APPENDIX H

2022–2023 WINTER MONITORING RESULTS TECHNICAL MEMORANDUM

WSP USA Environment & Infrastructure Inc.
(formerly Wood Environment & Infrastructure Solutions, Inc.)
9177 Sky Park Court
San Diego, CA 92123

April 24, 2023

Ms. Karen Holman
Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

Subject: Results from the 2022 and 2023 Winter Monitoring Events for the SIYB Dissolved Copper TMDL

Introduction

This technical memorandum presents the results from the winter water quality monitoring events conducted in Shelter Island Yacht Basin (SIYB) in March 2022 and January 2023. These winter monitoring events were conducted to supplement the annual SIYB Dissolved Copper Total Maximum Daily Load (TMDL) compliance monitoring, which occurs in the summer. The purpose of the winter monitoring was to understand the seasonal variability of dissolved copper levels in SIYB and at the reference stations during a period of cooler water temperatures, and lower frequencies of hull cleaning and vessel usage relative to the summer months.

Sampling and Analysis Methods

The 2022 and 2023 SIYB TMDL winter monitoring events were conducted on March 22, 2022 and January 25, 2023, respectively[1]. During each monitoring event, field water quality readings and surface water samples (1-meter below the surface) were collected from six stations within SIYB (SIYB-1 at the head of the basin through SIYB-6 at the mouth of the basin) and two reference stations in the main channel of San Diego Bay (SIYB-REF-1 and SIYB-REF-2). In addition, quality control samples were collected, which included an independent replicate sample at Station SIYB-1 (SIYB-1 [Rep]), a field blank, and an equipment rinsate blank. Sampling was conducted in accordance with procedures described in the Monitoring Plan (Wood Environment & Infrastructure Solutions, Inc. [Wood], 2021a and 2022a) and Quality Assurance Project Plan (QAPP; Wood, 2021b and 2022b). Sampling locations and methods were also consistent with those employed during the annual summer TMDL compliance monitoring. Field data sheets from each event, which include field measurements and field notes, are provided in Appendix A.

After collection, each water sample was sent to Weck Laboratories to be analyzed for dissolved and total copper and zinc, dissolved organic carbon (DOC), total organic carbon (TOC), and total suspended solids (TSS). Samples were analyzed following certified United States Environmental Protection Agency (USEPA) methods or Standard Methods (SM) in accordance with the Monitoring Plan and QAPP. Analytical methods, method detection limits, and reporting limits for each analysis are provided in the analytical chemistry laboratory reports in Appendix B.

A subset of samples (SIYB-1 through SIYB-6 and SIYB-REF-1) were also sent to the WSP Environmental Toxicology Laboratory (formerly known as the Wood Aquatic Toxicology Laboratory) for toxicity testing, as follows:

[1] Monitoring dates were selected based on tides (i.e., sampling to bracket slack high tide) and weather (i.e., <0.1-inch of rain and minimal flow in the 72 hours prior to sampling) in accordance with the SIYB TMDL Monitoring Plan (Wood, 2021a and 2022a). In addition, the 2022 winter monitoring event was not conducted until the end of March to allow sufficient time for dissolved copper levels to return to baseline conditions following completion of the In-Water Hull Cleaning Pause Study.

1. For the 2022 winter monitoring event, toxicity tests consisted of (1) a 48-hour chronic bioassay test using mussel larvae (*Mytilus galloprovincialis*) and (2) a 96-hour acute bioassay test using Pacific topsmelt (*Atherinops affinis*).
2. For the 2023 winter monitoring event, the 48-hour chronic bioassay test was conducted using mussel larvae (*Mytilus galloprovincialis*), consistent with all prior monitoring events. However, due to the many challenges experienced using Pacific topsmelt for toxicity testing in previous monitoring years (e.g., limited organism supply and availability, poor organism health and sensitivity), the acute bioassay test for the 2023 winter monitoring event was performed using the inland silverside (*Menidia beryllina*).[2]

   As a follow-up to the Phase I toxicity identification evaluation (TIE) performed for Station SIYB-1 in August 2022, additional toxicant identification and confirmation (Phase II/III TIE) procedures, including a copper spiking study, were also conducted on the SIYB-1 sample collected during the 2023 winter monitoring event.

Toxicity tests were conducted in accordance with procedures described in USEPA 1995 and 2002. Test methods and specifications for each bioassay are included in the toxicity laboratory reports in Appendix C and the technical memorandum summarizing TIE efforts in Appendix D.

Monitoring Results – March 22, 2022

Chemistry

All chemistry results for the 2022 winter monitoring event are summarized in Table 1 and included in the analytical chemistry laboratory report in Appendix B-1. During the March 2022 event, dissolved copper concentrations in SIYB ranged from 2.6 µg/L at the outermost station (SIYB-6) to 11 µg/L at the innermost station (SIYB-1). Five of the six stations in SIYB had dissolved copper concentrations exceeding the USEPA National Recommended Water Quality Criterion Continuous Concentration (CCC) water quality objective (3.1 µg/L; Table 1). The 2022 winter basin-wide average dissolved copper concentration was 5.7 µg/L.

Chronic Toxicity

Results of the chronic mussel development tests conducted for the 2022 winter monitoring event are summarized in Table 2 and Appendix C-1. The greatest effect to mussel development was observed in the unfiltered and undiluted sample (i.e., 100% concentration) from Station SIYB-1, with a 12% decrease in the combined survival and normal mussel development endpoint relative to the laboratory control. While the effect was statistically significant using the USEPA 1995 traditional flow-chart statistical methods (i.e., Dunnett multiple comparison test), the effect was not significant using the Test of Significant Toxicity (TST) approach (USEPA, 2010). No statistically significant effects to mussel development were observed in any of the other unfiltered or 1.2-micrometer (µm) filtered samples (Table 2).

Acute Toxicity

Results of the acute topsmelt survival tests conducted for the 2022 winter monitoring event are summarized in Table 3 and Appendix C-1. There were no statistically significant effects to Pacific topsmelt survival observed in any samples tested, indicating that surface water samples collected in SIYB and at the reference station (SIYB-REF-1) were not acutely toxic to Pacific topsmelt.

[2] In previous monitoring years, there have been many challenges with using Pacific topsmelt for toxicity testing including limited test organism supply and availability, as well as poor organism health and sensitivity due to difficulties culturing these organisms in a laboratory setting. The inland silverside (*Menidia beryllina*) is a USEPA-approved alternate test species for Pacific topsmelt that is commonly used in environmental compliance testing nationwide (40 CFR Part 136).

Table 1. Chemistry Results for SIYB Surface Waters – March 22, 2022 Event

Station	Dissolved Copper (µg/L)	Total Copper (µg/L)	Dissolved Zinc (µg/L)	Total Zinc (µg/L)	DOC (mg/L)	TOC (mg/L)	TSS (mg/L)
SIYB-1	**11**	12	30	31	1.0	1.2	3 J
SIYB-2	**5.4**	6.1	15	17	0.91	1.0	7
SIYB-3	**5.7**	6.5	16	17	0.91	1.1	6
SIYB-4	**5.3**	6.0	16	17	1.0	1.1	6
SIYB-5	**4.3**	4.8	12	13	0.96	1.4	6
SIYB-6	2.6	3.0	8.2	8.7	0.92	1.1	4 J
SIYB-REF-1	2.2	2.5	6.9	7.6	0.91	0.95	10
SIYB-REF-2	2.5	2.8	7.7	8.4	0.95	0.97	9

Notes:
Values in **bold** are above the USEPA National Recommended Water Quality Criterion Continuous Concentration (CCC) for dissolved copper of 3.1 µg/L in marine waters. No values were above the CCC for dissolved zinc of 81 µg/L.
µg/L = microgram(s) per liter; DOC = dissolved organic carbon; J = estimated value; mg/L = milligram(s) per liter; REF = reference; SIYB = Shelter Island Yacht Basin; TOC = total organic carbon; TSS = total suspended solids; USEPA = United States Environmental Protection Agency

Table 2. Results of the 48-Hour Bivalve Larvae Bioassay – March 22, 2022 Event

Concentration (% Sample)	Station/Combined Survival and Normal Development (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Laboratory Control	90.8	85.0	89.1	91.0	91.6	89.6	91.1
6.25	93.4	88.2	86.0	89.9	91.7	88.7	90.9
12.5	90.4	90.6	85.2	87.2	89.4	90.0	92.6
25	92.8	89.1	88.4	92.1	89.7	89.3	90.3
50	92.3	89.5	88.5	91.8	90.7	90.4	92.3
100	79.9*	86.5	90.5	92.3	91.4	93.0	88.5
Filter Control	89.4	91.3	84.0	83.4	88.0	90.5	89.2
100 (1.2-µm filtered)[a]	83.2	89.2	88.5	89.1	90.3	89.3	91.6
Test Results – Unfiltered Sample							
NOEC (%)	50	100	100	100	100	100	100
% Effect	12.0	-1.8	-1.6	-1.5	0.2	-3.8	2.9
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Test Results – Filtered Sample							
NOEC (%)	100	100	100	100	100	100	100
% Effect	6.9	2.3	-5.4	-6.9	-2.6	1.4	-2.8
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Notes:
a. Tests were also performed on undiluted samples that were filtered through a 1.2-µm filter to remove potentially harmful native algae that might interfere with test organism performance.
* Indicates a statistically significant decrease compared to control using the traditional USEPA flow-chart statistical methods (i.e., Dunnett multiple comparison test). Effect was not significant using the TST approach.
µm = micrometer(s); % = percent; % effect = the percent effect in the 100% sample compared to the laboratory control (a negative % effect value represents a positive effect); NOEC = no observed effect concentration; REF = reference; SIYB = Shelter Island Yacht Basin; TST (Pass/Fail) = test of significant toxicity; TST Pass = sample is nontoxic according to the TST calculation; USEPA = United States Environmental Protection Agency

Table 3. Results of the 96-Hour Pacific Topsmelt Bioassay – March 22, 2022 Event

Concentration (% Sample)	Station/Mean Survival (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Laboratory Control	96.7	96.7	100	100	100	100	100
25	100	96.7	100	100	100	100	100
50	100	93.3	100	100	100	100	100
100	100	96.7	100	100	96.7	100	100
Test Results							
NOEC (%)	100	100	100	100	100	100	100
% Effect	-3.5	0.0	0.0	0.0	3.3	0.0	0.0
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Notes:
% = percent; % effect = the percent effect in the 100% sample compared to the laboratory control (a negative % effect value represents a positive effect); NOEC = no observed effect concentration; REF = reference; SIYB = Shelter Island Yacht Basin; TST (Pass/Fail) = test of significant toxicity; TST Pass = sample is nontoxic according to the TST calculation

Monitoring Results – January 25, 2023

Chemistry

All chemistry results for the 2023 winter monitoring event are summarized in Table 4 and included in the analytical chemistry laboratory report in Appendix B-2. During the 2023 winter monitoring event, dissolved copper concentrations in SIYB ranged from 2.3 µg/L at the outermost station (SIYB-6) to 7.7 µg/L at the innermost station (SIYB-1). Five of the six stations in SIYB had dissolved copper concentrations exceeding the CCC water quality objective (3.1 µg/L; Table 4). The 2023 winter basin-wide average dissolved copper concentration was 5.2 µg/L.

Chronic Toxicity

Results of the chronic mussel development tests conducted for the 2023 winter monitoring event are summarized in Table 5 and Appendix C-2. Using the USEPA 1995 traditional flow-chart statistical methods (i.e., Dunnett multiple comparison test), significant effects to mussel development were observed in unfiltered and undiluted samples from Stations SIYB-1 (9.7% effect) and SIYB-2 (9.3% effect). However, these effects were not significant using the TST approach (USEPA, 2010).

Interestingly, the greatest effect to mussel development was observed in the undiluted sample from Station SIYB-1 that was filtered through a 1.2-µm mesh screen (28% effect). This effect was statistically significant using both the USEPA 1995 methods and the TST approach. During each chronic bioassay test performed for the SIYB TMDL, samples are filtered to remove potentially harmful native algae that might interfere with test organism performance; however, during the January 2023 event, the toxicity of the sample from Station SIYB-1 increased after filtration for unknown reasons. Further testing would be required to evaluate potential causes of the increased toxicity observed in the filtered sample.

No statistically significant effects to mussel development were observed in any of the other unfiltered or filtered samples collected in SIYB or at the reference station during the 2023 winter monitoring event (Table 5).

Toxicity Identification Evaluation for Chronic Toxicity at Station SIYB-1

Because chronic toxicity has been observed at Station SIYB-1 in almost every monitoring event during the SIYB TMDL Monitoring Program, a Phase I TIE was conducted during the August 2022

event to identify the likely class(es) of contaminants causing toxicity. Results of the Phase I TIE indicated that the observed toxicity was likely due to a cationic trace metal (WSP, 2023). Additional toxicant identification and confirmation (Phase II/III TIE) procedures were conducted on the SIYB-1 sample collected during the 2023 winter monitoring event.

Based on the results of the TIEs conducted in August 2022 and January 2023, multiple lines of evidence indicate that dissolved copper is a principal cause of toxicity to mussel embryos exposed to samples from Station SIYB-1. Key observations supporting this conclusion are as follows:

1. The addition of ethylenediaminetetraacetic acid (EDTA) during both the summer 2022 and winter 2023 monitoring events successfully removed toxicity in water from SIYB-1. This treatment is highly specific at chelating and thus reducing the toxicity of cationic trace metals, including copper.
2. Concentrations of dissolved copper are consistently elevated at SIYB-1 above values found to cause toxicity to mussel embryos as reported in the literature and based on results from the TMDL Monitoring Program.
3. Addition of copper to clean laboratory water and site water from SIYB-1 (Phase II/III TIE) resulted in comparable dose response curves and median effect concentration (EC_{50}) values. If another toxicant was present, these curves and EC_{50} values would be expected to diverge from each other.
4. Toxicity of water from SIYB is consistently observed above a threshold of approximately 8 µg/L. The dissolved copper measurement of 7.7 µg/L at SIYB-1 during the winter 2023 sampling event is just below this threshold, thus likely explaining why there was only subtle chronic toxicity observed during this event.
5. The statistical correlation between dissolved copper and % effect on mussel embryo development over time is also strong and statistically significant.

Detailed methods and results from the TIE efforts conducted in January 2023 are presented in a technical memorandum in Appendix D.

Acute Toxicity

Results of the acute inland silverside survival tests conducted for the 2023 winter monitoring event are summarized in Table 6 and in Appendix C-2. There were no statistically significant effects to inland silverside survival observed in any samples tested, indicating that surface water samples collected in SIYB and at the reference station (SIYB-REF-1) were not acutely toxic to inland silversides.

Table 4. Chemistry Results for SIYB Surface Waters – January 25, 2023 Event

Station	Dissolved Copper (µg/L)	Total Copper (µg/L)	Dissolved Zinc (µg/L)	Total Zinc (µg/L)	DOC (mg/L)	TOC (mg/L)	TSS (mg/L)
SIYB-1	**7.7**	7.3	26	23	1.3	1.2	9
SIYB-2	**6.9**	7.3	28	26	1.3	1.3	10
SIYB-3	**5.3**	5.3	20	19	1.4	1.2	5
SIYB-4	**5.2**	5.4	19	19	1.3	1.2	5
SIYB-5	**3.7**	3.7	14	13	1.4	1.2	5
SIYB-6	2.3	2.3	8.9	8.1	1.2	1.2	5
SIYB-REF-1	1.6	1.6	6.1	5.9	1.3	1.2	6
SIYB-REF-2	2.2	2.5	14	14	1.4	1.4	4 J

Notes:
Values in **bold** are above the USEPA National Recommended Water Quality Criterion Continuous Concentration (CCC) for dissolved copper of 3.1 µg/L in marine waters. No values were above the CCC for dissolved zinc of 81 µg/L.
µg/L = microgram(s) per liter; DOC = dissolved organic carbon; J = estimated value; mg/L = milligram(s) per liter; REF = reference; SIYB = Shelter Island Yacht Basin; TOC = total organic carbon; TSS = total suspended solids; USEPA = United States Environmental Protection Agency

Table 5. Results of the 48-Hour Bivalve Larvae Bioassay – January 25, 2023 Event

Concentration (% Sample)	Station/Combined Survival and Normal Development (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Laboratory Control	84.0	87.7	85.9	85.4	76.4	88.1	83.9
6.25	86.3	85.2	87.4	87.9	82.1	87.1	87.4
12.5	87.0	84.9	88.8	84.7	83.5	87.4	87.3
25	87.0	84.8	86.3	87.4	76.0	88.8	85.2
50	85.0	86.0	88.1	86.7	86.0	87.8	82.7
100	75.9*	79.6*	89.5	84.6	82.0	89.0	85.9
Filter Control	85.1	85.0	84.9	88.8	75.6	82.0	83.3
100 (1.2-µm filtered)[a]	**61.2***	75.6	87.2	82.7	83.9	87.3	83.4
Test Results – Unfiltered Sample							
NOEC (%)	50	50	100	100	100	100	100
% Effect	9.7	9.3	-4.2	0.9	-7.4	-1.0	-2.4
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Test Results – Filtered Sample							
NOEC (%)	<100	100	100	100	100	100	100
% Effect	28.1	11.0	-2.8	7.0	-11.0	-6.5	-0.1
TST Result	Fail	Pass	Pass	Pass	Pass	Pass	Pass

Notes:
a. Tests were also performed on undiluted samples that were filtered through a 1.2-µm filter to remove potentially harmful native algae that might interfere with test organism performance.
* Indicates a statistically significant decrease compared to control using the traditional USEPA flow-chart statistical methods (i.e., Dunnett multiple comparison test). Effect was not significant using the TST approach.
Bold underline* indicates a statistically significant decrease compared to control using both the traditional USEPA flow-chart statistical methods and the TST approach.
µm = micrometer(s); % = percent; % effect = the percent effect in the 100% sample compared to the laboratory control (a negative % effect value represents a positive effect); NOEC = no observed effect concentration; REF = reference; SIYB = Shelter Island Yacht Basin; TST (Pass/Fail) = test of significant toxicity; TST Fail = sample is toxic according to the TST calculation; TST Pass = sample is nontoxic according to the TST calculation; USEPA = United States Environmental Protection Agency

Table 6. Results of the 96-Hour Inland Silverside Bioassay – January 25, 2023 Event

Concentration (% Sample)	Station/Mean Survival (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Laboratory Control	93.3	93.3	96.7	96.7	100	100	100
25	96.7	96.7	93.3	96.7	100	100	100
50	100	96.7	96.7	96.7	100	96.7	100
100	100	100	97.2	96.7	93.3	100	100
Test Results							
NOEC (%)	100	100	100	100	100	100	100
% Effect	-7.1	-7.1	-0.6	0.0	6.7	0.0	0.0
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Notes:
% = percent; % effect = the percent effect in the 100% sample compared to the laboratory control (a negative % effect value represents a positive effect); NOEC = no observed effect concentration; REF = reference; SIYB = Shelter Island Yacht Basin; TST (Pass/Fail) = test of significant toxicity; TST Pass = sample is nontoxic according to the TST calculation

Quality Assurance and Quality Control Summary

Rigorous quality assurance (QA) and quality control (QC) procedures were implemented from the sample collection stage through the analysis and reporting stages, as described in the QAPP (Wood, 2021b and 2022b). Field QA checklists were used during each monitoring event to ensure that sample collection procedures were consistent at each station and all required field data were recorded properly (see Appendix A). Following sample collection, proper chain-of-custody (COC) procedures were used to identify sample analyses to be conducted, as well as document sample possession, transport, and condition upon receipt at the laboratory. COC forms are included with the laboratory reports in Appendices B and C.

All samples collected during the 2022 and 2023 winter monitoring events were submitted to the appropriate laboratory on the day of collection (toxicity) or the day after collection (chemistry). Samples were received in good condition at Weck Laboratories and WSP Environmental Toxicology Laboratory and analyzed within the required holding times. Both laboratories are accredited by the National Environmental Laboratory Accreditation Program (NELAP) and/or California Environmental Laboratory Accreditation Program (ELAP) for all analyses performed at the time they were conducted.

Analytical and toxicity results from both monitoring events underwent a thorough QA/QC evaluation and were deemed acceptable for reporting purposes, with qualifications noted in the laboratory reports in Appendices B and C. A summary of this evaluation and any potential impacts to data quality is provided below.

Chemistry

- Low-level detections of metals, organic carbon, and TSS were measured in the field and equipment rinsate blanks for both monitoring events.
    - This may indicate trace contamination from the field, Niskin sampler, and/or laboratory. The low-level concentrations of these analytes were negligible relative to the sample concentrations measured within SIYB and therefore not considered a significant data bias.

- DOC and TOC spike recoveries were outside of performance-based recovery limits for the 2022 winter monitoring event.
    - Matrix spike and matrix spike duplicate recoveries were below the laboratory's performance-based recovery limits for DOC and TOC, indicating possible matrix interference. These results are consistent with historical concentrations and are reported as measured. The data are flagged to indicate possible matrix interference. The laboratory control samples were within acceptance limits, indicating that the laboratory was in control and the data is acceptable.
- Dissolved zinc concentrations were slightly higher than the corresponding total zinc concentrations in several samples collected during the 2023 winter monitoring event.
    - Review of the method blank, equipment rinsate blank, and field blank results for zinc did not indicate any significant contamination that may have resulted during field filtration, and the corresponding dissolved copper analytical sequence did not show the same trend. Deviations likely resulted from slight differences in calibration when the samples were analyzed. These slight deviations are not considered significant enough to warrant resampling or retesting. The results were reported within acceptance criteria determined by the test method and standard operating procedure and therefore considered usable for their intended purposes and reported as provided by the laboratory.
- TSS was detected at low levels in method blanks analyzed for the 2023 winter monitoring event.
    - These low-level detections were estimated (i.e., below the reporting limit) and not considered a significant data bias.
- DOC values in several cases were higher than the TOC values reported for the same sample collected during the 2023 winter monitoring event.
    - Water samples for TOC and DOC analyses are dispensed to separate sample vials in the field, and laboratory analyses are conducted separately. Since the DOC and TOC are tested separately, they can have slight differences in calibration that can sometimes result in TOC levels being slightly lower than DOC levels. The magnitudes of these minor differences are in general agreement with results from previous events. Corresponding laboratory QA/QC samples met all QAPP limits, and concentrations measured in the associated laboratory blanks were non-detect. All results are considered usable for their intended data purposes and are reported as provided by the laboratory.

Raw analytical chemistry QC results and applicable data qualifiers are provided in the laboratory reports in Appendix B.

Toxicity

- Laboratory controls for the chronic mussel development tests conducted for the 2022 and 2023 winter monitoring events met the USEPA test acceptability criteria (TAC) of 50% or greater survival and 90% or greater proportion normal. All laboratory controls also met the ASTM TAC of 70% or greater for the combined survival and proportion normal endpoint. Chronic tests were performed in accordance with USEPA protocol guidelines, and no major deviations were required. All chronic mussel development test results from the 2022

and 2023 winter monitoring events were therefore considered valid and acceptable for reporting purposes.

- Acute toxicity tests conducted with Pacific topsmelt (winter 2022) and inland silversides (winter 2023) met the USEPA method TAC, with greater than 90% survival in the laboratory controls. Tests were performed in accordance with USEPA protocol guidelines, and no major deviations were required. All acute toxicity test results from the 2022 and 2023 winter monitoring events were therefore considered valid and acceptable for reporting purposes.
- Concurrent reference toxicant tests were conducted with both test organisms for the 2022 and 2023 winter monitoring events. All reference toxicant tests met the corresponding minimum TAC and were deemed valid. The calculated EC_{50} values for the bivalve tests and median lethal effect concentration (LC_{50}) values for the Pacific topsmelt/inland silverside tests were within the acceptable range (i.e., within two standard deviations of the laboratory historical mean), indicating that the test organisms used during the 2022 and 2023 winter monitoring events were healthy and exhibited typical sensitivity to copper.

Detailed QA/QC summaries for the toxicity testing, including raw data and applicable qualifiers, are provided in each laboratory report in Appendix C.

References

United States Environmental Protection Agency (USEPA). 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. EPA-600-R-95-136. EPA Office of Research and Development. Narragansett, RI.

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

USEPA. 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document. EPA-833-R-10-003. June 2010.

Wood Environment & Infrastructure Solutions, Inc. (Wood). 2021a. Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load Monitoring Plan (Revision 7). August 2021.

Wood. 2021b. Quality Assurance Project Plan for Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load. August 2021.

Wood. 2022a. Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load Monitoring Plan (Revision 8). August 2022.

Wood. 2022b. Quality Assurance Project Plan for Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load Monitoring Plan. August 2022.

WSP USA Environment & Infrastructure Inc. (WSP). 2023. Mussel Embryo Toxicity Identification Evaluation (TIE) Results for 2022 Annual Summer Compliance Monitoring for the SIYB Dissolved Copper TMDL – Site SIYB-1.

Appendix A

Field Data Sheets and QA Checklists

A-1: March 22, 2022 Event

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-ER

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 0735

Time of Sample Collection: 0745

Time of CTD Cast: N/A

GPS: (WGS84) Lat. transient dock Long. transient dock

Tide (ft): N/A

Time of Slack High Tide: N/A

Water Depth (ft): N/A

Wind (mph): 0 mph

Weather conditions: Sunny, Calm

Surface Water Conditions: N/A

Water Visibility (ft): N/A

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station					
During sample collection			N/A		
End of sample collection					
Average value					

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: Equipment Rinse collected @ transient dock prior to sample collection

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-REF-2

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 0835

Time of Sample Collection: 08:45

Time of CTD Cast: N/A

GPS: (WGS84) Lat. 32.70928 Long. -117.22544

Tide (ft): +0.8 ft

Time of Slack High Tide: 13:03

Water Depth (ft): 45.1

Wind (mph): ~2 mph S

Weather conditions: sunny, calm

Surface Water Conditions: light texture, current- direction E

Water Visibility (ft): 16'0"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	16.7	50567	33.24	7.97	7.61
During sample collection	16.7	50594	33.23	7.95	7.62
End of sample collection	16.7	50600	33.24	7.95	7.62
Average value	16.7	50587	33.23	7.96	7.62

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: WQ/chem only, no toy, no CTD cast

drifted over site w/ motor off; did not anchor

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-REF-1

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 08:55

Time of Sample Collection: 09:30

Time of CTD Cast: 09:58

GPS: (WGS84) Lat. 32.70404 Long. -117.23235

Tide (ft): +1.23 ft.

Time of Slack High Tide: 13:03

Water Depth (ft): 67.4

Wind (mph): ~0.2 mph SW

Weather conditions: Sunny, calm

Surface Water Conditions: light texture, incoming tide

Water Visibility (ft): 16'8"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	16.3	50811	33.38	8.01	7.47
During sample collection	16.3	50822	33.39	8.05	7.46
End of sample collection	16.1	50849	33.40	7.98	7.40
Average value	16.2	50827	33.39	8.01	7.44

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-6

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 10:12

Time of Sample Collection: 10:30

Time of CTD Cast: 10:45

GPS: (WGS84) Lat. 32.70877 Long. -117.23511

Tide (ft): +2.0

Time of Slack High Tide: 13:03

Water Depth (ft): 15.5 ft.

Wind (mph): ~0.2mph N

Weather conditions: Sunny, calm

Surface Water Conditions: mostly calm, incoming tide

Water Visibility (ft): 15'6"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	16.3	50864	33.43	8.01	7.28
During sample collection	16.4	50845	33.41	8.01	7.40
End of sample collection	16.4	50914	33.44	7.99	7.34
Average value	16.4	50874	33.43	8.00	7.34

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-5

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 11:43

Time of Sample Collection: 11:50

Time of CTD Cast: 12:12

GPS: (WGS84) Lat. 32.71213 Long. -117.23300

Tide (ft): +3.22 ft.

Time of Slack High Tide: 13:03

Water Depth (ft): 22.2 ft.

Wind (mph): 1-4 mph NW

Weather conditions: Sunny, light breeze.

Surface Water Conditions: Slight texture, incoming tide

Water Visibility (ft): 16'6"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	17.1	50896	33.47	8.06	7.52
During sample collection	17.0	50867	33.45	8.03	7.56
End of sample collection	17.0	50893	33.45	8.03	7.58
Average value	17.0	50885	33.46	8.04	7.55

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: Topside cleaning observed ~15 yds SW
Hull cleaner observed leaving slip ~50 yds W (not actively cleaning) @ 1142
Two other hull cleaners observed walking docks (not actively cleaning) @ 1144

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-4

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 12:53

Time of Sample Collection: 13:00

Time of CTD Cast: 13:25

GPS: (WGS84) Lat. 32.71681 Long. -117.23202

Tide (ft): +3.63 ft.

Time of Slack High Tide: 13:03

Water Depth (ft): 16.0

Wind (mph): 6-12mph NNW

Weather conditions: sunny, light breeze

Surface Water Conditions: textured conditions, slack high tide

Water Visibility (ft): 13' 6"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	17.1	50899	33.46	8.05	7.47
During sample collection	17.1	50906	33.47	8.01	7.53
End of sample collection	17.1	50899	33.46	8.04	7.57
Average value	17.1	50901	33.46	8.03	7.52

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: Sample collected @ slack high tide

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-3

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 13:45

Time of Sample Collection: 13:50

Time of CTD Cast: 14:14

GPS: (WGS84) Lat: 32.71549 Long. -117.22986

Tide (ft): +3.58 ft

Time of Slack High Tide: 13:03

Water Depth (ft): 18.0 ft

Wind (mph): 8-12 mph NW

Weather conditions: Sunny, breezy

Surface Water Conditions: light chop, outgoing tide

Water Visibility (ft): 12'9"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	17.2	50898	33.46	8.04	7.56
During sample collection	17.2	50912	33.47	8.01	7.57
End of sample collection	17.1	50918	33.47	8.04	7.53
Average value	17.2	50909	33.47	8.03	7.55

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-2

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 14:55

Time of Sample Collection: 15:00

Time of CTD Cast: 15:22

GPS: (WGS84) Lat. 32.71414 Long. -117.22919

Tide (ft): +3.1ft

Time of Slack High Tide: 13:03

Water Depth (ft): 14.3 ft

Wind (mph): 12-15mph NW

Weather conditions: Sunny, windy

Surface Water Conditions: mild chop, some white capping outside marina

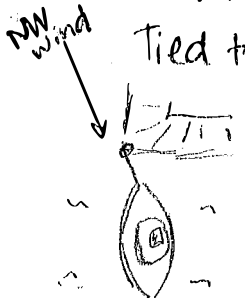
Water Visibility (ft): 14'3"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	17.2	50943	33.52	8.04	7.54
During sample collection	17.2	50928	33.49	8.02	7.54
End of sample collection	17.0	50932	33.48	8.00	7.52
Average value	17.1	50934	33.50	8.02	7.53

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: Freshwater observed leaking from hose ~50yds E @ ~1440.

Tied to dock on low, not anchored due to wind (see depiction)



PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-1

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 15:35

Time of Sample Collection: 15:50

Time of CTD Cast: 16:20

GPS: (WGS84) Lat. 32.71820 Long. -117.22600

Tide (ft): +2.79 ft.

Time of Slack High Tide: 13:03

Water Depth (ft): 17.3

Wind (mph): 5-7 mph NW

Weather conditions: sunny, breezy

Surface Water Conditions: light texture, outgoing tide

Water Visibility (ft): 13'3"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	17.9	50900	33.48	8.03	7.36
During sample collection	17.8	50912	33.48	8.00	7.36
End of sample collection	17.8	50898	33.47	8.00	7.38
Average value	17.8	50903	33.48	8.01	7.37

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: extra volume collected for MS/MSD

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-1-REP

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) 15:35

Time of Sample Collection: 16:30

Time of CTD Cast: N/A

GPS: (WGS84) Lat. 32.71818 Long. -117.22593

Tide (ft): +2.35 ft.

Time of Slack High Tide: 13:03

Water Depth (ft): 17.4 ft

Wind (mph): 8-12 mph NW

Weather conditions: Sunny, breezy

Surface Water Conditions: light texture, outgoing tide

Water Visibility (ft): 13' 1"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	17.7	50948	33.50	8.00	7.39
During sample collection	17.8	50878	33.46	7.99	7.35
End of sample collection	17.8	50909	33.49	8.00	7.36
Average value	17.8	50912	33.48	8.00	7.37

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: independent surface grab taken at SIYB-1 for field replicate (chemical analysis only; no toxicity)

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-FB

Date: (mm/dd/yyyy) 03/22/2022

Time on Station: (hh:mm) N/A

Time of Sample Collection: 16:55

Time of CTD Cast: N/A

GPS: (WGS84) Lat. N/A Long. N/A

Tide (ft): N/A

Time of Slack High Tide: 13:03

Water Depth (ft): N/A

Wind (mph): 1-4 mph NW

Weather conditions: sunny, breezy

Surface Water Conditions: N/A

Water Visibility (ft): N/A

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station					
During sample collection			N/A		
End of sample collection					
Average value					

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: Boat anchored, motor off during sample collection. field blank collected while anchored at SIYB-1

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB - ER **Date/Time:** 3/22/22 0745

Mark each box with Y, N, or NA PD = police dock, ① = significant fuel slick around dock

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	P.D.
Tide recorded	NA
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	①
Time of sampling recorded	Y
Water depth at sample site recorded	ND
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	NA

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	NA
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	NA
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	NA
Sampling depth recorded	NA
Sample bottles filled in the following order: metals, organics, ~~toxicity~~	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/23/22 1005

Print Name/Company: Rolf Schotte / Wood

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB - REF2 **Date/Time:** 3/22/22 0845

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off) – stay on station w/ trolling motor	NA
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	NA

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	Y NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/22/22 1005

Print Name/Company: Wood Rolf Schotte

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB - REF 1 **Date/Time:** 3/22/22 0930

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/23/22 1005

Print Name/Company: Bob Talbot / Wood

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-6 **Date/Time:** 3/22/22 1:30

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/23/22 1605

Print Name/Company: Rolf Schaffer / Ward

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-5 **Date/Time:** 3/22/22 1150

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/23/22 1015

Print Name/Company: Bob Tobitt / Ward

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-4 **Date/Time:** 3/22/22 1300

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/05/22 1005

Print Name/Company: Rolf Schuttle / Weck

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-3 **Date/Time:** 3/22/22 1350

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

large filter issue with bubbles... rectified in the field.

Signature of QA/QC Personnel: _____ **Date/Time:** 3/23/22 1005

Print Name/Company: Rolf Schaffer / Wood

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-2 **Date/Time:** 3/22/22 1500

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/22/22 1025

Print Name/Company: Rolf Schottle, Weed

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-1 **Date/Time:** 3/22/22 1550

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded 1 drop	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable) MS/MSD extra volume	–
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: [signature] **Date/Time:** 3/23/22 1105

Print Name/Company: Rolf Schottle - Wood

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-1-Dup (Rep) **Date/Time:** 3/22/22 1630

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, ~~toxicity~~ not collected	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable) duplicate	Y
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/23/22 1005

Print Name/Company: Rolf Schulz - Ward

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2022 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB - FB **Date/Time:** 3/22/22 1655

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off) @ SIYB-1	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	NA
Tide recorded	
Weather conditions recorded	
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	
Time of sampling recorded	
Water depth at sample site recorded	
General site observations recorded	
Check for boat cleaning operations in the area – if active, move to a new station	

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	NA
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	N/A
Sampling depth recorded	N/A
Sample bottles filled in the following order: metals, organics, ~~toxicity~~ no toxs	Y
Staff avoided contaminating ~~samples at all~~ times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 3/23/22 1005

Print Name/Company: Rolf Schmitz - Ward

A-2: January 25, 2023 Event

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-ER

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 06:00

Time of Sample Collection: 06:25

Time of CTD Cast: N/A

GPS: (WGS84) Lat. N/A Long. N/A

Tide (ft): +1.4

Time of Slack High Tide: 11:21

Water Depth (ft): N/A

Wind (mph): 0 mph

Weather conditions: Clear, calm

Surface Water Conditions: N/A

Water Visibility (ft): N/A

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station					
During sample collection			N/A		
End of sample collection					
Average value					

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-REF-2

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 07:15

Time of Sample Collection: 07:20

Time of CTD Cast: N/A

GPS: (WGS84) Lat. 32.70929 Long. -117.22539

Tide (ft): +2.1

Time of Slack High Tide: 11:17

Water Depth (ft): 46' 3"

Wind (mph): 0 mph

Weather conditions: sunny, clear calm

Surface Water Conditions: light texture, incoming tide current

Water Visibility (ft): 15' 8"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.0	49920	32.68	7.94	8.08
During sample collection					
End of sample collection					
Average value					

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-REF-1

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 07:35

Time of Sample Collection: 0800

Time of CTD Cast: N/A

GPS: (WGS84) Lat. 32.70406 Long. -117.23232

Tide (ft): +2.7 ft

Time of Slack High Tide: 11:17

Water Depth (ft): 68'7"

Wind (mph): <1 mph

Weather conditions: Sunny, clear, calm

Surface Water Conditions: light texture, incoming tide current

Water Visibility (ft): 14'5"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.1	50482	33.07	7.97	7.81
During sample collection	14.1	50713	33.26	8.00	7.80
End of sample collection	14.1	50882	33.38	8.02	7.80
Average value	14.1	50692.3	33.236	7.996	7.803

TD 2/13/23

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-6

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 0835

Time of Sample Collection: 0900

Time of CTD Cast: N/A

GPS: (WGS84) Lat. 32.70880 Long. -117.23510

Tide (ft): +3.6

Time of Slack High Tide: 1117

Water Depth (ft): 16' 6"

Wind (mph): <1 mph

Weather conditions: Sunny, clear, calm

Surface Water Conditions: light texture, incoming tide current

Water Visibility (ft): 16' 6"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.1	50662	33.22	8.03	7.73
During sample collection	14.1	50709	33.26	8.03	7.70
End of sample collection	14.1	50740	33.28	8.07	7.78
Average value	14.1	50703.6	33.25	8.043	7.736

TO 2/13/23

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-5

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 0935

Time of Sample Collection: 1000

Time of CTD Cast: N/A*

GPS: (WGS84) Lat. 32.71216 Long. -117.23297

Tide (ft): +4.7 ft

Time of Slack High Tide: 1117

Water Depth (ft): 24'3"

Wind (mph): <1 mph

Weather conditions: Sunny, clear, calm

Surface Water Conditions: light texture, incoming tide current

Water Visibility (ft): 15'9"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.1	50608	33.18	8.08	7.93
During sample collection	14.1	50639	33.21	8.07	7.92
End of sample collection	14.2	50592	33.17	8.15	7.90
Average value	$14.1\overline{3}$	50613	$33.1\overline{86}$	8.10	$7.91\overline{6}$

TD 2/13/23

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: * water quality measurements taken every 1-M with YSI pro DSS.
Hull cleaner motoring into basin ~0935.

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-4

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 1030

Time of Sample Collection: 1100

Time of CTD Cast: N/A*

GPS: (WGS84) Lat. 32.71683 Long. -117.23205

Tide (ft): +5.3 ft

Time of Slack High Tide: 1117

Water Depth (ft): 17'6"

Wind (mph): <1 mph

Weather conditions: sunny, clear, calm

Surface Water Conditions: calm, slack tide

Water Visibility (ft): 14'5"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.5	50753	33.30	8.08	7.95
During sample collection	14.4	50755	33.30	8.07	7.95
End of sample collection	14.4	50770	33.30	8.11	7.96
Average value	$14.4\overline{3}$	$50759.\overline{3}$	33.30	$8.08\overline{6}$	$7.95\overline{3}$

TD 2/13/23

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

* Water quality measurements taken every 1-m with YSI pro DSS

Two boats anchored in anchorage ~150 ft from site. Harbor police arrived ~1110. Vessels leaving anchorage at 1120.

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-3

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 1155

Time of Sample Collection: 1200

Time of CTD Cast: N/A*

GPS: (WGS84) Lat. 32.71549 Long. -117.22990

Tide (ft): +5.3 ft

Time of Slack High Tide: 1117

Water Depth (ft): 21' 11"

Wind (mph): 5mph SSW

Weather conditions: Sunny, clear, calm / light breeze

Surface Water Conditions: mostly calm, outgoing tide

Water Visibility (ft): 14' 0"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.4	50775	33.31	8.13	7.96
During sample collection	14.4	50768	33.31	8.11	7.99
End of sample collection	14.7	50738	33.29	8.10	7.95
Average value	14.5	50760.3	32.63$\overline{6}$	8.11$\overline{3}$	7.9$\overline{6}$

TD 2/13/23

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: *water quality measurements taken every 1-m with YSI Pro DSS

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-2

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 1255

Time of Sample Collection: 1300

Time of CTD Cast: N/A*

GPS: (WGS84) Lat. 32.71412 Long. -117.22918

Tide (ft): +4.9

Time of Slack High Tide: 1117

Water Depth (ft): 15'11"

Wind (mph): 4mph W

Weather conditions: sunny, clear, light breeze

Surface Water Conditions: light texture, outgoing tide

Water Visibility (ft): 15'0"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.5	50792	33.33	8.07	7.60
During sample collection	14.5	50795	33.32	8.07	7.60
End of sample collection	14.5	50792	33.33	8.09	7.59
Average value	14.5	50793	33.$\overline{32}$6	8.0$\overline{76}$	7.5$\overline{96}$

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: * water quality measurements taken every 1-M with YSI ProDSS.

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-1

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 1330

Time of Sample Collection: 1400

Time of CTD Cast: N/A*

GPS: (WGS84) Lat. 32.71821 Long. -117.22599

Tide (ft): +4.0 ft

Time of Slack High Tide: 1117

Water Depth (ft): 19' 0"

Wind (mph): 6-8 mph W

Weather conditions: Sunny, clear, light breeze

Surface Water Conditions: light texture, outgoing tide

Water Visibility (ft): 11' 0"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.8	50744	33.31	8.08	7.88
During sample collection	14.8	50760	33.31	8.07	7.83
End of sample collection	14.8	50756	33.31	8.10	7.85
Average value	14.8	50753.3	33.31	8.083	7.853

TD 2/13/23

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes: * Water quality measurements taken every 1-M with YSI ProDSS.

Boat cleaning observed ~80 ft. from sampling location after chemistry samples were collected (~1420).

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-1 (Rep)

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) 1330

Time of Sample Collection: 1450

Time of CTD Cast: N/A

GPS: (WGS84) Lat. 32.71820 Long. -117.22601

Tide (ft): +2.8 ft

Time of Slack High Tide: 1117

Water Depth (ft): 18' 6"

Wind (mph): 4-5 mph W

Weather conditions: Sunny, clear, light breeze

Surface Water Conditions: light texture, outgoing tide

Water Visibility (ft): 11' 2"

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	14.8	50750	33.30	8.07	7.84
During sample collection	14.7	50730	33.29	8.07	7.84
End of sample collection	14.8	50728	33.29	8.07	7.85
Average value	$14.7\overline{6}$	50736	$33.29\overline{3}$	8.07	$7.84\overline{3}$

TD 2113123

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

Boat cleaning + spraying occurring within ~50 ft of sampling location (~1440) prior to collecting chemistry samples

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD WATER QUALITY DATA SHEET

Station ID: SIYB-FB

Date: (mm/dd/yyyy) 01/25/2023

Time on Station: (hh:mm) N/A

Time of Sample Collection: 1520

Time of CTD Cast: N/A

GPS: (WGS84) Lat. N/A Long. N/A

Tide (ft): N/A

Time of Slack High Tide: N/A

Water Depth (ft): N/A

Wind (mph): 6-8 mph WNW

Weather conditions: sunny, clear, light breeze

Surface Water Conditions: N/A

Water Visibility (ft): N/A

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station					
During sample collection			N/A		
End of sample collection					
Average value					

*Water quality measured at the same depth as sample collection (i.e., within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: Transit Dock / Eq Blank **Date/Time:** 1/25/23 0625

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	NA
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	NA
Tide recorded	NA
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	NA
Time of sampling recorded	Y
Water depth at sample site recorded	NA
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	OK

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment DI	NA
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	NA
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	NA
Sampling depth recorded	NA
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable) ☆	Y
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

EQ - BCPK

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 1/25/23 9:44

Print Name/Company: Annabelle Burruss / Port

Rolf Schottle / WSP _____ 1/26/23 1000

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-REF-2 **Date/Time:** 1/25/23 0720

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off) – used electric motor to stay on station	–
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y (OK)

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

SIYB-REF-2 **FIELD SAMPLING QA CHECKLIST**

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 1/25/23 9:44

Print Name/Company: Annabelle Burruss / Port

Rolf Schottle / WSP _____ 1/26/23 1000

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-REF-1 **Date/Time:** 1/25/23 0800

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off) on electric motor + one anchor	~~NA~~ Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

SIYB-REF-1 **FIELD SAMPLING QA CHECKLIST**

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 1/25/23 9:43

Print Name/Company: Annabelle Burruss/Port

Rolf Schottle/WSP _____ 1/26/23 1000

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-6 **Date/Time:** 1/25/23 0900

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off) Police Dock	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station none	OK

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

SIYB-6

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 1/25/23 9:42

Print Name/Company: Annabelle Burruss / Port

Rolf Schottle / WSP _____ 1/26/23 1000

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-5 **Date/Time:** 1/25/23 0900

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

SYB-5

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 1/25/23 10:17

Print Name/Company: Annabelle Burruss / Port

Rolf Schottle / WSP _____ 1/26/23 0700

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-4 **Date/Time:** 1/25/23 1100

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

S17B-4

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

2 anchored boats 60ft @ 150' away to west-north of station S17B-4

Signature of QA/QC Personnel: _____ **Date/Time:** 1/25/23 11:23

Print Name/Company: Annabelle Burruss/Port
Rolf Schultz/USP 1/24/23 1000

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-3 **Date/Time:** 1/25/23 1200

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

SIYB-3

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: _____ **Date/Time:** 1/26/23 1800

Print Name/Company: Rob Schottle / WSP

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-2 **Date/Time:** 11/25/23 1302

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off) — motor only / electric motor	→
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

SIYB-2

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: [signature] **Date/Time:** 1/25/23 2:40pm

Print Name/Company: POSD

Rolf Schottle/WSP [signature] 1/26/23 1000

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB -1 **Date/Time:** 1/25/23 1400

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off) –	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: Kelly Jao **Date/Time:** 1/25/23

Print Name/Company: POSD

Rolf Schottle/MWH 1/26/23 1000

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-1-REF **Date/Time:** 1/25/23 1450

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (including H_2O clarity by Secchi disk)	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station*	Y

*see notes, last station

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	NA
Site replicate (i.e., duplicate) collected (if applicable)	Y
PPE properly removed and disposed of upon station completion	Y

SIYB-1-REP

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

1430 ⇒ 1445
topside cleaning observed on 40' cat "Morning Star"
located @ end tie ~ 75 ft south of station SIYB-1
(outgoing tide)

Signature of QA/QC Personnel: Kelly Jao **Date/Time:** 1/25/23

Print Name/Company: POSD

Rolf Schutte/WSP 1/26/23 1050

PORT OF SAN DIEGO
SIYB DISSOLVED COPPER TMDL
2023 WINTER MONITORING EVENT

FIELD SAMPLING QA CHECKLIST

Station Location: Field Blank (@SIYB-1) **Date/Time:** 11/25/23 1520

Mark each box with Y, N, or NA

Field Procedures

1. Station Occupation:

Vessel has been anchored (or tied off) @SIYB-1	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded ~~(including H_2O clarity by Secchi disk)~~	Y
Time of sampling recorded	Y
Water depth at sample site recorded	NA
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	NA

2. Sample Collection:

Field staff wearing fresh, powder-free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	NA
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab-certified, contaminant-free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	NA
Field water quality readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	NA
Sampling depth recorded	NA
Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
Equipment rinsate blank and field blank have been collected (if applicable)	Yes
Site replicate (i.e., duplicate) collected (if applicable)	NA
PPE properly removed and disposed of upon station completion	Y

FIELD SAMPLING QA CHECKLIST

3. Data Recording:

Field notes have been recorded for this site before moving to the next, LAST SAMPLE ←	Y
Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

Additional Notes:

Signature of QA/QC Personnel: Kelly Jao **Date/Time:** 1/25/23

Print Name/Company: POSD

Rolf Schottle / WSP 1/24/23 POSD

Appendix B

Analytical Chemistry Laboratory Reports

B-1: March 22, 2022 Event

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	2C23057
Project:	Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)
Attn:	Marisa Swiderski
Client:	Wood - San Diego 9177 Sky Park Court, Ste A San Diego, CA 92123

Report Date:	4/12/2022
Received Date:	3/23/2022
Turnaround Time:	Normal
Phones:	(858) 300-4324
Fax:	(858) 278-5300
P.O. #:	
Billing Code:	

EPA-UCMR #CA00211 • Guam-EPA #17-008R • LACSD #10143 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Marisa Swiderski,

Enclosed are the results of analyses for samples received 3/23/22 with the Chain-of-Custody document. The samples were received in good condition, at 4.3 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SIYB-1	Marisa Swiderski/Kate Buckley	2C23057-01	Sea Water	03/22/22 15:50	
SIYB-1 (REP)	Marisa Swiderski/Kate Buckley	2C23057-02	Sea Water	03/22/22 16:30	
SIYB-2	Marisa Swiderski/Kate Buckley	2C23057-03	Sea Water	03/22/22 15:00	
SIYB-3	Marisa Swiderski/Kate Buckley	2C23057-04	Sea Water	03/22/22 13:50	
SIYB-4	Marisa Swiderski/Kate Buckley	2C23057-05	Sea Water	03/22/22 13:00	
SIYB-5	Marisa Swiderski/Kate Buckley	2C23057-06	Sea Water	03/22/22 11:50	
SIYB-6	Marisa Swiderski/Kate Buckley	2C23057-07	Sea Water	03/22/22 10:30	
SIYB-REF-1	Marisa Swiderski/Kate Buckley	2C23057-08	Sea Water	03/22/22 09:30	
SIYB-REF-2	Marisa Swiderski/Kate Buckley	2C23057-09	Sea Water	03/22/22 08:45	
SIYB-ER	Marisa Swiderski/Kate Buckley	2C23057-10	Water	03/22/22 07:45	
SIYB-FB	Marisa Swiderski/Kate Buckley	2C23057-11	Water	03/22/22 16:55	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

Sample: SIYB-1

Sampled: 03/22/22 15:50 by Marisa Swiderski/Kate Buckley

2C23057-01 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** _ANALYST				
Batch ID: W2C1847 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/28/22 09:35				**Analyst:** ttf
Total Suspended Solids	**3**		5	mg/l	1	03/28/22	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**1.2**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**1.0**	0.15	0.30	mg/l	1	04/04/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**12**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**31**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**11**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**30**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-1 (REP)

2C23057-02 (Sea Water)

Sampled: 03/22/22 16:30 by Marisa Swiderski/Kate Buckley

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** _ANALYST				
Batch ID: W2C1847 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/28/22 09:35				**Analyst:** ttf
Total Suspended Solids	**4**		5	mg/l	1	03/28/22	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**1.2**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**1.0**	0.15	0.30	mg/l	1	04/04/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**13**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**32**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**12**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**31**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-2

2C23057-03 (Sea Water)

Sampled: 03/22/22 15:00 by Marisa Swiderski/Kate Buckley

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W2C1767 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/25/22 09:20				**Analyst:** jao
Total Suspended Solids	**7**		5	mg/l	1	03/25/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**1.0**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**0.91**	0.15	0.30	mg/l	1	04/04/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**6.1**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**17**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**5.4**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**15**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-3

Sampled: 03/22/22 13:50 by Marisa Swiderski/Kate Buckley

2C23057-04 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W2C1767 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/25/22 09:20				**Analyst:** jao
Total Suspended Solids	**6**		5	mg/l	1	03/25/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**1.1**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**0.91**	0.15	0.30	mg/l	1	04/04/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**6.5**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**17**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**5.7**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**16**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-4

Sampled: 03/22/22 13:00 by Marisa Swiderski/Kate Buckley

2C23057-05 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W2C1767 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/25/22 09:20				**Analyst:** jao
Total Suspended Solids	**6**		5	mg/l	1	03/25/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**1.1**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**1.0**	0.15	0.30	mg/l	1	04/04/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**6.0**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**17**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**5.3**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**16**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-5

2C23057-06 (Sea Water)

Sampled: 03/22/22 11:50 by Marisa Swiderski/Kate Buckley

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W2C1767 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/25/22 09:20				**Analyst:** jao
Total Suspended Solids	**6**		5	mg/l	1	03/25/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**1.4**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**0.96**	0.15	0.30	mg/l	1	04/04/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**4.8**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**13**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**4.3**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**12**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-6

2C23057-07 (Sea Water)

Sampled: 03/22/22 10:30 by Marisa Swiderski/Kate Buckley

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W2C1767 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/25/22 09:20				**Analyst:** jao
Total Suspended Solids	**4**		5	mg/l	1	03/25/22	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**1.1**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**0.92**	0.15	0.30	mg/l	1	04/05/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**3.0**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**8.7**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**2.6**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**8.2**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-REF-1

Sampled: 03/22/22 9:30 by Marisa Swiderski/Kate Buckley

2C23057-08 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W2C1767 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/25/22 09:20				**Analyst:** jao
Total Suspended Solids	**10**		5	mg/l	1	03/25/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**0.95**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**0.91**	0.15	0.30	mg/l	1	04/05/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**2.5**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**7.6**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**2.2**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**6.9**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-REF-2

Sampled: 03/22/22 8:45 by Marisa Swiderski/Kate Buckley

2C23057-09 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W2C1767 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/25/22 09:20				**Analyst:** jao
Total Suspended Solids	**9**		5	mg/l	1	03/25/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	**0.97**	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**0.95**	0.15	0.30	mg/l	1	04/05/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**2.8**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**8.4**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**2.5**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**7.7**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-ER

Sampled: 03/22/22 7:45 by Marisa Swiderski/Kate Buckley

2C23057-10 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W2C1767 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/25/22 09:20				**Analyst:** jao
Total Suspended Solids	**0.5**		5	mg/l	1	03/25/22	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	ND	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	**0.16**	0.15	0.30	mg/l	1	04/05/22	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**0.039**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	**0.61**	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**0.093**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	**0.21**	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Sample Results

(Continued)

Sample: SIYB-FB

Sampled: 03/22/22 16:55 by Marisa Swiderski/Kate Buckley

2C23057-11 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** _ANALYST				
Batch ID: W2C1847 **Preparation:** _NONE (WETCHEM)			**Prepared:** 03/28/22 09:35				**Analyst:** ttf
Total Suspended Solids	ND		5	mg/l	1	03/28/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2C2118 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 03/30/22 13:52				**Analyst:** mpw
Total Organic Carbon (TOC)	ND	0.19	0.30	mg/l	1	04/01/22	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W2D0053 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 04/04/22 09:00				**Analyst:** ajc
Dissolved Organic Carbon	ND	0.15	0.30	mg/l	1	04/05/22	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0063 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:15				**Analyst:** ALN
Copper, Total	**0.49**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Total	ND	0.036	0.20	ug/l	1	04/02/22	
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W2D0066 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 04/01/22 16:24				**Analyst:** ALN
Copper, Dissolved	**0.015**	0.0038	0.010	ug/l	1	04/02/22	
Zinc, Dissolved	ND	0.036	0.20	ug/l	1	04/02/22	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Quality Control Results

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

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2C1767 - SM 2540D											
Blank (W2C1767-BLK1)					**Prepared & Analyzed: 03/25/22**						
Total Suspended Solids	ND		5	mg/l							
LCS (W2C1767-BS1)					**Prepared & Analyzed: 03/25/22**						
Total Suspended Solids	50.0		5	mg/l	49.9		100	90-110			
Duplicate (W2C1767-DUP1)	**Source: 2C04007-01**				**Prepared & Analyzed: 03/25/22**						
Total Suspended Solids	3.40		5	mg/l		3.60			6	10	J
Duplicate (W2C1767-DUP2)	**Source: 2C22026-01**				**Prepared & Analyzed: 03/25/22**						
Total Suspended Solids	98.0		5	mg/l		95.8			2	10	
Batch: W2C1847 - SM 2540D											
Blank (W2C1847-BLK1)					**Prepared & Analyzed: 03/28/22**						
Total Suspended Solids	ND		5	mg/l							
LCS (W2C1847-BS1)					**Prepared & Analyzed: 03/28/22**						
Total Suspended Solids	56.2		5	mg/l	55.4		101	90-110			
Duplicate (W2C1847-DUP1)	**Source: 2C23032-01**				**Prepared & Analyzed: 03/28/22**						
Total Suspended Solids	192		5	mg/l		208			8	10	
Duplicate (W2C1847-DUP2)	**Source: 2C23057-01**				**Prepared & Analyzed: 03/28/22**						
Total Suspended Solids	3.30		5	mg/l		3.40			3	10	J
Batch: W2C2118 - SM 5310B											
Blank (W2C2118-BLK1)					**Prepared: 03/30/22 Analyzed: 03/31/22**						
Total Organic Carbon (TOC)	ND	0.19	0.30	mg/l							
LCS (W2C2118-BS1)					**Prepared: 03/30/22 Analyzed: 03/31/22**						
Total Organic Carbon (TOC)	1.86	0.19	0.30	mg/l	2.00		93	76-115		20	
Matrix Spike (W2C2118-MS1)	**Source: 2C23057-01**				**Prepared: 03/30/22 Analyzed: 04/01/22**						
Total Organic Carbon (TOC)	2.56	0.19	0.30	mg/l	2.00	1.16	70	76-115		20	MS-01
Matrix Spike Dup (W2C2118-MSD1)	**Source: 2C23057-01**				**Prepared: 03/30/22 Analyzed: 04/01/22**						
Total Organic Carbon (TOC)	2.45	0.19	0.30	mg/l	2.00	1.16	65	76-115	4	20	MS-01
Batch: W2D0053 - SM 5310B											
Blank (W2D0053-BLK1)					**Prepared & Analyzed: 04/04/22**						
Dissolved Organic Carbon	ND	0.15	0.30	mg/l							
LCS (W2D0053-BS1)					**Prepared & Analyzed: 04/04/22**						
Dissolved Organic Carbon	1.86	0.15	0.30	mg/l	2.00		93	74-120		20	
Matrix Spike (W2D0053-MS1)	**Source: 2C23057-01**				**Prepared & Analyzed: 04/04/22**						
Dissolved Organic Carbon	2.23	0.15	0.30	mg/l	2.00	1.04	60	74-120		20	MS-01
Matrix Spike Dup (W2D0053-MSD1)	**Source: 2C23057-01**				**Prepared: 04/04/22 Analyzed: 04/05/22**						
Dissolved Organic Carbon	2.32	0.15	0.30	mg/l	2.00	1.04	64	74-120	4	20	MS-01

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2D0063 - EPA 1640											
Blank (W2D0063-BLK1)					**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Total	ND	0.0038	0.010	ug/l							
Zinc, Total	ND	0.036	0.20	ug/l							
LCS (W2D0063-BS1)					**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Total	10.4	0.0038	0.010	ug/l	10.0		104	83-109		25	
Zinc, Total	33.1	0.036	0.20	ug/l	30.0		110	68-132		30	
Matrix Spike (W2D0063-MS1)	**Source: 2C23057-01**				**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Total	22.8	0.0038	0.010	ug/l	10.0	12.0	108	83-109		25	
Zinc, Total	63.4	0.036	0.20	ug/l	30.0	30.9	108	68-132		30	
Matrix Spike (W2D0063-MS2)	**Source: 2C23057-02**				**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Total	23.9	0.0038	0.010	ug/l	10.0	13.0	109	83-109		25	
Zinc, Total	64.5	0.036	0.20	ug/l	30.0	31.8	109	68-132		30	
Matrix Spike Dup (W2D0063-MSD1)	**Source: 2C23057-01**				**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Total	22.8	0.0038	0.010	ug/l	10.0	12.0	108	83-109	0.1	25	
Zinc, Total	63.8	0.036	0.20	ug/l	30.0	30.9	110	68-132	0.7	30	
Matrix Spike Dup (W2D0063-MSD2)	**Source: 2C23057-02**				**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Total	23.3	0.0038	0.010	ug/l	10.0	13.0	104	83-109	2	25	
Zinc, Total	64.6	0.036	0.20	ug/l	30.0	31.8	109	68-132	0.06	30	
Batch: W2D0066 - EPA 1640											
Blank (W2D0066-BLK1)					**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
Zinc, Dissolved	ND	0.036	0.20	ug/l							
LCS (W2D0066-BS1)					**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Dissolved	10.3	0.0038	0.010	ug/l	10.0		103	70-130		30	
Zinc, Dissolved	31.3	0.036	0.20	ug/l	30.0		104	68-132		30	
Matrix Spike (W2D0066-MS1)	**Source: 2C23057-01**				**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Dissolved	21.5	0.0038	0.010	ug/l	10.0	10.9	107	70-130		30	
Zinc, Dissolved	61.8	0.036	0.20	ug/l	30.0	29.9	106	68-132		30	
Matrix Spike (W2D0066-MS2)	**Source: 2C23057-02**				**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Dissolved	22.5	0.0038	0.010	ug/l	10.0	12.0	105	70-130		30	
Zinc, Dissolved	63.1	0.036	0.20	ug/l	30.0	31.2	106	68-132		30	
Matrix Spike Dup (W2D0066-MSD1)	**Source: 2C23057-01**				**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Dissolved	21.5	0.0038	0.010	ug/l	10.0	10.9	107	70-130	0.03	30	
Zinc, Dissolved	61.9	0.036	0.20	ug/l	30.0	29.9	107	68-132	0.2	30	
Matrix Spike Dup (W2D0066-MSD2)	**Source: 2C23057-02**				**Prepared: 04/01/22 Analyzed: 04/02/22**						
Copper, Dissolved	22.5	0.0038	0.010	ug/l	10.0	12.0	105	70-130	0.1	30	
Zinc, Dissolved	63.8	0.036	0.20	ug/l	30.0	31.2	109	68-132	1	30	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Wood - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TMDL Winter Monitoring (Port of San Diego)

Project Manager: Marisa Swiderski

Reported: 04/12/2022 18:00

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
%REC	Percent Recovery
Dil	Dilution
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964

14859 East Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

STANDARD JC23057

Page 1 Of 1

CLIENT NAME: Wood Environment & Infrastructure Solutions, Inc.

ADDRESS: 9177 Sky Park Ct., San Diego, CA 92123

PROJECT: 2022 SIYB TMDL Winter Monitoring (Port of San Diego)

PHONE: 858-300-4324
FAX: 858-300-4301
EMAIL: marisa.swiderski@woodplc.com, barry.snyder@woodplc.com

PROJECT MANAGER: Marisa Swiderski

SAMPLER: Marisa Swiderski (MS) / Kate Buckley (KB)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL. TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper[1] EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1,2] EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Zinc[1] EPA 1640 MDL 0.036 µg/L, RL= 0.20 µg/L	Dissolved Zinc[1,2] EPA 1640 MDL 0.036 µg/L, RL= 0.20 µg/L	Total Organic Carbon (TOC) SM 5310B MDL = 0.016 mg/L, RL = 0.10 mg/L	Dissolved Organic Carbon (DOC)[3] SM 5310B MDL = 0.016 mg/L, RL = 0.10 mg/L	Total Suspended Solids EPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L				COMMENTS
	03/22/22	1550	seawater	SIYB-1	15	X	X	X	X	X	X	X				extra vol. analyze sample MS/MSD
	03/22/22	1630	seawater	SIYB-1 (REP)	7	X	X	X	X	X	X	X				
	03/22/22	1500	seawater	SIYB-2	7	X	X	X	X	X	X	X				
	03/22/22	1350	seawater	SIYB-3	7	X	X	X	X	X	X	X				
	03/22/22	1300	seawater	SIYB-4	7	X	X	X	X	X	X	X				
	03/22/22	1150	seawater	SIYB-5	7	X	X	X	X	X	X	X				
	03/22/22	1030	seawater	SIYB-6	7	X	X	X	X	X	X	X				
	03/22/22	0930	seawater	SIYB-REF-1	7	X	X	X	X	X	X	X				
	03/22/22	0845	seawater	SIYB-REF-2	7	X	X	X	X	X	X	X				
	03/22/22	0745	DI	SIYB-ER	7	X	X	X	X	X	X	X				
	03/22/22	1655	DI	SIYB-FB	7	X	X	X	X	X	X	X				

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Marisa Swiderski	03/23/2022 0900	Heet Sanchez
Heet Sanchez	3-23-22 11:25	[illegible] 3/23/22 11:25

SAMPLE CONDITION:

Actual Temperature: 4.3 °C

Received On Ice	(Y) / N
Preserved	(Y) / N
Evidence Seals Present	Y / (N)
Container Intact	Y / (N)
Preserved at Lab	Y / (N)

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) LAB ACTION: PRESERVE Cu/Zn IMMEDIATELY. HDPE Metals bottles have NO acid (HNO3) in bottle.
2) Diss. metals were field filtered using 0.45 um bottletop filt. system.
3) DOC samples were field filtered through 0.45 um Nylon filters.
4) Preserve extra of each sample for total and dissolved metals to archive.
5) SPIKE level at the following amounts: Copper = 10 ug/L, Zinc = 30 ug/L, TOC/DOC = 2.0 mg/L
6) WECK will contact Wood PM within 24 hours if any sample anomalies are found.

Please submit invoices to APInvoice.US@woodplc.com and include the following information :
1) Project #: 2015100111.0007.WECK
(2) PO #: C015101804
(3) Org: 3151
(4) GL: 573000

WECK LABORATORIES, INC.

Sample Receipt Checklist

Weck WKO: 2C23057
WKO Logged by: Lester Abad
Samples Checked by: LKA

Date/Time Received: 03/23/22 11:25
# of Samples: 11
Delivered by: Hector S.

	Task	Yes	No	N/A	Comments
COC	COC present at receipt?	☒	☐		
	COC properly completed?	☒	☐		
	COC matches sample labels?	☒	☐		
		☐	☐		
	Project Manager notified?	☐	☐	☒	
Receipt Information	Sample Temperature	4.3°C			
	Samples received on ice?	☒	☐		
	Ice Type (Blue/Wet)	WET			
	All samples intact?	☒	☐		
	Samples in proper containers?	☒	☐		
	Sufficient sample volume?	☒	☐		
	Samples intact?	☒	☐		
	Received within holding time?	☒	☐		
		☐	☐		
	Project Manager notified?	☐	☐	☒	
Sample Preservation Verification?	Sample labels checked for correct preservation?	☒	☐	☐	
	VOC Headspace: none, <6mm/<Pea size? 524.2, 524.3, 624.1, 8260, 1666 P/T, LUFT	☐	☐	☒	
	pH verified upon receipt? Metals <2; H2SO4 pres tests <2; 522<4; TOC <2; 608.3 5-9	☒	☐	☐	
	Free Chlorine Tested <0.1	☐	☐	☒	
	O&G pH <2 verified?	☐	☐	☐	pH paper Lot#
	pH adjusted for O&G	☐	☐	☐	pH Reading: / Acid Lot# / Amt added:
	Project Manager notified?	☐	☐	☒	

PM Comments

Sample Receipt Checklist Prepared by:

Signature: LKA Date: 03/23/22

B-2: January 25, 2023 Event

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 3A26102

Project: 2023 SIYB TMDL Winter Monitoring

Attn: Marisa Swiderski

Client: WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Report Date: 2/24/2023
Received Date: 1/26/2023
Turnaround Time: Normal
Phones: (858) 300-4324
Fax: (858) 278-5300
P.O. #: C015102550
Billing Code:

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • ISO17025 ANAB #L2457.01 • LACSD #10143

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Marisa Swiderski,

Enclosed are the results of analyses for samples received 1/26/23 with the Chain-of-Custody document. The samples were received in good condition, at 4.3 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SIYB-ER	Marisa Swiderski / Kate Buckley	3A26102-01	Water	01/25/23 06:25	
SIYB-REF-2	Marisa Swiderski / Kate Buckley	3A26102-02	Water	01/25/23 07:20	
SIYB-REF-1	Marisa Swiderski / Kate Buckley	3A26102-03	Water	01/25/23 08:00	
SIYB-6	Marisa Swiderski / Kate Buckley	3A26102-04	Water	01/25/23 09:00	
SIYB-5	Marisa Swiderski / Kate Buckley	3A26102-05	Water	01/25/23 10:00	
SIYB-4	Marisa Swiderski / Kate Buckley	3A26102-06	Water	01/25/23 11:00	
SIYB-3	Marisa Swiderski / Kate Buckley	3A26102-07	Water	01/25/23 12:00	
SIYB-2	Marisa Swiderski / Kate Buckley	3A26102-08	Water	01/25/23 13:00	
SIYB-1	Marisa Swiderski / Kate Buckley	3A26102-09	Water	01/25/23 14:00	
SIYB-1 (REP)	Marisa Swiderski / Kate Buckley	3A26102-10	Water	01/25/23 14:50	
SIYB-FB	Marisa Swiderski / Kate Buckley	3A26102-11	Water	01/25/23 15:20	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

Sample: SIYB-ER
3A26102-01 (Water)

Sampled: 01/25/23 6:25 by Marisa Swiderski / Kate Buckley

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**0.4**		5	mg/l	1	01/27/23	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**0.21**	0.19	0.30	mg/l	1	02/03/23	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**0.25**	0.15	0.30	mg/l	1	02/07/23	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**0.037**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**1.9**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**0.061**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**3.8**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-REF-2

Sampled: 01/25/23 7:20 by Marisa Swiderski / Kate Buckley

3A26102-02 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**4**		5	mg/l	1	01/27/23	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.4**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.4**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**2.2**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**14**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**2.5**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**14**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-REF-1

Sampled: 01/25/23 8:00 by Marisa Swiderski / Kate Buckley

3A26102-03 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**6**		5	mg/l	1	01/27/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.2**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.3**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**1.6**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**6.1**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**1.6**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**5.9**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-6

Sampled: 01/25/23 9:00 by Marisa Swiderski / Kate Buckley

3A26102-04 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**5**		5	mg/l	1	01/27/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.2**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.2**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**2.3**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**8.9**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**2.3**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**8.1**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-5

Sampled: 01/25/23 10:00 by Marisa Swiderski / Kate Buckley

3A26102-05 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**5**		5	mg/l	1	01/27/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.2**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.4**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**3.7**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**14**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**3.7**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**13**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-4

Sampled: 01/25/23 11:00 by Marisa Swiderski / Kate Buckley

3A26102-06 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**5**		5	mg/l	1	01/27/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.2**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.3**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**5.2**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**19**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**5.4**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**19**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-3

Sampled: 01/25/23 12:00 by Marisa Swiderski / Kate Buckley

3A26102-07 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**5**		5	mg/l	1	01/27/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.2**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.4**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**5.3**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**20**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**5.3**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**19**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-2

Sampled: 01/25/23 13:00 by Marisa Swiderski / Kate Buckley

3A26102-08 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**10**		5	mg/l	1	01/27/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.3**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.3**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**6.9**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**28**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**7.3**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**26**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-1

Sampled: 01/25/23 14:00 by Marisa Swiderski / Kate Buckley

3A26102-09 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2312 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/27/23 09:40				**Analyst:** mes
Total Suspended Solids	**9**		5	mg/l	1	01/27/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.2**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.3**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**7.7**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**26**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**7.3**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**23**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-1 (REP)
3A26102-10 (Water)

Sampled: 01/25/23 14:50 by Marisa Swiderski / Kate Buckley

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3A2544 **Preparation:** _NONE (WETCHEM)			**Prepared:** 01/31/23 11:13				**Analyst:** mes
Total Suspended Solids	**4**		5	mg/l	1	01/31/23	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**1.3**	0.19	0.30	mg/l	1	02/03/23	
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.2**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**7.9**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	**28**	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**8.0**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**26**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Sample Results

(Continued)

Sample: SIYB-FB

Sampled: 01/25/23 15:20 by Marisa Swiderski / Kate Buckley

3A26102-11 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D			**Instr:** OVEN15				
Batch ID: W3B0029 **Preparation:** _NONE (WETCHEM)			**Prepared:** 02/01/23 12:54				**Analyst:** mes
Total Suspended Solids	**0.3**		5	mg/l	1	02/01/23	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0162 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/02/23 08:39				**Analyst:** ajc
Total Organic Carbon (TOC)	**0.22**	0.19	0.30	mg/l	1	02/03/23	J
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**0.34**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1337 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/15/23 15:55				**Analyst:** ALN
Copper, Dissolved	**0.036**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Dissolved	ND	0.036	0.20	ug/l	1	02/16/23	
Method: EPA 1640			**Instr:** ICPMS08				
Batch ID: W3B1445 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:18				**Analyst:** ALN
Copper, Total	**0.12**	0.0038	0.010	ug/l	1	02/16/23	
Zinc, Total	**0.30**	0.036	0.20	ug/l	1	02/16/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported: 02/24/2023 11:02

Quality Control Results

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

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W3A2312 - SM 2540D											
Blank (W3A2312-BLK1)					**Prepared & Analyzed: 01/27/23**						
Total Suspended Solids	1.10		5	mg/l							J
LCS (W3A2312-BS1)					**Prepared & Analyzed: 01/27/23**						
Total Suspended Solids	54.7		5	mg/l	54.0		101	90-110			
Duplicate (W3A2312-DUP1)	**Source: 3A26015-01**				**Prepared & Analyzed: 01/27/23**						
Total Suspended Solids	3040		5	mg/l		2780			9	10	
Duplicate (W3A2312-DUP2)	**Source: 3A27056-01**				**Prepared & Analyzed: 01/27/23**						
Total Suspended Solids	126		5	mg/l		128			2	10	
Batch: W3A2544 - SM 2540D											
Blank (W3A2544-BLK1)					**Prepared & Analyzed: 01/31/23**						
Total Suspended Solids	ND		5	mg/l							
LCS (W3A2544-BS1)					**Prepared & Analyzed: 01/31/23**						
Total Suspended Solids	52.5		5	mg/l	55.4		95	90-110			
Duplicate (W3A2544-DUP1)	**Source: 3A25110-03**				**Prepared & Analyzed: 01/31/23**						
Total Suspended Solids	16.4		5	mg/l		18.0			9	10	
Duplicate (W3A2544-DUP2)	**Source: 3A25110-08**				**Prepared & Analyzed: 01/31/23**						
Total Suspended Solids	8.60		5	mg/l		8.00			7	10	
Batch: W3B0029 - SM 2540D											
Blank (W3B0029-BLK1)					**Prepared & Analyzed: 02/01/23**						
Total Suspended Solids	0.200		5	mg/l							J
LCS (W3B0029-BS1)					**Prepared & Analyzed: 02/01/23**						
Total Suspended Solids	65.0		5	mg/l	63.7		102	90-110			
Duplicate (W3B0029-DUP1)	**Source: 3A27039-01**				**Prepared & Analyzed: 02/01/23**						
Total Suspended Solids	58.4		5	mg/l		64.2			9	10	
Duplicate (W3B0029-DUP2)	**Source: 3A27093-01**				**Prepared & Analyzed: 02/01/23**						
Total Suspended Solids	27.1		5	mg/l		28.3			4	10	
Batch: W3B0162 - SM 5310B											
Blank (W3B0162-BLK1)					**Prepared: 02/02/23 Analyzed: 02/03/23**						
Total Organic Carbon (TOC)	ND	0.19	0.30	mg/l							
LCS (W3B0162-BS1)					**Prepared: 02/02/23 Analyzed: 02/03/23**						
Total Organic Carbon (TOC)	1.99	0.19	0.30	mg/l	2.00		100	76-115		20	
Matrix Spike (W3B0162-MS1)	**Source: 3A26102-09**				**Prepared: 02/02/23 Analyzed: 02/03/23**						
Total Organic Carbon (TOC)	3.27	0.19	0.30	mg/l	2.00	1.24	101	76-115		20	
Matrix Spike Dup (W3B0162-MSD1)	**Source: 3A26102-09**				**Prepared: 02/02/23 Analyzed: 02/03/23**						
Total Organic Carbon (TOC)	3.23	0.19	0.30	mg/l	2.00	1.24	99	76-115	1	20	
Batch: W3B0440 - SM 5310B											
Blank (W3B0440-BLK1)					**Prepared: 02/06/23 Analyzed: 02/07/23**						
Dissolved Organic Carbon	ND	0.15	0.30	mg/l							

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W3B0440 - SM 5310B (Continued)											
Blank (W3B0440-BLK2)					**Prepared: 02/06/23**	**Analyzed: 02/07/23**					
Dissolved Organic Carbon	ND	0.15	0.30	mg/l							A-01
LCS (W3B0440-BS1)					**Prepared: 02/06/23**	**Analyzed: 02/07/23**					
Dissolved Organic Carbon	2.01	0.15	0.30	mg/l	2.00		100	74-120		20	
Matrix Spike (W3B0440-MS1)	**Source: 3A26102-09**				**Prepared: 02/06/23**	**Analyzed: 02/07/23**					
Dissolved Organic Carbon	3.39	0.15	0.30	mg/l	2.00	1.26	107	74-120		20	
Matrix Spike Dup (W3B0440-MSD1)	**Source: 3A26102-09**				**Prepared: 02/06/23**	**Analyzed: 02/07/23**					
Dissolved Organic Carbon	3.43	0.15	0.30	mg/l	2.00	1.26	109	74-120	1	20	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported: 02/24/2023 11:02

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W3B1337 - EPA 1640											
Blank (W3B1337-BLK1)					**Prepared: 02/15/23**	**Analyzed: 02/16/23**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
Zinc, Dissolved	ND	0.036	0.20	ug/l							
LCS (W3B1337-BS1)					**Prepared: 02/15/23**	**Analyzed: 02/16/23**					
Copper, Dissolved	10.7	0.0038	0.010	ug/l	10.0		107	70-130		30	
Zinc, Dissolved	33.4	0.036	0.20	ug/l	30.0		111	68-132		30	
Matrix Spike (W3B1337-MS1)	**Source: 3A26102-09**				**Prepared: 02/15/23**	**Analyzed: 02/16/23**					
Copper, Dissolved	18.6	0.0038	0.010	ug/l	10.0	7.69	109	70-130		30	
Zinc, Dissolved	59.8	0.036	0.20	ug/l	30.0	25.9	113	68-132		30	
Matrix Spike (W3B1337-MS2)	**Source: 3A26102-10**				**Prepared: 02/15/23**	**Analyzed: 02/16/23**					
Copper, Dissolved	17.1	0.0038	0.010	ug/l	10.0	7.87	92	70-130		30	
Zinc, Dissolved	57.1	0.036	0.20	ug/l	30.0	28.5	95	68-132		30	
Matrix Spike Dup (W3B1337-MSD1)	**Source: 3A26102-09**				**Prepared: 02/15/23**	**Analyzed: 02/16/23**					
Copper, Dissolved	18.8	0.0038	0.010	ug/l	10.0	7.69	111	70-130	1	30	
Zinc, Dissolved	61.7	0.036	0.20	ug/l	30.0	25.9	120	68-132	3	30	
Matrix Spike Dup (W3B1337-MSD2)	**Source: 3A26102-10**				**Prepared: 02/15/23**	**Analyzed: 02/16/23**					
Copper, Dissolved	17.8	0.0038	0.010	ug/l	10.0	7.87	100	70-130	4	30	
Zinc, Dissolved	59.4	0.036	0.20	ug/l	30.0	28.5	103	68-132	4	30	
Batch: W3B1445 - EPA 1640											
Blank (W3B1445-BLK1)					**Prepared & Analyzed: 02/16/23**						
Copper, Total	ND	0.0038	0.010	ug/l							
Zinc, Total	ND	0.036	0.20	ug/l							
LCS (W3B1445-BS1)					**Prepared & Analyzed: 02/16/23**						
Copper, Total	9.90	0.0038	0.010	ug/l	10.0		99	83-109		25	
Zinc, Total	30.9	0.036	0.20	ug/l	30.0		103	68-132		30	
Matrix Spike (W3B1445-MS1)	**Source: 3A26102-09**				**Prepared & Analyzed: 02/16/23**						
Copper, Total	17.4	0.0038	0.010	ug/l	10.0	7.30	101	83-109		25	
Zinc, Total	53.9	0.036	0.20	ug/l	30.0	23.4	101	68-132		30	
Matrix Spike (W3B1445-MS2)	**Source: 3A26102-10**				**Prepared & Analyzed: 02/16/23**						
Copper, Total	17.5	0.0038	0.010	ug/l	10.0	7.98	95	83-109		25	
Zinc, Total	56.7	0.036	0.20	ug/l	30.0	26.4	101	68-132		30	
Matrix Spike Dup (W3B1445-MSD1)	**Source: 3A26102-09**				**Prepared & Analyzed: 02/16/23**						
Copper, Total	17.0	0.0038	0.010	ug/l	10.0	7.30	97	83-109	2	25	
Zinc, Total	52.5	0.036	0.20	ug/l	30.0	23.4	97	68-132	3	30	
Matrix Spike Dup (W3B1445-MSD2)	**Source: 3A26102-10**				**Prepared & Analyzed: 02/16/23**						
Copper, Total	17.9	0.0038	0.010	ug/l	10.0	7.98	99	83-109	2	25	
Zinc, Total	57.2	0.036	0.20	ug/l	30.0	26.4	102	68-132	0.8	30	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: 2023 SIYB TMDL Winter Monitoring

Project Manager: Marisa Swiderski

Reported:
02/24/2023 11:02

Notes and Definitions

Item	Definition
A-01	filtered and acidified 01/25/2023
J	Estimated conc. detected <MRL and >MDL.
%REC	Percent Recovery
Dil	Dilution
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

3A26102

Standard CHAIN OF CUSTODY RECORD

Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964
14859 Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

WECK WKO# 3A26102

CLIENT NAME:	PROJECT:
WSP USA Environment & Infrastructure Inc.	2023 SIYB TMDL Winter Monitoring (Port of San Diego)
ADDRESS: 9177 Sky Park Court San Diego, CA 92123	PHONE: 808-772-8740 FAX: EMAIL: marisa.swiderski@wsp.com barry.snyder@wsp.com
PROJECT MANAGER Marisa Swiderski	SAMPLER Marisa Swiderski (MS) / Kate Buckley (KB)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl_2 Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper[1] (EPA 1640)	Dissolved Copper[1,2] (EPA 1640)	Total Zinc[1] (EPA 1640)	Dissolved Zinc[1,2] (EPA1640)	Total Organic Carbon (TOC) (SM 5310B)	Dissolved Organic Carbon (DOC)[3] (SM 5310B)	Total Suspended Solids (SM 2540D)	COMMENTS
	01/25/2023	0625	DI	N	SIYB-ER	7	X	X	X	X	X	X	X	
		0720	SW	N	SIYB-REF-2	7	X	X	X	X	X	X	X	
		0800	SW	N	SIYB-REF-1	7	X	X	X	X	X	X	X	
		0900	SW	N	SIYB-6	7	X	X	X	X	X	X	X	
		1000	SW	N	SIYB-5	7	X	X	X	X	X	X	X	
		1100	SW	N	SIYB-4	7	X	X	X	X	X	X	X	
		1200	SW	N	SIYB-3	7	X	X	X	X	X	X	X	
		1300	SW	N	SIYB-2	7	X	X	X	X	X	X	X	
		1400	SW	N	SIYB-1	15	X	X	X	X	X	X	X	extra volume - analyze sample MS/MSD
		1450	SW	N	SIYB-1 (REP)	7	X	X	X	X	X	X	X	
		1520	DI	N	SIYB-FB	7	X	X	X	X	X	X	X	

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
Marisa Swiderski	01/26/2022 0845	Jacob Sanchez	1-26-23 0845
Jacob Sanchez	1-26-23 1240		1-26-23 12:40

SAMPLE CONDITION:

Actual Temperature:	Thermometer #:
4.3c	T-0279
Received On Ice	Y / N
Samples Preserved	Y / N
Evidence Seals Present	Y / N
Container Attacked	Y / N

SAMPLE TYPE CODE:

DW = Drinking Water
WW = Waste Water
GW = Ground Water
SF = Surface Water
SW = Sea Water
SO = Soild/Soil
SL = Sludge
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY OVER UNSCHEDULED RUSH REQUESTS

Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) LAB ACTION: PRESERVE Cu/Zn IMMEDIATELY. HDPE Metals bottles have NO acid (HNO3) in bottle.
2) Diss. metals were field filtered using 0.45 um bottletop filt. system.
3) DOC samples were field filtered through 0.45 um Nylon filters.
4) Preserve extra of each sample for total and dissolved metals to archive.
5) SPIKE level at the following amounts: Copper = 10 ug/L, Zinc = 30 ug/L, TOC/DOC = 2.0 mg/L
6) Weck will contact WSP PM within 24 hours if any sample anomalies are found.

Please submit invoices to APInvoice.US@woodplc.com (cc: marisa.swiderski@wsp.com & marissa.cuevas@wsp.com) and include the following information:
1) Project #: 2015100118.0007.WECK
(2) PO #: C015102550
(3) Org: 3151
(4) GL: 573000

WECK LABORATORIES, INC.

Sample Receipt Checklist

Weck WKO: 3A26102
WKO Logged by: Jerico Bolotano
Samples Checked by: Jerico Bolotano

Date/Time Received: 01/26/23 @ 12:40
# of Samples: 11
Delivered by: Hector Sanchez

	Task	Yes	No	N/A	Comments
COC	COC present at receipt?	☒	☐		
	COC properly completed?	☒	☐		
	COC matches sample labels?	☒	☐		
		☐	☐		
	Project Manager notified?	☐	☐	☒	
Receipt Information	Sample Temperature	4.3°C			
	Samples received on ice?	☒	☐		
	Ice Type (Blue/Wet)	Wet			
	All samples intact?	☒	☐		
	Samples in proper containers?	☒	☐		
	Sufficient sample volume?	☒	☐		
	Samples intact?	☒	☐		
	Received within holding time?	☒	☐		
		☐	☐		
	Project Manager notified?	☐	☐	☒	
Sample Preservation Verification?	Sample labels checked for correct preservation?	☒	☐	☐	
	VOC Headspace: (No) none, If Yes (See comment) 524.2, 524.3, 624.1, 8260, 1666 P/T, LUFT	☐	☐	☒	☐ <6mm/Pea size?
	pH verified upon receipt? Metals <2; H2SO4 pres tests <2; 522<4; TOC <2; 525.2<2; 6710B<2; 608.3 5-9	☒	☐	☐	pH paper Lot# 2071882
	Free Chlorine Tested <0.1	☐	☐	☒	Cl Test Strip Lot# 061221E
	O&G pH <2 verified?	☐	☐	☐	pH paper Lot# / pH Reading:
	pH adjusted for O&G	☐	☐	☐	Acid Lot# / Amt added:
	Project Manager notified?	☐	☐	☐	

PM Comments

Sample Receipt Checklist Prepared by:

Signature: JB Date: 01/26/23

Appendix C

Toxicity Laboratory Reports

C-1: March 22, 2022 Event

Results of Toxicity Testing for Shelter Island Yacht Basin Total Maximum Daily Load Monitoring

Sample Collection: March 22, 2022
Wood Project Number: 2015100111

Submitted to:

Wood Environment & Infrastructure Solutions, Inc.
9177 Sky Park Court
San Diego, CA 92123

Testing Performed by:

wood.

Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicology Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117

The Wood Aquatic Toxicology Laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: Steve Carlson **Date:** 5/24/22.

INTRODUCTION

Located in the Port of San Diego, Shelter Island Yacht Basin (SIYB) was issued an Investigative Order (R9-2011-0036, amended from Resolution No. R9-2005-0019) from the San Diego Regional Water Quality Control Board that requires annual monitoring for the SIYB Dissolved Copper Total Maximum Daily Load (TMDL) program. The monitoring program requires the performance of water column toxicity testing at 7 locations within the basin area. The 7 sample sites are tested for chronic toxicity with the mussel species *Mytilus galloprovincialis*, and for acute toxicity with the Pacific topsmelt species *Atherinops affinis*. Testing was conducted during March 2022 as part of a winter monitoring event.

Staff for Wood Environment & Infrastructure Solutions, Inc. (Wood) collected and delivered all 7 samples to Wood's in-house Aquatic Toxicology Laboratory located in San Diego, California. The samples were collected on March 22, 2022, and testing was initiated on March 23, 2022.

