

PO #: **1108003** PHYSIS SOS #: **1108003**

TYPE OF ICE USED:  WET  BLUE  DRY

SHIPPED VIA:  FEDEX  UPS  USPS

Client  Physis  other

PHYSIS MATRIX CODES: **SW = seawater FW = freshwater RW = rainwater**  
**WW = wastewater DW = drinking water**  
**S = sediment T = tissue E = extract Q = other (specify)**

**T11152**

**3.6'**

lab use	SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE		physis matrix code	no. of bottles	Total Organic Carbon		Dissolved Organic Carbon	
			date	time						
	1	SIYB-1	8/22/11	16:35	SW	1	X	X		
	2	SIYB-2	8/22/11	16:25	SW	1	X	X		
	3	SIYB-3	8/22/11	16:15	SW	1	X	X		
	4	SIYB-4	8/22/11	16:10	SW	1	X	X		
	5	SIYB-5	8/22/11	16:00	SW	1	X	X		
	6	SIYB-6	8/22/11	15:40	SW	1	X	X		
	7	SIYB-REF	8/22/11	15:25	SW	1	X	X		
	8									
	9									
	10									

RELINQUISHED BY: **Kevin Leurs** SIGNATURE: *[Signature]* COMPANY: **PHYSIS** DATE & TIME: **8/23/11**

RECEIVED BY: **Dan Martenski** SIGNATURE: *[Signature]* COMPANY: **SunStar Labs** DATE & TIME: **8/23/11**

## SAMPLE RECEIVING REVIEW SHEET

BATCH # T11152

Client Name: PHYSIS

Project: 1108003-001

Received by: DAN

Date/Time Received: 8/23/11 1600

Delivered by:  Client  SunStar Courier  GSO  FedEx  Other

Total number of coolers received 0 Temp criteria = 6°C > 0°C (no frozen containers)

Temperature: cooler #1 3.8 °C +/- the CF (-0.2°C) = 3.6 °C corrected temperature

cooler #2 \_\_\_\_\_ °C +/- the CF (-0.2°C) = \_\_\_\_\_ °C corrected temperature

cooler #3 \_\_\_\_\_ °C +/- the CF (-0.2°C) = \_\_\_\_\_ °C corrected temperature

Samples outside temp. but received on ice, w/in 6 hours of final sampling.  Yes  No\*  N/A

Custody Seals Intact on Cooler/Sample  Yes  No\*  N/A

Sample Containers Intact  Yes  No\*

Sample labels match COC ID's  Yes  No\*

Total number of containers received match COC  Yes  No\*

Proper containers received for analyses requested on COC  Yes  No\*

Proper preservative indicated on COC/containers for analyses requested  Yes  No\*  N/A

Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times.  Yes  No\*

\* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date BC 8/23/11

Comments:

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