MATERIALS & METHODS

Sample Information

Client:	Port of San Diego
Project Name:	Shelter Island Yacht Basin Annual TMDL Monitoring
Monitoring Period:	March 2022 (winter event)
Sample IDs (7 sites):	SIYB-1, SIYB-2, SIYB-3, SIYB-4, SIYB-5, SIYB-6, and SIYB-REF-1
Sample Collection Date, Times:	3/22/2022, 09:30 – 15:50
Sample Receipt Date, Time:	3/22/2022, 17:40

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (℃)	pH (units)	DO (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	TRC (mg/L)
SIYB-1	13.7	7.74	7.9	32.9	124	<0.02
SIYB-2	13.0	7.74	8.0	32.8	123	0.03
SIYB-3	4.9	7.76	8.2	32.3	126	0.03
SIYB-4	1.9	7.77	8.6	32.5	122	<0.02
SIYB-5	3.9	7.77	8.2	32.5	121	<0.02
SIYB-6	2.2	7.76	8.2	32.5	123	<0.02
SIYB-REF-1	4.6	7.76	8.0	32.5	119	<0.02

DO = dissolved oxygen, TRC = total residual chlorine

Chronic Mussel Development Test Specifications

Test Period:	3/23/2022, 16:15 – 3/25/2022, 16:15
Test Organism:	*Mytilus galloprovincialis* (bivalve - mussel)
Test Organism Source:	Field-collected – Mission Bay (San Diego, CA)
Test Organism Age at start:	Fertilized embryos (<4 hours old)
Test Procedure:	48-hour embryo-larval development
Test Endpoint:	Combined survival & proportion normal (ASTM)
Test Concentrations:	Lab Control, 6.25, 12.5, 25, 50, and 100% sample
Treatment Concentrations:	Filter Control and 100% Filtered (1.2μm filter)
Lab Control/Dilution Water:	Natural seawater from the inlet at Scripps Institution of Oceanography (20-μm filtered)
Protocols Used:	EPA 1995 West Coast Manual (EPA/600/R-95/136); and ASTM 1998 (E 724-98).
EPA Test Acceptability Criteria:	Control: ≥50% survival; ≥90% proportion normal; and minimum significant difference (MSD) <25%
ASTM Test Acceptability Criteria:	Control: ≥70% combined survival/proportion normal
Reference Toxicant Test:	Lab Control, 2.5, 5.0, 10, 20, and 40 μg/L copper
Statistical Analysis Software:	CETIS™ v.1.9.3.0

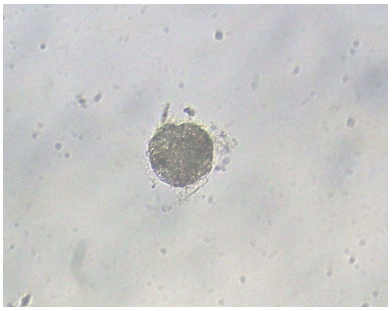
Calculating the mussel test endpoint: Embryos within each test replicate are scored under a microscope by counting all larvae observed in the vial. Percent survival is evaluated by comparing the total number of larvae observed in each vial to an initial (time-zero) density count derived from 5 surrogate exposure chambers (vials) interspersed within the test and preserved immediately after adding embryos. Each larva is scored as normal or abnormal resulting in a second test endpoint; proportion normal. Normal development is exhibited by a clearly defined "D-shaped" shell with a clear straight line as a hinge, while abnormal development is exhibited by any clear abnormalities or differences to the normal "D-shaped" shell. This includes larva that have not fully developed a clear straight hinge (this is exhibited by a slightly curved hinge). Abnormal development was further enumerated to determine the magnitude of effect. The abnormal larvae were counted as having 1) a curved hinge, which indicates a moderate effect, or 2) more significant defects or abnormalities, which indicates a more severe effect. Examples of each of the larva (normal, abnormal with curved hinge, and abnormal with severe effects) are presented in Figure 1. A final combined surviving normal embryo endpoint is calculated by comparing the number of recovered normal embryos in each replicate test chamber to the average number of fertilized embryos counted in the time zero vials. Results for the combined

embryo development endpoint are presented herein in the main report, with supporting summaries and analyses of the individual percent survival and percent normal endpoints included in Appendix A

Figure 1. Images of Different Larva Development

1) Normal D-shape/straight hinge

2) Abnormal with curved hinge



3) Abnormal with severe effects

Pacific Topsmelt Acute Survival Test Specifications

Test Start Date, Time:	3/23/2022, 11:40 – 12:30
Test End Date, Time:	3/27/2022, 12:40 – 13:15
Test Organism:	*Atherinops affinis* (Pacific topsmelt)
Organism Source; Age at start:	Aquatic BioSystems (Fort Collins, CO); 14-days old
Test Procedure and Endpoint:	96-hour static-renewal acute survival test
Test Concentrations:	Lab Control, 25, 50, and 100% each sample
Replicates/Number of Organisms:	6 replicates/5 fish per replicate (30 fish/conc.)
Lab Control/Dilution Water:	Natural seawater collected from the inlet at Scripps Institution of Oceanography (34 ppt salinity)
USEPA Protocol:	EPA/821/R-02/012, 2002 Acute Manual
Test Acceptability Criteria:	≥90% mean survival in the control
Reference Toxicant Test:	Lab Control, 25, 50, 100, 200, and 400 μg/L copper
Statistical Software:	CETIS™ v1.9.3.0

RESULTS

Test results were evaluated using two USEPA methods of analysis. The results were first analyzed using the standard approach with multiple comparisons on a dilution series of concentrations to develop a No Observed Effect Concentration (NOEC). Then, the results were analyzed using the EPA Test of Significant Toxicity (TST) approach, as referenced in USEPA 2010. The TST approach applies a modified t-test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) is the 100% sample. The IWC is compared to the Control for statistical analysis. The TST results in a "Pass" if there are no biologically significant effects with the sample (non-toxic), or it will result in a "Fail" if there are significant effects (toxic).

Chronic Mussel Test:

For the chronic mussel development test, a standard dilution series of 6.25, 12.5, 25, 50, and 100% effluent was performed on the unfiltered sample from each of the 7 sites. For the chronic mussel test, the most significant effects were observed in site SIYB-1, where there was a 12% effect observed in the 100% undiluted sample compared to the Lab Control. This 12% effect was significant using the standard method of analysis, which resulted in a NOEC equal to the 50% concentration. However, using the TST method of analysis, this effect was not significant, resulting in a Pass with the TST. The other 6 sites all resulted in less than a 3.0% effect. Therefore, the other 6 sites resulted in a NOEC equal to 100% sample and a Pass with the TST. The chronic test results for the unfiltered samples are summarized and presented in Table 2.

The 100% concentration for each sample was also tested after filtering with a 1.2μm mesh screen to remove any potential algae or other native organisms. The 100% filtered sample was compared to a Filter Control (lab control water that received the same filtering treatment). The filtered samples produced similar results to the unfiltered samples. The most effect was observed in the SIYB-1 sample. However, the effect was only 6.9%, which is slightly less than the 12% effect observed in the unfiltered sample. The other 6 sites all resulted in less than a 3.0% effect. All 7 sites, though, resulted in a NOEC equal to 100% and a Pass with the TST. Summary results for the filtered samples are presented in Table 3.

As described in the Methods section, abnormal larvae were further enumerated as either having a curved hinge (moderate effect) or having clear abnormalities or defects (severe effect). During this round of testing, the frequency of curved hinges observed remained low as presented in Table 4. The greatest effect was observed in the 100% concentration of SIYB-1. There was 3.6% with curved hinges in the unfiltered 100% sample and 3.4% in the filtered 100% sample. All other sites and concentrations all had less than 1.0% with curved hinges.

All raw data and associated statistical analyses for the mussel tests are provided for reference in Appendix A.

Table 2. Summary of Chronic Mussel Test Results: Unfiltered Samples

Sample Concentration (%)	Sample ID / Combined Survival & Proportion Normal (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Lab Control	90.8	85.0	89.1	91.0	91.6	89.6	91.1
6.25	93.4	88.2	86.0	89.9	91.7	88.7	90.9
12.5	90.4	90.6	85.2	87.2	89.4	90.0	92.6
25	92.8	89.1	88.4	92.1	89.7	89.3	90.3
50	92.3	89.5	88.5	91.8	90.7	90.4	92.3
100	79.9	86.5	90.5	92.3	91.4	93.0	88.5
NOEC	50	100	100	100	100	100	100
EC_{50}	>100	>100	>100	>100	>100	>100	>100
% Effect	12.0	-1.8	-1.6	-1.5	0.2	-3.8	2.9
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

NOEC = the highest concentration tested that results in No Observed Effect
EC_{50} = the concentration expected to cause a 50% adverse effect to the organisms
% Effect = the % effect of the IWC compared to control; a negative value indicates the IWC out-performed the control
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the sample

Table 3. Summary of Chronic Mussel Test Results: 1.2 μm Filtered Samples

Sample Concentration (%)	Sample ID / Combined Survival & Proportion Normal (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Filter Control	89.4	91.3	84.0	83.4	88.0	90.5	89.2
100 filtered	83.2	89.2	88.5	89.1	90.3	89.3	91.6
NOEC	100	100	100	100	100	100	100
% Effect	6.9	2.3	-5.4	-6.9	-2.6	1.4	-2.8
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

NOEC = the highest concentration tested that results in No Observed Effect
% Effect = the % effect of the IWC compared to control; a negative value indicates the IWC out-performed the control
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the sample

Table 4. Summary of Chronic Mussel Test: Percentage of Curved Hinges

Sample Concentration (%)	Sample ID / Mean Number of Curved Hinges (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Lab Control	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.3	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100	3.6	0.0	0.0	0.0	0.0	0.0	0.4
Filter Control	0.0	0.0	0.0	0.4	0.0	0.0	0.0
100 Filtered	3.4	0.0	0.0	0.0	0.0	0.0	0.0

Acute Pacific Topsmelt Test:

For the acute topsmelt survival test, the 7 sample sites were tested along with 3 sets of Lab Controls. There was one Lab Control per two sample sites (except the SIYB-REF-1 site went with the final two sites). All 3 Lab Controls were valid with 90% or greater survival. Also, all 7 sample sites resulted in less than 4.0% effect when compared to the Lab Control. Therefore, all 7 sites resulted in a NOEC equal to the 100% concentration and a Pass with the TST analysis. A summary of the acute topsmelt test results is presented in Table 5. All raw data and associated statistical analyses for the topsmelt tests are provided for reference in Appendix B.

Table 5. Summary of Acute Topsmelt Test Results

Sample Concentration (%)	Sample ID / Mean Survival (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Lab Control	96.7	96.7	100	100	100	100	100
25	100	96.7	100	100	100	100	100
50	100	93.3	100	100	100	100	100
100	100	96.7	100	100	96.7	100	100
NOEC	100	100	100	100	100	100	100
LC_{50}	>100	>100	>100	>100	>100	>100	>100
% Effect	-3.5	0.0	0.0	0.0	3.3	0.0	0.0
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

NOEC = the highest concentration tested that results in No Observed Effect
LC_{50} = the concentration expected to cause a lethal effect to 50% of the fish
% Effect = the % effect of the IWC compared to control; a negative value indicates the IWC out-performed the control
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the sample

QUALITY ASSURANCE

Samples were received by the lab in good condition the same day as collected. The samples were checked in, water quality measured, and then held in cold storage (4°C) until testing. Both chronic and acute tests were initiated the following day within the 36-hour holding time limit. For test organisms, the mussels were collected by Wood staff the morning of test initiation. The topsmelt were received by a commercial supplier 5-days prior to testing. The fish were held in-house and allowed to acclimate to test conditions. There was <10% mortality with the fish during holding, which is considered typical, as there is naturally some die-off of weaker fish within a population. The topsmelt were determined to be of good quality for initiating tests.

For the chronic mussel test, each sample was tested with its own Lab Control. All 7 Lab Controls met the EPA test acceptability criteria (TAC) of 50% or greater survival and 90% or greater proportion normal. All the Lab Controls also met the ASTM TAC of 70% or greater for the combined survival and proportion normal endpoint. All samples were analyzed for the combined endpoint to determine percent effects and TST results.

For the acute topsmelt test, there were 3 Lab Controls conducted with the 7 samples, and all 3 met the TAC of 90% or greater survival. Both acute and chronic tests were performed in accordance with EPA protocol guidelines and no major deviations were required during the testing period. Any minor deviations or errors made with recordings are noted on the raw bench sheets for both test species. A list of data qualifier codes is provided in Appendix C. Sample receipt information and chain of custody forms are provided in Appendix D.

Concurrent reference toxicant tests were conducted with both species. Both acute and chronic tests met the TAC and were deemed valid. The median effect concentration (EC_{50}) for both tests was within two standard deviations of the historical control chart mean for the laboratory. This indicates both the mussels and the topsmelt were healthy and resulted in typical sensitivity to the copper toxicant. A summary of the reference toxicant results for both species is presented in Table 6. Raw data, statistical analysis, and control charts for the reference toxicant tests are provided in Appendix E.

Table 6. Summary of Copper Reference Toxicant Test Results

Test Species & Endpoint	NOEC (µg/L)	EC_{50} (µg/L)	Historical EC_{50} ± 2SD range (µg/L)
Chronic Mussel Combined Surviving/Normal Embryo Development	5.0	12.6	4.54 – 17.8
Acute Pacific Topsmelt 96-hour Survival	50	159	71.3 – 278

NOEC = the highest concentration tested that results in No Observed Effect
EC_{50} = the concentration expected to cause a 50% adverse effect to the test organisms
Historical EC_{50} = the mean EC_{50} for previous tests by the lab, presented as a range of ± two standard deviations

REFERENCES

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724-98.

Tidepool Scientific Software, 2001-2015. CETIS: Comprehensive Environmental Toxicity Information System software, version 1.9.3.0.

USEPA (U.S. Environmental Protection Agency) 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). The USEPA, Office of Research and Development, Washington, DC.

USEPA 2002. U.S. Environmental Protection Agency. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. 5th Edition. EPA/821/R-02/012. USEPA, Office of Water, Washington, DC.

USEPA 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC.

APPENDIX A

Chronic Mussel Development Test

Raw Data & Statistical Analyses

Site: SIYB-1

CETIS Summary Report

Bivalve Larval Survival and Development Test — Wood E&IS

Batch ID:	18-9596-9430	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	23 ~~22~~ Mar-22 16:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	~~24~~ 25 Mar-22 16:15	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Field Collected	**Age:**	

Sample ID:	19-1947-9576	**Code:**	22-W065	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 15:50	**Material:**	Seawater	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	~~26~~ 25m (13.7 °C) 24hr	**Station:**	SIYB 1		

Comments:
FC = Filtered Control (1.2um), 101= 100% Filtred (1.2um)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-9037-3799	Combined Proportion Norma	TST-Welch's t Test	0.0131	100% passed combined proportion normal
15-8638-3255	Combined Proportion Norma	TST-Welch's t Test	1.5E-04	101% passed combined proportion normal

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
18-2921-1865	Combined Proportion Norma	Dunnett Multiple Comparison Test	50	100	70.71	2	6.67% ✓
04-7605-2775	Proportion Normal	Dunnett Multiple Comparison Test	50	100	70.71	2	3.57% ✓
16-3354-9738	Survival Rate	Dunnett Multiple Comparison Test	100	> 100	n/a	1	6.38% ✓

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
04-7605-2775	Proportion Normal	Control Resp	0.9403	0.9	>>	Yes	Passes Criteria
16-3354-9738	Survival Rate	Control Resp	0.9649	0.5	>>	Yes	Passes Criteria
18-2921-1865	Combined Proportion Norma	PMSD	0.0667	<<	0.25	No	Passes Criteria

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9077	0.8488	0.9666	0.8511	0.9622	0.0212	0.0474	5.22%	0.00%
0	FC	5	0.8939	0.8548	0.9330	0.8397	0.9160	0.0141	0.0315	3.53%	1.52%
6.25		5	0.9337	0.9095	0.9579	0.9084	0.9547	0.0087	0.0195	2.09%	-2.86%
12.5		5	0.9051	0.8587	0.9515	0.8550	0.9453	0.0167	0.0374	4.13%	0.29%
25		5	0.9282	0.9123	0.9441	0.9068	0.9407	0.0057	0.0128	1.38%	-2.26%
50		5	0.9228	0.8833	0.9622	0.8779	0.9592	0.0142	0.0318	3.45%	-1.66%
100		5	0.7985	0.6954	0.9015	0.6718	0.8945	0.0371	0.0830	10.40%	12.04%
101		5	0.8323	0.7835	0.8810	0.7863	0.8936	0.0176	0.0393	4.72%	8.31%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9403	0.9039	0.9768	0.9028	0.9679	0.0131	0.0293	3.12%	0.00%
0	FC	5	0.9270	0.8999	0.9542	0.8943	0.9478	0.0098	0.0219	2.36%	1.42%
6.25		5	0.9484	0.9249	0.9718	0.9182	0.9686	0.0085	0.0189	1.99%	-0.85%
12.5		5	0.9365	0.9156	0.9575	0.9180	0.9545	0.0076	0.0169	1.80%	0.40%
25		5	0.9282	0.9123	0.9441	0.9068	0.9407	0.0057	0.0128	1.38%	1.29%
50		5	0.9326	0.9091	0.9561	0.9080	0.9592	0.0085	0.0189	2.03%	0.82%
100		5	0.8267	0.7688	0.8847	0.7788	0.8945	0.0209	0.0467	5.64%	12.08%
101		5	0.8391	0.8001	0.8782	0.8161	0.8936	0.0141	0.0314	3.74%	10.76%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9649	0.9328	0.9969	0.9427	1.0000	0.0115	0.0258	2.67%	0.00%
0	FC	5	0.9641	0.9405	0.9877	0.9389	0.9847	0.0085	0.0190	1.97%	0.08%
6.25		5	0.9847	0.9569	1.0000	0.9504	1.0000	0.0100	0.0224	2.28%	-2.06%
12.5		5	0.9664	0.9218	1.0000	0.9237	1.0000	0.0161	0.0360	3.72%	-0.16%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-3.64%
50		5	0.9893	0.9622	1.0000	0.9504	1.0000	0.0098	0.0218	2.21%	-2.53%
100		5	0.9641	0.8920	1.0000	0.8626	1.0000	0.0260	0.0581	6.03%	0.08%
101		5	0.9916	0.9683	1.0000	0.9580	1.0000	0.0084	0.0188	1.89%	-2.77%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9198	0.8511	0.9389	0.8664	0.9622
0	FC	0.9160	0.8969	0.9160	0.8397	0.9008
6.25		0.9444	0.9427	0.9547	0.9084	0.9182
12.5		0.9453	0.9084	0.8817	0.8550	0.9351
25		0.9338	0.9315	0.9068	0.9407	0.9283
50		0.9592	0.9391	0.9331	0.9046	0.8779
100		0.6718	0.8000	0.8945	0.7824	0.8435
101		0.8289	0.8161	0.8364	0.7863	0.8936

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9679	0.9028	0.9535	0.9153	0.9622
0	FC	0.9302	0.9180	0.9449	0.8943	0.9478
6.25		0.9444	0.9686	0.9547	0.9558	0.9182
12.5		0.9453	0.9189	0.9545	0.9180	0.9459
25		0.9338	0.9315	0.9068	0.9407	0.9283
50		0.9592	0.9391	0.9331	0.9080	0.9237
100		0.7788	0.8000	0.8945	0.8071	0.8533
101		0.8289	0.8161	0.8364	0.8207	0.8936

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9504	0.9427	0.9847	0.9466	1.0000
0	FC	0.9847	0.9771	0.9695	0.9389	0.9504
6.25		1.0000	0.9733	1.0000	0.9504	1.0000
12.5		1.0000	0.9885	0.9237	0.9313	0.9885
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	0.9962	0.9504
100		0.8626	1.0000	1.0000	0.9695	0.9885
101		1.0000	1.0000	1.0000	0.9580	1.0000

Bivalve Larval Survival and Development Test — **Wood E&IS**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/262	223/262	246/262	227/262	280/291
0	FC	240/262	235/262	240/262	220/262	236/262
6.25		255/270	247/262	253/265	238/262	247/269
12.5		259/274	238/262	231/262	224/262	245/262
25		268/287	272/292	253/279	254/270	259/279
50		282/294	262/279	265/284	237/262	230/262
100		176/262	216/270	246/275	205/262	221/262
101		218/263	253/310	230/275	206/262	252/282

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/249	223/247	246/258	227/248	280/291
0	FC	240/258	235/256	240/254	220/246	236/249
6.25		255/270	247/255	253/265	238/249	247/269
12.5		259/274	238/259	231/242	224/244	245/259
25		268/287	272/292	253/279	254/270	259/279
50		282/294	262/279	265/284	237/261	230/249
100		176/226	216/270	246/275	205/254	221/259
101		218/263	253/310	230/275	206/251	252/282

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	249/262	247/262	258/262	248/262	262/262
0	FC	258/262	256/262	254/262	246/262	249/262
6.25		262/262	255/262	262/262	249/262	262/262
12.5		262/262	259/262	242/262	244/262	259/262
25		262/262	262/262	262/262	262/262	262/262
50		262/262	262/262	262/262	261/262	249/262
100		226/262	262/262	262/262	254/262	259/262
101		262/262	262/262	262/262	251/262	262/262

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	18-2921-1865	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 12:15	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101= 100% Filtred (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	50	100	70.71	2	6.67%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	-0.9864	2.362	0.101	8	CDF	0.9827	Non-Significant Effect
		12.5	0.1887	2.362	0.101	8	CDF	0.7716	Non-Significant Effect
		25	-0.703	2.362	0.101	8	CDF	0.9633	Non-Significant Effect
		50	-0.5472	2.362	0.101	8	CDF	0.9463	Non-Significant Effect
		100*	3.708	2.362	0.101	8	CDF	0.0024	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.138312	0.0276625	5	6.036	9.4E-04	Significant Effect
Error	0.109986	0.0045828	24			
Total	0.248299		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.25	15.09	0.1430	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.987	0.9031	0.9661	Normal Distribution

Combined Proportion Normal Summary

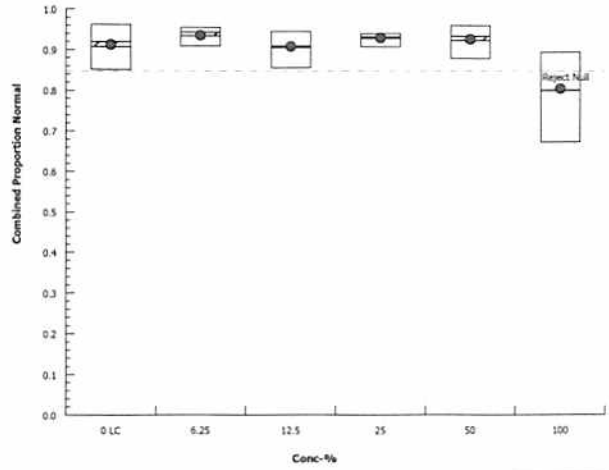
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9077	0.8488	0.9666	0.9198	0.8511	0.9622	0.0212	5.22%	0.00%
6.25		5	0.9337	0.9095	0.9579	0.9427	0.9084	0.9547	0.0087	2.09%	-2.86%
12.5		5	0.9051	0.8587	0.9515	0.9084	0.8550	0.9453	0.0167	4.13%	0.29%
25		5	0.9282	0.9123	0.9441	0.9315	0.9068	0.9407	0.0057	1.38%	-2.26%
50		5	0.9228	0.8833	0.9622	0.9331	0.8779	0.9592	0.0142	3.45%	-1.66%
100		5	0.7985	0.6954	0.9015	0.8000	0.6718	0.8945	0.0371	10.40%	12.04%

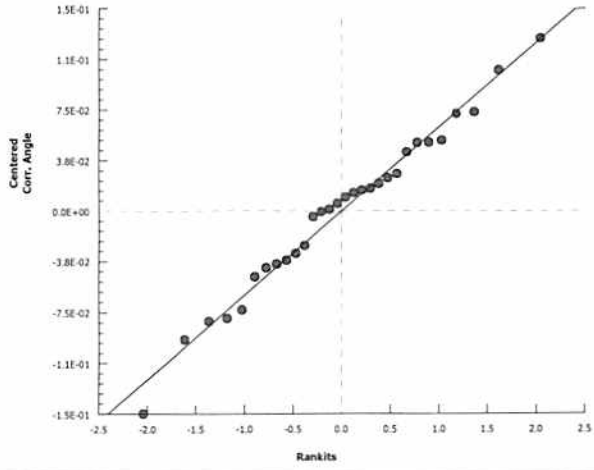
Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.27	1.166	1.375	1.284	1.175	1.375	0.03763	6.62%	0.00%
6.25		5	1.312	1.264	1.361	1.329	1.263	1.356	0.01738	2.96%	-3.32%
12.5		5	1.262	1.183	1.342	1.263	1.18	1.335	0.02864	5.07%	0.64%
25		5	1.3	1.27	1.33	1.306	1.261	1.325	0.01077	1.85%	-2.37%
50		5	1.294	1.22	1.368	1.309	1.214	1.367	0.02663	4.60%	-1.84%
100		5	1.112	0.9832	1.24	1.107	0.9607	1.24	0.04622	9.30%	12.50%

Bivalve Larval Survival and Development Test					Wood E&IS
Analysis ID:	18-2921-1865	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 12:15	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test (LC vs 100% with TST) **Wood E&IS**

Analysis ID:	11-9037-3799	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 12:17	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101= 100% Filtred (1.2um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	2.933	1.943	6	CDF	0.0131	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0630015	0.0630015	1	7.095	0.0286	Significant Effect
Error	0.0710348	0.0088794	8			
Total	0.134036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.509	23.15	0.7000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9766	0.7411	0.9446	Normal Distribution

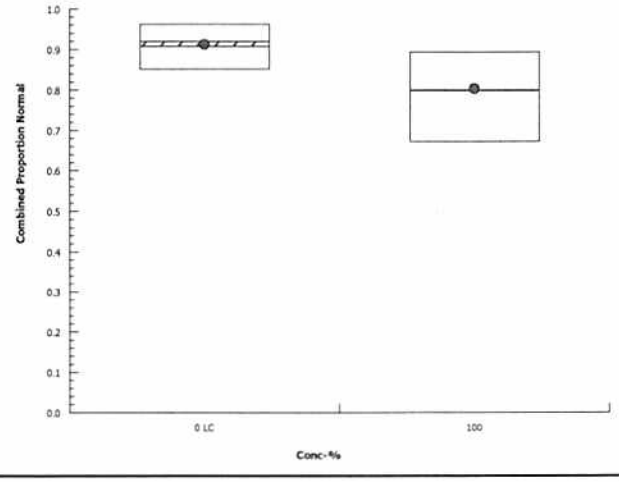
Combined Proportion Normal Summary

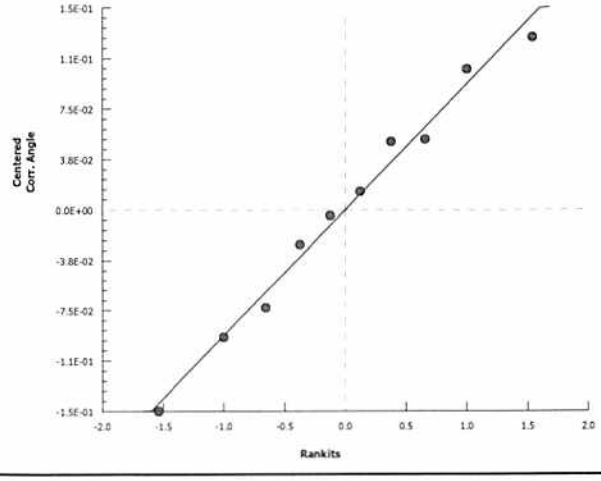
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9077	0.8488	0.9666	0.9198	0.8511	0.9622	0.0212	5.22%	0.00%
100		5	0.7985	0.6954	0.9015	0.8000	0.6718	0.8945	0.0371	10.40%	12.04%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.27	1.166	1.375	1.284	1.175	1.375	0.03763	6.62%	0.00%
100		5	1.112	0.9832	1.24	1.107	0.9607	1.24	0.04622	9.30%	12.50%

Graphics





Bivalve Larval Survival and Development Test (FC vs 100% Filtered w/ TST) **Wood E&IS**

Analysis ID:	15-8638-3255	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 12:17	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101= 100% Filtred (1.2um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	7.489	1.943	6	CDF	1.5E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.020406	0.020406	1	7.639	0.0245	Significant Effect
Error	0.0213712	0.0026714	8			
Total	0.0417772		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.272	23.15	0.8212	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9673	0.7411	0.8650	Normal Distribution

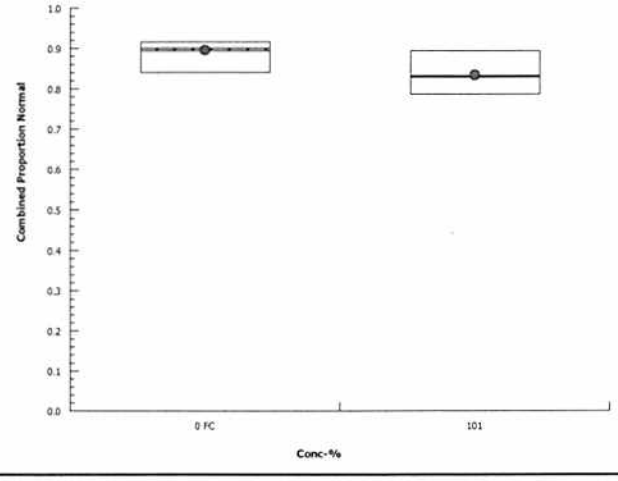
Combined Proportion Normal Summary

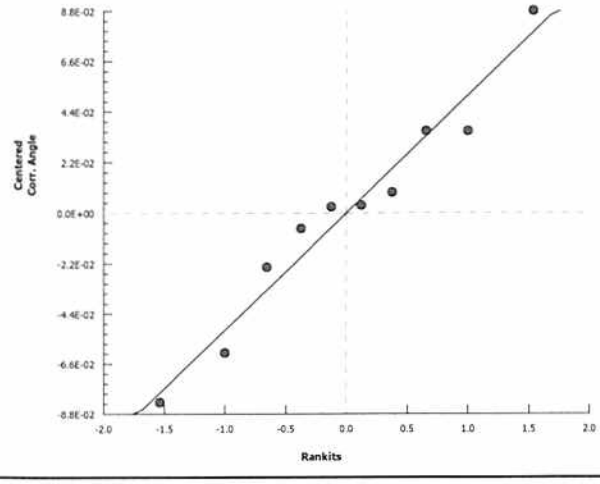
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8939	0.8548	0.9330	0.9008	0.8397	0.9160	0.0141	3.53%	0.00%
101		5	0.8323	0.7835	0.8810	0.8289	0.7863	0.8936	0.0176	4.72%	6.90%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.241	1.181	1.302	1.25	1.159	1.277	0.02169	3.91%	0.00%
101		5	1.151	1.083	1.219	1.144	1.09	1.239	0.02446	4.75%	7.28%

Graphics





Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	04-7605-2775	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 12:15	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101= 100% Filtred (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	50	100	70.71	2	3.57%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	-0.5006	2.362	0.069	8	CDF	0.9402	Non-Significant Effect
		12.5	0.4046	2.362	0.069	8	CDF	0.6877	Non-Significant Effect
		25	1.002	2.362	0.069	8	CDF	0.4192	Non-Significant Effect
		50	0.6619	2.362	0.069	8	CDF	0.5744	Non-Significant Effect
		100*	6.327	2.362	0.069	8	CDF	4.4E-06	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.135052	0.0270104	5	12.6	4.5E-06	Significant Effect
Error	0.0514537	0.0021439	24			
Total	0.186506		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	4.591	15.09	0.4678	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9779	0.9031	0.7680	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9403	0.9039	0.9768	0.9535	0.9028	0.9679	0.0131	3.12%	0.00%
6.25		5	0.9484	0.9249	0.9719	0.9547	0.9182	0.9686	0.0085	1.99%	-0.85%
12.5		5	0.9365	0.9156	0.9575	0.9453	0.9180	0.9545	0.0076	1.80%	0.40%
25		5	0.9282	0.9123	0.9441	0.9315	0.9068	0.9407	0.0057	1.38%	1.29%
50		5	0.9326	0.9091	0.9561	0.9331	0.9080	0.9592	0.0085	2.03%	0.82%
100		5	0.8267	0.7688	0.8847	0.8071	0.7788	0.8945	0.0209	5.64%	12.08%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.33	1.254	1.406	1.353	1.254	1.391	0.02741	4.61%	0.00%
6.25		5	1.344	1.293	1.396	1.356	1.281	1.393	0.01854	3.08%	-1.10%
12.5		5	1.318	1.275	1.361	1.335	1.28	1.356	0.01541	2.61%	0.89%
25		5	1.3	1.27	1.33	1.306	1.261	1.325	0.01077	1.85%	2.21%
50		5	1.31	1.262	1.358	1.309	1.263	1.367	0.01735	2.96%	1.46%
100		5	1.144	1.065	1.224	1.116	1.081	1.24	0.02869	5.61%	13.93%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	16-3354-9738	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 12:15	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101= 100% Filtred (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	6.38%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	-1.212	2.362	0.145	8	CDF	0.9909	Non-Significant Effect
		12.5	-0.2075	2.362	0.145	8	CDF	0.8874	Non-Significant Effect
		25	-2.275	2.362	0.145	8	CDF	0.9997	Non-Significant Effect
		50	-1.545	2.362	0.145	8	CDF	0.9967	Non-Significant Effect
		100	-0.4223	2.362	0.145	8	CDF	0.9285	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0739934	0.0147987	5	1.564	0.2081	Non-Significant Effect
Error	0.227087	0.009462	24			
Total	0.301081		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.157	3.895	0.0249	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.042	4.248	0.4235	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.951	0.9031	0.1801	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9649	0.9328	0.9969	0.9504	0.9427	1.0000	0.0115	2.67%	0.00%
6.25		5	0.9847	0.9569	1.0000	1.0000	0.9504	1.0000	0.0100	2.28%	-2.06%
12.5		5	0.9664	0.9218	1.0000	0.9885	0.9237	1.0000	0.0161	3.72%	-0.16%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-3.64%
50		5	0.9893	0.9622	1.0000	1.0000	0.9504	1.0000	0.0098	2.21%	-2.53%
100		5	0.9641	0.8920	1.0000	0.9885	0.8626	1.0000	0.0260	6.03%	0.08%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.4	1.286	1.514	1.346	1.329	1.54	0.04098	6.55%	0.00%
6.25		5	1.474	1.36	1.589	1.54	1.346	1.54	0.04118	6.24%	-5.33%
12.5		5	1.413	1.277	1.548	1.464	1.291	1.54	0.04882	7.73%	-0.91%
25		5	1.54	1.54	1.54	1.54	1.54	1.54	0	0.00%	-10.00%
50		5	1.495	1.39	1.6	1.54	1.346	1.54	0.03768	5.64%	-6.79%
100		5	1.426	1.247	1.605	1.464	1.191	1.54	0.06462	10.13%	-1.86%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID: 15-8471-9837 Endpoint: Proportion ~~Normal~~ SC Curved Hinge CETIS Version: CETISv1.9.3
Analyzed: 21 May-22 15:12 Analysis: Nonparametric-Control vs Treatments Official Results: Yes

Comments:
FC = Filtered Control (1.2um), 101= 100% Filtred (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C > T	101	> 101	n/a	0.9901

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	27.5	16	1	8	Asymp	0.8571	Non-Significant Effect
		12.5	27.5	16	1	8	Asymp	0.8571	Non-Significant Effect
		25	27.5	16	1	8	Asymp	0.8571	Non-Significant Effect
		50	27.5	16	1	8	Asymp	0.8571	Non-Significant Effect
		100	40	16	0	8	Asymp	1.0000	Non-Significant Effect
		101	40	16	0	8	Asymp	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.172408	0.0287346	6	101.8	<1.0E-37	Significant Effect
Error	0.0079038	0.0002823	28			
Total	0.180311		34			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	105.4	16.81	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6548	0.9146	7.9E-08	Non-Normal Distribution

Proportion ~~Normal~~ SC Curved Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
6.25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
12.5		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
100		5	0.0355	0.0230	0.0481	0.0354	0.0218	0.0487	0.0045	28.49%	
101		5	0.0344	0.0192	0.0496	0.0327	0.0177	0.0516	0.0055	35.51%	

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.0311	0.0298	0.0325	0.0317	0.0293	0.0318	0.0005	3.40%	0.00%
6.25		5	0.0309	0.0303	0.0316	0.0307	0.0304	0.0317	0.0002	1.78%	0.68%
12.5		5	0.0313	0.0303	0.0323	0.0311	0.0302	0.0322	0.0004	2.53%	-0.52%
25		5	0.0298	0.0293	0.0304	0.0299	0.0293	0.0304	0.0002	1.50%	4.25%
50		5	0.0303	0.0290	0.0316	0.0299	0.0292	0.0317	0.0005	3.37%	2.76%
100		5	0.1880	0.1533	0.2227	0.1894	0.1483	0.2224	0.0125	14.88%	-503.65%
101		5	0.1841	0.1412	0.2269	0.1819	0.1336	0.2292	0.0154	18.74%	-491.07%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.0000	0.0000	0.0000	0.0000	0.0000
6.25		0.0000	0.0000	0.0000	0.0000	0.0000
12.5		0.0000	0.0000	0.0000	0.0000	0.0000
25		0.0000	0.0000	0.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0487	0.0407	0.0218	0.0354	0.0309
101		0.0380	0.0516	0.0327	0.0319	0.0177

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	15-8471-9837	**Endpoint:**	Proportion ~~Normal~~ SC Curved Hinge	**CETIS Version:**	CETISv1.9.3
Analyzed:	21 May-22 15:12	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

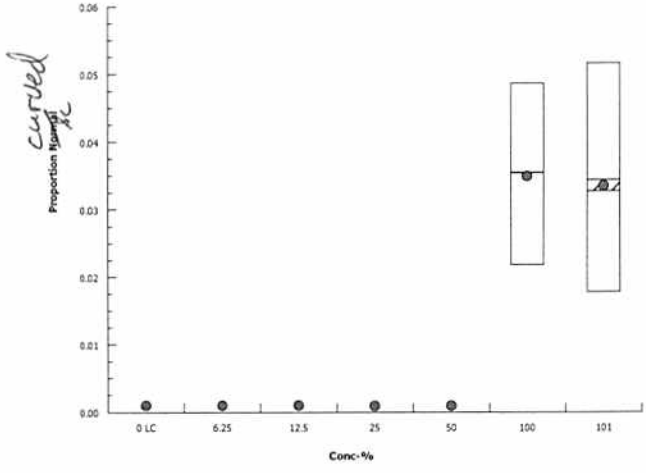
Angular (Corrected) Transformed Detail

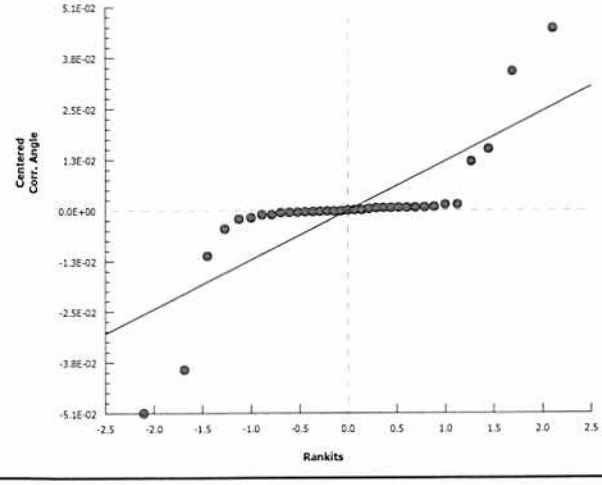
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.0317	0.0318	0.0311	0.0318	0.0293
6.25		0.0304	0.0313	0.0307	0.0317	0.0305
12.5		0.0302	0.0311	0.0322	0.0320	0.0311
25		0.0295	0.0293	0.0299	0.0304	0.0299
50		0.0292	0.0299	0.0297	0.0310	0.0317
100		0.2224	0.2032	0.1483	0.1894	0.1767
101		0.1963	0.2292	0.1819	0.1795	0.1336

Proportion ~~Normal~~ SC curved Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0/249	0/247	0/258	0/248	0/291
6.25		0/270	0/255	0/265	0/249	0/269
12.5		0/274	0/259	0/242	0/244	0/259
25		0/287	0/292	0/279	0/270	0/279
50		0/294	0/279	0/284	0/261	0/249
100		11/226	11/270	6/275	9/254	8/259
101		10/263	16/310	9/275	8/251	5/282

Graphics





CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:08 (p 1 of 2)
Test Code/ID: ~~06-5212-0616~~/22-03-057

Bivalve Larval Survival and Development Test — ~~06-5212-0616~~ 22-03-057 Wood E&IS

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ 22 Mar-22 1550

Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater

Sample Code: ~~7268EF18~~ 22-W065
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB 1

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			1			249	~~253~~ 241 BI	BI 3/30/22 249 → 241
			2			~~288~~ 246	~~194~~ 220	246 → 220
			3			~~237~~ 261	~~215~~ 237	261 → 237
			4			~~282~~ 294	282	294 → 282
			5			244	224	
			6	11		226	~~189~~ 176 BF	11 curved
			7			279	253	
			8			287	268	
			9			258	246	
			10			258	240	
			11			259	245	3/31/22
			12	6		275	246	𝍸 = 6 curved
			13			279	259	
			14			249	236	
			15			248	227	
			16			247	223	
			17	9		275	230	𝍸 IIII = 9 curved
			18			270	255	
			19	11		270	216	~~𝍸𝍸~~ = 11 curved
			20			256	235	
			21			279	262	
			22			254	240	
			23			284	265	
			24			259	238	
			25	5		282	252	𝍸 = 5 curved
			26			242	231	
			27			270	254	
			28			255	247	
			29			249	230	
			30			274	259	
			31	9		254	205	𝍸 IIII = 9 curved
			32	10		263	218	10 curved
			33			292	272	
			34			265	253	

CETIS Test Data Worksheet

Test Code/ID: AG ~~06-5212-0616~~/22-03-057

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			35	8		259	221	BI 3/31/22 ||||| = 8 curved
			36			269	247	4/1/22
			37	8		251	206	||||| = 8 curved
			38			291	280	
			39			249	238	
			40	16		310	253	||||| ||||| = 16 Curved

22-W065

Analyst: BI QA: AG

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:09 (p 1 of 2)
Test Code/ID: 06-5212-0616/22-03-057

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ 22 Mar-22 1550
Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater
Sample Code: ~~AE7268EF18~~ 22-WC65
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB 1

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	10			258	240	
0	FC	2	20					
0	FC	3	22					
0	FC	4	2					
0	FC	5	14					
0	LC	1	1			249	241	
0	LC	2	16					
0	LC	3	9					
0	LC	4	15					
0	LC	5	38					
6.25		1	18			~~25~~ 270 BI	255	
6.25		2	28					
6.25		3	34					
6.25		4	39					
6.25		5	36					
12.5		1	30			274	259	
12.5		2	24					
12.5		3	26					
12.5		4	5					
12.5		5	11					
25		1	8			287	268	
25		2	33					
25		3	7					
25		4	27					
25		5	13					
50		1	4			294	282	
50		2	21					
50		3	23					
50		4	3					
50		5	29					
100		1	6			226	189	
100		2	19					
100		3	12					
100		4	31					

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:09 (p 2 of 2)
Test Code/ID: 06-5212-0616/22-03-057

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
100		5	35					
101		1	32			26~~8~~83 BI	218	~~||||~~ = 10 Curved
101		2	40					
101		3	17					
101		4	37					
101		5	25					

QC: KB

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-1
Test No. 22-03-057

Test Species: *M. galloprovincialis*
Start Date/Time: ~~3/22~~/2022 1615 3/23
End Date/Time: ~~3/24~~/2022 1615 3/25

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	14.5	15.6	15.5
	Salinity (ppt)	32.8	33.4	33.5
	pH (units)	8.00	7.76	7.79
	DO (mg/L)	7.9	8.5	8.6
Filter Control	Temp. (°C)	14.2	15.8	15.6
	Salinity (ppt)	32.8	33.4	33.6
	pH (units)	7.99	7.79	7.83
	DO (mg/L)	7.9	8.6	8.6
6.25	Temp. (°C)	14.1	15.8	15.6
	Salinity (ppt)	33.0	33.6	33.7
	pH (units)	8.00	7.82	7.85
	DO (mg/L)	8.2	8.7	8.6
12.5	Temp. (°C)	14.0	15.9	15.6
	Salinity (ppt)	33.0	33.7	33.7
	pH (units)	8.00	7.81	7.82
	DO (mg/L)	8.2	9.0	8.7
25	Temp. (°C)	14.0	15.9	15.6
	Salinity (ppt)	33.0	33.8	33.7
	pH (units)	7.99	7.82	7.87
	DO (mg/L)	8.2	8.9	8.7
50	Temp. (°C)	14.0	15.9	15.6
	Salinity (ppt)	33.0	33.7	33.7
	pH (units)	7.98	7.82	7.87
	DO (mg/L)	8.2	8.6	8.7
100	Temp. (°C)	14.1	15.9	15.6
	Salinity (ppt)	32.9	33.1	33.5
	pH (units)	7.96	7.81	7.86
	DO (mg/L)	8.2	9.0	8.8
100 Filtered (1.2µm)	Temp. (°C)	14.4	15.9	15.7
	Salinity (ppt)	32.3	33.7	33.7
	pH (units)	7.95	7.80	7.88
	DO (mg/L)	8.1	9.0	8.8
	Tech Initials:	~~BE~~	CB	AO

Source of Animals: AG Mission Bay 3/23/22 **Date Received:** 3/23/22

Comments:

QA: AG 4/29/22

Final QC: SC 5/9/22

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID: Mission Bay Collection (3/23/22)
Test Type: Chronic Bivalve Development

Test Date: 3/23/22
Analyst: AG

Task	
Spawning Induction	1230
Spawning Begins	1315
# Males/# Females	5/3
Spawn Condition	good
Fertilization Initiated	1345
Fertilzation End/Eggs Rinsed	~~13~~ AG 1400/1415
Embryo Counts	AG 1500
Test Initiation	1615

Embryo Density Counts **# per 100 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	300	55	60	64	65	61	610
Stock 2							
Stock 3							

Cell Division:

	% Divided
Stock 1	AG ~~93~~ 94-1
Stock 2	
Stock 3	

Selected Stock:	1

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density 610 / 500

Dil Factor 1.22

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: QC=237/255

TD_1=275, TD_2=261 TD_3=268 TD_4=255, TD_5=250 $\bar{X}$=262

QA Review: AG 4/29/22

Final Review: SC 5/9/22

Site: SIYB-2

Bivalve Larval Survival and Development Test — Wood E&IS

Batch ID:	10-7376-6388	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	~~22~~ 23 Mar-22 16:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	~~24~~ 25 Mar-22 16:15	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Field Collected	**Age:**	

Sample ID:	19-6675-9349	**Code:**	22-W066	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 15:00	**Material:**	Seawater	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	~~75h~~ 25hr (13 °C)	**Station:**	SIYB 2		

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
19-6125-9091	Combined Proportion Norma	TST-Welch's t Test	2.8E-04	100% passed combined proportion normal
17-5538-4076	Combined Proportion Norma	TST-Welch's t Test	2.6E-05	101% passed combined proportion normal

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
11-9892-6215	Combined Proportion Norma	Dunnett Multiple Comparison Test	100	> 100	n/a	1	11.0%
11-0146-4821	Proportion Normal	Steel Many-One Rank Sum Test	100	> 100	n/a	1	3.35%
18-3587-6954	Survival Rate	Dunnett Multiple Comparison Test	100	> 100	n/a	1	12.2%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
11-0146-4821	Proportion Normal	Control Resp	0.9153	0.9	>>	Yes	Passes Criteria
18-3587-6954	Survival Rate	Control Resp	0.9282	0.5	>>	Yes	Passes Criteria

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8497	0.7708	0.9286	0.7634	0.9126	0.0284	0.0635	7.48%	0.00%
0	FC	5	0.9132	0.8841	0.9423	0.8740	0.9314	0.0105	0.0235	2.57%	-7.47%
6.25		5	0.8824	0.8213	0.9435	0.8015	0.9233	0.0220	0.0492	5.58%	-3.85%
12.5		5	0.9056	0.8294	0.9817	0.8015	0.9604	0.0274	0.0613	6.77%	-6.58%
25		5	0.8914	0.8316	0.9512	0.8092	0.9312	0.0215	0.0482	5.40%	-4.90%
50		5	0.8950	0.8485	0.9415	0.8397	0.9262	0.0168	0.0375	4.19%	-5.33%
100		5	0.8646	0.7814	0.9478	0.7595	0.9440	0.0300	0.0670	7.75%	-1.75%
101		5	0.8921	0.8479	0.9362	0.8321	0.9197	0.0159	0.0356	3.99%	-4.99%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9153	0.9032	0.9273	0.9009	0.9270	0.0043	0.0097	1.06%	0.00%
0	FC	5	0.9230	0.9136	0.9325	0.9157	0.9314	0.0034	0.0076	0.83%	-0.85%
6.25		5	0.9248	0.9183	0.9314	0.9173	0.9305	0.0024	0.0053	0.57%	-1.04%
12.5		5	0.9279	0.9017	0.9541	0.9058	0.9604	0.0094	0.0211	2.27%	-1.38%
25		5	0.9231	0.9163	0.9299	0.9176	0.9312	0.0025	0.0055	0.60%	-0.86%
50		5	0.9158	0.9008	0.9307	0.8980	0.9262	0.0054	0.0120	1.31%	-0.06%
100		5	0.9134	0.8683	0.9586	0.8674	0.9536	0.0163	0.0364	3.98%	0.20%
101		5	0.9093	0.8998	0.9189	0.9031	0.9197	0.0034	0.0077	0.85%	0.65%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9282	0.8444	1.0000	0.8473	1.0000	0.0302	0.0675	7.27%	0.00%
0	FC	5	0.9893	0.9622	1.0000	0.9504	1.0000	0.0098	0.0218	2.21%	-6.58%
6.25		5	0.9542	0.8864	1.0000	0.8626	1.0000	0.0244	0.0546	5.72%	-2.80%
12.5		5	0.9756	0.9078	1.0000	0.8779	1.0000	0.0244	0.0546	5.60%	-5.10%
25		5	0.9656	0.9004	1.0000	0.8740	1.0000	0.0235	0.0525	5.44%	-4.03%
50		5	0.9771	0.9376	1.0000	0.9351	1.0000	0.0142	0.0318	3.26%	-5.26%
100		5	0.9466	0.8666	1.0000	0.8550	1.0000	0.0288	0.0644	6.80%	-1.97%
101		5	0.9809	0.9377	1.0000	0.9198	1.0000	0.0156	0.0348	3.54%	-5.67%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.7634	0.8359	0.8244	0.9126	0.9122
0	FC	0.9173	0.9122	0.9310	0.9314	0.8740
6.25		0.9198	0.8015	0.9233	0.8779	0.8893
12.5		0.9288	0.9058	0.9313	0.8015	0.9604
25		0.9046	0.9188	0.8931	0.8092	0.9312
50		0.9262	0.8740	0.9257	0.8397	0.9094
100		0.8626	0.8674	0.7595	0.9440	0.8893
101		0.9154	0.9197	0.8321	0.9038	0.8893

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9009	0.9202	0.9270	0.9126	0.9157
0	FC	0.9173	0.9157	0.9310	0.9314	0.9197
6.25		0.9305	0.9292	0.9233	0.9237	0.9173
12.5		0.9288	0.9058	0.9313	0.9130	0.9604
25		0.9222	0.9188	0.9176	0.9258	0.9312
50		0.9262	0.9197	0.9257	0.8980	0.9094
100		0.9536	0.8674	0.8884	0.9440	0.9137
101		0.9154	0.9197	0.9046	0.9038	0.9031

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8473	0.9084	0.8893	1.0000	0.9962
0	FC	1.0000	0.9962	1.0000	1.0000	0.9504
6.25		0.9885	0.8626	1.0000	0.9504	0.9695
12.5		1.0000	1.0000	1.0000	0.8779	1.0000
25		0.9809	1.0000	0.9733	0.8740	1.0000
50		1.0000	0.9504	1.0000	0.9351	1.0000
100		0.9046	1.0000	0.8550	1.0000	0.9733
101		1.0000	1.0000	0.9198	1.0000	0.9847

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	200/262	219/262	216/262	261/286	239/262
0	FC	244/266	239/262	270/290	258/277	229/262
6.25		241/262	210/262	265/287	230/262	233/262
12.5		248/267	250/276	244/262	210/262	267/278
25		237/262	249/271	234/262	212/262	257/276
50		251/271	229/262	249/269	220/262	241/265
100		226/262	229/264	199/262	253/268	233/262
101		249/272	252/274	218/262	263/291	233/262

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	200/222	219/238	216/233	261/286	239/261
0	FC	244/266	239/261	270/290	258/277	229/249
6.25		241/259	210/226	265/287	230/249	233/254
12.5		248/267	250/276	244/262	210/230	267/278
25		237/257	249/271	234/255	212/229	257/276
50		251/271	229/249	249/269	220/245	241/265
100		226/237	229/264	199/224	253/268	233/255
101		249/272	252/274	218/241	263/291	233/258

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	222/262	238/262	233/262	262/262	261/262
0	FC	262/262	261/262	262/262	262/262	249/262
6.25		259/262	226/262	262/262	249/262	254/262
12.5		262/262	262/262	262/262	230/262	262/262
25		257/262	262/262	255/262	229/262	262/262
50		262/262	249/262	262/262	245/262	262/262
100		237/262	262/262	224/262	262/262	255/262
101		262/262	262/262	241/262	262/262	258/262

Bivalve Larval Survival and Development Test FC vs 100% Filtered **Wood E&IS**

Analysis ID:	17-5538-4076	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:21	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	10.22	1.943	6	CDF	2.6E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0029965	0.0029965	1	1.317	0.2844	Non-Significant Effect
Error	0.0182089	0.0022761	8			
Total	0.0212054		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.856	23.15	0.5638	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8488	0.7411	0.0562	Normal Distribution

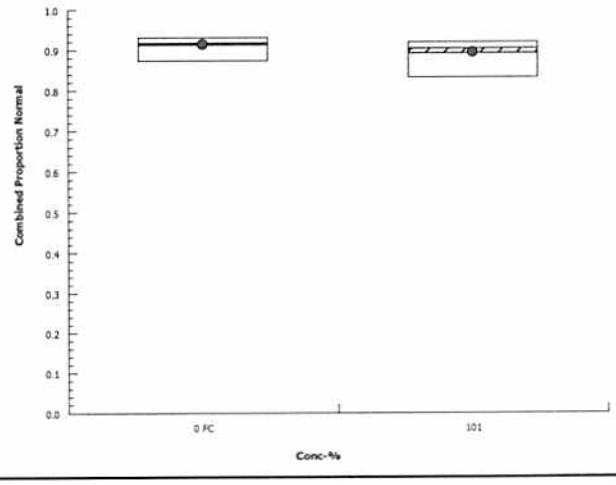
Combined Proportion Normal Summary

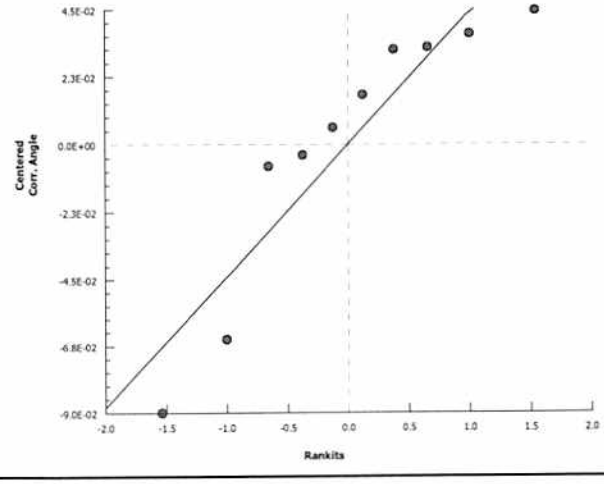
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.9132	0.8841	0.9423	0.9173	0.8740	0.9314	0.0105	2.57%	0.00%
101		5	0.8921	0.8479	0.9362	0.9038	0.8321	0.9197	0.0159	3.99%	2.31%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.274	1.224	1.323	1.279	1.208	1.306	0.01785	3.13%	0.00%
101		5	1.239	1.171	1.307	1.255	1.149	1.284	0.02432	4.39%	2.72%

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	11-9892-6215	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:21	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	10.95%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	-0.886	2.362	0.124	8	CDF	0.9772	Non-Significant Effect
		12.5	-1.709	2.362	0.124	8	CDF	0.9981	Non-Significant Effect
		25	-1.159	2.362	0.124	8	CDF	0.9894	Non-Significant Effect
		50	-1.243	2.362	0.124	8	CDF	0.9917	Non-Significant Effect
		100	-0.4393	2.362	0.124	8	CDF	0.9312	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0257295	0.0051459	5	0.7443	0.5981	Non-Significant Effect
Error	0.165937	0.0069140	24			
Total	0.191666		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.385	15.09	0.9259	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9479	0.9031	0.1487	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8497	0.7708	0.9286	0.8359	0.7634	0.9126	0.0284	7.48%	0.00%
6.25		5	0.8824	0.8213	0.9435	0.8893	0.8015	0.9233	0.0220	5.58%	-3.85%
12.5		5	0.9056	0.8294	0.9817	0.9288	0.8015	0.9604	0.0274	6.77%	-6.58%
25		5	0.8914	0.8316	0.9512	0.9046	0.8092	0.9312	0.0215	5.40%	-4.90%
50		5	0.8950	0.8485	0.9415	0.9094	0.8397	0.9262	0.0168	4.19%	-5.33%
100		5	0.8646	0.7814	0.9478	0.8674	0.7595	0.9440	0.0300	7.75%	-1.75%

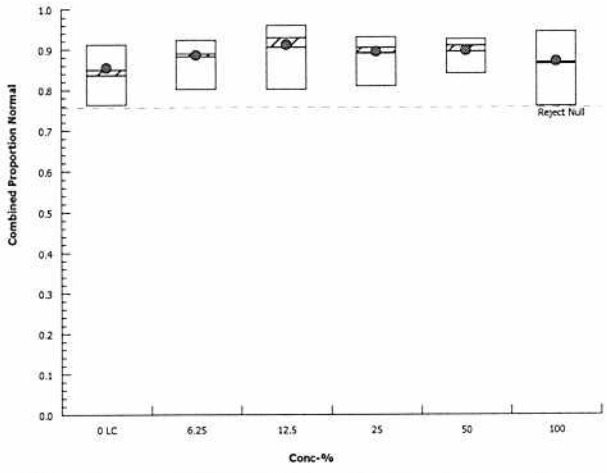
Angular (Corrected) Transformed Summary

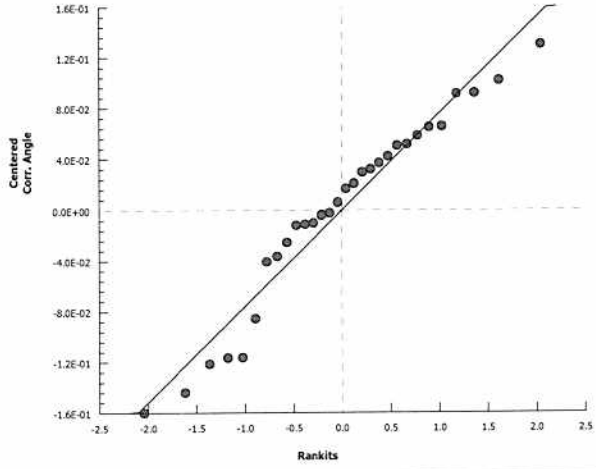
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.179	1.067	1.291	1.154	1.063	1.271	0.0403	7.64%	0.00%
6.25		5	1.226	1.135	1.316	1.232	1.109	1.29	0.03265	5.96%	-3.95%
12.5		5	1.269	1.147	1.391	1.301	1.109	1.371	0.04379	7.72%	-7.62%
25		5	1.24	1.15	1.33	1.257	1.119	1.305	0.03242	5.85%	-5.17%
50		5	1.244	1.17	1.318	1.265	1.159	1.296	0.02667	4.79%	-5.54%
100		5	1.202	1.08	1.324	1.198	1.058	1.332	0.04391	8.17%	-1.96%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	11-9892-6215	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:21	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test LC vs 100% **Wood E&IS**

Analysis ID:	19-6125-9091	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:22	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	5.964	1.895	7	CDF	2.8E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013343	0.0013343	1	0.1503	0.7084	Non-Significant Effect
Error	0.0710303	0.0088788	8			
Total	0.0723646		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.187	23.15	0.8720	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9562	0.7411	0.7416	Normal Distribution

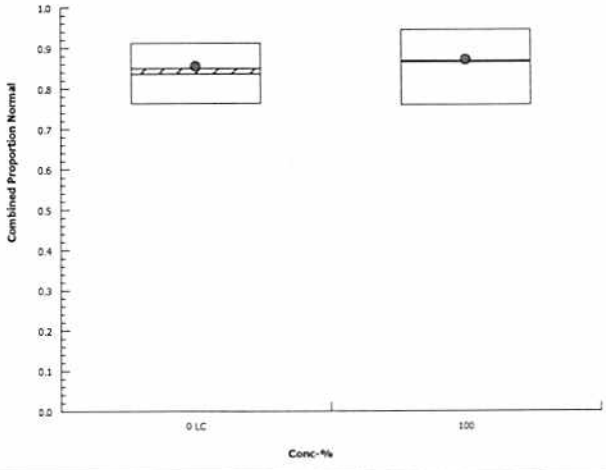
Combined Proportion Normal Summary

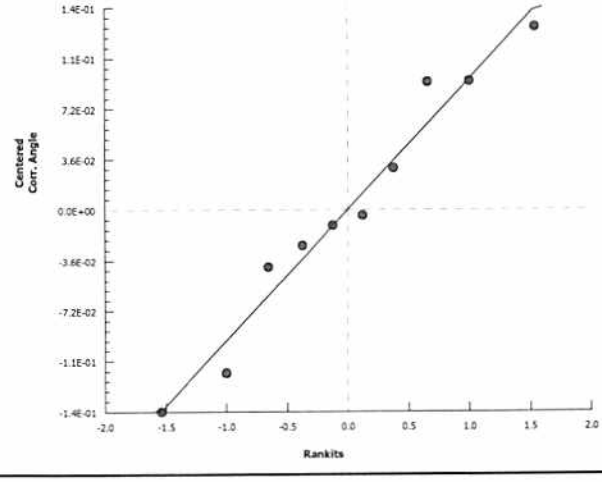
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8497	0.7708	0.9286	0.8359	0.7634	0.9126	0.0284	7.48%	0.00%
100		5	0.8646	0.7814	0.9478	0.8674	0.7595	0.9440	0.0300	7.75%	-1.75%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.179	1.067	1.291	1.154	1.063	1.271	0.0403	7.64%	0.00%
100		5	1.202	1.08	1.324	1.198	1.058	1.332	0.04391	8.17%	-1.96%

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	11-0146-4821	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:21	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	3.35%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	36	16	0	8	Asymp	0.9991	Non-Significant Effect
		12.5	33	16	0	8	Asymp	0.9907	Non-Significant Effect
		25	34	16	0	8	Asymp	0.9954	Non-Significant Effect
		50	27	16	0	8	Asymp	0.8003	Non-Significant Effect
		100	27	16	0	8	Asymp	0.8003	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0028352	0.0005670	5	0.4744	0.7917	Non-Significant Effect
Error	0.0286893	0.0011954	24			
Total	0.0315245		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	20.04	15.09	0.0012	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9352	0.9031	0.0678	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9153	0.9032	0.9273	0.9157	0.9009	0.9270	0.0043	1.06%	0.00%
6.25		5	0.9248	0.9183	0.9314	0.9237	0.9173	0.9305	0.0024	0.57%	-1.04%
12.5		5	0.9279	0.9017	0.9541	0.9288	0.9058	0.9604	0.0094	2.27%	-1.38%
25		5	0.9231	0.9163	0.9299	0.9222	0.9176	0.9312	0.0025	0.60%	-0.86%
50		5	0.9158	0.9008	0.9307	0.9197	0.8980	0.9262	0.0054	1.31%	-0.06%
100		5	0.9134	0.8683	0.9586	0.9137	0.8674	0.9536	0.0163	3.98%	0.20%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.276	1.254	1.297	1.276	1.251	1.297	0.007743	1.36%	0.00%
6.25		5	1.293	1.281	1.306	1.291	1.279	1.304	0.004455	0.77%	-1.36%
12.5		5	1.301	1.248	1.355	1.301	1.259	1.371	0.01937	3.33%	-2.01%
25		5	1.29	1.277	1.303	1.288	1.28	1.305	0.004654	0.81%	-1.11%
50		5	1.277	1.25	1.303	1.283	1.246	1.296	0.009551	1.67%	-0.09%
100		5	1.277	1.196	1.359	1.273	1.198	1.354	0.02944	5.15%	-0.12%

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	18-3587-6954	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:21	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	12.20%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	-0.4859	2.362	0.217	8	CDF	0.9381	Non-Significant Effect
		12.5	-1.441	2.362	0.217	8	CDF	0.9955	Non-Significant Effect
		25	-0.9021	2.362	0.217	8	CDF	0.9782	Non-Significant Effect
		50	-1.235	2.362	0.217	8	CDF	0.9915	Non-Significant Effect
		100	-0.4584	2.362	0.217	8	CDF	0.9341	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0610039	0.0122008	5	0.581	0.7142	Non-Significant Effect
Error	0.504017	0.0210007	24			
Total	0.565021		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	0.7287	15.09	0.9814	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9334	0.9031	0.0604	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9282	0.8444	1.0000	0.9084	0.8473	1.0000	0.0302	7.27%	0.00%
6.25		5	0.9542	0.8864	1.0000	0.9695	0.8626	1.0000	0.0244	5.72%	-2.80%
12.5		5	0.9756	0.9078	1.0000	1.0000	0.8779	1.0000	0.0244	5.60%	-5.10%
25		5	0.9656	0.9004	1.0000	0.9809	0.8740	1.0000	0.0235	5.44%	-4.03%
50		5	0.9771	0.9376	1.0000	1.0000	0.9351	1.0000	0.0142	3.26%	-5.26%
100		5	0.9466	0.8666	1.0000	0.9733	0.8550	1.0000	0.0288	6.80%	-1.97%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.343	1.132	1.553	1.263	1.169	1.54	0.0759	12.64%	0.00%
6.25		5	1.387	1.224	1.551	1.395	1.191	1.54	0.0589	9.49%	-3.32%
12.5		5	1.475	1.294	1.656	1.54	1.214	1.54	0.06522	9.89%	-9.83%
25		5	1.425	1.257	1.594	1.432	1.208	1.54	0.06078	9.54%	-6.16%
50		5	1.456	1.312	1.6	1.54	1.313	1.54	0.05175	7.95%	-8.43%
100		5	1.385	1.182	1.588	1.407	1.18	1.54	0.07311	11.81%	-3.13%

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:12 (p 1 of 2)
Test Code/ID: AG ~~01-1485-1509/22~~-03-058
~~AG 22-W058~~ 22-03-058 Wood E&IS

Bivalve Larval Survival and Development Test

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ MG 22 Mar-22 1500

Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater

Sample Code: AG ~~753A5DB5~~ 22-W066
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB 2

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			41			290	270	BI 4/1/22
			42			269	249	
			43			278	267	
			44			266	244	
			45			277	258	
			46			255	233	4/3/22
			47			222	200	
			48			230	210	
			49			249	229	
			50			264	229	
			51			238	219	
			52			286	261	
			53			271	251	
			54			261	239	
			55			~~272~~ 271	249	
			56			267	248	
			57			272	249	
			58			254	233	
			59			262	244	4/6/22
			60			291	263	
			61			224	199	
			62			265	241	
			63			249	230	
			64			276	257	
			65			233	216	
			66			237	226	
			67			268	253	
			68			229	212	
			69			276	250	
			70			287	265	
			71			245	220	
			72			249	229	
			73			226	210	
			74			259	241	

CETIS Test Data Worksheet

Test Code/ID: ~~01-1485-1509~~/22-03-058

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	BI 4/6/22 Notes
			75			261	239	
			76			258	233	
			77			255	234	
			78			274	252	
			79			241	218	(218)
			80			257	237	

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:12 (p 1 of 2)
Test Code/ID: ~~01-1485-1509~~/22-03-058

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date: 22 Mar-22 1615 Species: Mytilis galloprovincialis Sample Code: ~~783A5DB5~~ 22-W066
End Date: 24 Mar-22 1615 Protocol: EPA/600/R-95/136 (1995) Sample Source: Shelter Island Yacht Basin
Sample Date: ~~21~~ 22 Mar-22 1500 Material: Seawater Sample Station: SIYB 2

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	44			266	244	BI 4/1/22
0	FC	2	75					
0	FC	3	41					
0	FC	4	45					
0	FC	5	49					
0	LC	1	47			222	200	
0	LC	2	51					
0	LC	3	65					
0	LC	4	52					
0	LC	5	54					
6.25		1	74			259	241	
6.25		2	73					
6.25		3	70					
6.25		4	63					
6.25		5	58					
12.5		1	56			267	248	
12.5		2	69					
12.5		3	59					
12.5		4	48					
12.5		5	43					
25		1	80			257	237	
25		2	55					
25		3	77					
25		4	68					
25		5	64					
50		1	53			271	251	
50		2	72				~~226~~	
50		3	42					
50		4	71					
50		5	62					
100		1	66			237	226	
100		2	50					
100		3	61					
100		4	67					

CETIS Test Data Worksheet

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
100		5	46					
101		1	57			272	249	
101		2	78					
101		3	79					
101		4	60					
101		5	76					

QC: LCB

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-2
Test No. 22-03-058

Test Species: *M. galloprovincialis*
Start Date/Time: 3/22/2022 1615
End Date/Time: 3/24/2022 1615

Test Conc. (%)	Water Quality Measurements QC4			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	14.7	15.7	15.8
	Salinity (ppt)	32.6	33.2	33.4
	pH (units)	7.94	7.79	7.64
	DO (mg/L)	7.7	8.7	8.6
Filter Control	Temp. (°C)	14.3	15.4	15.6
	Salinity (ppt)	32.8	33.4	33.6
	pH (units)	7.96	7.80	7.86
	DO (mg/L)	8.0	8.6	8.6
6.25	Temp. (°C)	14.2	15.7	15.6
	Salinity (ppt)	33.0	33.5	33.6
	pH (units)	7.98	7.83	7.86
	DO (mg/L)	8.1	8.5	8.5
12.5	Temp. (°C)	14.4	15.6	15.6
	Salinity (ppt)	33.0	33.6	33.7
	pH (units)	7.99	7.84	7.86
	DO (mg/L)	8.2	9.1	8.7
25	Temp. (°C)	14.6	15.6	15.6
	Salinity (ppt)	33.0	33.6	33.7
	pH (units)	7.99	7.84	7.86
	DO (mg/L)	8.2	8.8	8.7
50	Temp. (°C)	14.3	15.7	15.6
	Salinity (ppt)	33.0	33.6	33.7
	pH (units)	7.98	7.83	7.85
	DO (mg/L)	8.2	9.1	8.8
100	Temp. (°C)	14.1	15.9	15.7
	Salinity (ppt)	32.9	33.6	33.7
	pH (units)	7.95	7.82	7.84
	DO (mg/L)	8.3	8.5	8.6
100 Filtered (1.2µm)	Temp. (°C)	14.2	15.7	15.8
	Salinity (ppt)	32.1	32.9	33.2
	pH (units)	7.95	7.82	7.84
	DO (mg/L)	8.4	8.4	8.6
	Tech Initials:	~~BT~~	CB	AO

Source of Animals: AG Mission Bay 3/23/22 **Date Received:** 3/23/22

Comments:

QA: 4/29/22 AG

Final: JK 5/10/22

Site: SIYB-3

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Wood E&IS**

Batch ID:	20-1568-3914	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	23 22 Mar-22 16:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	25 24 Mar-22 16:15	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Field Collected	**Age:**	

Sample ID:	21-1662-5842	**Code:**	22-W067	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 13:50	**Material:**	Seawater	**Project:**	SIYB TMDL Monitoring
Receipt Date:	21 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	24 (4.9 °C) 26hr	**Station:**	SIYB 3		

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
06-4385-5796	Combined Proportion Norma	TST-Welch's t Test	3.1E-06	100% passed combined proportion normal
09-5505-6264	Combined Proportion Norma	TST-Welch's t Test	1.1E-04	101% passed combined proportion normal

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
16-2084-0631	Combined Proportion Norma	Dunnett Multiple Comparison Test	100	> 100	n/a	1	5.85%
08-0107-7872	Proportion Normal	Dunnett Multiple Comparison Test	100	> 100	n/a	1	2.33%
06-3609-2189	Survival Rate	Dunnett Multiple Comparison Test	100	> 100	n/a	1	6.69%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
08-0107-7872	Proportion Normal	Control Resp	0.9222	0.9	>>	Yes	Passes Criteria
06-3609-2189	Survival Rate	Control Resp	0.9656	0.5	>>	Yes	Passes Criteria

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8905	0.8400	0.9410	0.8321	0.9348	0.0182	0.0407	4.57%	0.00%
0	FC	5	0.8395	0.7529	0.9261	0.7481	0.9286	0.0312	0.0698	8.31%	5.72%
6.25		5	0.8604	0.8118	0.9089	0.8282	0.9278	0.0175	0.0391	4.54%	3.39%
12.5		5	0.8518	0.7869	0.9167	0.7824	0.9231	0.0234	0.0523	6.14%	4.35%
25		5	0.8839	0.8516	0.9163	0.8588	0.9137	0.0117	0.0261	2.95%	0.74%
50		5	0.8849	0.8663	0.9036	0.8702	0.9046	0.0067	0.0150	1.70%	0.63%
100		5	0.9047	0.8764	0.9329	0.8664	0.9245	0.0102	0.0228	2.52%	-1.59%
101		5	0.8849	0.8553	0.9145	0.8435	0.9051	0.0107	0.0239	2.70%	0.63%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9222	0.9114	0.9330	0.9109	0.9348	0.0039	0.0087	0.94%	0.00%
0	FC	5	0.9003	0.8729	0.9277	0.8829	0.9286	0.0099	0.0221	2.45%	2.37%
6.25		5	0.9147	0.9018	0.9276	0.9016	0.9278	0.0047	0.0104	1.14%	0.81%
12.5		5	0.9014	0.8686	0.9342	0.8723	0.9313	0.0118	0.0264	2.93%	2.26%
25		5	0.9097	0.8931	0.9264	0.8972	0.9298	0.0060	0.0134	1.47%	1.35%
50		5	0.9008	0.8909	0.9108	0.8923	0.9120	0.0036	0.0080	0.89%	2.31%
100		5	0.9187	0.9028	0.9346	0.9044	0.9368	0.0057	0.0128	1.40%	0.38%
101		5	0.8916	0.8792	0.9040	0.8770	0.9051	0.0045	0.0100	1.12%	3.32%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9656	0.9120	1.0000	0.9008	1.0000	0.0193	0.0432	4.47%	0.00%
0	FC	5	0.9321	0.8494	1.0000	0.8473	1.0000	0.0298	0.0666	7.14%	3.48%
6.25		5	0.9405	0.8949	0.9860	0.9008	1.0000	0.0164	0.0367	3.90%	2.61%
12.5		5	0.9450	0.8797	1.0000	0.8893	1.0000	0.0235	0.0526	5.56%	2.13%
25		5	0.9718	0.9327	1.0000	0.9237	1.0000	0.0141	0.0314	3.23%	-0.63%
50		5	0.9824	0.9561	1.0000	0.9542	1.0000	0.0095	0.0212	2.16%	-1.74%
100		5	0.9847	0.9586	1.0000	0.9580	1.0000	0.0094	0.0211	2.14%	-1.98%
101		5	0.9924	0.9712	1.0000	0.9618	1.0000	0.0076	0.0171	1.72%	-2.77%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9348	0.8969	0.8702	0.8321	0.9185
0	FC	0.9286	0.8321	0.8836	0.8053	0.7481
6.25		0.8397	0.8550	0.8511	0.8282	0.9278
12.5		0.8282	0.7824	0.8511	0.9231	0.8740
25		0.8664	0.9104	0.9137	0.8588	0.8702
50		0.8702	0.9046	0.8942	0.8702	0.8855
100		0.9245	0.9046	0.9091	0.8664	0.9187
101		0.8901	0.8927	0.8931	0.8435	0.9051

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9348	0.9109	0.9231	0.9237	0.9185
0	FC	0.9286	0.9198	0.8836	0.8866	0.8829
6.25		0.9016	0.9069	0.9177	0.9195	0.9278
12.5		0.9313	0.8723	0.9028	0.9231	0.8774
25		0.8972	0.9104	0.9137	0.9298	0.8976
50		0.9120	0.9046	0.8942	0.9012	0.8923
100		0.9245	0.9368	0.9091	0.9044	0.9187
101		0.8901	0.8927	0.8931	0.8770	0.9051

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9847	0.9427	0.9008	1.0000
0	FC	1.0000	0.9046	1.0000	0.9084	0.8473
6.25		0.9313	0.9427	0.9275	0.9008	1.0000
12.5		0.8893	0.8969	0.9427	1.0000	0.9962
25		0.9656	1.0000	1.0000	0.9237	0.9695
50		0.9542	1.0000	1.0000	0.9656	0.9924
100		1.0000	0.9656	1.0000	0.9580	1.0000
101		1.0000	1.0000	1.0000	0.9618	1.0000

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	258/276	235/262	228/262	218/262	248/270
0	FC	247/266	218/262	281/318	211/262	196/262
6.25		220/262	224/262	223/262	217/262	244/263
12.5		217/262	205/262	223/262	252/273	229/262
25		227/262	244/268	254/278	225/262	228/262
50		228/262	237/262	245/274	228/262	232/262
100		245/265	237/262	260/286	227/262	260/283
101		243/273	258/289	234/262	221/262	267/295

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	258/276	235/258	228/247	218/236	248/270
0	FC	247/266	218/237	281/318	211/238	196/222
6.25		220/244	224/247	223/243	217/236	244/263
12.5		217/233	205/235	223/247	252/273	229/261
25		227/253	244/268	254/278	225/242	228/254
50		228/250	237/262	245/274	228/253	232/260
100		245/265	237/253	260/286	227/251	260/283
101		243/273	258/289	234/262	221/252	267/295

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	262/262	258/262	247/262	236/262	262/262
0	FC	262/262	237/262	262/262	238/262	222/262
6.25		244/262	247/262	243/262	236/262	262/262
12.5		233/262	235/262	247/262	262/262	261/262
25		253/262	262/262	262/262	242/262	254/262
50		250/262	262/262	262/262	253/262	260/262
100		262/262	253/262	262/262	251/262	262/262
101		262/262	262/262	262/262	252/262	262/262

CETIS Analytical Report

Bivalve Larval Survival and Development Test FC vs 100% Filtered TST **Wood E&IS**

Analysis ID:	09-5505-6264	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:40	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	9.558	2.015	5	CDF	1.1E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0089482	0.0089482	1	1.625	0.2381	Non-Significant Effect
Error	0.0440443	0.0055055	8			
Total	0.0529925		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.565	23.15	0.0754	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9745	0.7411	0.9289	Normal Distribution

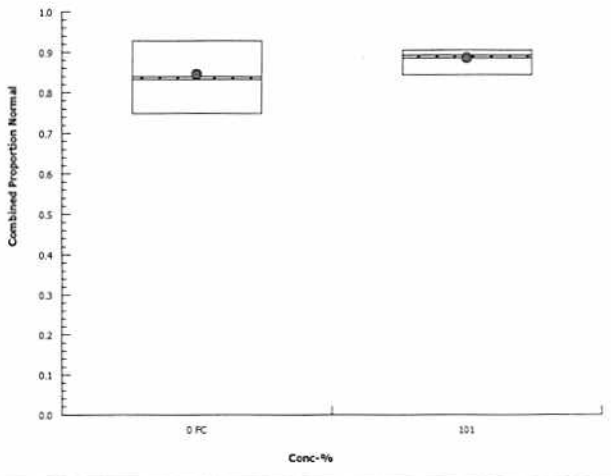
Combined Proportion Normal Summary

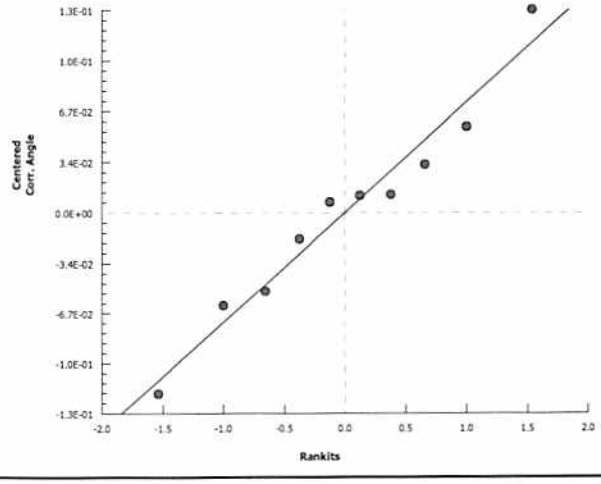
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8395	0.7529	0.9261	0.8321	0.7481	0.9286	0.0312	8.31%	0.00%
101		5	0.8849	0.8553	0.9145	0.8927	0.8435	0.9051	0.0107	2.70%	-5.40%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.166	1.044	1.289	1.149	1.045	1.3	0.0441	8.46%	0.00%
101		5	1.226	1.181	1.27	1.237	1.164	1.258	0.01603	2.92%	-5.13%

Graphics





Bivalve Larval Survival and Development Test LC vs 100% TST — **Wood E&IS**

Analysis ID:	06-4385-5796	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:40	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	12.06	1.895	7	CDF	3.1E-06	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0010693	0.0010693	1	0.3835	0.5530	Non-Significant Effect
Error	0.0223088	0.0027886	8			
Total	0.0233781		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.011	23.15	0.3109	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9651	0.7411	0.8417	Normal Distribution

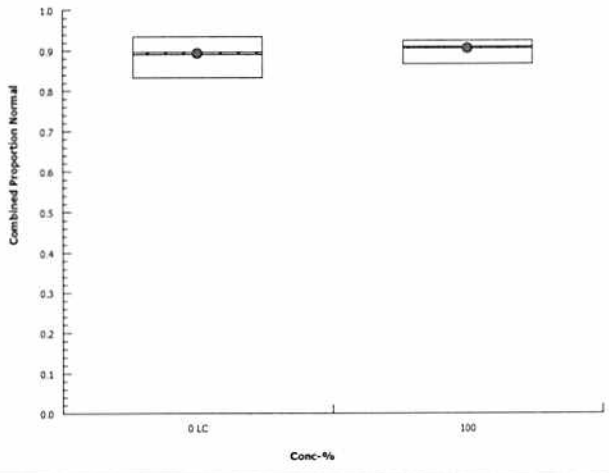
Combined Proportion Normal Summary

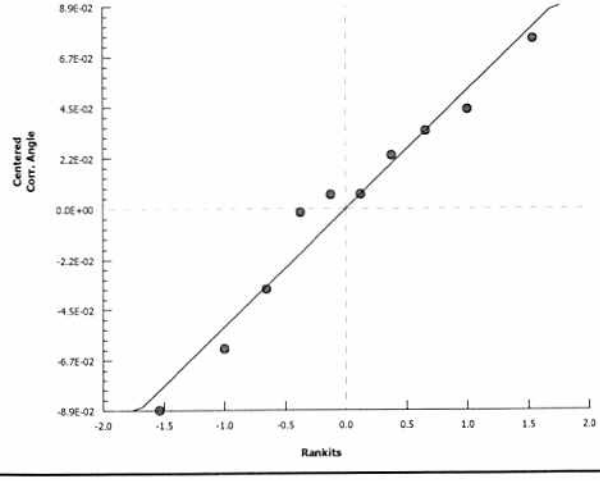
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8905	0.8400	0.9410	0.8969	0.8321	0.9348	0.0182	4.57%	0.00%
100		5	0.9047	0.8764	0.9329	0.9091	0.8664	0.9245	0.0102	2.52%	-1.59%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.238	1.157	1.318	1.244	1.149	1.313	0.02894	5.23%	0.00%
100		5	1.258	1.212	1.305	1.265	1.197	1.292	0.01668	2.96%	-1.67%

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	16-2084-0631	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	5.85%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	1.365	2.362	0.081	8	CDF	0.2704	Non-Significant Effect
		12.5	1.684	2.362	0.081	8	CDF	0.1695	Non-Significant Effect
		25	0.3798	2.362	0.081	8	CDF	0.6979	Non-Significant Effect
		50	0.3656	2.362	0.081	8	CDF	0.7038	Non-Significant Effect
		100	-0.6062	2.362	0.081	8	CDF	0.9534	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0212443	0.0042489	5	1.46	0.2395	Non-Significant Effect
Error	0.0698373	0.0029099	24			
Total	0.0910816		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	5.776	15.09	0.3287	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9726	0.9031	0.6122	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8905	0.8400	0.9410	0.8969	0.8321	0.9348	0.0182	4.57%	0.00%
6.25		5	0.8604	0.8118	0.9089	0.8511	0.8282	0.9278	0.0175	4.54%	3.39%
12.5		5	0.8518	0.7869	0.9167	0.8511	0.7824	0.9231	0.0234	6.14%	4.35%
25		5	0.8839	0.8516	0.9163	0.8702	0.8588	0.9137	0.0117	2.95%	0.74%
50		5	0.8849	0.8663	0.9036	0.8855	0.8702	0.9046	0.0067	1.70%	0.63%
100		5	0.9047	0.8764	0.9329	0.9091	0.8664	0.9245	0.0102	2.52%	-1.59%

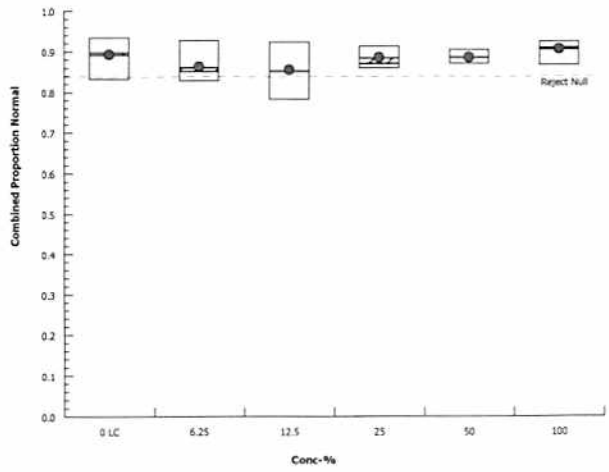
Angular (Corrected) Transformed Summary

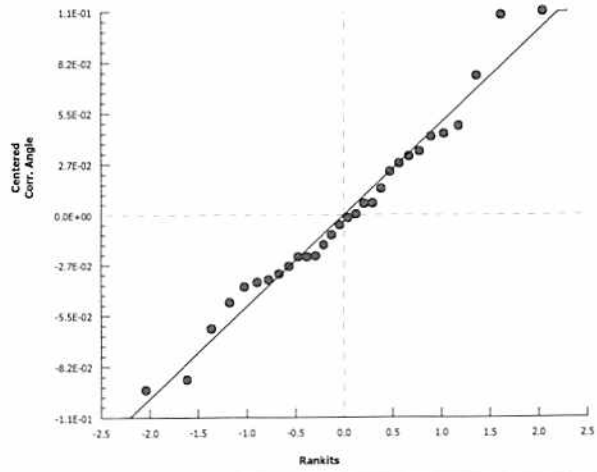
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.238	1.157	1.318	1.244	1.149	1.313	0.02894	5.23%	0.00%
6.25		5	1.191	1.114	1.268	1.175	1.143	1.299	0.02763	5.19%	3.76%
12.5		5	1.18	1.086	1.275	1.175	1.086	1.29	0.034	6.44%	4.64%
25		5	1.225	1.173	1.276	1.202	1.186	1.273	0.01857	3.39%	1.05%
50		5	1.225	1.196	1.255	1.226	1.202	1.257	0.01061	1.94%	1.01%
100		5	1.258	1.212	1.305	1.265	1.197	1.292	0.01668	2.96%	-1.67%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	16-2084-0631	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	08-0107-7872	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	2.33%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	0.8421	2.362	0.038	8	CDF	0.4916	Non-Significant Effect
		12.5	2.157	2.362	0.038	8	CDF	0.0745	Non-Significant Effect
		25	1.367	2.362	0.038	8	CDF	0.2698	Non-Significant Effect
		50	2.335	2.362	0.038	8	CDF	0.0527	Non-Significant Effect
		100	0.3768	2.362	0.038	8	CDF	0.6992	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0058601	0.0011720	5	1.79	0.1531	Non-Significant Effect
Error	0.0157177	0.0006549	24			
Total	0.0215779		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	7.211	15.09	0.2054	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9801	0.9031	0.8273	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9222	0.9114	0.9330	0.9231	0.9109	0.9348	0.0039	0.94%	0.00%
6.25		5	0.9147	0.9018	0.9276	0.9177	0.9016	0.9278	0.0047	1.14%	0.81%
12.5		5	0.9014	0.8686	0.9342	0.9028	0.8723	0.9313	0.0118	2.93%	2.26%
25		5	0.9097	0.8931	0.9264	0.9104	0.8972	0.9298	0.0060	1.47%	1.35%
50		5	0.9008	0.8909	0.9108	0.9012	0.8923	0.9120	0.0036	0.89%	2.31%
100		5	0.9187	0.9028	0.9346	0.9187	0.9044	0.9368	0.0057	1.40%	0.38%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.288	1.268	1.309	1.29	1.268	1.313	0.007331	1.27%	0.00%
6.25		5	1.275	1.252	1.298	1.28	1.252	1.299	0.008343	1.46%	1.06%
12.5		5	1.254	1.198	1.309	1.254	1.205	1.306	0.01998	3.56%	2.71%
25		5	1.266	1.237	1.296	1.267	1.244	1.303	0.01067	1.88%	1.72%
50		5	1.251	1.234	1.267	1.251	1.236	1.27	0.006021	1.08%	2.93%
100		5	1.282	1.253	1.312	1.282	1.256	1.317	0.01064	1.86%	0.47%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	06-3609-2189	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Apr-22 15:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	6.69%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	1.062	2.362	0.170	8	CDF	0.3925	Non-Significant Effect
		12.5	0.7002	2.362	0.170	8	CDF	0.5569	Non-Significant Effect
		25	-0.1219	2.362	0.170	8	CDF	0.8668	Non-Significant Effect
		50	-0.5445	2.362	0.170	8	CDF	0.9460	Non-Significant Effect
		100	-0.7272	2.362	0.170	8	CDF	0.9655	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0633786	0.0126757	5	0.9743	0.4533	Non-Significant Effect
Error	0.312234	0.0130097	24			
Total	0.375612		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.443	15.09	0.9195	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9498	0.9031	0.1670	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9656	0.9120	1.0000	0.9847	0.9008	1.0000	0.0193	4.47%	0.00%
6.25		5	0.9405	0.8949	0.9860	0.9313	0.9008	1.0000	0.0164	3.90%	2.61%
12.5		5	0.9450	0.8797	1.0000	0.9427	0.8893	1.0000	0.0235	5.56%	2.13%
25		5	0.9718	0.9327	1.0000	0.9695	0.9237	1.0000	0.0141	3.23%	-0.63%
50		5	0.9824	0.9561	1.0000	0.9924	0.9542	1.0000	0.0095	2.16%	-1.74%
100		5	0.9847	0.9586	1.0000	1.0000	0.9580	1.0000	0.0094	2.14%	-1.98%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.421	1.261	1.581	1.447	1.25	1.54	0.05767	9.07%	0.00%
6.25		5	1.345	1.204	1.485	1.306	1.25	1.54	0.05047	8.39%	5.39%
12.5		5	1.371	1.19	1.552	1.329	1.232	1.54	0.06514	10.63%	3.55%
25		5	1.43	1.296	1.564	1.395	1.291	1.54	0.04838	7.56%	-0.62%
50		5	1.461	1.353	1.568	1.483	1.355	1.54	0.03875	5.93%	-2.76%
100		5	1.474	1.361	1.587	1.54	1.364	1.54	0.04066	6.17%	-3.69%

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:14 (p 1 of 2)
Test Code/ID: 05-1144-8338/22-03-059

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ 22 Mar-22 1350
Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater
Sample Code: AG ~~7E2925B2~~ 22-W067
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB 3

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			81			242	225	~~BA~~ 4/6/22
			82			251	227	4/7/22
			83			278	254	
			84			253	228	
			85			247	223	
			86			261	229	
			87			260	232	
			88			274	245	
			89			235	205	
			90			273	243	
			91			262	237	
			92			276	258	
			93			262	234	
			94			289	258	
			95			273	252	
			96			222	196	
			97			252	221	
			98			254	228	
			99			247	228	
			100			236	217	
			101			250	228	
			102			247	224	
			103			243	223	
			104			270	248	
			105			265	245	
			106			263	244	
			107			253	227	
			108			238	211	
			109			283	260	
			110			237	218	
			111			233	217	
			112			244	220	
			113			286	260	
			114			268	244	

CETIS Test Data Worksheet

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			115			266	247	~~BT~~ 4/8/22
			116			295	267	
			117			236	218	
			118			253	237	
			119			318	281	
			120			258	235	

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1618
Sample Date: ~~21~~ 22 Mar-22 1350
Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater
Sample Code: ~~7E2925B2~~ 22-W067
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB 3

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	115			266	247	BI 4/6/22
0	FC	2	110					
0	FC	3	119					
0	FC	4	108					
0	FC	5	96					
0	LC	1	92			276	258	
0	LC	2	120					
0	LC	3	99					
0	LC	4	117					
0	LC	5	104					
6.25		1	112			244	220	
6.25		2	102					
6.25		3	103					
6.25		4	100					
6.25		5	106					
12.5		1	111			233	217	
12.5		2	89					
12.5		3	85					
12.5		4	95					
12.5		5	86					
25		1	107			253	227	
25		2	114					
25		3	83					
25		4	81					
25		5	98					
50		1	101			250	228	
50		2	91					
50		3	88					
50		4	84					
50		5	87					
100		1	105			265	245	
100		2	118					
100		3	113					
100		4	82					

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
100		5	109					
101		1	90			273	243	
101		2	94					
101		3	93					
101		4	97					
101		5	116					

QC: KB

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-3
Test No. 22-03-059

Test Species: *M. galloprovincialis*
Start Date/Time: ~~3/22/2022~~ 1615 3/23/22
End Date/Time: ~~3/24/2022~~ 1615 3/25/22

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr @CH	48hr
Lab Control	Temp. (°C)	14.5	15.7	15.6
	Salinity (ppt)	32.9	33.4	33.6
	pH (units)	7.96	7.83	7.86
	DO (mg/L)	7.8	8.8	8.7
Filter Control	Temp. (°C)	14.0	15.7	15.7
	Salinity (ppt)	33.0	33.4	33.6
	pH (units)	7.98	7.79	7.83
	DO (mg/L)	8.0	8.6	8.7
6.25	Temp. (°C)	14.0	15.7	15.7
	Salinity (ppt)	33.0	33.6	33.7
	pH (units)	8.00	7.82	7.82
	DO (mg/L)	8.1	~~8~~ 8.8	8.7
12.5	Temp. (°C)	~~13.9~~ RW 15.0	15.8	15.7
	Salinity (ppt)	32.9	33.6	33.7
	pH (units)	8.00	7.83	7.81
	DO (mg/L)	8.1	9.0	8.7
25	Temp. (°C)	~~13.9~~ RW 15.0	15.6	15.7
	Salinity (ppt) 33.0	~~8.00~~ CB	33.6	33.7
	pH (units) 8.00	~~8333.0~~ CB	CB ~~33.6~~ 7.83	7.81
	DO (mg/L) 8.3	CB ~~8.3~~ ~~33.0~~	CB ~~33.6~~ 8.8	8.7
50	Temp. (°C)	~~13.9~~ RW 15.0	15.8	15.7
	Salinity (ppt)	32.8	33.7	33.7
	pH (units)	7.99	7.83	7.81
	DO (mg/L)	8.5	9.2	8.8
100	Temp. (°C)	14.0	15.9	15.8
	Salinity (ppt)	33.1	33.6	33.6
	pH (units)	7.96	7.81	7.80
	DO (mg/L)	8.6	8.8	8.7
100 Filtered (1.2µm)	Temp. (°C)	14.2	15.9	15.8
	Salinity (ppt)	32.3	33.0	33.3
	pH (units)	7.95	7.81	7.83
	DO (mg/L)	8.6	8.8	8.7
	Tech Initials:	~~BT~~	CB	AG

Source of Animals: AG Mission Bay 3/23/22 **Date Received:** 3/23/22

Comments:

QA: AG 4/29/22

Final: SL 5/20/22

Site: SIYB-4

CETIS Summary Report

Bivalve Larval Survival and Development Test — Wood E&IS

Batch ID:	11-5753-7677	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	23 ~~22~~ Mar-22 16:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	~~24~~ 25 Mar-22 16:15	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Field Collected	**Age:**	

Sample ID:	19-4862-4511	**Code:**	22-W068	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 13:00	**Material:**	Seawater	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	~~3h~~ (1.9 °C) 27hr	**Station:**	SIYB 4		

Comments:
FC = Filtered Control (1.2 um), 101 = 100% filtered (1.2um)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
02-5444-8755	Combined Proportion Norma	TST-Welch's t Test	2.7E-04	100% passed combined proportion normal
09-4471-8807	Combined Proportion Norma	TST-Welch's t Test	3.4E-05	101% passed combined proportion normal

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
13-7740-2385	Combined Proportion Norma	Dunnett Multiple Comparison Test	100	> 100	n/a	1	7.31%
15-8398-1867	Proportion Normal	Dunnett Multiple Comparison Test	100	> 100	n/a	1	3.37%
06-0879-0720	Survival Rate	Dunnett Multiple Comparison Test	100	> 100	n/a	1	4.77%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
15-8398-1867	Proportion Normal	Control Resp	0.9222	0.9	>>	Yes	Passes Criteria
06-0879-0720	Survival Rate	Control Resp	0.9863	0.5	>>	Yes	Passes Criteria

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9095	0.8727	0.9463	0.8664	0.9470	0.0133	0.0297	3.26%	0.00%
0	FC	5	0.8336	0.7769	0.8903	0.7824	0.8969	0.0204	0.0457	5.48%	8.34%
6.25		5	0.8994	0.8434	0.9554	0.8397	0.9384	0.0202	0.0451	5.01%	1.11%
12.5		5	0.8718	0.7784	0.9653	0.7443	0.9244	0.0337	0.0753	8.64%	4.14%
25		5	0.9214	0.8960	0.9467	0.8893	0.9461	0.0091	0.0204	2.21%	-1.31%
50		5	0.9179	0.8985	0.9372	0.8939	0.9363	0.0070	0.0156	1.70%	-0.92%
100		5	0.9227	0.8725	0.9728	0.8893	0.9855	0.0181	0.0404	4.38%	-1.45%
101		5	0.8911	0.8845	0.8977	0.8819	0.8956	0.0024	0.0053	0.60%	2.02%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9222	0.8905	0.9538	0.9008	0.9528	0.0114	0.0255	2.77%	0.00%
0	FC	5	0.9120	0.8944	0.9295	0.8952	0.9325	0.0063	0.0142	1.55%	1.11%
6.25		5	0.9275	0.9173	0.9377	0.9167	0.9384	0.0037	0.0082	0.89%	-0.58%
12.5		5	0.9054	0.8815	0.9294	0.8744	0.9244	0.0086	0.0193	2.13%	1.81%
25		5	0.9277	0.9110	0.9444	0.9102	0.9461	0.0060	0.0135	1.45%	-0.60%
50		5	0.9179	0.8985	0.9372	0.8939	0.9363	0.0070	0.0156	1.70%	0.47%
100		5	0.9477	0.9213	0.9741	0.9357	0.9855	0.0095	0.0213	2.24%	-2.77%
101		5	0.8911	0.8845	0.8977	0.8819	0.8956	0.0024	0.0053	0.60%	3.37%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9863	0.9627	1.0000	0.9618	1.0000	0.0085	0.0190	1.93%	0.00%
0	FC	5	0.9137	0.8646	0.9628	0.8740	0.9618	0.0177	0.0395	4.33%	7.35%
6.25		5	0.9695	0.9171	1.0000	0.9160	1.0000	0.0189	0.0422	4.35%	1.70%
12.5		5	0.9618	0.8818	1.0000	0.8511	1.0000	0.0288	0.0645	6.71%	2.48%
25		5	0.9931	0.9804	1.0000	0.9771	1.0000	0.0046	0.0102	1.03%	-0.70%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-1.39%
100		5	0.9733	0.9428	1.0000	0.9504	1.0000	0.0110	0.0246	2.53%	1.32%
101		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-1.39%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9022	0.9237	0.9470	0.8664	0.9081
0	FC	0.8626	0.8168	0.7824	0.8969	0.8092
6.25		0.8626	0.8397	0.9384	0.9321	0.9241
12.5		0.9148	0.7443	0.9244	0.9132	0.8626
25		0.9220	0.9461	0.9258	0.9237	0.8893
50		0.8939	0.9363	0.9158	0.9251	0.9182
100		0.9407	0.8893	0.9855	0.8969	0.9008
101		0.8926	0.8956	0.8819	0.8933	0.8921

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9022	0.9528	0.9470	0.9008	0.9081
0	FC	0.9076	0.9185	0.8952	0.9325	0.9060
6.25		0.9262	0.9167	0.9384	0.9321	0.9241
12.5		0.9148	0.8744	0.9244	0.9132	0.9004
25		0.9220	0.9461	0.9258	0.9344	0.9102
50		0.8939	0.9363	0.9158	0.9251	0.9182
100		0.9407	0.9357	0.9855	0.9363	0.9402
101		0.8926	0.8956	0.8819	0.8933	0.8921

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9695	1.0000	0.9618	1.0000
0	FC	0.9504	0.8893	0.8740	0.9618	0.8931
6.25		0.9313	0.9160	1.0000	1.0000	1.0000
12.5		1.0000	0.8511	1.0000	1.0000	0.9580
25		1.0000	1.0000	1.0000	0.9885	0.9771
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	0.9504	1.0000	0.9580	0.9580
101		1.0000	1.0000	1.0000	1.0000	1.0000

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	249/276	242/262	250/264	227/262	257/283
0	FC	226/262	214/262	205/262	235/262	212/262
6.25		226/262	220/262	259/276	261/280	268/290
12.5		279/305	195/262	269/291	242/265	226/262
25		272/295	281/297	262/283	242/262	233/262
50		236/264	250/267	250/273	247/267	247/269
100		254/270	233/262	272/276	235/262	236/262
101		241/270	266/297	254/288	268/300	248/278

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	249/276	242/254	250/264	227/252	257/283
0	FC	226/249	214/233	205/229	235/252	212/234
6.25		226/244	220/240	259/276	261/280	268/290
12.5		279/305	195/223	269/291	242/265	226/251
25		272/295	281/297	262/283	242/259	233/256
50		236/264	250/267	250/273	247/267	247/269
100		254/270	233/249	272/276	235/251	236/251
101		241/270	266/297	254/288	268/300	248/278

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	262/262	254/262	262/262	252/262	262/262
0	FC	249/262	233/262	229/262	252/262	234/262
6.25		244/262	240/262	262/262	262/262	262/262
12.5		262/262	223/262	262/262	262/262	251/262
25		262/262	262/262	262/262	259/262	256/262
50		262/262	262/262	262/262	262/262	262/262
100		262/262	249/262	262/262	251/262	251/262
101		262/262	262/262	262/262	262/262	262/262

Bivalve Larval Survival and Development Test FC vs 100%Filtered TST **Wood E&IS**

Analysis ID:	09-4471-8807	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:05	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2 um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	17.12	2.132	4	CDF	3.4E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.016416	0.016416	1	8.039	0.0220	Significant Effect
Error	0.0163365	0.0020421	8			
Total	0.0327525		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	56.67	23.15	0.0018	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9393	0.7411	0.5453	Normal Distribution

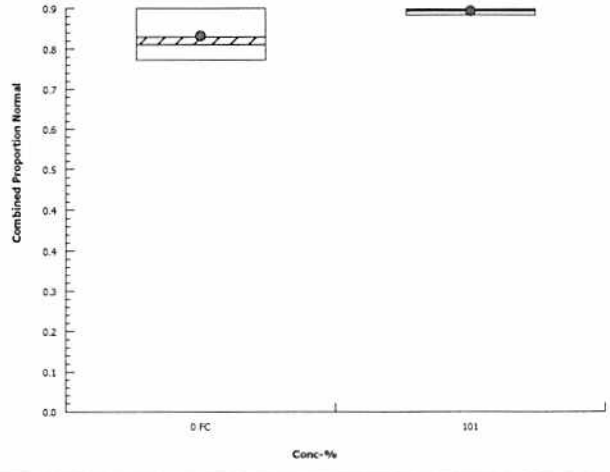
Combined Proportion Normal Summary

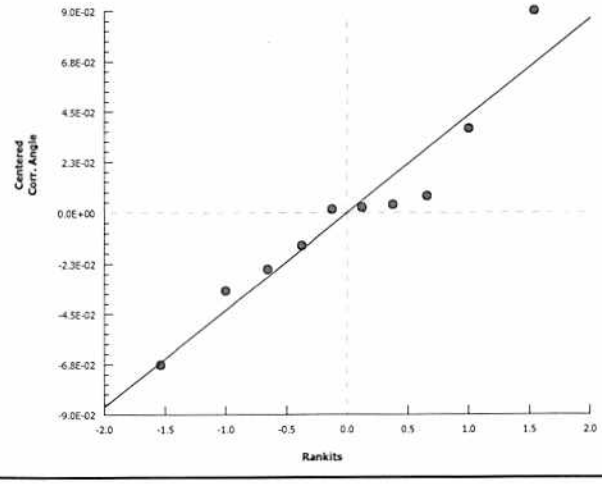
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8336	0.7769	0.8903	0.8168	0.7824	0.8969	0.0204	5.48%	0.00%
101		5	0.8911	0.8845	0.8977	0.8926	0.8819	0.8956	0.0024	0.60%	-6.90%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.154	1.075	1.232	1.128	1.086	1.244	0.02833	5.49%	0.00%
101		5	1.235	1.224	1.245	1.237	1.22	1.242	0.003764	0.68%	-7.02%

Graphics





Bivalve Larval Survival and Development Test LC vs 100% TST — **Wood E&IS**

Analysis ID:	02-5444-8755	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:05	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2 um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	7.85	2.015	5	CDF	2.7E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0025440	0.0025440	1	0.4597	0.5169	Non-Significant Effect
Error	0.044271	0.0055339	8			
Total	0.046815		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.085	23.15	0.3009	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8981	0.7411	0.2088	Normal Distribution

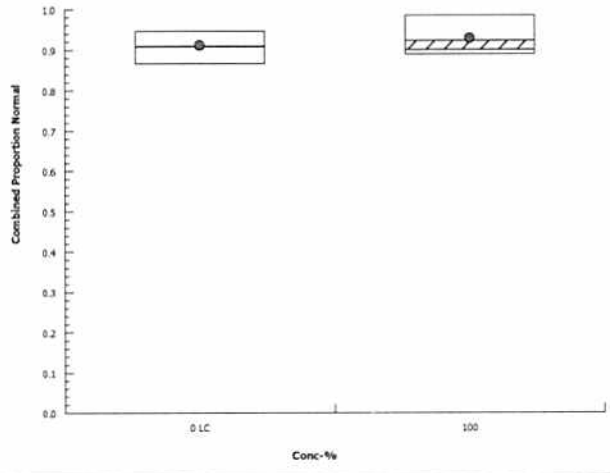
Combined Proportion Normal Summary

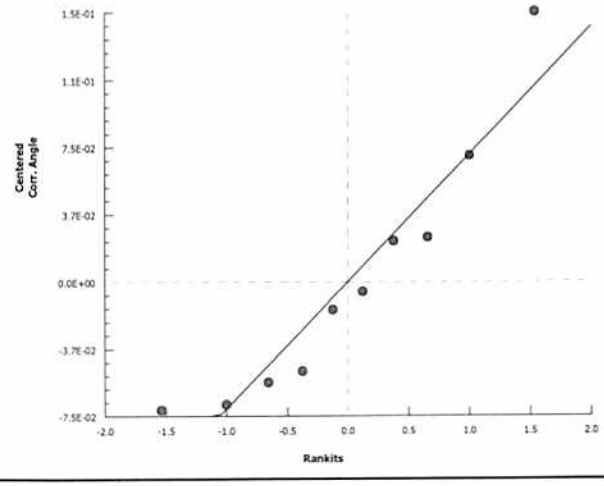
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9095	0.8727	0.9463	0.9081	0.8664	0.9470	0.0133	3.26%	0.00%
100		5	0.9227	0.8725	0.9728	0.9008	0.8893	0.9855	0.0181	4.38%	-1.45%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.268	1.204	1.333	1.263	1.197	1.338	0.02328	4.10%	0.00%
100		5	1.3	1.187	1.414	1.25	1.232	1.45	0.04089	7.03%	-2.52%

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	13-7740-2385	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:05	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2 um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	7.31%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	0.3266	2.362	0.105	8	CDF	0.7194	Non-Significant Effect
		12.5	1.222	2.362	0.105	8	CDF	0.3256	Non-Significant Effect
		25	-0.4517	2.362	0.105	8	CDF	0.9331	Non-Significant Effect
		50	-0.2881	2.362	0.105	8	CDF	0.9045	Non-Significant Effect
		100	-0.7183	2.362	0.105	8	CDF	0.9647	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0236756	0.0047351	5	0.9603	0.4614	Non-Significant Effect
Error	0.118345	0.0049310	24			
Total	0.14202		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.315	15.09	0.1397	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9755	0.9031	0.6984	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9095	0.8727	0.9463	0.9081	0.8664	0.9470	0.0133	3.26%	0.00%
6.25		5	0.8994	0.8434	0.9554	0.9241	0.8397	0.9384	0.0202	5.01%	1.11%
12.5		5	0.8718	0.7784	0.9653	0.9132	0.7443	0.9244	0.0337	8.64%	4.14%
25		5	0.9214	0.8960	0.9467	0.9237	0.8893	0.9461	0.0091	2.21%	-1.31%
50		5	0.9179	0.8985	0.9372	0.9182	0.8939	0.9363	0.0070	1.70%	-0.92%
100		5	0.9227	0.8725	0.9728	0.9008	0.8893	0.9855	0.0181	4.38%	-1.45%

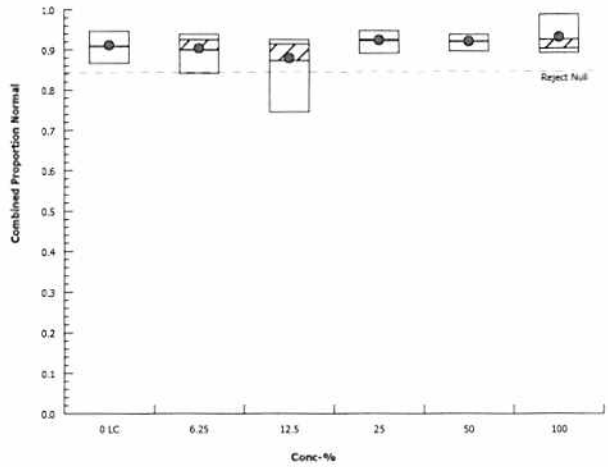
Angular (Corrected) Transformed Summary

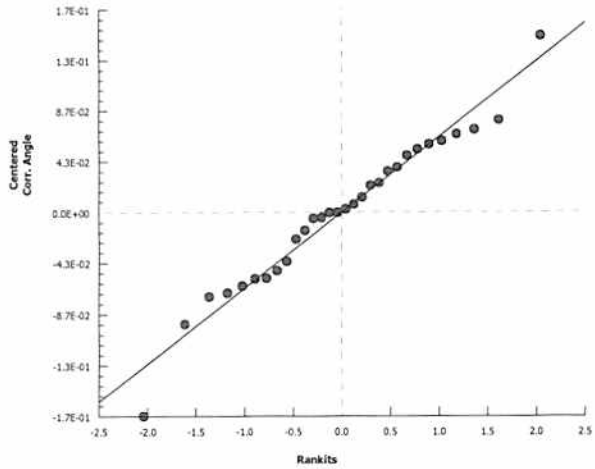
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.268	1.204	1.333	1.263	1.197	1.338	0.02328	4.10%	0.00%
6.25		5	1.254	1.162	1.345	1.292	1.159	1.32	0.03289	5.87%	1.14%
12.5		5	1.214	1.084	1.344	1.272	1.041	1.292	0.04675	8.61%	4.28%
25		5	1.288	1.242	1.335	1.291	1.232	1.337	0.01672	2.90%	-1.58%
50		5	1.281	1.246	1.316	1.281	1.239	1.316	0.01253	2.19%	-1.01%
100		5	1.3	1.187	1.414	1.25	1.232	1.45	0.04089	7.03%	-2.52%

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	13-7740-2385	Endpoint:	Combined Proportion Normal	CETIS Version:	CETISv1.9.3
Analyzed:	03 May-22 16:05	Analysis:	Parametric-Control vs Treatments	Official Results:	Yes

Graphics





Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	15-8398-1867	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:05	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2 um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	3.37%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	-0.3054	2.362	0.057	8	CDF	0.9079	Non-Significant Effect
		12.5	1.326	2.362	0.057	8	CDF	0.2850	Non-Significant Effect
		25	-0.3442	2.362	0.057	8	CDF	0.9152	Non-Significant Effect
		50	0.4214	2.362	0.057	8	CDF	0.6806	Non-Significant Effect
		100	-2.272	2.362	0.057	8	CDF	0.9997	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0204227	0.0040845	5	2.832	0.0379	Significant Effect
Error	0.0346093	0.0014421	24			
Total	0.055032		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	7.328	15.09	0.1974	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9388	0.9031	0.0844	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9222	0.8905	0.9538	0.9081	0.9008	0.9528	0.0114	2.77%	0.00%
6.25		5	0.9275	0.9173	0.9377	0.9262	0.9167	0.9384	0.0037	0.89%	-0.58%
12.5		5	0.9054	0.8815	0.9294	0.9132	0.8744	0.9244	0.0086	2.13%	1.81%
25		5	0.9277	0.9109	0.9444	0.9258	0.9102	0.9461	0.0060	1.45%	-0.60%
50		5	0.9179	0.8985	0.9372	0.9182	0.8939	0.9363	0.0070	1.70%	0.47%
100		5	0.9477	0.9213	0.9741	0.9402	0.9357	0.9855	0.0095	2.24%	-2.77%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.291	1.23	1.353	1.263	1.25	1.352	0.02219	3.84%	0.00%
6.25		5	1.299	1.279	1.318	1.296	1.278	1.32	0.00712	1.23%	-0.57%
12.5		5	1.259	1.219	1.299	1.272	1.209	1.292	0.01438	2.55%	2.47%
25		5	1.299	1.267	1.332	1.295	1.266	1.337	0.01178	2.03%	-0.64%
50		5	1.281	1.246	1.316	1.281	1.239	1.316	0.01253	2.19%	0.78%
100		5	1.346	1.273	1.418	1.324	1.315	1.45	0.02617	4.35%	-4.23%

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	06-0879-0720	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:05	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2 um), 101 = 100% filtered (1.2um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	4.77%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	0.5658	2.362	0.156	8	CDF	0.6179	Non-Significant Effect
		12.5	0.6968	2.362	0.156	8	CDF	0.5585	Non-Significant Effect
		25	-0.3425	2.362	0.156	8	CDF	0.9149	Non-Significant Effect
		50	-0.9398	2.362	0.156	8	CDF	0.9803	Non-Significant Effect
		100	0.7089	2.362	0.156	8	CDF	0.5529	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0486673	0.0097335	5	0.8918	0.5021	Non-Significant Effect
Error	0.261935	0.010914	24			
Total	0.310603		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	9.339	3.895	4.8E-05	Unequal Variances
Variances	Mod Levene Equality of Variance Test	0.8329	4.248	0.5431	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9164	0.9031	0.0216	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9863	0.9627	1.0000	1.0000	0.9618	1.0000	0.0085	1.93%	0.00%
6.25		5	0.9695	0.9171	1.0000	1.0000	0.9160	1.0000	0.0189	4.35%	1.70%
12.5		5	0.9618	0.8818	1.0000	1.0000	0.8511	1.0000	0.0288	6.71%	2.48%
25		5	0.9931	0.9804	1.0000	1.0000	0.9771	1.0000	0.0046	1.03%	-0.70%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-1.39%
100		5	0.9733	0.9428	1.0000	0.9580	0.9504	1.0000	0.0110	2.53%	1.32%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.478	1.372	1.584	1.54	1.374	1.54	0.03817	5.78%	0.00%
6.25		5	1.44	1.271	1.61	1.54	1.277	1.54	0.06109	9.48%	2.53%
12.5		5	1.432	1.23	1.634	1.54	1.175	1.54	0.0727	11.35%	3.12%
25		5	1.5	1.431	1.57	1.54	1.419	1.54	0.02518	3.75%	-1.53%
50		5	1.54	1.54	1.54	1.54	1.54	1.54	0	0.00%	-4.20%
100		5	1.431	1.307	1.555	1.364	1.346	1.54	0.0446	6.97%	3.17%

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:17 (p 1 of 2)
Test Code/ID: 01-2958-4604/22-03-060

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ 22 Mar-22 1300

Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater

Sample Code: ~~7425A67F~~ 22-WOES
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB 4

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			121			288	254	BF 4/8/22
			122			~~BF~~ 267	250	
			123			297	266	
			124			270	241	
			125			267	247	
			126			254	242	
			127			240	220	
			128			249	233	
			129			264	236	
			130			297	281	
			131			300	268	
			132			283	257	4/13/22
			133			305	279	
			134			251	226	
			135			273	250	
			136			251	236	
			137			233	214	0.4% 1 curved hinge
			138			259	242	
			139			244	226	
			140			278	248	
			141			291	269	0.3% 1 curved hinge
			142			249	226	
			143			269	247	
			144			276	259	
			145			283	262	
			146			276	249	
			147			264	250	
			148			270	254	
			149			251	235	
			150			265	242	
			151			229	205	
			152			252	235	
			153			256	233	
			154			280	261	

CETIS Test Data Worksheet

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			155			234	212	BI 4/13/22
			156			290	268	
			157			223	195	
			158			252	227	
			159			276	272	
			160			295	272	

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date: 22 Mar-22 1615 Species: Mytilis galloprovincialis Sample Code: ~~AS7425A07F~~ 22-WC68
End Date: 24 Mar-22 1615 Protocol: EPA/600/R-95/136 (1995) Sample Source: Shelter Island Yacht Basin
Sample Date: ~~21~~ AS 22 Mar-22 1300 Material: Seawater Sample Station: SIYB 4

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	142			249	226	BI 4/8/22
0	FC	2	137			~~BS 276~~	~~BS 249~~	27
0	FC	3	151					
0	FC	4	152					
0	FC	5	155					
0	LC	1	146			276	249	
0	LC	2	126					
0	LC	3	147					
0	LC	4	158					
0	LC	5	132					
6.25		1	139			244	226	
6.25		2	127					
6.25		3	144					
6.25		4	154					
6.25		5	156					
12.5		1	133			305	279	26
12.5		2	157					
12.5		3	141					
12.5		4	150					
12.5		5	134					
25		1	160			295	272	23
25		2	130					
25		3	145					
25		4	138					
25		5	153					
50		1	129			264	236	28
50		2	122					
50		3	135					
50		4	125					
50		5	143					
100		1	148			270	254	
100		2	128					
100		3	159					
100		4	149					

CETIS Test Data Worksheet

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
100		5	136					/
101		1	124			270	241	BF 4/8/22 29
101		2	123					
101		3	121					
101		4	131					
101		5	140					

QC: KB

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-4
Test No. 22-03-060

Test Species: *M. galloprovincialis*
Start Date/Time: 3/22/2022 1615
End Date/Time: 3/24/2022 1645

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	14.1	15.7	15.7
	Salinity (ppt)	32.4	33.2	33.4
	pH (units)	7.97	7.79	7.84
	DO (mg/L)	7.8	8.5	8.4
Filter Control	Temp. (°C)	14.7	15.9	15.7
	Salinity (ppt)	32.7	33.4	33.6
	pH (units)	7.97	7.77	7.83
	DO (mg/L)	8.0	8.6	8.5
6.25	Temp. (°C)	14.5	15.6	15.7
	Salinity (ppt)	33.0	33.5	33.6
	pH (units)	7.99	7.82	7.83
	DO (mg/L)	8.0	8.5	8.6
12.5	Temp. (°C)	14.6	15.4	15.6
	Salinity (ppt)	33.0	33.7	33.7
	pH (units)	7.99	7.83	7.84
	DO (mg/L)	8.1	8.8	8.7
25	Temp. (°C)	14.8	15.5	15.6
	Salinity (ppt)	32.7	33.7	33.7
	pH (units)	7.98	7.83	7.84
	DO (mg/L)	8.1	8.7	8.7
50	Temp. (°C)	14.7	15.4	15.5
	Salinity (ppt)	32.8	33.6	33.7
	pH (units)	7.97	7.83	7.83
	DO (mg/L)	8.2	8.8	8.7
100	Temp. (°C)	14.9	15.5	15.4
	Salinity (ppt)	32.7	33.7	33.8
	pH (units)	7.95	7.82	7.82
	DO (mg/L)	8.3	8.8	8.7
100 Filtered (1.2µm)	Temp. (°C)	14.7	15.6	15.5
	Salinity (ppt)	32.5	33.3	33.5
	pH (units)	7.93	7.82	7.85
	DO (mg/L)	8.3	8.8	8.7
	Tech Initials:	BI	CB	AG

Source of Animals: AG Mission Bay
Date Received: 3/23/22

Comments:

QA: AG 4/24/22

Final: JC 5/20/22

Site: SIYB-5

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Wood E&IS**

Batch ID:	09-2480-7121	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	23 ~~22~~ Mar-22 16:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	~~24~~ 25 Mar-22 16:15	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Field Collected	**Age:**	

Sample ID:	10-0155-2905	**Code:**	22-W069	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 11:50	**Material:**	Seawater	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	~~4h~~ 5 (3.9 °C) 28 hr	**Station:**	SIYB 5		

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
07-7388-9532	Combined Proportion Norma	TST-Welch's t Test	2.0E-05	100% passed combined proportion normal
05-4352-7153	Combined Proportion Norma	TST-Welch's t Test	2.0E-06	101% passed combined proportion normal

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
06-5299-0345	Combined Proportion Norma	Dunnett Multiple Comparison Test	100	> 100	n/a	1	4.68%
02-9605-8370	Proportion Normal	Dunnett Multiple Comparison Test	100	> 100	n/a	1	3.33%
07-1175-1156	Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	3.03%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
02-9605-8370	Proportion Normal	Control Resp	0.9231	0.9	>>	Yes	Passes Criteria
07-1175-1156	Survival Rate	Control Resp	0.9924	0.5	>>	Yes	Passes Criteria

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9161	0.8849	0.9474	0.8855	0.9544	0.0113	0.0252	2.75%	0.00%
0	FC	5	0.8802	0.8346	0.9257	0.8206	0.9122	0.0164	0.0367	4.17%	3.93%
6.25		5	0.9165	0.8881	0.9449	0.8783	0.9359	0.0102	0.0229	2.50%	-0.04%
12.5		5	0.8940	0.8357	0.9522	0.8130	0.9340	0.0210	0.0469	5.25%	2.42%
25		5	0.8972	0.8750	0.9194	0.8740	0.9118	0.0080	0.0179	1.99%	2.07%
50		5	0.9065	0.8807	0.9324	0.8924	0.9402	0.0093	0.0208	2.30%	1.05%
100		5	0.9142	0.8752	0.9533	0.8702	0.9504	0.0141	0.0315	3.44%	0.21%
101		5	0.9028	0.8841	0.9214	0.8811	0.9189	0.0067	0.0151	1.67%	1.46%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9231	0.9000	0.9463	0.9052	0.9544	0.0083	0.0186	2.02%	0.00%
0	FC	5	0.9387	0.9182	0.9592	0.9110	0.9516	0.0074	0.0165	1.76%	-1.69%
6.25		5	0.9165	0.8881	0.9449	0.8783	0.9359	0.0102	0.0229	2.50%	0.72%
12.5		5	0.9185	0.9028	0.9342	0.9007	0.9340	0.0056	0.0126	1.37%	0.50%
25		5	0.9105	0.8927	0.9284	0.8911	0.9315	0.0064	0.0144	1.58%	1.37%
50		5	0.9151	0.8870	0.9432	0.8924	0.9402	0.0101	0.0227	2.48%	0.87%
100		5	0.9248	0.8925	0.9571	0.8837	0.9540	0.0116	0.0260	2.81%	-0.18%
101		5	0.9070	0.8872	0.9267	0.8811	0.9189	0.0071	0.0159	1.76%	1.75%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9924	0.9737	1.0000	0.9656	1.0000	0.0067	0.0150	1.51%	0.00%
0	FC	5	0.9374	0.9015	0.9733	0.9008	0.9733	0.0129	0.0289	3.08%	5.54%
6.25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.77%
12.5		5	0.9733	0.9115	1.0000	0.8855	1.0000	0.0223	0.0498	5.11%	1.92%
25		5	0.9855	0.9566	1.0000	0.9466	1.0000	0.0104	0.0233	2.36%	0.69%
50		5	0.9908	0.9654	1.0000	0.9542	1.0000	0.0092	0.0205	2.07%	0.15%
100		5	0.9885	0.9684	1.0000	0.9618	1.0000	0.0072	0.0162	1.64%	0.38%
101		5	0.9954	0.9827	1.0000	0.9771	1.0000	0.0046	0.0102	1.03%	-0.31%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9198	0.9052	0.8855	0.9158	0.9544
0	FC	0.8702	0.8206	0.8969	0.9122	0.9008
6.25		0.9324	0.9178	0.9359	0.8783	0.9179
12.5		0.9084	0.9007	0.9137	0.8130	0.9340
25		0.9106	0.8817	0.9118	0.8740	0.9078
50		0.8935	0.9135	0.8931	0.9402	0.8924
100		0.8969	0.8702	0.9198	0.9504	0.9338
101		0.8811	0.9022	0.9189	0.8969	0.9147

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9234	0.9052	0.9170	0.9158	0.9544
0	FC	0.9500	0.9110	0.9438	0.9373	0.9516
6.25		0.9324	0.9178	0.9359	0.8783	0.9179
12.5		0.9261	0.9007	0.9137	0.9181	0.9340
25		0.9106	0.9315	0.9118	0.8911	0.9078
50		0.8935	0.9135	0.9360	0.9402	0.8924
100		0.9325	0.8837	0.9198	0.9540	0.9338
101		0.8811	0.9022	0.9189	0.9180	0.9147

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9962	1.0000	0.9656	1.0000	1.0000
0	FC	0.9160	0.9008	0.9504	0.9733	0.9466
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		0.9809	1.0000	1.0000	0.8855	1.0000
25		1.0000	0.9466	1.0000	0.9809	1.0000
50		1.0000	1.0000	0.9542	1.0000	1.0000
100		0.9618	0.9847	1.0000	0.9962	1.0000
101		1.0000	1.0000	1.0000	0.9771	1.0000

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/262	277/306	232/262	250/273	251/263
0	FC	228/262	215/262	235/262	239/262	236/262
6.25		276/296	268/292	263/281	231/263	257/280
12.5		238/262	245/272	254/278	213/262	269/288
25		275/302	231/262	279/306	229/262	256/282
50		260/291	264/289	234/262	283/301	257/288
100		235/262	228/262	241/262	249/262	254/272
101		252/286	249/276	272/296	235/262	268/293

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/261	277/306	232/253	250/273	251/263
0	FC	228/240	215/236	235/249	239/255	236/248
6.25		276/296	268/292	263/281	231/263	257/280
12.5		238/257	245/272	254/278	213/232	269/288
25		275/302	231/248	279/306	229/257	256/282
50		260/291	264/289	234/250	283/301	257/288
100		235/252	228/258	241/262	249/261	254/272
101		252/286	249/276	272/296	235/256	268/293

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	261/262	262/262	253/262	262/262	262/262
0	FC	240/262	236/262	249/262	255/262	248/262
6.25		262/262	262/262	262/262	262/262	262/262
12.5		257/262	262/262	262/262	232/262	262/262
25		262/262	248/262	262/262	257/262	262/262
50		262/262	262/262	250/262	262/262	262/262
100		252/262	258/262	262/262	261/262	262/262
101		262/262	262/262	262/262	256/262	262/262

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	06-5299-0345	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	4.68%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	0.01078	2.362	0.073	8	CDF	0.8301	Non-Significant Effect
		12.5	1.153	2.362	0.073	8	CDF	0.3539	Non-Significant Effect
		25	1.117	2.362	0.073	8	CDF	0.3689	Non-Significant Effect
		50	0.5847	2.362	0.073	8	CDF	0.6094	Non-Significant Effect
		100	0.07917	2.362	0.073	8	CDF	0.8089	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070807	0.0014161	5	0.5918	0.7063	Non-Significant Effect
Error	0.0574263	0.0023928	24			
Total	0.064507		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	3.612	15.09	0.6065	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9671	0.9031	0.4634	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9161	0.8849	0.9474	0.9158	0.8855	0.9544	0.0113	2.75%	0.00%
6.25		5	0.9165	0.8881	0.9449	0.9179	0.8783	0.9359	0.0102	2.50%	-0.04%
12.5		5	0.8940	0.8357	0.9522	0.9084	0.8130	0.9340	0.0210	5.25%	2.42%
25		5	0.8972	0.8750	0.9194	0.9078	0.8740	0.9118	0.0080	1.99%	2.07%
50		5	0.9065	0.8807	0.9324	0.8935	0.8924	0.9402	0.0093	2.30%	1.05%
100		5	0.9142	0.8752	0.9533	0.9198	0.8702	0.9504	0.0141	3.44%	0.21%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.28	1.22	1.339	1.276	1.226	1.356	0.02143	3.74%	0.00%
6.25		5	1.279	1.23	1.329	1.28	1.214	1.315	0.01773	3.10%	0.03%
12.5		5	1.244	1.156	1.332	1.263	1.124	1.311	0.0318	5.72%	2.79%
25		5	1.245	1.209	1.281	1.262	1.208	1.269	0.01301	2.34%	2.70%
50		5	1.262	1.215	1.309	1.238	1.237	1.324	0.0169	3.00%	1.41%
100		5	1.277	1.208	1.347	1.284	1.202	1.346	0.02513	4.40%	0.19%

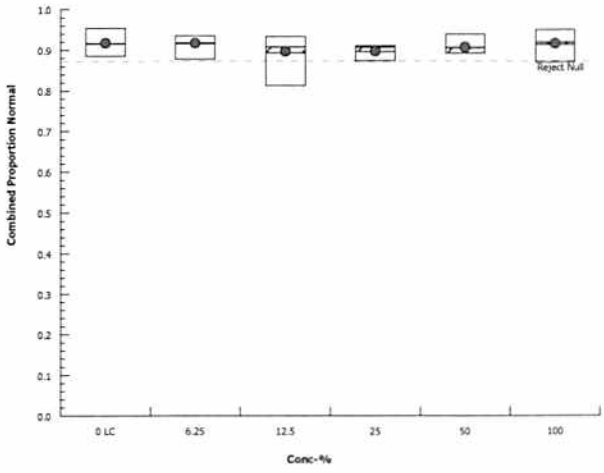
Combined Proportion Normal Binomials

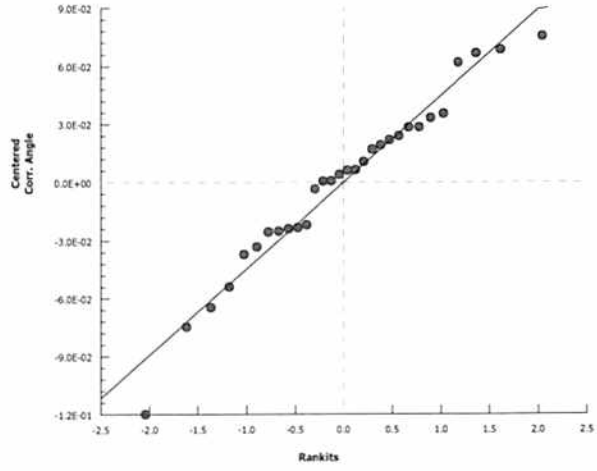
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/262	277/306	232/262	250/273	251/263
6.25		276/296	268/292	263/281	231/263	257/280
12.5		238/262	245/272	254/278	213/262	269/288
25		275/302	231/262	279/306	229/262	256/282
50		260/291	264/289	234/262	283/301	257/288
100		235/262	228/262	241/262	249/262	254/272

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	06-5299-0345	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test FC vs 100% Filtered TST **Wood E&IS**

Analysis ID:	05-4352-7153	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:28	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	15.84	1.943	6	CDF	2.0E-06	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0029536	0.0029536	1	1.647	0.2353	Non-Significant Effect
Error	0.0143442	0.0017930	8			
Total	0.0172978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.639	23.15	0.1664	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9195	0.7411	0.3530	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8802	0.8346	0.9257	0.8969	0.8206	0.9122	0.0164	4.17%	0.00%
101		5	0.9028	0.8841	0.9214	0.9022	0.8811	0.9189	0.0067	1.67%	-2.57%

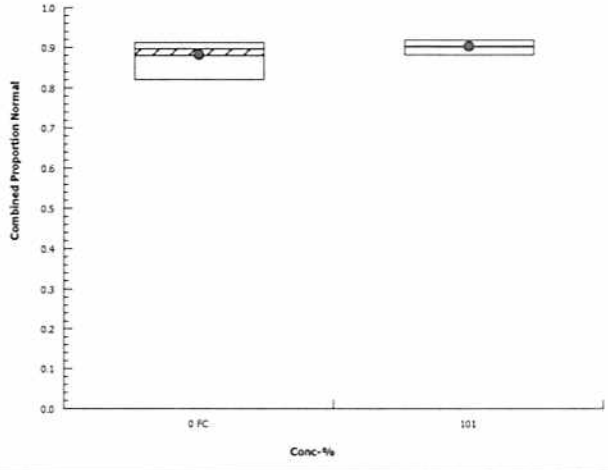
Angular (Corrected) Transformed Summary

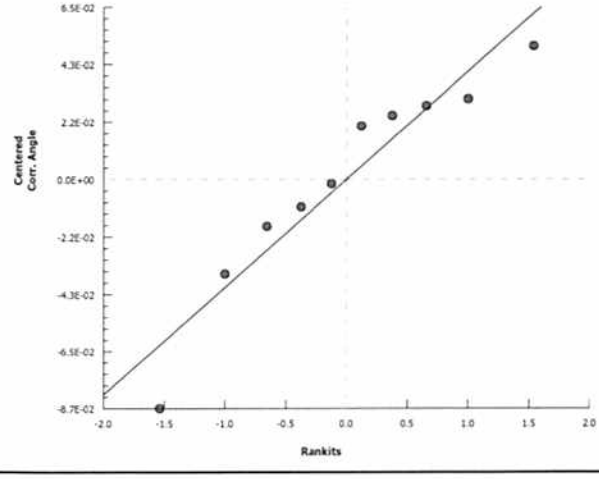
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.22	1.153	1.287	1.244	1.133	1.27	0.02429	4.45%	0.00%
101		5	1.254	1.223	1.286	1.253	1.219	1.282	0.01128	2.01%	-2.82%

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	FC	228/262	215/262	235/262	239/262	236/262
101		252/286	249/276	272/296	235/262	268/293

Graphics





Bivalve Larval Survival and Development Test LC vs 100% TST **Wood E&IS**

Analysis ID:	07-7388-9532	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:28	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	10.64	1.943	6	CDF	2.0E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.5E-05	1.5E-05	1	0.0055	0.9427	Non-Significant Effect
Error	0.0218146	0.0027268	8			
Total	0.0218296		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.376	23.15	0.7648	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9645	0.7411	0.8354	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9161	0.8849	0.9474	0.9158	0.8855	0.9544	0.0113	2.75%	0.00%
100		5	0.9142	0.8752	0.9533	0.9198	0.8702	0.9504	0.0141	3.44%	0.21%

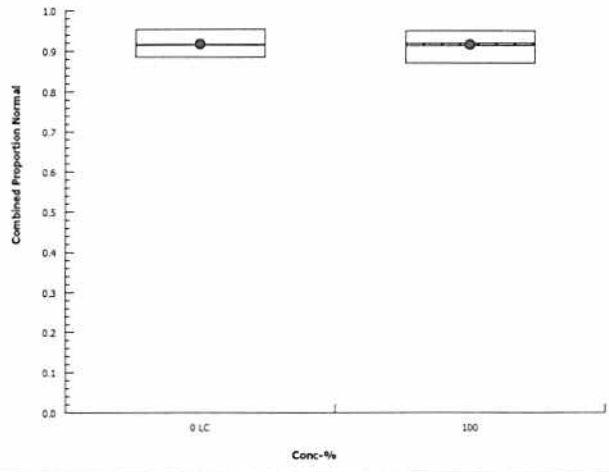
Angular (Corrected) Transformed Summary

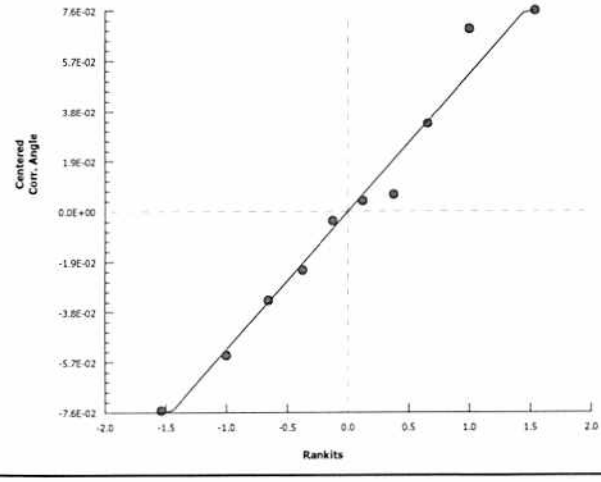
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.28	1.22	1.339	1.276	1.226	1.356	0.02143	3.74%	0.00%
100		5	1.277	1.208	1.347	1.284	1.202	1.346	0.02513	4.40%	0.19%

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/262	277/306	232/262	250/273	251/263
100		235/262	228/262	241/262	249/262	254/272

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	02-9605-8370	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	3.33%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	0.5238	2.362	0.055	8	CDF	0.6365	Non-Significant Effect
		12.5	0.4169	2.362	0.055	8	CDF	0.6825	Non-Significant Effect
		25	1.024	2.362	0.055	8	CDF	0.4091	Non-Significant Effect
		50	0.6223	2.362	0.055	8	CDF	0.5925	Non-Significant Effect
		100	-0.1831	2.362	0.055	8	CDF	0.8818	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026047	0.0005209	5	0.3819	0.8562	Non-Significant Effect
Error	0.0327342	0.0013639	24			
Total	0.0353389		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.772	15.09	0.7351	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.978	0.9031	0.7714	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9231	0.9000	0.9463	0.9170	0.9052	0.9544	0.0083	2.02%	0.00%
6.25		5	0.9165	0.8881	0.9449	0.9179	0.8783	0.9359	0.0102	2.50%	0.72%
12.5		5	0.9185	0.9028	0.9342	0.9181	0.9007	0.9340	0.0056	1.37%	0.50%
25		5	0.9105	0.8927	0.9284	0.9106	0.8911	0.9315	0.0064	1.58%	1.37%
50		5	0.9151	0.8870	0.9432	0.9135	0.8924	0.9402	0.0101	2.48%	0.87%
100		5	0.9248	0.8925	0.9571	0.9325	0.8837	0.9540	0.0116	2.81%	-0.18%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.292	1.245	1.338	1.279	1.258	1.356	0.01678	2.90%	0.00%
6.25		5	1.279	1.23	1.329	1.28	1.214	1.315	0.01773	3.10%	0.95%
12.5		5	1.282	1.253	1.311	1.281	1.25	1.311	0.0103	1.80%	0.75%
25		5	1.268	1.236	1.299	1.267	1.234	1.306	0.0114	2.01%	1.85%
50		5	1.277	1.226	1.328	1.272	1.237	1.324	0.01842	3.23%	1.13%
100		5	1.296	1.236	1.356	1.308	1.223	1.355	0.02158	3.72%	-0.33%

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/261	277/306	232/253	250/273	251/263
6.25		276/296	268/292	263/281	231/263	257/280
12.5		238/257	245/272	254/278	213/232	269/288
25		275/302	231/248	279/306	229/257	256/282
50		260/291	264/289	234/250	283/301	257/288
100		235/252	228/258	241/262	249/261	254/272

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	07-1175-1156	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:27	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	3.03%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	32.5	16	1	8	Asymp	0.9870	Non-Significant Effect
		12.5	26.5	16	1	8	Asymp	0.7637	Non-Significant Effect
		25	26.5	16	1	8	Asymp	0.7637	Non-Significant Effect
		50	29	16	1	8	Asymp	0.9104	Non-Significant Effect
		100	24.5	16	2	8	Asymp	0.5880	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0207288	0.0041458	5	0.5722	0.7206	Non-Significant Effect
Error	0.173893	0.0072456	24			
Total	0.194622		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.697	3.895	0.0452	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.6321	4.248	0.6778	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8436	0.9031	4.6E-04	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9924	0.9737	1.0000	1.0000	0.9656	1.0000	0.0067	1.51%	0.00%
6.25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.77%
12.5		5	0.9733	0.9115	1.0000	1.0000	0.8855	1.0000	0.0223	5.11%	1.92%
25		5	0.9855	0.9566	1.0000	1.0000	0.9466	1.0000	0.0104	2.36%	0.69%
50		5	0.9908	0.9654	1.0000	1.0000	0.9542	1.0000	0.0092	2.07%	0.15%
100		5	0.9885	0.9684	1.0000	0.9962	0.9618	1.0000	0.0072	1.64%	0.38%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.503	1.419	1.586	1.54	1.384	1.54	0.03016	4.49%	0.00%
6.25		5	1.54	1.54	1.54	1.54	1.54	1.54	0	0.00%	-2.48%
12.5		5	1.456	1.286	1.625	1.54	1.226	1.54	0.06114	9.39%	3.14%
25		5	1.478	1.365	1.591	1.54	1.338	1.54	0.04082	6.18%	1.65%
50		5	1.503	1.4	1.606	1.54	1.355	1.54	0.03696	5.50%	-0.02%
100		5	1.482	1.394	1.57	1.509	1.374	1.54	0.03185	4.81%	1.37%

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	261/262	262/262	253/262	262/262	262/262
6.25		262/262	262/262	262/262	262/262	262/262
12.5		257/262	262/262	262/262	232/262	262/262
25		262/262	248/262	262/262	257/262	262/262
50		262/262	262/262	250/262	262/262	262/262
100		252/262	258/262	262/262	261/262	262/262

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date: 22 Mar-22 1615 | Species: Mytilis galloprovincialis | Sample Code: ~~3BB27C09~~ 22-W069
End Date: 24 Mar-22 1615 | Protocol: EPA/600/R-95/136 (1995) | Sample Source: Shelter Island Yacht Basin
Sample Date: ~~21~~ 22 Mar-22 1150 | Material: Seawater | Sample Station: SIYB 5

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			161			296	276	BF 4/14/22
			162			250	234	
			163			288	257	
			164			282	256	
			165			280	257	
			166			286	252	
			167			278	254	
			168			296	272	
			169			302	275	
			170			288	269	
			171			263	231	
			172			257	229	
			173			306	277	
			174			249	235	
			175			257	238	
			176			289	264	
			177			236	215	
			178			281	263	
			179			261	249	
			180			256	235	
			181			232	213	
			182			306	279	
			183			276	249	
			184			248	231	
			185			272	254	
			186			292	268	
			187			262	241	
			188			258	228	
			189			263	251	
			190			272	245	
			191			255	239	
			192			252	235	
			193			248	236	4/15/22
			194			293	268	

CETIS Test Data Worksheet

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			195			253	232	~~BI~~ 4/15/22
			196			301	283	
			197			291	260	
			198			240	228	
			199			261	241	
			200			273	250	

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date: 22 Mar-22 1615 Species: Mytilis galloprovincialis Sample Code: ~~3BB27C09~~ 22-WC69
End Date: 24 Mar-22 1615 Protocol: EPA/600/R-95/136 (1995) Sample Source: Shelter Island Yacht Basin
Sample Date: ~~21~~ 22 Mar-22 1180 Material: Seawater Sample Station: SIYB 5

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	198			240	228	~~BI~~ 4/13/22
0	FC	2	177			~~261~~	~~241~~	
0	FC	3	174					
0	FC	4	191					
0	FC	5	193					
0	LC	1	199			261	241	
0	LC	2	173					
0	LC	3	195					
0	LC	4	200					
0	LC	5	189					
6.25		1	161			296	276	
6.25		2	186					
6.25		3	178					
6.25		4	171					
6.25		5	165					
12.5		1	175			257	238	
12.5		2	190					
12.5		3	167					
12.5		4	181					
12.5		5	170					
25		1	169			302	275	
25		2	184					
25		3	182					
25		4	172					
25		5	164					
50		1	197			291	260	
50		2	176					
50		3	162					
50		4	196					
50		5	163					
100		1	192			252	235	
100		2	188					
100		3	187					
100		4	179					

CETIS Test Data Worksheet

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
100		5	185					
101		1	166			286	252	BF 4/14/22
101		2	183					
101		3	168					
101		4	180					
101		5	194					

QC: KB

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-5
Test No. 22-03-061

Test Species: *M. galloprovincialis*
Start Date/Time: 3/~~22~~23/2022 1615
End Date/Time: 3/~~24~~25/2022 1615

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	14.6	15.8	15.7
	Salinity (ppt)	32.9	33.4	33.6
	pH (units)	7.94	7.78	7.85
	DO (mg/L)	7.9	8.4	8.3
Filter Control	Temp. (°C)	14.6	15.8	15.6
	Salinity (ppt)	32.8	33.3	33.6
	pH (units)	7.96	7.77	7.85
	DO (mg/L)	7.7	8.6	8.4
6.25	Temp. (°C)	14.6	15.4	15.4
	Salinity (ppt)	32.8	33.5	33.7
	pH (units)	7.97	7.80	7.83
	DO (mg/L)	8.0	8.7	8.5
12.5	Temp. (°C)	14.2	15.3	15.4
	Salinity (ppt)	33.0	33.7	33.7
	pH (units)	7.99	7.81	7.83
	DO (mg/L)	8.0	8.8	8.6
25	Temp. (°C)	14.3	15.3	15.4
	Salinity (ppt)	32.8	33.7	33.8
	pH (units)	7.98	7.82	7.83
	DO (mg/L)	8.1	8.6	8.5
50	Temp. (°C)	14.3	15.4	15.5
	Salinity (ppt)	33.0	33.7	33.8
	pH (units)	7.98	7.83	7.83
	DO (mg/L)	8.1	8.8	8.7
100	Temp. (°C)	14.5	15.5	15.5
	Salinity (ppt)	33.0	33.7	33.8
	pH (units)	7.96	7.82	7.82
	DO (mg/L)	8.2	8.8	8.7
100 Filtered (1.2µm)	Temp. (°C)	14.5	15.5	15.6
	Salinity (ppt)	32.5	33.2	33.4
	pH (units)	7.94	7.82	7.83
	DO (mg/L)	8.5	8.8	8.7
	Tech Initials:	~~RT~~	CB	AG

Source of Animals: AG Mission Bay **Date Received:** 3/23/22

Comments:

QA: MG 4/24/22

Final: JC 5/20/22

Site: SIYB-6

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Wood E&IS**

Batch ID:	12-7539-7101	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	23 22 Mar-22 16:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	24 Mar-22 16:15	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	25 48h	**Source:**	Field Collected	**Age:**	

Sample ID:	01-9832-6686	**Code:**	22-W070	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 10:30	**Material:**	Seawater	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	6h (2.2 °C) 30hr	**Station:**	SIYB 6		

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-8497-8412	Combined Proportion Norma	TST-Welch's t Test	1.4E-05	100% passed combined proportion normal
10-2819-8685	Combined Proportion Norma	TST-Welch's t Test	8.1E-05	101% passed combined proportion normal

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
03-7275-9714	Combined Proportion Norma	Dunnett Multiple Comparison Test	100	> 100	n/a	1	5.67%
13-2255-2678	Proportion Normal	Dunnett Multiple Comparison Test	100	> 100	n/a	1	4.54%
06-3057-5365	Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	2.98%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
13-2255-2678	Proportion Normal	Control Resp	0.9146	0.9	>>	Yes	Passes Criteria
06-3057-5365	Survival Rate	Control Resp	0.9802	0.5	>>	Yes	Passes Criteria

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8961	0.8733	0.9188	0.8750	0.9176	0.0082	0.0184	2.05%	0.00%
0	FC	5	0.9049	0.8444	0.9655	0.8206	0.9393	0.0218	0.0488	5.39%	-0.99%
6.25		5	0.8874	0.8473	0.9275	0.8511	0.9180	0.0144	0.0323	3.64%	0.97%
12.5		5	0.8997	0.8643	0.9351	0.8759	0.9414	0.0128	0.0285	3.17%	-0.41%
25		5	0.8931	0.8661	0.9201	0.8626	0.9112	0.0097	0.0217	2.43%	0.33%
50		5	0.9041	0.8528	0.9554	0.8582	0.9659	0.0185	0.0413	4.57%	-0.90%
100		5	0.9300	0.8972	0.9628	0.8960	0.9627	0.0118	0.0265	2.84%	-3.79%
101		5	0.8927	0.8370	0.9484	0.8206	0.9299	0.0201	0.0448	5.02%	0.38%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9146	0.8836	0.9456	0.8750	0.9431	0.0112	0.0250	2.73%	0.00%
0	FC	5	0.9291	0.9140	0.9442	0.9084	0.9393	0.0054	0.0122	1.31%	-1.58%
6.25		5	0.9045	0.8909	0.9181	0.8956	0.9180	0.0049	0.0109	1.21%	1.11%
12.5		5	0.9024	0.8695	0.9353	0.8759	0.9414	0.0119	0.0265	2.94%	1.33%
25		5	0.9050	0.8873	0.9227	0.8812	0.9187	0.0064	0.0142	1.57%	1.05%
50		5	0.9082	0.8598	0.9567	0.8582	0.9659	0.0175	0.0390	4.30%	0.70%
100		5	0.9300	0.8972	0.9628	0.8960	0.9627	0.0118	0.0265	2.84%	-1.68%
101		5	0.9183	0.8962	0.9404	0.8958	0.9414	0.0080	0.0178	1.94%	-0.40%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9802	0.9449	1.0000	0.9389	1.0000	0.0127	0.0284	2.89%	0.00%
0	FC	5	0.9740	0.9096	1.0000	0.8817	1.0000	0.0232	0.0519	5.33%	0.62%
6.25		5	0.9809	0.9484	1.0000	0.9504	1.0000	0.0117	0.0262	2.67%	-0.08%
12.5		5	0.9969	0.9885	1.0000	0.9847	1.0000	0.0031	0.0068	0.68%	-1.71%
25		5	0.9870	0.9536	1.0000	0.9389	1.0000	0.0121	0.0269	2.73%	-0.70%
50		5	0.9954	0.9827	1.0000	0.9771	1.0000	0.0046	0.0102	1.03%	-1.56%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.02%
101		5	0.9718	0.9289	1.0000	0.9160	1.0000	0.0154	0.0345	3.55%	0.86%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8893	0.9176	0.8750	0.9129	0.8855
0	FC	0.9198	0.9084	0.9366	0.8206	0.9393
6.25		0.8982	0.8511	0.8550	0.9147	0.9180
12.5		0.9170	0.8779	0.8864	0.9414	0.8759
25		0.9044	0.8779	0.8626	0.9094	0.9112
50		0.9182	0.8779	0.9004	0.9659	0.8582
100		0.9396	0.9627	0.9408	0.8960	0.9110
101		0.9152	0.9198	0.9299	0.8779	0.8206

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9246	0.9176	0.8750	0.9129	0.9431
0	FC	0.9305	0.9084	0.9366	0.9307	0.9393
6.25		0.8982	0.8956	0.8960	0.9147	0.9180
12.5		0.9170	0.8915	0.8864	0.9414	0.8759
25		0.9044	0.8812	0.9187	0.9094	0.9112
50		0.9182	0.8984	0.9004	0.9659	0.8582
100		0.9396	0.9627	0.9408	0.8960	0.9110
101		0.9152	0.9414	0.9299	0.9091	0.8958

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9618	1.0000	1.0000	1.0000	0.9389
0	FC	0.9885	1.0000	1.0000	0.8817	1.0000
6.25		1.0000	0.9504	0.9542	1.0000	1.0000
12.5		1.0000	0.9847	1.0000	1.0000	1.0000
25		1.0000	0.9962	0.9389	1.0000	1.0000
50		1.0000	0.9771	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000
101		1.0000	0.9771	1.0000	0.9656	0.9160

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	233/262	245/267	231/264	241/264	232/262
0	FC	241/262	248/273	251/268	215/262	263/280
6.25		247/275	223/262	224/262	268/293	280/305
12.5		254/277	230/262	242/273	257/273	247/282
25		246/272	230/262	226/262	261/287	308/338
50		247/269	230/262	244/271	255/264	242/282
100		249/265	258/268	286/304	267/298	266/292
101		259/283	241/262	252/271	230/262	215/262

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	233/252	245/267	231/264	241/264	232/246
0	FC	241/259	248/273	251/268	215/231	263/280
6.25		247/275	223/249	224/250	268/293	280/305
12.5		254/277	230/258	242/273	257/273	247/282
25		246/272	230/261	226/246	261/287	308/338
50		247/269	230/256	244/271	255/264	242/282
100		249/265	258/268	286/304	267/298	266/292
101		259/283	241/256	252/271	230/253	215/240

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	252/262	262/262	262/262	262/262	246/262
0	FC	259/262	262/262	262/262	231/262	262/262
6.25		262/262	249/262	250/262	262/262	262/262
12.5		262/262	258/262	262/262	262/262	262/262
25		262/262	261/262	246/262	262/262	262/262
50		262/262	256/262	262/262	262/262	262/262
100		262/262	262/262	262/262	262/262	262/262
101		262/262	256/262	262/262	253/262	240/262

CETIS Analytical Report

Bivalve Larval Survival and Development Test FC vs 100% Filtered TST — **Wood E&IS**

Analysis ID:	10-2819-8685	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:46	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	7.311	1.895	7	CDF	8.1E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011989	0.0011989	1	0.2249	0.6480	Non-Significant Effect
Error	0.0426366	0.0053296	8			
Total	0.0438355		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.229	23.15	0.8467	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8245	0.7411	0.0287	Normal Distribution

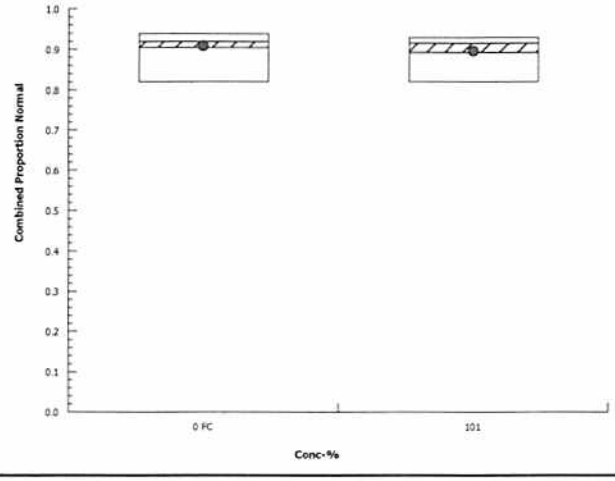
Combined Proportion Normal Summary

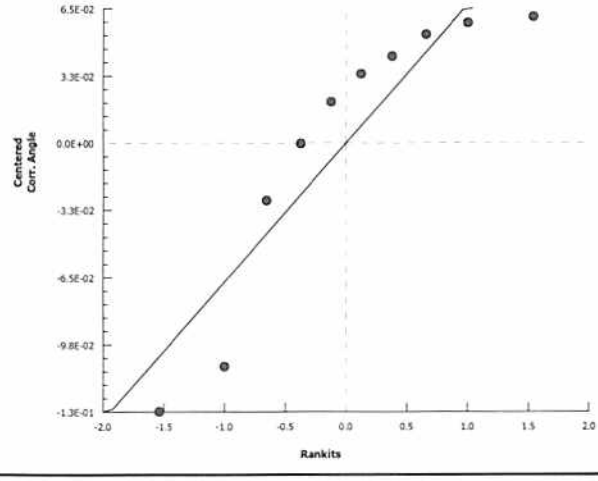
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.9049	0.8444	0.9655	0.9198	0.8206	0.9393	0.0218	5.39%	0.00%
101		5	0.8927	0.8370	0.9484	0.9152	0.8206	0.9299	0.0201	5.02%	1.36%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.264	1.169	1.359	1.284	1.133	1.322	0.03428	6.07%	0.00%
101		5	1.242	1.156	1.328	1.275	1.133	1.303	0.03093	5.57%	1.73%

Graphics





Bivalve Larval Survival and Development Test LC vs 100% TST — **Wood E&IS**

Analysis ID:	11-8497-8412	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:46	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	14.58	2.015	5	CDF	1.4E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0100257	0.0100257	1	5.423	0.0483	Significant Effect
Error	0.0147892	0.0018487	8			
Total	0.0248149		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.003	23.15	0.3121	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9801	0.7411	0.9655	Normal Distribution

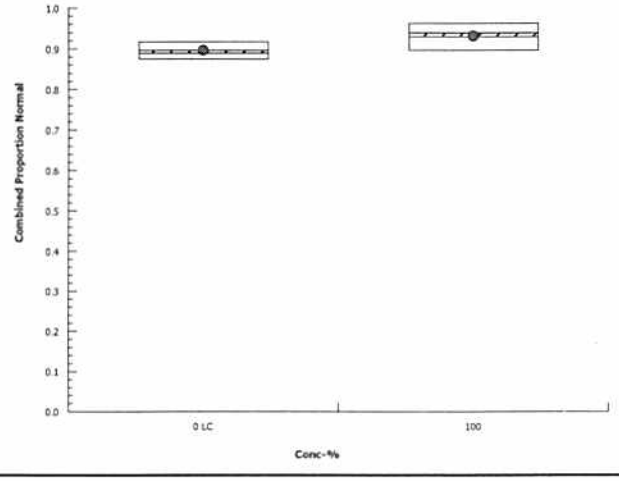
Combined Proportion Normal Summary

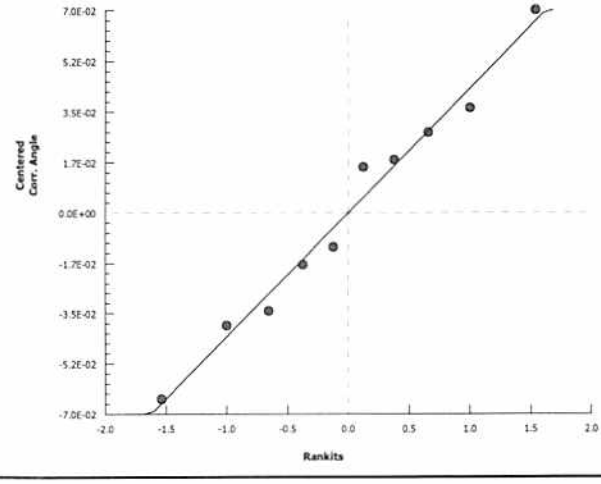
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8961	0.8733	0.9188	0.8893	0.8750	0.9176	0.0082	2.05%	0.00%
100		5	0.9300	0.8972	0.9628	0.9396	0.8960	0.9627	0.0118	2.84%	-3.79%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.243	1.206	1.281	1.232	1.209	1.28	0.01359	2.44%	0.00%
100		5	1.307	1.241	1.372	1.323	1.242	1.376	0.02355	4.03%	-5.09%

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	03-7275-9714	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	5.67%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	0.3793	2.362	0.077	8	CDF	0.6982	Non-Significant Effect
		12.5	-0.2387	2.362	0.077	8	CDF	0.8942	Non-Significant Effect
		25	0.14	2.362	0.077	8	CDF	0.7887	Non-Significant Effect
		50	-0.5915	2.362	0.077	8	CDF	0.9517	Non-Significant Effect
		100	-1.941	2.362	0.077	8	CDF	0.9991	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0185868	0.0037174	5	1.398	0.2606	Non-Significant Effect
Error	0.0638373	0.0026599	24			
Total	0.082424		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	4.004	15.09	0.5489	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9607	0.9031	0.3224	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8961	0.8733	0.9188	0.8893	0.8750	0.9176	0.0082	2.05%	0.00%
6.25		5	0.8874	0.8473	0.9275	0.8982	0.8511	0.9180	0.0144	3.64%	0.97%
12.5		5	0.8997	0.8643	0.9351	0.8864	0.8759	0.9414	0.0128	3.17%	-0.41%
25		5	0.8931	0.8661	0.9201	0.9044	0.8626	0.9112	0.0097	2.43%	0.33%
50		5	0.9041	0.8528	0.9554	0.9004	0.8582	0.9659	0.0185	4.57%	-0.90%
100		5	0.9300	0.8972	0.9628	0.9396	0.8960	0.9627	0.0118	2.84%	-3.79%

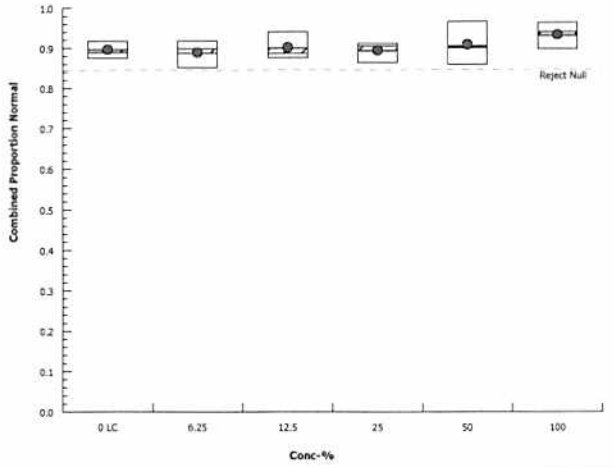
Angular (Corrected) Transformed Summary

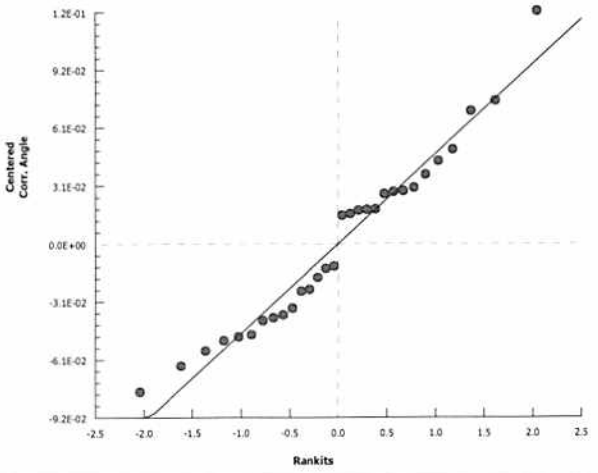
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.243	1.206	1.281	1.232	1.209	1.28	0.01359	2.44%	0.00%
6.25		5	1.231	1.168	1.294	1.246	1.175	1.28	0.02271	4.12%	0.99%
12.5		5	1.251	1.189	1.313	1.227	1.211	1.326	0.02236	4.00%	-0.63%
25		5	1.239	1.196	1.282	1.256	1.191	1.268	0.01546	2.79%	0.37%
50		5	1.263	1.167	1.359	1.25	1.185	1.385	0.03461	6.13%	-1.55%
100		5	1.307	1.241	1.372	1.323	1.242	1.376	0.02355	4.03%	-5.09%

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	03-7275-9714	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	13-2255-2678	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	4.54%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	0.6594	2.362	0.070	8	CDF	0.5756	Non-Significant Effect
		12.5	0.7085	2.362	0.070	8	CDF	0.5531	Non-Significant Effect
		25	0.623	2.362	0.070	8	CDF	0.5922	Non-Significant Effect
		50	0.244	2.362	0.070	8	CDF	0.7514	Non-Significant Effect
		100	-1.02	2.362	0.070	8	CDF	0.9842	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0095869	0.0019174	5	0.8719	0.5144	Non-Significant Effect
Error	0.0527787	0.0021991	24			
Total	0.0623656		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.041	15.09	0.1540	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9678	0.9031	0.4818	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9146	0.8836	0.9456	0.9176	0.8750	0.9431	0.0112	2.73%	0.00%
6.25		5	0.9045	0.8909	0.9181	0.8982	0.8956	0.9180	0.0049	1.21%	1.11%
12.5		5	0.9024	0.8695	0.9353	0.8915	0.8759	0.9414	0.0119	2.94%	1.33%
25		5	0.9050	0.8873	0.9227	0.9094	0.8812	0.9187	0.0064	1.57%	1.05%
50		5	0.9082	0.8598	0.9567	0.9004	0.8582	0.9659	0.0175	4.30%	0.70%
100		5	0.9300	0.8972	0.9628	0.9396	0.8960	0.9627	0.0118	2.84%	-1.68%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.277	1.222	1.331	1.28	1.209	1.33	0.01956	3.43%	0.00%
6.25		5	1.257	1.234	1.28	1.246	1.242	1.28	0.008413	1.50%	1.53%
12.5		5	1.256	1.197	1.314	1.235	1.211	1.326	0.02093	3.73%	1.65%
25		5	1.258	1.229	1.287	1.265	1.219	1.282	0.01059	1.88%	1.45%
50		5	1.269	1.178	1.361	1.25	1.185	1.385	0.03287	5.79%	0.57%
100		5	1.307	1.241	1.372	1.323	1.242	1.376	0.02355	4.03%	-2.37%

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	06-3057-5365	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:46	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	2.98%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect
		12.5	31	16	1	8	Asymp	0.9676	Non-Significant Effect
		25	28	16	2	8	Asymp	0.8627	Non-Significant Effect
		50	31	16	1	8	Asymp	0.9676	Non-Significant Effect
		100	32.5	16	1	8	Asymp	0.9870	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025195	0.005039	5	0.8411	0.5339	Non-Significant Effect
Error	0.143791	0.0059913	24			
Total	0.168986		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.42	3.895	6.4E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	0.9074	4.248	0.4979	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8569	0.9031	8.7E-04	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9802	0.9449	1.0000	1.0000	0.9389	1.0000	0.0127	2.89%	0.00%
6.25		5	0.9809	0.9484	1.0000	1.0000	0.9504	1.0000	0.0117	2.67%	-0.08%
12.5		5	0.9969	0.9885	1.0000	1.0000	0.9847	1.0000	0.0031	0.68%	-1.71%
25		5	0.9870	0.9536	1.0000	1.0000	0.9389	1.0000	0.0121	2.73%	-0.70%
50		5	0.9954	0.9827	1.0000	1.0000	0.9771	1.0000	0.0046	1.03%	-1.56%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.02%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.463	1.33	1.596	1.54	1.321	1.54	0.04784	7.31%	0.00%
6.25		5	1.464	1.335	1.593	1.54	1.346	1.54	0.04638	7.08%	-0.08%
12.5		5	1.521	1.47	1.573	1.54	1.447	1.54	0.0186	2.73%	-3.99%
25		5	1.49	1.372	1.608	1.54	1.321	1.54	0.04264	6.40%	-1.84%
50		5	1.516	1.448	1.583	1.54	1.419	1.54	0.0242	3.57%	-3.60%
100		5	1.54	1.54	1.54	1.54	1.54	1.54	0	0.00%	-5.26%

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ 22 Mar-22 1030

Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater

Sample Code: ~~BD2399E~~ 22-W6TD
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB 6

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			201			264	255	BI 4/15/22
			202			264	241	
			203			246	226	
			204			280	263	
			205			272	246	
			206			264	231	
			207			256	241	
			208			283	259	
			209			293	268	
			210			249	223	
			211			277	254	
			212			261	230	
			213			268	251	
			214			231	215	
			215			275	247	
			216			253	230	
			217			305	280	
			218			271	252	
			219			304	286	
			220			240	215	
			221			256	230	
			222			273	257	
			223			265	249	
			224			259	241	
			225			252	233	
			226			268	258	
			227			298	267	
			228			250	224	
			229			267	245	4/19/22
			230			271	244	
			231			287	261	
			232			292	266	
			233			273	242	
			234			338	308	

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			235			258	230	~~BI~~ 4/19/22
			236			246	232	
			237			273	248	
			238			269	247	
			239			282	242	
			240			282	247	

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ 22 Mar-22 1030

Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater

Sample Code: ~~BD2399E~~ 22-W070
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB 6

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	224			259	241	BT 4/15/22
0	FC	2	237					
0	FC	3	213					
0	FC	4	214					
0	FC	5	204					
0	LC	1	225			252	233	
0	LC	2	229					
0	LC	3	206					
0	LC	4	202					
0	LC	5	236					
6.25		1	215			275	247	
6.25		2	210					
6.25		3	228					
6.25		4	209					
6.25		5	217					
12.5		1	211			277	254	
12.5		2	235					
12.5		3	233					
12.5		4	222					
12.5		5	240					
25		1	205			272	246	
25		2	212					
25		3	203					
25		4	231					
25		5	234					
50		1	238			269	247	
50		2	221					
50		3	230					
50		4	201					
50		5	239					
100		1	223			265	249	
100		2	226					
100		3	219					
100		4	227					

CETIS Test Data Worksheet

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
100		5	232					
101		1	208			283	259	BI 4/15/22
101		2	207					
101		3	218					
101		4	216					
101		5	220					

QC: KB

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-6
Test No. 22-03-062

Test Species: *M. galloprovincialis*
Start Date/Time: 3/22/2022 1615
End Date/Time: 3/24/2022 1615

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	15.8	15.6
	Salinity (ppt)	32.9	33.2	33.4
	pH (units)	8.00	7.79	7.85
	DO (mg/L)	7.9	8.9	8.7
Filter Control	Temp. (°C)	15.9	15.7	15.6
	Salinity (ppt)	33.0	33.3	33.4
	pH (units)	7.98	7.76	7.85
	DO (mg/L)	8.0	8.8	8.7
6.25	Temp. (°C)	15.9	15.5	15.6
	Salinity (ppt)	33.0	33.5	33.6
	pH (units)	7.98	7.79	7.85
	DO (mg/L)	8.1	8.9	8.8
12.5	Temp. (°C)	16.0	15.4	15.6
	Salinity (ppt)	32.8	33.7	33.6
	pH (units)	7.98	7.81	7.85
	DO (mg/L)	8.1	8.8	8.8
25	Temp. (°C)	16.0	15.4	15.6
	Salinity (ppt)	32.7	33.7	33.6
	pH (units)	7.98	7.82	7.85
	DO (mg/L)	8.3	8.8	8.7
50	Temp. (°C)	16.0	15.4	15.5
	Salinity (ppt)	32.8	33.6	33.7
	pH (units)	7.97	7.82	7.85
	DO (mg/L)	8.3	8.9	8.8
100	Temp. (°C)	16.0	15.4	15.5
	Salinity (ppt)	32.8	33.7	33.7
	pH (units)	7.94	7.81	7.85
	DO (mg/L)	8.5	8.9	8.8
100 Filtered (1.2µm)	Temp. (°C)	16.0	15.4	15.6
	Salinity (ppt)	32.1	33.1	33.3
	pH (units)	7.93	7.81	7.85
	DO (mg/L)	8.5	8.8	8.7
	Tech Initials:	~~BE~~	CB	AG

Source of Animals: AG Mission Bay
Date Received: 3/23/22

Comments:

QA: AG 4/29/22

Final: JC 5/20/22

Site: SIYB-REF-1

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Wood E&IS**

Batch ID:	17-7141-2118	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	23 Mar-22 16:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	25 Mar-22 16:15	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Field Collected	**Age:**	

Sample ID:	15-8067-4716	**Code:**	22-W071	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 09:30	**Material:**	Seawater	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	4h (4.6 °C) 31hr	**Station:**	SIYB REF1		

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
10-5076-3931	Combined Proportion Norma	TST-Welch's t Test	5.6E-04	100% passed combined proportion normal
06-6774-9758	Combined Proportion Norma	TST-Welch's t Test	7.4E-07	101% passed combined proportion normal

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
20-8154-8703	Combined Proportion Norma	Dunnett Multiple Comparison Test	100	> 100	n/a	1	5.53%
06-0682-9626	Proportion Normal	Dunnett Multiple Comparison Test	100	> 100	n/a	1	3.43%
01-6506-6316	Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	2.9%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
06-0682-9626	Proportion Normal	Control Resp	0.9105	0.9	>>	Yes	Passes Criteria
01-6506-6316	Survival Rate	Control Resp	1	0.5	>>	Yes	Passes Criteria

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9105	0.8978	0.9232	0.8947	0.9190	0.0046	0.0102	1.12%	0.00%
0	FC	5	0.8917	0.8542	0.9293	0.8435	0.9187	0.0135	0.0302	3.39%	2.06%
6.25		5	0.9088	0.8718	0.9459	0.8779	0.9467	0.0133	0.0298	3.28%	0.18%
12.5		5	0.9255	0.8906	0.9605	0.8817	0.9579	0.0126	0.0282	3.04%	-1.65%
25		5	0.9025	0.8454	0.9597	0.8244	0.9368	0.0206	0.0460	5.10%	0.87%
50		5	0.9230	0.9065	0.9396	0.9008	0.9363	0.0060	0.0133	1.45%	-1.38%
100		5	0.8845	0.8231	0.9458	0.8015	0.9278	0.0221	0.0494	5.59%	2.85%
101		5	0.9164	0.9009	0.9318	0.8973	0.9304	0.0056	0.0125	1.36%	-0.65%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9105	0.8978	0.9232	0.8947	0.9190	0.0046	0.0102	1.12%	0.00%
0	FC	5	0.9062	0.8938	0.9185	0.8919	0.9187	0.0045	0.0100	1.10%	0.47%
6.25		5	0.9207	0.8926	0.9489	0.8846	0.9467	0.0102	0.0227	2.46%	-1.13%
12.5		5	0.9296	0.9040	0.9552	0.9023	0.9579	0.0092	0.0206	2.22%	-2.10%
25		5	0.9169	0.8939	0.9399	0.8963	0.9368	0.0083	0.0186	2.02%	-0.71%
50		5	0.9323	0.9191	0.9456	0.9231	0.9492	0.0048	0.0107	1.15%	-2.40%
100		5	0.9125	0.8832	0.9418	0.8830	0.9417	0.0106	0.0236	2.59%	-0.22%
101		5	0.9171	0.9009	0.9333	0.8973	0.9304	0.0058	0.0131	1.42%	-0.73%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	FC	5	0.9840	0.9496	1.0000	0.9351	1.0000	0.0124	0.0277	2.82%	1.60%
6.25		5	0.9870	0.9654	1.0000	0.9580	1.0000	0.0078	0.0174	1.76%	1.30%
12.5		5	0.9954	0.9827	1.0000	0.9771	1.0000	0.0046	0.0102	1.03%	0.46%
25		5	0.9840	0.9395	1.0000	0.9198	1.0000	0.0160	0.0359	3.64%	1.60%
50		5	0.9901	0.9731	1.0000	0.9733	1.0000	0.0061	0.0137	1.38%	0.99%
100		5	0.9702	0.8876	1.0000	0.8511	1.0000	0.0298	0.0666	6.86%	2.98%
101		5	0.9992	0.9971	1.0000	0.9962	1.0000	0.0008	0.0017	0.17%	0.08%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9163	0.8947	0.9056	0.9190	0.9167
0	FC	0.9187	0.9101	0.8817	0.8435	0.9046
6.25		0.9296	0.9084	0.8817	0.8779	0.9467
12.5		0.9395	0.9239	0.9245	0.9579	0.8817
25		0.8986	0.9220	0.9308	0.8244	0.9368
50		0.9363	0.9231	0.9008	0.9275	0.9275
100		0.8015	0.9278	0.8961	0.8830	0.9140
101		0.8973	0.9142	0.9237	0.9163	0.9304

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9163	0.8947	0.9056	0.9190	0.9167
0	FC	0.9187	0.9101	0.8919	0.9020	0.9080
6.25		0.9296	0.9225	0.9203	0.8846	0.9467
12.5		0.9395	0.9239	0.9245	0.9579	0.9023
25		0.8986	0.9220	0.9308	0.8963	0.9368
50		0.9363	0.9231	0.9255	0.9492	0.9275
100		0.9417	0.9278	0.8961	0.8830	0.9140
101		0.8973	0.9142	0.9272	0.9163	0.9304

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000
0	FC	1.0000	1.0000	0.9885	0.9351	0.9962
6.25		1.0000	0.9847	0.9580	0.9924	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	0.9771
25		1.0000	1.0000	1.0000	0.9198	1.0000
50		1.0000	1.0000	0.9733	0.9771	1.0000
100		0.8511	1.0000	1.0000	1.0000	1.0000
101		1.0000	1.0000	0.9962	1.0000	1.0000

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/263	238/266	259/286	261/284	253/276
0	FC	260/283	253/278	231/262	221/262	237/262
6.25		264/284	238/262	231/262	230/262	284/300
12.5		264/281	255/276	245/265	273/285	231/262
25		257/286	272/295	269/289	216/262	252/269
50		294/314	252/273	236/262	243/262	256/276
100		210/262	270/291	250/279	234/265	255/279
101		262/292	245/268	242/262	241/263	254/273

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	241/263	238/266	259/286	261/284	253/276
0	FC	260/283	253/278	231/259	221/245	237/261
6.25		264/284	238/258	231/251	230/260	284/300
12.5		264/281	255/276	245/265	273/285	231/256
25		257/286	272/295	269/289	216/241	252/269
50		294/314	252/273	236/255	243/256	256/276
100		210/223	270/291	250/279	234/265	255/279
101		262/292	245/268	242/261	241/263	254/273

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	262/262	262/262	262/262	262/262	262/262
0	FC	262/262	262/262	259/262	245/262	261/262
6.25		262/262	258/262	251/262	260/262	262/262
12.5		262/262	262/262	262/262	262/262	256/262
25		262/262	262/262	262/262	241/262	262/262
50		262/262	262/262	255/262	256/262	262/262
100		223/262	262/262	262/262	262/262	262/262
101		262/262	262/262	261/262	262/262	262/262

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	20-8154-8703	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:55	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	5.53%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	-0.001614	2.362	0.08	8	CDF	0.8338	Non-Significant Effect
		12.5	-0.9085	2.362	0.08	8	CDF	0.9786	Non-Significant Effect
		25	0.2497	2.362	0.08	8	CDF	0.7492	Non-Significant Effect
		50	-0.6849	2.362	0.08	8	CDF	0.9616	Non-Significant Effect
		100	1.132	2.362	0.08	8	CDF	0.3627	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0150087	0.0030017	5	1.052	0.4108	Non-Significant Effect
Error	0.0684829	0.0028535	24			
Total	0.0834915		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.421	15.09	0.0934	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.9031	0.0384	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9105	0.8978	0.9232	0.9163	0.8947	0.9190	0.0046	1.12%	0.00%
6.25		5	0.9088	0.8718	0.9459	0.9084	0.8779	0.9467	0.0133	3.28%	0.18%
12.5		5	0.9255	0.8906	0.9605	0.9245	0.8817	0.9579	0.0126	3.04%	-1.65%
25		5	0.9025	0.8454	0.9597	0.9220	0.8244	0.9368	0.0206	5.10%	0.87%
50		5	0.9230	0.9065	0.9396	0.9275	0.9008	0.9363	0.0060	1.45%	-1.38%
100		5	0.8845	0.8231	0.9458	0.8961	0.8015	0.9278	0.0221	5.59%	2.85%

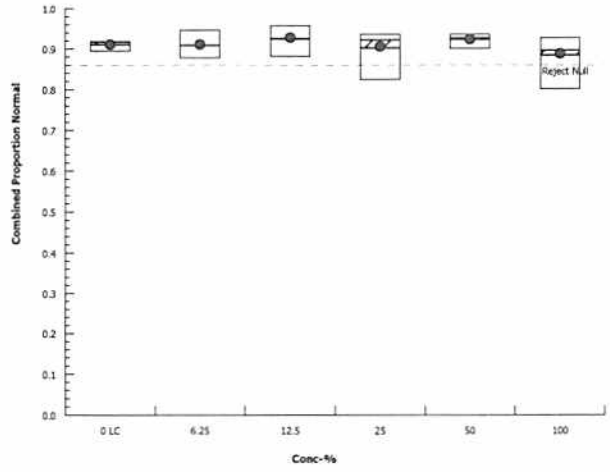
Angular (Corrected) Transformed Summary

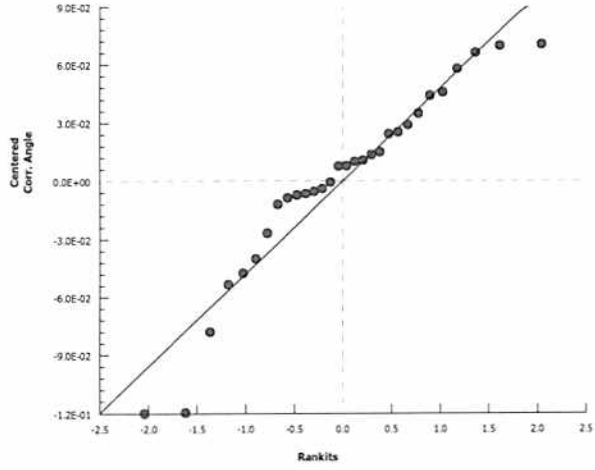
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.267	1.245	1.289	1.277	1.24	1.282	0.007876	1.39%	0.00%
6.25		5	1.267	1.201	1.333	1.263	1.214	1.338	0.0238	4.20%	0.00%
12.5		5	1.298	1.232	1.364	1.292	1.22	1.364	0.02364	4.07%	-2.42%
25		5	1.259	1.169	1.349	1.288	1.138	1.317	0.03234	5.75%	0.67%
50		5	1.29	1.26	1.321	1.298	1.25	1.316	0.01088	1.88%	-1.83%
100		5	1.229	1.138	1.32	1.243	1.109	1.299	0.03274	5.96%	3.02%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	20-8154-8703	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:55	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test LC vs 100% TST **Wood E&IS**

Analysis ID:	10-5076-3931	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:55	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	8.373	2.132	4	CDF	5.6E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0036543	0.0036543	1	1.289	0.2891	Non-Significant Effect
Error	0.0226842	0.0028355	8			
Total	0.0263385		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	17.28	23.15	0.0173	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8626	0.7411	0.0820	Normal Distribution

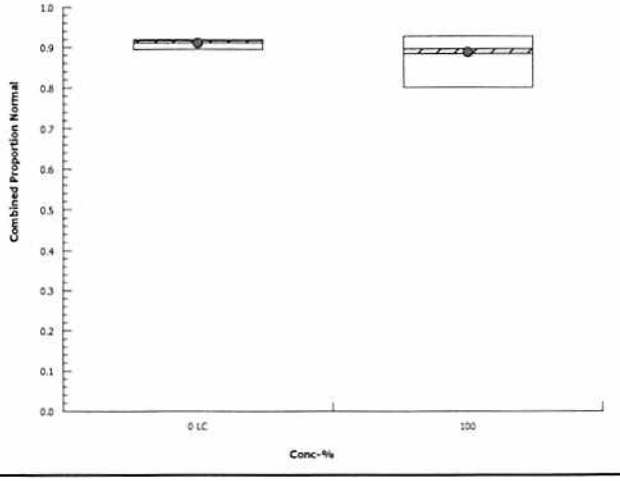
Combined Proportion Normal Summary

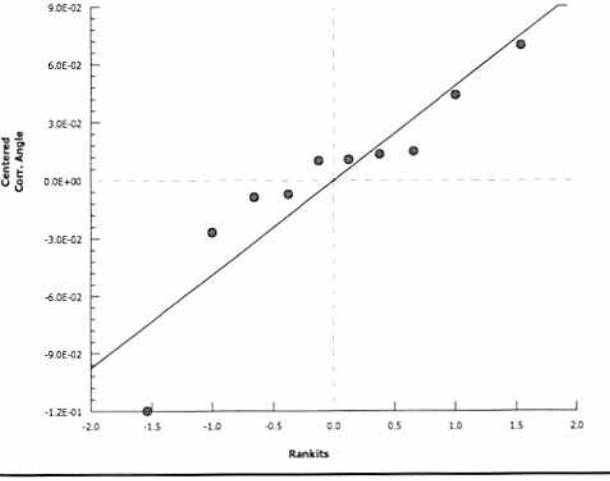
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9105	0.8978	0.9232	0.9163	0.8947	0.9190	0.0046	1.12%	0.00%
100		5	0.8845	0.8231	0.9458	0.8961	0.8015	0.9278	0.0221	5.59%	2.85%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.267	1.245	1.289	1.277	1.24	1.282	0.007876	1.39%	0.00%
100		5	1.229	1.138	1.32	1.243	1.109	1.299	0.03274	5.96%	3.02%

Graphics





Bivalve Larval Survival and Development Test FC vs 100% Filtered TST **Wood E&IS**

Analysis ID:	06-6774-9758	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:55	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	18.75	1.943	6	CDF	7.4E-07	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0040655	0.0040655	1	3.002	0.1214	Non-Significant Effect
Error	0.0108328	0.0013541	8			
Total	0.0148983		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.485	23.15	0.1752	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9366	0.7411	0.5158	Normal Distribution

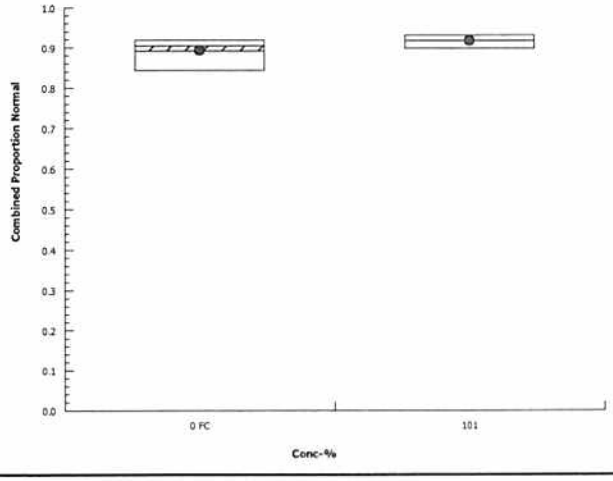
Combined Proportion Normal Summary

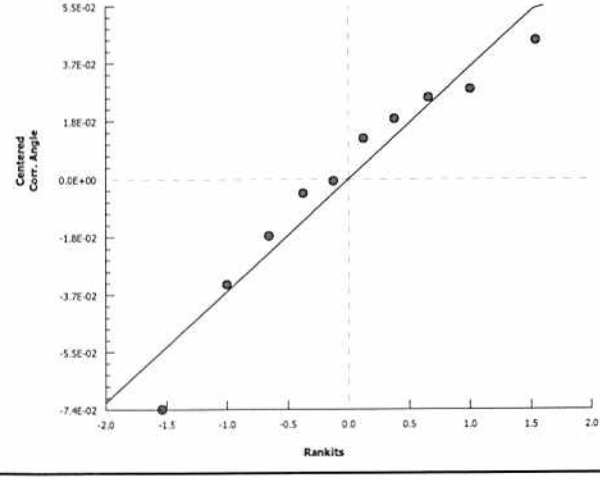
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8917	0.8542	0.9293	0.9046	0.8435	0.9187	0.0135	3.39%	0.00%
101		5	0.9164	0.9009	0.9318	0.9163	0.8973	0.9304	0.0056	1.36%	-2.77%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.238	1.179	1.296	1.257	1.164	1.282	0.02105	3.80%	0.00%
101		5	1.278	1.25	1.306	1.277	1.245	1.304	0.009938	1.74%	-3.26%

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	06-0682-9626	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:55	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	3.43%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	-0.9286	2.362	0.051	8	CDF	0.9797	Non-Significant Effect
		12.5	-1.717	2.362	0.051	8	CDF	0.9981	Non-Significant Effect
		25	-0.5723	2.362	0.051	8	CDF	0.9494	Non-Significant Effect
		50	-1.885	2.362	0.051	8	CDF	0.9989	Non-Significant Effect
		100	-0.2456	2.362	0.051	8	CDF	0.8957	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070623	0.0014125	5	1.193	0.3419	Non-Significant Effect
Error	0.0284045	0.0011835	24			
Total	0.0354668		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	4.199	15.09	0.5211	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9855	0.9031	0.9457	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9105	0.8978	0.9232	0.9163	0.8947	0.9190	0.0046	1.12%	0.00%
6.25		5	0.9207	0.8926	0.9489	0.9225	0.8846	0.9467	0.0102	2.46%	-1.13%
12.5		5	0.9296	0.9040	0.9552	0.9245	0.9023	0.9579	0.0092	2.22%	-2.10%
25		5	0.9169	0.8939	0.9399	0.9220	0.8963	0.9368	0.0083	2.02%	-0.71%
50		5	0.9323	0.9191	0.9456	0.9275	0.9231	0.9492	0.0048	1.15%	-2.40%
100		5	0.9125	0.8832	0.9418	0.9140	0.8830	0.9417	0.0106	2.59%	-0.22%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.267	1.245	1.289	1.277	1.24	1.282	0.007876	1.39%	0.00%
6.25		5	1.287	1.236	1.339	1.289	1.224	1.338	0.01838	3.19%	-1.59%
12.5		5	1.305	1.253	1.356	1.292	1.253	1.364	0.0185	3.17%	-2.95%
25		5	1.28	1.238	1.321	1.288	1.243	1.317	0.015	2.62%	-0.98%
50		5	1.308	1.281	1.336	1.298	1.29	1.343	0.009831	1.68%	-3.24%
100		5	1.273	1.22	1.325	1.273	1.222	1.327	0.01889	3.32%	-0.42%

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	01-6506-6316	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 16:55	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Comments:
FC = Filtered Control (1.2um), 101 = 100% Filtered (1.2 um)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	2.90%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	20	16	1	8	Asymp	0.1899	Non-Significant Effect
		12.5	25	16	1	8	Asymp	0.6353	Non-Significant Effect
		25	25	16	1	8	Asymp	0.6353	Non-Significant Effect
		50	22.5	16	1	8	Asymp	0.3937	Non-Significant Effect
		100	25	16	1	8	Asymp	0.6353	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0185592	0.0037118	5	0.4204	0.8298	Non-Significant Effect
Error	0.211885	0.0088285	24			
Total	0.230444		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.726	3.895	0.0436	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.4173	4.248	0.8305	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7695	0.9031	1.9E-05	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		5	0.9870	0.9654	1.0000	0.9924	0.9580	1.0000	0.0078	1.76%	1.30%
12.5		5	0.9954	0.9827	1.0000	1.0000	0.9771	1.0000	0.0046	1.03%	0.46%
25		5	0.9840	0.9395	1.0000	1.0000	0.9198	1.0000	0.0160	3.64%	1.60%
50		5	0.9901	0.9731	1.0000	1.0000	0.9733	1.0000	0.0061	1.38%	0.99%
100		5	0.9702	0.8876	1.0000	1.0000	0.8511	1.0000	0.0298	6.86%	2.98%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.54	1.54	1.54	1.54	1.54	1.54	0	0.00%	0.00%
6.25		5	1.475	1.384	1.566	1.483	1.364	1.54	0.03279	4.97%	4.22%
12.5		5	1.516	1.448	1.583	1.54	1.419	1.54	0.0242	3.57%	1.57%
25		5	1.489	1.346	1.631	1.54	1.284	1.54	0.05123	7.69%	3.33%
50		5	1.489	1.402	1.576	1.54	1.407	1.54	0.03121	4.69%	3.30%
100		5	1.467	1.264	1.67	1.54	1.175	1.54	0.07304	11.13%	4.74%

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:25 (p 1 of 2)
Test Code/ID: 15-6712-3463/22-03-~~063~~ 056 MG

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date: 22 Mar-22 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ 22 Mar-22 0930 AG
Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater
Sample Code: AG ~~5E372E9C~~ 22-W071
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB REF1

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			241			258	238	BE 4/19/22
			242			283	260	↓
			243			279	255	4/20/22 (0.4%) 1 curved hinge
			244			284	261	
			245			276	253	
			246			279	250	
			247			265	234	
			248			260	230	
			249			273	252	
			250			273	254	
			251			295	272	
			252			291	270	
			253			266	238	
			254			276	256	
			255			314	294	
			256			~~256~~	243	256 + 243
			257			265	245	
			258			292	262	
			259			286	257	
			260			276	255	
			261			241	216	counted abnormal
			262			~~291~~ 210	~~270~~	→ 223 + 210
			263			278	253	
			264			285	273	
			265			245	221	4/21/22
			266			286	259	
			267			255	236	
			268			281	264	
			269			268	245	
			270			269	252	
			271			263	241	
			272			263	241	
			273			256	231	
			274			289	269	

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:25 (p 2 of 2)
Test Code/ID: 15-6712-3463/22-03-0635

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			275			259	231	BI 4/21/22 BI
			276			284	269	
			277			261	237	
			278			300	284	
			279			251	231	
			280			261	242	

CETIS Test Data Worksheet

Report Date: 19 Mar-22 15:25 (p 1 of 2)
Test Code/ID: 15-6712-3463/22-03~~-063~~ 56

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date: 22 Mar-22 ~~16:15~~ 1615
End Date: 24 Mar-22 1615
Sample Date: ~~21~~ 22 Mar-22 0430

Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Seawater

Sample Code: ~~5E372E9C~~ ~~22SN071~~
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB REF1

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	242			283	260	~~BT~~ 4/19/22
0	FC	2	263			~~BT 264~~	~~BT 241~~	
0	FC	3	275					
0	FC	4	265					
0	FC	5	277					
0	LC	1	272			263	241	
0	LC	2	253					
0	LC	3	266					
0	LC	4	244					
0	LC	5	245					
6.25		1	276			284	264	
6.25		2	241					
6.25		3	279					
6.25		4	248					
6.25		5	278					
12.5		1	268			281	264	
12.5		2	260					
12.5		3	257					
12.5		4	264					
12.5		5	273					
25		1	259			286	257	
25		2	251					
25		3	274					
25		4	261					
25		5	270					
50		1	255			314	294	
50		2	249					
50		3	267					
50		4	256					
50		5	254					
100		1	262			~~BT 294~~	~~BT 270~~	
100		2	252			291	270	
100		3	246					
100		4	247					

CETIS Test Data Worksheet

Test Code/ID: 15-6712-3463/~~22-03-005~~ 22-03-056

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
100		5	243					
101		1	258			292	262	
101		2	269					
101		3	280					
101		4	271					
101		5	250					

QC: KB

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-REF-1
Test No. 2203 ~~662~~ AG -056

Test Species: *M. galloprovincialis*
Start Date/Time: 3/~~22~~23/2022 1615
End Date/Time: 3/~~24~~25/2022 1615

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.7	15.9	15.7
	Salinity (ppt)	32.9	33.2	33.5
	pH (units)	7.91	7.83	7.86
	DO (mg/L)	7.7	8.7	8.5
Filter Control	Temp. (°C)	15.3	15.9	15.7
	Salinity (ppt)	32.9	33.3	33.5
	pH (units)	7.93	7.81	7.85
	DO (mg/L)	7.8	8.7	8.5
6.25	Temp. (°C)	15.3	15.8	15.7
	Salinity (ppt)	32.9	33.5	33.7
	pH (units)	7.94	7.82	7.85
	DO (mg/L)	8.0	8.8	8.6
12.5	Temp. (°C)	15.4	15.8	15.7
	Salinity (ppt)	32.9	33.4	33.6
	pH (units)	7.95	7.83	7.86
	DO (mg/L)	8.0	8.8	8.5
25	Temp. (°C)	15.2	15.9	15.8
	Salinity (ppt)	32.9	33.5	33.6
	pH (units)	7.96	7.84	7.86
	DO (mg/L)	8.6	8.9	8.6
50	Temp. (°C)	15.3	15.9	15.8
	Salinity (ppt)	33.0	33.5	33.6
	pH (units)	7.98	7.84	7.87
	DO (mg/L)	8.0	8.8	8.6
100	Temp. (°C)	15.0	15.9	15.8
	Salinity (ppt)	~~35 7.94~~ 32.9	33.4	33.6
	pH (units)	7.94	7.82	7.85
	DO (mg/L)	8.3	8.7	8.5
100 Filtered (1.2µm)	Temp. (°C)	15.0	15.9	15.7
	Salinity (ppt)	32.3	33.0	33.3
	pH (units)	7.92	7.83	7.86
	DO (mg/L)	8.2	8.6	8.5
	Tech Initials:	~~BS~~	CB	~~AG~~

Source of Animals: AG Mission Bay **Date Received:** 3/23/22

Comments:

QA: AG 4/29/22

Final: JC 5/20/22

APPENDIX B

Acute Topsmelt Test

Raw Data & Statistical Analyses

Site: SIYB-1

CETIS Summary Report

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	04-1874-6629	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	23 Mar-22 11:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	27 Mar-22 12:40	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	14 d

Sample ID:	19-7413-1782	**Code:**	22-W065	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 15:50	**Material:**	Ambient Sample	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	20h (13.7 °C)	**Station:**	SIYB 1		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
12-3679-8711	96h Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	7.21%
20-4884-4623	96h Survival Rate	TST-Welch's t Test	100	> 100	n/a	1	n/a

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-3.45%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-3.45%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-3.45%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	0.8000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	12-3679-8711	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:37	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	7.21%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	42	26	1	10	Asymp	0.8900	Non-Significant Effect
		50	42	26	1	10	Asymp	0.8900	Non-Significant Effect
		100	42	26	1	10	Asymp	0.8900	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070885	0.0023628	3	1	0.4133	Non-Significant Effect
Error	0.0472566	0.0023628	20			
Total	0.0543451		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.25	4.938	0.0036	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1	4.938	0.4133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.4436	0.884	1.7E-08	Non-Normal Distribution

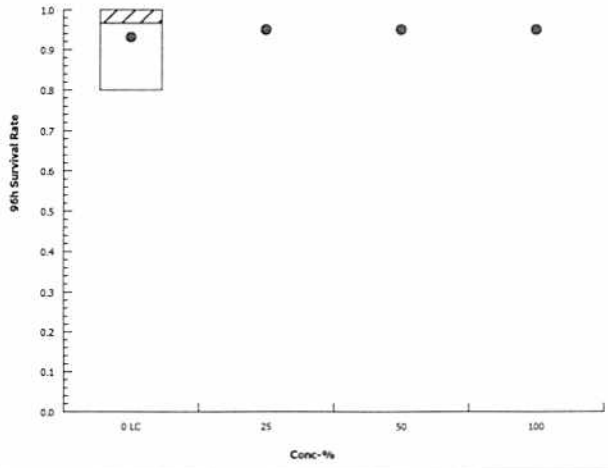
96h Survival Rate Summary

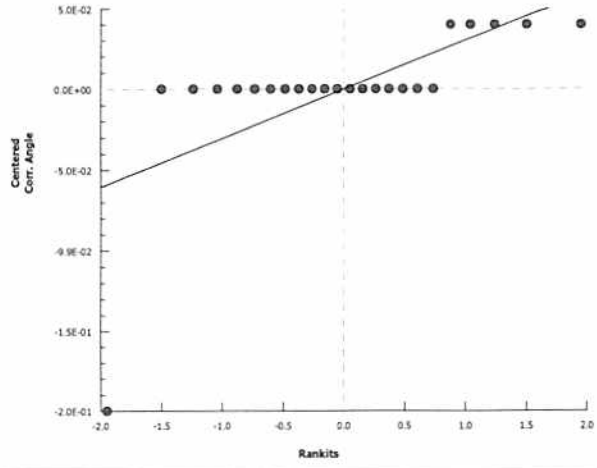
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-3.45%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-3.45%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-3.45%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	-3.04%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	-3.04%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	-3.04%

Graphics





Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	20-4884-4623	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:37	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.8	100	> 100	n/a	1

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
Lab Control		25*	9.474	1.476	5	CDF	1.1E-04	Non-Significant Effect
		50*	9.474	1.476	5	CDF	1.1E-04	Non-Significant Effect
		100*	9.474	1.476	5	CDF	1.1E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070885	0.0023628	3	1	0.4133	Non-Significant Effect
Error	0.0472566	0.0023628	20			
Total	0.0543451		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.25	4.938	0.0036	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1	4.938	0.4133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.4436	0.884	1.7E-08	Non-Normal Distribution

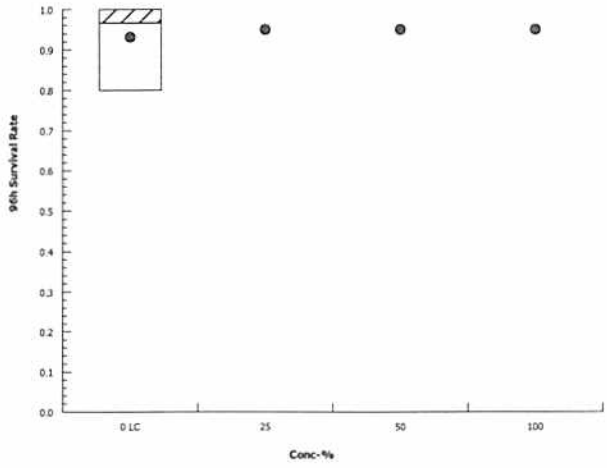
96h Survival Rate Summary

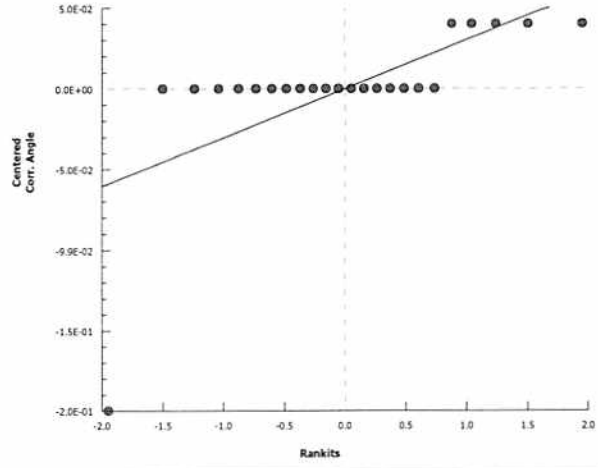
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-3.45%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-3.45%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-3.45%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	-3.04%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	-3.04%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	-3.04%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: Wood: POSD - Shelter Island Yacht Basin
Sample ID: SIYB-1
Test No. 22-03-050

Test Species: *Atherinops affinis* (topsmelt)
Start Date/Time: 3/23/22 1140
End Date/Time: 3/27/22 1240

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #1	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	4	4
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		SC	SC	AG	SC	AG

Water Quality						
Parameter	0	24	48f	48i	72	96
Temp. (°C)	21.5	22.0	21.2	~~21.9~~ 20.3 AG	20.9	20.7
Salinity (ppt)	33.1	34.0	33.8	33.6	34.0	34.2
pH (units)	7.90	7.72	7.62	7.88	7.83	7.80
DO (mg/L)	7.2	6.2	6.1	7.5	6.3	6.1
Temp. (°C)	21.7	21.9	21.2	20.5	20.8	20.7
Salinity (ppt)	33.1	34.0	33.9	33.7	34.0	34.2
pH (units)	7.90	7.70	7.66	7.89	7.82	7.76
DO (mg/L)	7.3	6.4	6.3	7.6	6.3	6.1
Temp. (°C)	21.6	21.9	21.2	20.6	20.8	20.7
Salinity (ppt)	33.0	34.0	33.9	33.5	34.0	34.2
pH (units)	7.90	7.69	7.66	7.90	7.82	7.75
DO (mg/L)	7.3	6.3	6.1	7.7	6.5	6.2
Temp. (°C)	21.1	21.9	21.1	20.4	20.8	20.7
Salinity (ppt)	33.0	34.1	34.0	33.2	34.0	34.2
pH (units)	7.89	7.69	7.67	7.90	7.81	7.71
DO (mg/L)	7.4	6.4	6.2	8.0	6.7	6.3
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	SC	SC	AG	AC	SC	AG

QC: RV
Date Animals Received: 3/18/22 ABS
Age of Animals at Test Start: 14 days

Feedings	0	24	48	72	96
Initials (AM):	RV	SC	AG	SC	AG
Initials (PM):					

Comments:

QC Check: RV 4/13/22

Final Review: AC 5/20/22

Site: SIYB-2

CETIS Summary Report

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	18-2203-6722	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	23 Mar-22 11:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	27 Mar-22 12:40	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	14 d

Sample ID:	15-5493-8898	**Code:**	22-W066	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 15:00	**Material:**	Ambient Sample	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	21h (13 °C)	**Station:**	SIYB 2		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
09-6857-0666	96h Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	12.0%
11-1162-1219	96h Survival Rate	TST-Welch's t Test	100	> 100	n/a	1	n/a

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%
25		6	0.9667	0.8810	1.0000	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%
50		6	0.9333	0.8249	1.0000	0.8000	1.0000	0.0422	0.1033	11.07%	3.45%
100		6	0.9667	0.8810	1.0000	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	0.8000	1.0000	1.0000
25		0.8000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	0.8000	0.8000	1.0000	1.0000	1.0000
100		1.0000	1.0000	0.8000	1.0000	1.0000	1.0000

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	09-6857-0666	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:40	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	12.03%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	39	26	2	10	Asymp	0.7500	Non-Significant Effect
		50	36	26	2	10	Asymp	0.5503	Non-Significant Effect
		100	39	26	2	10	Asymp	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070885	0.0023628	3	0.2174	0.8832	Non-Significant Effect
Error	0.21738	0.010869	20			
Total	0.224469		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	0.411	11.34	0.9380	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6264	0.884	1.2E-06	Non-Normal Distribution

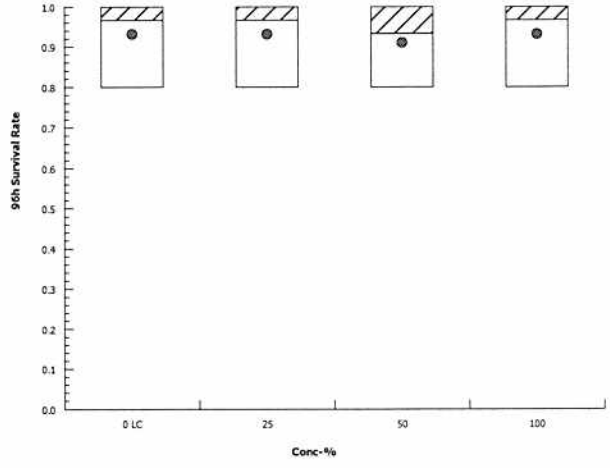
96h Survival Rate Summary

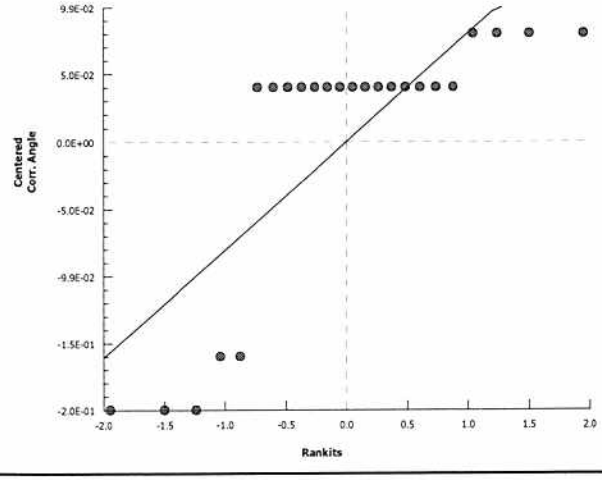
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
25		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
50		6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	3.45%
100		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
25		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
50		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	3.04%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%

Graphics





Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	11-1162-1219	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:40	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.8	100	> 100	n/a	1

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
Lab Control		25*	5.137	1.383	9	CDF	3.1E-04	Non-Significant Effect
		50*	3.728	1.397	8	CDF	0.0029	Non-Significant Effect
		100*	5.137	1.383	9	CDF	3.1E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070885	0.0023628	3	0.2174	0.8832	Non-Significant Effect
Error	0.21738	0.010869	20			
Total	0.224469		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	0.411	11.34	0.9380	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6264	0.884	1.2E-06	Non-Normal Distribution

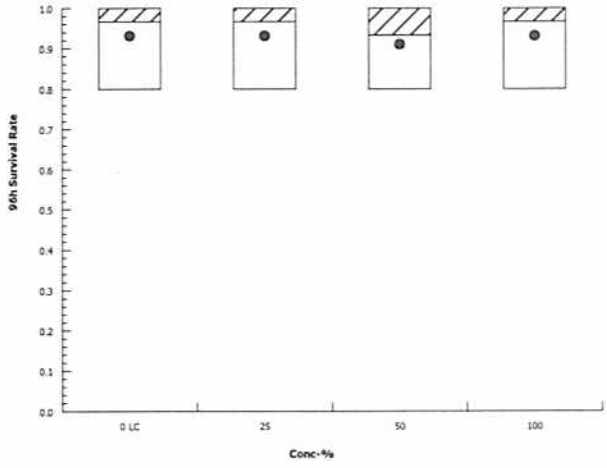
96h Survival Rate Summary

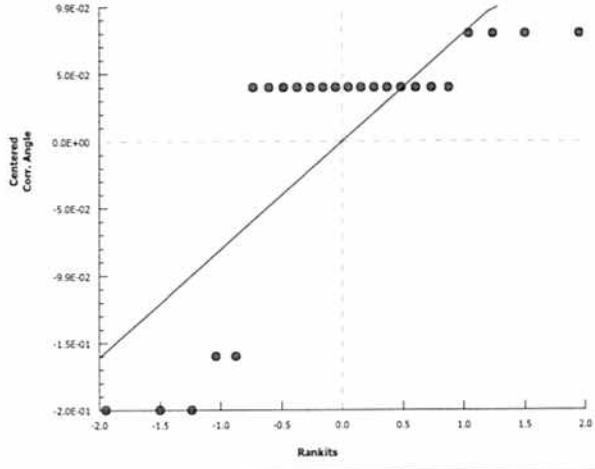
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
25		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
50		6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	3.45%
100		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
25		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
50		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	3.04%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: Wood: POSD - Shelter Island Yacht Basin
Test Species: *Atherinops affinis* (topsmelt)
Sample ID: SIYB-2
Start Date/Time: 3/23/22 1140
Test No. 22-03-051
End Date/Time: 3/27/22 1240

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #1	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5 4	4
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	4	4	4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	4	4	4	4
	C	5	5	5	4	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		RV	SC	AG	SC	AG

Water Quality						
Parameter	0	24	48f	48i	72	96
Temp. (°C)	21.5	22.0	21.2	20.3	20.9	20.7
Salinity (ppt)	33.1	34.0	33.8	33.6	34.0	34.2
pH (units)	7.90	7.72	7.62	7.88	7.83	7.80
DO (mg/L)	7.2	6.2	6.1	7.5	6.3	6.1
Temp. (°C)	21.7	22.0	21.1	21.0	20.8	20.6
Salinity (ppt)	33.1	33.7	33.8	33.5	33.9	~~33~~ 34.1
pH (units)	7.91	7.70	7.70	7.80	7.87 MS	7.80
DO (mg/L)	7.3	6.0	6.2	7.7	6.6	6.5
Temp. (°C)	21.5	21.8	21.1	21.0	20.8	20.6
Salinity (ppt)	33.0	34.0	33.9	33.5	33.9	34.1
pH (units)	7.91	7.69	7.68	7.89	7.81	7.77
DO (mg/L)	7.3	6.1	6.3	7.7	6.5	6.3
Temp. (°C)	21.0	21.9	21.1	20.5	20.7	20.6
Salinity (ppt)	33.0	34.0	33.9	33.4	33.9	34.1
pH (units)	7.90	7.68	7.69	7.90	7.81	7.74
DO (mg/L)	7.5	5.9	6.5	7.9	6.5	6.3
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	SC	CB	AG	AG	SC	AG

QC: SC

Date Animals Received: 3/18/22 ABS

Age of Animals at Test Start: 14 days

Feedings	0	24	48	72	96
Initials (AM):	RV	SC	AG	SC	AG
Initials (PM):					

Comments:

QC Check: RV 4/13/22

Final Review: SC 5/20/22

Site: SIYB-3

CETIS Summary Report

Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Batch ID:	03-4363-5945	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	23 Mar-22 12:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	27 Mar-22 13:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	14 d

Sample ID:	08-6425-8260	**Code:**	22-W067	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 13:50	**Material:**	Ambient Sample	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	22h (4.9 °C)	**Station:**	SIYB 3		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
07-3868-8737	96h Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	n/a
11-1219-5946	96h Survival Rate	TST-Welch's t Test	100	> 100	n/a	1	n/a

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	07-3868-8737	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:43	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C > T	100	> 100	n/a	1

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		50	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		100	39	26	1	10	Asymp	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<1.0E-37	Significant Effect
Error	0	0	20			
Total	0		23			

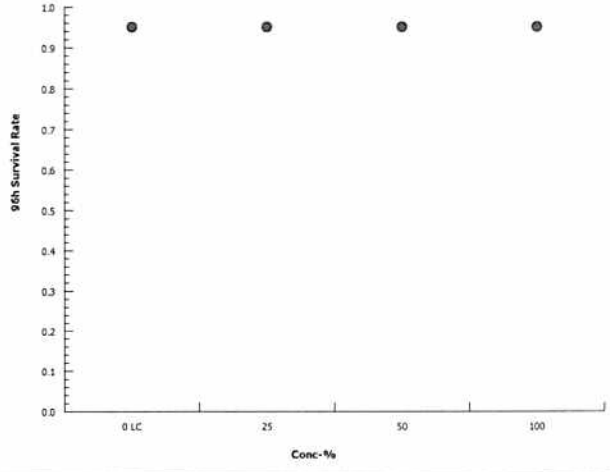
96h Survival Rate Summary

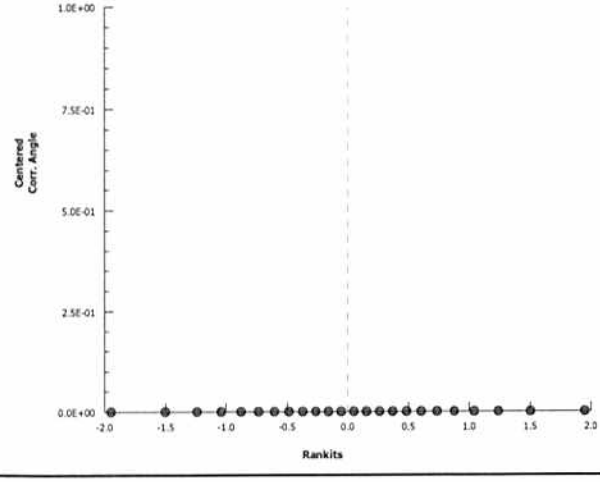
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%

Graphics





Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	11-1219-5946	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:43	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.8	100	> 100	n/a	1

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		25*	0.2691	n/a		<0.1	Non-Significant Effect
		50*	0.2691	n/a		<0.1	Non-Significant Effect
		100*	0.2691	n/a		<0.1	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<1.0E-37	Significant Effect
Error	0	0	20			
Total	0		23			

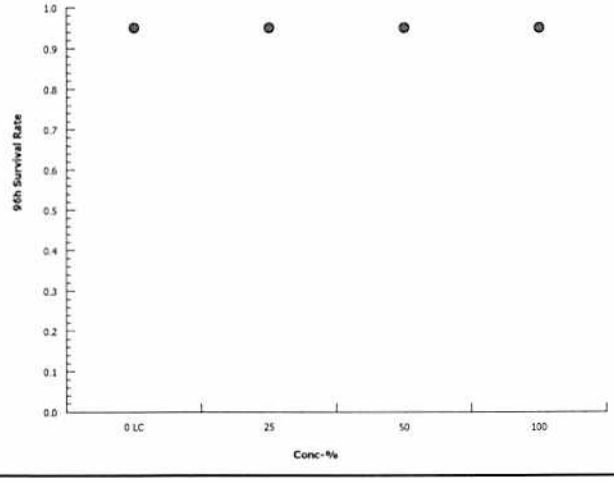
96h Survival Rate Summary

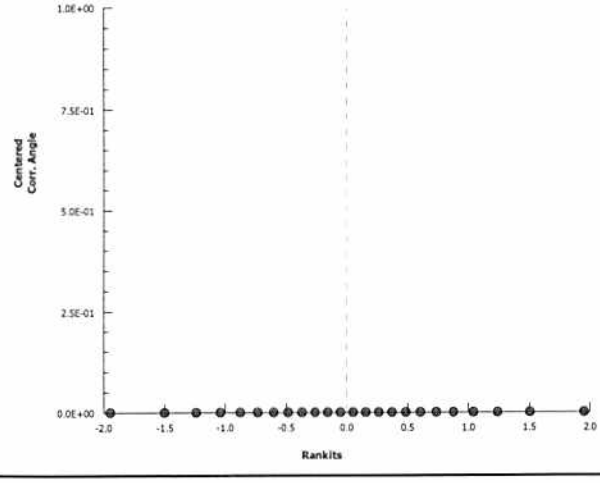
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: Wood: POSD - Shelter Island Yacht Basin
Sample ID: SIYB-3
Test No. 22-03-052

Test Species: *Atherinops affinis* (topsmelt)
Start Date/Time: 3/23/22 1200
End Date/Time: 3/27/22 1300

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #2	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		RV	JC	AB	SC	AB

Water Quality						
Parameter	0	24	48f	48i	72	96
Temp. (°C)	21.2	21.9	21.1	20.3	20.7	20.5
Salinity (ppt)	33.1	34.0	33.8	33.5	34.0	34.2
pH (units)	7.94	7.71	7.69	7.92	7.79	7.77
DO (mg/L)	7.3	5.7	6.0	7.4	6.5	6.3
Temp. (°C)	21.7	21.8	21.2	20.6	20.7	20.6
Salinity (ppt)	33.0	33.7	33.8	33.5	33.9	34.2
pH (units)	7.92	7.70	7.69	7.93	7.79	7.75
DO (mg/L)	7.3	6.0	6.1	7.5	6.9	6.2
Temp. (°C)	21.4	21.8	21.2	20.6	20.7	20.6
Salinity (ppt)	33.0	33.9	33.8	33.4	33.9	34.1
pH (units)	7.92	7.69	7.68	7.92	7.79	7.75
DO (mg/L)	7.4	6.0	6.1	7.7	6.5	6.2
Temp. (°C)	20.7	21.8	21.1	20.3	20.7	20.6
Salinity (ppt)	32.9	33.7	33.8	33.4	33.9	34.1
pH (units)	7.91	7.71	7.69	7.90	7.79	7.74
DO (mg/L)	7.6	6.1	6.3	8.0	6.6	6.3
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	SC	CB	AB	AB	SC	AB

AC, SC

Date Animals Received: 3/18/22 ABS
Age of Animals at Test Start: 14 days

Feedings	0	24	48	72	96
Initials (AM):	RV	SC	AB	SC	AB
Initials (PM):					

Comments:

QC Check: RV 4/13/22

Final Review: JC 5/20/22

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Site: SIYB-4

CETIS Summary Report

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	12-6594-8652	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	23 Mar-22 12:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	27 Mar-22 13:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	14 d

Sample ID:	16-2612-5069	**Code:**	22-W068	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 13:00	**Material:**	Ambient Sample	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	23h (1.9 °C)	**Station:**	SIYB 4		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
06-0369-0353	96h Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	n/a
05-3321-0171	96h Survival Rate	TST-Welch's t Test	100	> 100	n/a	1	n/a

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	06-0369-0353	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:44	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C > T	100	> 100	n/a	1

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		50	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		100	39	26	1	10	Asymp	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<1.0E-37	Significant Effect
Error	0	0	20			
Total	0		23			

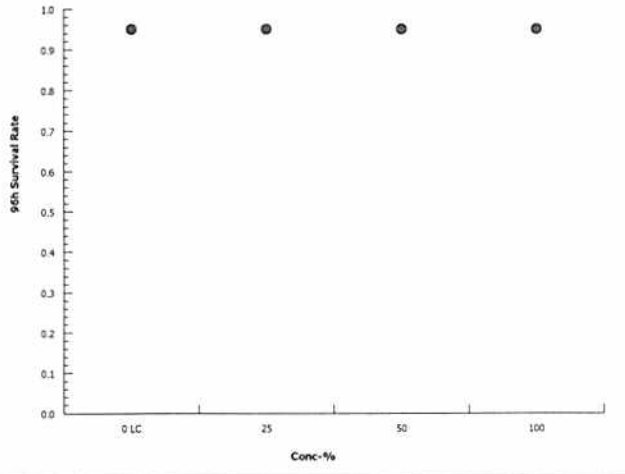
96h Survival Rate Summary

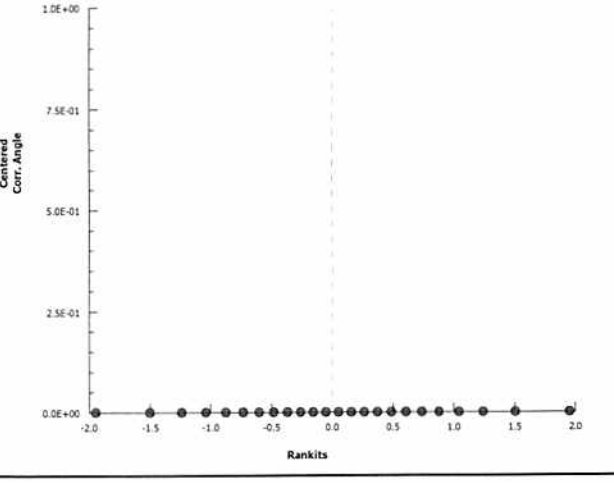
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%

Graphics





Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	05-3321-0171	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:45	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.8	100	> 100	n/a	1

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		25*	0.2691	n/a		<0.1	Non-Significant Effect
		50*	0.2691	n/a		<0.1	Non-Significant Effect
		100*	0.2691	n/a		<0.1	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<1.0E-37	Significant Effect
Error	0	0	20			
Total	0		23			

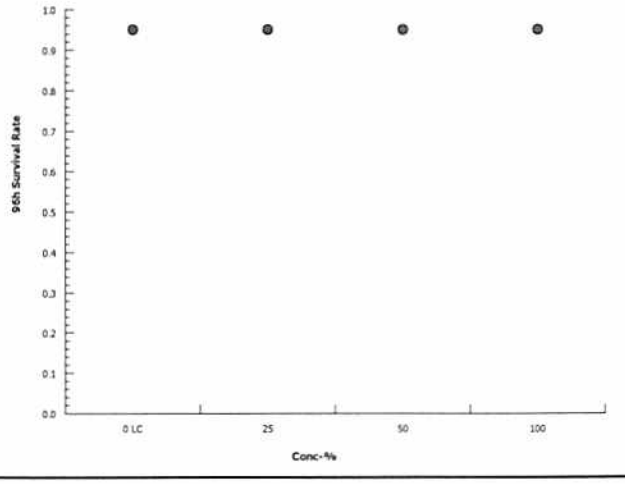
96h Survival Rate Summary

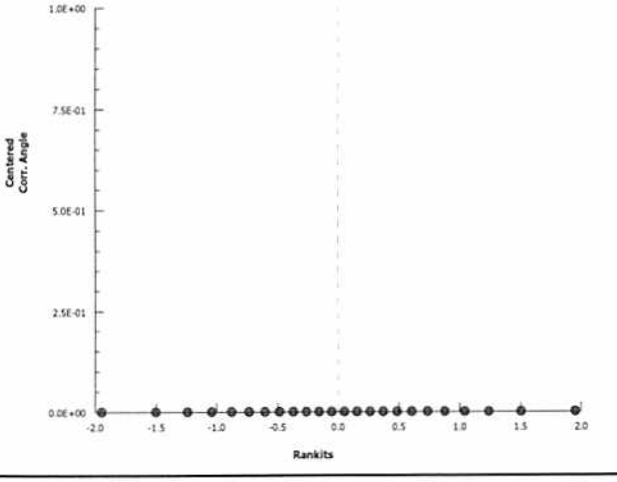
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: Wood: POSD - Shelter Island Yacht Basin
Test Species: *Atherinops affinis* (topsmelt)
Sample ID: SIYB-4
Start Date/Time: 3/23/22 1200
Test No. 22-03-053
End Date/Time: 3/27/22 1300

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #2	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		SC	SC	AG	SC	AG

Water Quality						
Parameter	0	24	48f	48i	72	96
Temp. (°C)	21.2	21.9	21.1	20.8	20.7	20.5
Salinity (ppt)	33.1	34.0	33.8	33.5	34.0	34.2
pH (units)	7.94	7.71	7.69	7.92	7.79	7.77
DO (mg/L)	7.3	5.7	6.0	7.4	6.5	6.3
Temp. (°C)	21.7	21.8	21.1	20.8	20.7	20.6
Salinity (ppt)	33.0	33.7	33.8	33.5	34.0	34.2
pH (units)	7.93	7.74	7.70	7.90	7.79	7.76
DO (mg/L)	7.3	6.4	6.2	7.6	6.9	6.7
Temp. (°C)	21.4	21.8	21.0	20.8	20.7	20.7
Salinity (ppt)	33.0	34.0	33.9	33.5	34.0	34.2
pH (units)	7.92	7.70	7.70	7.91	7.80	7.77
DO (mg/L)	7.4	6.1	6.2	7.7	6.8	6.6
Temp. (°C)	20.8	21.6	21.0	20.6	20.7	20.7
Salinity (ppt)	32.9	34.0	33.9	33.4	34.0	34.3
pH (units)	7.91	7.69	7.70	7.90	7.80	7.77
DO (mg/L)	7.6	6.0	6.4	8.2	6.8	6.6
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	SC	CB	AG	AG	SC	AG

QC: RV

Date Animals Received: 3/18/22 ABS

Age of Animals at Test Start: 14 days

Feedings	0	24	48	72	96
Initials (AM):	RV	SC	AG	SC	AG
Initials (PM):					

Comments:

QC Check: RV 4/13/22

Final Review: SC 5/20/22

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Site: SIYB-5

CETIS Summary Report

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	02-0208-6696	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	23 Mar-22 12:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	27 Mar-22 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	14 d

Sample ID:	21-0774-0699	**Code:**	22-W069	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 11:50	**Material:**	Ambient Sample	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	25h (3.9 °C)	**Station:**	SIYB 5		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
08-2002-2128	96h Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	8.02%
19-7874-3648	96h Survival Rate	TST-Welch's t Test	100	> 100	n/a	1	n/a

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		6	0.9667	0.8810	1.0000	0.8000	1.0000	0.0333	0.0817	8.45%	3.33%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	0.8000	1.0000	1.0000	1.0000	1.0000

Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	08-2002-2128	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:47	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	8.02%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		50	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		100	36	26	1	10	Asymp	0.5503	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070885	0.0023628	3	1	0.4133	Non-Significant Effect
Error	0.0472566	0.0023628	20			
Total	0.0543451		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.25	4.938	0.0036	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1	4.938	0.4133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.4436	0.884	1.7E-08	Non-Normal Distribution

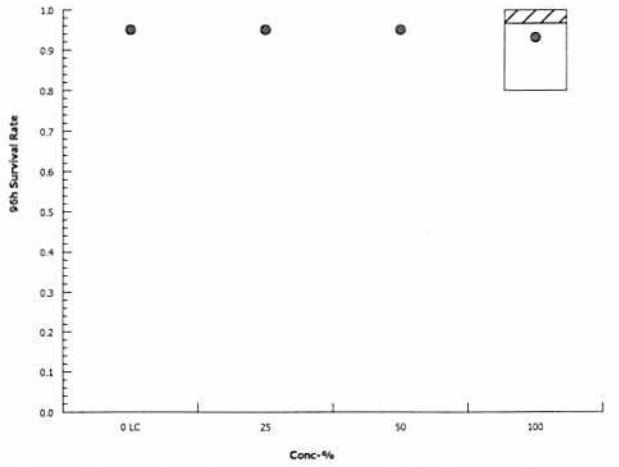
96h Survival Rate Summary

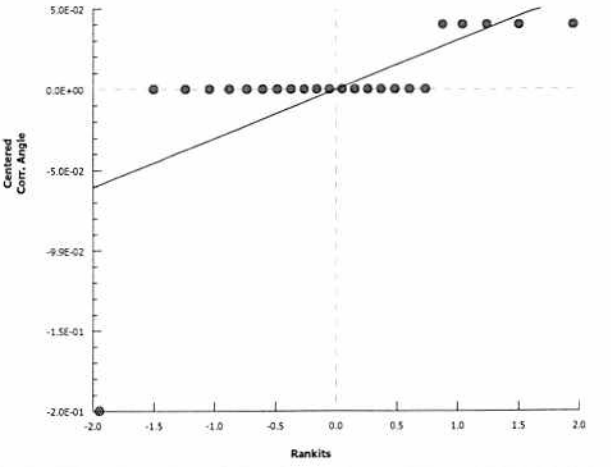
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	3.33%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	2.95%

Graphics





Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	19-7874-3648	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:47	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.8	100	> 100	n/a	1

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
Lab Control		25*	0.2691	n/a			<0.1	Non-Significant Effect
		50*	0.2691	n/a			<0.1	Non-Significant Effect
		100*	5.779	1.476	5	CDF	0.0011	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070885	0.0023628	3	1	0.4133	Non-Significant Effect
Error	0.0472566	0.0023628	20			
Total	0.0543451		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.25	4.938	0.0036	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1	4.938	0.4133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.4436	0.884	1.7E-08	Non-Normal Distribution

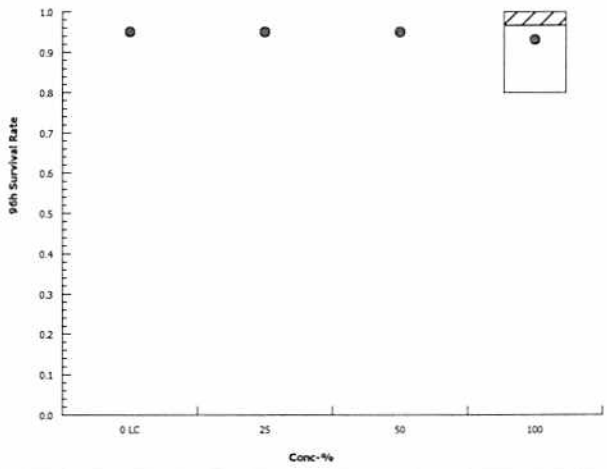
96h Survival Rate Summary

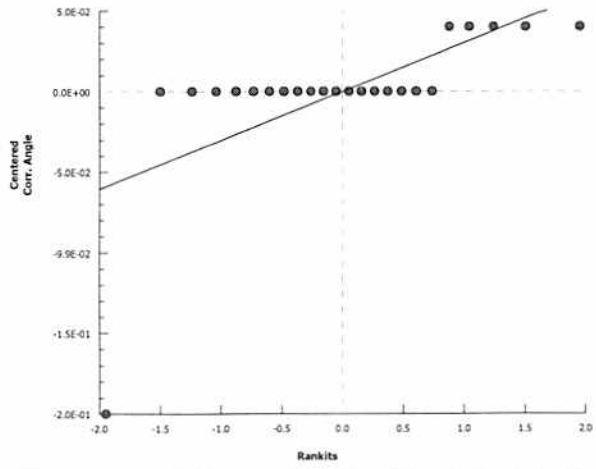
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	3.33%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	2.95%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: Wood: POSD - Shelter Island Yacht Basin
Test Species: *Atherinops affinis* (topsmelt)
Sample ID: SIYB-5
Start Date/Time: 3/23/22 1230
Test No. 22-03-054
End Date/Time: 3/27/22 1315

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #3	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	4
	C	5	5	6	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		RN	SC	AG	SC	AG

Water Quality						
Parameter	0	24	48f	48i	72	96
Temp. (°C)	21.2	21.8	21.0	20.5	20.7	20.6
Salinity (ppt)	33.1	34.0	33.9	33.5	34.1	34.3
pH (units)	7.90	7.73	7.71	7.95	7.79	7.76
DO (mg/L)	7.3	6.2	6.3	7.5	6.5	6.2
Temp. (°C)	21.8	21.7	21.0	20.8	20.7	20.7
Salinity (ppt)	33.0	33.9	33.8	33.6	33.9	34.2
pH (units)	7.91	7.71	7.70	7.94	7.79	7.74
DO (mg/L)	7.3	6.0	6.1	7.6	6.6	6.2
Temp. (°C)	21.5	21.7	21.0	20.8	20.7	20.6
Salinity (ppt)	33.0	33.9	33.9	33.4	33.9	34.2
pH (units)	7.91	7.70	7.71	7.93	7.79	7.74
DO (mg/L)	7.4	6.3	6.5	7.7	6.5	6.2
Temp. (°C)	20.9	21.7	21.0	20.7	20.7	20.6
Salinity (ppt)	33.0	34.0	33.9	33.3	33.9	34.2
pH (units)	7.90	7.69	7.70	7.91	7.79	7.75
DO (mg/L)	7.6	6.0	6.2	8.1	6.9	6.1
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	SC	CB	AG	AG	SC	AG

QC: SC
Date Animals Received: 3/18/22 AGS
Age of Animals at Test Start: 14 days

Feedings	0	24	48	72	96
Initials (AM):	RN	SC	AG	SC	AG
Initials (PM):					

Comments:

QC Check: RN 4/13/22

Final Review: SC 5/20/22

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Site: SIYB-6

CETIS Summary Report

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	14-5937-9710	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	23 Mar-22 12:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	27 Mar-22 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	14 d

Sample ID:	18-8350-1225	**Code:**	22-W070	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 10:30	**Material:**	Ambient Sample	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	26h (2.2 °C)	**Station:**	SIYB 6		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
02-5554-6486	96h Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	n/a
11-8235-1974	96h Survival Rate	TST-Welch's t Test	100	> 100	n/a	1	n/a

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Analyst: RN QA: 5/20/22

Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	02-5554-6486	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:48	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C > T	100	> 100	n/a	1

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		50	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		100	39	26	1	10	Asymp	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<1.0E-37	Significant Effect
Error	0	0	20			
Total	0		23			

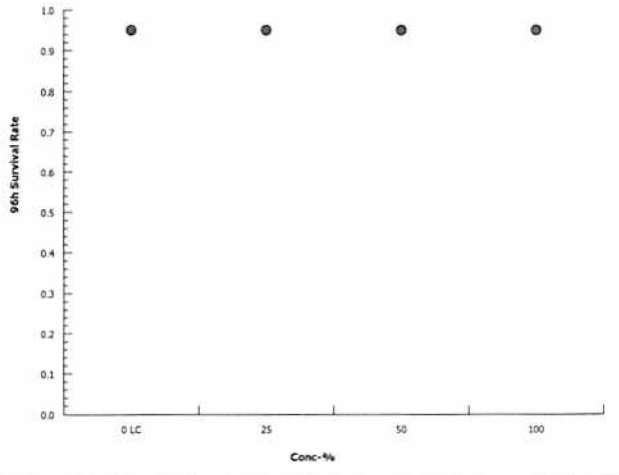
96h Survival Rate Summary

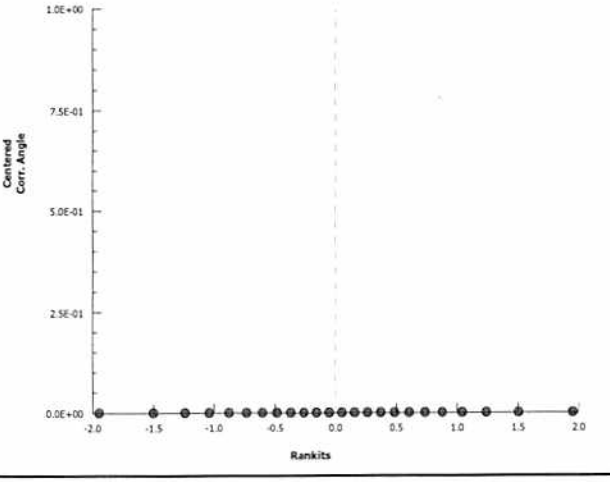
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%

Graphics





Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	11-8235-1974	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:48	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.8	100	> 100	n/a	1

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		25*	0.2691	n/a		<0.1	Non-Significant Effect
		50*	0.2691	n/a		<0.1	Non-Significant Effect
		100*	0.2691	n/a		<0.1	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<1.0E-37	Significant Effect
Error	0	0	20			
Total	0		23			

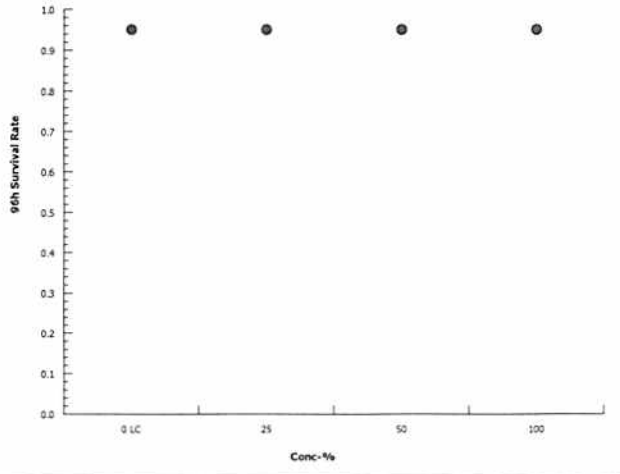
96h Survival Rate Summary

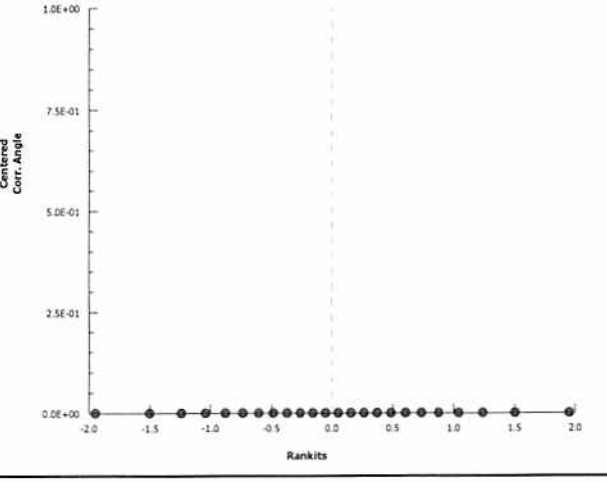
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: Wood: POSD - Shelter Island Yacht Basin
Test Species: *Atherinops affinis* (topsmelt)
Sample ID: SIYB-6
Start Date/Time: 3/23/22 1230
Test No. 22-03-055
End Date/Time: 3/27/22 1315

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #3	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		SC	SC	AG	SC	AG

Water Quality						
Parameter	0	24	48f	48i	72	96
Temp. (°C)	21.2	21.8	21.0	20.5	20.7	20.6
Salinity (ppt)	33.1	34.0	33.9	33.5	34.1	34.3
pH (units)	7.90	7.73	7.71	7.95	7.79	7.76
DO (mg/L)	7.3	6.2	6.3	7.5	6.5	6.2
Temp. (°C)	21.8	21.7	20.8	20.8	20.6	20.5
Salinity (ppt)	33.0	34.1	33.9	33.5	34.1	34.3
pH (units)	7.90	7.70	7.73	7.89	7.79	7.75
DO (mg/L)	7.3	6.3	6.6	7.5	6.5	6.3
Temp. (°C)	21.4	21.7	20.9	20.6	20.6	20.5
Salinity (ppt)	33.0	34.0	33.9	33.5	34.0	34.2
pH (units)	7.90	7.70	7.72	7.89	7.79	7.75
DO (mg/L)	7.4	6.2	6.5	7.7	6.5	6.3
Temp. (°C)	20.8	21.7	20.9	20.4	20.6	20.4
Salinity (ppt)	33.0	34.1	33.9	33.4	33.9	34.2
pH (units)	7.88	7.69	7.72	7.89	7.79	7.74
DO (mg/L)	7.6	6.1	6.4	8.1	6.5	6.3
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	SC	CB	AG	AG	SC	AG

QC: RV
Date Animals Received: 3/18/22 ABS
Age of Animals at Test Start: 14 dys

Feedings	0	24	48	72	96
Initials (AM):	RV	SC	AG	SC	AG
Initials (PM):					

Comments:

QC Check: RV 4/13/22

Final Review: SC 5/20/22

Site: SIYB-REF-1

CETIS Summary Report

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	12-4021-7845	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	23 Mar-22 12:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	27 Mar-22 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	14 d

Sample ID:	09-0807-7198	**Code:**	22-W071	**Client:**	Wood Environment and Infrastructure
Sample Date:	22 Mar-22 09:30	**Material:**	Ambient Sample	**Project:**	SIYB TMDL Monitoring
Receipt Date:	22 Mar-22 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	27h (4.6 °C)	**Station:**	SIYB REF1		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
13-9967-3862	96h Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	n/a
14-0379-4151	96h Survival Rate	TST-Welch's t Test	100	> 100	n/a	1	n/a

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Analyst: PV QA: 5/20/22

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	14-0379-4151	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:50	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.8	100	> 100	n/a	1

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		25*	0.2691	n/a		<0.1	Non-Significant Effect
		50*	0.2691	n/a		<0.1	Non-Significant Effect
		100*	0.2691	n/a		<0.1	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<1.0E-37	Significant Effect
Error	0	0	20			
Total	0		23			

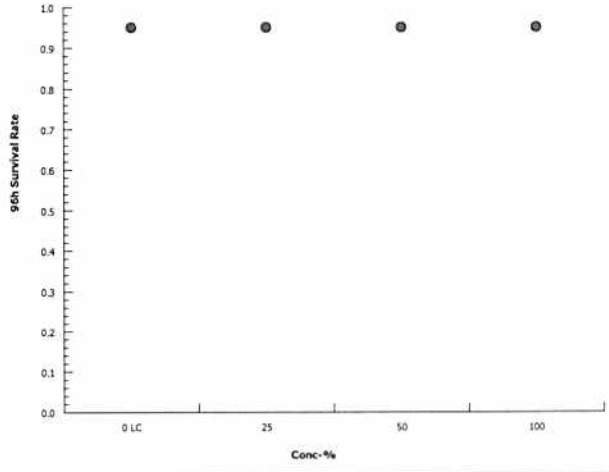
96h Survival Rate Summary

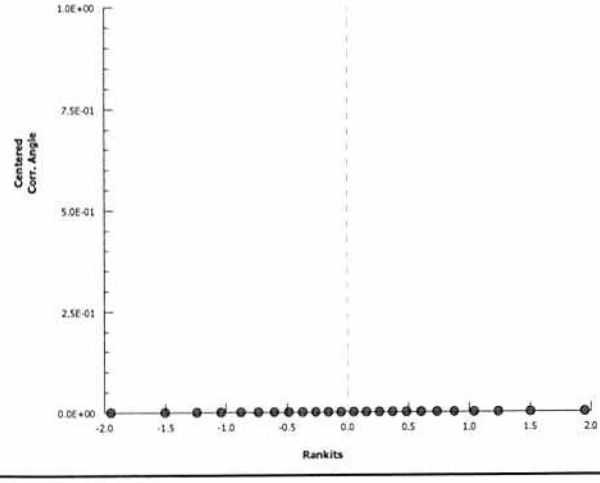
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%

Graphics





Pacific Topsmelt 96-h Acute Survival Test — Wood E&IS

Analysis ID:	13-9967-3862	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:50	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C > T	100	> 100	n/a	1

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		50	39	26	1	10	Asymp	0.7500	Non-Significant Effect
		100	39	26	1	10	Asymp	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<1.0E-37	Significant Effect
Error	0	0	20			
Total	0		23			

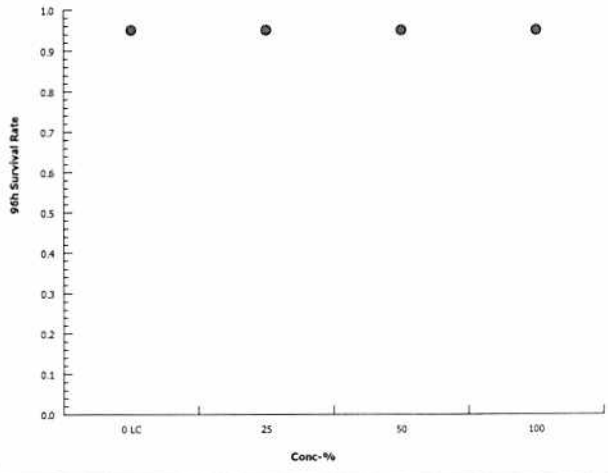
96h Survival Rate Summary

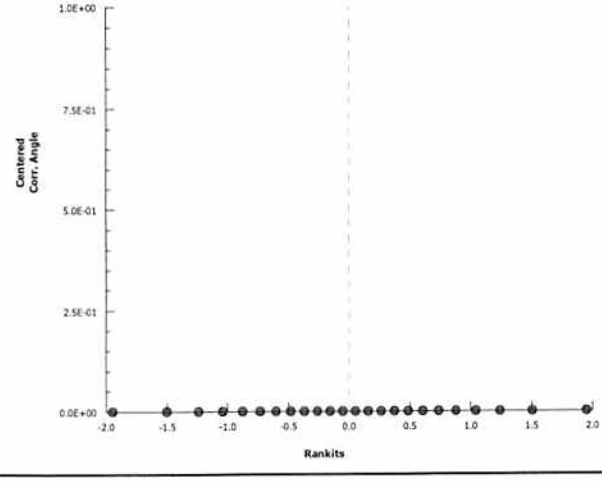
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: Wood: POSD - Shelter Island Yacht Basin
Test Species: *Atherinops affinis* (topsmelt)
Sample ID: SIYB-REF-1
Start Date/Time: 3/23/22 ~~1250~~ 1230
Test No. 22-03-0556
End Date/Time: 3/27/22 1315

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC ~~#4~~ #3	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		RV	SC	AG	SC	AG

QC = SC

Water Quality						
Parameter	**0**	**24**	**48f**	**48i**	**72**	**96**
Temp. (°C)	21.2	21.8	21.0	20.5	20.7	20.6
Salinity (ppt)	33.1	34.0	33.9	33.5	34.1	34.3
pH (units)	7.90	7.73	7.71	7.95	7.79	7.76
DO (mg/L)	7.3	6.2	6.3	7.5	6.5	6.2
Temp. (°C)	21.7	21.2	20.8	20.5	20.2	20.2
Salinity (ppt)	33.1	34.2	34.0	33.6	34.3	34.4
pH (units)	7.91	7.67	7.70	7.90	7.79	7.77
DO (mg/L)	7.3	5.7	5.9	7.6	6.9	6.5
Temp. (°C)	21.6	21.0	20.8	20.6	20.1	20.2
Salinity (ppt)	33.0	34.3	34.2	33.5	34.2	34.4
pH (units)	7.91	7.68	7.69	7.90	7.79	7.75
DO (mg/L)	7.4	5.7	6.1	7.7	6.7	6.5
Temp. (°C)	21.1	20.8	20.7	20.5	20.0	20.1
Salinity (ppt)	33.0	34.3	34.2	33.4	34.2	34.4
pH (units)	7.89	7.64	7.68	7.90	7.78	7.74
DO (mg/L)	7.6	5.5	5.9	8.1	6.6	6.4
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	SC	CB	AG	AG	SC	AG

Date Animals Received: 3/18/22 ABS
Age of Animals at Test Start: 14 days

Feedings	0	24	48	72	96
Initials (AM):	RV	SC	AG	SC	AG
Initials (PM):					

Comments:

QC Check: RV 4/13/22

Final Review: SC 5/20/22

APPENDIX C

List of Data Qualifier Codes

wood.

Data Qualifier Codes

QC1: Temperatures out of recommended range; corrective action taken

QC2: Temperatures out of recommended range; no action taken, test terminated

QC3: Test initiated on aeration due to anticipated drop in dissolved oxygen

QC4: Dissolved oxygen percent saturation <110

QC5: Survival counts not recorded due to poor visibility

QC6: Inadequate sample volume remaining; 50% renewal performed

QC7: Inadequate sample volume remaining; no renewal performed

APPENDIX D

Sample Receipt Information

& Chain of Custody Form

Sample Check-In: Effluent/Water

Wood Aquatic Toxicology Laboratory
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Wood - POSD
Project Name: SIYB TMDL Winter Testing
Test ID Numbers: 22-03-050 to 063

Sample ID:	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-Ref1	
Sample Number:	22-W065	22-W066	22-W067	22-W068	22-W069	22-W070	22-W071	
Collection Date/Time:	3/22/22 1550	3/22/22 1500	3/22/22 1350 PW	3/22/22 1300	3/22/22 1150	3/22/22 1030	3/22/22 0930	
Receipt Date/Time:	↓ 1740	↓ 1740	↓ 1740	↓ 1740	↓ 1740	↓ 1740	↓ 1740	
Total Sample Volume (L):	14L	14L	14L	14L	14L	14L	14L	
Receipt Temp (°C):	13.7	13.0	4.9	1.9	3.9	2.2	4.6	
Appropriate Temp (Y/N)[1]:	Y	Y	Y	Y	Y	Y	Y	
pH (units):	7.74	7.74	7.76	7.77	7.77	7.76	7.76	
DO (mg/L):	7.9	8.0	8.2	8.6	8.2	8.2	8.0	
Conductivity (µS/cm)[2]:	—	—	—	—	—	—	—	
Salinity (ppt):	32.9	32.8	32.3	32.5	32.5	32.5	32.5	
Alkalinity (mg/L):	124 —	123 —	126 —	— 122	121 —	— 123	— 119	
Hardness (mg/L)[2]:	—	—	—	—	—	—	—	
Total Chlorine (mg/L)[3]:	<0.02	0.03	0.03	<0.02	<0.02	<0.02	<0.02	
Free Chlorine (mg/L)[3]:	—	—	—	—	—	—	—	
Technician Initials:	RV/AG	RV/AG	RV/AG	RV	RV	RV	RV	

Notes:

[1] Temperature should be 0 - 6°C if received > 24 hours past collection

[2] Only measured on samples with less than 3 ppt salinity

[3] If total chlorine is above 0.10 mg/L, the free chlorine will be measured

[4] Debris, odor, and color is described only if observed in the sample

Sample Descriptions[4]:

- all samples clear & colorless

Test Organism: Topsmelt/Mussels Dilution Water: (Nat-SW), Art-SW, RW, DMW, Other _____ Salinity 34

Additional Control: Filter control for Mussels Salinity 34

Initial QC: AG 4/29/22

Final Review: SC 5/9/22

wood.

Wood Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Client/Send Report To:

Company: Wood E & I Solutions, Inc.
Address: 9177 Sky Park Court
San Diego, CA 92123
Contact/PM: Marisa Swiderski
Phone Number: (858) 300-4324
Email Address: marisa.swiderski@woodplc.com

Project Information (if needed):

Project Name: 2022 SIYB TMDL Winter Monitoring
Project No.: 2015100111.0007.TOXLAB
PO Number: N/A

Personal Cooler Shipped:
Return Requested: YES____ NO X

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Analysis Requested: Aa-a	Mg-dv						Receipt Temp (°C)
SIYB-1	3/22/22	1550	14L	Grab		X	X						13.7
SIYB-2		1500	14L	Grab		X	X						13.0
SIYB-3		1350	14L	Grab		X	X						4.9
SIYB-4		1300	14L	Grab		X	X						1.9
SIYB-5		1150	14L	Grab		X	X						3.9
SIYB-6		1030	14L	Grab		X	X						2.2
SIYB-REF-1		0930	14L	Grab		X	X						4.6

Analysis Requested (write out or use codes below)

Samples Collected By:
MS/KB

Additional Comments: Concurrent ref. tox. test for both species (copper concentrations of 0, 25, 50, 100, 200, 400 ug/L for topsmelt and 0, 2.5, 5.0, 10, 20 and 40 µg/L for bivalve).
Topsmelt tests at 3 concentrations (25, 50, 100%) and a control; 6 reps/sample.
Bivalve tests at 5 concentrations (6.25, 12.5, 25, 50, and 100%), and a control; and a 100% filtered undiluted sample (Look for Noctiluca sp.); 5 reps/sample.

Samples Shipped via: Chris S. Wood
Condition Upon Receipt:

Relinquished/Shipped By:
Signature: Marisa Swiderski
Print Name: Marisa Swiderski
Date/Time: 3/22/22 1740

Received By:
Signature:
Print Name: Chris Strandy
Date/Time: 3/22/22 1740

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

APPENDIX E

Reference Toxicant Test

Statistical Analysis, Control Chart, and Raw Data

Chronic Mussel
Reference Toxicant Test

CETIS Summary Report

Test Code: 220322mgrd | 07-3402-8050

Bivalve Larval Survival and Development Test — Wood E&IS

Batch ID:	20-5972-8344	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	23 Mar-22 16:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Diluted Natural Seawater
Ending Date:	24 Mar-22 16:15	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Field Collected	**Age:**	

Sample ID:	16-7570-0116	**Code:**	220322mgrd	**Client:**	Internal
Sample Date:	22 Mar-22	**Material:**	Total Copper	**Project:**	
Receipt Date:	22 Mar-22	**Source:**	Reference Toxicant		
Sample Age:	16h	**Station:**			

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
15-1421-6731	Combined Proportion Norma	Steel Many-One Rank Sum Test	5	10	7.071		7.73%	✓
12-7911-5919	Proportion Normal	Steel Many-One Rank Sum Test	5	10	7.071		3.01%	✓
02-5653-4987	Survival Rate	Dunnett Multiple Comparison Test	40	> 40	n/a		9.56%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU	✓
17-5105-1124	Combined Proportion Norma	Trimmed Spearman-Kärber	EC50	12.55	12.33	12.77		

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
12-7911-5919	Proportion Normal	Control Resp	0.9039	0.9	>>	Yes	Passes Criteria
02-5653-4987	Survival Rate	Control Resp	0.9855	0.5	>>	Yes	Passes Criteria
15-1421-6731	Combined Proportion Norma	PMSD	0.0773	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8907	0.8659	0.9155	0.8626	0.9104	0.0089	0.0200	2.24%	0.00%
2.5		5	0.8627	0.7938	0.9317	0.7863	0.9201	0.0248	0.0555	6.43%	3.14%
5		5	0.8220	0.6899	0.9542	0.6412	0.8955	0.0476	0.1065	12.95%	7.71%
10		5	0.7730	0.7243	0.8218	0.7354	0.8371	0.0176	0.0392	5.08%	13.21%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9039	0.8921	0.9157	0.8915	0.9150	0.0043	0.0095	1.05%	0.00%
2.5		5	0.8935	0.8687	0.9183	0.8729	0.9201	0.0089	0.0200	2.24%	1.15%
5		5	0.8773	0.8418	0.9128	0.8317	0.8987	0.0128	0.0286	3.26%	2.94%
10		5	0.7826	0.7369	0.8283	0.7354	0.8371	0.0165	0.0368	4.70%	13.42%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9855	0.9547	1.0000	0.9427	1.0000	0.0111	0.0248	2.52%	0.00%
2.5		5	0.9649	0.9118	1.0000	0.9008	1.0000	0.0191	0.0428	4.43%	2.09%
5		5	0.9351	0.8102	1.0000	0.7710	1.0000	0.0450	0.1006	10.76%	5.11%
10		5	0.9878	0.9647	1.0000	0.9580	1.0000	0.0083	0.0186	1.88%	-0.23%
20		5	0.9084	0.7888	1.0000	0.7748	1.0000	0.0431	0.0963	10.60%	7.82%
40		5	0.8740	0.7479	1.0000	0.7634	1.0000	0.0455	0.1016	11.63%	11.31%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8779	0.8626	0.9104	0.8974	0.9051
2.5		0.8855	0.8244	0.8973	0.9201	0.7863
5		0.8942	0.8664	0.8130	0.6412	0.8955
10		0.7354	0.7697	0.7481	0.8371	0.7748
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8915	0.9150	0.9104	0.8974	0.9051
2.5		0.9027	0.8745	0.8973	0.9201	0.8729
5		0.8942	0.8664	0.8987	0.8317	0.8955
10		0.7354	0.7697	0.7809	0.8371	0.7899
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9847	0.9427	1.0000	1.0000	1.0000
2.5		0.9809	0.9427	1.0000	1.0000	0.9008
5		1.0000	1.0000	0.9046	0.7710	1.0000
10		1.0000	1.0000	0.9580	1.0000	0.9809
20		0.9084	1.0000	0.7748	0.8588	1.0000
40		0.7634	0.8931	0.9351	1.0000	0.7786

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	230/262	226/262	244/268	245/273	248/274
2.5		232/262	216/262	236/263	265/288	206/262
5		245/274	227/262	213/262	168/262	257/287
10		214/291	234/304	196/262	221/264	203/262
20		0/262	0/285	0/262	0/262	0/281
40		0/262	0/262	0/262	0/264	0/262

Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	230/258	226/247	244/268	245/273	248/274
2.5		232/257	216/247	236/263	265/288	206/236
5		245/274	227/262	213/237	168/202	257/287
10		214/291	234/304	196/251	221/264	203/257
20		0/238	0/285	0/203	0/225	0/281
40		0/200	0/234	0/245	0/264	0/204

Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	258/262	247/262	262/262	262/262	262/262
2.5		257/262	247/262	262/262	262/262	236/262
5		262/262	262/262	237/262	202/262	262/262
10		262/262	262/262	251/262	262/262	257/262
20		238/262	262/262	203/262	225/262	262/262
40		200/262	234/262	245/262	262/262	204/262

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	15-1421-6731	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 17:02	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	5	10	7.071		7.73%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	24	16	0	8	Asymp	0.5394	Non-Significant Effect
		5	20	16	0	8	Asymp	0.1899	Non-Significant Effect
		10*	15	16	0	8	Asymp	0.0191	Significant Effect
		20*	15	16	0	8	Asymp	0.0191	Significant Effect
		40*	15	16	0	8	Asymp	0.0191	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.62279	1.72456	5	386.4	<1.0E-37	Significant Effect
Error	0.107125	0.0044635	24			
Total	8.72992		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	87.58	15.09	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8554	0.9031	8.1E-04	Non-Normal Distribution

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8907	0.8659	0.9155	0.8974	0.8626	0.9104	0.0089	2.24%	0.00%
2.5		5	0.8627	0.7938	0.9317	0.8855	0.7863	0.9201	0.0248	6.43%	3.14%
5		5	0.8220	0.6899	0.9542	0.8664	0.6412	0.8955	0.0476	12.95%	7.71%
10		5	0.7730	0.7243	0.8218	0.7697	0.7354	0.8371	0.0176	5.08%	13.21%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

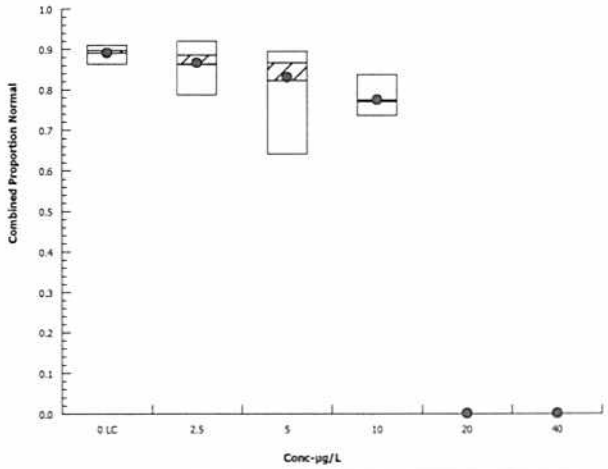
Angular (Corrected) Transformed Summary

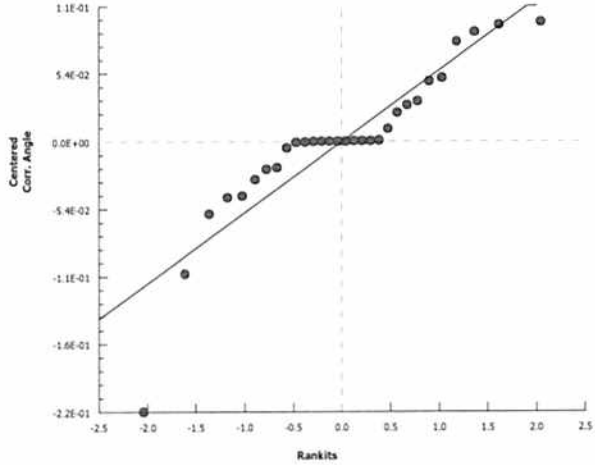
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.235	1.196	1.274	1.245	1.191	1.267	0.01416	2.56%	0.00%
2.5		5	1.197	1.097	1.296	1.226	1.09	1.284	0.03574	6.68%	3.09%
5		5	1.146	0.9838	1.308	1.197	0.9286	1.242	0.0584	11.40%	7.20%
10		5	1.076	1.015	1.136	1.07	1.03	1.155	0.02164	4.50%	12.90%
20		5	0.03043	0.02963	0.03123	0.0309	0.02962	0.0309	0.0002881	2.12%	97.54%
40		5	0.03087	0.03081	0.03094	0.0309	0.03078	0.0309	0.0000235	0.17%	97.50%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	15-1421-6731	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 17:02	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	12-7911-5919	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 17:02	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	5	10	7.071		3.01%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	23	16	0	8	Asymp	0.4416	Non-Significant Effect
		5	19	16	0	8	Asymp	0.1314	Non-Significant Effect
		10*	15	16	0	8	Asymp	0.0191	Significant Effect
		20*	15	16	0	8	Asymp	0.0191	Significant Effect
		40*	15	16	0	8	Asymp	0.0191	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.16119	1.83224	5	2122	<1.0E-37	Significant Effect
Error	0.0207257	0.0008636	24			
Total	9.18191		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	35.9	15.09	1.0E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9457	0.9031	0.1295	Normal Distribution

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9039	0.8921	0.9157	0.9051	0.8915	0.9150	0.0043	1.05%	0.00%
2.5		5	0.8935	0.8687	0.9183	0.8973	0.8729	0.9201	0.0089	2.24%	1.15%
5		5	0.8773	0.8418	0.9128	0.8942	0.8317	0.8987	0.0128	3.26%	2.94%
10		5	0.7826	0.7369	0.8283	0.7809	0.7354	0.8371	0.0165	4.70%	13.42%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

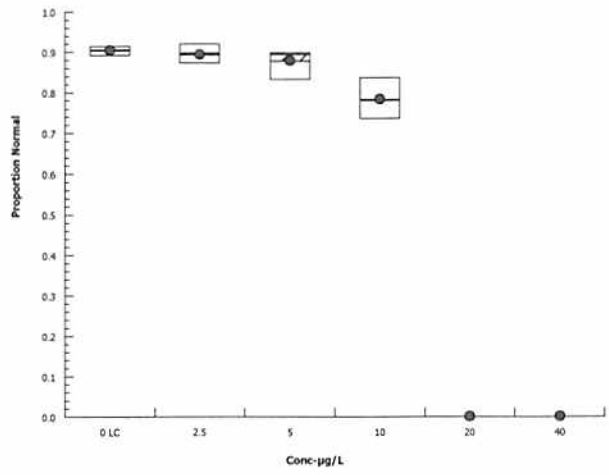
Angular (Corrected) Transformed Summary

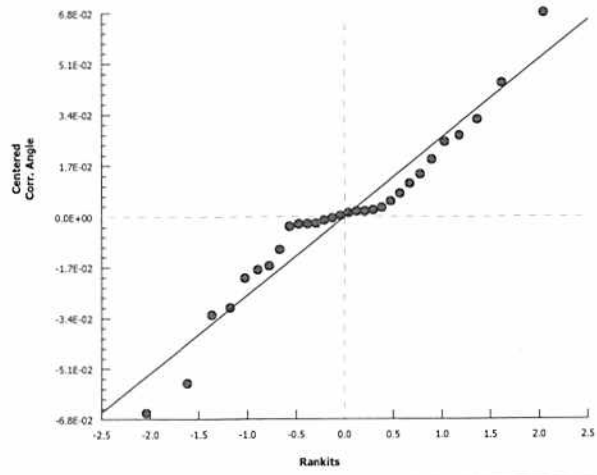
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.256	1.236	1.276	1.258	1.235	1.275	0.007217	1.28%	0.00%
2.5		5	1.239	1.199	1.28	1.245	1.206	1.284	0.01464	2.64%	1.30%
5		5	1.215	1.162	1.267	1.239	1.148	1.247	0.0189	3.48%	3.29%
10		5	1.087	1.031	1.143	1.084	1.03	1.155	0.02027	4.17%	13.46%
20		5	0.03206	0.02916	0.03497	0.03242	0.02962	0.0351	0.001047	7.30%	97.45%
40		5	0.03316	0.0307	0.03562	0.03269	0.03078	0.03536	0.0008846	5.97%	97.36%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	12-7911-5919	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 17:02	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	02-5653-4987	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 17:02	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	40	> 40	n/a		9.56%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	0.5881	2.362	0.244	8	CDF	0.6079	Non-Significant Effect
		5	0.865	2.362	0.244	8	CDF	0.4810	Non-Significant Effect
		10	-0.03971	2.362	0.244	8	CDF	0.8448	Non-Significant Effect
		20	1.528	2.362	0.244	8	CDF	0.2149	Non-Significant Effect
		40	2.244	2.362	0.244	8	CDF	0.0630	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.21341	0.0426821	5	1.594	0.1997	Non-Significant Effect
Error	0.642445	0.0267686	24			
Total	0.855856		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	5.864	15.09	0.3197	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.978	0.9031	0.7690	Normal Distribution

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9855	0.9547	1.0000	1.0000	0.9427	1.0000	0.0111	2.52%	0.00%
2.5		5	0.9649	0.9118	1.0000	0.9809	0.9008	1.0000	0.0191	4.43%	2.09%
5		5	0.9351	0.8102	1.0000	1.0000	0.7710	1.0000	0.0450	10.76%	5.11%
10		5	0.9878	0.9647	1.0000	1.0000	0.9580	1.0000	0.0083	1.88%	-0.23%
20		5	0.9084	0.7888	1.0000	0.9084	0.7748	1.0000	0.0431	10.60%	7.82%
40		5	0.8740	0.7479	1.0000	0.8931	0.7634	1.0000	0.0455	11.63%	11.31%

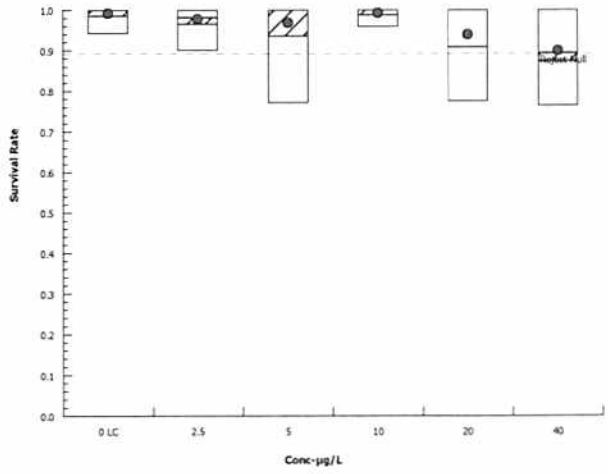
Angular (Corrected) Transformed Summary

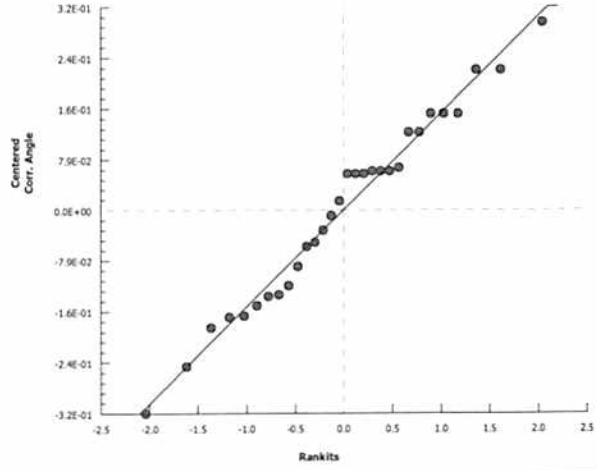
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.479	1.364	1.595	1.54	1.329	1.54	0.04159	6.29%	0.00%
2.5		5	1.418	1.259	1.578	1.432	1.25	1.54	0.05741	9.05%	4.11%
5		5	1.39	1.122	1.658	1.54	1.072	1.54	0.09654	15.53%	6.05%
10		5	1.483	1.382	1.584	1.54	1.364	1.54	0.0363	5.47%	-0.28%
20		5	1.321	1.06	1.582	1.263	1.076	1.54	0.09417	15.94%	10.69%
40		5	1.247	1.005	1.489	1.238	1.063	1.54	0.08712	15.62%	15.70%

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	02-5653-4987	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 17:02	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	17-5105-1124	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	03 May-22 17:02	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

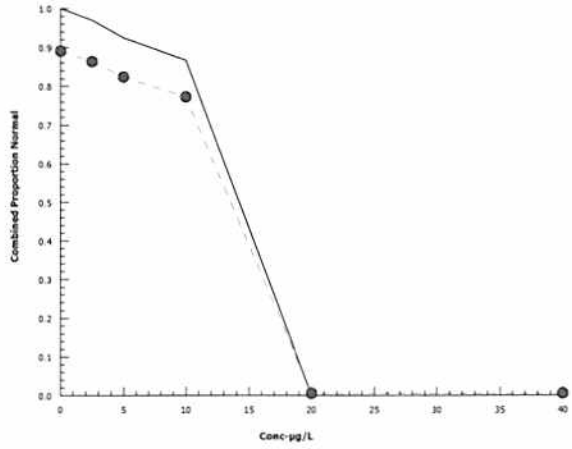
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.109	3.04%	1.099	0.003799	12.55	12.33	12.77

Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	5	0.8907	0.8626	0.9104	0.0200	2.24%	0.0%	1193/1339	0.8907	0.0%
2.5		5	0.8627	0.7863	0.9201	0.0555	6.44%	3.14%	1155/1337	0.8627	3.14%
5		5	0.8220	0.6412	0.8955	0.1065	12.95%	7.71%	1110/1347	0.822	7.71%
10		5	0.7730	0.7354	0.8371	0.0392	5.08%	13.21%	1068/1383	0.773	13.21%
20		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1352	0	100.0%
40		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1312	0	100.0%

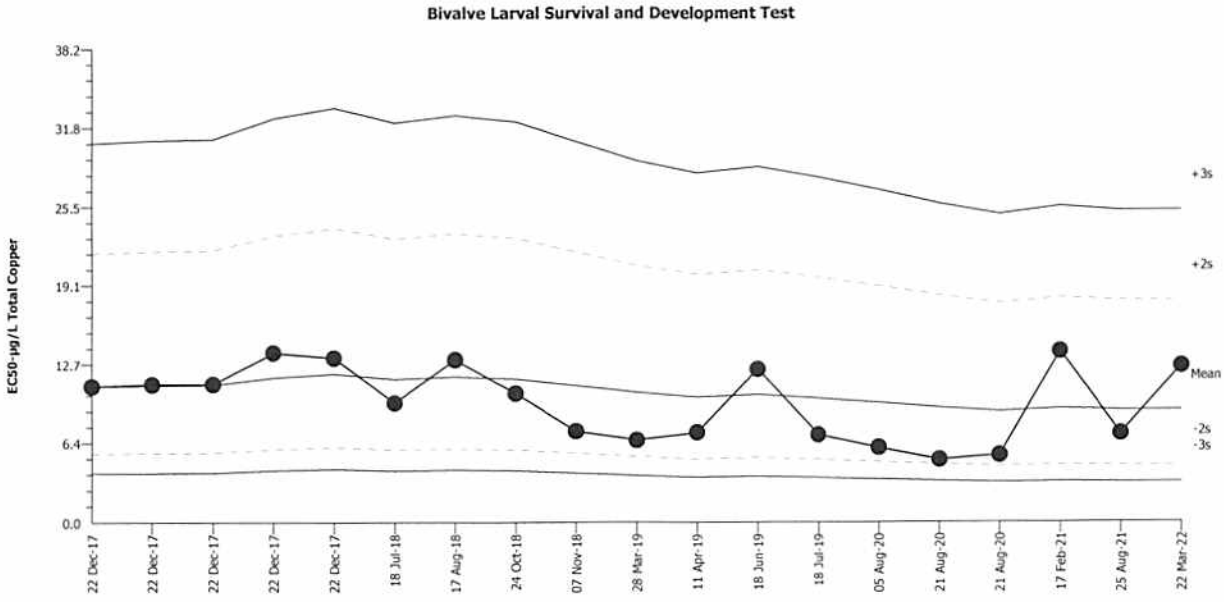
Graphics



CETIS QC Plot

Bivalve Larval Survival and Development Test — **Wood E&IS**

Test Type:	Development-Survival	**Organism:**	Mytilis galloprovincialis (Bay Mussel)	**Material:**	Total Copper
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	8.998	**Count:**	18	**-2s Warning Limit:**	4.535	**-3s Action Limit:**	3.22
Sigma:	n/a	**CV:**	35.30%	**+2s Warning Limit:**	17.84	**+3s Action Limit:**	25.13

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Dec	22	15:00	10.95	1.948	0.5724			13-8076-0092	04-7666-8867
2			22	15:00	11.1	2.107	0.6144			18-9173-1279	00-8804-3805
3			22	15:00	11.13	2.131	0.6207			19-1537-3013	20-7428-0259
4			22	15:10	13.69	4.689	1.225			05-2148-4604	14-2190-9809
5			22	15:10	13.26	4.263	1.133			07-4924-1298	02-9536-6591
6	2018	Jul	18	12:30	9.593	0.5954	0.1871			17-4700-2672	19-1834-7581
7		Aug	17	18:15	13.11	4.109	1.099			06-6531-4070	03-3159-5721
8		Oct	24	14:25	10.37	1.375	0.4154			10-5049-1350	21-2167-7967
9		Nov	7	14:40	7.288	-1.71	-0.6154			21-2560-8966	08-1725-7308
10	2019	Mar	28	15:00	6.57	-2.428	-0.9184			01-1205-3490	09-9916-0601
11		Apr	11	15:05	7.2	-1.798	-0.6509			09-5126-5022	11-0264-5925
12		Jun	18	15:35	12.33	3.331	0.92			20-1050-4622	12-9168-6963
13		Jul	18	14:55	7	-1.998	-0.7333			14-0843-5203	16-2395-2147
14	2020	Aug	5	16:15	5.97	-3.028	-1.198			01-5363-1852	03-9719-1127
15			21	17:45	4.994	-4.004	-1.719			02-6167-5910	09-0147-8078
16			21	17:45	5.371	-3.627	-1.507			09-7758-0702	07-5383-0657
17	2021	Feb	17	16:05	13.75	4.752	1.238			02-0888-9810	19-5282-1839
18		Aug	25	16:50	7.088	-1.91	-0.6969			01-4286-8892	09-6353-7527
19	2022	Mar	22	16:15	12.55	3.548	0.9709			07-3402-8050	17-5105-1124

Analyst: RV QA: 5/20/22

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	22 Mar-22	**Species:**	Mytilis galloprovincialis	**Sample Code:**	220322mgrd
End Date:	24 Mar-22	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	22 Mar-22	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			301			288	265	~~BI~~ 4/21/22
			302			274	248	
			303			304	234	
			304			234	~~0~~	many disintegrated
			305			251	196	
			306			281	~~0~~	
			307			236	206	
			308			204	~~0~~	many disintegrated
			309			245	0	↓
			310			247	226	
			311			264	~~0~~	many disintegrated
			312			287	257	
			313			257	203	4/22/22
			314			237	213	
			315			257	232	
			316			~~275~~ 263 ~~245~~ 236		263 - 236
			317			273	245	
			318			238	~~0~~	
			319			268	244	
			320			291	214	
			321			247	216	
			322			225	~~0~~	
			323			264	221	
			324			274	245	
			325			262	227	
			326			200	~~0~~	a lot disintegrated
			327			203	~~0~~	
			328			202	168	
			329			258	230	
			330			285	~~0~~	

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	22 Mar-22 1615	**Species:**	Mytilis galloprovincialis	**Sample Code:**	220322mgrd
End Date:	24 Mar-22 1615	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	22 Mar-22	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	329			258	230 BI	BI 4/21/22
0	LC	2	310			~~257~~ BI	~~232~~ BI	
0	LC	3	319					
0	LC	4	317					
0	LC	5	302					
2.5		1	315			257	232	
2.5		2	321					
2.5		3	316					
2.5		4	301					
2.5		5	307					
5		1	324			274	245	
5		2	325					
5		3	314					
5		4	328					
5		5	312					
10		1	320			291	214	
10		2	303					
10		3	305					
10		4	323					
10		5	313					
20		1	318			238	~~0~~	
20		2	330					
20		3	327					
20		4	322					
20		5	306					
40		1	326			200	~~0~~	mostly disintegrated
40		2	304					
40		3	309					
40		4	311					
40		5	308					

QC: ICB

Water Quality for Bivalve Development

Client: Internal
Project ID: Cu Reftox
Test No. 220323mgrd

Test Species: *M. galloprovincialis*
Start Date/Time: 3/23/2022 1615
End Date/Time: 3/25/2022 1615

Test Conc. (µg/L Cu)	Parameter	Water Quality Measurements 0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	15.8	15.6
	Salinity (ppt)	32.6	33.0 AG	33.3
	pH (units)	7.88	7.80	7.84
	DO (mg/L)	7.9	8.9	8.7
2.5	Temp. (°C)	14.8	15.5	15.6
	Salinity (ppt)	33.0	33.5	33.7
	pH (units)	7.94	7.82	7.85
	DO (mg/L)	8.3	9.0	~~8.7~~ 8.8
5	Temp. (°C)	14.6	15.6	15.5
	Salinity (ppt)	32.8	33.7	33.8
	pH (units)	7.95	7.83	7.85
	DO (mg/L)	8.2	8.8	8.6
10	Temp. (°C)	14.6	15.4	15.5
	Salinity (ppt)	32.9	33.6	33.7
	pH (units)	7.95	7.83	7.87
	DO (mg/L)	8.1	9.2	8.8
20	Temp. (°C)	14.6	15.3	15.5
	Salinity (ppt)	32.9	33.6	33.6
	pH (units)	7.95	7.83	7.87
	DO (mg/L)	8.2	8.9	8.8
40	Temp. (°C)	14.5	15.3	15.4
	Salinity (ppt)	32.8	33.6	33.5
	pH (units)	7.97	7.84	7.88
	DO (mg/L)	8.1	8.9	8.7
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	BT	CB	AG

Source of Animals: AG Mission Bay
Date Received: 3/23/22

Comments:

QC Check: AG 4/29/22
Final Review: JC 5/20/22

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 3/23/22

Batch ID: Mission Bay Collection (3/23/22) **Analyst:** AG

Test Type: Chronic Bivalve Development

Task	
Spawning Induction	1230
Spawning Begins	1315
# Males/# Females	5/3
Spawn Condition	good
Fertilization Initiated	1345
Fertilzation End/Eggs Rinsed	~~13~~ AG 1400/1415
Embryo Counts	1500
Test Initiation	1615

Embryo Density Counts **# per 100 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	300	55	60	64	65	61	610
Stock 2							
Stock 3							

Cell Division:

	% Divided
Stock 1	AG 93.1
Stock 2	
Stock 3	

Selected Stock:	1

Stock Density **Dil Factor**

Adjust selected embryo stock to 500 embryos/mL. 610 / 500 = 1.22

Dilution Factor = Stock Density/mL/500

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: QC=237/255

TΦ1=275, TΦ2=261 TΦ3=268 TΦ4=255, TΦ5=250 X̄=262

QA Review: AG 4/29/22 **Final Review:** SC 5/9/22

Acute Topsmelt

Reference Toxicant Test

CETIS Summary Report

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	08-5663-3415	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	23 Mar-22 13:05	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Diluted Natural Seawater
Ending Date:	27 Mar-22 13:30	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	4d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	14 d

Sample ID:	16-4807-6841	**Code:**	220323aara	**Client:**	Internal
Sample Date:	23 Mar-22	**Material:**	Total Copper	**Project:**	
Receipt Date:	23 Mar-22	**Source:**	Reference Toxicant		
Sample Age:	13h	**Station:**			

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
16-7555-8362	96h Survival Rate	Steel Many-One Rank Sum Test	50	100	70.71		13.6%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU	✓
03-1482-7264	96h Survival Rate	Spearman-Kärber	LC50	158.7	132.8	189.8		

96h Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	0.9000	0.7850	1.0000	0.8000	1.0000	0.0447	0.1095	12.17%	10.00%
100		6	0.8000	0.6673	0.9327	0.6000	1.0000	0.0516	0.1265	15.81%	20.00%
200		6	0.4667	0.2953	0.6380	0.2000	0.6000	0.0667	0.1633	34.99%	53.33%
400		6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

96h Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		0.8000	1.0000	1.0000	0.8000	1.0000	0.8000
100		0.8000	1.0000	0.8000	0.6000	0.8000	0.8000
200		0.2000	0.4000	0.6000	0.6000	0.4000	0.6000
400		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Analyst: PV QA: 5/10/22

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	16-7555-8362	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:54	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	50	100	70.71		13.61%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	39	25	1	10	Asymp	0.8000	Non-Significant Effect
		50	30	25	1	10	Asymp	0.2033	Non-Significant Effect
		100*	24	25	1	10	Asymp	0.0277	Significant Effect
		200*	21	25	0	10	Asymp	0.0072	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.46827	0.367068	4	27.26	<1.0E-37	Significant Effect
Error	0.336653	0.0134661	25			
Total	1.80492		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.222	4.177	0.0013	Unequal Variances
Variances	Mod Levene Equality of Variance Test	5.651	4.177	0.0022	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8898	0.9031	0.0048	Non-Normal Distribution

96h Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	0.9000	0.7850	1.0000	0.9000	0.8000	1.0000	0.0447	12.17%	10.00%
100		6	0.8000	0.6673	0.9327	0.8000	0.6000	1.0000	0.0516	15.81%	20.00%
200		6	0.4667	0.2953	0.6380	0.5000	0.2000	0.6000	0.0667	34.99%	53.33%
400		6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

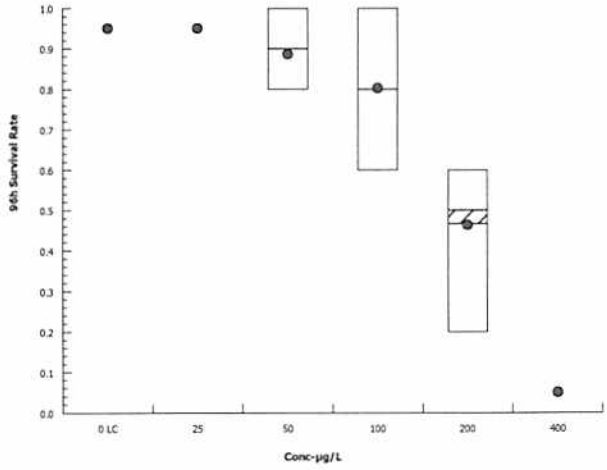
Angular (Corrected) Transformed Summary

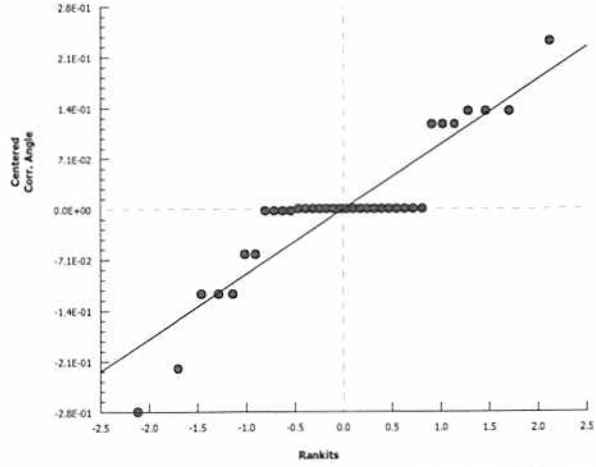
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
25		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.00%	0.00%
50		6	1.226	1.089	1.363	1.226	1.107	1.345	0.05325	10.64%	8.85%
100		6	1.11	0.9575	1.262	1.107	0.8861	1.345	0.05931	13.09%	17.49%
200		6	0.7486	0.5692	0.9279	0.7854	0.4636	0.8861	0.06978	22.83%	44.36%
400		6	0.2255	0.2255	0.2255	0.2255	0.2255	0.2255	0	0.00%	83.24%

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	16-7555-8362	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:54	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	03-1482-7264	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	13 Apr-22 17:54	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

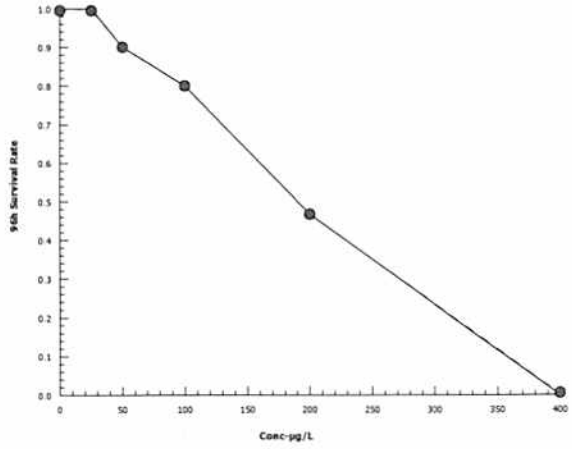
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	0.00%	2.201	0.03882	158.7	132.8	189.8

96h Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	6	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	30/30	1	0.0%
25		6	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	30/30	1	0.0%
50		6	0.9000	0.8000	1.0000	0.1095	12.17%	10.0%	27/30	0.9	10.0%
100		6	0.8000	0.6000	1.0000	0.1265	15.81%	20.0%	24/30	0.8	20.0%
200		6	0.4667	0.2000	0.6000	0.1633	34.99%	53.33%	14/30	0.4667	53.33%
400		6	0.0000	0.0000	0.0000	0.0000		100.0%	0/30	0	100.0%

Graphics

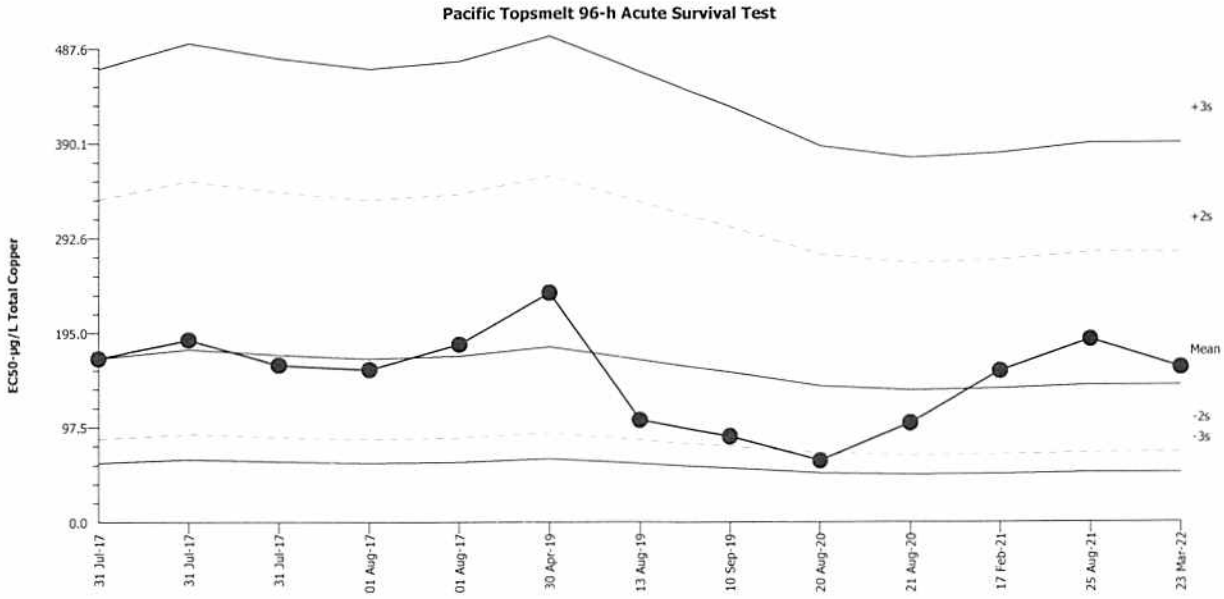


CETIS QC Plot

Report Date: 21 May-22 14:59 (1 of 1)

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Test Type:	Survival (96h)	**Organism:**	Atherinops affinis (Topsmelt)	**Material:**	Total Copper
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF



Mean:	140.6	**Count:**	12	**-2s Warning Limit:**	71.25	**-3s Action Limit:**	50.71
Sigma:	n/a	**CV:**	35.00%	**+2s Warning Limit:**	277.6	**+3s Action Limit:**	390

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Jul	31	16:00	168.3	27.7	0.5288			19-5584-5627	06-5699-4422
2			31	16:10	187.7	47.1	0.8497			08-6518-1949	12-2976-8720
3			31	16:20	161.5	20.9	0.4076			16-0803-3194	14-0325-5692
4		Aug	1	14:20	156.9	16.31	0.3227			21-0766-0876	04-5806-5680
5			1	14:30	183.1	42.52	0.7771			08-2262-5738	12-8323-6897
6	2019	Apr	30	15:00	236.6	95.95	1.53			01-1235-0968	05-2157-6049
7		Aug	13	17:20	104.8	-35.82	-0.8647			15-7782-6769	06-7735-0148
8		Sep	10	16:30	88.01	-52.6	-1.378			00-1845-1071	18-3128-5862
9	2020	Aug	20	11:30	63	-77.62	-2.362	(-)		10-0704-2056	18-4092-2436
10			21	16:40	101.7	-38.95	-0.9539			04-1235-4342	09-8231-6847
11	2021	Feb	17	18:00	155.3	14.73	0.293			20-5527-3551	01-0267-4966
12		Aug	25	16:45	188.1	47.5	0.856			03-9028-8227	05-7488-9745
13	2022	Mar	23	13:05	158.7	18.13	0.3567			09-7418-9044	03-1482-7264

96hr Marine Acute Test with 48hr Renewal

Client: Internal
Sample ID: Cu Reference Toxicant
Test No. 220323aara

Test Species: *Atherinops affinis* (topsmelt)
Start Date/Time: 3/23/22 1305
End Date/Time: 3/27/22 1330

Sample ID (µg/L Cu)	Rep	Counts				
		0	24	48	72	96
LC #4	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	4	4	4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	4
	E	5	5	5	5	5
	F	5	5	5	4	4
100	A	5	5	4	4	4
	B	5	5	5	5	5
	C	5	5	5	5	4
	D	5	5	3	3	3
	E	5	4	4	4	4
	F	5	4	4	4	4
200	A	5	3	1	1	1
	B	5	4	2	2	2
	C	5	5	4	4	3
	D	5	4	4	4	3
	E	5	5	3	3	2
	F	5	5	4	4	3
400	A	5	0	All Dead		
	B	5	0			
	C	5	0			
	D	5	0			
	E	5	0			
	F	5	0			
Tech Initials:		SC	SC	AV	SC	AB

QC: RV

Date Animals Received: 3/18/22 ABS
Age of Animals at Test Start: 14 days

Water Quality						
Parameter	0	24	48f	48i	72	96
Temp. (°C)	20.9	21.6	20.8	21.2	20.0	20.2
Salinity (ppt)	29.8	30.9	30.8	30.7	31.2	31.5
pH (units)	7.84	7.74	7.70	7.83	7.81	7.80
DO (mg/L)	7.1	6.4	6.3	7.2	6.7	6.4
Temp. (°C)	21.0	21.3	20.6	21.0	20.0	20.2
Salinity (ppt)	29.8	30.9	30.8	30.7	31.2	31.4
pH (units)	7.85	7.69	7.70	7.83	7.80	7.77
DO (mg/L)	7.2	6.1	6.5	7.3	6.8	6.4
Temp. (°C)	20.9	21.2	20.6	21.0	20.1	20.3
Salinity (ppt)	29.7	30.9	30.8	30.7	31.1	31.3
pH (units)	7.85	7.68	7.70	7.83	7.81	7.79
DO (mg/L)	7.3	6.2	6.5	7.3	6.9	6.5
Temp. (°C)	21.0	21.0	20.5	21.1	20.1	20.2
Salinity (ppt)	29.8	31.0	31.0	30.7	31.1	31.3
pH (units)	7.85	7.66	7.70	7.82	7.82	7.79
DO (mg/L)	7.2	6.0	6.7	7.3	7.0	6.6
Temp. (°C)	21.0	20.9	20.5	21.2	20.1	20.2
Salinity (ppt)	29.8	~~31.0~~ 31.0	31.0	30.6	31.2	31.3
pH (units)	7.82	7.64	7.70	7.78	7.83	7.80
DO (mg/L)	7.3	6.0	6.7	7.2	7.2	6.6
Temp. (°C)	21.0	20.9	All Dead			
Salinity (ppt)	29.6	30.9				
pH (units)	7.77	7.58				
DO (mg/L)	7.3	5.4				
Tech Initials:	SC	CB	AB	AB	SC	AB

Feedings	0	24	48	72	96
Initials (AM):	RV	SC	AB	SC	AB
Initials (PM):					

Comments:

QC Check: RV 4/13/22

Final Review: SC 5/20/22

C-2: January 25, 2023 Event

Results of Toxicity Testing for:
Shelter Island Yacht Basin
Total Maximum Daily Load Monitoring

Sample Collection: January 25, 2023
Winter Sampling Event

Submitted to:

WSP USA Environment & Infrastructure, Inc.
9177 Sky Park Court
San Diego, CA 92123

Testing Performed by:

WSP USA Environment & Infrastructure, Inc.
Environmental Toxicology Laboratory
4905 Morena Blvd., Suite 1304
San Diego, CA 92117

The WSP Environmental Toxicology Laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: Steve Carlson **Date:** 4/3/23.

INTRODUCTION

Located in the Port of San Diego, Shelter Island Yacht Basin (SIYB) was issued an Investigative Order (R9-2011-0036, amended from Resolution No. R9-2005-0019) from the San Diego Regional Water Quality Control Board that requires annual monitoring for the SIYB Dissolved Copper Total Maximum Daily Load (TMDL) program. The monitoring program requires the performance of water column toxicity testing at 7 locations within the basin area. Chronic toxicity is monitored with a marine invertebrate species, while acute toxicity is monitored with a marine fish species. Chronic testing has routinely used the mussel species *Mytilus galloprovincialis*, and acute testing has previously been performed with the Pacific topsmelt *Atherinops affinis*. However, due to the many challenges experienced using Pacific topsmelt during previous years (limited test organism supply and availability, difficulties in culturing and holding in a laboratory environment, and overall organism health and sensitivity), acute toxicity testing was performed using the Inland silverside minnow *Menidia beryllina,* a USEPA-approved alternate marine fish species, for the most recent winter monitoring event conducted in January 2023.

Staff from WSP USA Environment & Infrastructure, Inc. (WSP; formerly known as Wood Environment & Infrastructure Solutions, Inc.) collected and delivered all 7 samples to WSP's in-house Environmental Toxicology Laboratory located in San Diego, California. The samples were collected on January 25th, 2023, and both acute and chronic testing was initiated on January 26th, 2023.

MATERIALS & METHODS

Sample Information

Client:	Port of San Diego
Project Name:	Shelter Island Yacht Basin Annual TMDL Monitoring
Monitoring Period:	January 2023 (Winter event)
Sample IDs (7 sites):	SIYB-1, SIYB-2, SIYB-3, SIYB-4, SIYB-5, SIYB-6, and SIYB-REF-1
Sample Collection Date, Times:	1/25/23, 08:00 to 14:00
Sample Receipt Date, Time:	1/25/23, 12:40 (1st batch) and 17:00 (2nd batch)
Water Quality Measurements:	See Table 1 (measured upon sample receipt at lab)

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (℃)	pH (units)	DO (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	TRC (mg/L)
SIYB-1	15.7	7.83	9.1	32.9	109	0.03
SIYB-2	15.7	7.83	8.5	32.8	112	<0.02
SIYB-3	14.9	7.92	8.8	32.7	111	NR
SIYB-4	17.8	7.92	8.4	32.8	108	0.02
SIYB-5	15.8	7.92	8.2	32.7	110	<0.02
SIYB-6	16.1	7.88	8.1	32.6	114	0.06
SIYB-REF-1	15.6	7.90	7.8	32.3	107	0.02

DO = dissolved oxygen, TRC = total residual chlorine, NR= not recorded

Chronic Mussel Development Test Specifications

Test Period:	1/26/23, 17:30 – 1/28/23, 16:00
Test Organism:	*Mytilus galloprovincialis* (bivalve - mussel)
Test Organism Source:	Field-collected – Mission Bay (San Diego, CA)
Test Organism Age at Start:	Fertilized embryos (<4 hours old)
Test Procedure:	48-hour embryo-larval development
Test Endpoint:	Combined survival & proportion normal (ASTM)
Test Concentrations:	Lab Control, 6.25, 12.5, 25, 50, and 100% sample
Treatment Concentrations:	Filter Control and 100% Filtered (1.2 μm filter)
Lab Control/Dilution Water:	Natural seawater from the inlet at Scripps Institution of Oceanography (20-μm filtered)
Test Protocols Used:	EPA 1995 West Coast Manual (EPA/600/R-95/136); and ASTM 1998 (E 724-98).
EPA Test Acceptability Criteria:	Control: ≥50% survival; ≥90% proportion normal; and minimum significant difference (MSD) <25%
ASTM Test Acceptability Criteria:	Control: ≥70% combined survival/proportion normal
Reference Toxicant Test:	Lab Control, 2.5, 5.0, 10, 20, and 40 μg/L copper
Statistical Analysis Software:	CETIS™ v.2.1.3.5

Calculating the mussel test endpoint: Embryos within each test replicate are scored under a microscope by counting all larvae observed in the vial. Percent survival is evaluated by comparing the total number of larvae observed in each vial to an initial (time-zero) density count derived from 5 surrogate exposure chambers (vials) interspersed within the test and preserved immediately after adding embryos. Each larva is scored as normal or abnormal resulting in a second test endpoint: proportion normal. Normal development is exhibited by a clearly defined "D-shaped" shell with a clear straight line as a hinge, while abnormal development is exhibited by any clear abnormalities or differences to the normal "D-shaped" shell. This includes larva that have not fully developed a clear straight hinge (this is exhibited by a slightly curved hinge). Abnormal development was further enumerated to determine the magnitude of effect. The abnormal larvae were counted as having 1) a curved hinge, which indicates a moderate effect, or 2) more significant defects or abnormalities, which indicates a more severe effect. Examples of each of the larva (normal, abnormal with curved hinge, and abnormal with severe effects) are presented in Figure 1. A final combined surviving normal embryo endpoint is calculated by comparing the number of recovered normal embryos in each replicate test chamber to the average number of fertilized embryos counted in the time zero vials. Results for the combined embryo development endpoint are presented herein in the main report, with supporting summaries and full analyses of the individual percent survival and percent normal endpoints included in Appendix A

Figure 1. Images of Bivalve Embryo Development Showing Normal vs Abnormal Morphology

1) Normal D-shape/straight hinge 2) Abnormal with curved hinge 3) Abnormal with severe effects

Inland Silverside Acute Survival Test Specifications

Test Start Date, Time:	1/26/23, 12:15 – 13:12
Test End Date, Time:	1/30/23, 11:00 – 11:45
Test Organism:	*Menidia beryllina* (Inland Silverside minnow)
Organism Source; Age at Start:	Aquatic BioSystems (Fort Collins, CO); 12-days old
Test Procedure and Endpoint:	96-hour static-renewal acute survival test
Test Concentrations:	Lab Control, 25, 50, and 100% each sample
Replicates/Number of Organisms:	6 replicates/5 fish per replicate (30 fish/conc.)
Lab Control/Dilution Water:	Natural seawater collected from the inlet at Scripps Institution of Oceanography (34 ppt salinity)
USEPA Protocol:	EPA/821/R-02/012, 2002 Acute Manual
Test Acceptability Criteria:	≥90% mean survival in the control
Reference Toxicant Test:	Lab Control, 25, 50, 100, 200, and 400 µg/L copper
Statistical Software:	CETIS™ v.2.1.3.5

RESULTS

Test results were evaluated using two USEPA methods of analysis. The results were first analyzed using the traditional EPA statistical approach with multiple comparisons on a dilution series of concentrations to develop a No Observed Effect Concentration (NOEC) as described in the EPA documents (EPA 1995 and EPA 2002). Then, the results were analyzed using the newer EPA Test of Significant Toxicity (TST) approach, as referenced in USEPA 2010. The TST approach applies a modified t-test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) is the 100% sample, which is compared to the Control for statistical analysis. The TST results in a "Pass" if there are no effects or effects are considered to not be biologically significant in the sample (non-toxic), or it will result in a "Fail" if there are significant effects (toxic).

Chronic Mussel Test:

For the chronic mussel test, embryos were exposed to a serial dilution series of 6.25, 12.5, 25, 50, and 100% unfiltered sample from each of the 7 sites. Significant effects were observed for embryos exposed to water from Site SIYB-1 and Site SIYB-2. Site SIYB-1 had a 9.7% effect observed in the 100% undiluted sample when compared to the Lab Control, and SIYB-2 had a 9.3% effect in the 100% undiluted sample. Both the 9.7% and 9.3% effects were statistically significant using the traditional EPA method of analysis, resulting in a NOEC equal to the 50% concentration. However, the newer TST approach showed no biologically significant effects, resulting in a Pass result. Samples from the other 5 sites all resulted in less than a 1.0% effect, resulting in a NOEC equal to 100% sample and a Pass with the TST. The chronic test results for the unfiltered samples are summarized and presented in Table 2.

The 100% concentration for each sample was also tested after filtering with a 1.2 micron (μm) mesh screen to remove any potential algae or other native organisms. The 100% filtered sample was compared to a Filter Control (lab control water with the same filtered treatment). The greatest effect was observed in the SIYB-1 sample with a 28.1% effect which resulted in a Fail with the TST. The filtering process appeared to increase the toxicity of the sample (the effect rose from 9.7% to 28.1% when filtered). Samples from the other 6 sites all resulted in less than an 11% effect resulting in a Pass using the TST. Summary results for the filtered samples are presented in Table 3.

As described in the Methods section, abnormal larvae were further enumerated as either having a curved hinge (moderate effect) or having clear abnormalities or defects (severe effect). During this round of testing, the frequency of curved hinges observed remained low as presented in Table 4. The greatest effect was observed in the 100% concentration of SIYB-1, with 8.1% with curved hinges in the unfiltered 100% sample and 20.9% with curved hinges in the filtered sample. There was also 5.4% with curved hinges observed in the 100% filtered sample of SIYB-2. All other samples and concentrations resulted in less than 1.0% with curved hinges. All raw data and statistical analyses for the mussel tests are provided for reference in Appendix A.

Table 2. Summary of Chronic Mussel Test Results: Unfiltered Samples

Sample Concentration (%)	Sample ID / Combined Survival & Proportion Normal (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Lab Control	84.0	87.7	85.9	85.4	76.4	88.1	83.9
6.25	86.3	85.2	87.4	87.9	82.1	87.1	87.4
12.5	87.0	84.9	88.8	84.7	83.5	87.4	87.3
25	87.0	84.8	86.3	87.4	76.0	88.8	85.2
50	85.0	86.0	88.1	86.7	86.0	87.8	82.7
100	75.9*	79.6*	89.5	84.6	82.0	89.0	85.9
NOEC	50	50	100	100	100	100	100
EC_{50}	>100	>100	>100	>100	>100	>100	>100
% Effect	9.7	9.3	-4.2	0.9	-7.4	-1.0	-2.4
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

* An asterisk indicates a statistically significant effect using the traditional EPA statistical approach
NOEC = the highest concentration tested which results in No Observed Effect (using the traditional approach)
EC_{50} = the concentration expected to cause a 50% adverse effect to the organisms
% Effect = the % effect of the IWC compared to control; a negative value indicates the IWC outperformed the control
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the 100% sample concentration

Table 3. Summary of Chronic Mussel Test Results: 1.2 μm Filtered Samples

Sample Concentration (%)	Sample ID / Combined Survival & Proportion Normal (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Filter Control	85.1	85.0	84.9	88.8	75.6	82.0	83.3
100 filtered	**61.2***	75.6	87.2	82.7	83.9	87.3	83.4
NOEC	<100	100	100	100	100	100	100
% Effect	28.1	11.0	-2.8	7.0	-11.0	-6.5	-0.1
TST Result	Fail	Pass	Pass	Pass	Pass	Pass	Pass

NOEC = the highest concentration tested which results in No Observed Effect
% Effect = the % effect of the IWC compared to control; a negative value indicates the IWC outperformed the control
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the sample
A **bold** value with asterisk resulted in a significant effect using both the traditional approach and the TST approach

Table 4. Summary of Chronic Mussel Test: Percentage with Curved Hinges

Sample Concentration (%)	Sample ID / Mean Number of Curved Hinges (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Lab Control	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.4	0.0	0.0	0.0	0.0	0.0	0.0
100	8.1	0.4	0.0	0.0	0.0	0.0	0.0
Filter Control	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100 Filtered	20.9	5.4	0.0	0.0	0.0	0.0	0.0

Acute Inland Silverside Test:

The 96-hour acute fish test was conducted using the Inland Silverside minnow (*Menidia beryllina*), which is an EPA-approved marine fish species. Acute testing was conducted on all 7 sample sites with a dilution series of 25, 50, and 100% for each sample location. Also, there were three sets of Lab Controls, one with SIYB-1 and 2, one with SIYB-3 and 4, and one with SIYB-5, 6, and Ref. Mean survival in the three Lab Controls ranged from 93.3% to 100%, exceeding the EPA TAC of 90% survival. Mean survival in all concentrations of the 7 sample sites also ranged from 93.3% to 100%. With less than a 7.0% effect when compared to the Lab Controls, all 7 sites resulted in a NOEC equal to the 100% concentration, and all 7 sites Passed the TST analysis. A summary of the acute Inland Silverside test results is presented in Table 5. All acute raw data and statistical analyses are presented in Appendix B.

Table 5. Summary of Acute Inland Silverside Test Results

Sample Concentration (%)	Sample ID / Mean Survival (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Lab Control	93.3	93.3	96.7	96.7	100	100	100
25	96.7	96.7	93.3	96.7	100	100	100
50	100	96.7	96.7	96.7	100	96.7	100
100	100	100	97.2	96.7	93.3	100	100
NOEC	100	100	100	100	100	100	100
LC_{50}	>100	>100	>100	>100	>100	>100	>100
% Effect	-7.1	-7.1	-0.6	0.0	6.7	0.0	0.0
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

NOEC = the highest concentration tested which results in No Observed Effect (using the traditional approach)
LC_{50} = the concentration expected to cause a lethal effect to 50% of the fish
% Effect = the % effect of the IWC compared to control; a negative value indicates the IWC outperformed the control
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the sample

QUALITY ASSURANCE

Samples were received by the WSP laboratory in good condition the same day as collected. The samples were checked in, water quality measured, and then held in cold storage (4-6°C) until testing. Both chronic and acute tests were initiated the following day within the 36-hour holding time limit. For test organisms, mussels were collected locally by WSP staff the day of the test initiation (January 26th, 2023). The marine fish species (Inland Silverside) were received by a commercial supplier (Aquatic BioSystems in Fort Collins, Colorado) two days prior to test initiation. The fish were held in-house and allowed to acclimate to test conditions over a 48-hour period. There was greater than 10% mortality during the initial 24-hours of receiving the fish. However,

there was less than 2% mortality during the next 24-hour period prior to testing. The fish were deemed healthy and acceptable for testing. The acute tests conducted with the Silverside minnows met the EPA method TAC with greater than 90% survival in all three Lab Controls. Therefore, the acute test results were deemed valid and acceptable for reporting.

For the chronic mussel test, each sample site was tested with its own Lab Control. All 7 Lab Controls met the EPA TAC of 50% or greater survival and 90% or greater proportion normal. The Lab Controls also met the ASTM TAC of 70% or greater for the combined survival and proportion normal endpoint. All samples were analyzed for the combined endpoint to determine percent effects and statistical results using the TST. All chronic mussel test results were deemed valid for reporting.

Both acute and chronic tests were performed in accordance with EPA protocol guidelines and no major deviations were required or noted during this testing period. Any minor deviations or errors made with recordings are noted on the raw bench sheets for both test species. A list of data qualifier codes is provided in Appendix C. Sample receipt information and chain of custody forms are provided in Appendix D.

Concurrent reference toxicant tests were conducted with both test organisms. Both the acute fish test and the chronic mussel test had Lab Controls that met the EPA method TAC and were thus deemed valid. The median effect concentration for the mussels (EC_{50}) and lethal effect concentration for the fish species (LC_{50}) were within two standard deviations of the historical control chart means for the laboratory. This indicates that the mussels and Inland Silversides both produced a typical response or sensitivity to the copper toxicants. A summary of the reference toxicant results for both species is presented in Table 6. Raw data, statistical analyses, and control charts for the reference toxicant tests are provided in Appendix E.

Table 6. Summary of Copper Reference Toxicant Test Results

Test Species & Endpoint	NOEC (µg/L)	EC_{50}/LC_{50} (µg/L)	Historical EC_{50}/LC_{50} ± 2 SD range (µg/L)
Chronic Mussel Combined Surviving/Normal Embryo Development	5.0	7.73	4.72 - 17.8
Acute Inland Silverside 96-hour Survival	100	168	116 - 351

NOEC = the highest concentration tested which results in No Observed Effect
SD = Standard deviation, µg/L = micrograms per liter
EC_{50} = the concentration expected to cause a 50% adverse effect to the test organisms (mussels)
LC_{50} = the concentration expected to cause a 50% lethal effect to the test organisms (fish)
Historical EC_{50}/ LC_{50} = the mean EC_{50}/ LC_{50} for previous testing by the lab, presented as a range of ± 2 SD

REFERENCES

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724-98.

Tidepool Scientific Software, 2009-2022. CETIS: Comprehensive Environmental Toxicity Information System software, version 2.1.3.5.

USEPA (U.S. Environmental Protection Agency) 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). The USEPA, Office of Research and Development, Washington, DC.

USEPA 2002. U.S. Environmental Protection Agency. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. 5th Edition. EPA/821/R-02/012. USEPA, Office of Water, Washington, DC.

USEPA 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC

APPENDIX A

Chronic Mussel Development Test

Raw Data & Statistical Analyses

Bivalve Summary Tables

For Combined, %Survival, & %Normal Endpoints

Summary Results for Chronic Bivalve Tests
Final

Client: WSP USA Environment & Infrastructure

Project ID: Shelter Island Yacht Basin TMDL Monitoring

Species *Mytilus galloprovincialis* (Mussel)

Endpoint: **Combined Survival & Normal Development**

Unfiltered Sample:

Test Concentration (% Sample)	Sample ID / Combined Survival & Normal Development (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Lab Control	84.0	87.7	85.9	85.4	76.4	88.1	83.9
6.25	86.3	85.2	87.4	87.9	82.1	87.1	87.4
12.5	87.0	84.9	88.8	84.7	83.5	87.4	87.3
25	87.0	84.8	86.3	87.4	76.0	88.8	85.2
50	85.0	86.0	88.1	86.7	86.0	87.8	82.7
100	75.9	80.0	89.5	84.6	82.0	89.0	85.9
NOEC	50	50	100	100	100	100	100
% Effect	9.7	9.3	-4.2	0.9	-7.4	-1.0	-2.4
TST Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

NOEC = the highest Concentration tested with No Observed Effect (using standard method of analysis).

% Effect = the percent effect in the 100% sample compared to the Lab Control. A negative value indicates the 100% sample outperformed the Lab Control.

TST = Test of Significant Toxicity (Pass/Fail) in 100%. A Pass indicates no significant effects were observed.

Filtered Sample:

Test Concentration (% Sample)	Sample ID / Combined Survival & Normal Development (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Filter Control	85.1	85.0	84.9	88.8	75.6	82.0	83.3
100 filtered	**61.2***	75.6	87.2	82.7	83.9	87.3	83.4
NOEC	<100	100	100	100	100	100	100
% Effect	28.1	11.0	-2.8	7.0	-11.0	-6.5	-0.1
TST Result	Fail	Pass	Pass	Pass	Pass	Pass	Pass

Summary Results for Chronic Bivalve Tests
Final

Client: WSP USA Environment & Infrastructure

Project ID: Shelter Island Yacht Basin TMDL Monitoring

Species *Mytilus galloprovincialis* (Mussel)

Endpoint: **Percent Survival**

Unfiltered Sample:

Test Concentration (% Sample)	Sample ID / Percent Survival (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Lab Control	93.7	97.1	95.6	95.2	84.7	97.5	93.6
6.25	98.6	94.8	96.0	98.1	94.2	96.5	97.9
12.5	97.5	94.3	97.1	95.1	93.0	96.8	94.9
25	98.0	94.9	94.9	97.5	85.7	98.3	93.9
50	97.7	95.2	96.1	96.2	97.3	97.6	93.7
100	93.8	89.0	97.8	95.4	94.5	98.0	95.7
NOEC	100	50	100	100	100	100	100
% Effect	-0.1	8.3	-2.3	-0.2	-11.6	-0.6	-2.3

NOEC = the highest Concentration tested with No Observed Effect.

% Effect = the percent effect in the 100% sample compared to the Lab Control. A negative value indicates the 100% sample outperformed the Lab Control.

Filtered Sample:

Test Concentration (% Sample)	Sample ID / Percent Survival (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Filter Control	95.0	95.0	94.0	99.5	84.4	91.9	91.7
100 filtered	92.6	94.2	97.8	90.9	94.3	95.3	92.2

Summary Results for Chronic Bivalve Tests
Final

Client: WSP USA Environment & Infrastructure

Project ID: Shelter Island Yacht Basin TMDL Monitoring

Species *Mytilus galloprovincialis* (Mussel)

Endpoint: **Percent Normal**

Unfiltered Sample:

Test Concentration (% Sample)	Sample ID / Percent Normal (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Lab Control	89.6	90.4	89.9	89.7	90.0	90.4	89.8
6.25	87.6	90.1	91.0	89.6	87.0	90.2	89.2
12.5	89.3	90.0	91.5	89.1	89.8	90.4	90.4
25	88.7	89.3	91.0	89.6	88.6	90.4	90.7
50	87.0	90.4	91.7	90.1	88.4	89.9	88.3
100	80.8	89.3	91.5	88.6	86.8	90.8	89.7
NOEC	50	100	100	100	100	100	100
% Effect	9.8	1.2	-1.8	1.2	3.6	-0.4	0.2

NOEC = the highest Concentration tested with No Observed Effect.

% Effect = the percent effect in the 100% sample compared to the Lab Control. A negative value indicates the 100% sample outperformed the Lab Control.

Filtered Sample:

Test Concentration (% Sample)	Sample ID / Percent Normal (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Filter Control	89.6	89.6	90.3	89.3	89.7	89.2	90.9
100 filtered	**66.0***	80.0	89.2	90.8	89.0	91.7	89.0

Site: SIYB-1

CETIS Summary Report

Bivalve Larval Survival and Development Test

WSP ~~Wood E&IS~~ JF

Batch ID:	12-7737-3114	**Test Type:**	Development-Survival	**Analyst:**		
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater	
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable	
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**

Sample ID:	11-7919-1635	**Code:**	23-W0236	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 14:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**	WSP	**Station:**	SIYB 1
Sample Age:	27h (15.7 °C)	**Client:**	~~Wood Environment and Infrastructure Soluti~~ AB		

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-2001-9715	Combined Proportion Norma	TST-Welch's t Test	0.0021	100% passed combined proportion normal	1
05-1739-5468	Combined Proportion Norma	TST-Welch's t Test	0.3735	101% failed combined proportion normal	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
02-4943-4035	Combined Proportion Norma	Dunnett Multiple Comparison Test	✓	50	100	70.71	7.6%	2	1
18-5852-8913	Proportion Normal	Dunnett Multiple Comparison Test	✓	50	100	70.71	3.32%	2	1
01-1269-0759	Survival Rate	Dunnett Multiple Comparison Test	✓	100	>100	---	8.75%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
18-5852-8913	Proportion Normal	Control Resp	0.8962	0.9	<<	Yes	Below Criteria (i)
01-1269-0759	Survival Rate	Control Resp	0.9366	0.5	<<	Yes	Passes Criteria
02-4943-4035	Combined Proportion Norma	PMSD	0.07597	<<	0.25	No	Passes Criteria

(i) Ok-rounds up to 90%

Bivalve Larval Survival and Development Test

WSP ~~Wood E&I8~~ JF

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8396	0.7601	0.9191	0.7705	0.9158	0.0286	0.0640	7.63%	0.00%
0	FC	5	0.8513	0.7855	0.9171	0.7814	0.8984	0.0237	0.0530	6.22%	-1.39%
6.25		5	0.8634	0.8336	0.8932	0.8251	0.8830	0.0107	0.0240	2.78%	-2.83%
12.5		5	0.8703	0.8277	0.9129	0.8197	0.9021	0.0153	0.0343	3.94%	-3.66%
25		5	0.8697	0.8247	0.9147	0.8142	0.8995	0.0162	0.0362	4.17%	-3.58%
50		5	0.8497	0.8302	0.8693	0.8306	0.8723	0.0070	0.0158	1.85%	-1.20%
100		5	0.7585	0.6812	0.8358	0.6940	0.8307	0.0278	0.0623	8.21%	9.66%
101		5	0.6120	0.5095	0.7146	0.5082	0.6995	0.0369	0.0826	13.50%	27.11%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8962	0.8725	0.9199	0.8667	0.9158	0.0085	0.0191	2.13%	0.00%
0	FC	5	0.8961	0.8751	0.9171	0.8720	0.9195	0.0076	0.0169	1.89%	0.01%
6.25		5	0.8759	0.8551	0.8966	0.8548	0.8994	0.0075	0.0167	1.91%	2.27%
12.5		5	0.8928	0.8733	0.9122	0.8703	0.9116	0.0070	0.0157	1.75%	0.39%
25		5	0.8869	0.8705	0.9032	0.8663	0.8995	0.0059	0.0132	1.49%	1.04%
50		5	0.8702	0.8426	0.8978	0.8478	0.9059	0.0099	0.0222	2.55%	2.90%
100		5	0.8084	0.7625	0.8542	0.7515	0.8380	0.0165	0.0369	4.57%	9.80%
101		5	0.6596	0.5802	0.7390	0.5962	0.7485	0.0286	0.0639	9.69%	26.40%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9366	0.8571	1.0160	0.8525	1.0000	0.0286	0.0640	6.84%	0.00%
0	FC	5	0.9497	0.8869	1.0130	0.8962	1.0000	0.0226	0.0506	5.33%	-1.40%
6.25		5	0.9858	0.9588	1.0130	0.9508	1.0000	0.0097	0.0217	2.20%	-5.25%
12.5		5	0.9749	0.9321	1.0180	0.9180	1.0000	0.0154	0.0345	3.54%	-4.08%
25		5	0.9803	0.9455	1.0150	0.9399	1.0000	0.0125	0.0280	2.86%	-4.67%
50		5	0.9770	0.9362	1.0180	0.9290	1.0000	0.0147	0.0329	3.37%	-4.32%
100		5	0.9377	0.8745	1.0010	0.8743	1.0000	0.0228	0.0509	5.43%	-0.12%
101		5	0.9257	0.8601	0.9912	0.8525	1.0000	0.0236	0.0528	5.70%	1.17%

Bivalve Larval Survival and Development Test

WSP ~~Wood E&IS~~ JP

Combined Proportion Normal Detail MD5: B6079B7E609735A704DC762EA09F7EF5

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8415	0.7705	0.7814	0.9158	0.8889
0	FC	0.7814	0.8984	0.8087	0.8743	0.8936
6.25		0.8548	0.8830	0.8251	0.8798	0.8743
12.5		0.9021	0.8197	0.8579	0.9016	0.8703
25		0.8525	0.8848	0.8995	0.8973	0.8142
50		0.8478	0.8723	0.8415	0.8306	0.8564
100		0.6940	0.7213	0.7268	0.8197	0.8307
101		0.5574	0.6066	0.6995	0.5082	0.6885

Proportion Normal Detail MD5: 7F68C1E15DF302148AF0A24EB8B1EC33

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9059	0.9038	0.8667	0.9158	0.8889
0	FC	0.8720	0.8984	0.8970	0.9195	0.8936
6.25		0.8548	0.8830	0.8678	0.8994	0.8743
12.5		0.9021	0.8929	0.8870	0.9116	0.8703
25		0.8864	0.8848	0.8995	0.8973	0.8663
50		0.8478	0.8723	0.9059	0.8686	0.8564
100		0.7515	0.7904	0.8312	0.8380	0.8307
101		0.6000	0.6647	0.7485	0.5962	0.6885

Survival Rate Detail MD5: 8F9ABFA31D9EBE02F1835375E76E7DCB

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9290	0.8525	0.9016	1.0000	1.0000
0	FC	0.8962	1.0000	0.9016	0.9508	1.0000
6.25		1.0000	1.0000	0.9508	0.9781	1.0000
12.5		1.0000	0.9180	0.9672	0.9891	1.0000
25		0.9617	1.0000	1.0000	1.0000	0.9399
50		1.0000	1.0000	0.9290	0.9563	1.0000
100		0.9235	0.9126	0.8743	0.9781	1.0000
101		0.9290	0.9126	0.9344	0.8525	1.0000

Bivalve Larval Survival and Development Test

WSP ~~Wood E&IS~~ JF

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	154/183	141/183	143/183	174/190	176/198
0	FC	143/183	168/187	148/183	160/183	168/188
6.25		159/186	166/188	151/183	161/183	160/183
12.5		175/194	150/183	157/183	165/183	161/185
25		156/183	169/191	179/199	166/185	149/183
50		156/184	164/188	154/183	152/183	167/195
100		127/183	132/183	133/183	150/183	157/189
101		102/183	111/183	128/183	93/183	126/183

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	154/170	141/156	143/165	174/190	176/198
0	FC	143/164	168/187	148/165	160/174	168/188
6.25		159/186	166/188	151/174	161/179	160/183
12.5		175/194	150/168	157/177	165/181	161/185
25		156/176	169/191	179/199	166/185	149/172
50		156/184	164/188	154/170	152/175	167/195
100		127/169	132/167	133/160	150/179	157/189
101		102/170	111/167	128/171	93/156	126/183

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	170/183	156/183	165/183	183/183	183/183
0	FC	164/183	183/183	165/183	174/183	183/183
6.25		183/183	183/183	174/183	179/183	183/183
12.5		183/183	168/183	177/183	181/183	183/183
25		176/183	183/183	183/183	183/183	172/183
50		183/183	183/183	170/183	175/183	183/183
100		169/183	167/183	160/183	179/183	183/183
101		170/183	167/183	171/183	156/183	183/183

Bivalve Larval Survival and Development Test (LC vs 100%) WSE ~~Wood E&IS~~ JF

Analysis ID:	07-2001-9715	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 11:44	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 11:25	**MD5 Hash:**	FA90F020C04DC7B47D57B7DEDE04F04F	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	7	4.16	1.895	CDF	0.0021	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0275854	0.0275854	1	4.08	0.0781	Non-Significant Effect
Error	0.0540905	0.0067613	8			
Total	0.0816758		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.457	23.15	0.7242	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8909	0.7411	0.1737	Normal Distribution

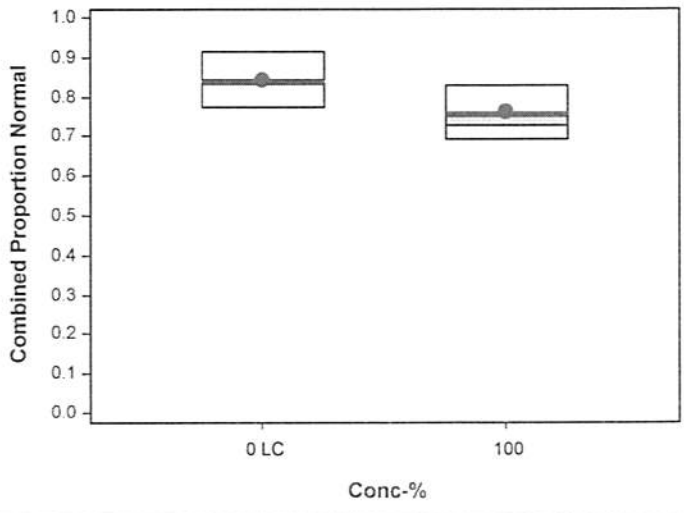
Combined Proportion Normal Summary

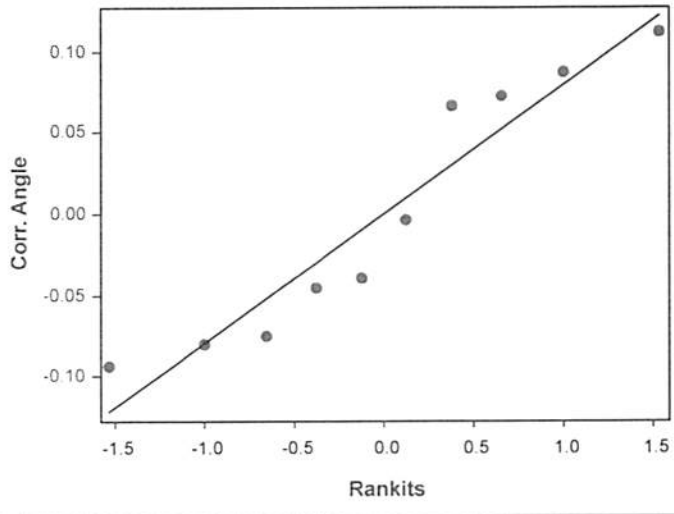
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8396	0.7601	0.9191	0.8415	0.7705	0.9158	0.0286	7.63%	0.00%
100		5	0.7585	0.6812	0.8358	0.7268	0.6940	0.8307	0.0278	8.21%	9.66%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1650	1.0540	1.2760	1.1610	1.0710	1.2760	0.0401	7.69%	0.00%
100		5	1.0600	0.9677	1.1520	1.0210	0.9846	1.1470	0.0332	7.00%	9.02%

Graphics





Bivalve Larval Survival and Development Test (FC vs 100% filtered) WSP ~~Wood E&IS~~

Analysis ID:	05-1739-5468	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 11:45	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 11:25	**MD5 Hash:**	5490966515668B4C38075307FB9241B6	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% failed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Filter Control		101	6	0.3379	1.943	CDF	0.3735	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.195237	0.195237	1	30.84	0.0005	Significant Effect
Error	0.050647	0.0063309	8			
Total	0.245884		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.343	23.15	0.7821	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8991	0.7411	0.2141	Normal Distribution

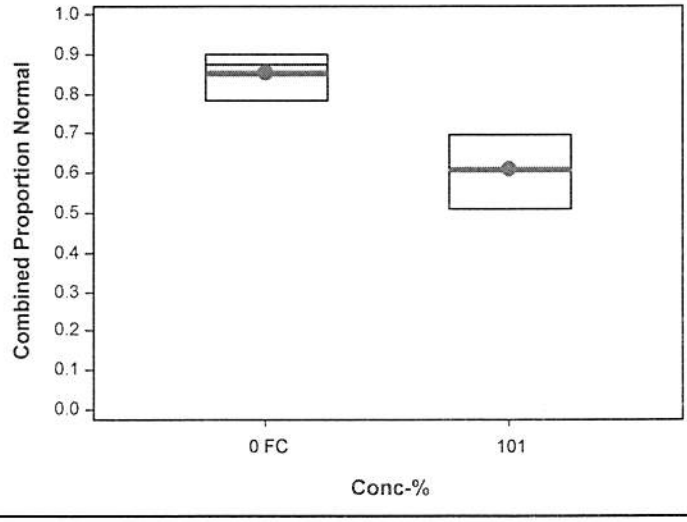
Combined Proportion Normal Summary

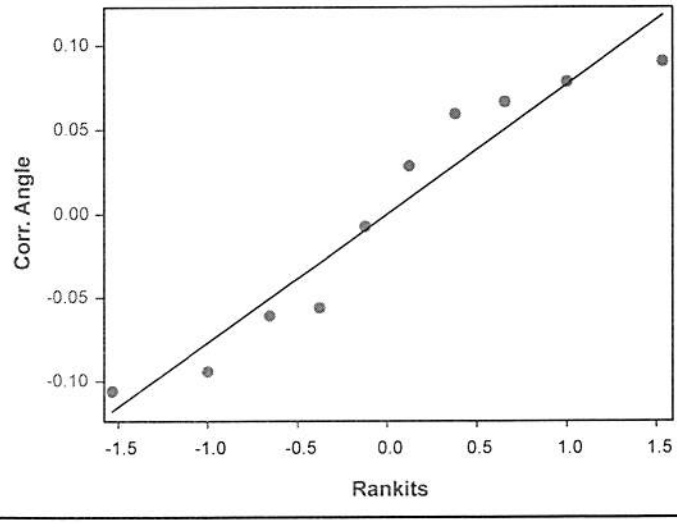
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8513	0.7855	0.9171	0.8743	0.7814	0.8984	0.0237	6.22%	0.00%
101		5	0.6120	0.5095	0.7146	0.6066	0.5082	0.6995	0.0369	13.50%	28.11%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.1790	1.0880	1.2700	1.2080	1.0840	1.2460	0.0329	6.23%	0.00%
101		5	0.8997	0.7939	1.0050	0.8928	0.7936	0.9906	0.0381	9.47%	23.70%

Graphics





Bivalve Larval Survival and Development Test

WSP ~~Wood E&IS~~

Analysis ID:	02-4943-4035	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 11:45	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 11:25	**MD5 Hash:**	C5F5156452D7E3BC3B8CBF054D24B750	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	50	100	70.71	2	0.06379	7.60%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-0.7679	2.362	0.08726	CDF	0.9689	Non-Significant Effect
		12.5	8	-1.077	2.362	0.08726	CDF	0.9866	Non-Significant Effect
		25	8	-1.055	2.362	0.08726	CDF	0.9857	Non-Significant Effect
		50	8	-0.2242	2.362	0.08726	CDF	0.8911	Non-Significant Effect
		100*	8	2.843	2.362	0.08726	CDF	0.0181	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0749551	0.014991	5	4.393	0.0056	Significant Effect
Error	0.081902	0.0034126	24			
Total	0.156857		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	7.962	15.09	0.1584	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9804	0.9031	0.8363	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8396	0.7601	0.9191	0.8415	0.7705	0.9158	0.0286	7.63%	0.00%
6.25		5	0.8634	0.8336	0.8932	0.8743	0.8251	0.8830	0.0107	2.78%	-2.83%
12.5		5	0.8703	0.8277	0.9129	0.8703	0.8197	0.9021	0.0153	3.94%	-3.66%
25		5	0.8697	0.8247	0.9147	0.8848	0.8142	0.8995	0.0162	4.17%	-3.58%
50		5	0.8497	0.8302	0.8693	0.8478	0.8306	0.8723	0.0070	1.85%	-1.20%
100		5	0.7585	0.6812	0.8358	0.7268	0.6940	0.8307	0.0278	8.21%	9.66%

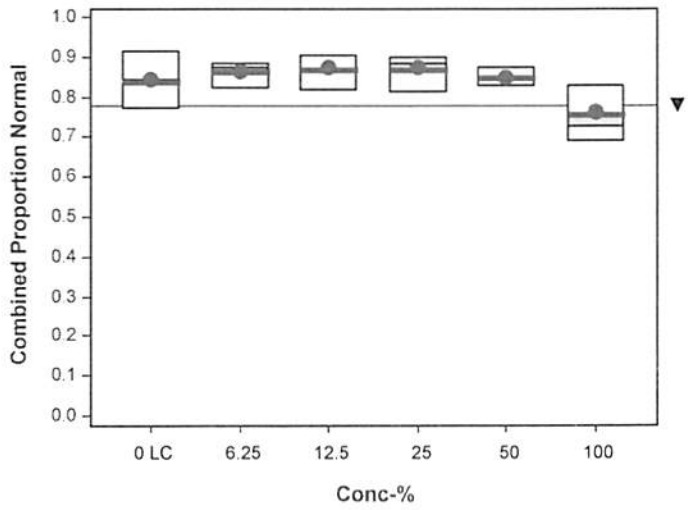
Angular (Corrected) Transformed Summary

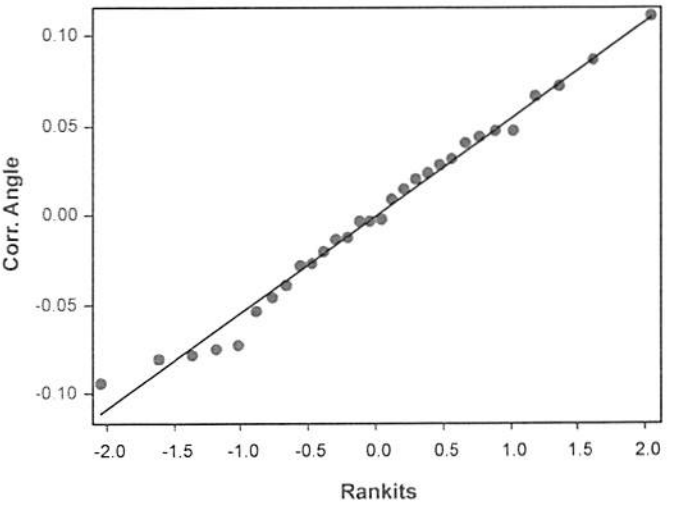
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1650	1.0540	1.2760	1.1610	1.0710	1.2760	0.0401	7.69%	0.00%
6.25		5	1.1930	1.1510	1.2360	1.2080	1.1390	1.2220	0.0153	2.86%	-2.44%
12.5		5	1.2050	1.1420	1.2670	1.2020	1.1320	1.2520	0.0226	4.19%	-3.42%
25		5	1.2040	1.1390	1.2690	1.2250	1.1250	1.2480	0.0234	4.35%	-3.34%
50		5	1.1730	1.1460	1.2010	1.1700	1.1470	1.2050	0.0099	1.89%	-0.71%
100		5	1.0600	0.9677	1.1520	1.0210	0.9846	1.1470	0.0332	7.00%	9.02%

Bivalve Larval Survival and Development Test ~~Wood E&IS~~ JF

Analysis ID:	02-4943-4035	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 11:45	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 11:25	**MD5 Hash:**	C5F5156452D7E3BC3B8CBF054D24B750	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test

WSP ~~Wood E&IS~~

Analysis ID:	18-5852-8913	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 11:45	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 11:25	**MD5 Hash:**	D282DD7917B6C088A62662CB1158F8BD	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	50	100	70.71	2	0.02971	3.32%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	1.628	2.362	0.047	CDF	0.1848	Non-Significant Effect
		12.5	8	0.2993	2.362	0.047	CDF	0 7302	Non-Significant Effect
		25	8	0.7851	2.362	0.047	CDF	0.5178	Non-Significant Effect
		50	8	2.034	2.362	0.047	CDF	0.0934	Non-Significant Effect
		100*	8	6.27	2.362	0.047	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0526347	0.0105269	5	10.63	1.8E-05	Significant Effect
Error	0.0237627	0.0009901	24			
Total	0.0763974		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	3.032	15.09	0.6950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9836	0.9031	0.9102	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8962	0.8725	0.9200	0.9038	0.8667	0.9158	0.0085	2.13%	0.00%
6.25		5	0.8759	0.8551	0.8966	0.8743	0.8548	0.8994	0.0075	1.91%	2.27%
12.5		5	0.8928	0.8733	0.9122	0.8929	0.8703	0.9116	0.0070	1.75%	0.39%
25		5	0.8869	0.8705	0.9032	0.8864	0.8663	0.8995	0.0059	1.49%	1.04%
50		5	0.8702	0.8426	0.8978	0.8686	0.8478	0.9059	0.0099	2.55%	2.90%
100		5	0.8084	0.7625	0.8542	0.8307	0.7515	0.8380	0.0165	4.57%	9.80%

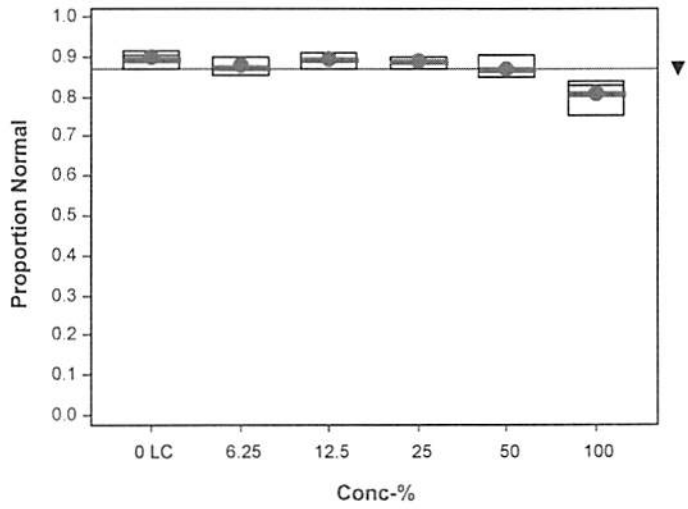
Angular (Corrected) Transformed Summary

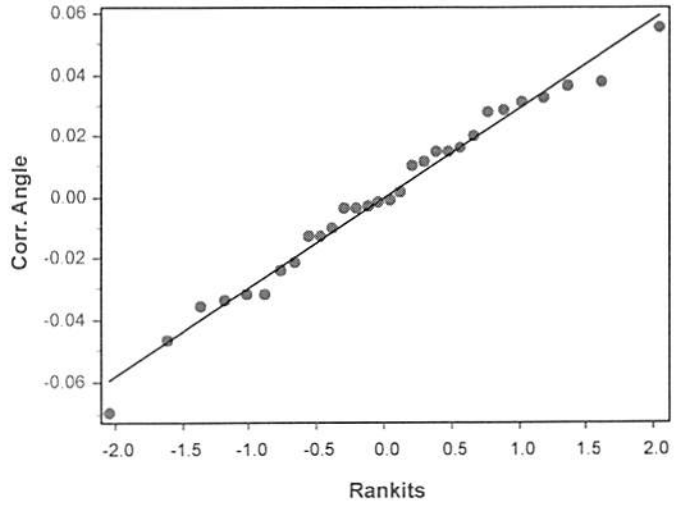
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2440	1.2060	1.2820	1.2560	1.1970	1.2760	0.0138	2.47%	0.00%
6.25		5	1.2110	1.1800	1.2430	1.2080	1.1800	1.2480	0.0114	2.11%	2.61%
12.5		5	1.2380	1.2070	1.2690	1.2370	1.2020	1.2690	0.0113	2.04%	0.48%
25		5	1.2280	1.2030	1.2540	1.2270	1.1960	1.2480	0.0092	1.67%	1.26%
50		5	1.2030	1.1610	1.2460	1.2000	1.1700	1.2590	0.0153	2.84%	3.25%
100		5	1.1190	1.0620	1.1760	1.1470	1.0490	1.1570	0.0206	4.11%	10.03%

Bivalve Larval Survival and Development Test

Analysis ID:	18-5852-8913	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 11:45	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 11:25	**MD5 Hash:**	D282DD7917B6C088A62662CB1158F8BD	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test

WSR ~~Wood E&IS~~

Analysis ID:	01-1269-0759	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 11:45	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 11:25	**MD5 Hash:**	F1D526C070135A0CC7672BE425D36DF8	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.082	8.75%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-1.508	2.362	0.1798	CDF	0.9963	Non-Significant Effect
		12.5	8	-1.066	2.362	0.1798	CDF	0.9862	Non-Significant Effect
		25	8	-1.318	2.362	0.1798	CDF	0.9934	Non-Significant Effect
		50	8	-1.223	2.362	0.1798	CDF	0.9912	Non-Significant Effect
		100	8	0.187	2.362	0.1798	CDF	0.7722	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0762392	0.0152478	5	1.052	0.4107	Non-Significant Effect
Error	0.347755	0.0144898	24			
Total	0.423995		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	1.914	15.09	0.8608	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9213	0.9031	0.0291	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9366	0.8571	1.0000	0.9290	0.8525	1.0000	0.0286	6.84%	0.00%
6.25		5	0.9858	0.9588	1.0000	1.0000	0.9508	1.0000	0.0097	2.20%	-5.25%
12.5		5	0.9749	0.9321	1.0000	0.9891	0.9180	1.0000	0.0154	3.54%	-4.08%
25		5	0.9803	0.9455	1.0000	1.0000	0.9399	1.0000	0.0125	2.86%	-4.67%
50		5	0.9770	0.9362	1.0000	1.0000	0.9290	1.0000	0.0147	3.37%	-4.32%
100		5	0.9377	0.8745	1.0000	0.9235	0.8743	1.0000	0.0228	5.43%	-0.12%

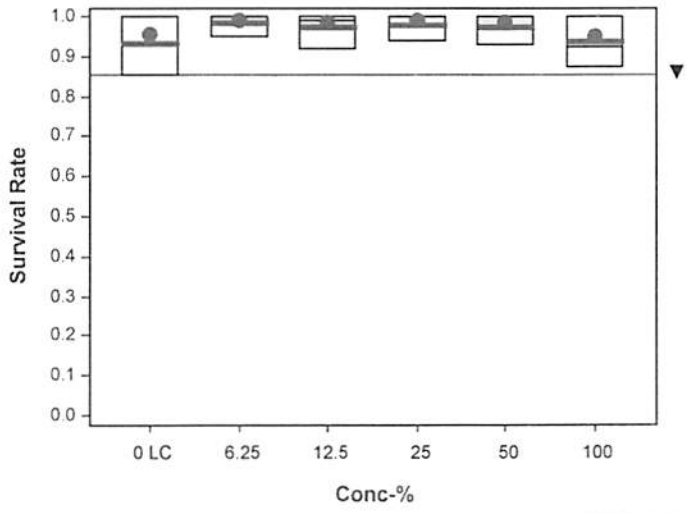
Angular (Corrected) Transformed Summary

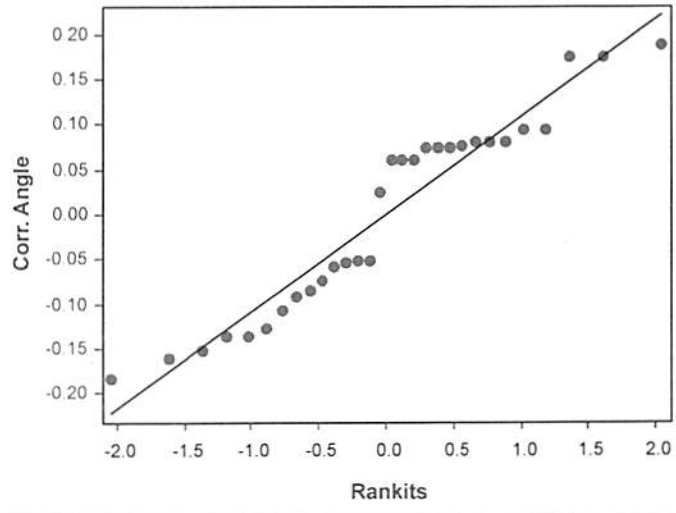
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.3590	1.1540	1.5650	1.3010	1.1770	1.5340	0.0739	12.16%	0.00%
6.25		5	1.4740	1.3680	1.5810	1.5340	1.3470	1.5340	0.0384	5.82%	-8.45%
12.5		5	1.4410	1.3070	1.5740	1.4660	1.2800	1.5340	0.0482	7.47%	-5.97%
25		5	1.4600	1.3320	1.5880	1.5340	1.3230	1.5340	0.0461	7.06%	-7.38%
50		5	1.4530	1.3120	1.5930	1.5340	1.3010	1.5340	0.0507	7.80%	-6.85%
100		5	1.3450	1.1820	1.5080	1.2910	1.2080	1.5340	0.0587	9.75%	1.05%

Bivalve Larval Survival and Development Test WSP ~~Wood E&IS~~ JF

Analysis ID:	01-1269-0759	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 11:45	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 11:25	**MD5 Hash:**	F1D526C070135A0CC7672BE425D36DF8	**Editor ID:**	002-883-387-8

Graphics





Mean # of Curved Hinges

CETIS Summary Report

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	19-8592-5793	**Test Type:**	Development-Survival	**Analyst:**			
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater		
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable		
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**	

Sample ID:	17-0883-6847	**Code:**	65DAC7EF	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 14:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 1
Sample Age:	27h (15.7 °C)	**Client:**	WSP		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
07-4277-1022	Proportion Normal	Steel Many-One Rank Sum Test		101	>101	---	---	1	1

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
07-4277-1022	Proportion Normal	Control Resp	0	0.9	<<	Yes	Below Criteria

Proportion Normal Summary (% Curved hinges)

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
0	FC	5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
6.25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
12.5		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
50		5	0.0043	0.0013	0.0073	0.0000	0.0057	0.0011	0.0024	56.12%	---
100		5	0.0809	0.0332	0.1285	0.0438	0.1361	0.0172	0.0384	47.49%	---
101		5	0.2087	0.1471	0.2703	0.1404	0.2706	0.0222	0.0496	23.76%	---

Proportion Normal Detail — MD5: 85D2F3B625AFE5C6EA7DA36C224B6A36

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.0000	0.0000	0.0000	0.0000	0.0000
0	FC	0.0000	0.0000	0.0000	0.0000	0.0000
6.25		0.0000	0.0000	0.0000	0.0000	0.0000
12.5		0.0000	0.0000	0.0000	0.0000	0.0000
25		0.0000	0.0000	0.0000	0.0000	0.0000
50		0.0054	0.0053	0.0000	0.0057	0.0051
100		0.1361	0.0898	0.0438	0.0447	0.0900
101		0.2706	0.2096	0.1404	0.2372	0.1858

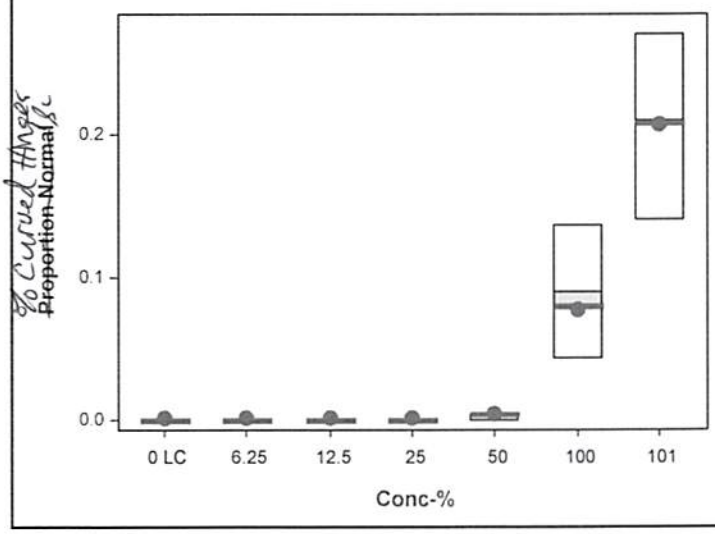
Proportion Normal Binomials

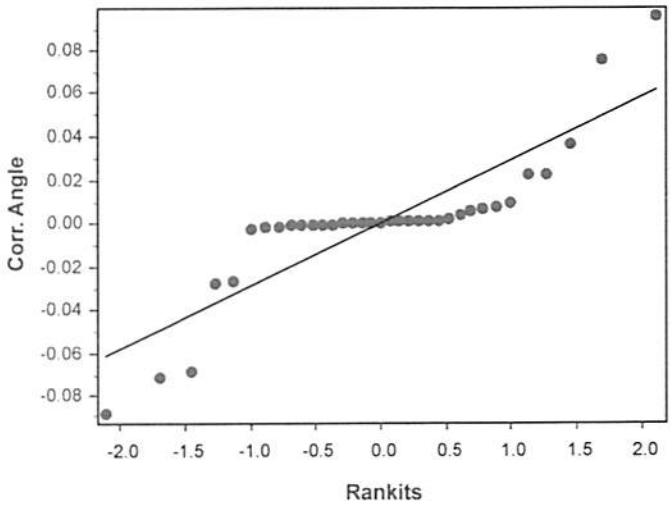
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0/170	0/156	0/165	0/190	0/198
0	FC	0/164	0/187	0/165	0/174	0/188
6.25		0/186	0/188	0/174	0/179	0/183
12.5		0/194	0/168	0/177	0/181	0/185
25		0/176	0/191	0/199	0/185	0/172
50		1/184	1/188	0/170	1/175	1/195
100		23/169	15/167	7/160	8/179	17/189
101		46/170	35/167	24/171	37/156	34/183

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	07-4277-1022	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Mar-23 11:21	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Mar-23 11:12	**MD5 Hash:**	8F278600214A5677C6D7E5EF36AE66B4	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:23 (p 1 of 1)
Test Code/ID: 23FDC2D6 / 06-0383-3046

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23 1730	**Species:**	Mytilis galloprovincialis	**Sample Code:**	46490953
End Date:	28 Jan-23 1600	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23 1400	**Material:**	Seawater	**Sample Station:**	SIYB 1

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			31			169	127	23 curved
			32			177	157	
			33			184	156	1 curved, copepod observed
			34			170 ~~168~~ AC	102	46 curved
			35			164	143	
			36			188 ~~195~~ AC	~~167~~ AC 164	1 curved
			37			179	161	
			38			170	154	
			39			156	141	
			40			174	160	
			41			185	166	
			42			190	174	
			43			188	166	
			44			172	149	
			45			167	132	15 curved, copepod observed
			46			167	111	35 curved
			47			181	165	
			48			175	152	1 curved
			49			179	150	8 curved, copepod observed
			50			171	128	24 curved
			51			195	167	1 curved
			52			183	126	34 curved
			53			188	168	
			54			185	161	
			55			194	175	
			56			168	150	
			57			198	176	
			58			165	148	
			59			160	133	copepod observed, 7 curved
			60			170	154	
			61			176	156	
			62			183	160	
			63			187	168	
			64			165	143	
			65			174	151	
			66			199	179	
			67			191	169	
			68			186	159	
			69			189	157	17 curved, copepod observed
			70			156	93	37 curved

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	46490953
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 1

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	35					
0	FC	2	63					
0	FC	3	58					
0	FC	4	40					
0	FC	5	53					
0	LC	1	38			170	154	
0	LC	2	39					
0	LC	3	64					
0	LC	4	42					
0	LC	5	57					
6.25		1	68					
6.25		2	43					
6.25		3	65					
6.25		4	37					
6.25		5	62					
12.5		1	55					
12.5		2	56					
12.5		3	32					
12.5		4	47					
12.5		5	54					
25		1	61					
25		2	67					
25		3	66					
25		4	41					
25		5	44					
50		1	33					
50		2	36					
50		3	60					
50		4	48					
50		5	51					
100		1	31			169	127	23 curved
100		2	45					
100		3	59					
100		4	49					
100		5	69					
101		1	34					
101		2	46					
101		3	50					
101		4	70					
101		5	52					

QC = TD

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-1
Test No. 23-01-050

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~28/2023 1600

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	15.5	15.4
	Salinity (ppt)	33.5	33.4	33.6
	pH (units)	7.92	7.73	7.75
	DO (mg/L)	8.1	8.3	8.3
Filter Control	Temp. (°C)	15.6	15.5	15.4
	Salinity (ppt)	33.0	33.2	33.4
	pH (units)	7.89	7.75	7.77
	DO (mg/L)	7.7	8.4	8.3
6.25	Temp. (°C)	15.8	15.4	15.3
	Salinity (ppt)	33.5	33.6	33.7
	pH (units)	7.90	7.75	7.77
	DO (mg/L)	8.2	8.4	8.4
12.5	Temp. (°C)	15.8	15.3	15.3
	Salinity (ppt)	33.5	33.5	33.6
	pH (units)	7.89	7.75	7.78
	DO (mg/L)	8.2	8.4	8.4
25	Temp. (°C)	15.9	15.6	15.4
	Salinity (ppt)	33.3	33.4	33.6
	pH (units)	7.87	7.70	7.76
	DO (mg/L)	8.1	8.4	8.4
50	Temp. (°C)	15.9	15.6	15.4
	Salinity (ppt)	33.1	33.2	33.5
	pH (units)	7.86	7.70	7.74
	DO (mg/L)	8.1	8.3	8.4
100	Temp. (°C)	15.9	15.6 JF	15.5
	Salinity (ppt)	32.7	32.7	33.0
	pH (units)	7.83	7.71	7.74
	DO (mg/L)	8.1	8.3	8.4
100 Filtered (1.2µm)	Temp. (°C)	15.5	15.7	15.5
	Salinity (ppt)	32.3	32.3	32.5
	pH (units)	7.76	7.72	7.74
	DO (mg/L)	8.4	8.3	8.4
	Tech Initials:	HK	JF	AL

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

Final QC: lc 3/9/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

X = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

Site: SIYB-2

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	13-6528-0512	**Test Type:**	Development-Survival	**Analyst:**			
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater		
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable		
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**	

Sample ID:	15-7870-5602	**Code:**	23_W027	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 13:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 2
Sample Age:	28h (15.7 °C)	**Client:**	WSP		

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
08-4779-6573	Combined Proportion Norma	TST-Welch's t Test	0.0050	100% passed combined proportion normal	1
02-4301-4096	Combined Proportion Norma	TST-Welch's t Test	0.0134	101% passed combined proportion normal	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
12-1128-9758	Combined Proportion Norma	Dunnett Multiple Comparison Test	✓	50	100	70.71	7.66%	2	1
16-6597-4163	Proportion Normal	Dunnett Multiple Comparison Test	✓	100	>100	---	4.02%	1	1
11-8891-1433	Survival Rate	Dunnett Multiple Comparison Test	✓	50	100	70.71	6.28%	2	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
16-6597-4163	Proportion Normal	Control Resp	0.9035	0.9	<<	Yes	Passes Criteria
11-8891-1433	Survival Rate	Control Resp	0.9705	0.5	<<	Yes	Passes Criteria
12-1128-9758	Combined Proportion Norma	PMSD	0.0766	<<	0.25	No	Passes Criteria

Bivalve Larval Survival and Development Test
WSP Laboratory

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8770	0.8232	0.9307	0.8033	0.9105	0.0194	0.0433	4.94%	0.00%
0	FC	5	0.8497	0.8072	0.8922	0.8197	0.8934	0.0153	0.0342	4.03%	3.11%
6.25		5	0.8522	0.8160	0.8883	0.8087	0.8783	0.0130	0.0291	3.41%	2.83%
12.5		5	0.8487	0.7940	0.9034	0.7869	0.8937	0.0197	0.0440	5.19%	3.22%
25		5	0.8478	0.7872	0.9084	0.7814	0.9000	0.0218	0.0488	5.76%	3.33%
50		5	0.8601	0.8274	0.8929	0.8306	0.8907	0.0118	0.0264	3.07%	1.92%
100		5	0.7956	0.6997	0.8915	0.6940	0.8962	0.0345	0.0772	9.71%	9.27%
101		5	0.7560	0.6390	0.8731	0.6503	0.8495	0.0422	0.0943	12.47%	13.79%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9035	0.8848	0.9222	0.8855	0.9249	0.0067	0.0151	1.67%	0.00%
0	FC	5	0.8955	0.8653	0.9257	0.8779	0.9375	0.0109	0.0243	2.72%	0.89%
6.25		5	0.9007	0.8600	0.9414	0.8644	0.9487	0.0147	0.0328	3.64%	0.31%
12.5		5	0.9002	0.8786	0.9219	0.8779	0.9231	0.0078	0.0174	1.94%	0.37%
25		5	0.8934	0.8697	0.9171	0.8701	0.9209	0.0085	0.0191	2.14%	1.12%
50		5	0.9035	0.8944	0.9125	0.8977	0.9157	0.0033	0.0073	0.81%	0.01%
100		5	0.8931	0.8482	0.9380	0.8301	0.9162	0.0162	0.0362	4.05%	1.16%
101		5	0.8002	0.7435	0.8569	0.7532	0.8495	0.0204	0.0457	5.71%	11.44%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9705	0.9176	1.0230	0.9071	1.0000	0.0191	0.0426	4.39%	0.00%
0	FC	5	0.9497	0.8844	1.0150	0.8743	1.0000	0.0235	0.0526	5.54%	2.14%
6.25		5	0.9475	0.8779	1.0170	0.8525	1.0000	0.0251	0.0561	5.92%	2.36%
12.5		5	0.9432	0.8749	1.0110	0.8634	1.0000	0.0246	0.0550	5.83%	2.82%
25		5	0.9486	0.8932	1.0040	0.8852	1.0000	0.0200	0.0447	4.71%	2.25%
50		5	0.9519	0.9222	0.9816	0.9235	0.9727	0.0107	0.0239	2.52%	1.91%
100		5	0.8896	0.8165	0.9628	0.8361	0.9781	0.0263	0.0589	6.62%	8.33%
101		5	0.9421	0.8578	1.0260	0.8634	1.0000	0.0304	0.0679	7.21%	2.93%

Bivalve Larval Survival and Development Test — WSP Laboratory

Combined Proportion Normal Detail MD5: 68F9C052572156A815E14EF26303B5EF

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8743	0.8947	0.8033	0.9105	0.9020
0	FC	0.8251	0.8934	0.8197	0.8306	0.8798
6.25		0.8689	0.8087	0.8689	0.8361	0.8783
12.5		0.8525	0.8937	0.7869	0.8852	0.8251
25		0.8415	0.8251	0.8907	0.9000	0.7814
50		0.8306	0.8634	0.8907	0.8798	0.8361
100		0.7486	0.8251	0.8142	0.8962	0.6940
101		0.6721	0.6503	0.7596	0.8486	0.8495

Proportion Normal Detail MD5: 695114B2C500D79AEDE269784B3EA7EE

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9249	0.8947	0.8855	0.9105	0.9020
0	FC	0.8779	0.8934	0.9375	0.8889	0.8798
6.25		0.9138	0.9487	0.8983	0.8644	0.8783
12.5		0.9231	0.8937	0.9114	0.8950	0.8779
25		0.8701	0.8935	0.9209	0.9000	0.8827
50		0.8994	0.8977	0.9157	0.9045	0.9000
100		0.8954	0.9096	0.9141	0.9162	0.8301
101		0.7688	0.7532	0.7809	0.8486	0.8495

Survival Rate Detail MD5: 04C45CD6299120F013C4830042BDC5CF

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9454	1.0000	0.9071	1.0000	1.0000
0	FC	0.9399	1.0000	0.8743	0.9344	1.0000
6.25		0.9508	0.8525	0.9672	0.9672	1.0000
12.5		0.9235	1.0000	0.8634	0.9891	0.9399
25		0.9672	0.9235	0.9672	1.0000	0.8852
50		0.9235	0.9617	0.9727	0.9727	0.9290
100		0.8361	0.9071	0.8907	0.9781	0.8361
101		0.8743	0.8634	0.9727	1.0000	1.0000

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	160/183	170/190	147/183	173/190	184/204
0	FC	151/183	176/197	150/183	152/183	161/183
6.25		159/183	148/183	159/183	153/183	166/189
12.5		156/183	185/207	144/183	162/183	151/183
25		154/183	151/183	163/183	171/190	143/183
50		152/183	158/183	163/183	161/183	153/183
100		137/183	151/183	149/183	164/183	127/183
101		123/183	119/183	139/183	157/185	158/186

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	160/173	170/190	147/166	173/190	184/204
0	FC	151/172	176/197	150/160	152/171	161/183
6.25		159/174	148/156	159/177	153/177	166/189
12.5		156/169	185/207	144/158	162/181	151/172
25		154/177	151/169	163/177	171/190	143/162
50		152/169	158/176	163/178	161/178	153/170
100		137/153	151/166	149/163	164/179	127/153
101		123/160	119/158	139/178	157/185	158/186

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	173/183	183/183	166/183	183/183	183/183
0	FC	172/183	183/183	160/183	171/183	183/183
6.25		174/183	156/183	177/183	177/183	183/183
12.5		169/183	183/183	158/183	181/183	172/183
25		177/183	169/183	177/183	183/183	162/183
50		169/183	176/183	178/183	178/183	170/183
100		153/183	166/183	163/183	179/183	153/183
101		160/183	158/183	178/183	183/183	183/183

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	12-1128-9758	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 13:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 13:23	**MD5 Hash:**	AD3DB17695BBD7CD8B5EA947F6397A0	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	50	100	70.71	2	0.06717	7.66%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	0.9428	2.362	0.09638	CDF	0.4456	Non-Significant Effect
		12.5	8	1.022	2.362	0.09638	CDF	0.4100	Non-Significant Effect
		25	8	1.036	2.362	0.09638	CDF	0.4039	Non-Significant Effect
		50	8	0.6668	2.362	0.09638	CDF	0.5722	Non-Significant Effect
		100*	8	2.656	2.362	0.09638	CDF	0.0272	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0319774	0.0063955	5	1.536	0.2161	Non-Significant Effect
Error	0.0999117	0.004163	24			
Total	0.131889		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	4.464	15.09	0.4847	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9031	0.7575	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8770	0.8232	0.9307	0.8947	0.8033	0.9105	0.0194	4.94%	0.00%
6.25		5	0.8522	0.8160	0.8883	0.8689	0.8087	0.8783	0.0130	3.41%	2.83%
12.5		5	0.8487	0.7940	0.9034	0.8525	0.7869	0.8937	0.0197	5.19%	3.22%
25		5	0.8478	0.7872	0.9084	0.8415	0.7814	0.9000	0.0218	5.76%	3.33%
50		5	0.8601	0.8274	0.8929	0.8634	0.8306	0.8907	0.0118	3.07%	1.92%
100		5	0.7956	0.6997	0.8915	0.8142	0.6940	0.8962	0.0345	9.71%	9.27%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2160	1.1380	1.2930	1.2400	1.1110	1.2670	0.0279	5.13%	0.00%
6.25		5	1.1770	1.1270	1.2270	1.2000	1.1180	1.2140	0.0180	3.42%	3.16%
12.5		5	1.1740	1.0980	1.2500	1.1770	1.0910	1.2390	0.0273	5.20%	3.43%
25		5	1.1740	1.0890	1.2580	1.1610	1.0840	1.2490	0.0305	5.81%	3.48%
50		5	1.1890	1.1410	1.2360	1.1920	1.1470	1.2340	0.0171	3.21%	2.24%
100		5	1.1070	0.9856	1.2290	1.1250	0.9846	1.2430	0.0439	8.86%	8.91%

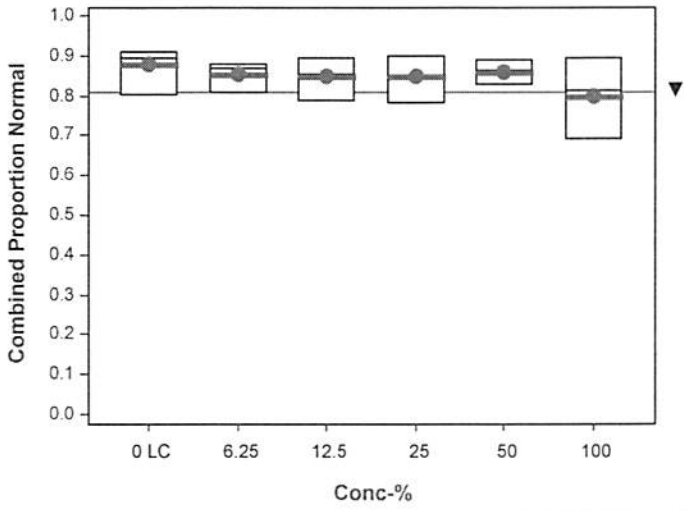
Combined Proportion Normal Binomials

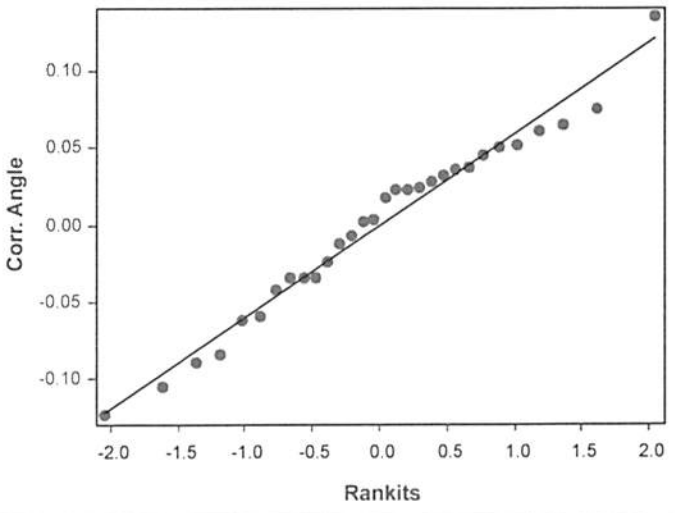
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	160/183	170/190	147/183	173/190	184/204
6.25		159/183	148/183	159/183	153/183	166/189
12.5		156/183	185/207	144/183	162/183	151/183
25		154/183	151/183	163/183	171/190	143/183
50		152/183	158/183	163/183	161/183	153/183
100		137/183	151/183	149/183	164/183	127/183

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	12-1128-9758	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 13:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 13:23	**MD5 Hash:**	AD3DB17695BBD7CD8B5EA947F6397A0	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test (LC vs 100%) **WSP Laboratory**

Analysis ID:	08-4779-6573	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 13:40	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 13:23	**MD5 Hash:**	2A176530F758F6F89A3487864C5C19CF	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	5	4.022	2.015	CDF	0.0050	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0293652	0.0293652	1	4.343	0.0707	Non-Significant Effect
Error	0.0540877	0.006761	8			
Total	0.0834528		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.479	23.15	0.4007	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9402	0.7411	0.5550	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8770	0.8232	0.9307	0.8947	0.8033	0.9105	0.0194	4.94%	0.00%
100		5	0.7956	0.6997	0.8915	0.8142	0.6940	0.8962	0.0345	9.71%	9.27%

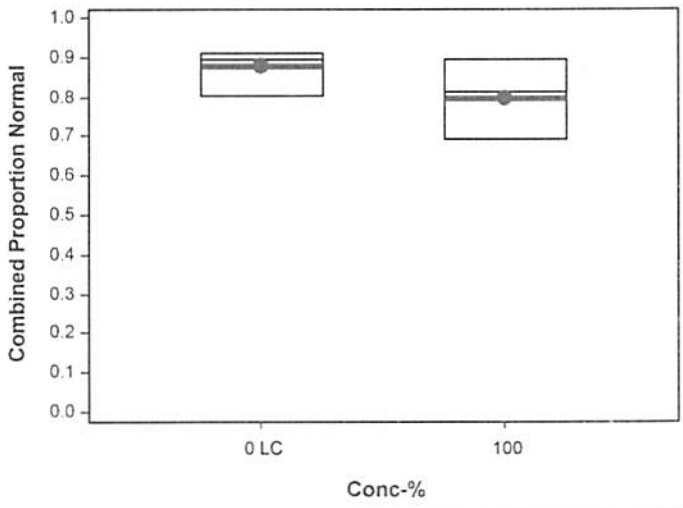
Angular (Corrected) Transformed Summary

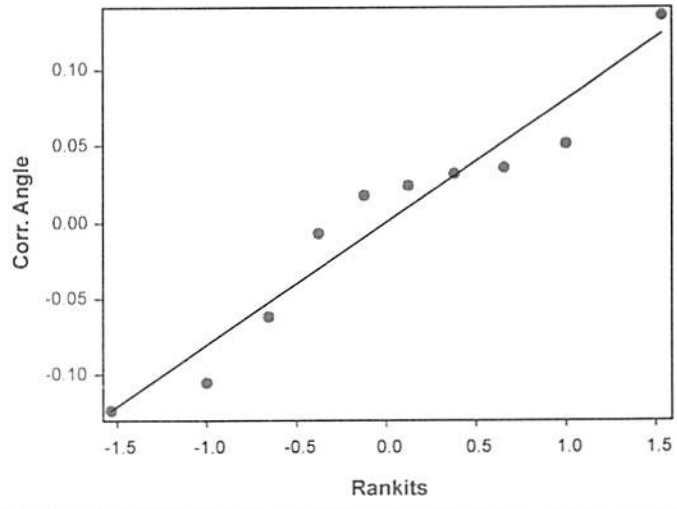
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2160	1.1380	1.2930	1.2400	1.1110	1.2670	0.0279	5.13%	0.00%
100		5	1.1070	0.9856	1.2290	1.1250	0.9846	1.2430	0.0439	8.86%	8.91%

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	160/183	170/190	147/183	173/190	184/204
100		137/183	151/183	149/183	164/183	127/183

Graphics





Bivalve Larval Survival and Development Test (FC vs 100% Filtered) — **WSP Laboratory**

Analysis ID:	02-4301-4096	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 13:41	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 13:23	**MD5 Hash:**	1951562735DAB8F287AB9C2B78772473	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	4	3.416	2.132	CDF	0.0134	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0327299	0.0327299	1	4.417	0.0688	Non-Significant Effect
Error	0.059284	0.0074105	8			
Total	0.092014		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	5.15	23.15	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9459	0.7411	0.6201	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8497	0.8072	0.8922	0.8306	0.8197	0.8934	0.0153	4.03%	0.00%
101		5	0.7560	0.6390	0.8731	0.7596	0.6503	0.8495	0.0422	12.47%	11.03%

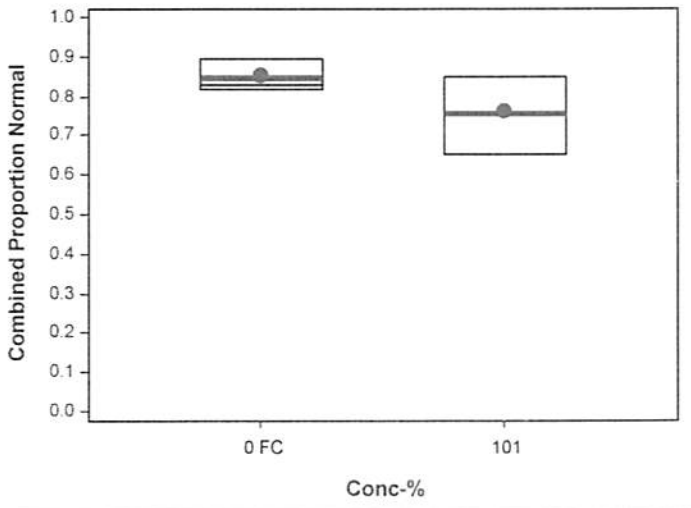
Angular (Corrected) Transformed Summary

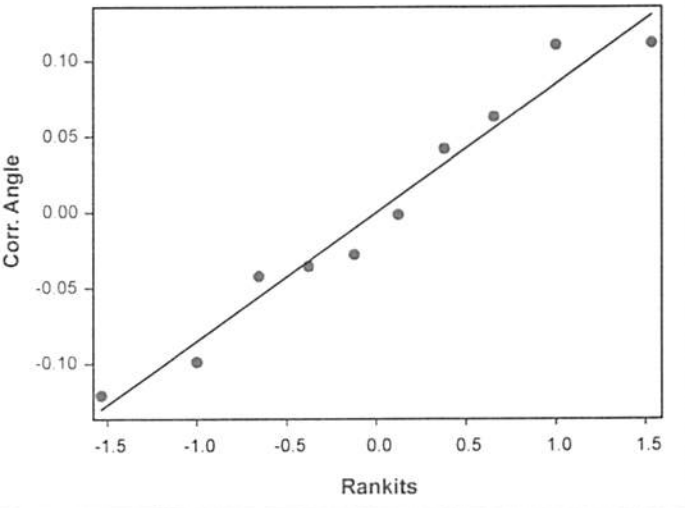
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.1750	1.1140	1.2360	1.1470	1.1320	1.2380	0.0220	4.18%	0.00%
101		5	1.0600	0.9219	1.1990	1.0580	0.9380	1.1720	0.0498	10.51%	9.74%

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	FC	151/183	176/197	150/183	152/183	161/183
101		123/183	119/183	139/183	157/185	158/186

Graphics





Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	16-6597-4163	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 13:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 13:23	**MD5 Hash:**	31F57EDBBEF81DD8CCF53F828DE59B5	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.03635	4.02%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	0.07316	2.362	0.05796	CDF	0.8108	Non-Significant Effect
		12.5	8	0.2183	2.362	0.05796	CDF	0.7609	Non-Significant Effect
		25	8	0.6694	2.362	0.05796	CDF	0.5710	Non-Significant Effect
		50	8	0.0265	2.362	0.05796	CDF	0.8254	Non-Significant Effect
		100	8	0.6127	2.362	0.05796	CDF	0.5968	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013564	0.0002713	5	0.1802	0.9674	Non-Significant Effect
Error	0.0361336	0.0015056	24			
Total	0.0374901		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	9.299	15.09	0.0977	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9731	0.9031	0.6271	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9035	0.8848	0.9222	0.9020	0.8855	0.9249	0.0067	1.67%	0.00%
6.25		5	0.9007	0.8600	0.9414	0.8983	0.8644	0.9487	0.0147	3.64%	0.31%
12.5		5	0.9002	0.8786	0.9219	0.8950	0.8779	0.9231	0.0078	1.94%	0.37%
25		5	0.8934	0.8697	0.9171	0.8935	0.8701	0.9209	0.0085	2.14%	1.12%
50		5	0.9035	0.8944	0.9125	0.9000	0.8977	0.9157	0.0033	0.81%	0.01%
100		5	0.8931	0.8482	0.9380	0.9096	0.8301	0.9162	0.0162	4.05%	1.16%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2560	1.2240	1.2880	1.2520	1.2260	1.2930	0.0116	2.06%	0.00%
6.25		5	1.2540	1.1820	1.3260	1.2460	1.1940	1.3420	0.0259	4.62%	0.14%
12.5		5	1.2500	1.2140	1.2870	1.2410	1.2140	1.2900	0.0131	2.35%	0.43%
25		5	1.2390	1.2000	1.2780	1.2380	1.2020	1.2860	0.0141	2.54%	1.31%
50		5	1.2550	1.2390	1.2710	1.2490	1.2450	1.2760	0.0056	1.00%	0.05%
100		5	1.2410	1.1730	1.3090	1.2650	1.1460	1.2770	0.0245	4.41%	1.20%

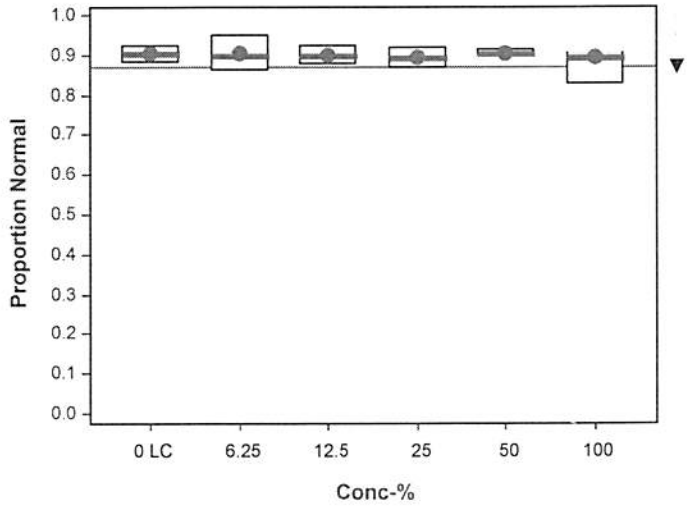
Proportion Normal Binomials

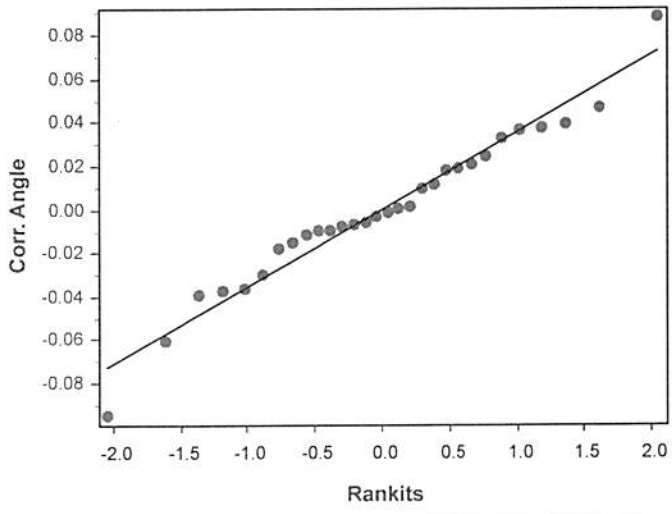
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	160/173	170/190	147/166	173/190	184/204
6.25		159/174	148/156	159/177	153/177	166/189
12.5		156/169	185/207	144/158	162/181	151/172
25		154/177	151/169	163/177	171/190	143/162
50		152/169	158/176	163/178	161/178	153/170
100		137/153	151/166	149/163	164/179	127/153

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	16-6597-4163	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 13:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 13:23	**MD5 Hash:**	31F57EDBBEF81DD8CCF53F828DE59B5	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	11-8891-1433	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 13:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 13:23	**MD5 Hash:**	1ABDCF2A51106B4D021D2C96FF8C3C31	**Editor ID:**	002-883-387-8

Comments: FC = Filtered Control, 101 = 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	50	100	70.71	2	0.06093	6.28%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	0.983	2.362	0.1742	CDF	0.4275	Non-Significant Effect
		12.5	8	1.062	2.362	0.1742	CDF	0.3925	Non-Significant Effect
		25	8	1.005	2.362	0.1742	CDF	0.4179	Non-Significant Effect
		50	8	1.146	2.362	0.1742	CDF	0.3568	Non-Significant Effect
		100*	8	2.637	2.362	0.1742	CDF	0.0283	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0975767	0.0195153	5	1.436	0.2476	Non-Significant Effect
Error	0.326243	0.0135935	24			
Total	0.42382		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	3.015	15.09	0.6977	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9634	0.9031	0.3778	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9705	0.9176	1.0000	1.0000	0.9071	1.0000	0.0191	4.39%	0.00%
6.25		5	0.9475	0.8779	1.0000	0.9672	0.8525	1.0000	0.0251	5.92%	2.36%
12.5		5	0.9432	0.8749	1.0000	0.9399	0.8634	1.0000	0.0246	5.83%	2.82%
25		5	0.9486	0.8932	1.0000	0.9672	0.8852	1.0000	0.0200	4.71%	2.25%
50		5	0.9519	0.9222	0.9816	0.9617	0.9235	0.9727	0.0107	2.52%	1.91%
100		5	0.8896	0.8165	0.9628	0.8907	0.8361	0.9781	0.0263	6.62%	8.33%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.4390	1.2760	1.6030	1.5340	1.2610	1.5340	0.0589	9.16%	0.00%
6.25		5	1.3670	1.2080	1.5260	1.3890	1.1770	1.5340	0.0572	9.36%	5.04%
12.5		5	1.3610	1.1900	1.5320	1.3230	1.1920	1.5340	0.0616	10.11%	5.44%
25		5	1.3650	1.2200	1.5110	1.3890	1.2250	1.5340	0.0523	8.57%	5.15%
50		5	1.3550	1.2860	1.4240	1.3740	1.2910	1.4050	0.0249	4.11%	5.87%
100		5	1.2450	1.1080	1.3820	1.2340	1.1540	1.4220	0.0492	8.84%	13.51%

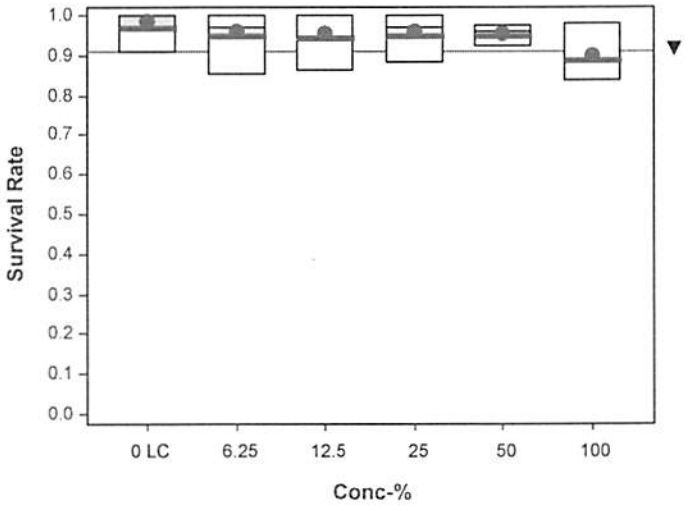
Survival Rate Binomials

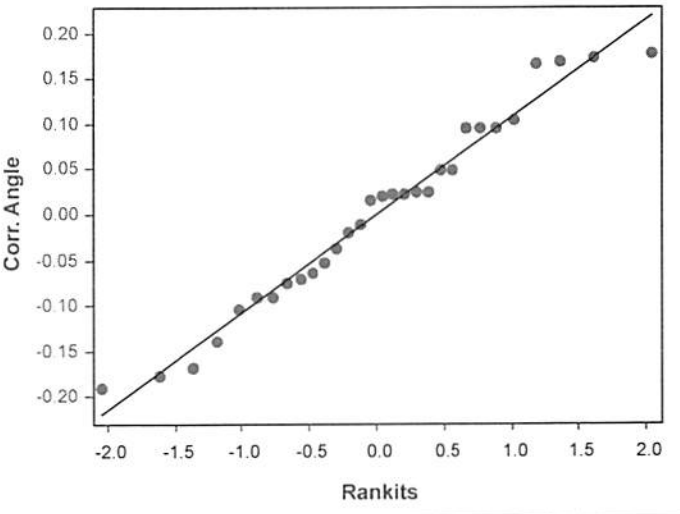
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	173/183	183/183	166/183	183/183	183/183
6.25		174/183	156/183	177/183	177/183	183/183
12.5		169/183	183/183	158/183	181/183	172/183
25		177/183	169/183	177/183	183/183	162/183
50		169/183	176/183	178/183	178/183	170/183
100		153/183	166/183	163/183	179/183	153/183

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	11-8891-1433	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 13:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 13:23	**MD5 Hash:**	1ABDCF2A51106B4D021D2C96FF8C3C31	**Editor ID:**	002-883-387-8

Graphics





Mean # of Curved hinges

CETIS Summary Report

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	20-1528-4906	**Test Type:**	Development-Survival	**Analyst:**			
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater		
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable		
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**	

Sample ID:	20-2467-5178	**Code:**	78AE176A	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 13:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 2
Sample Age:	28h (15.7 °C)	**Client:**	WSP		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
15-0470-5158	Proportion Normal	Steel Many-One Rank Sum Test		101	>101	---	---	1	1

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
15-0470-5158	Proportion Normal	Control Resp	0	0.9	<<	Yes	Below Criteria

Proportion Normal Summary % Curved hinges

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
0	FC	5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
6.25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
12.5		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	---
100		5	0.0037	-0.0031	0.0105	0.0000	0.0121	0.0024	0.0055	146.63%	---
101		5	0.0537	0.0177	0.0897	0.0270	0.0886	0.0130	0.0290	53.94%	---

Proportion Normal Detail

MD5: E9E703512D384B3B9659683D028D79B0

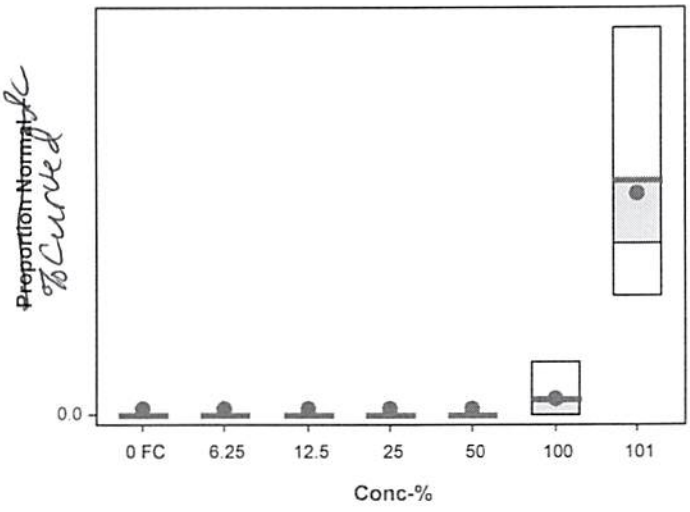
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.0000	0.0000	0.0000	0.0000	0.0000
0	FC	0.0000	0.0000	0.0000	0.0000	0.0000
6.25		0.0000	0.0000	0.0000	0.0000	0.0000
12.5		0.0000	0.0000	0.0000	0.0000	0.0000
25		0.0000	0.0000	0.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0121	0.0000	0.0000	0.0065
101		0.0813	0.0886	0.0393	0.0270	0.0323

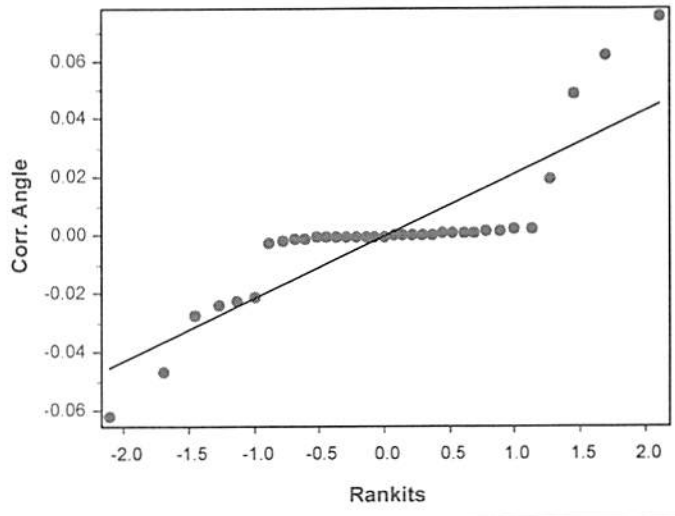
Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0/173	0/190	0/166	0/190	0/204
0	FC	0/172	0/197	0/160	0/171	0/183
6.25		0/174	0/156	0/177	0/177	0/189
12.5		0/169	0/207	0/158	0/181	0/172
25		0/177	0/169	0/177	0/190	0/162
50		0/169	0/176	0/178	0/178	0/170
100		0/153	2/166	0/163	0/179	1/153
101		13/160	14/158	7/178	5/185	6/186

Bivalve Larval Survival and Development Test					WSP Laboratory
Analysis ID:	15-0470-5158	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Mar-23 11:32	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Mar-23 11:28	**MD5 Hash:**	9AF0ACCE5D9617224DA576B78D57EA4	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:24 (p 1 of 1)
Test Code/ID: ~~TF6852EDE~~ / 20-8910-3070
23-01-051

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date:	26 Jan-23 1730	**Species:**	Mytilis galloprovincialis	**Sample Code:**	5E1922C2
End Date:	28 Jan-23 1600	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23 1300	**Material:**	Seawater	**Sample Station:**	SIYB 2

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			71			197	176	
			72			177	153	
			73			178	163	
			74			153	137	
			75			169	152	
			76			158	144	
			77			170	153	
			78			162	143	
			79			163	149	copepod observed
			80			173	160	
			81			179	164	
			82			190	173	
			83			189	166	
			84			204	184	
			85			172	151	
			86			178	161	
			87			166	147	
			88			172	151	
			89			177	154	
			90			186	158	6 curved
			91			207	185	
			92			153	127	1 curved, copepod observed
			93			177	159	
			94			166	151	2 curved, copepod observed
			95			185	157	5 curved
			96			183	161	
			97			190	170	
			98			181	162	
			99			160	123	13 curved
			100			160	150	
			101			177	163	
			102			156 ~~157~~	148	
			103			169	156	
			104			171	~~154~~ 152	
			105			190	171	
			106			176	158	
			107			178	139	7 curved
			108			158	119	14 curved
			109			174	159	
			110			169	151	

Analyst: RJP QA: JF 3/7/23

CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:24 (p 1 of 1)
Test Code/ID: 7C852EDE / 20-8910-3070

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	5E1922C2
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 2

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	85					
0	FC	2	71					
0	FC	3	100					
0	FC	4	104					
0	FC	5	96					
0	LC	1	80					
0	LC	2	97					
0	LC	3	87					
0	LC	4	82					
0	LC	5	84					
6.25		1	109					
6.25		2	102					
6.25		3	93					
6.25		4	72					
6.25		5	83					
12.5		1	103					
12.5		2	91					
12.5		3	76					
12.5		4	98					
12.5		5	88					
25		1	89					
25		2	110					
25		3	101					
25		4	105					
25		5	78					
50		1	75					
50		2	106					
50		3	73					
50		4	86					
50		5	77					
100		1	74					
100		2	94					
100		3	79					
100		4	81					
100		5	92					
101		1	99					
101		2	108					
101		3	107					
101		4	95					
101		5	90					

QC = TD

Analyst: AB QA: JC

Water Quality for Bivalve Development

JF WSP
Client: ~~Wood~~ Port of San Diego
Sample ID: SIYB-2
Test No. 23-01-051

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~28/2023 1600

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.9	15.5	15.4
	Salinity (ppt)	33.4	33.1	33.3
	pH (units)	7.88	7.70	7.75
	DO (mg/L)	8.3	8.3	8.3
Filter Control	Temp. (°C)	15.9	15.2	15.4
	Salinity (ppt)	33.2	32.9	33.1
	pH (units)	7.89	7.54	7.70
	DO (mg/L)	7.7	8.2	8.3
6.25	Temp. (°C)	15.9	15.5	15.4
	Salinity (ppt)	33.2	33.4	33.5
	pH (units)	7.88	7.73	7.75
	DO (mg/L)	8.3	8.3	8.4
12.5	Temp. (°C)	16.0	15.5	15.5
	Salinity (ppt)	33.5	33.3	33.5
	pH (units)	7.87	7.74	7.75
	DO (mg/L)	8.4	8.4	8.4
25	Temp. (°C)	15.9	15.6	15.5
	Salinity (ppt)	33.4	33.3	33.5
	pH (units)	7.87	7.74	7.76
	DO (mg/L)	8.4	8.4	8.4
50	Temp. (°C)	15.9	15.6	15.5
	Salinity (ppt)	33.2	33.0	33.2
	pH (units)	7.87	7.75	7.76
	DO (mg/L)	8.5	8.4	8.4
100	Temp. (°C)	15.8	15.6	15.6
	Salinity (ppt)	32.7	32.7	33.0
	pH (units)	7.88	7.75	7.77
	DO (mg/L)	8.4	8.3	8.4
100 Filtered (1.2µm)	Temp. (°C)	16.0	15.6	15.6
	Salinity (ppt)	31.9	31.9	32.2
	pH (units)	7.83	7.75	7.78
	DO (mg/L)	8.2	8.5	8.4
	Tech Initials:	HK	JF	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

Intial QC: ~~JF~~ 3/7/23

Final QC: JC 3/9/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: TØ1 = 195, TØ2 = ~~175~~ 168, TØ3 = 175, TØ4 = 192, TØ5 = 184

$\bar{X}$ = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

Site: SIYB-3

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	08-3213-5785	**Test Type:**	Development-Survival	**Analyst:**		
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater	
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable	
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**

Sample ID:	02-7598-2582	**Code:**	23-W028	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 12:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 3
Sample Age:	29h (14.9 °C)	**Client:**	WSP		

Comments: FC= Filtered Control, 101= 100% (1.2um filtered)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-3426-3578	Combined Proportion Norma	TST-Welch's t Test	<1.0E-05	100% passed combined proportion normal	1
15-9930-4992	Combined Proportion Norma	TST-Welch's t Test	<1.0E-05	101% passed combined proportion normal	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
11-6123-0405	Combined Proportion Norma	Steel Many-One Rank Sum Test		100	>100	---	8.44%	1	1
21-0554-4498	Proportion Normal	Dunnett Multiple Comparison Test		100	>100	---	2.58%	1	1
01-1347-8503	Survival Rate	Dunnett Multiple Comparison Test		100	>100	---	8.85%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
21-0554-4498	Proportion Normal	Control Resp	0.8988	0.9	<<	Yes	Below Criteria ①
01-1347-8503	Survival Rate	Control Resp	0.9563	0.5	<<	Yes	Passes Criteria
11-6123-0405	Combined Proportion Norma	PMSD	0.08442	<<	0.25	No	Passes Criteria

① OK - rounds up to 90%

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8593	0.8063	0.9123	0.7869	0.8962	0.0191	0.0427	4.97%	0.00%
0	FC	5	0.8486	0.7910	0.9062	0.7923	0.8962	0.0207	0.0464	5.46%	1.24%
6.25		5	0.8737	0.8209	0.9265	0.8142	0.9175	0.0190	0.0425	4.87%	-1.68%
12.5		5	0.8883	0.8212	0.9554	0.8142	0.9297	0.0242	0.0540	6.08%	-3.37%
25		5	0.8627	0.8041	0.9213	0.7869	0.9016	0.0211	0.0472	5.47%	-0.40%
50		5	0.8809	0.8305	0.9313	0.8306	0.9235	0.0182	0.0406	4.61%	-2.51%
100		5	0.8950	0.8504	0.9395	0.8361	0.9297	0.0161	0.0359	4.01%	-4.15%
101		5	0.8721	0.8421	0.9020	0.8415	0.9071	0.0108	0.0241	2.77%	-1.49%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8988	0.8814	0.9162	0.8756	0.9128	0.0063	0.0140	1.56%	0.00%
0	FC	5	0.9029	0.8893	0.9164	0.8896	0.9141	0.0049	0.0109	1.21%	-0.46%
6.25		5	0.9103	0.9008	0.9198	0.8976	0.9175	0.0034	0.0076	0.84%	-1.29%
12.5		5	0.9147	0.8934	0.9360	0.8922	0.9297	0.0077	0.0171	1.87%	-1.77%
25		5	0.9101	0.8829	0.9373	0.8873	0.9375	0.0098	0.0219	2.41%	-1.26%
50		5	0.9168	0.9052	0.9283	0.9048	0.9278	0.0042	0.0093	1.02%	-2.00%
100		5	0.9149	0.9031	0.9267	0.9037	0.9297	0.0043	0.0095	1.04%	-1.79%
101		5	0.8919	0.8677	0.9160	0.8677	0.9121	0.0087	0.0194	2.18%	0.77%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9563	0.8928	1.0200	0.8743	1.0000	0.0229	0.0511	5.35%	0.00%
0	FC	5	0.9399	0.8766	1.0030	0.8907	1.0000	0.0228	0.0510	5.42%	1.71%
6.25		5	0.9596	0.9089	1.0100	0.9071	1.0000	0.0183	0.0408	4.25%	-0.34%
12.5		5	0.9705	0.9189	1.0220	0.9126	1.0000	0.0186	0.0415	4.28%	-1.49%
25		5	0.9486	0.8731	1.0240	0.8470	1.0000	0.0272	0.0608	6.41%	0.80%
50		5	0.9607	0.9143	1.0070	0.9180	1.0000	0.0167	0.0373	3.89%	-0.46%
100		5	0.9781	0.9339	1.0220	0.9180	1.0000	0.0159	0.0356	3.64%	-2.29%
101		5	0.9781	0.9377	1.0190	0.9235	1.0000	0.0146	0.0326	3.33%	-2.29%

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Detail

MD5: 7ACA6BC89F190C49310ABB1193E177CD

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8798	0.8962	0.8756	0.8579	0.7869
0	FC	0.8932	0.8962	0.8470	0.8142	0.7923
6.25		0.9175	0.9100	0.8525	0.8142	0.8743
12.5		0.9297	0.8142	0.9208	0.8470	0.9296
25		0.7869	0.8470	0.8907	0.9016	0.8873
50		0.8306	0.8470	0.9126	0.8907	0.9235
100		0.9297	0.8907	0.8361	0.9037	0.9146
101		0.8677	0.8806	0.8634	0.9071	0.8415

Proportion Normal Detail

MD5: AD6577E225E60C8305C1937786339CBF

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8994	0.9061	0.8756	0.9128	0.9000
0	FC	0.8932	0.9111	0.9064	0.9141	0.8896
6.25		0.9175	0.9100	0.9123	0.8976	0.9143
12.5		0.9297	0.8922	0.9208	0.9012	0.9296
25		0.9290	0.8960	0.9006	0.9375	0.8873
50		0.9048	0.9172	0.9278	0.9106	0.9235
100		0.9297	0.9157	0.9107	0.9037	0.9146
101		0.8677	0.8806	0.8876	0.9121	0.9112

Survival Rate Detail

MD5: E41AE949FC795E1877E52F7F0D4AE5CC

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9781	0.9891	1.0000	0.9399	0.8743
0	FC	1.0000	0.9836	0.9344	0.8907	0.8907
6.25		1.0000	1.0000	0.9344	0.9071	0.9563
12.5		1.0000	0.9126	1.0000	0.9399	1.0000
25		0.8470	0.9454	0.9891	0.9617	1.0000
50		0.9180	0.9235	0.9836	0.9781	1.0000
100		1.0000	0.9727	0.9180	1.0000	1.0000
101		1.0000	1.0000	0.9727	0.9945	0.9235

Bivalve Larval Survival and Development Test — WSP Laboratory

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	161/183	164/183	176/201	157/183	144/183
0	FC	184/206	164/183	155/183	149/183	145/183
6.25		178/194	182/200	156/183	149/183	160/183
12.5		172/185	149/183	186/202	155/183	185/199
25		144/183	155/183	163/183	165/183	189/213
50		152/183	155/183	167/183	163/183	181/196
100		172/185	163/183	153/183	169/187	182/199
101		164/189	177/201	158/183	166/183	154/183

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	161/179	164/181	176/201	157/172	144/160
0	FC	184/206	164/180	155/171	149/163	145/163
6.25		178/194	182/200	156/171	149/166	160/175
12.5		172/185	149/167	186/202	155/172	185/199
25		144/155	155/173	163/181	165/176	189/213
50		152/168	155/169	167/180	163/179	181/196
100		172/185	163/178	153/168	169/187	182/199
101		164/189	177/201	158/178	166/182	154/169

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	179/183	181/183	183/183	172/183	160/183
0	FC	183/183	180/183	171/183	163/183	163/183
6.25		183/183	183/183	171/183	166/183	175/183
12.5		183/183	167/183	183/183	172/183	183/183
25		155/183	173/183	181/183	176/183	183/183
50		168/183	169/183	180/183	179/183	183/183
100		183/183	178/183	168/183	183/183	183/183
101		183/183	183/183	178/183	182/183	169/183

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	11-6123-0405	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:29	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:23	**MD5 Hash:**	6EA9C5F0729FE6F4670D7A683219174A	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.07254	8.44%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	29	16	0	CDF	0.9104	Non-Significant Effect
		12.5	8	32	16	0	CDF	0.9821	Non-Significant Effect
		25	8	29.5	16	1	CDF	0.9290	Non-Significant Effect
		50	8	31	16	0	CDF	0.9676	Non-Significant Effect
		100	8	35	16	0	CDF	0.9979	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0122806	0.0024561	5	0.5677	0.7239	Non-Significant Effect
Error	0.103838	0.0043266	24			
Total	0.116119		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	0.776	15.09	0.9785	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8877	0.9031	0.0043	Non-Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8593	0.8063	0.9123	0.8756	0.7869	0.8962	0.0191	4.97%	0.00%
6.25		5	0.8737	0.8209	0.9265	0.8743	0.8142	0.9175	0.0190	4.87%	-1.68%
12.5		5	0.8883	0.8212	0.9554	0.9208	0.8142	0.9297	0.0242	6.08%	-3.37%
25		5	0.8627	0.8041	0.9213	0.8873	0.7869	0.9016	0.0211	5.47%	-0.40%
50		5	0.8809	0.8305	0.9313	0.8907	0.8306	0.9235	0.0182	4.61%	-2.51%
100		5	0.8950	0.8504	0.9395	0.9037	0.8361	0.9297	0.0161	4.01%	-4.15%

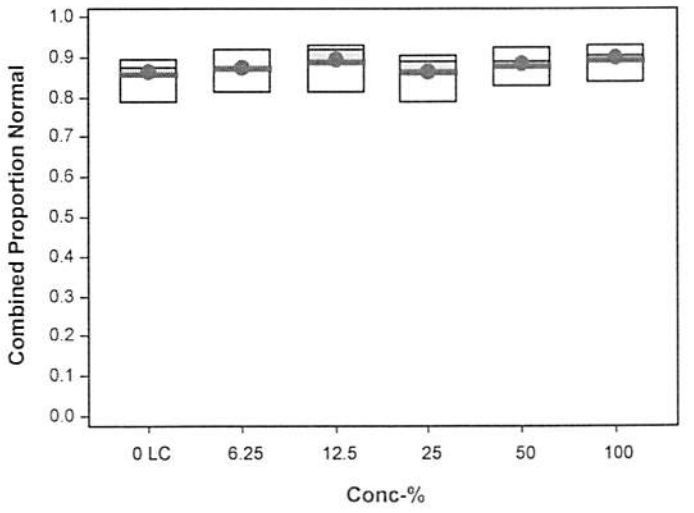
Angular (Corrected) Transformed Summary

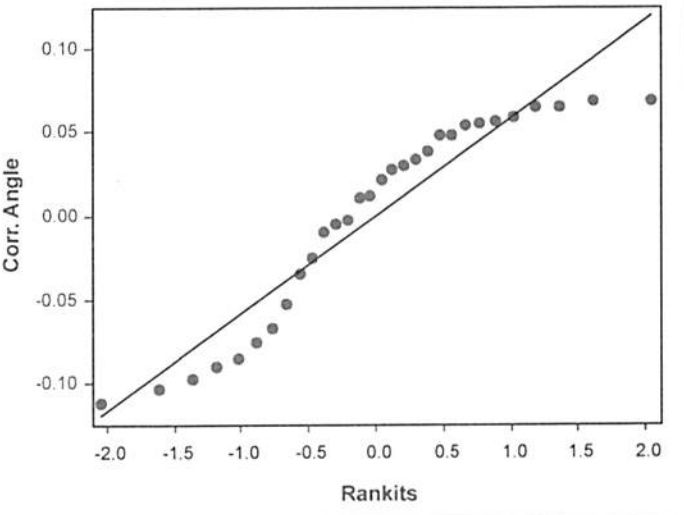
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1890	1.1160	1.2620	1.2100	1.0910	1.2430	0.0262	4.93%	0.00%
6.25		5	1.2110	1.1320	1.2900	1.2080	1.1250	1.2800	0.0285	5.27%	-1.86%
12.5		5	1.2370	1.1330	1.3410	1.2860	1.1250	1.3030	0.0375	6.77%	-4.03%
25		5	1.1950	1.1130	1.2770	1.2280	1.0910	1.2520	0.0295	5.51%	-0.49%
50		5	1.2220	1.1440	1.3000	1.2340	1.1470	1.2900	0.0280	5.13%	-2.78%
100		5	1.2440	1.1740	1.3140	1.2550	1.1540	1.3030	0.0252	4.53%	-4.62%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	11-6123-0405	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:29	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:23	**MD5 Hash:**	6EA9C5F0729FE6F4670D7A683219174A	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test (LC vs 100%) **WSP Laboratory**

Analysis ID:	17-3426-3578	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:30	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 14:23	**MD5 Hash:**	BBC841DF7CD647BC86C1B0A8032F1B06	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	7	11.03	1.895	CDF	<1.0E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0075492	0.0075492	1	2.286	0.1690	Non-Significant Effect
Error	0.0264231	0.0033029	8			
Total	0.0339723		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.085	23.15	0.9392	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8532	0.7411	0.0635	Normal Distribution

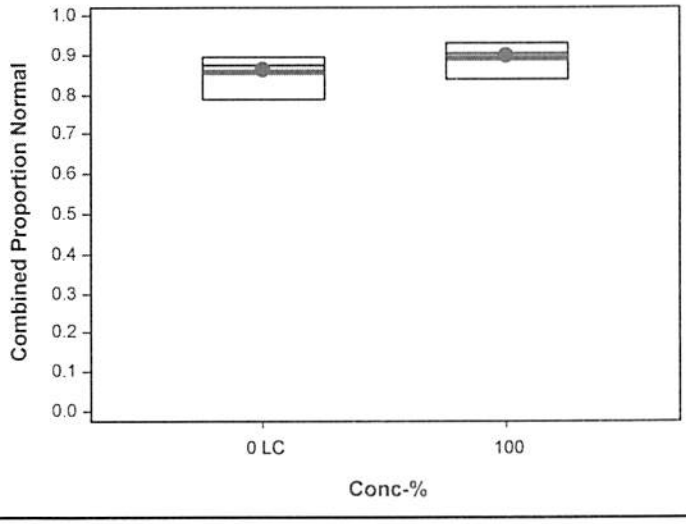
Combined Proportion Normal Summary

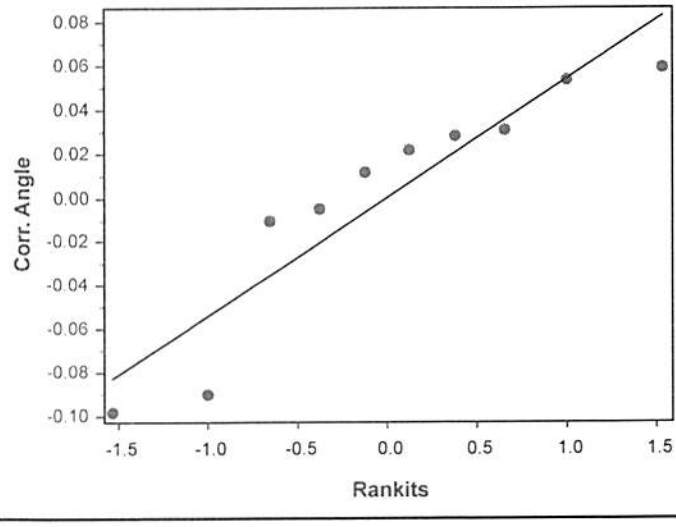
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8593	0.8063	0.9123	0.8756	0.7869	0.8962	0.0191	4.97%	0.00%
100		5	0.8950	0.8504	0.9395	0.9037	0.8361	0.9297	0.0161	4.01%	-4.15%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1890	1.1160	1.2620	1.2100	1.0910	1.2430	0.0262	4.93%	0.00%
100		5	1.2440	1.1740	1.3140	1.2550	1.1540	1.3030	0.0252	4.53%	-4.62%

Graphics





Bivalve Larval Survival and Development Test (FC vs 100% Filtered) **WSP Laboratory**

Analysis ID:	15-9930-4992	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:30	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 14:23	**MD5 Hash:**	920C4294A453C22A8C65E510DAABDD13	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	7	11.88	1.895	CDF	<1.0E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0025240	0.0025240	1	0.8991	0.3708	Non-Significant Effect
Error	0.0224579	0.0028072	8			
Total	0.024982		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	3.148	23.15	0.2927	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9354	0.7411	0.5026	Normal Distribution

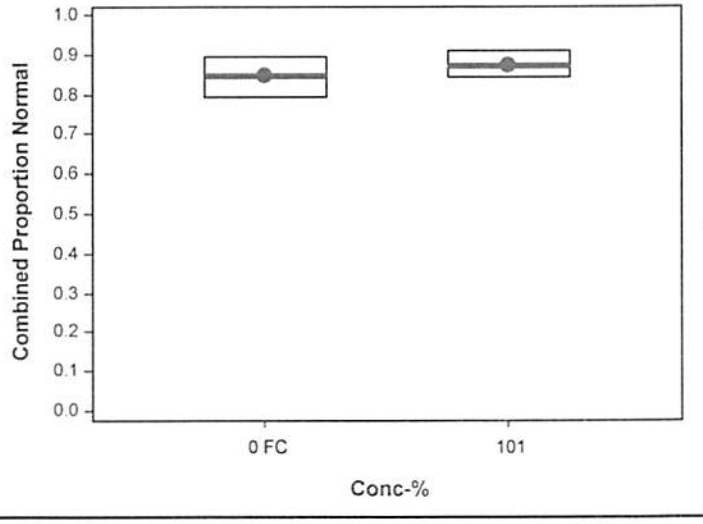
Combined Proportion Normal Summary

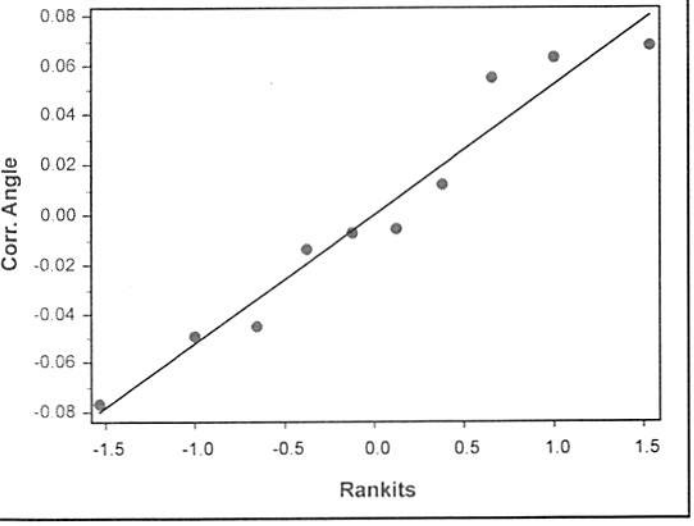
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8486	0.7910	0.9062	0.8470	0.7923	0.8962	0.0207	5.46%	0.00%
101		5	0.8721	0.8421	0.9020	0.8677	0.8415	0.9071	0.0108	2.77%	-2.77%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.1740	1.0930	1.2560	1.1690	1.0980	1.2430	0.0292	5.56%	0.00%
101		5	1.2060	1.1610	1.2520	1.1990	1.1610	1.2610	0.0165	3.05%	-2.71%

Graphics





Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	21-0554-4498	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:29	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:23	**MD5 Hash:**	CEA115FBD61DB9F7534BAB22E9F97543	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.02322	2.58%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-1.224	2.362	0.03728	CDF	0.9912	Non-Significant Effect
		12.5	8	-1.771	2.362	0.03728	CDF	0.9984	Non-Significant Effect
		25	8	-1.295	2.362	0.03728	CDF	0.9929	Non-Significant Effect
		50	8	-1.957	2.362	0.03728	CDF	0.9992	Non-Significant Effect
		100	8	-1.746	2.362	0.03728	CDF	0.9983	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0031663	0.0006333	5	1.016	0.4299	Non-Significant Effect
Error	0.0149538	0.0006231	24			
Total	0.01812		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	6.115	15.09	0.2952	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9745	0.9031	0.6685	Normal Distribution

Proportion Normal Summary

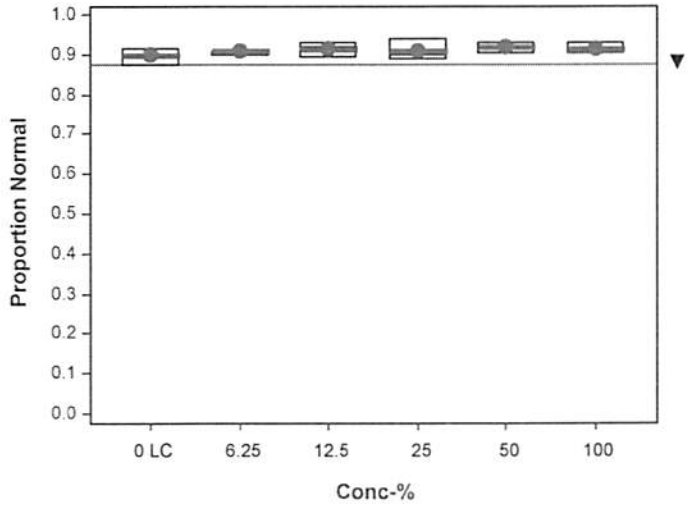
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8988	0.8814	0.9162	0.9000	0.8756	0.9128	0.0063	1.56%	0.00%
6.25		5	0.9103	0.9008	0.9198	0.9123	0.8976	0.9175	0.0034	0.84%	-1.29%
12.5		5	0.9147	0.8934	0.9360	0.9208	0.8922	0.9297	0.0077	1.87%	-1.77%
25		5	0.9101	0.8829	0.9373	0.9006	0.8873	0.9375	0.0098	2.41%	-1.26%
50		5	0.9168	0.9052	0.9283	0.9172	0.9048	0.9278	0.0042	1.02%	-2.00%
100		5	0.9149	0.9031	0.9267	0.9146	0.9037	0.9297	0.0043	1.04%	-1.79%

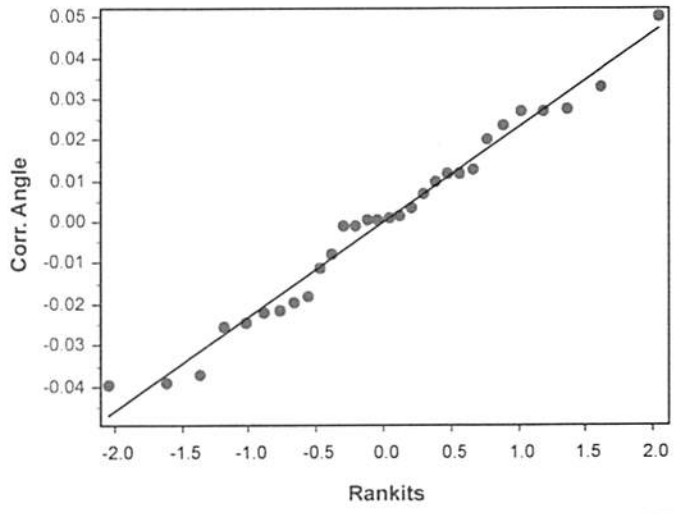
Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2480	1.2190	1.2760	1.2490	1.2100	1.2710	0.0102	1.83%	0.00%
6.25		5	1.2670	1.2510	1.2830	1.2700	1.2450	1.2800	0.0059	1.04%	-1.55%
12.5		5	1.2760	1.2380	1.3130	1.2860	1.2360	1.3030	0.0136	2.38%	-2.24%
25		5	1.2680	1.2190	1.3170	1.2500	1.2280	1.3180	0.0175	3.09%	-1.64%
50		5	1.2780	1.2570	1.2990	1.2790	1.2570	1.2990	0.0076	1.32%	-2.48%
100		5	1.2750	1.2540	1.2970	1.2740	1.2550	1.3030	0.0078	1.36%	-2.21%

Bivalve Larval Survival and Development Test					WSP Laboratory
Analysis ID:	21-0554-4498	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:29	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:23	**MD5 Hash:**	CEA115FBD61DB9F7534BAB22E9F97543	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	01-1347-8503	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:29	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:23	**MD5 Hash:**	B846EF97F28A0FFD2DCD855EAF449453	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.08465	8.85%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-0.1189	2.362	0.1864	CDF	0.8661	Non-Significant Effect
		12.5	8	-0.6117	2.362	0.1864	CDF	0.9540	Non-Significant Effect
		25	8	0.1931	2.362	0.1864	CDF	0.7700	Non-Significant Effect
		50	8	-0.04012	2.362	0.1864	CDF	0.8449	Non-Significant Effect
		100	8	-0.8435	2.362	0.1864	CDF	0.9745	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0249819	0.0049964	5	0.3209	0.8955	Non-Significant Effect
Error	0.373732	0.0155722	24			
Total	0.398714		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	0.325	15.09	0.9971	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.9031	0.0303	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9563	0.8928	1.0000	0.9781	0.8743	1.0000	0.0229	5.35%	0.00%
6.25		5	0.9596	0.9089	1.0000	0.9563	0.9071	1.0000	0.0183	4.25%	-0.34%
12.5		5	0.9705	0.9189	1.0000	1.0000	0.9126	1.0000	0.0186	4.28%	-1.49%
25		5	0.9486	0.8731	1.0000	0.9617	0.8470	1.0000	0.0272	6.41%	0.80%
50		5	0.9607	0.9143	1.0000	0.9781	0.9180	1.0000	0.0167	3.89%	-0.46%
100		5	0.9781	0.9339	1.0000	1.0000	0.9180	1.0000	0.0159	3.64%	-2.29%

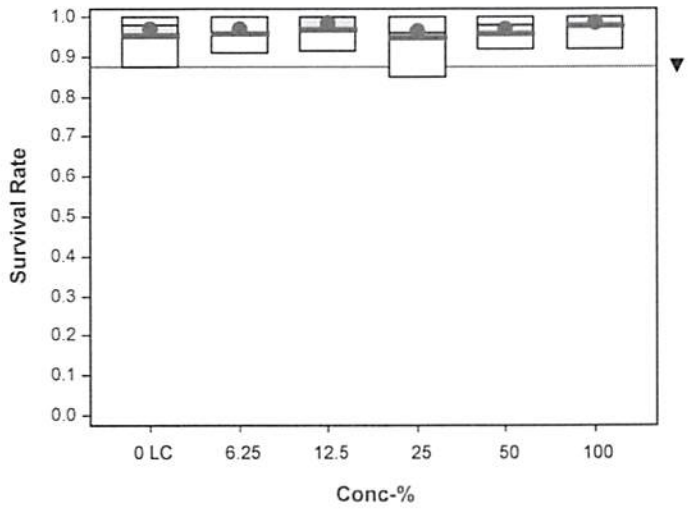
Angular (Corrected) Transformed Summary

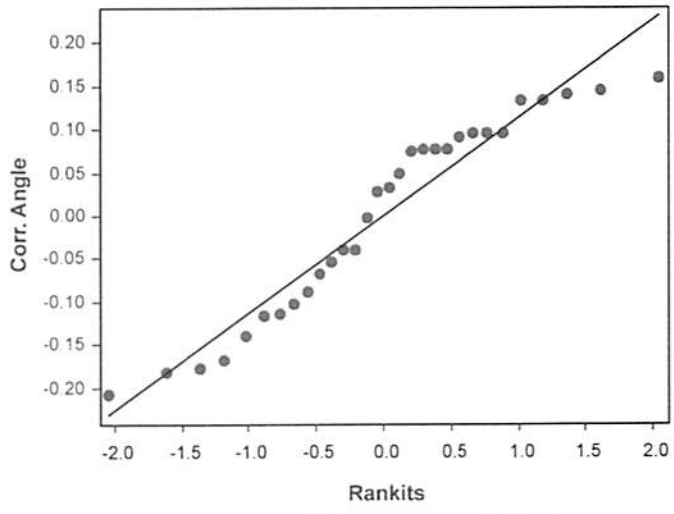
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.3910	1.2330	1.5490	1.4220	1.2080	1.5340	0.0570	9.16%	0.00%
6.25		5	1.4000	1.2430	1.5580	1.3600	1.2610	1.5340	0.0568	9.07%	-0.67%
12.5		5	1.4390	1.2760	1.6020	1.5340	1.2710	1.5340	0.0586	9.11%	-3.47%
25		5	1.3760	1.2030	1.5480	1.3740	1.1690	1.5340	0.0623	10.13%	1.10%
50		5	1.3940	1.2600	1.5280	1.4220	1.2800	1.5340	0.0481	7.72%	-0.23%
100		5	1.4570	1.3160	1.5980	1.5340	1.2800	1.5340	0.0508	7.79%	-4.79%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	01-1347-8503	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:29	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:23	**MD5 Hash:**	B846EF97F28A0FFD2DCD855EAF449453	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:25 (p 1 of 1)
Test Code/ID: ~~2F7856C~~ / 00-4977-5980

Bivalve Larval Survival and Development Test 23-01-052 Wood E&IS

Start Date:	26 Jan-23 1730	**Species:**	Mytilis galloprovincialis	**Sample Code:**	107328F6
End Date:	28 Jan-23 1600	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23 1200	**Material:**	Seawater	**Sample Station:**	SIYB 3

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			111			196	181	
			112			173	155	
			113			180	167	
			114			175	160	
			115			169	154	
			116			172	157	
			117			168	153	
			118			199	182	
			119			155	144	
			120			163	149	
			121			185	172	
			122			202	186	
			123			200	182	
			124			178	158	
			125			187	169	copepod observed
			126			169	155	
			127			201	177	
			128			171	156	
			129			160	144	
			130			163	145	
			131			181	163	
			132			171	155	
			133			166	149	
			134			179	163	
			135			185	172	
			136			180	164	
			137			181	164	
			138			179	161	
			139			189	164	
			140			168	152	
			141			194	178	
			142			206	184	
			143			176	165	
			144			167	149	
			145			201	176	
			146			213	189	
			147			178	163	
			148			199	185	
			149			182	166	
			150			172	155	

Analyst: AG QA: JF 3/7/23

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	107328F6
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 3

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	142					
0	FC	2	136					
0	FC	3	132					
0	FC	4	120					
0	FC	5	130					
0	LC	1	138					
0	LC	2	137					
0	LC	3	145					
0	LC	4	116					
0	LC	5	129					
6.25		1	141					
6.25		2	123					
6.25		3	128					
6.25		4	133					
6.25		5	114					
12.5		1	135					
12.5		2	144					
12.5		3	122					
12.5		4	150					
12.5		5	148					
25		1	119					
25		2	112					
25		3	131					
25		4	143					
25		5	146					
50		1	140					
50		2	126					
50		3	113					
50		4	134					
50		5	111					
100		1	121					
100		2	147					
100		3	117					
100		4	125					
100		5	118					
101		1	139					
101		2	127					
101		3	124					
101		4	149					
101		5	115					

QC = TD

Analyst: AC QA: JC

Water Quality for Bivalve Development

Client: ~~Wood~~ JF WSP - Port of San Diego
Sample ID: SIYB-3
Test No. 23-01-052

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~ 23/2023 1600 AG

Test Conc. (%)	Parameter	Water Quality Measurements 0hr	24hr	48hr
Lab Control	Temp. (°C)	15.9	15.6	15.5
	Salinity (ppt)	33.4	33.9	34.0
	pH (units)	7.90	7.78	7.80
	DO (mg/L)	8.3	8.4	8.3
Filter Control	Temp. (°C)	15.9	15.5	15.4
	Salinity (ppt)	33.3	33.8	34.0
	pH (units)	7.90	7.78	7.81
	DO (mg/L)	7.7	7.5	8.0
6.25	Temp. (°C)	15.8	15.5	15.4
	Salinity (ppt)	33.4	33.9	34.0
	pH (units)	7.90	7.76	7.79
	DO (mg/L)	8.4	8.4	8.3
12.5	Temp. (°C)	15.9	15.6	15.5
	Salinity (ppt)	33.4	34.0	34.1
	pH (units)	7.90	7.76	7.78
	DO (mg/L)	8.4	8.4	8.3
25	Temp. (°C)	16.0	15.6	15.5
	Salinity (ppt)	33.2	33.9	34.0
	pH (units)	7.90	7.74	7.77
	DO (mg/L)	8.3	8.5	8.4
50	Temp. (°C)	15.9	15.6	15.5
	Salinity (ppt)	33.0	33.9	34.0
	pH (units)	7.91	7.74	7.77
	DO (mg/L)	8.6	8.5	8.4
100	Temp. (°C)	15.7	15.6	15.5
	Salinity (ppt)	32.7	33.3	33.6
	pH (units)	7.91	7.75	7.76
	DO (mg/L)	8.6	8.4	8.3
100 Filtered (1.2µm)	Temp. (°C)	16.0	15.5	15.4
	Salinity (ppt)	31.9	32.3	32.6
	pH (units)	7.84	7.76	7.76
	DO (mg/L)	8.2	8.4	8.3
	Tech Initials:	HK	JF	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

Initial QC: ~~JF~~ 3/7/23

Final QC: SC 3/9/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

$\bar{X}$ = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

Site: SIYB-4

Bivalve Larval Survival and Development Test

WSP Laboratory

Batch ID:	00-9037-2630	**Test Type:**	Development-Survival	**Analyst:**		
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater	
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable	
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**

Sample ID:	12-1230-7538	**Code:**	23-W029	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 11:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 12:40	**CAS (PC):**		**Station:**	SIYB 4
Sample Age:	30h (17.8 °C)	**Client:**	WSP		

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
11-9999-6181	Combined Proportion Norma	TST-Welch's t Test	0.0001	100% passed combined proportion normal	1
20-6655-4017	Combined Proportion Norma	TST-Welch's t Test	0.0090	101% passed combined proportion normal	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
14-5704-5111	Combined Proportion Norma	Dunnett Multiple Comparison Test		100	>100	---	7.93%	1	1
01-7259-2876	Proportion Normal	Dunnett Multiple Comparison Test		100	>100	---	4.41%	1	1
07-8651-7941	Survival Rate	Dunnett Multiple Comparison Test		100	>100	---	7.31%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
01-7259-2876	Proportion Normal	Control Resp	0.8974	0.9	<<	Yes	Below Criteria (1)
07-8651-7941	Survival Rate	Control Resp	0.9519	0.5	<<	Yes	Passes Criteria
14-5704-5111	Combined Proportion Norma	PMSD	0.07928	<<	0.25	No	Passes Criteria

(1) OK-rounds up to 90%

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8537	0.8076	0.8998	0.8033	0.8907	0.0166	0.0371	4.35%	0.00%
0	FC	5	0.8883	0.8661	0.9105	0.8743	0.9180	0.0080	0.0179	2.01%	-4.05%
6.25		5	0.8792	0.8347	0.9237	0.8197	0.9126	0.0160	0.0358	4.08%	-2.98%
12.5		5	0.8474	0.8003	0.8944	0.7923	0.8907	0.0170	0.0379	4.48%	0.74%
25		5	0.8737	0.8422	0.9053	0.8470	0.8985	0.0114	0.0254	2.91%	-2.35%
50		5	0.8672	0.7948	0.9396	0.7869	0.9235	0.0261	0.0583	6.72%	-1.58%
100		5	0.8459	0.7842	0.9076	0.8033	0.9126	0.0222	0.0497	5.87%	0.91%
101		5	0.8265	0.7080	0.9449	0.7268	0.9344	0.0427	0.0954	11.54%	3.19%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8974	0.8723	0.9225	0.8674	0.9157	0.0090	0.0202	2.25%	0.00%
0	FC	5	0.8932	0.8679	0.9186	0.8769	0.9282	0.0091	0.0204	2.28%	0.47%
6.25		5	0.8958	0.8714	0.9201	0.8763	0.9278	0.0088	0.0196	2.19%	0.18%
12.5		5	0.8914	0.8704	0.9124	0.8706	0.9157	0.0076	0.0169	1.90%	0.67%
25		5	0.8964	0.8661	0.9268	0.8757	0.9371	0.0109	0.0245	2.73%	0.11%
50		5	0.9009	0.8671	0.9348	0.8623	0.9337	0.0122	0.0273	3.03%	-0.39%
100		5	0.8863	0.8409	0.9317	0.8400	0.9257	0.0164	0.0366	4.12%	1.24%
101		5	0.9080	0.8691	0.9469	0.8590	0.9448	0.0140	0.0314	3.45%	-1.18%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9519	0.8873	1.0170	0.8852	1.0000	0.0233	0.0520	5.47%	0.00%
0	FC	5	0.9945	0.9849	1.0040	0.9836	1.0000	0.0035	0.0077	0.78%	-4.48%
6.25		5	0.9814	0.9403	1.0230	0.9235	1.0000	0.0148	0.0332	3.38%	-3.10%
12.5		5	0.9508	0.8955	1.0060	0.8852	1.0000	0.0199	0.0446	4.69%	0.11%
25		5	0.9749	0.9454	1.0040	0.9508	1.0000	0.0106	0.0237	2.43%	-2.41%
50		5	0.9617	0.9138	1.0100	0.9126	1.0000	0.0173	0.0386	4.02%	-1.03%
100		5	0.9541	0.9213	0.9868	0.9235	0.9945	0.0118	0.0264	2.76%	-0.23%
101		5	0.9093	0.7991	1.0190	0.7923	1.0000	0.0397	0.0888	9.76%	4.48%

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Detail

MD5: 137709973C9556CA571C9A119325C32F

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8860	0.8579	0.8033	0.8306	0.8907
0	FC	0.8914	0.8769	0.8808	0.8743	0.9180
6.25		0.8989	0.8763	0.8197	0.9126	0.8883
12.5		0.8706	0.8525	0.7923	0.8907	0.8306
25		0.8985	0.8800	0.8470	0.8962	0.8470
50		0.7869	0.9235	0.8962	0.9043	0.8251
100		0.8087	0.8197	0.8033	0.8852	0.9126
101		0.7268	0.9344	0.8361	0.9029	0.7322

Proportion Normal Detail

MD5: 15B7D8CFE447C4906D10C53A2D6DA37F

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8860	0.8674	0.9074	0.9157	0.9106
0	FC	0.8914	0.8769	0.8808	0.8889	0.9282
6.25		0.8989	0.8763	0.8876	0.9278	0.8883
12.5		0.8706	0.8814	0.8951	0.9157	0.8941
25		0.8985	0.8800	0.8908	0.9371	0.8757
50		0.8623	0.9337	0.9162	0.9043	0.8882
100		0.8605	0.8876	0.8400	0.9257	0.9176
101		0.9172	0.9448	0.9162	0.9029	0.8590

Survival Rate Detail

MD5: A0656CCB257320A52B043F2F7B6BBBB7

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9891	0.8852	0.9071	0.9781
0	FC	1.0000	1.0000	1.0000	0.9836	0.9891
6.25		1.0000	1.0000	0.9235	0.9836	1.0000
12.5		1.0000	0.9672	0.8852	0.9727	0.9290
25		1.0000	1.0000	0.9508	0.9563	0.9672
50		0.9126	0.9891	0.9781	1.0000	0.9290
100		0.9399	0.9235	0.9563	0.9563	0.9945
101		0.7923	0.9891	0.9126	1.0000	0.8525

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	171/193	157/183	147/183	152/183	163/183
0	FC	197/221	171/195	170/193	160/183	168/183
6.25		169/188	170/194	150/183	167/183	167/188
12.5		175/201	156/183	145/183	163/183	152/183
25		177/197	176/200	155/183	164/183	155/183
50		144/183	169/183	164/183	170/188	151/183
100		148/183	150/183	147/183	162/183	167/183
101		133/183	171/183	153/183	186/206	134/183

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	171/193	157/181	147/162	152/166	163/179
0	FC	197/221	171/195	170/193	160/180	168/181
6.25		169/188	170/194	150/169	167/180	167/188
12.5		175/201	156/177	145/162	163/178	152/170
25		177/197	176/200	155/174	164/175	155/177
50		144/167	169/181	164/179	170/188	151/170
100		148/172	150/169	147/175	162/175	167/182
101		133/145	171/181	153/167	186/206	134/156

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	183/183	181/183	162/183	166/183	179/183
0	FC	183/183	183/183	183/183	180/183	181/183
6.25		183/183	183/183	169/183	180/183	183/183
12.5		183/183	177/183	162/183	178/183	170/183
25		183/183	183/183	174/183	175/183	177/183
50		167/183	181/183	179/183	183/183	170/183
100		172/183	169/183	175/183	175/183	182/183
101		145/183	181/183	167/183	183/183	156/183

Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	14-5704-5111	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:55	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:50	**MD5 Hash:**	4A37CC422506C585613A0923CDCDDF39	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.06768	7.93%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-0.9858	2.362	0.09059	CDF	0.9827	Non-Significant Effect
		12.5	8	0.234	2.362	0.09059	CDF	0.7551	Non-Significant Effect
		25	8	-0.7386	2.362	0.09059	CDF	0.9665	Non-Significant Effect
		50	8	-0.6118	2.362	0.09059	CDF	0.9540	Non-Significant Effect
		100	8	0.2345	2.362	0.09059	CDF	0.7549	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0104465	0.0020893	5	0.568	0.7236	Non-Significant Effect
Error	0.0882818	0.0036784	24			
Total	0.0987283		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.859	15.09	0.7216	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9638	0.9031	0.3863	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8537	0.8076	0.8998	0.8579	0.8033	0.8907	0.0166	4.35%	0.00%
6.25		5	0.8792	0.8347	0.9237	0.8883	0.8197	0.9126	0.0160	4.08%	-2.98%
12.5		5	0.8474	0.8003	0.8944	0.8525	0.7923	0.8907	0.0170	4.48%	0.74%
25		5	0.8737	0.8422	0.9053	0.8800	0.8470	0.8985	0.0114	2.91%	-2.35%
50		5	0.8672	0.7948	0.9396	0.8962	0.7869	0.9235	0.0261	6.72%	-1.58%
100		5	0.8459	0.7842	0.9076	0.8197	0.8033	0.9126	0.0222	5.87%	0.91%

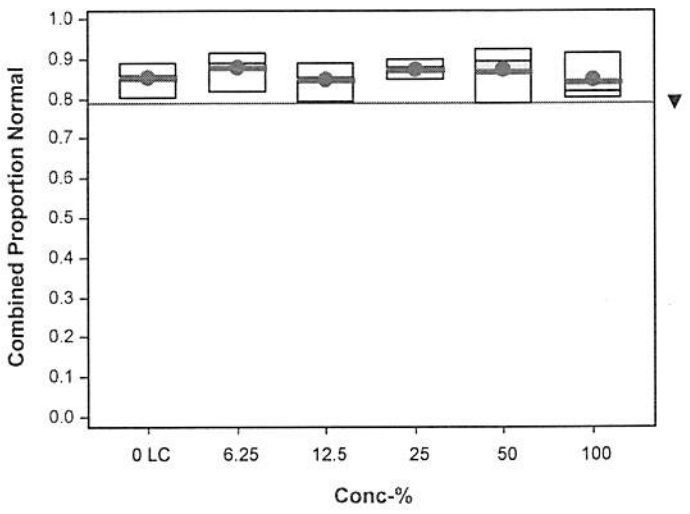
Angular (Corrected) Transformed Summary

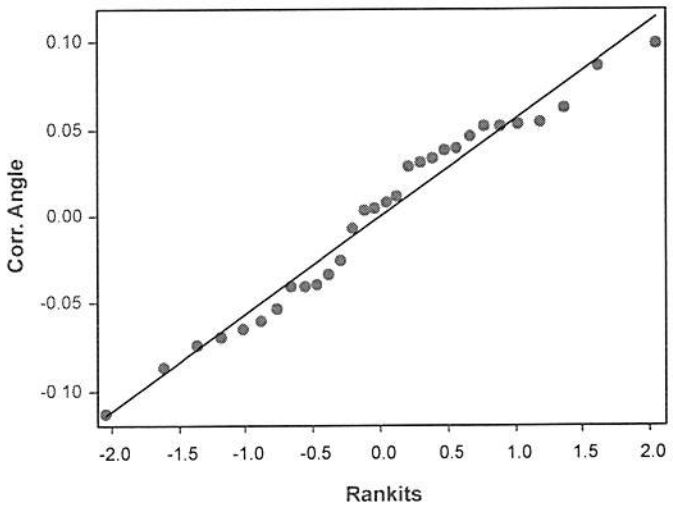
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1800	1.1160	1.2450	1.1840	1.1110	1.2340	0.0234	4.42%	0.00%
6.25		5	1.2180	1.1530	1.2840	1.2300	1.1320	1.2710	0.0236	4.34%	-3.20%
12.5		5	1.1720	1.1060	1.2370	1.1770	1.0980	1.2340	0.0234	4.47%	0.76%
25		5	1.2090	1.1610	1.2560	1.2170	1.1690	1.2470	0.0171	3.16%	-2.40%
50		5	1.2040	1.0990	1.3090	1.2430	1.0910	1.2910	0.0379	7.03%	-1.99%
100		5	1.1710	1.0820	1.2610	1.1320	1.1110	1.2710	0.0322	6.14%	0.76%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	14-5704-5111	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:55	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:50	**MD5 Hash:**	4A37CC422506C585613A0923CDCDDF39	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test (LC vs 100%) **WSP Laboratory**

Analysis ID:	11-9999-6181	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:56	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 14:50	**MD5 Hash:**	2EE6BAC62904C724432EF028FFCB1BDA	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	6	7.807	1.943	CDF	0.0001	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002023	0.0002023	1	0.05117	0.8267	Non-Significant Effect
Error	0.0316377	0.0039547	8			
Total	0.03184		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.899	23.15	0.5497	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9019	0.7411	0.2296	Normal Distribution

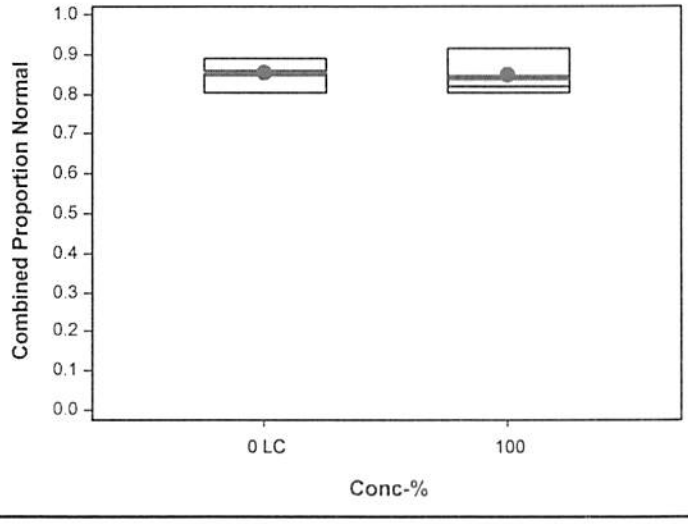
Combined Proportion Normal Summary

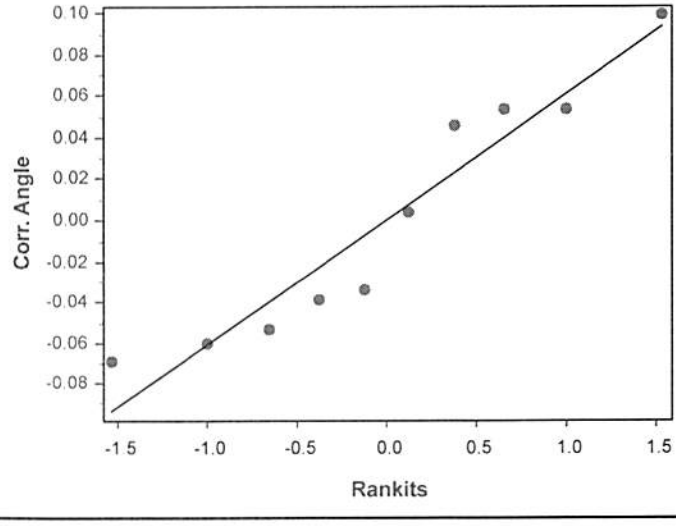
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8537	0.8076	0.8998	0.8579	0.8033	0.8907	0.0166	4.35%	0.00%
100		5	0.8459	0.7842	0.9076	0.8197	0.8033	0.9126	0.0222	5.87%	0.91%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1800	1.1160	1.2450	1.1840	1.1110	1.2340	0.0234	4.42%	0.00%
100		5	1.1710	1.0820	1.2610	1.1320	1.1110	1.2710	0.0322	6.14%	0.76%

Graphics





Bivalve Larval Survival and Development Test (FC vs 100% Filtered) WSP Laboratory

Analysis ID:	20-6655-4017	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:56	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 14:50	**MD5 Hash:**	F5B0A0C530F3A687FA8F04AFBE390AAF	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	4	3.872	2.132	CDF	0.0090	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0149835	0.0149835	1	1.658	0.2338	Non-Significant Effect
Error	0.0722753	0.0090344	8			
Total	0.0872588		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	19.78	23.15	0.0135	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9383	0.7411	0.5339	Normal Distribution

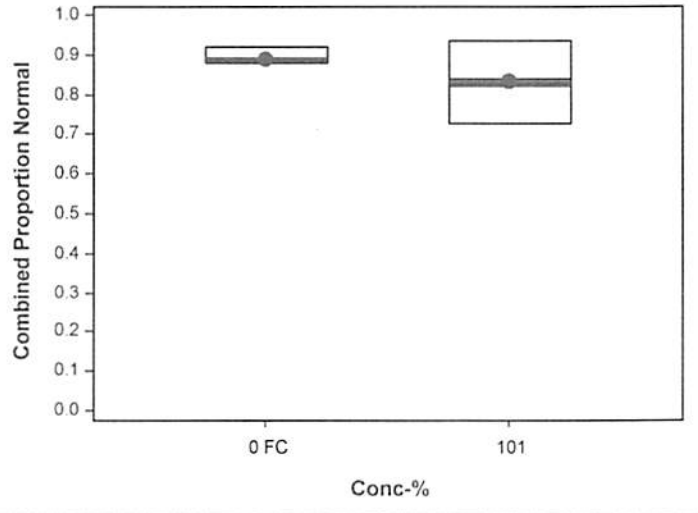
Combined Proportion Normal Summary

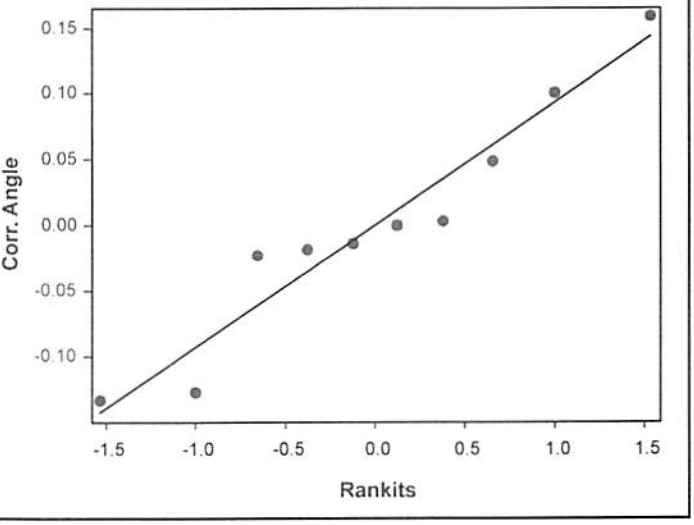
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8883	0.8661	0.9105	0.8808	0.8743	0.9180	0.0080	2.01%	0.00%
101		5	0.8265	0.7080	0.9449	0.8361	0.7268	0.9344	0.0427	11.54%	6.96%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.2310	1.1940	1.2680	1.2180	1.2080	1.2800	0.0132	2.40%	0.00%
101		5	1.1530	0.9906	1.3160	1.1540	1.0210	1.3120	0.0587	11.37%	6.29%

Graphics





Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	01-7259-2876	Endpoint:	Proportion Normal	CETIS Version:	CETISv2.1.3
Analyzed:	07 Mar-23 14:55	Analysis:	Parametric-Control vs Treatments	Status Level:	1
Edit Date:	07 Mar-23 14:50	MD5 Hash:	A65ED201B5324D77E1D57E4DC4758F8C	Editor ID:	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.03955	4.41%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	0.1008	2.362	0.06164	CDF	0.8018	Non-Significant Effect
		12.5	8	0.3896	2.362	0.06164	CDF	0.6939	Non-Significant Effect
		25	8	0.03028	2.362	0.06164	CDF	0.8242	Non-Significant Effect
		50	8	-0.2666	2.362	0.06164	CDF	0.9001	Non-Significant Effect
		100	8	0.6048	2.362	0.06164	CDF	0.6004	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0016240	0.0003248	5	0.1907	0.9632	Non-Significant Effect
Error	0.040873	0.0017030	24			
Total	0.042497		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.694	15.09	0.7470	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9757	0.9031	0.7027	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8974	0.8723	0.9225	0.9074	0.8674	0.9157	0.0090	2.25%	0.00%
6.25		5	0.8958	0.8714	0.9201	0.8883	0.8763	0.9278	0.0088	2.19%	0.18%
12.5		5	0.8914	0.8704	0.9124	0.8941	0.8706	0.9157	0.0076	1.90%	0.67%
25		5	0.8964	0.8661	0.9268	0.8908	0.8757	0.9371	0.0109	2.73%	0.11%
50		5	0.9009	0.8671	0.9348	0.9043	0.8623	0.9337	0.0122	3.03%	-0.39%
100		5	0.8863	0.8409	0.9317	0.8876	0.8400	0.9257	0.0164	4.12%	1.24%

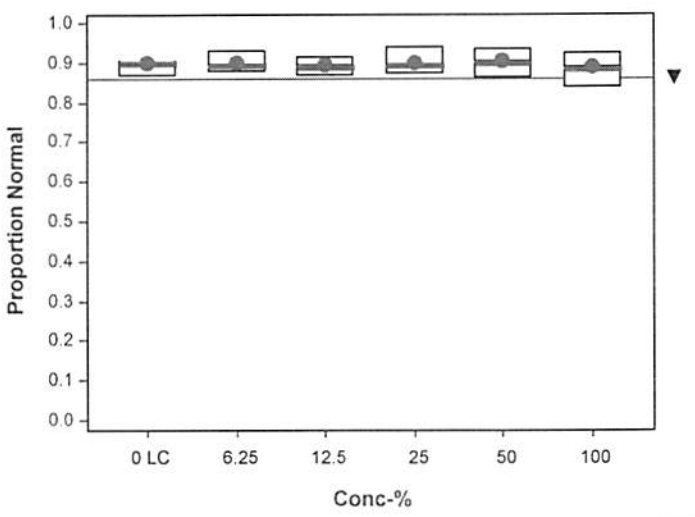
Angular (Corrected) Transformed Summary

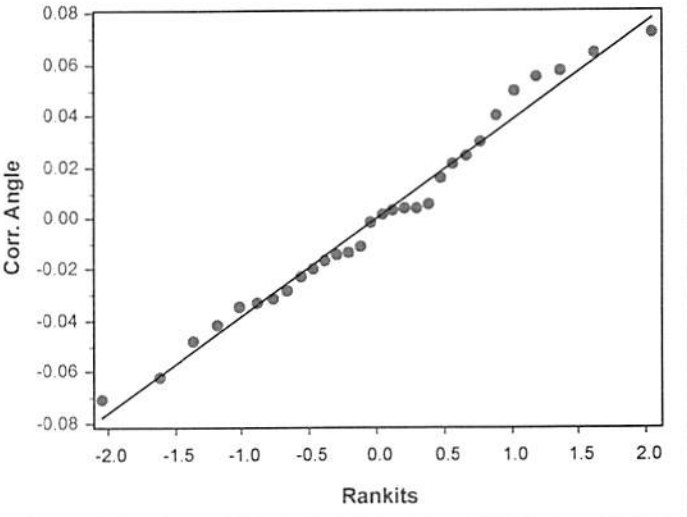
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2460	1.2050	1.2860	1.2620	1.1980	1.2760	0.0146	2.63%	0.00%
6.25		5	1.2430	1.2020	1.2850	1.2300	1.2110	1.2990	0.0150	2.69%	0.21%
12.5		5	1.2360	1.2020	1.2700	1.2390	1.2030	1.2760	0.0123	2.23%	0.82%
25		5	1.2450	1.1920	1.2980	1.2340	1.2100	1.3170	0.0192	3.44%	0.06%
50		5	1.2530	1.1960	1.3090	1.2560	1.1910	1.3100	0.0204	3.64%	-0.56%
100		5	1.2300	1.1580	1.3020	1.2290	1.1590	1.2950	0.0259	4.71%	1.27%

Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	01-7259-2876	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:55	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:50	**MD5 Hash:**	A65ED201B5324D77E1D57E4DC4758F8C	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	07-8651-7941	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:55	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:50	**MD5 Hash:**	C6A062E0028E3DE76816CC538FD4885D	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.06961	7.31%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-1.249	2.362	0.1611	CDF	0.9919	Non-Significant Effect
		12.5	8	0.1615	2.362	0.1611	CDF	0.7812	Non-Significant Effect
		25	8	-0.748	2.362	0.1611	CDF	0.9673	Non-Significant Effect
		50	8	-0.2502	2.362	0.1611	CDF	0.8967	Non-Significant Effect
		100	8	0.2281	2.362	0.1611	CDF	0.7573	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0391882	0.0078376	5	0.6737	0.6473	Non-Significant Effect
Error	0.279198	0.0116332	24			
Total	0.318386		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	1.16	15.09	0.9486	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9637	0.9031	0.3843	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9519	0.8873	1.0000	0.9781	0.8852	1.0000	0.0233	5.47%	0.00%
6.25		5	0.9814	0.9403	1.0000	1.0000	0.9235	1.0000	0.0148	3.38%	-3.10%
12.5		5	0.9508	0.8955	1.0000	0.9672	0.8852	1.0000	0.0199	4.69%	0.11%
25		5	0.9749	0.9454	1.0000	0.9672	0.9508	1.0000	0.0106	2.43%	-2.41%
50		5	0.9617	0.9138	1.0000	0.9781	0.9126	1.0000	0.0173	4.02%	-1.03%
100		5	0.9541	0.9213	0.9868	0.9563	0.9235	0.9945	0.0118	2.76%	-0.23%

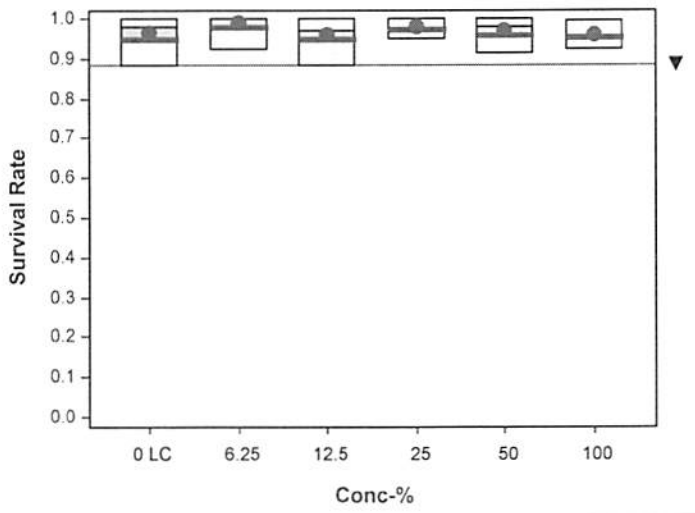
Angular (Corrected) Transformed Summary

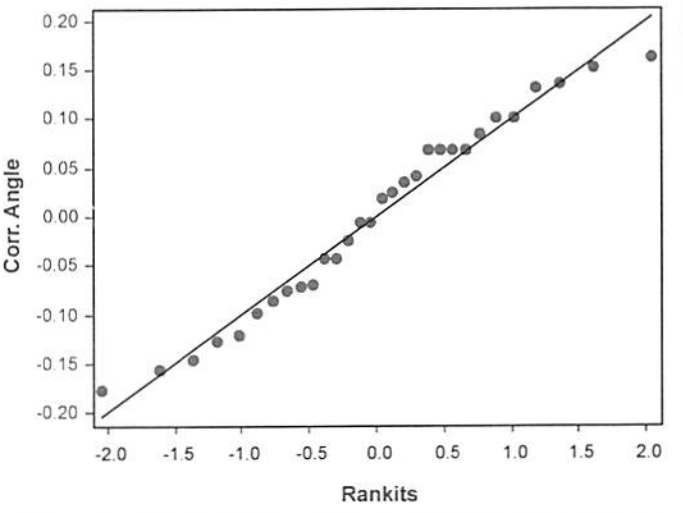
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.3820	1.2160	1.5470	1.4220	1.2250	1.5340	0.0596	9.64%	0.00%
6.25		5	1.4670	1.3350	1.5990	1.5340	1.2910	1.5340	0.0475	7.24%	-6.16%
12.5		5	1.3710	1.2260	1.5150	1.3890	1.2250	1.5340	0.0520	8.49%	0.80%
25		5	1.4330	1.3170	1.5490	1.3890	1.3470	1.5340	0.0418	6.53%	-3.69%
50		5	1.3990	1.2610	1.5370	1.4220	1.2710	1.5340	0.0497	7.94%	-1.24%
100		5	1.3660	1.2690	1.4640	1.3600	1.2910	1.4970	0.0352	5.75%	1.13%

Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	07-8651-7941	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 14:55	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 14:50	**MD5 Hash:**	C6A062E0028E3DE76816CC538FD4885D	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:27 (p 1 of 1)
Test Code/ID: ~~JF 62D49728/~~ 16-5809-9496

Bivalve Larval Survival and Development Test 23-01-053 ~~Wood E&IS~~ WSPE

Start Date:	26 Jan-23 1700	**Species:**	Mytilis galloprovincialis	**Sample Code:**	48425852
End Date:	28 Jan-23 1600	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23 1100	**Material:**	Seawater	**Sample Station:**	SIYB 4

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			151			145	133	HK 3/3/23
			152			162	145	
			153			174	155	
			154			178	163	
			155			179	163	
			156			167	144	
			157			175	147	
			158			180	160	
			159			169~~173~~	~~170~~ 150	
			160			193	170	
			161			221	197	
			162			177	155	
			163			180	167	
			164			162	147	
			165			172	148	
			166			188	170	
			167			197	177	
			168			156	134	
			169			200	170	
			170			180	152	
			171			195	171	HK 3/4/23
			172			181	168	
			173			188	169	
			174			193	171	
			175			181	157	
			176			194	170	
			177			169	150	
			178			177	156	
			179			181	171	
			180			181	169	
			181			186	167	
			182			170	152	
			183			170	151	
			184			175	162	
			185			201	175	
			186			167	153	
			187			182	167	
			188			206	180	
			189			179	164	
			190			175~~169~~	164	

CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:27 (p 1 of 1)
Test Code/ID: 62D49728 / 16-5809-9496

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	48425852
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 4

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	161					
0	FC	2	171					
0	FC	3	160					
0	FC	4	158					
0	FC	5	172					
0	LC	1	174					
0	LC	2	175					
0	LC	3	164					
0	LC	4	170					
0	LC	5	155					
6.25		1	173					
6.25		2	176					
6.25		3	177					
6.25		4	163					
6.25		5	181					
12.5		1	185					
12.5		2	178					
12.5		3	152					
12.5		4	154					
12.5		5	182					
25		1	167					
25		2	169					
25		3	153					
25		4	190					
25		5	162					
50		1	156					
50		2	180					
50		3	189					
50		4	166					
50		5	183					
100		1	165					
100		2	159					
100		3	157					
100		4	184					
100		5	187					
101		1	151					
101		2	179					
101		3	186					
101		4	188					
101		5	168					

QC = TD

Analyst: AE QA: JC

Water Quality for Bivalve Development

JF WSP
Client: ~~Wood~~ Port of San Diego
Sample ID: SIYB-4
Test No. 23-01-053

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~28/2023 1600

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.9	15.3	15.2
	Salinity (ppt)	33.4	33.2	33.4
	pH (units)	7.91	7.71	7.75
	DO (mg/L)	8.1	8.1	8.2
Filter Control	Temp. (°C)	15.9	15.2	15.3
	Salinity (ppt)	33.3	33.3	33.5
	pH (units)	7.89	7.73	7.76
	DO (mg/L)	7.6	8.3	8.3
6.25	Temp. (°C)	15.9	15.2	15.3
	Salinity (ppt)	33.3	33.6	33.8
	pH (units)	7.90	7.73	7.76
	DO (mg/L)	8.4	8.3	8.3
12.5	Temp. (°C)	15.9	15.2	15.3
	Salinity (ppt)	33.5	33.7	33.8
	pH (units)	7.90	7.73	7.77
	DO (mg/L)	8.4	8.5	8.4
25	Temp. (°C)	15.9	15.2	15.3
	Salinity (ppt)	33.3	33.3	33.5
	pH (units)	7.91	7.71	7.75
	DO (mg/L)	8.5	8.4	8.3
50	Temp. (°C)	15.9	15.3	15.4
	Salinity (ppt)	33.2	33.2	33.4
	pH (units)	7.90	7.72	7.75
	DO (mg/L)	8.7	8.4	8.3
100	Temp. (°C)	16.0	15.2	15.3
	Salinity (ppt)	32.7	32.9	33.1
	pH (units)	7.92	7.73	7.75
	DO (mg/L)	8.8	8.4	8.3
100 Filtered (1.2µm)	Temp. (°C)	15.9	15.3	15.4
	Salinity (ppt)	31.8	32.1	32.3
	pH (units)	7.78	7.75	7.76
	DO (mg/L)	8.2	8.5	8.4
	Tech Initials:	HK	JF	AP

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

Initial QC: JF 3/7/23

Final QC: JC 3/9/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

$\bar{X}$ = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

Site: SIYB-5

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	08-0964-0400	**Test Type:**	Development-Survival	**Analyst:**		
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater	
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable	
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**

Sample ID:	18-1062-5916	**Code:**	23-W030	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 10:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 12:40	**CAS (PC):**		**Station:**	SIYB 5
Sample Age:	32h (15.8 °C)	**Client:**	WSP		

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-0377-1384	Combined Proportion Norma	TST-Welch's t Test	0.0008	100% passed combined proportion normal	1
00-0876-0348	Combined Proportion Norma	TST-Welch's t Test	5.8E-05	101% passed combined proportion normal	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
10-6335-2463	Combined Proportion Norma	Dunnett Multiple Comparison Test		100	>100	---	15.3%	1	1
10-9404-9738	Proportion Normal	Dunnett Multiple Comparison Test		100	>100	---	5.19%	1	1
13-3323-0854	Survival Rate	Dunnett Multiple Comparison Test		100	>100	---	19.5%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
10-9404-9738	Proportion Normal	Control Resp	0.9004	0.9	<<	Yes	Passes Criteria
13-3323-0854	Survival Rate	Control Resp	0.847	0.5	<<	Yes	Passes Criteria
10-6335-2463	Combined Proportion Norma	PMSD	0.1533	<<	0.25	No	Passes Criteria

Bivalve Larval Survival and Development Test
WSP Laboratory

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.7639	0.6689	0.8590	0.6557	0.8251	0.0342	0.0765	10.02%	0.00%
0	FC	5	0.7563	0.7151	0.7974	0.7322	0.8142	0.0148	0.0332	4.38%	1.00%
6.25		5	0.8211	0.7149	0.9273	0.7104	0.9010	0.0382	0.0855	10.41%	-7.48%
12.5		5	0.8354	0.7678	0.9029	0.7705	0.8927	0.0243	0.0544	6.51%	-9.35%
25		5	0.7596	0.6852	0.8339	0.6612	0.8142	0.0268	0.0599	7.88%	0.57%
50		5	0.8596	0.8282	0.8910	0.8251	0.8907	0.0113	0.0253	2.94%	-12.52%
100		5	0.8201	0.6982	0.9420	0.6721	0.9180	0.0439	0.0982	11.97%	-7.35%
101		5	0.8393	0.7728	0.9058	0.7541	0.8811	0.0240	0.0536	6.38%	-9.86%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9004	0.8659	0.9350	0.8571	0.9264	0.0124	0.0278	3.09%	0.00%
0	FC	5	0.8974	0.8654	0.9294	0.8713	0.9257	0.0115	0.0258	2.87%	0.33%
6.25		5	0.8703	0.8366	0.9039	0.8280	0.9010	0.0121	0.0271	3.11%	3.35%
12.5		5	0.8982	0.8879	0.9085	0.8868	0.9062	0.0037	0.0083	0.92%	0.25%
25		5	0.8860	0.8566	0.9154	0.8671	0.9255	0.0106	0.0237	2.67%	1.60%
50		5	0.8842	0.8539	0.9145	0.8602	0.9157	0.0109	0.0244	2.76%	1.80%
100		5	0.8681	0.7936	0.9426	0.7725	0.9385	0.0268	0.0600	6.91%	3.60%
101		5	0.8902	0.8751	0.9053	0.8780	0.9080	0.0054	0.0122	1.37%	1.14%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8470	0.7713	0.9227	0.7650	0.8907	0.0273	0.0610	7.20%	0.00%
0	FC	5	0.8437	0.7764	0.9110	0.7978	0.9344	0.0242	0.0542	6.42%	0.39%
6.25		5	0.9421	0.8496	1.0350	0.8579	1.0000	0.0333	0.0745	7.91%	-11.23%
12.5		5	0.9301	0.8564	1.0040	0.8689	1.0000	0.0265	0.0593	6.37%	-9.81%
25		5	0.8568	0.7879	0.9258	0.7596	0.8907	0.0248	0.0555	6.48%	-1.16%
50		5	0.9727	0.9282	1.0170	0.9126	1.0000	0.0160	0.0358	3.68%	-14.84%
100		5	0.9454	0.8236	1.0670	0.7705	1.0000	0.0439	0.0981	10.37%	-11.61%
101		5	0.9432	0.8617	1.0250	0.8415	1.0000	0.0294	0.0656	6.96%	-11.35%

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Detail

MD5: 5CA0F768DD187FB0648D388F0CD1A59F

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.7104	0.8087	0.8251	0.6557	0.8197
0	FC	0.7322	0.8142	0.7486	0.7486	0.7377
6.25		0.9010	0.7104	0.7486	0.8711	0.8743
12.5		0.8927	0.7923	0.8852	0.7705	0.8361
25		0.8142	0.7814	0.7486	0.7923	0.6612
50		0.8602	0.8251	0.8907	0.8470	0.8750
100		0.7725	0.9180	0.8743	0.8634	0.6721
101		0.8634	0.7541	0.8197	0.8811	0.8780

Proportion Normal Detail

MD5: 06956FCC4141BCE1F761FF4E62D98636

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8904	0.9080	0.9264	0.8571	0.9202
0	FC	0.8816	0.8713	0.9257	0.8839	0.9247
6.25		0.9010	0.8280	0.8671	0.8711	0.8840
12.5		0.8927	0.9062	0.9050	0.8868	0.9000
25		0.9255	0.8773	0.8671	0.8896	0.8705
50		0.8602	0.9042	0.9157	0.8659	0.8750
100		0.7725	0.9385	0.8840	0.8729	0.8723
101		0.9080	0.8961	0.8876	0.8811	0.8780

Survival Rate Detail

MD5: 473A59A1208B731002F2820A0601BDA4

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.7978	0.8907	0.8907	0.7650	0.8907
0	FC	0.8306	0.9344	0.8087	0.8470	0.7978
6.25		1.0000	0.8579	0.8634	1.0000	0.9891
12.5		1.0000	0.8743	0.9781	0.8689	0.9290
25		0.8798	0.8907	0.8634	0.8907	0.7596
50		1.0000	0.9126	0.9727	0.9781	1.0000
100		1.0000	0.9781	0.9891	0.9891	0.7705
101		0.9508	0.8415	0.9235	1.0000	1.0000

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	130/183	148/183	151/183	120/183	150/183
0	FC	134/183	149/183	137/183	137/183	135/183
6.25		173/192	130/183	137/183	169/194	160/183
12.5		183/205	145/183	162/183	141/183	153/183
25		149/183	143/183	137/183	145/183	121/183
50		160/186	151/183	163/183	155/183	168/192
100		146/189	168/183	160/183	158/183	123/183
101		158/183	138/183	150/183	163/185	180/205

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	130/146	148/163	151/163	120/140	150/163
0	FC	134/152	149/171	137/148	137/155	135/146
6.25		173/192	130/157	137/158	169/194	160/181
12.5		183/205	145/160	162/179	141/159	153/170
25		149/161	143/163	137/158	145/163	121/139
50		160/186	151/167	163/178	155/179	168/192
100		146/189	168/179	160/181	158/181	123/141
101		158/174	138/154	150/169	163/185	180/205

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	146/183	163/183	163/183	140/183	163/183
0	FC	152/183	171/183	148/183	155/183	146/183
6.25		183/183	157/183	158/183	183/183	181/183
12.5		183/183	160/183	179/183	159/183	170/183
25		161/183	163/183	158/183	163/183	139/183
50		183/183	167/183	178/183	179/183	183/183
100		183/183	179/183	181/183	181/183	141/183
101		174/183	154/183	169/183	183/183	183/183

Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	10-6335-2463	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 13:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	08 Mar-23 13:22	**MD5 Hash:**	7DF525D5CC7149BFA41BDA87D230ACF	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.1171	15.33%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-1.334	2.362	0.1328	CDF	0.9937	Non-Significant Effect
		12.5	8	-1.597	2.362	0.1328	CDF	0.9973	Non-Significant Effect
		25	8	0.1203	2.362	0.1328	CDF	0.7953	Non-Significant Effect
		50	8	-2.146	2.362	0.1328	CDF	0.9996	Non-Significant Effect
		100	8	-1.351	2.362	0.1328	CDF	0.9940	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0654647	0.013093	5	1.657	0.1834	Non-Significant Effect
Error	0.189618	0.0079007	24			
Total	0.255083		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	5.656	15.09	0.3412	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9443	0.9031	0.1188	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.7639	0.6689	0.8590	0.8087	0.6557	0.8251	0.0342	10.02%	0.00%
6.25		5	0.8211	0.7149	0.9273	0.8711	0.7104	0.9010	0.0382	10.41%	-7.48%
12.5		5	0.8354	0.7678	0.9029	0.8361	0.7705	0.8927	0.0243	6.51%	-9.35%
25		5	0.7596	0.6852	0.8339	0.7814	0.6612	0.8142	0.0268	7.88%	0.57%
50		5	0.8596	0.8282	0.8910	0.8602	0.8251	0.8907	0.0113	2.94%	-12.52%
100		5	0.8201	0.6982	0.9420	0.8634	0.6721	0.9180	0.0439	11.97%	-7.35%

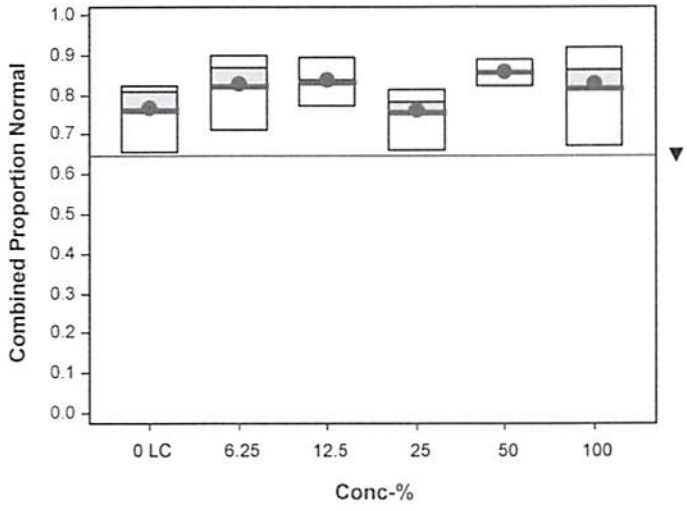
Angular (Corrected) Transformed Summary

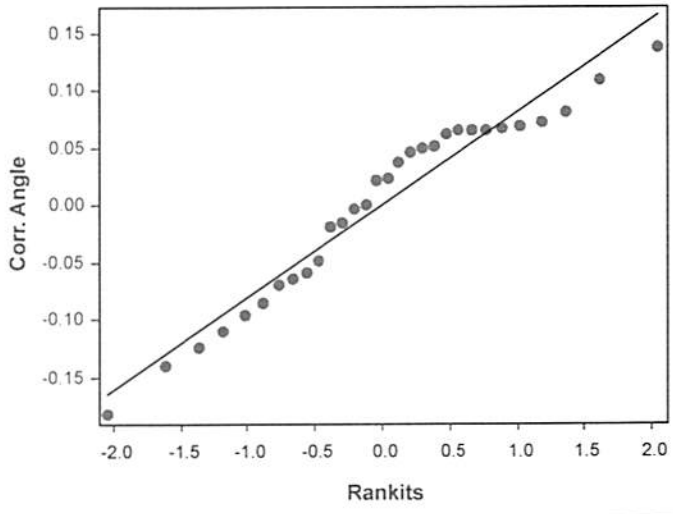
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.0670	0.9571	1.1770	1.1180	0.9438	1.1390	0.0397	8.31%	0.00%
6.25		5	1.1420	1.0050	1.2790	1.2040	1.0030	1.2510	0.0494	9.67%	-7.03%
12.5		5	1.1570	1.0650	1.2490	1.1540	1.0710	1.2370	0.0331	6.40%	-8.41%
25		5	1.0600	0.9756	1.1450	1.0840	0.9495	1.1250	0.0306	6.44%	0.63%
50		5	1.1880	1.1430	1.2330	1.1880	1.1390	1.2340	0.0163	3.06%	-11.30%
100		5	1.1430	0.9867	1.3000	1.1920	0.9611	1.2800	0.0563	11.02%	-7.12%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	10-6335-2463	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 13:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	08 Mar-23 13:22	**MD5 Hash:**	7DF525D5CC7149BFA41BDA87D230ACF	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test (LC vs 100%) — **WSP Laboratory**

Analysis ID:	05-0377-1384	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 13:25	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	08 Mar-23 13:22	**MD5 Hash:**	62741D19A3DF75C0EA554AF0091EA598	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	6	5.38	1.943	CDF	0.0008	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0144146	0.0144146	1	1.215	0.3025	Non-Significant Effect
Error	0.0949339	0.0118667	8			
Total	0.109349		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.019	23.15	0.5130	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9008	0.7411	0.2237	Normal Distribution

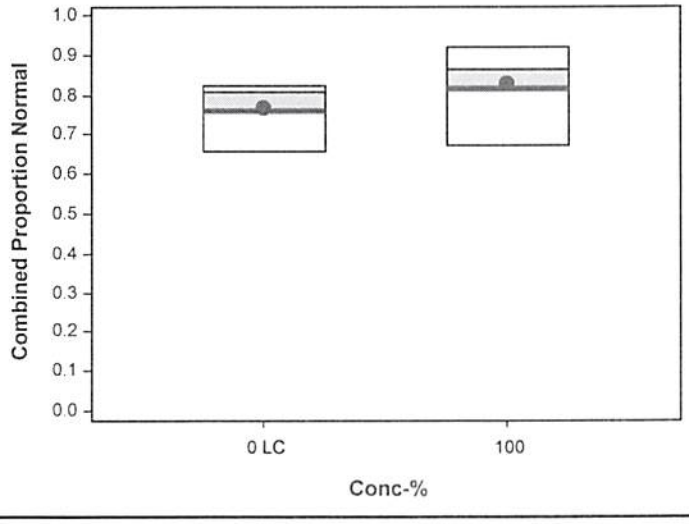
Combined Proportion Normal Summary

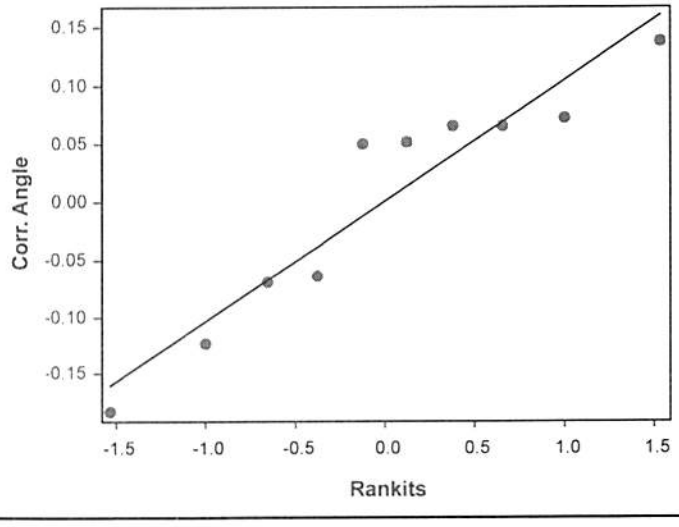
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.7639	0.6689	0.8590	0.8087	0.6557	0.8251	0.0342	10.02%	0.00%
100		5	0.8201	0.6982	0.9420	0.8634	0.6721	0.9180	0.0439	11.97%	-7.35%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.0670	0.9571	1.1770	1.1180	0.9438	1.1390	0.0397	8.31%	0.00%
100		5	1.1430	0.9867	1.3000	1.1920	0.9611	1.2800	0.0563	11.02%	-7.12%

Graphics





Bivalve Larval Survival and Development Test (FC vs 100% Filtered) **WSP Laboratory**

Analysis ID:	00-0876-0348	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 13:25	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	08 Mar-23 13:22	**MD5 Hash:**	81B9E2394CF33F0B1E5283E018C68EC3	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	5	10.82	2.015	CDF	5.8E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0283791	0.0283791	1	8.664	0.0186	Significant Effect
Error	0.0262042	0.0032755	8			
Total	0.0545833		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	3.117	23.15	0.2967	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9206	0.7411	0.3616	Normal Distribution

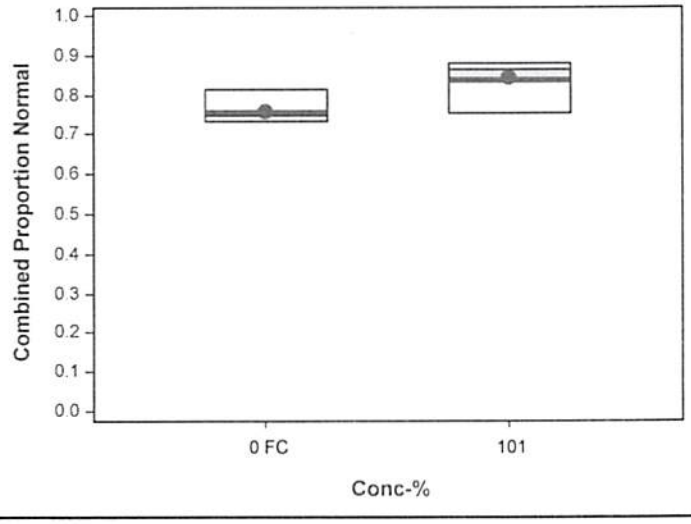
Combined Proportion Normal Summary

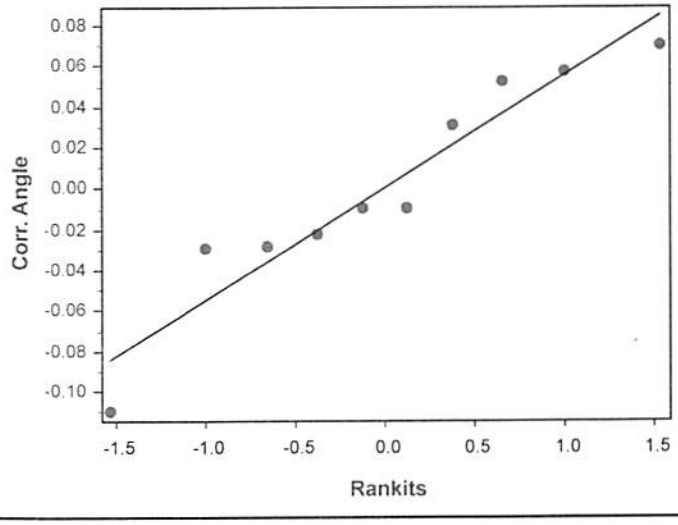
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.7563	0.7151	0.7974	0.7486	0.7322	0.8142	0.0148	4.38%	0.00%
101		5	0.8393	0.7728	0.9058	0.8634	0.7541	0.8811	0.0240	6.38%	-10.97%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.0550	1.0060	1.1050	1.0460	1.0270	1.1250	0.0178	3.78%	0.00%
101		5	1.1620	1.0740	1.2490	1.1920	1.0520	1.2190	0.0315	6.06%	-10.10%

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	10-9404-9738	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 13:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	08 Mar-23 13:22	**MD5 Hash:**	0AE94591E3E47AFDBF56BD047F7AE771	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.04677	5.19%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	1.547	2.362	0.07368	CDF	0.2092	Non-Significant Effect
		12.5	8	0.1848	2.362	0.07368	CDF	0.7730	Non-Significant Effect
		25	8	0.7701	2.362	0.07368	CDF	0.5247	Non-Significant Effect
		50	8	0.8614	2.362	0.07368	CDF	0.4827	Non-Significant Effect
		100	8	1.48	2.362	0.07368	CDF	0.2305	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0099404	0.0019881	5	0.817	0.5495	Non-Significant Effect
Error	0.0584033	0.0024335	24			
Total	0.0683437		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	10.74	15.09	0.0568	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9556	0.9031	0.2377	Normal Distribution

Proportion Normal Summary

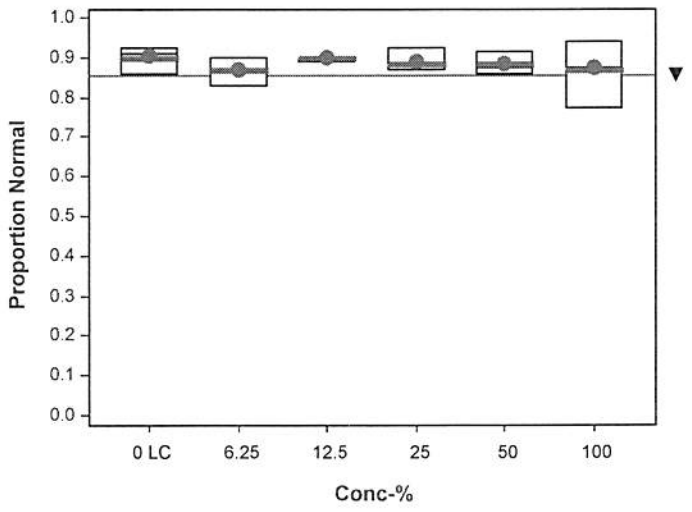
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9004	0.8659	0.9350	0.9080	0.8571	0.9264	0.0124	3.09%	0.00%
6.25		5	0.8703	0.8366	0.9039	0.8711	0.8280	0.9010	0.0121	3.11%	3.35%
12.5		5	0.8982	0.8879	0.9084	0.9000	0.8868	0.9062	0.0037	0.92%	0.25%
25		5	0.8860	0.8566	0.9154	0.8773	0.8671	0.9255	0.0106	2.67%	1.60%
50		5	0.8842	0.8539	0.9145	0.8750	0.8602	0.9157	0.0109	2.76%	1.80%
100		5	0.8681	0.7936	0.9426	0.8729	0.7725	0.9385	0.0268	6.91%	3.60%

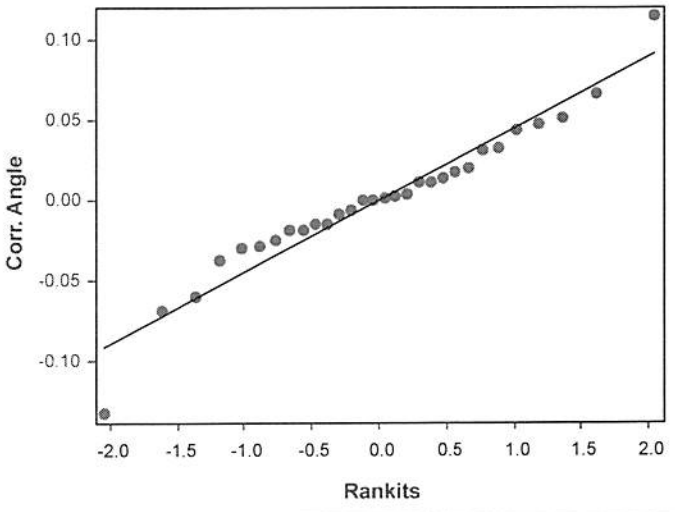
Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2520	1.1960	1.3080	1.2630	1.1830	1.2960	0.0202	3.61%	0.00%
6.25		5	1.2040	1.1540	1.2530	1.2040	1.1430	1.2510	0.0177	3.30%	3.85%
12.5		5	1.2460	1.2290	1.2630	1.2490	1.2280	1.2600	0.0061	1.09%	0.46%
25		5	1.2280	1.1790	1.2770	1.2130	1.1980	1.2940	0.0176	3.21%	1.92%
50		5	1.2250	1.1770	1.2730	1.2090	1.1880	1.2760	0.0174	3.18%	2.15%
100		5	1.2060	1.0970	1.3150	1.2060	1.0740	1.3200	0.0393	7.29%	3.69%

Bivalve Larval Survival and Development Test					WSP Laboratory
Analysis ID:	10-9404-9738	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 13:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	08 Mar-23 13:22	**MD5 Hash:**	0AE94591E3E47AFDBF56BD047F7AE771	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	13-3323-0854	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 13:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	08 Mar-23 13:22	**MD5 Hash:**	DECF7D3C89584881EBCD1DA09D775B4	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.1654	19.52%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-2.42	2.362	0.2029	CDF	0.9998	Non-Significant Effect
		12.5	8	-1.851	2.362	0.2029	CDF	0.9988	Non-Significant Effect
		25	8	-0.1495	2.362	0.2029	CDF	0.8737	Non-Significant Effect
		50	8	-3.014	2.362	0.2029	CDF	1.0000	Non-Significant Effect
		100	8	-2.535	2.362	0.2029	CDF	0.9999	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.304437	0.0608874	5	3.301	0.0208	Significant Effect
Error	0.442702	0.0184459	24			
Total	0.747139		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	5.001	15.09	0.4157	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9448	0.9031	0.1227	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8470	0.7713	0.9227	0.8907	0.7650	0.8907	0.0273	7.20%	0.00%
6.25		5	0.9421	0.8496	1.0000	0.9891	0.8579	1.0000	0.0333	7.91%	-11.23%
12.5		5	0.9301	0.8564	1.0000	0.9290	0.8689	1.0000	0.0265	6.37%	-9.81%
25		5	0.8568	0.7879	0.9258	0.8798	0.7596	0.8907	0.0248	6.48%	-1.16%
50		5	0.9727	0.9282	1.0000	0.9781	0.9126	1.0000	0.0160	3.68%	-14.84%
100		5	0.9454	0.8236	1.0000	0.9891	0.7705	1.0000	0.0439	10.37%	-11.61%

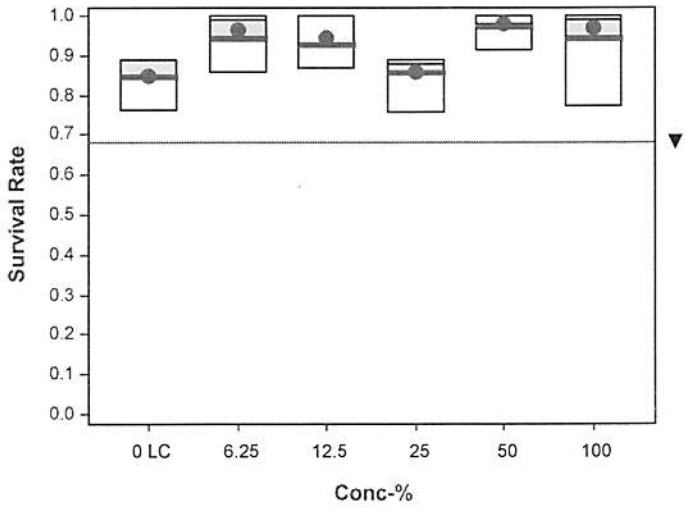
Angular (Corrected) Transformed Summary

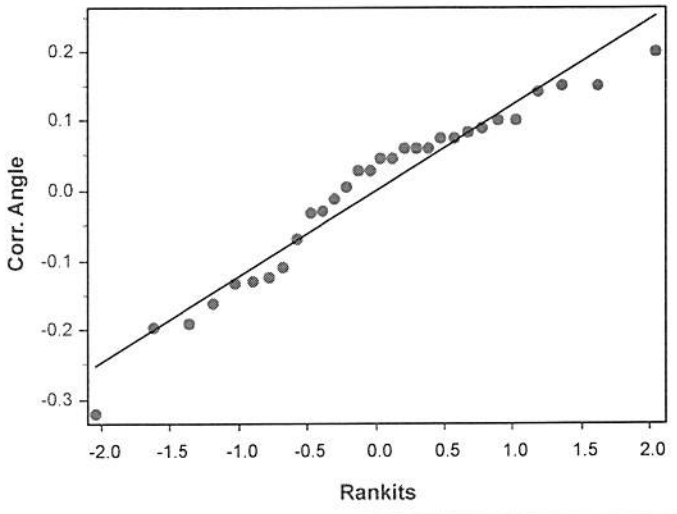
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1740	1.0710	1.2770	1.2340	1.0650	1.2340	0.0371	7.07%	0.00%
6.25		5	1.3820	1.1600	1.6040	1.4660	1.1840	1.5340	0.0801	12.96%	-17.71%
12.5		5	1.3330	1.1550	1.5110	1.3010	1.2000	1.5340	0.0642	10.77%	-13.54%
25		5	1.1870	1.0950	1.2790	1.2170	1.0580	1.2340	0.0331	6.23%	-1.09%
50		5	1.4330	1.2980	1.5690	1.4220	1.2710	1.5340	0.0488	7.61%	-22.05%
100		5	1.3920	1.1640	1.6200	1.4660	1.0710	1.5340	0.0821	13.19%	-18.55%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	13-3323-0854	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 13:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	08 Mar-23 13:22	**MD5 Hash:**	DECF7D3C89584881EBCD1DA09D775B4	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:27 (p 1 of 1)
Test Code/ID: 369FEA8E / 09-1644-9934

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23 1730	**Species:**	Mytilis galloprovincialis	**Sample Code:**	6BEBF57C
End Date:	28 Jan-23 1600	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23 1000	**Material:**	Seawater	**Sample Station:**	SIYB 5

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			191			152	134	JF 2/21/23
			192			179	155	plankton observed
			193			148	137	
			194			141	123	plankton observed
			195			~~133~~ 146 JF	135	
			196			163	145	plankton observed
			197			157	130	JF 3/1/23
			198			163	143	plankton observed
			199			181	160	plankton
			200			139	121	plankton
			201			163	150	
			202			171	149	
			203			205	183	
			204			163	148	
			205			146	130	JF 3/6/23
			206			~~129~~ 158 JF	~~111~~ 137 JF	
			207			161	149	
			208			194	169	plankton
			209			181	158	plankton
			210			174	158	
			211			205	180	
			212			192	173	
			213			192	168	
			214			159	141	plankton
			215			~~150~~ JF 185	~~111~~ JF 163	
			216			~~185~~ 186	~~163~~ 160	plankton
			217			189	146	plankton
			218			178	163	plankton
			219			160	145	
			220			163	151	
			221			158	137	
			222			~~129~~ 140 JF	~~114~~ 120 JF	
			223			170	153	plankton
			224			154	138	
			225			155	137	
			226			169	150	plankton
			227			179	162	↓
			228			167	151	plankton
			229			179	168	plankton
			230			181	160	plankton

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	6BEBF57C
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 5

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	191					
0	FC	2	202					
0	FC	3	193					
0	FC	4	225					
0	FC	5	195					
0	LC	1	205					
0	LC	2	204					
0	LC	3	220					
0	LC	4	222					
0	LC	5	201					
6.25		1	212					
6.25		2	197					
6.25		3	206					
6.25		4	208					
6.25		5	230					
12.5		1	203					
12.5		2	219					
12.5		3	227					
12.5		4	214					
12.5		5	223					
25		1	207					
25		2	198					
25		3	221					
25		4	196					
25		5	200					
50		1	216					
50		2	228					
50		3	218					
50		4	192					
50		5	213					
100		1	217					
100		2	229					
100		3	199					
100		4	209					
100		5	194					
101		1	210					
101		2	224					
101		3	226					
101		4	215					
101		5	211					

QC = TD

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-5
Test No. 23-01-054

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~28/2023 1600

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.6	15.0	15.2
	Salinity (ppt)	33.2	33.8	34.0
	pH (units)	7.89	7.73	7.77
	DO (mg/L)	8.2	8.5	8.4
Filter Control	Temp. (°C)	15.9	15.1	15.2
	Salinity (ppt)	33.2	33.5	33.8
	pH (units)	7.91	7.76	7.78
	DO (mg/L)	7.7	8.5	8.5
6.25	Temp. (°C)	16.0	15.1	15.2
	Salinity (ppt)	33.3	33.7	33.8
	pH (units)	7.90	7.74	7.77
	DO (mg/L)	8.4	8.5	8.4
12.5	Temp. (°C)	15.9	15.0	15.1
	Salinity (ppt)	33.4	33.9	34.0
	pH (units)	7.88	7.75	7.77
	DO (mg/L)	8.3	8.5	8.5
25	Temp. (°C)	15.9	15.0	15.1
	Salinity (ppt)	33.3	33.9	34.0
	pH (units)	7.88	7.74	7.77
	DO (mg/L)	8.5	8.5	8.4
50	Temp. (°C)	15.8	15.2	15.1
	Salinity (ppt)	33.1	33.4	33.8
	pH (units)	7.89	7.75	7.77
	DO (mg/L)	8.7	8.5	8.5
100	Temp. (°C)	15.8	15.2	15.1
	Salinity (ppt)	32.4	32.9	33.5
	pH (units)	7.90	7.75	7.77
	DO (mg/L)	8.9	8.5	8.5
100 Filtered (1.2µm)	Temp. (°C)	15.9	15.2	15.1
	Salinity (ppt)	33.2	33.6	33.8
	pH (units)	7.85	7.76	7.75
	DO (mg/L)	8.4	8.4	8.5
	Tech Initials:	HK	JF	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

Initial QC: JF 3/7/23

Final QC: JC 3/9/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500

Dil Factor 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

X = 183

QA Review: AG 2/9/23

Final Review: SC 3/9/23

Site: SIYB-6

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	06-7404-2495	**Test Type:**	Development-Survival	**Analyst:**		
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater	
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable	
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**

Sample ID:	14-9548-0044	**Code:**	23-W031	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 09:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 12:40	**CAS (PC):**		**Station:**	SIYB 6
Sample Age:	32h (16.1 °C)	**Client:**	WSP		

Comments: FC= Filtered Control, 101=100% (1.2um Filtered)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-6742-4557	Combined Proportion Norma	TST-Welch's t Test	<1.0E-05	100% passed combined proportion normal	1
14-8304-8792	Combined Proportion Norma	TST-Welch's t Test	5.1E-05	101% passed combined proportion normal	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
17-3873-0154	Combined Proportion Norma	Dunnett Multiple Comparison Test		100	>100	---	8.67%	1	1
17-9995-4147	Proportion Normal	Dunnett Multiple Comparison Test		100	>100	---	3.25%	1	1
11-6300-6571	Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	8.95%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
17-9995-4147	Proportion Normal	Control Resp	0.904	0.9	<<	Yes	Passes Criteria
11-6300-6571	Survival Rate	Control Resp	0.9749	0.5	<<	Yes	Passes Criteria
17-3873-0154	Combined Proportion Norma	PMSD	0.08674	<<	0.25	No	Passes Criteria

Bivalve Larval Survival and Development Test
WSP Laboratory

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8813	0.8505	0.9121	0.8579	0.9091	0.0111	0.0248	2.81%	0.00%
0	FC	5	0.8202	0.7200	0.9204	0.7322	0.9100	0.0361	0.0807	9.84%	6.93%
6.25		5	0.8706	0.7711	0.9700	0.7322	0.9394	0.0358	0.0801	9.20%	1.22%
12.5		5	0.8744	0.8045	0.9443	0.7760	0.9130	0.0252	0.0563	6.44%	0.78%
25		5	0.8878	0.8471	0.9285	0.8361	0.9185	0.0147	0.0328	3.69%	-0.74%
50		5	0.8779	0.8129	0.9429	0.8087	0.9293	0.0234	0.0523	5.96%	0.38%
100		5	0.8898	0.8530	0.9266	0.8470	0.9233	0.0132	0.0296	3.33%	-0.97%
101		5	0.8733	0.8242	0.9223	0.8197	0.9126	0.0177	0.0395	4.52%	0.91%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9040	0.8788	0.9293	0.8785	0.9326	0.0091	0.0203	2.25%	0.00%
0	FC	5	0.8917	0.8608	0.9226	0.8481	0.9100	0.0111	0.0249	2.79%	1.37%
6.25		5	0.9016	0.8738	0.9294	0.8827	0.9394	0.0100	0.0224	2.48%	0.27%
12.5		5	0.9037	0.8842	0.9231	0.8852	0.9221	0.0070	0.0157	1.73%	0.04%
25		5	0.9038	0.8828	0.9249	0.8776	0.9185	0.0076	0.0169	1.87%	0.02%
50		5	0.8991	0.8684	0.9297	0.8644	0.9293	0.0110	0.0247	2.74%	0.55%
100		5	0.9076	0.8964	0.9188	0.9006	0.9233	0.0040	0.0090	0.99%	-0.39%
101		5	0.9172	0.8868	0.9476	0.8811	0.9434	0.0109	0.0245	2.67%	-1.46%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9749	0.9501	0.9996	0.9508	1.0000	0.0089	0.0199	2.04%	0.00%
0	FC	5	0.9191	0.8237	1.0150	0.8361	1.0000	0.0344	0.0768	8.36%	5.72%
6.25		5	0.9650	0.8679	1.0620	0.8251	1.0000	0.0350	0.0782	8.10%	1.01%
12.5		5	0.9683	0.8803	1.0560	0.8415	1.0000	0.0317	0.0709	7.32%	0.67%
25		5	0.9825	0.9340	1.0310	0.9126	1.0000	0.0175	0.0391	3.98%	-0.78%
50		5	0.9760	0.9286	1.0230	0.9126	1.0000	0.0171	0.0382	3.91%	-0.11%
100		5	0.9803	0.9439	1.0170	0.9344	1.0000	0.0131	0.0293	2.99%	-0.56%
101		5	0.9530	0.8813	1.0250	0.8689	1.0000	0.0258	0.0578	6.06%	2.24%

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Detail

MD5: 2744FD4FDFD073B74469D4D350298858

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8689	0.8634	0.9071	0.9091	0.8579
0	FC	0.8960	0.7322	0.9100	0.7541	0.8087
6.25		0.9394	0.8827	0.8990	0.8994	0.7322
12.5		0.9082	0.8897	0.9130	0.7760	0.8852
25		0.9185	0.9102	0.8361	0.8967	0.8776
50		0.9091	0.9293	0.8361	0.9063	0.8087
100		0.9038	0.9233	0.9006	0.8470	0.8743
101		0.8197	0.8470	0.8811	0.9059	0.9126

Proportion Normal Detail

MD5: E7FAF27834742A9FD522AB697B345C53

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8785	0.9080	0.9326	0.9091	0.8920
0	FC	0.8960	0.8481	0.9100	0.9020	0.9024
6.25		0.9394	0.8827	0.8990	0.8994	0.8874
12.5		0.9082	0.8897	0.9130	0.9221	0.8852
25		0.9185	0.9102	0.9162	0.8967	0.8776
50		0.9091	0.9293	0.8644	0.9063	0.8862
100		0.9038	0.9233	0.9006	0.9064	0.9040
101		0.9434	0.9226	0.8811	0.9059	0.9330

Survival Rate Detail

MD5: 308D261638CF45AC4E03C5341E89A470

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9891	0.9508	0.9727	1.0000	0.9617
0	FC	1.0000	0.8634	1.0000	0.8361	0.8962
6.25		1.0000	1.0000	1.0000	1.0000	0.8251
12.5		1.0000	1.0000	1.0000	0.8415	1.0000
25		1.0000	1.0000	0.9126	1.0000	1.0000
50		1.0000	1.0000	0.9672	1.0000	0.9126
100		1.0000	1.0000	1.0000	0.9344	0.9672
101		0.8689	0.9180	1.0000	1.0000	0.9781

Bivalve Larval Survival and Development Test — WSP Laboratory

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	159/183	158/183	166/183	310/341	157/183
0	FC	310/346	134/183	182/200	138/183	148/183
6.25		186/198	346/392	187/208	322/358	134/183
12.5		178/196	355/399	168/184	142/183	162/183
25		169/184	304/334	153/183	165/184	172/196
50		170/187	184/198	153/183	329/363	148/183
100		310/343	301/326	317/352	155/183	160/183
101		150/183	155/183	163/185	183/202	167/183

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	159/181	158/174	166/178	310/341	157/176 (1)
0	FC	310/346	134/158	182/200	138/153	148/164
6.25		186/198	346/392	187/208	322/358	134/151
12.5		178/196	355/399	168/184	142/154	162/183
25		169/184	304/334	153/167	165/184	172/196
50		170/187	184/198	153/177	329/363	148/167
100		310/343	301/326	317/352	155/171	160/177
101		150/159	155/168	163/185	183/202	167/179

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	181/183	174/183	178/183	183/183	176/183
0	FC	183/183	158/183	183/183	153/183	164/183
6.25		183/183	183/183	183/183	183/183	151/183
12.5		183/183	183/183	183/183	154/183	183/183
25		183/183	183/183	167/183	183/183	183/183
50		183/183	183/183	177/183	183/183	167/183
100		183/183	183/183	183/183	171/183	177/183
101		159/183	168/183	183/183	183/183	179/183

(1) Vials with total counts >300 were accidently inoculated twice. However, this did not affect the final Percent or Proportion results.

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	17-3873-0154	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 15:39	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 15:33	**MD5 Hash:**	32AD7AD0AA04C951AA3803ED80A4E616	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101=100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.07644	8.67%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	0.1614	2.362	0.1073	CDF	0.7812	Non-Significant Effect
		12.5	8	0.1443	2.362	0.1073	CDF	0.7872	Non-Significant Effect
		25	8	-0.2475	2.362	0.1073	CDF	0.8961	Non-Significant Effect
		50	8	0.01899	2.362	0.1073	CDF	0.8277	Non-Significant Effect
		100	8	-0.3108	2.362	0.1073	CDF	0.9089	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0020210	0.0004042	5	0.07839	0.9950	Non-Significant Effect
Error	0.123749	0.0051562	24			
Total	0.12577		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	5.617	15.09	0.3453	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9168	0.9031	0.0221	Normal Distribution

Combined Proportion Normal Summary

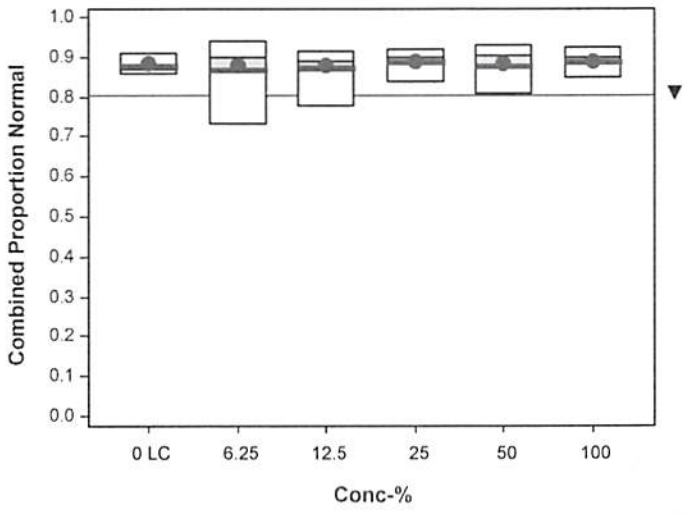
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8813	0.8505	0.9121	0.8689	0.8579	0.9091	0.0111	2.81%	0.00%
6.25		5	0.8706	0.7711	0.9700	0.8990	0.7322	0.9394	0.0358	9.20%	1.22%
12.5		5	0.8744	0.8045	0.9443	0.8897	0.7760	0.9130	0.0252	6.44%	0.78%
25		5	0.8878	0.8471	0.9285	0.8967	0.8361	0.9185	0.0147	3.69%	-0.74%
50		5	0.8779	0.8129	0.9429	0.9063	0.8087	0.9293	0.0234	5.96%	0.38%
100		5	0.8898	0.8530	0.9266	0.9006	0.8470	0.9233	0.0132	3.33%	-0.97%

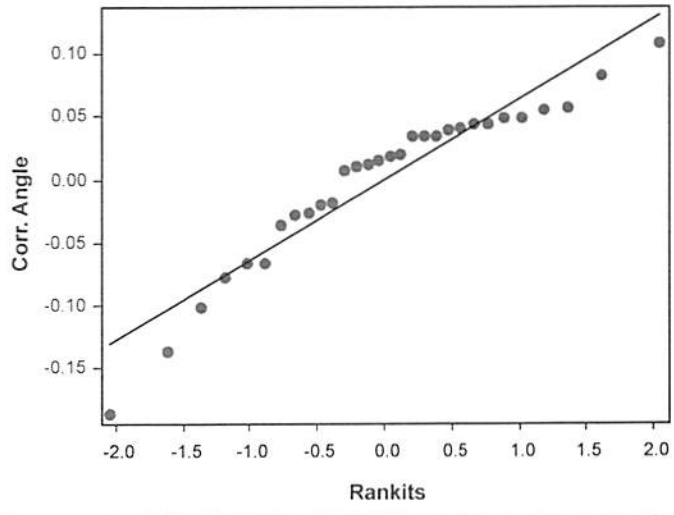
Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2200	1.1720	1.2690	1.2000	1.1840	1.2650	0.0175	3.20%	0.00%
6.25		5	1.2130	1.0760	1.3510	1.2470	1.0270	1.3220	0.0495	9.12%	0.60%
12.5		5	1.2140	1.1160	1.3120	1.2320	1.0780	1.2710	0.0352	6.48%	0.54%
25		5	1.2320	1.1690	1.2940	1.2440	1.1540	1.2810	0.0226	4.10%	-0.92%
50		5	1.2200	1.1220	1.3180	1.2600	1.1180	1.3020	0.0353	6.48%	0.07%
100		5	1.2350	1.1760	1.2930	1.2500	1.1690	1.2900	0.0209	3.79%	-1.16%

Bivalve Larval Survival and Development Test					WSP Laboratory
Analysis ID:	17-3873-0154	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 15:39	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 15:33	**MD5 Hash:**	32AD7AD0AA04C951AA3803ED80A4E616	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test (LC vs 100%) **WSP Laboratory**

Analysis ID:	18-6742-4557	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 15:40	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 15:33	**MD5 Hash:**	0788170C23134125CDAE57434914CEB1	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101=100% (1.2um Filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	6	12.93	1.943	CDF	<1.0E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000498	0.000498	1	0.2679	0.6187	Non-Significant Effect
Error	0.0148695	0.0018587	8			
Total	0.0153675		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.436	23.15	0.7346	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9355	0.7411	0.5038	Normal Distribution

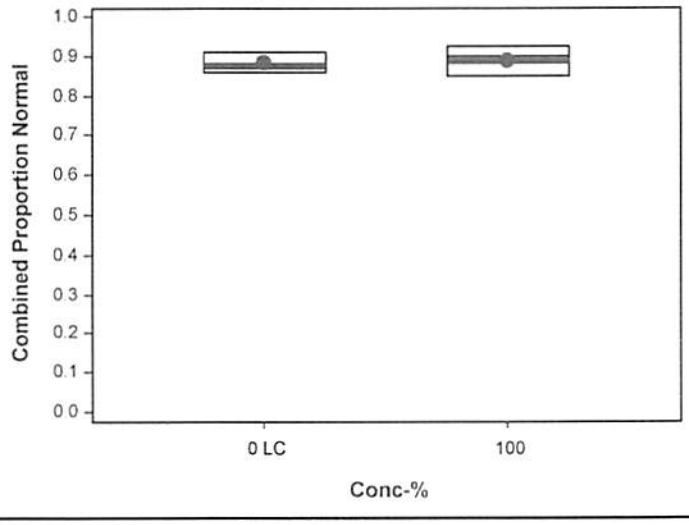
Combined Proportion Normal Summary

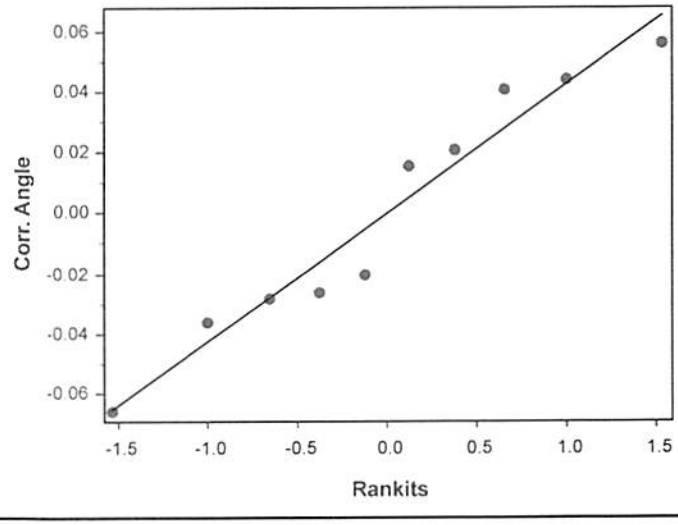
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8813	0.8505	0.9121	0.8689	0.8579	0.9091	0.0111	2.81%	0.00%
100		5	0.8898	0.8530	0.9266	0.9006	0.8470	0.9233	0.0132	3.33%	-0.97%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2200	1.1720	1.2690	1.2000	1.1840	1.2650	0.0175	3.20%	0.00%
100		5	1.2350	1.1760	1.2930	1.2500	1.1690	1.2900	0.0209	3.79%	-1.16%

Graphics





Bivalve Larval Survival and Development Test (FC vs 100% Filtered) **WSP Laboratory**

Analysis ID:	14-8304-8792	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 15:40	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	07 Mar-23 15:33	**MD5 Hash:**	D83FD872764772A8732412383D71CB96	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101=100% (1.2um Filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	7	7.863	1.895	CDF	5.1E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.011837	0.011837	1	1.545	0.2491	Non-Significant Effect
Error	0.0612893	0.0076612	8			
Total	0.0731263		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	3.41	23.15	0.2619	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9545	0.7411	0.7223	Normal Distribution

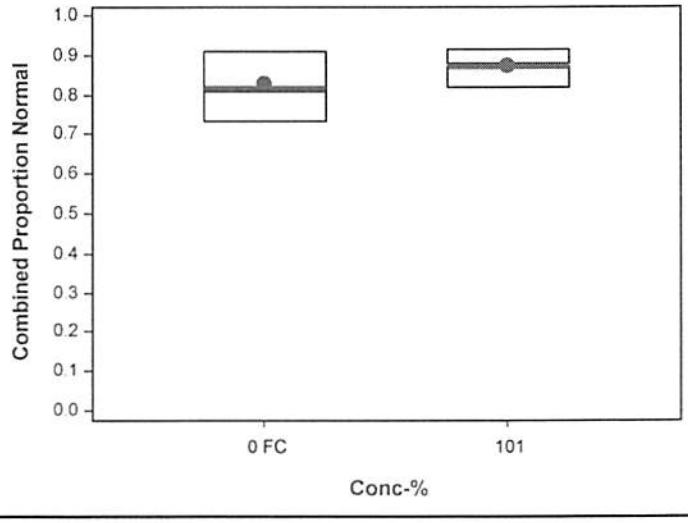
Combined Proportion Normal Summary

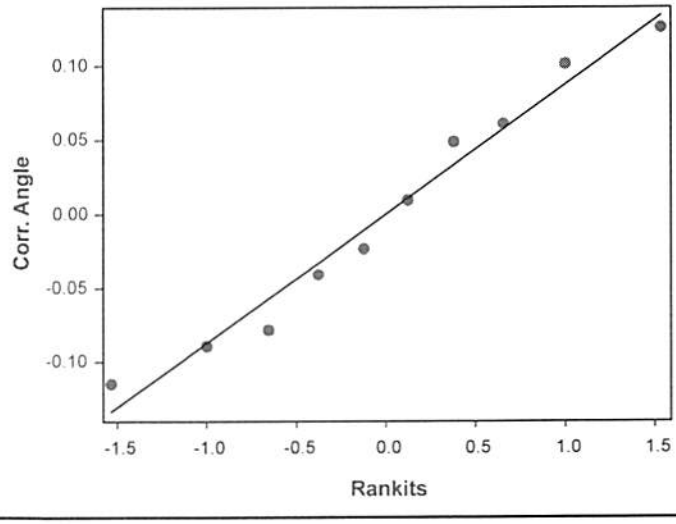
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8202	0.7200	0.9204	0.8087	0.7322	0.9100	0.0361	9.84%	0.00%
101		5	0.8733	0.8242	0.9223	0.8811	0.8197	0.9126	0.0177	4.52%	-6.47%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.1410	1.0060	1.2760	1.1180	1.0270	1.2660	0.0487	9.54%	0.00%
101		5	1.2100	1.1370	1.2830	1.2190	1.1320	1.2710	0.0264	4.87%	-6.03%

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	17-9995-4147	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 15:38	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 15:33	**MD5 Hash:**	AD8F45A4C3F87B4F3140498B8958F7D7	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101=100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.02936	3.25%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	0.1826	2.362	0.04826	CDF	0.7738	Non-Significant Effect
		12.5	8	0.06168	2.362	0.04826	CDF	0.8145	Non-Significant Effect
		25	8	0.04298	2.362	0.04826	CDF	0.8203	Non-Significant Effect
		50	8	0.3885	2.362	0.04826	CDF	0.6944	Non-Significant Effect
		100	8	-0.2464	2.362	0.04826	CDF	0.8959	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0004592	9.183E-05	5	0.08797	0.9934	Non-Significant Effect
Error	0.0250539	0.0010439	24			
Total	0.0255131		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	3.666	15.09	0.5984	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9832	0.9031	0.9036	Normal Distribution

Proportion Normal Summary

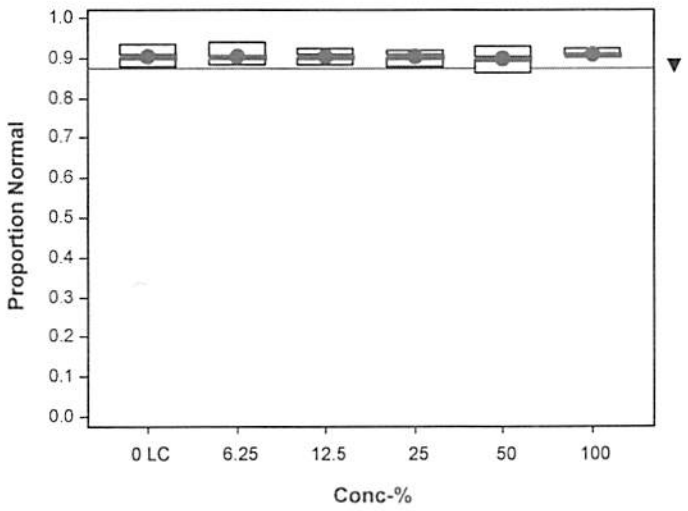
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9040	0.8788	0.9293	0.9080	0.8785	0.9326	0.0091	2.25%	0.00%
6.25		5	0.9016	0.8738	0.9294	0.8990	0.8827	0.9394	0.0100	2.48%	0.27%
12.5		5	0.9037	0.8842	0.9231	0.9082	0.8852	0.9221	0.0070	1.73%	0.04%
25		5	0.9038	0.8828	0.9249	0.9102	0.8776	0.9185	0.0076	1.87%	0.02%
50		5	0.8991	0.8684	0.9297	0.9063	0.8644	0.9293	0.0110	2.74%	0.55%
100		5	0.9076	0.8964	0.9188	0.9040	0.9006	0.9233	0.0040	0.99%	-0.39%

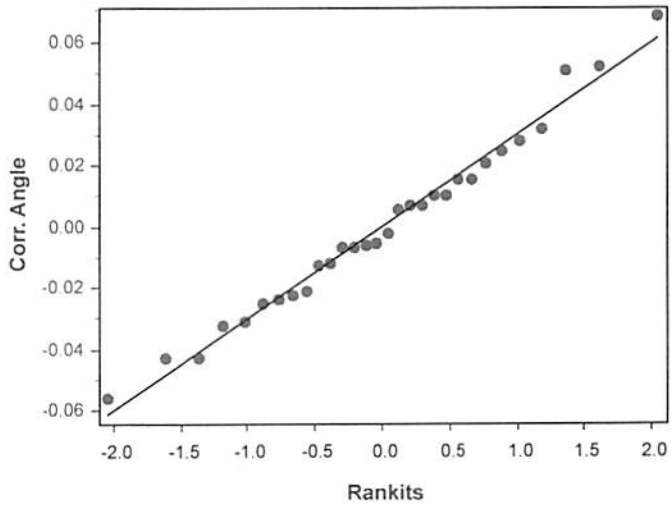
Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2570	1.2140	1.3010	1.2630	1.2150	1.3080	0.0157	2.79%	0.00%
6.25		5	1.2530	1.2040	1.3030	1.2470	1.2210	1.3220	0.0179	3.20%	0.30%
12.5		5	1.2560	1.2230	1.2890	1.2630	1.2250	1.2880	0.0119	2.11%	0.10%
25		5	1.2560	1.2210	1.2910	1.2660	1.2130	1.2810	0.0126	2.24%	0.07%
50		5	1.2490	1.1990	1.3000	1.2600	1.1940	1.3020	0.0183	3.27%	0.63%
100		5	1.2620	1.2420	1.2820	1.2560	1.2500	1.2900	0.0072	1.27%	-0.40%

Bivalve Larval Survival and Development Test					WSP Laboratory
Analysis ID:	17-9995-4147	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 15:38	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 15:33	**MD5 Hash:**	AD8F45A4C3F87B4F3140498B8958F7D7	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	11-6300-6571	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 15:38	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 15:33	**MD5 Hash:**	32625E4E3E597F63CFE9B82EDF856F61	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101=100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.08721	8.95%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	33	16	1	CDF	0.9907	Non-Significant Effect
		12.5	8	33	16	1	CDF	0.9907	Non-Significant Effect
		25	8	33	16	1	CDF	0.9907	Non-Significant Effect
		50	8	30.5	16	1	CDF	0.9573	Non-Significant Effect
		100	8	30.5	16	1	CDF	0.9573	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0081557	0.0016311	5	0.09459	0.9922	Non-Significant Effect
Error	0.413854	0.0172439	24			
Total	0.42201		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	3.365	15.09	0.6439	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7444	0.9031	<1.0E-05	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9749	0.9501	0.9996	0.9727	0.9508	1.0000	0.0089	2.04%	0.00%
6.25		5	0.9650	0.8679	1.0000	1.0000	0.8251	1.0000	0.0350	8.10%	1.01%
12.5		5	0.9683	0.8803	1.0000	1.0000	0.8415	1.0000	0.0317	7.32%	0.67%
25		5	0.9825	0.9340	1.0000	1.0000	0.9126	1.0000	0.0175	3.98%	-0.78%
50		5	0.9760	0.9286	1.0000	1.0000	0.9126	1.0000	0.0171	3.91%	-0.11%
100		5	0.9803	0.9439	1.0000	1.0000	0.9344	1.0000	0.0131	2.99%	-0.56%

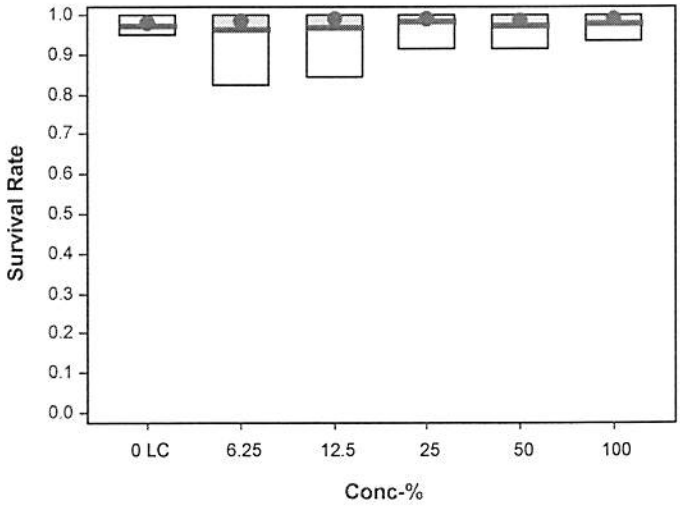
Angular (Corrected) Transformed Summary

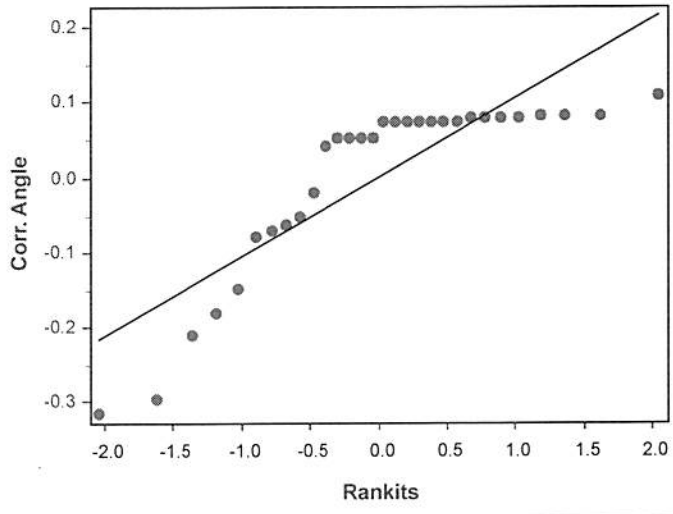
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.4250	1.3320	1.5180	1.4050	1.3470	1.5340	0.0336	5.27%	0.00%
6.25		5	1.4550	1.2360	1.6740	1.5340	1.1390	1.5340	0.0789	12.12%	-2.09%
12.5		5	1.4590	1.2530	1.6660	1.5340	1.1610	1.5340	0.0745	11.41%	-2.40%
25		5	1.4810	1.3350	1.6270	1.5340	1.2710	1.5340	0.0526	7.95%	-3.93%
50		5	1.4520	1.3040	1.6000	1.5340	1.2710	1.5340	0.0534	8.22%	-1.90%
100		5	1.4600	1.3310	1.5900	1.5340	1.3120	1.5340	0.0466	7.13%	-2.47%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	11-6300-6571	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	07 Mar-23 15:38	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	07 Mar-23 15:33	**MD5 Hash:**	32625E4E3E597F63CFE9B82EDF856F61	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:29 (p 1 of 1)
Test Code/ID: JF ~~747DCF5B~~ / 19-5440-2139

Bivalve Larval Survival and Development Test 23-01-055 ~~Wood E&IS~~ JF

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	592336EC
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 6

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			231			~~HK 180~~ 184	169	HK 2/23/23
			232			200	182	
			233			164	148	
			234			184	168	
			235			177	153	
			236			153	138	
			237			179	167	
			238			174	158	
			239			158	134	
			240			176	157	
			241			151	134	HK 3/1/23
			242			198	186	
			243			202	183	
			244			171	155	
			245			187	170	
			246			178	166	
			247			167	148	
			248			181	159	
			249			208	187	
			250			177	160	
			251			~~HK 30~~ 326	301	*Double-Inoculated by accident
			252			358	322	
			253			341	310	
			254			343	310	
			255			346	313	
			256			352	317	
			257			392	346	
			258			363	329	
			259			399	355	
			260			334	304	
			261			196	178	
			262			168	155	
			263			183	162	
			264			198	184	
			265			159	150	
			266			196	172	
			267			184	165	
			268			154	142	
			269			167	153	
			270			185	163	

CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:29 (p 1 of 1)
Test Code/ID: 747DCF5B / 19-5440-2139

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	592336EC
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 6

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	255					
0	FC	2	239					
0	FC	3	232					
0	FC	4	236					
0	FC	5	233					
0	LC	1	248					
0	LC	2	238					
0	LC	3	246					
0	LC	4	253					
0	LC	5	240					
6.25		1	242					
6.25		2	257					
6.25		3	249					
6.25		4	252					
6.25		5	241					
12.5		1	261					
12.5		2	259					
12.5		3	234					
12.5		4	268					
12.5		5	263					
25		1	231					
25		2	260					
25		3	269					
25		4	267					
25		5	266					
50		1	245					
50		2	264					
50		3	235					
50		4	258					
50		5	247					
100		1	254					
100		2	251					
100		3	256					
100		4	244					
100		5	250					
101		1	265					
101		2	262					
101		3	270					
101		4	243					
101		5	237					

QC: TD

Water Quality for Bivalve Development

Client: Wood - Port of San Diego
Sample ID: SIYB-6
Test No. 23-01-055

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~28/2023 1600

Test Conc. (%)	Parameter	Water Quality Measurements 0hr	24hr	48hr
Lab Control	Temp. (°C)	15.9	15.2	15.3
	Salinity (ppt)	33.2	33.6	33.8
	pH (units)	7.91	7.75	7.77
	DO (mg/L)	8.3	8.3	8.2
Filter Control	Temp. (°C)	15.9	15.1	15.3
	Salinity (ppt)	33.1	33.7	33.8
	pH (units)	7.92	7.76	7.77
	DO (mg/L)	7.6	8.4	8.3
6.25	Temp. (°C)	15.9	15.1	15.2
	Salinity (ppt)	33.4	33.8	33.9
	pH (units)	7.91	7.74	7.76
	DO (mg/L)	8.5	8.3	8.3
12.5	Temp. (°C)	16.0	15.0	15.2
	Salinity (ppt)	33.4	34.1	34.2
	pH (units)	7.88	7.74	7.76
	DO (mg/L)	8.5	8.4	8.3
25	Temp. (°C)	15.8	15.2	15.2
	Salinity (ppt)	33.3	33.8	34.0
	pH (units)	7.90	7.73	7.75
	DO (mg/L)	8.7	8.5	8.4
50	Temp. (°C)	15.7	15.2	15.2
	Salinity (ppt)	33.1	33.7	34.0
	pH (units)	7.90	7.73	7.75
	DO (mg/L)	8.8	8.6	8.4
100	Temp. (°C)	15.7	15.4	15.3
	Salinity (ppt)	32.5	33.1	33.4
	pH (units)	7.90	7.74	7.75
	DO (mg/L)	8.8	8.4	8.4
100 Filtered (1.2µm)	Temp. (°C)	16.0	15.2	15.3
	Salinity (ppt)	32.3	32.8	33.1
	pH (units)	7.82	7.74	7.76
	DO (mg/L)	8.2	8.5	8.4
	Tech Initials:	HK	JF	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

Initial QC: JF 3/7/23

Final QC: JC 3-9-23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: TØ1 = 195, TØ2 = ~~175~~ 168, TØ3 = 175, TØ4 = 192, TØ5 = 184

$\bar{X}$ = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

Site: SIYB-REF-1

Bivalve Larval Survival and Development Test

WSP Laboratory

Batch ID:	18-9017-1135	**Test Type:**	Development-Survival	**Analyst:**			
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater		
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable		
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**	

Sample ID:	10-9402-6059	**Code:**	23-W032	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 08:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 12:40	**CAS (PC):**		**Station:**	SIYB REF-1
Sample Age:	33h (15.6 °C)	**Client:**	WSP		

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0600-4848	Combined Proportion Norma	TST-Welch's t Test	0.0009	100% passed combined proportion normal	1
08-0755-1045	Combined Proportion Norma	TST-Welch's t Test	7.2E-05	101% passed combined proportion normal	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
12-2249-6451	Combined Proportion Norma	Dunnett Multiple Comparison Test		100	>100	---	10.8%	1	1
17-1354-8764	Proportion Normal	Dunnett Multiple Comparison Test		100	>100	---	3.97%	1	1
16-9688-8529	Survival Rate	Dunnett Multiple Comparison Test		100	>100	---	12.2%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
17-1354-8764	Proportion Normal	Control Resp	0.8981	0.9	<<	Yes	Below Criteria (1)
16-9688-8529	Survival Rate	Control Resp	0.9355	0.5	<<	Yes	Passes Criteria
12-2249-6451	Combined Proportion Norma	PMSD	0.108	<<	0.25	No	Passes Criteria

(1) OK - rounds up to 90%

Bivalve Larval Survival and Development Test
WSP Laboratory

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8394	0.7769	0.9019	0.7541	0.8798	0.0225	0.0504	6.00%	0.00%
0	FC	5	0.8329	0.7689	0.8969	0.7650	0.9076	0.0231	0.0515	6.19%	0.78%
6.25		5	0.8738	0.8230	0.9247	0.8087	0.9149	0.0183	0.0409	4.68%	-4.10%
12.5		5	0.8727	0.8217	0.9236	0.8087	0.9206	0.0183	0.0410	4.70%	-3.96%
25		5	0.8520	0.7756	0.9283	0.7760	0.9211	0.0275	0.0615	7.22%	-1.50%
50		5	0.8273	0.7654	0.8892	0.7541	0.8743	0.0223	0.0499	6.03%	1.44%
100		5	0.8591	0.7661	0.9521	0.7760	0.9457	0.0335	0.0749	8.72%	-2.35%
101		5	0.8339	0.7687	0.8991	0.7486	0.8798	0.0235	0.0525	6.30%	0.66%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8981	0.8735	0.9227	0.8691	0.9181	0.0089	0.0198	2.21%	0.00%
0	FC	5	0.9086	0.8872	0.9301	0.8844	0.9312	0.0077	0.0173	1.90%	-1.17%
6.25		5	0.8924	0.8709	0.9139	0.8681	0.9149	0.0077	0.0173	1.94%	0.64%
12.5		5	0.9044	0.8792	0.9296	0.8791	0.9261	0.0091	0.0203	2.24%	-0.70%
25		5	0.9071	0.8922	0.9220	0.8931	0.9211	0.0054	0.0120	1.32%	-1.00%
50		5	0.8829	0.8515	0.9142	0.8466	0.9107	0.0113	0.0252	2.86%	1.70%
100		5	0.8967	0.8533	0.9400	0.8521	0.9457	0.0156	0.0349	3.89%	0.16%
101		5	0.8895	0.8509	0.9282	0.8407	0.9195	0.0139	0.0311	3.50%	0.96%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9355	0.8494	1.0220	0.8251	1.0000	0.0310	0.0694	7.42%	0.00%
0	FC	5	0.9169	0.8424	0.9915	0.8470	1.0000	0.0269	0.0600	6.55%	1.99%
6.25		5	0.9792	0.9253	1.0330	0.9016	1.0000	0.0194	0.0434	4.44%	-4.67%
12.5		5	0.9486	0.8498	1.0470	0.8087	1.0000	0.0356	0.0796	8.39%	-1.40%
25		5	0.9388	0.8658	1.0120	0.8689	1.0000	0.0263	0.0588	6.26%	-0.35%
50		5	0.9366	0.8899	0.9833	0.8907	0.9781	0.0168	0.0376	4.01%	-0.12%
100		5	0.9574	0.8803	1.0350	0.8634	1.0000	0.0278	0.0621	6.49%	-2.34%
101		5	0.9224	0.8465	0.9983	0.8525	0.9945	0.0273	0.0611	6.63%	1.40%

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Detail

MD5: 98ECF5A76CE72F9113040752A928741A

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8691	0.8798	0.7541	0.8579	0.8361
0	FC	0.9076	0.8415	0.8142	0.7650	0.8361
6.25		0.8634	0.8848	0.8973	0.8087	0.9149
12.5		0.8743	0.8907	0.8689	0.9206	0.8087
25		0.8142	0.7760	0.9071	0.8415	0.9211
50		0.8361	0.8033	0.8743	0.8689	0.7541
100		0.9086	0.7869	0.9457	0.8783	0.7760
101		0.8306	0.8798	0.7486	0.8361	0.8743

Proportion Normal Detail

MD5: 458F1CB3EFFCFDCDD267ECD4C64208A7

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8691	0.8895	0.9139	0.9181	0.9000
0	FC	0.9076	0.9167	0.9312	0.9032	0.8844
6.25		0.8681	0.8848	0.8973	0.8970	0.9149
12.5		0.8791	0.9261	0.8883	0.9206	0.9080
25		0.8976	0.8931	0.9071	0.9167	0.9211
50		0.9107	0.8698	0.8989	0.8883	0.8466
100		0.9086	0.8521	0.9457	0.8783	0.8987
101		0.9048	0.9045	0.8782	0.8407	0.9195

Survival Rate Detail

MD5: 3095A595860844586C5A5EEA56F0E7BC

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9891	0.8251	0.9344	0.9290
0	FC	1.0000	0.9180	0.8743	0.8470	0.9454
6.25		0.9945	1.0000	1.0000	0.9016	1.0000
12.5		0.9945	0.9617	0.9781	1.0000	0.8087
25		0.9071	0.8689	1.0000	0.9180	1.0000
50		0.9180	0.9235	0.9727	0.9781	0.8907
100		1.0000	0.9235	1.0000	1.0000	0.8634
101		0.9180	0.9727	0.8525	0.9945	0.8743

Bivalve Larval Survival and Development Test

WSP Laboratory

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	166/191	161/183	138/183	157/183	153/183
0	FC	167/184	154/183	149/183	140/183	153/183
6.25		158/183	169/191	166/185	148/183	172/188
12.5		160/183	163/183	159/183	174/189	148/183
25		149/183	142/183	166/183	154/183	175/190
50		153/183	147/183	160/183	159/183	138/183
100		169/186	144/183	174/184	166/189	142/183
101		152/183	161/183	137/183	153/183	160/183

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	166/191	161/181	138/151	157/171	153/170
0	FC	167/184	154/168	149/160	140/155	153/173
6.25		158/182	169/191	166/185	148/165	172/188
12.5		160/182	163/176	159/179	174/189	148/163
25		149/166	142/159	166/183	154/168	175/190
50		153/168	147/169	160/178	159/179	138/163
100		169/186	144/169	174/184	166/189	142/158
101		152/168	161/178	137/156	153/182	160/174

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	183/183	181/183	151/183	171/183	170/183
0	FC	183/183	168/183	160/183	155/183	173/183
6.25		182/183	183/183	183/183	165/183	183/183
12.5		182/183	176/183	179/183	183/183	148/183
25		166/183	159/183	183/183	168/183	183/183
50		168/183	169/183	178/183	179/183	163/183
100		183/183	169/183	183/183	183/183	158/183
101		168/183	178/183	156/183	182/183	160/183

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	12-2249-6451	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 11:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	21 Feb-23 14:44	**MD5 Hash:**	26F8BD4ECC1D903DD6619A8D44B23632	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.09068	10.80%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-1.006	2.362	0.1158	CDF	0.9836	Non-Significant Effect
		12.5	8	-0.9724	2.362	0.1158	CDF	0.9820	Non-Significant Effect
		25	8	-0.4234	2.362	0.1158	CDF	0.9287	Non-Significant Effect
		50	8	0.3335	2.362	0.1158	CDF	0.7167	Non-Significant Effect
		100	8	-0.713	2.362	0.1158	CDF	0.9642	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0176378	0.0035276	5	0.5871	0.7097	Non-Significant Effect
Error	0.144208	0.0060087	24			
Total	0.161846		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.538	15.09	0.7707	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9505	0.9031	0.1748	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8394	0.7769	0.9019	0.8579	0.7541	0.8798	0.0225	6.00%	0.00%
6.25		5	0.8738	0.8230	0.9247	0.8848	0.8087	0.9149	0.0183	4.68%	-4.10%
12.5		5	0.8727	0.8217	0.9236	0.8743	0.8087	0.9206	0.0183	4.70%	-3.96%
25		5	0.8520	0.7756	0.9283	0.8415	0.7760	0.9211	0.0275	7.22%	-1.50%
50		5	0.8273	0.7654	0.8892	0.8361	0.7541	0.8743	0.0223	6.03%	1.44%
100		5	0.8591	0.7661	0.9521	0.8783	0.7760	0.9457	0.0335	8.72%	-2.35%

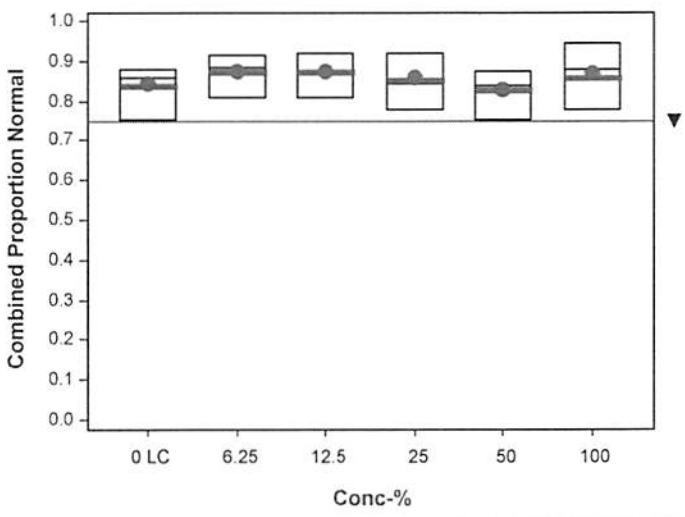
Angular (Corrected) Transformed Summary

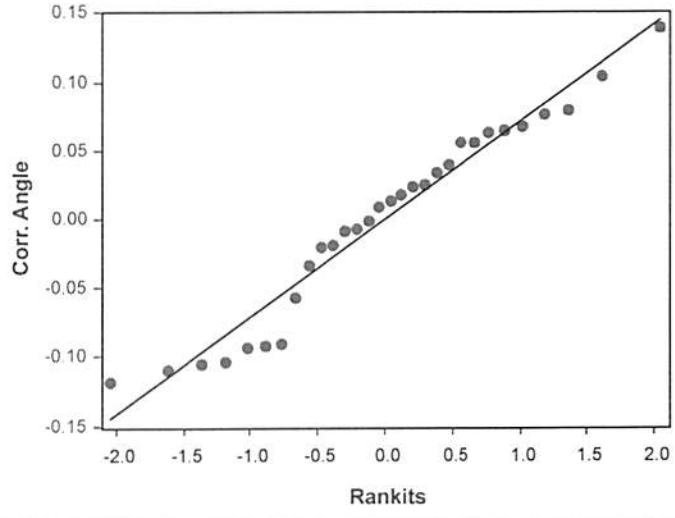
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1620	1.0800	1.2430	1.1840	1.0520	1.2170	0.0293	5.64%	0.00%
6.25		5	1.2110	1.1360	1.2850	1.2250	1.1180	1.2750	0.0268	4.95%	-4.25%
12.5		5	1.2090	1.1340	1.2850	1.2080	1.1180	1.2850	0.0272	5.02%	-4.10%
25		5	1.1820	1.0720	1.2930	1.1610	1.0780	1.2860	0.0398	7.52%	-1.79%
50		5	1.1450	1.0640	1.2260	1.1540	1.0520	1.2080	0.0291	5.68%	1.41%
100		5	1.1960	1.0580	1.3340	1.2140	1.0780	1.3360	0.0497	9.29%	-3.01%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	12-2249-6451	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 11:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	21 Feb-23 14:44	**MD5 Hash:**	26F8BD4ECC1D903DD6619A8D44B23632	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test (LC vs 100%) **WSP Laboratory**

Analysis ID:	12-0600-4848	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 11:25	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	21 Feb-23 14:44	**MD5 Hash:**	436682D09995A007B31F40C093F46A9D	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	5	5.987	2.015	CDF	0.0009	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0030547	0.0030547	1	0.3671	0.5614	Non-Significant Effect
Error	0.0665642	0.0083205	8			
Total	0.0696189		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.879	23.15	0.3302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9122	0.7411	0.2967	Normal Distribution

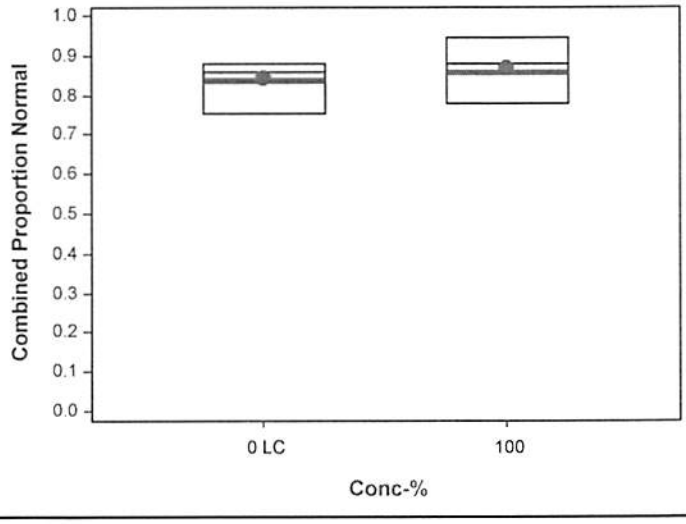
Combined Proportion Normal Summary

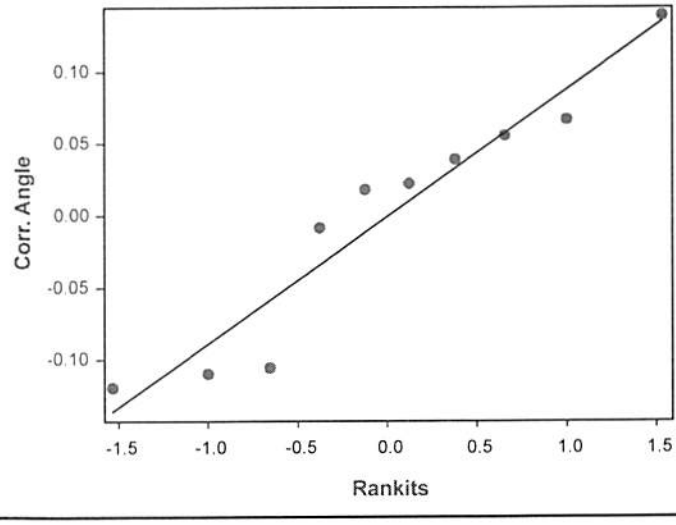
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8394	0.7769	0.9019	0.8579	0.7541	0.8798	0.0225	6.00%	0.00%
100		5	0.8591	0.7661	0.9521	0.8783	0.7760	0.9457	0.0335	8.72%	-2.35%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1620	1.0800	1.2430	1.1840	1.0520	1.2170	0.0293	5.64%	0.00%
100		5	1.1960	1.0580	1.3340	1.2140	1.0780	1.3360	0.0497	9.29%	-3.01%

Graphics





Bivalve Larval Survival and Development Test (FC vs 100% Filtered) **WSP Laboratory**

Analysis ID:	08-0755-1045	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 11:26	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	21 Feb-23 14:44	**MD5 Hash:**	B228EE256BDCFB30D39DCFDB1BD3A04	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	101% passed combined proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	7	7.439	1.895	CDF	7.2E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.713E-06	1.713E-06	1	0.0003497	0.9855	Non-Significant Effect
Error	0.0391999	0.0049	8			
Total	0.0392017		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.097	23.15	0.9306	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9594	0.7411	0.7787	Normal Distribution

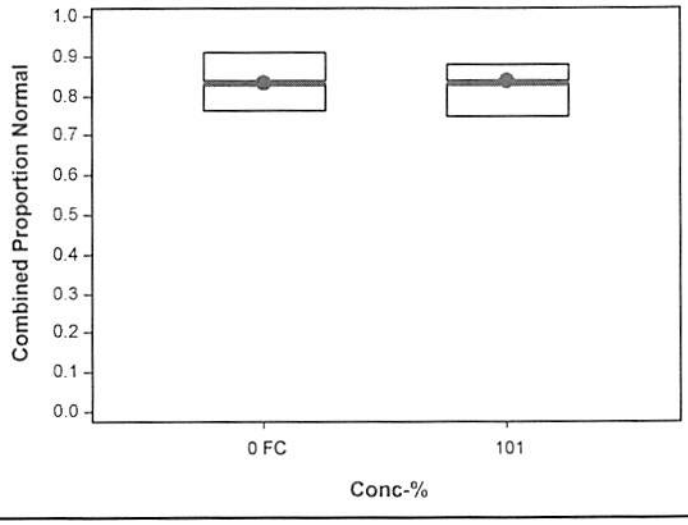
Combined Proportion Normal Summary

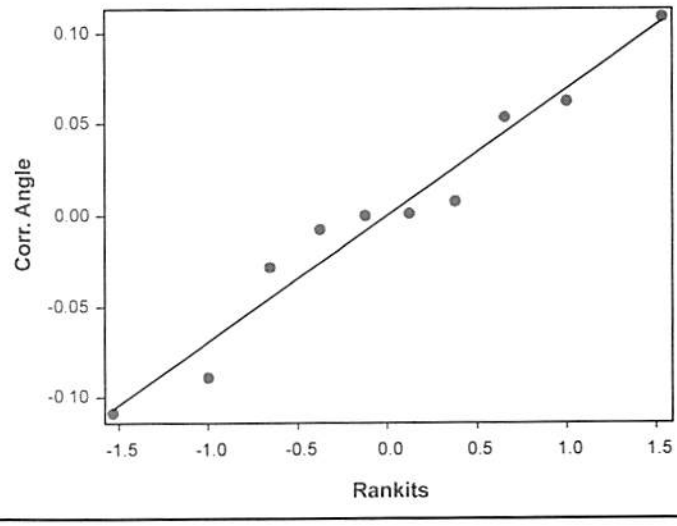
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8329	0.7689	0.8969	0.8361	0.7650	0.9076	0.0231	6.19%	0.00%
101		5	0.8339	0.7687	0.8991	0.8361	0.7486	0.8798	0.0235	6.30%	-0.12%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.1530	1.0650	1.2420	1.1540	1.0650	1.2620	0.0320	6.21%	0.00%
101		5	1.1540	1.0690	1.2390	1.1540	1.0460	1.2170	0.0306	5.92%	-0.07%

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	17-1354-8764	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 11:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	21 Feb-23 14:44	**MD5 Hash:**	8D26B5CFD987EA78FCF94369D4E3CBF0	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.0357	3.97%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	0.4045	2.362	0.05623	CDF	0.6877	Non-Significant Effect
		12.5	8	-0.4522	2.362	0.05623	CDF	0.9332	Non-Significant Effect
		25	8	-0.6095	2.362	0.05623	CDF	0.9538	Non-Significant Effect
		50	8	1.013	2.362	0.05623	CDF	0.4140	Non-Significant Effect
		100	8	-0.01157	2.362	0.05623	CDF	0.8367	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0049508	0.0009902	5	0.6988	0.6297	Non-Significant Effect
Error	0.0340085	0.0014170	24			
Total	0.0389593		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	4.72	15.09	0.4510	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.984	0.9031	0.9188	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8981	0.8735	0.9227	0.9000	0.8691	0.9181	0.0089	2.21%	0.00%
6.25		5	0.8924	0.8709	0.9139	0.8970	0.8681	0.9149	0.0077	1.94%	0.64%
12.5		5	0.9044	0.8792	0.9296	0.9080	0.8791	0.9261	0.0091	2.24%	-0.70%
25		5	0.9071	0.8922	0.9220	0.9071	0.8931	0.9211	0.0054	1.32%	-1.00%
50		5	0.8829	0.8515	0.9142	0.8883	0.8466	0.9107	0.0113	2.86%	1.70%
100		5	0.8967	0.8533	0.9400	0.8987	0.8521	0.9457	0.0156	3.89%	0.16%

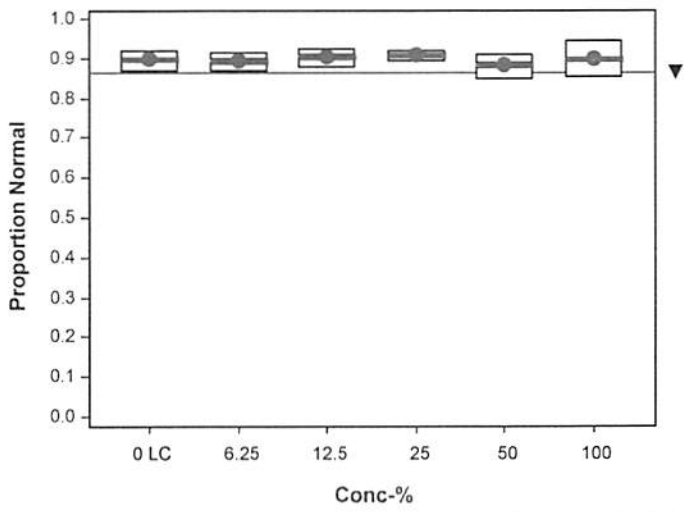
Angular (Corrected) Transformed Summary

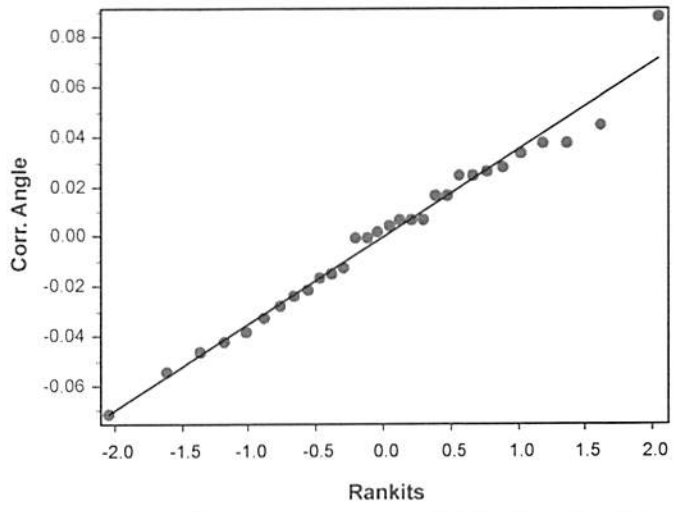
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2470	1.2070	1.2870	1.2490	1.2010	1.2810	0.0145	2.59%	0.00%
6.25		5	1.2370	1.2030	1.2720	1.2440	1.1990	1.2750	0.0125	2.26%	0.77%
12.5		5	1.2580	1.2150	1.3010	1.2630	1.2160	1.2960	0.0154	2.74%	-0.86%
25		5	1.2620	1.2360	1.2870	1.2610	1.2380	1.2860	0.0092	1.64%	-1.16%
50		5	1.2230	1.1750	1.2710	1.2300	1.1680	1.2670	0.0174	3.18%	1.93%
100		5	1.2470	1.1730	1.3210	1.2470	1.1760	1.3360	0.0267	4.78%	-0.02%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	17-1354-8764	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 11:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	21 Feb-23 14:44	**MD5 Hash:**	8D26B5CFD987EA78FCF94369D4E3CBF0	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	16-9688-8529	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 11:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	21 Feb-23 14:44	**MD5 Hash:**	72D5E253C39CF472BC66A4B986D82B64	**Editor ID:**	002-883-387-8

Comments: FC= Filtered Control, 101= 100% (1.2um Filtered)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.1139	12.17%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		6.25	8	-1.31	2.362	0.2156	CDF	0.9932	Non-Significant Effect
		12.5	8	-0.4229	2.362	0.2156	CDF	0.9286	Non-Significant Effect
		25	8	-0.1255	2.362	0.2156	CDF	0.8677	Non-Significant Effect
		50	8	0.2631	2.362	0.2156	CDF	0.7442	Non-Significant Effect
		100	8	-0.7275	2.362	0.2156	CDF	0.9655	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.067094	0.0134188	5	0.6439	0.6686	Non-Significant Effect
Error	0.500167	0.0208403	24			
Total	0.567261		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.154	15.09	0.8274	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9377	0.9031	0.0788	Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9355	0.8494	1.0000	0.9344	0.8251	1.0000	0.0310	7.42%	0.00%
6.25		5	0.9792	0.9253	1.0000	1.0000	0.9016	1.0000	0.0194	4.44%	-4.67%
12.5		5	0.9486	0.8498	1.0000	0.9781	0.8087	1.0000	0.0356	8.39%	-1.40%
25		5	0.9388	0.8658	1.0000	0.9180	0.8689	1.0000	0.0263	6.26%	-0.35%
50		5	0.9366	0.8899	0.9833	0.9235	0.8907	0.9781	0.0168	4.01%	-0.12%
100		5	0.9574	0.8803	1.0000	1.0000	0.8634	1.0000	0.0278	6.49%	-2.34%

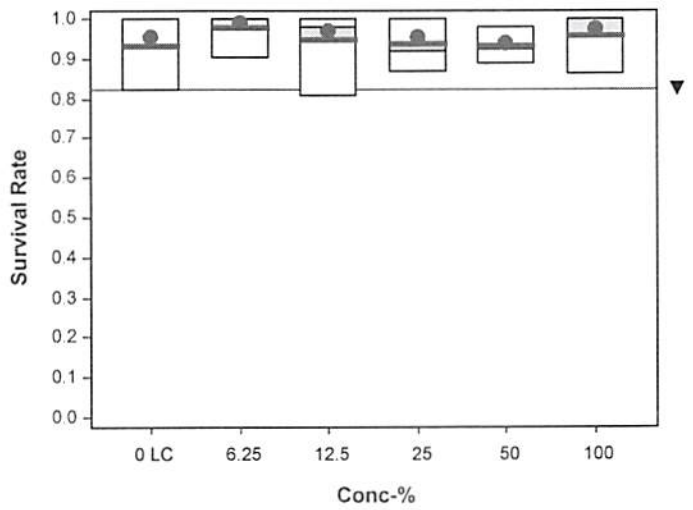
Angular (Corrected) Transformed Summary

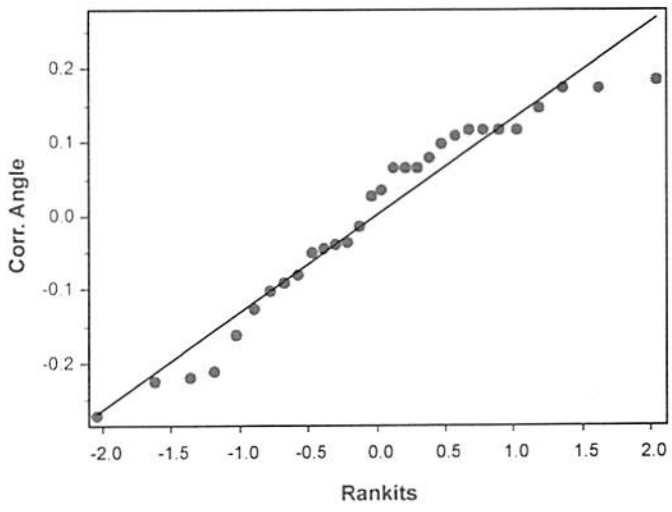
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.3500	1.1590	1.5420	1.3120	1.1390	1.5340	0.0691	11.44%	0.00%
6.25		5	1.4700	1.3170	1.6230	1.5340	1.2520	1.5340	0.0550	8.37%	-8.86%
12.5		5	1.3890	1.1860	1.5920	1.4220	1.1180	1.5340	0.0732	11.79%	-2.86%
25		5	1.3620	1.1640	1.5600	1.2800	1.2000	1.5340	0.0714	11.73%	-0.85%
50		5	1.3260	1.2240	1.4290	1.2910	1.2340	1.4220	0.0370	6.23%	1.78%
100		5	1.4170	1.2130	1.6200	1.5340	1.1920	1.5340	0.0733	11.57%	-4.92%

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	16-9688-8529	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	08 Mar-23 11:25	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	21 Feb-23 14:44	**MD5 Hash:**	72D5E253C39CF472BC66A4B986D82B64	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:30 (p 1 of 1)
Test Code/ID: ~~3D389535 /~~ 10-2711-8389

Bivalve Larval Survival and Development Test # 23-01-056 ~~Wood E&IS~~ WSPSF

Start Date:	26 Jan-23 1730	**Species:**	Mytilis galloprovincialis	**Sample Code:**	4135834B
End Date:	28 Jan-23 1600	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23 0800	**Material:**	Seawater	**Sample Station:**	SIYB REF-1

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			271			176	163	HK 2/20/23
			272			189	174	
			273			173	153	1 curved
			274			186	169	
			275			160	149	
			276			168 ~~188~~ HK	~~172~~ HK 152	
			277			158 ~~142~~ ~~184~~ HK	HK ~~167~~ 142	
			278			185	166	
			279			182	153	
			280			163	138	
			281			184	174	
			282			156	137	
			283			166	149	
			284			183	166	
			285			191	166	
			286			169	147	HK 2/21/23
			287			181	161	
			288			170	153	
			289			179	159	
			290			151	138	
			291			188	172	
			292			184	167	
			293			174 ~~160~~ HK	~~174~~ HK 160	
			294			163 ~~148~~ HK	HK ~~163~~ 148	
			295			190	175	
			296			155 ~~168~~ HK	~~152~~ HK 140	
			297			148 ~~165~~	~~148~~ 165	
			298			179	159	
			299			178	160	
			300			168	154	
			301			178	161	
			302			191	169	
			303			159	142	
			304			169	144	
			305			189	166	
			306			168	154	
			307			171	157	
			308			168	153	
			309			182	160	
			310			182	158	

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	4135834B
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB REF-1

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	292					
0	FC	2	300					
0	FC	3	275					
0	FC	4	296					
0	FC	5	273					
0	LC	1	285					
0	LC	2	287					
0	LC	3	290					
0	LC	4	307					
0	LC	5	288					
6.25		1	310					
6.25		2	302					
6.25		3	278					
6.25		4	297					
6.25		5	291					
12.5		1	309					
12.5		2	271					
12.5		3	298					
12.5		4	272					
12.5		5	294					
25		1	283					
25		2	303					
25		3	284					
25		4	306					
25		5	295					
50		1	308					
50		2	286					
50		3	299					
50		4	289					
50		5	280					
100		1	274					
100		2	304					
100		3	281					
100		4	305					
100		5	277					
101		1	276					
101		2	301					
101		3	282					
101		4	279					
101		5	293					

QC = TD

Analyst: AE QA: JC

Water Quality for Bivalve Development

Client: ~~Wood~~ TWSP - Port of San Diego
Sample ID: SIYB-REF-1
Test No. 23-01-056

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~29/2023 1600

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.9	15.1	15.3
	Salinity (ppt)	33.4	33.6	33.8
	pH (units)	7.92	7.76	7.79
	DO (mg/L)	8.3	8.4	8.3
Filter Control	Temp. (°C)	15.9	15.2	15.3
	Salinity (ppt)	33.4	33.4	33.6
	pH (units)	7.90	7.76	7.78
	DO (mg/L)	7.7	8.5	8.4
6.25	Temp. (°C)	16.0	15.2	15.3
	Salinity (ppt)	33.4	33.6	33.7
	pH (units)	7.91	7.74	7.78
	DO (mg/L)	8.5	8.4	8.4
12.5	Temp. (°C)	16.0	15.2	15.3
	Salinity (ppt)	33.4	33.6	33.7
	pH (units)	7.89	7.74	7.78
	DO (mg/L)	8.5	8.6	8.5
25	Temp. (°C)	15.9	15.3	15.4
	Salinity (ppt)	33.4	33.7	33.6
	pH (units)	7.90	7.75	7.78
	DO (mg/L)	8.7	8.3	8.4
50	Temp. (°C)	15.9	15.4	15.4
	Salinity (ppt)	33.2	33.2	33.4
	pH (units)	7.89	7.75	7.78
	DO (mg/L)	8.7	8.6	8.5
100	Temp. (°C)	15.8	15.3	15.4
	Salinity (ppt)	32.8	33.0	33.2
	pH (units)	7.89	7.76	7.78
	DO (mg/L)	8.9	8.3	8.5
100 Filtered (1.2µm)	Temp. (°C)	15.9	15.4	15.3
	Salinity (ppt)	32.0	32.2	32.5
	pH (units)	7.80	7.76	7.78
	DO (mg/L)	8.2	8.4	8.4
	Tech Initials:	HK	JF	AC

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

Initial QC: JF 3/8/23

Final QC: AC 3/9/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts **# per ~~100~~ 20 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

~~X~~ = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

APPENDIX B

Acute Menidia Test

Raw Data & Statistical Analyses

Site: SIYB-1

CETIS Summary Report

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Batch ID:	09-0368-3327	**Test Type:**	Survival (96h)	**Analyst:**		
Start Date:	26 Jan-23 12:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater	
Ending Date:	30 Jan-23 11:00	**Species:**	Menidia beryllina	**Brine:**	Not Applicable	
Test Length:	95h	**Taxon:**		**Source:**	Aquatic Biosystems, CO	**Age:** 12d

Sample ID:	07-4212-2415	**Code:**	23-W026	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 14:00	**Material:**	Ambient Sample	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 1
Sample Age:	22h (15.7 °C)	**Client:**	WSP		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-0925-2485	96h Survival Rate	TST-Welch's t Test	0.0002	100% passed 96h survival rate	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
04-6147-0785	96h Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	9.42%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
04-6147-0785	96h Survival Rate	Control Resp	0.9333	0.9	<<	Yes	Passes Criteria
14-0925-2485	96h Survival Rate	Control Resp	0.9333	0.9	<<	Yes	Passes Criteria

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	0.9333	0.8249	1.0420	0.8000	1.0000	0.0422	0.1033	11.07%	0.00%
25		6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	-3.57%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-7.14%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-7.14%

96h Survival Rate Detail — MD5: C20E171668B581A6A1D369E3CE2A0C26

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	0.8000	1.0000	1.0000	1.0000	1.0000	0.8000
25		1.0000	1.0000	0.8000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	04-6147-0785	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 14:03	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 14:02	**MD5 Hash:**	C20E171668B581A6A1D369E3CE2A0C26	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.08793	9.42%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		25	10	42	26	2	CDF	0.8900	Non-Significant Effect
		50	10	45	26	1	CDF	0.9626	Non-Significant Effect
		100	10	45	26	1	CDF	0.9626	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0259911	0.0086637	3	1.41	0.2691	Non-Significant Effect
Error	0.122867	0.0061434	20			
Total	0.148858		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.7409	0.884	3.7E-05	Non-Normal Distribution

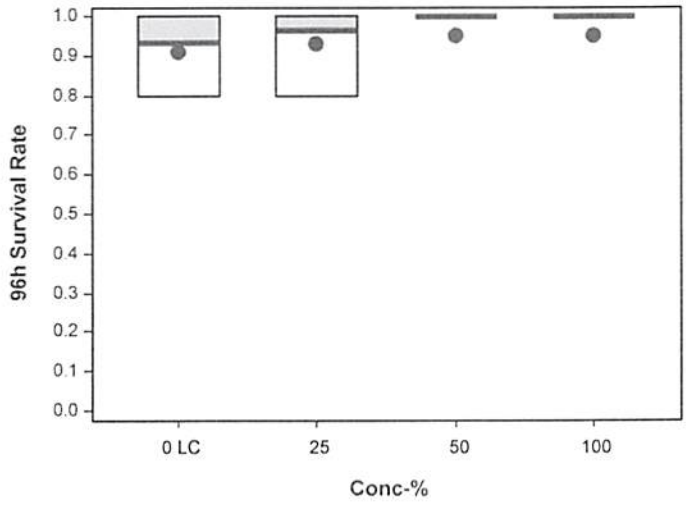
96h Survival Rate Summary

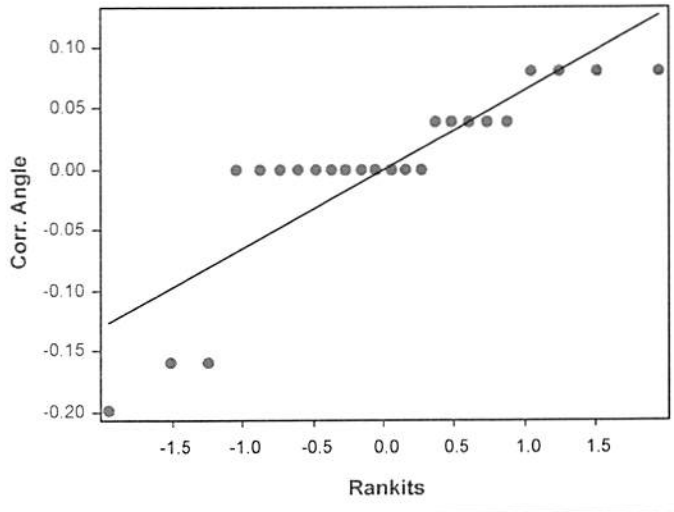
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
25		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	-3.57%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-7.14%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-7.14%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.2660	1.1370	1.3950	1.3450	1.1070	1.3450	0.0502	9.71%	0.00%
25		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	-3.14%
50		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	-6.27%
100		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	-6.27%

Graphics





Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	14-0925-2485	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 14:03	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	09 Feb-23 14:02	**MD5 Hash:**	A5C23311803EB7B73A6DE5985BFDFAA6	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		100*	5	8.28	1.476	CDF	0.0002	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0189026	0.0189026	1	2.5	0.1449	Non-Significant Effect
Error	0.0756105	0.0075611	10			
Total	0.0945132		11			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.7668	0.8025	0.0040	Non-Normal Distribution

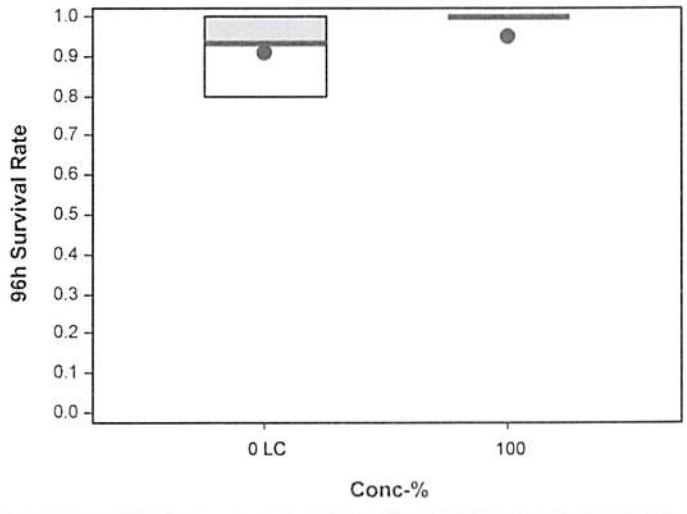
96h Survival Rate Summary

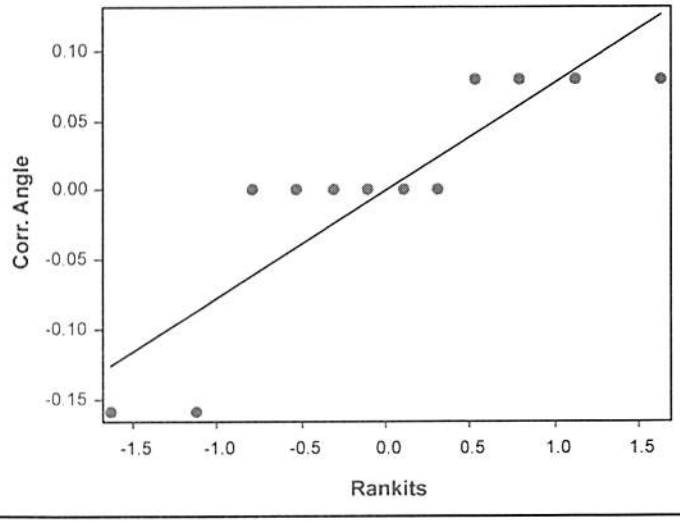
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-7.14%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.2660	1.1370	1.3950	1.3450	1.1070	1.3450	0.0502	9.71%	0.00%
100		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	-6.27%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: ~~Wood~~ WSP: POSD - Shelter Island Yacht Basin
Test Species: *Menidia beryllina*
Sample ID: SIYB-1
Start Date/Time: 1/26/2023 1215
Test No. 23-01-043 to -049
End Date/Time: 1/30/2023 1100

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #1	A	5	5	5	5	4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	4
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	4	4	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		HK	HK	AG	AG	RV

Water Quality						
Parameter	0	24 (A)	48f	48i	72	96
LC #1 Temp. (°C)	24.0	23.7	25.5	25.0	24.3	24.8
LC #1 Salinity (ppt)	33.7	34.0	35.0	33.6	35.1	37.0
LC #1 pH (units)	8.00	7.73	7.92	7.87	7.84	7.84
LC #1 DO (mg/L)	7.2	7.2	6.6	7.4	7.2	6.3
25 Temp. (°C)	24.0	24.2	25.8	24.1	24.5	25.2
25 Salinity (ppt)	33.4	33.6	34.8	33.3	34.9	35.8
25 pH (units)	7.97	7.82	7.92	8.00	7.90	7.90
25 DO (mg/L)	7.4	7.0	7.0	7.3	6.9	6.5
50 Temp. (°C)	24.1	24.4	26.0	24.2	24.3	24.8
50 Salinity (ppt)	33.2	33.1	34.0	33.2	34.5	35.8
50 pH (units) 7.91 (P)	7.98	7.81	7.92	7.96	7.91	7.90
50 DO (mg/L)	7.9	6.8	6.5	7.4	6.9	6.5
100 Temp. (°C) 24.2	25.1	24.3	26.1	24.3	24.2	24.7
100 Salinity (ppt) 32.9	33.0 (P)	33.0	34.0	32.8	34.3	35.7
100 pH (units)	7.91	7.82	7.92	7.91	7.91	7.91
100 DO (mg/L)	8.0	7.0	6.5	7.9	6.9	6.5
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	RV	HK	AG	AG	AG	RV

QC: RV

Date Animals Received: 1/24/23

Age of Animals at Test Start: 12d

Feedings	0	24	48	72	96
Initials (AM):	–	HK	AG	AG	RV
Initials (PM):	RV				

Comments: (A) Adjusted RM TEMP

QC Check: JF 2/9/23

Final Review: RV 3/7/23

Site: SIYB-2

CETIS Summary Report

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Batch ID:	06-9278-8660	**Test Type:**	Survival (96h)	**Analyst:**		
Start Date:	26 Jan-23 12:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater	
Ending Date:	30 Jan-23 11:15	**Species:**	Menidia beryllina	**Brine:**	Not Applicable	
Test Length:	95h	**Taxon:**		**Source:**	Aquatic Biosystems, CO	**Age:** 12d

Sample ID:	05-4971-3455	**Code:**	23-W027	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 13:00	**Material:**	Ambient Sample	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 2
Sample Age:	23h (15.7 °C)	**Client:**	WSP		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-2171-9816	96h Survival Rate	TST-Welch's t Test	0.0002	100% passed 96h survival rate	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
06-3549-0030	96h Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	10.8%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
03-2171-9816	96h Survival Rate	Control Resp	0.9333	0.9	<<	Yes	Passes Criteria
06-3549-0030	96h Survival Rate	Control Resp	0.9333	0.9	<<	Yes	Passes Criteria

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	0.9333	0.8249	1.0420	0.8000	1.0000	0.0422	0.1033	11.07%	0.00%
25		6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	-3.57%
50		6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	-3.57%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-7.14%

96h Survival Rate Detail — MD5: 39D13598E7B169D5F1EAB8DE9ECF2332

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	0.8000	1.0000	1.0000	1.0000	1.0000	0.8000
25		0.8000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	0.8000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	06-3549-0030	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 14:23	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 14:22	**MD5 Hash:**	39D13598E7B169D5F1EAB8DE9ECF2332	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.1008	10.80%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		25	10	42	26	2	CDF	0.8900	Non-Significant Effect
		50	10	42	26	2	CDF	0.8900	Non-Significant Effect
		100	10	45	26	1	CDF	0.9626	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0189026	0.0063009	3	0.7407	0.5402	Non-Significant Effect
Error	0.170124	0.0085062	20			
Total	0.189026		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.7213	0.884	2.0E-05	Non-Normal Distribution

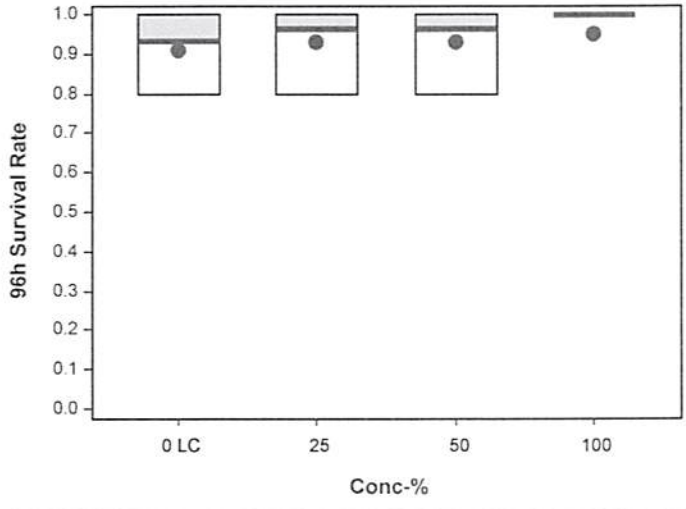
96h Survival Rate Summary

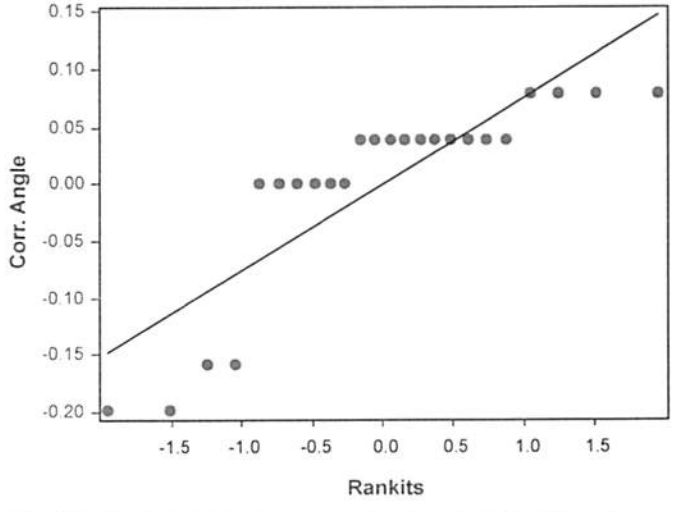
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
25		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	-3.57%
50		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	-3.57%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-7.14%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.2660	1.1370	1.3950	1.3450	1.1070	1.3450	0.0502	9.71%	0.00%
25		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	-3.14%
50		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	-3.14%
100		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	-6.27%

Graphics





Inland Silverside 96-h Acute Survival Test

WSP Laboratory

Analysis ID:	03-2171-9816	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 14:23	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	09 Feb-23 14:22	**MD5 Hash:**	A5C23311803EB7B73A6DE5985BFDFAA6	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		100*	5	8.28	1.476	CDF	0.0002	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0189026	0.0189026	1	2.5	0.1449	Non-Significant Effect
Error	0.0756105	0.0075611	10			
Total	0.0945132		11			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.7668	0.8025	0.0040	Non-Normal Distribution

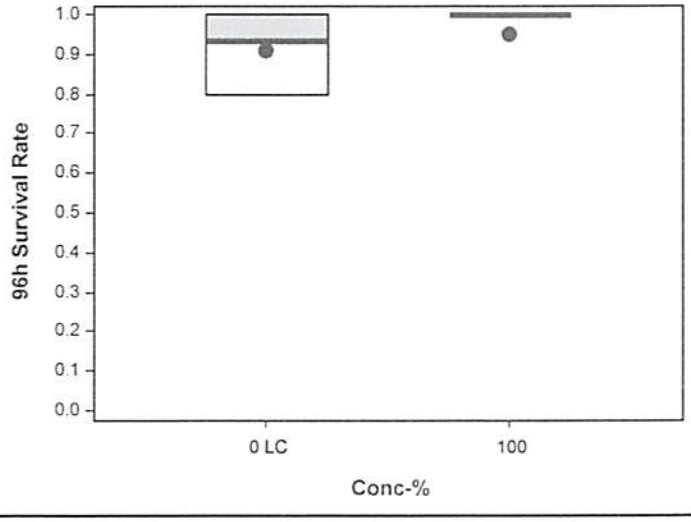
96h Survival Rate Summary

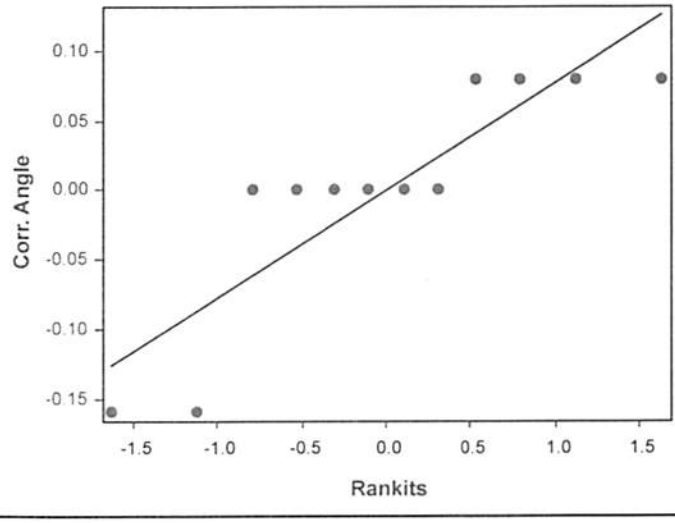
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-7.14%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.2660	1.1370	1.3950	1.3450	1.1070	1.3450	0.0502	9.71%	0.00%
100		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	-6.27%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: ~~Wood~~ RWSD: POSD - Shelter Island Yacht Basin
Test Species: *Menidia beryllina*
Sample ID: SIYB-2
Start Date/Time: 1/26/2023 1225
Test No. 23-01-043 to -049
End Date/Time: 1/30/2023 1115

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #1	A	5	5	5	5	4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	4
25	A	5	5	5	5	~~4~~ 4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	4	4	4	4
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		HK	HK	AG	AG	HK

Water Quality

Parameter	0	24 (QC)	48f	48i	72	96
Temp. (°C)	24.0	23.1 (HK)	25.5	25.0	24.3 ~~24.5~~ AG	24.8
Salinity (ppt)	33.7	34.0	35.0	33.6 ~~35.0~~ 33.1		37.0
pH (units)	8.00	7.73	7.92	7.87	7.84	7.84 7.87
DO (mg/L)	7.2	7.2	6.6	7.4	7.2	6.3
						RV ~~35.4~~
Temp. (°C)	25.0	24.0	25.5	24.1	24.0	~~24.2~~ RV 24.8
Salinity (ppt)	33.5	33.4	34.8	33.4	35.0	~~35.0~~ RV 37.0
pH (units)	7.95	7.83	7.92	8.00	7.91	~~7.87~~ RV 7.87
DO (mg/L)	7.4	6.5	6.6	7.3	7.0	6.5
Temp. (°C)	24.3	24.2	25.4	24.3	24.0	25.4
Salinity (ppt)	33.2	33.4	34.3	33.2	34.8	35.8
pH (units)	7.94	7.83	7.92	7.97	7.91	7.87
DO (mg/L)	7.6	6.7	6.7	7.5	6.9	6.5
Temp. (°C)	24.2	24.3	25.6	24.6	24.2	25.5
Salinity (ppt)	33.0	32.6	33.3	32.9	33.6	34.1
pH (units)	7.89	7.83	7.93	7.93	7.91	7.89
DO (mg/L)	7.5	6.8	6.8	8.2	6.9	6.2
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:		RV	HK	AG	AG	AG	RV

QC: RV
Date Animals Received: 1/24/23
Age of Animals at Test Start: 12d

Feedings	0	24	48	72	96
Initials (AM):	–	HK	AG	AG	RV
Initials (PM):	RV				

Comments:

QC Check: RV ~~3/7/23~~ JF 2/9/23
Final Review: RV 3/7/23

Site: SIYB-3

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Batch ID:	00-7487-2672	**Test Type:**	Survival (96h)	**Analyst:**			
Start Date:	26 Jan-23 12:37	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater		
Ending Date:	30 Jan-23 11:30	**Species:**	Menidia beryllina	**Brine:**	Not Applicable		
Test Length:	95h	**Taxon:**		**Source:**	Aquatic Biosystems, CO	**Age:**	12d

Sample ID:	13-0186-3818	**Code:**	23-W028	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 12:00	**Material:**	Ambient Sample	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 3
Sample Age:	25h (14.9 °C)	**Client:**	WSP		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-9354-4980	96h Survival Rate	TST-Welch's t Test	0.0001	100% passed 96h survival rate	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
07-8760-3636	96h Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	13.8%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
07-8760-3636	96h Survival Rate	Control Resp	0.9667	0.9	<<	Yes	Passes Criteria
07-9354-4980	96h Survival Rate	Control Resp	0.9667	0.9	<<	Yes	Passes Criteria

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%
25		6	0.9333	0.7620	1.1050	0.6000	1.0000	0.0667	0.1633	17.50%	3.45%
50		6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%
100		6	0.9722	0.9008	1.0440	0.8333	1.0000	0.0278	0.0680	7.00%	-0.57%

96h Survival Rate Detail — MD5: 0B93DAF0E9372F4903BC9231321F5374

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	0.8000	1.0000	1.0000	1.0000
25		0.6000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	0.8000	1.0000	1.0000	1.0000
100		1.0000	0.8333	1.0000	1.0000	1.0000	1.0000

Inland Silverside 96-h Acute Survival Test — WSP Laboratory

Analysis ID:	07-8760-3636	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 14:50	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 14:49	**MD5 Hash:**	0B93DAF0E9372F4903BC9231321F5374	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.1335	13.81%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		25	10	38.5	26	1	CDF	0.7200	Non-Significant Effect
		50	10	39	26	2	CDF	0.7500	Non-Significant Effect
		100	10	39.5	26	1	CDF	0.7782	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0071357	0.0023786	3	0.1576	0.9236	Non-Significant Effect
Error	0.301932	0.0150966	20			
Total	0.309068		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	4.428	11.34	0.2188	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.5958	0.884	<1.0E-05	Non-Normal Distribution

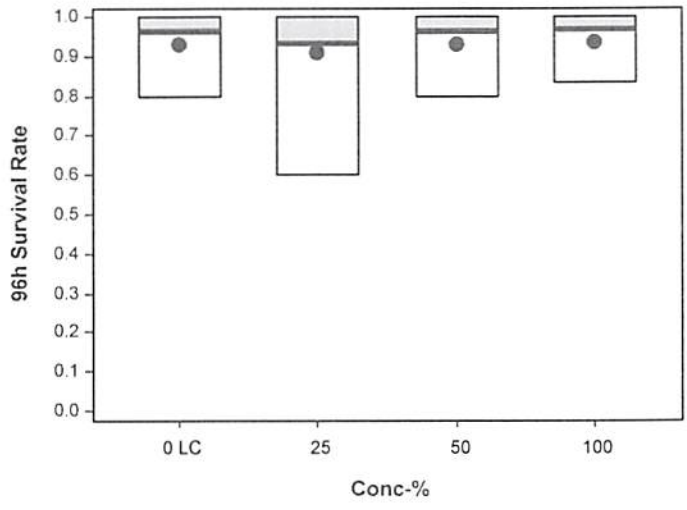
96h Survival Rate Summary

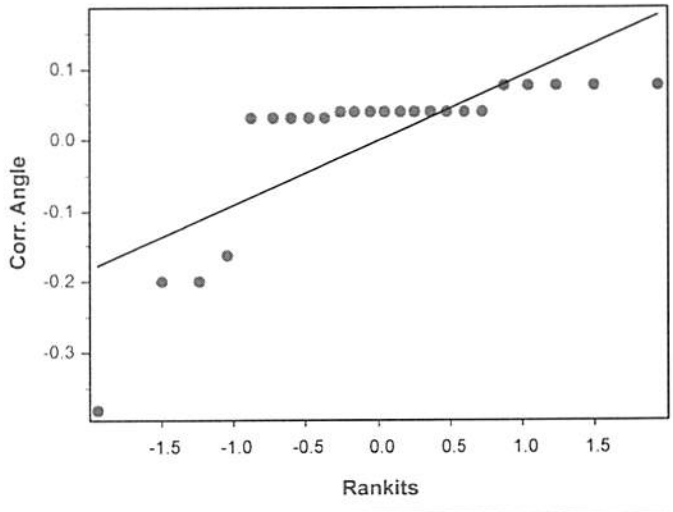
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
25		6	0.9333	0.7620	1.0000	1.0000	0.6000	1.0000	0.0667	17.50%	3.45%
50		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
100		6	0.9722	0.9008	1.0000	1.0000	0.8333	1.0000	0.0278	7.00%	-0.57%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%
25		6	1.2690	1.0720	1.4650	1.3450	0.8861	1.3450	0.0765	14.78%	2.82%
50		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%
100		6	1.3130	1.2290	1.3960	1.3450	1.1500	1.3450	0.0325	6.06%	-0.55%

Graphics





Inland Silverside 96-h Acute Survival Test — WSP Laboratory

Analysis ID:	07-9354-4980	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 14:51	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	09 Feb-23 14:49	**MD5 Hash:**	0AB6CB18595DA930133FB2BF2BDBCF84	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		100*	9	5.905	1.383	CDF	0.0001	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001549	0.0001549	1	0.01962	0.8914	Non-Significant Effect
Error	0.0789509	0.0078951	10			
Total	0.0791058		11			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.491	14.94	0.6718	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.5122	0.8025	2.2E-05	Non-Normal Distribution

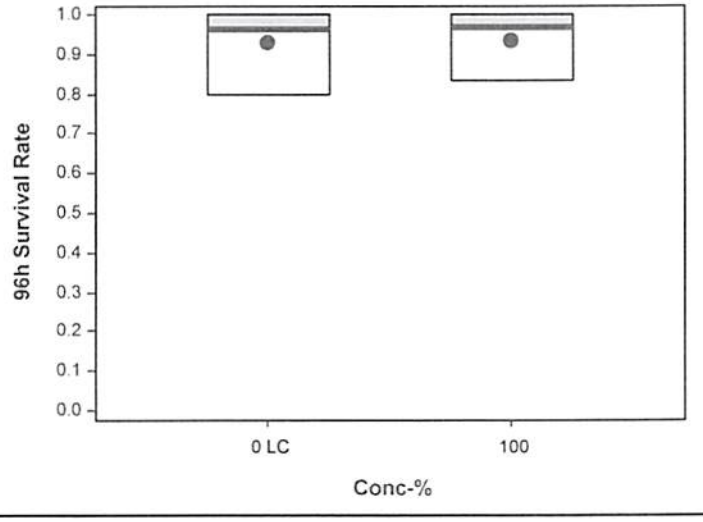
96h Survival Rate Summary

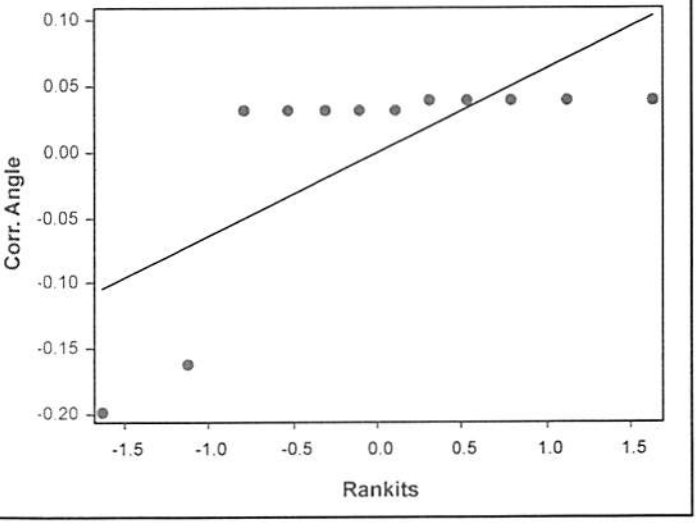
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
100		6	0.9722	0.9008	1.0000	1.0000	0.8333	1.0000	0.0278	7.00%	-0.57%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%
100		6	1.3130	1.2290	1.3960	1.3450	1.1500	1.3450	0.0325	6.06%	-0.55%

Graphics





96hr Marine Acute Test with 48hr Renewal

RV WSP

Client: ~~Wood~~: POSD - Shelter Island Yacht Basin
Test Species: *Menidia beryllina*
Sample ID: SIYB-3
Start Date/Time: 1/26/2023 1237
Test No. 23-01-043 to 049
End Date/Time: 1/30/2023 1130

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #2	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	4	4	4	3
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	6	6	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F		AG 0930			
Tech Initials:		HK	HK	AG	AG	HK

QC: RV
Date Animals Received: 11/24/23
Age of Animals at Test Start: 12d

Water Quality						
Parameter	0	24	48f	48i	72	96
Temp. (°C)	24.2	24.4	25.9	25.3	24.2	25.4
Salinity (ppt)	8.02	33.9	33.9	~~7.98~~ 34.3	34.3	34.5
pH (units)	33.7	~~33.07~~	~~33~~ 7.90	7.98	7.93	7.89
DO (mg/L)	7.2	~~6.70~~	6.7	7.3	6.9	6.2
Temp. (°C)	24.1	24.3	25.7	24.4	24.1	25.2
Salinity (ppt)	33.4	33.5	33.8	33.3	34.1	34.3
pH (units)	7.97	7.81	7.94	7.97	7.94	7.89
DO (mg/L)	7.5	6.7	6.6	7.3	6.8	6.1
Temp. (°C)	24.1	24.3	25.3	24.4	24.2	24.3
Salinity (ppt)	33.2	33.2	33.5	33.1	33.6	34.2
pH (units)	7.98	7.84	7.94	7.97	7.94	7.92
DO (mg/L)	7.0	6.6	6.6	7.6	6.8	6.2
Temp. (°C)	25.7	24.3	26.0	25.2	24.4	24.7
Salinity (ppt)	33.0	33.1	33.9	32.9	33.3	33.4
pH (units)	7.91	7.86	7.91	7.93	7.92	7.92
DO (mg/L)	8.0	6.9	6.6	8.2	6.7	6.5
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	RV	HK	AG	AG	AG	RV

Feedings	0	24	48	72	96
Initials (AM):	-	HK	AG	AG	RV
Initials (PM):	RV				

Comments:

QC Check: JF 2/9/23
Final Review: RV 3/7/23

Site: SIYB-4

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Batch ID:	17-2374-8940	**Test Type:**	Survival (96h)	**Analyst:**			
Start Date:	26 Jan-23 12:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater		
Ending Date:	30 Jan-23 11:30	**Species:**	Menidia beryllina	**Brine:**	Not Applicable		
Test Length:	95h	**Taxon:**		**Source:**	Aquatic Biosystems, CO	**Age:**	12d

Sample ID:	15-9510-5542	**Code:**	23-W029	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 11:00	**Material:**	Ambient Sample	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 12:40	**CAS (PC):**		**Station:**	SIYB 4
Sample Age:	26h (17.8 °C)	**Client:**	WSP		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-4954-8153	96h Survival Rate	TST-Welch's t Test	0.0003	100% passed 96h survival rate	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
20-0193-9922	96h Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	11.4%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
15-4954-8153	96h Survival Rate	Control Resp	0.9667	0.9	<<	Yes	Passes Criteria
20-0193-9922	96h Survival Rate	Control Resp	0.9667	0.9	<<	Yes	Passes Criteria

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%
25		6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%
50		6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%
100		6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	0.00%

96h Survival Rate Detail — MD5: 0C91FFCC0B976AE4940AF82D3100188C

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	0.8000	1.0000	1.0000	1.0000
25		0.8000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	0.8000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	0.8000	1.0000

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	20-0193-9922	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:01	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:00	**MD5 Hash:**	0C91FFCC0B976AE4940AF82D3100188C	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.11	11.38%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		25	10	39	26	2	CDF	0.7500	Non-Significant Effect
		50	10	39	26	2	CDF	0.7500	Non-Significant Effect
		100	10	39	26	2	CDF	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	0	1.0000	Non-Significant Effect
Error	0.189026	0.0094513	20			
Total	0.189026		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	0	11.34	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.4538	0.884	<1.0E-05	Non-Normal Distribution

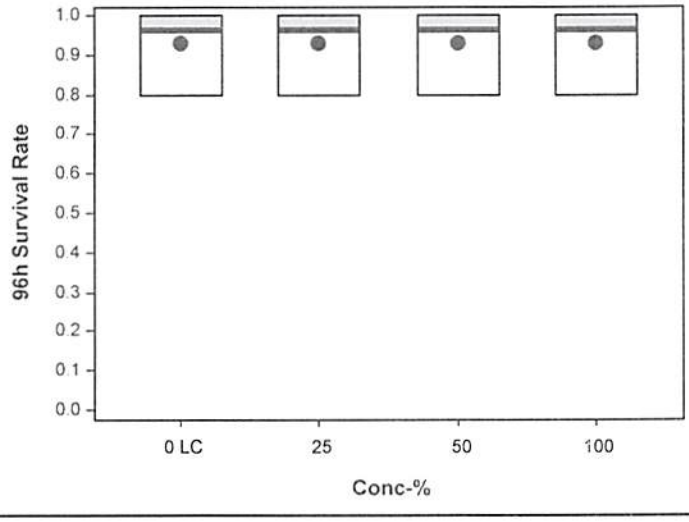
96h Survival Rate Summary

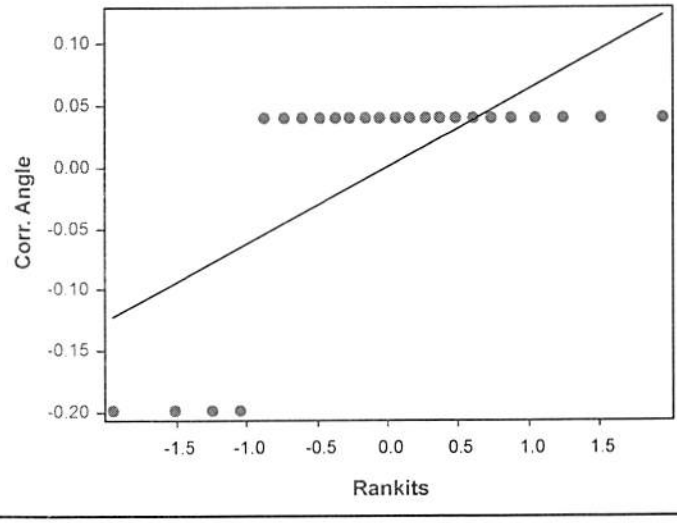
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
25		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
50		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
100		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%
25		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%
50		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%
100		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%

Graphics





Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	15-4954-8153	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:01	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	09 Feb-23 15:00	**MD5 Hash:**	825986151986FC9535B196CA2FC15A6A	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		100*	9	5.137	1.383	CDF	0.0003	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0945132	0.0094513	10			
Total	0.0945132		11			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.4647	0.8025	<1.0E-05	Non-Normal Distribution

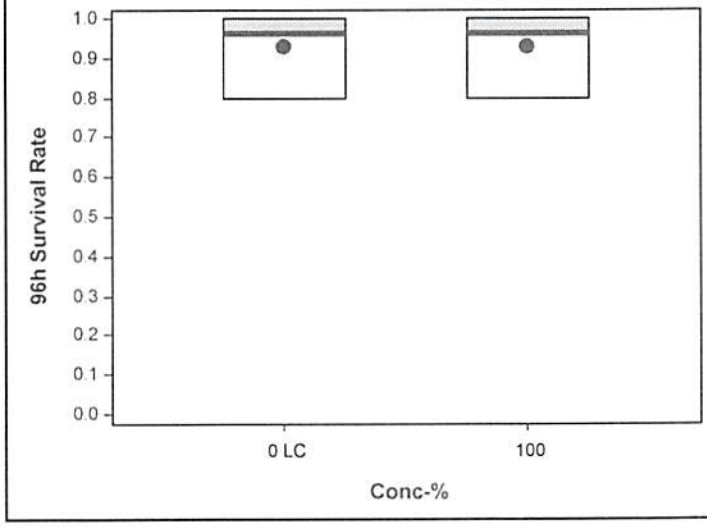
96h Survival Rate Summary

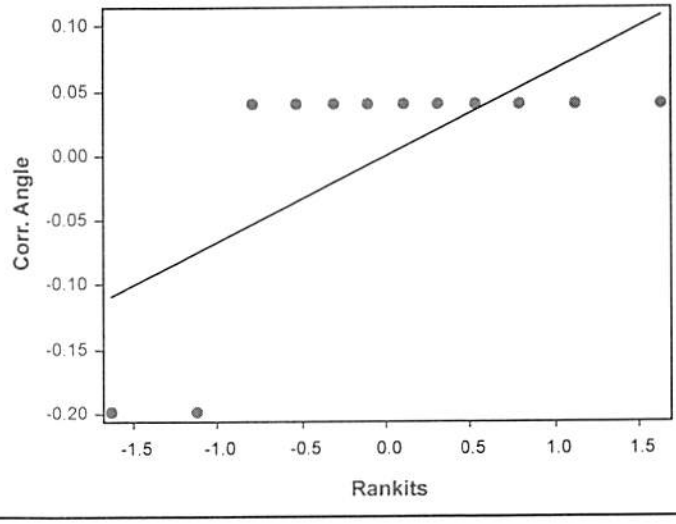
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
100		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%
100		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	0.00%

Graphics





96hr Marine Acute Test with 48hr Renewal

WSP RV

Client: ~~Wood~~ POSD - Shelter Island Yacht Basin
Test Species: *Menidia beryllina*
Sample ID: SIYB-4
Start Date/Time: 1/26/2023 1245
Test No. 23-01-043 to -049
End Date/Time: 1/30/2023 1130

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #2	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	4
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		JF	HK	AG	AG	HK

Water Quality QC1

Parameter	0	24	48f	48i	72	96
Temp. (°C)	24.2	24.4	25.9	25.3	24.2	25.4
Salinity (ppt)	33.2	33.4	33.9	33.5	34.3	34.5
pH (units)	7.87	7.83	7.90	7.98	7.93	7.89
DO (mg/L)	7.2	6.6	6.7	7.3	6.9	6.2
Temp. (°C)	25.0	24.3	26.3	24.2	24.5	24.8
Salinity (ppt)	33.7	33.5	33.6	33.3	33.9	34.3
pH (units)	7.91	7.84	7.91	8.00	7.92	7.89
DO (mg/L)	7.5	6.9	6.4	7.2	6.7	6.3
Temp. (°C)	24.0	24.3	26.5	24.3	24.5	24.8
Salinity (ppt)	33.2	32.9	33.0	33.2	33.0	33.6
pH (units)	7.98	7.84	7.84	7.96	7.92	7.89
DO (mg/L)	7.4	6.7	6.4	7.5	6.5	6.3
Temp. (°C)	24.2	24.5	26.3	24.9	24.5	24.5
Salinity (ppt)	33.0	33.0	33.0	32.8	33.0	33.4
pH (units)	7.92	7.84	7.89	7.89	7.91	7.92
DO (mg/L)	8.1	6.7	6.4	8.2	6.7	6.4
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	RV	HK	AG	AG	AG	RV

QC: RV

Date Animals Received: 1/24/23
Age of Animals at Test Start: 12d

Feedings	0	24	48	72	96
Initials (AM):	–	HK	AG	AG	RV
Initials (PM):	RV				

Comments:

QC Check: JF 2/9/23
Final Review: RV 3/7/23

Site: SIYB-5

CETIS Summary Report

Inland Silverside 96-h Acute Survival Test — WSP Laboratory

Batch ID:	06-8320-7024	**Test Type:**	Survival (96h)	**Analyst:**			
Start Date:	26 Jan-23 13:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater		
Ending Date:	30 Jan-23 11:30	**Species:**	Menidia beryllina	**Brine:**	Not Applicable		
Test Length:	94h	**Taxon:**		**Source:**	Aquatic Biosystems, CO	**Age:**	12d

Sample ID:	03-0625-2648	**Code:**	23-W030	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 10:00	**Material:**	Ambient Sample	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 12:40	**CAS (PC):**		**Station:**	SIYB 5
Sample Age:	27h (15.8 °C)	**Client:**	WSP		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-7271-6157	96h Survival Rate	TST-Welch's t Test	0.0267	100% passed 96h survival rate	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
19-8586-8240	96h Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	11.4%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
18-7271-6157	96h Survival Rate	Control Resp	1	0.9	<<	Yes	Passes Criteria
19-8586-8240	96h Survival Rate	Control Resp	1	0.9	<<	Yes	Passes Criteria

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		6	0.9333	0.7620	1.1050	0.6000	1.0000	0.0667	0.1633	17.50%	6.67%

96h Survival Rate Detail — MD5: DFD39CDAA7830DA19AF06134A94AE649

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	0.6000

Inland Silverside 96-h Acute Survival Test — WSP Laboratory

Analysis ID:	19-8586-8240	Endpoint:	96h Survival Rate	CETIS Version:	CETISv2.1.3
Analyzed:	09 Feb-23 15:58	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	09 Feb-23 15:57	MD5 Hash:	DFD39CDAA7830DA19AF06134A94AE649	Editor ID:	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.1138	11.38%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		25	10	39	26	1	CDF	0.7500	Non-Significant Effect
		50	10	39	26	1	CDF	0.7500	Non-Significant Effect
		100	10	36	26	1	CDF	0.5503	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0263588	0.0087863	3	1	0.4133	Non-Significant Effect
Error	0.175725	0.0087863	20			
Total	0.202084		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.4436	0.884	<1.0E-05	Non-Normal Distribution

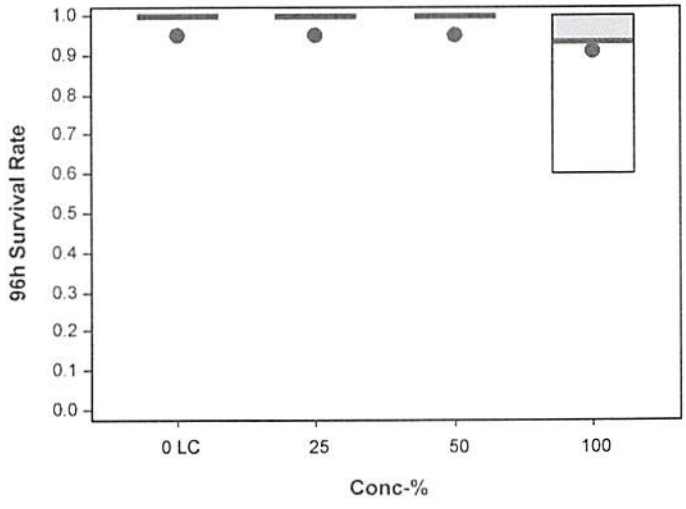
96h Survival Rate Summary

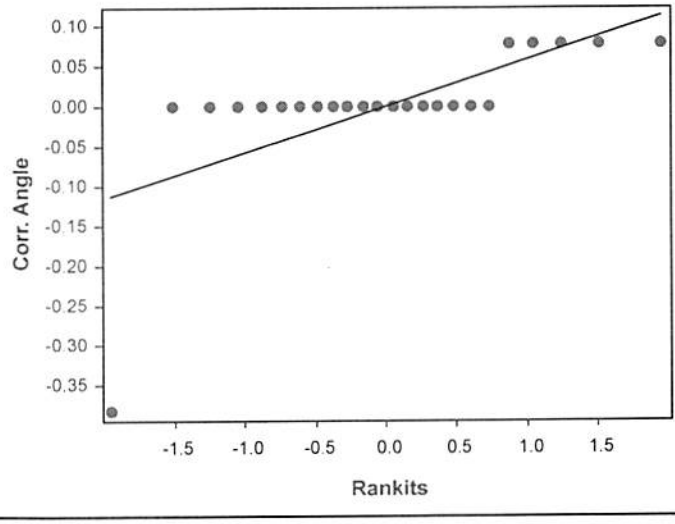
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	0.9333	0.7620	1.0000	1.0000	0.6000	1.0000	0.0667	17.50%	6.67%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
25		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
50		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
100		6	1.2690	1.0720	1.4650	1.3450	0.8861	1.3450	0.0765	14.78%	5.69%

Graphics





Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	18-7271-6157	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:58	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	09 Feb-23 15:57	**MD5 Hash:**	2AB7900AF817BB1C74CED6E6AED2F1D	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	df	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		100*	5	2.516	1.476	CDF	0.0267	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0175725	0.0175725	1	1	0.3409	Non-Significant Effect
Error	0.175725	0.0175725	10			
Total	0.193297		11			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.5612	0.8025	5.2E-05	Non-Normal Distribution

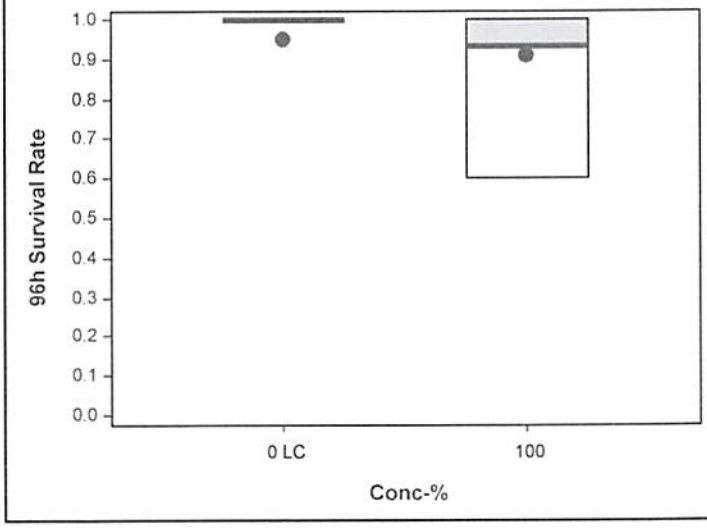
96h Survival Rate Summary

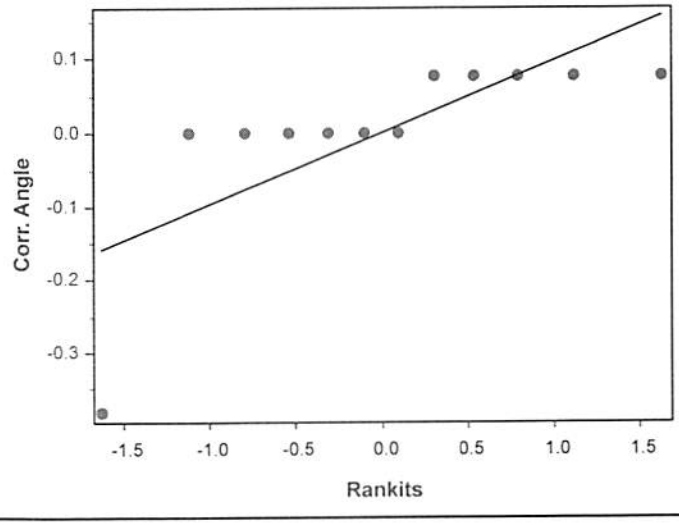
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	0.9333	0.7620	1.0000	1.0000	0.6000	1.0000	0.0667	17.50%	6.67%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
100		6	1.2690	1.0720	1.4650	1.3450	0.8861	1.3450	0.0765	14.78%	5.69%

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: ~~Weed~~ RV WSP: POSD - Shelter Island Yacht Basin
Test Species: *Menidia beryllina*
Sample ID: SIYB-5
Start Date/Time: 1/26/2023 1300
Test No. 23-01-043 to -049
End Date/Time: 1/30/2023 1130

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #3	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	4	3
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		JF	JF	AG	AG	HK

Water Quality QC1

Parameter	0	24	48f	48i	72	96
Temp. (°C)	24.3	23.8	~~25.8~~ 25.2	25.3	24.1	24.5
Salinity (ppt)	RV ~~33~~ 33.6	34.1	~~34.9~~ 34.4	33.5	34.9	36.3
pH (units)	8.02	7.76	~~7.75~~ 7.94	~~8.08~~ 7.98	7.92	7.88
DO (mg/L)	7.2	6.8	7.0	7.3	6.8	10.6
Temp. (°C)	24.1	24.3	26.1	24.1	24.4	24.9
Salinity (ppt)	33.3	33.1	33.5	33.2	33.8	35.2
pH (units)	7.97	7.78	7.88	7.97	7.95	7.82
DO (mg/L)	7.6	7.0	6.7	7.3	6.8	6.6
Temp. (°C)	24.1	24.5	26.2	24.3	24.6	25.2
Salinity (ppt)	33.2	33.5	33.9	33.1	33.8	34.7
pH (units)	7.97	7.78	7.91	7.97	7.95	7.92
DO (mg/L)	7.7	~~6.8~~	6.7	7.4	6.7	6.4
Temp. (°C)	24.3	24.8	25.9	25.0	24.4	25.7
Salinity (ppt)	32.9	33.0	33.3	32.8	33.2	33.7
pH (units)	7.91	7.79	7.91	7.93	7.95	7.92
DO (mg/L)	8.1	6.6	6.5	8.2	6.7	6.2
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	RV	HK	AG	AG	AG	RV

QC: RV

Date Animals Received: 1/24/23
Age of Animals at Test Start: 120

Feedings	0	24	48	72	96
Initials (AM):	–	HK	AG	AG	RV
Initials (PM):	RV				

Comments: (A) adjusted heater ventilation

QC Check: JF 2/10/23
Final Review: RV 3/7/23

Site: SIYB-6

CETIS Summary Report

Inland Silverside 96-h Acute Survival Test — WSP Laboratory

Batch ID:	05-8762-0672	**Test Type:**	Survival (96h)	**Analyst:**			
Start Date:	26 Jan-23 13:05	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater		
Ending Date:	30 Jan-23 11:40	**Species:**	Menidia beryllina	**Brine:**	Not Applicable		
Test Length:	95h	**Taxon:**		**Source:**	Aquatic Biosystems, CO	**Age:**	12d

Sample ID:	05-7284-7177	**Code:**	23-W031	**Project:**	SIYB TMDL Monitoring		
Sample Date:	25 Jan-23 09:00	**Material:**	Ambient Sample	**Source:**	Shelter Island Yacht Basin		
Receipt Date:	25 Jan-23 12:40	**CAS (PC):**		**Station:**	SIYB 6		
Sample Age:	28h (16.1 °C)	**Client:**	WSP				

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
08-9295-5429	96h Survival Rate	TST-Welch's t Test	<0.1	100% passed 96h survival rate	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
09-7991-1723	96h Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	8.02%	1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
08-9295-5429	96h Survival Rate	Control Resp	1	0.9	<<	Yes	Passes Criteria
09-7991-1723	96h Survival Rate	Control Resp	1	0.9	<<	Yes	Passes Criteria

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	0.9667	0.8810	1.0520	0.8000	1.0000	0.0333	0.0817	8.45%	3.33%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

96h Survival Rate Detail

MD5: 997932C2C84733B5EC9BB53958B6BDDE

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	0.8000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

96h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	5/5	5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	4/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5	5/5

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	08-9295-5429	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	10 Feb-23 11:57	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	10 Feb-23 11:56	**MD5 Hash:**	CC57638EEF991FDA8F955B37EA1A6E86	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		100*	0.2691	---		<0.1	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1			Indeterminate
Error	0	0	10			
Total	0		11			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test				Indeterminate

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

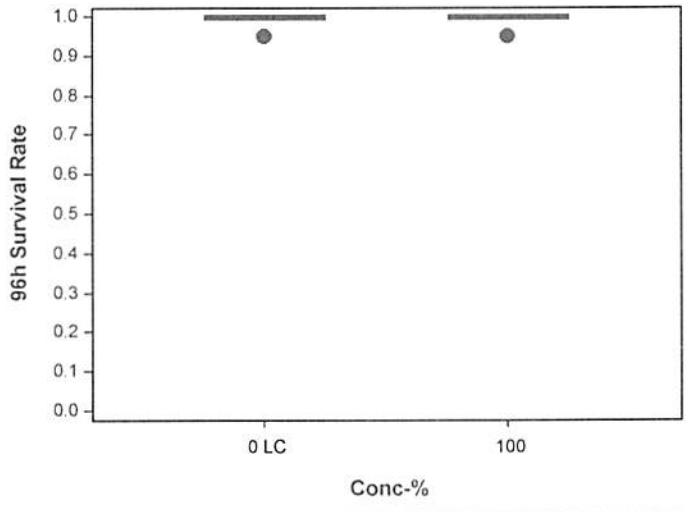
Angular (Corrected) Transformed Summary

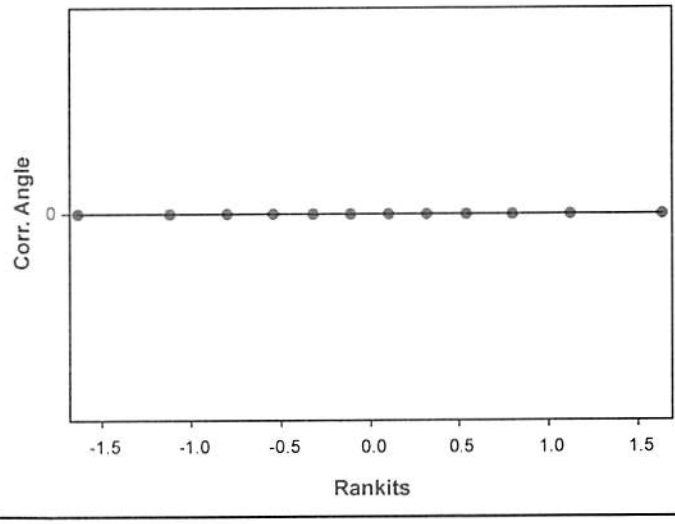
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
100		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%

96h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	5/5	5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5	5/5

Graphics





Inland Silverside 96-h Acute Survival Test — WSP Laboratory

Analysis ID:	09-7991-1723	Endpoint:	96h Survival Rate	CETIS Version:	CETISv2.1.3
Analyzed:	10 Feb-23 11:57	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	10 Feb-23 11:56	MD5 Hash:	997932C2C84733B5EC9BB53958B6BDDE	Editor ID:	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.08015	8.02%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		25	10	39	26	1	CDF	0.7500	Non-Significant Effect
		50	10	36	26	1	CDF	0.5503	Non-Significant Effect
		100	10	39	26	1	CDF	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0070885	0.0023628	3	1	0.4133	Non-Significant Effect
Error	0.0472566	0.0023628	20			
Total	0.0543451		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.4436	0.884	<1.0E-05	Non-Normal Distribution

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	3.33%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
25		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
50		6	1.3060	1.2040	1.4080	1.3450	1.1070	1.3450	0.0397	7.45%	2.95%
100		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%

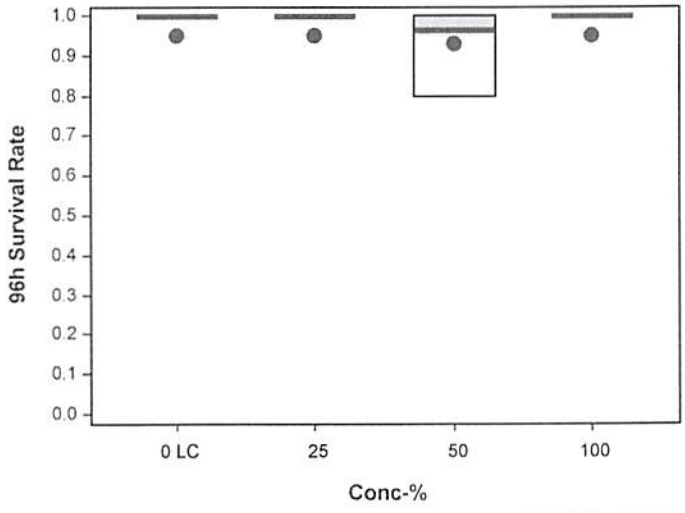
96h Survival Rate Binomials

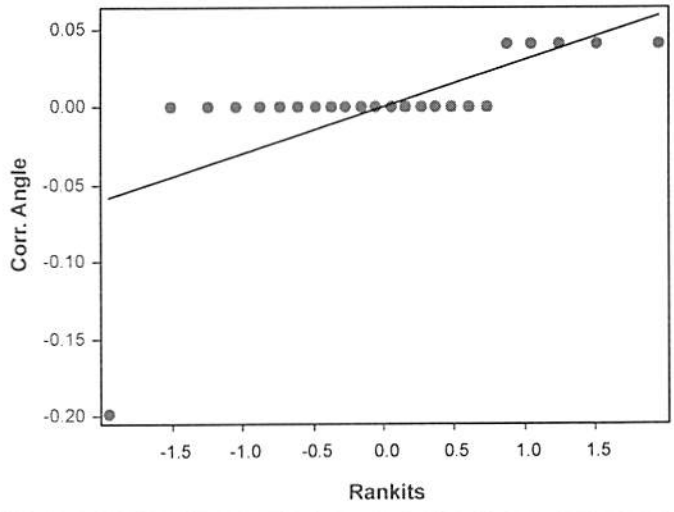
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	5/5	5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	4/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5	5/5

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	09-7991-1723	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	10 Feb-23 11:57	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Feb-23 11:56	**MD5 Hash:**	997932C2C84733B5EC9BB53958B6BDDE	**Editor ID:**	002-883-387-8

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: ~~Wood~~ WSP: POSD - Shelter Island Yacht Basin
Sample ID: SIYB-6
Test No. 23-01-043 to -049

Test Species: *Menidia beryllina*
Start Date/Time: 1/26/2023 1305
End Date/Time: 1/30/2023 1140

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #3	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	4
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		JF	JF	AG	AG	HK

Water Quality						
Parameter	0	24 (QC)	48f (QC)	48i	72	96
Temp. (°C)	24.3	23.8	26.2	25.2	24.1	24.5
Salinity (ppt)	33.4	34.1	34.4	33.5	34.9	36.3
pH (units)	8.02	7.76	7.94	8.00	7.92	7.88
DO (mg/L)	7.2	6.8	7.0	7.3	6.8	6.6
Temp. (°C)	24.3	24.6	26.3	24.1	24.2	25.2
Salinity (ppt)	33.5	33.7	34.4	33.1	34.0	36.0
pH (units)	7.99	7.86	7.94	7.98	7.95	7.91
DO (mg/L)	7.5	6.7	6.7	7.2	6.8	6.6
Temp. (°C)	24.1	24.7	26.4	24.2	25.0	25.2
Salinity (ppt)	33.1	33.4	34.0	33.1	33.9	34.9
pH (units)	7.96	7.85	7.94	7.97	7.95	7.93
DO (mg/L)	7.6	6.8	6.6	7.3	6.8	6.5
Temp. (°C)	24.1	25.0	26.4	24.0	25.2	25.7
Salinity (ppt)	33.0	33.2	34.6	33.0	33.5	34.3
pH (units)	7.91	7.95	7.94	7.99	7.95	7.95
DO (mg/L)	7.9	6.9	6.6	7.2	6.6	6.5
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	RV	HK	AG	AG	AG	RV

QC: RV
Date Animals Received: 1/24/23
Age of Animals at Test Start: 12 h

Feedings	0	24	48	72	96
Initials (AM):	–	HK	AG	AG	RV
Initials (PM):	RV				

Comments: (A) Adjusted RM temp

QC Check: JF 2/10/23
Final Review: RV 3/7/23

Site: SIYB-REF-1

CETIS Summary Report

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Batch ID:	02-9323-2759	**Test Type:**	Survival (96h)	**Analyst:**		
Start Date:	26 Jan-23 13:12	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater	
Ending Date:	30 Jan-23 11:45	**Species:**	Menidia beryllina	**Brine:**	Not Applicable	
Test Length:	95h	**Taxon:**		**Source:**	Aquatic Biosystems, CO	**Age:** 12d

Sample ID:	11-6985-6707	**Code:**	23-W032	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 08:00	**Material:**	Ambient Sample	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 12:40	**CAS (PC):**		**Station:**	SIYB REF1
Sample Age:	29h (15.6 °C)	**Client:**	WSP		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-7250-0586	96h Survival Rate	TST-Welch's t Test	<0.1	100% passed 96h survival rate	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
02-5378-0484	96h Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	---	1	1

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
02-5378-0484	96h Survival Rate	Control Resp	1	0.9	<<	Yes	Passes Criteria
03-7250-0586	96h Survival Rate	Control Resp	1	0.9	<<	Yes	Passes Criteria

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

96h Survival Rate Detail — MD5: 503BB78CB95B6F45DCAD06BBB154F769

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

96h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	5/5	5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	RN ~~5/5~~ 4/4	5/5	5/5

Inland Silverside 96-h Acute Survival Test

WSP Laboratory

Analysis ID:	02-5378-0484	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	10 Feb-23 12:08	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Feb-23 12:04	**MD5 Hash:**	503BB78CB95B6F45DCAD06BBB154F769	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units
Angular (Corrected)	C > T	100	>100	---	1

Steel Many-One Rank Sum Test

Control	vs	Conc-%	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		25	10	39	26	1	CDF	0.7500	Non-Significant Effect
		50	10	39	26	1	CDF	0.7500	Non-Significant Effect
		100	10	39	26	1	CDF	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3			Indeterminate
Error	0	0	20			
Total	0		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test				Indeterminate

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

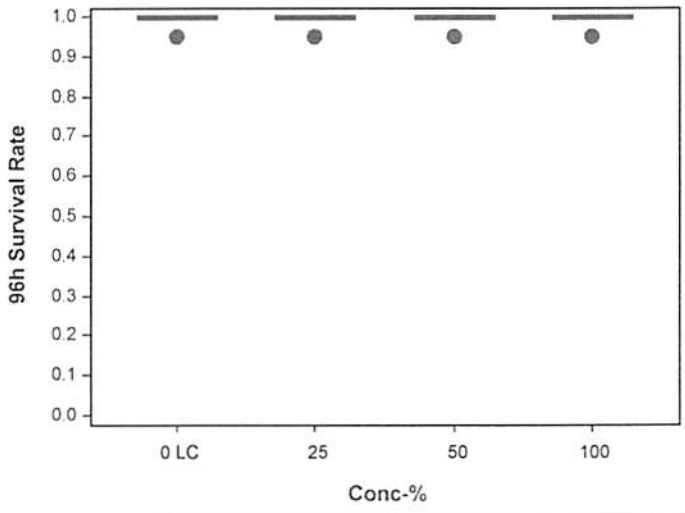
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
25		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
50		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
100		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%

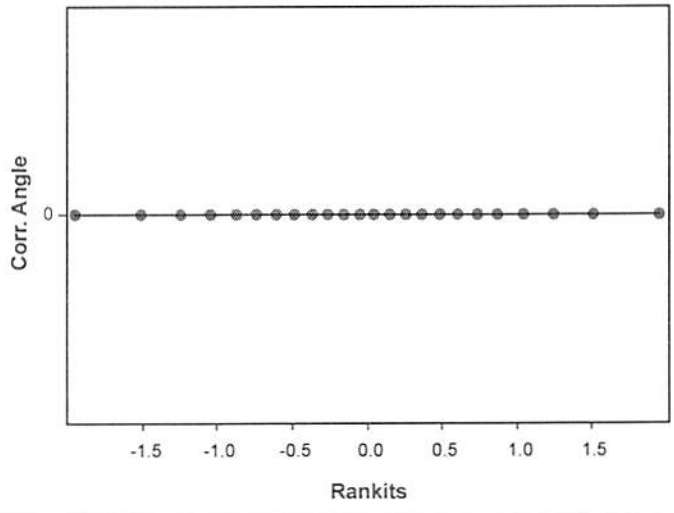
96h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	5/5	5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5	5/5

Inland Silverside 96-h Acute Survival Test					WSP Laboratory
Analysis ID:	02-5378-0484	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	10 Feb-23 12:08	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Feb-23 12:04	**MD5 Hash:**	503BB78CB95B6F45DCAD06BBB154F769	**Editor ID:**	002-883-387-8

Graphics





Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	03-7250-0586	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	10 Feb-23 12:08	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	10 Feb-23 12:04	**MD5 Hash:**	CC57638EEF991FDA8F955B37EA1A6E86	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	P-Type	P-Value	Decision(α:10%)
Lab Control		100*	0.2691	---		<0.1	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1			Indeterminate
Error	0	0	10			
Total	0		11			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test				Indeterminate

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

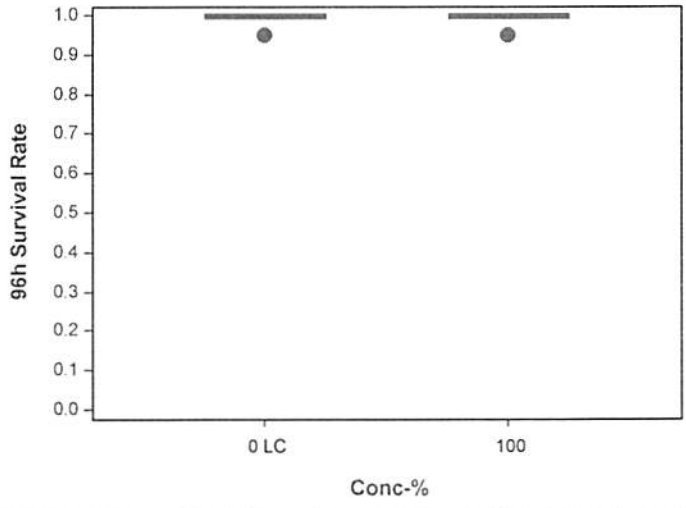
Angular (Corrected) Transformed Summary

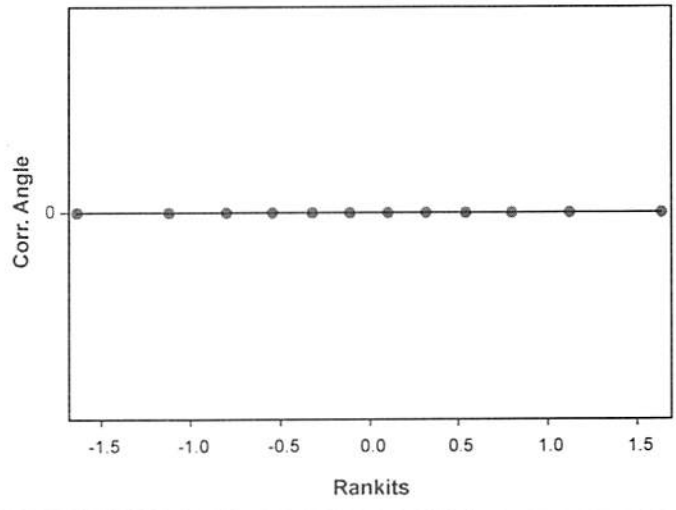
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
100		6	1.3450	1.3450	1.3450	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%

96h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	LC	5/5	5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5	5/5

Graphics





96hr Marine Acute Test with 48hr Renewal

Client: ~~Wood~~ WSP: POSD - Shelter Island Yacht Basin
Test Species: *Menidia beryllina*
Sample ID: SIYB-REF-1
Start Date/Time: 1/26/2023 1312
Test No. 23-01-043 to -049
End Date/Time: 1/30/2023 ~~1100~~ HK 1145

Sample ID (%)	Rep	Counts				
		0	24	48	72	96
LC #3	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
25	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	4 (L)
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
Tech Initials:		JF	JF	AO	AO	HK

QC: RV
Date Animals Received: 11/24/23
Age of Animals at Test Start: 12d

Water Quality						
Parameter	0	24 DM QC1	48f	48i	72	96
Temp. (°C)	24.3	23.8 (H)	26.2	25.2	24.1	24.5
Salinity (ppt)	33.0	34.1	34.4	33.5	34.9	36.3
pH (units)	8.02	7.76	7.94	8.00	7.92	7.88
DO (mg/L)	7.2	6.8	7.0	7.3	6.8	6.6
Temp. (°C)	24.0	24.8	26.4	24.4	25.2	25.2
Salinity (ppt)	33.5	34.3	35.0	33.3	34.7	35.3
pH (units)	7.98	7.80	7.94	7.99	7.96	7.94
DO (mg/L)	7.4	6.8	6.6	7.2	6.6	6.4
Temp. (°C)	24.1	24.8	26.3	24.7	25.0	25.8
Salinity (ppt)	33.3	34.0	35.1	33.2	35.0	34.0
pH (units)	7.95	7.84	7.95	7.97	7.96	7.94
DO (mg/L)	7.6	6.8	6.5	7.4	6.6	6.4
Temp. (°C)	25.1	24.6	26.5	25.6	24.5	25.8
Salinity (ppt)	33.2	33.7	35.3	33.1	35.1	35.4
pH (units)	7.91	7.86	7.93	7.94	7.96	7.96
DO (mg/L)	8.1	6.8	6.6	8.3	6.7	6.6
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	RV	HK	AO	AO	AO	RV

Feedings	0	24	48	72	96
Initials (AM):	-	HK	AO	AO	RV
Initials (PM):	RV				

Comments: (H) Adjusted fan temp (L) Lost in transfer

QC Check: JF 2/10/23
Final Review: RV 3/7/23

APPENDIX C

List of Data Qualifier Codes

Test Qualifier Codes

QC1: Temperatures out of recommended range; corrective action taken

QC2: Temperatures out of recommended range; no action taken, test terminated

QC3: Test initiated on aeration due to anticipated drop in dissolved oxygen

QC4: Dissolved oxygen percent saturation <110

QC5: Survival counts not recorded due to poor visibility

QC6: Inadequate sample volume remaining; 50% renewal performed

QC7: Inadequate sample volume remaining; no renewal performed

QC8: Organisms received at a temperature outside of recommended range of test specifications. Temperature changed more than 3 degrees Celsius within a 24-hour period.

QC9: Organisms received at a salinity outside of 3 ppt of recommended test specifications. Acclimated to appropriate salinity within a 24-hour period.

APPENDIX D

Sample Receipt Information

& Chain of Custody Form

Sample Check-In: Effluent/Water

WSP Environmental Laboratory
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: POSD - SIYB
Project Name: 2023 SIYB TMDL winter
Test ID Numbers: 23-01-043 to -056

Sample ID:	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1
Sample Number:	23-W026	23-W027	23-W028	23-W029	23-W030	23-W031	23-W032
Collection Date/Time:	1/25/23 1400	1/25/23 1300	1/25/23 1200	1/25/23 1100	1/25/23 1000	1/25/23 0900	1/25/23 0800
Receipt Date/Time:	1/25/23 1700	1/25/23 1700	1/25/23 1700	1/25/23 1240	1/25/23 1240	1/25/23 1240	1/25/23 1240
Total Sample Volume (L):	~~30~~ 14L RV	14L	14L	14L	14L	14L	14L
Receipt Temp (°C):	15.7	15.7	14.9	17.8	15.8	16.1	15.6
Appropriate Temp (Y/N)[1]:	Y	Y	Y	Y	Y	Y	Y
pH (units):	7.83	7.83	7.92	7.92	7.92	7.88	7.90
DO (mg/L):	~~RV~~ 9.1	8.5	8.8	8.4	8.2	8.1	7.8
Conductivity (µS/cm)[2]:	51	~~RV~~ 51	51	50	50	50	49
Salinity (ppt):	32.9	32.8	32.7	32.8	32.7	32.6	~~RV 7.8~~ 32.3
Alkalinity (mg/L):	109	112	111	108	~~RV 111~~ 110	114	107
Hardness (mg/L)[2]:	—	—	—	—	—	—	—
Total Chlorine (mg/L)[3]:	0.03	<0.02	NR	0.02	<0.02	0.06	0.02
Free Chlorine (mg/L)[3]:	—	—	—	—	—	—	—
Technician Initials:	RV	RV	RV	RV	RV	RV	RV

Notes:

[1] Temperature should be 0 - 6°C if received > 24 hours past collection

[2] Only measured on samples with less than 3 ppt salinity

[3] If total chlorine is above 0.10 mg/L, the free chlorine will be measured

[4] Debris, odor, and color is described only if observed in the sample

Sample Descriptions[4]:
All Samples: clear & colorless

Test Organism: M. Berrylling Dilution Water: (Nat-SW), Art-SW, RW, DMW, Other_____ Salinity_____
M. galloprovincialis
Additional Control: ~~ART~~ RV Salinity_____

Initial QC: JF 2/9/23
Final Review: RV 3/7/23

WSP Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Client/Send Report To:

Company: WSP USA E & I, Inc.
Address: 9177 Sky Park Court
San Diego, CA 92123
Contact/PM: Marisa Swiderski
Phone Number: (808) 772-8740
Email Address: marisa.swiderski@wsp.com

Project Information (if needed):

Project Name: 2023 SIYB TMDL Winter Monitoring
Project No.: 2015100118.0007
PO Number: N/A

Personal Cooler Shipped:
Return Requested: YES_____ NO_____.

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Analysis Requested: Mb-a	Mg-dv	Mg-dv TIE (SOW attached)					Receipt Temp (°C)
SIYB-REF-1	01/25/2023	0800	14L	Grab		X	X						15.6
SIYB-6	"	0900	14L	Grab		X	X						16.1
SIYB-5	"	1000	14L	Grab		X	X						15.8
SIYB-4	"	1100	14L	Grab		X	X						17.8
~~SIYB-3~~			~~14L~~	~~Grab~~		~~X~~	~~X~~						
~~SIYB-2~~			~~14L~~	~~Grab~~		~~X~~	~~X~~						
~~SIYB-1~~			~~30L~~	~~Grab~~		~~X~~	~~X~~	~~X~~					

Samples Collected By:
MS/KB

Additional Comments: Concurrent ref. tox. test for all species (copper concentrations of 0, 25, 50, 100, 200, 400 ug/L for Menidia and 0, 2.5, 5.0, 10, 20 and 40 µg/L for bivalve).
Menidia tests at 3 concentrations (25, 50, 100%) and a control; 6 reps/sample.
Bivalve tests at 5 concentrations (6.25, 12.5, 25, 50, and 100%), and a control; and a 100% filtered undiluted sample (Look for Noctiluca sp.); 5 reps/sample.

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:
Signature: Marisa Swiderski
Print Name: Marisa Swiderski
Date/Time: 01/25/2023 1135

Received By:
Signature: [signature]
Print Name: Chris Stransky
Date/Time: 01/25/2023 1135

Relinquished By:
Signature: [signature]
Print Name: Chris Stransky
Date/Time: 01/25/2023 1240

Received By:
Signature: [signature]
Print Name: Jacob Fletcher
Date/Time: 01/25/2023 1240

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

WSP Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Client/Send Report To:

Company: WSP USA E & I, Inc.
Address: 9177 Sky Park Court
San Diego, CA 92123
Contact/PM: Marisa Swiderski
Phone Number: (808) 772-8740
Email Address: marisa.swiderski@wsp.com

Project Information (if needed):

Project Name: 2023 SIYB TMDL Winter Monitoring
Project No.: 2015100118.0007
PO Number: N/A

Personal Cooler Shipped:
Return Requested: YES_____ NO_____.

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Analysis Requested: Mb-a	Mg-dv	Mg-dv TIE (SOW attached)					Receipt Temp (°C)
~~SIYB-REF-1~~			~~14L~~	~~Grab~~		X	X						
~~SIYB-6~~			~~14L~~	~~Grab~~		X	X						
~~SIYB-5~~			~~14L~~	~~Grab~~		X	X						
~~SIYB-4~~			~~14L~~	~~Grab~~		X	X						
SIYB-3	01/25/2023	1200	14L	Grab		X	X						14.9
SIYB-2	"	1300	14L	Grab		X	X						15.7
SIYB-1	"	1400	30L	Grab		X	X	X					15.7

Samples Collected By:
MS/KB

Additional Comments: Concurrent ref. tox. test for all species (copper concentrations of 0, 25, 50, 100, 200, 400 ug/L for Menidia and 0, 2.5, 5.0, 10, 20 and 40 µg/L for bivalve).
Menidia tests at 3 concentrations (25, 50, 100%) and a control; 6 reps/sample.
Bivalve tests at 5 concentrations (6.25, 12.5, 25, 50, and 100%), and a control; and a 100% filtered undiluted sample (Look for Noctiluca sp.); 5 reps/sample.

Samples Shipped via:

Condition Upon Receipt:

Relinquished/Shipped By:	Received By:	Relinquished By:	Received By:
Signature: Marisa Swiderski	Signature: Alex Gabriel	Signature:	Signature:
Print Name: Marisa Swiderski	Print Name: Alex Gabriel	Print Name:	Print Name:
Date/Time: 01/25/2023 1700	Date/Time: 1/25/23 1700	Date/Time:	Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

APPENDIX E

Reference Toxicant Test

Statistical Analysis, Control Chart, and Raw Data

Chronic Mussel
Reference Toxicant Test

CETIS Summary Report

Bivalve Larval Survival and Development Test

WSP ~~Wood E~~&IS

Batch ID:	17-5344-3019	Test Type:	Development-Survival	Analyst:	
Start Date:	26 Jan-23 1730	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Diluted Natural Seawater
Ending Date:	28 Jan-23 1600	Species:	Mytilis galloprovincialis	Brine:	Not Applicable
Test Length:	48h	Taxon:		Source:	Field Collected Age:

Sample ID:	01-3858-4478	Code:	230123mgrd	Project:	SIYB-TMDL Monitoring
Sample Date:	26 Jan-23	Material:	Total Copper	Source:	Reference Toxicant
Receipt Date:	26 Jan-23	CAS (PC):		Station:	
Sample Age:	---	Client:	Internal		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
05-5097-2236	Combined Proportion Norma	Dunnett Multiple Comparison Test	✓	5	10	7.071	21.3%	1
05-1195-9949	Proportion Normal	Steel Many-One Rank Sum Test	✓	5	10	7.071	16.8%	1
04-7549-6049	Survival Rate	Dunnett Multiple Comparison Test		20	40	28.28	8.37%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
07-0010-2705	Combined Proportion Norma	Spearman-Kärber		EC50	7.734	7.577	7.893	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
05-1195-9949	Proportion Normal	Control Resp	0.9051	0.9	<<	Yes	Passes Criteria
04-7549-6049	Survival Rate	Control Resp	0.9508	0.5	<<	Yes	Passes Criteria
05-5097-2236	Combined Proportion Norma	PMSD	0.2126	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8614	0.7879	0.9348	0.7760	0.9189	0.0265	0.0591	6.87%	0.00%
2.5		5	0.8671	0.7970	0.9372	0.7705	0.9130	0.0253	0.0565	6.51%	-0.66%
5		5	0.8155	0.7269	0.9042	0.7104	0.9043	0.0319	0.0714	8.75%	5.32%
10		5	0.1566	-0.0845	0.3977	0.0000	0.4550	0.0868	0.1942	124.01%	81.82%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9051	0.8713	0.9390	0.8659	0.9318	0.0122	0.0273	3.02%	0.00%
2.5		5	0.8829	0.8519	0.9138	0.8494	0.9130	0.0112	0.0249	2.82%	2.46%
5		5	0.8588	0.8100	0.9077	0.8075	0.9043	0.0176	0.0393	4.58%	5.12%
10		5	0.1575	-0.0827	0.3977	0.0000	0.4550	0.0865	0.1935	122.85%	82.60%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9508	0.9017	1.0000	0.8962	1.0000	0.0177	0.0396	4.16%	0.00%
2.5		5	0.9814	0.9298	1.0330	0.9071	1.0000	0.0186	0.0415	4.23%	-3.22%
5		5	0.9486	0.8812	1.0160	0.8798	1.0000	0.0243	0.0543	5.73%	0.23%
10		5	0.9607	0.9109	1.0100	0.9126	1.0000	0.0179	0.0400	4.17%	-1.03%
20		5	0.9421	0.9178	0.9664	0.9290	0.9727	0.0087	0.0196	2.08%	0.92%
40		5	0.1388	0.0758	0.2018	0.0820	0.1913	0.0227	0.0508	36.57%	85.40%

Bivalve Larval Survival and Development Test — Wood E&IS

Combined Proportion Normal Detail MD5: 0D7D7E46D0A7D6931FF9C7C14F7CBE32

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8962	0.8251	0.7760	0.8907	0.9189
2.5		0.9130	0.8913	0.8667	0.8939	0.7705
5		0.8033	0.9043	0.8087	0.7104	0.8510
10		0.4550	0.2513	0.0492	0.0273	0.0000
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Proportion Normal Detail MD5: 8833C98F08C9DE26800BA2DC6AB5FF0E

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9318	0.8882	0.8659	0.9209	0.9189
2.5		0.9130	0.8913	0.8667	0.8939	0.8494
5		0.8400	0.9043	0.8916	0.8075	0.8510
10		0.4550	0.2513	0.0511	0.0299	0.0000
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail MD5: 50C087EE7F2484A9ED642935CB82431C

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9617	0.9290	0.8962	0.9672	1.0000
2.5		1.0000	1.0000	1.0000	1.0000	0.9071
5		0.9563	1.0000	0.9071	0.8798	1.0000
10		1.0000	1.0000	0.9617	0.9126	0.9290
20		0.9508	0.9290	0.9290	0.9290	0.9727
40		0.1421	0.0820	0.1858	0.0929	0.1913

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/183	151/183	142/183	163/183	170/185
2.5		168/184	164/184	169/195	177/198	141/183
5		147/183	170/188	148/183	130/183	177/208
10		86/189	48/191	9/183	5/183	0/183
20		0/183	0/183	0/183	0/183	0/183
40		0/183	0/183	0/183	0/183	0/183

Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/176	151/170	142/164	163/177	170/185
2.5		168/184	164/184	169/195	177/198	141/166
5		147/175	170/188	148/166	130/161	177/208
10		86/189	48/191	9/176	5/167	0/170
20		0/174	0/170	0/170	0/170	0/178
40		0/26	0/15	0/34	0/17	0/35

Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	176/183	170/183	164/183	177/183	183/183
2.5		183/183	183/183	183/183	183/183	166/183
5		175/183	183/183	166/183	161/183	183/183
10		183/183	183/183	176/183	167/183	170/183
20		174/183	170/183	170/183	170/183	178/183
40		26/183	15/183	34/183	17/183	35/183

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	05-5097-2236	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:35	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	0D7D7E46D0A7D6931FF9C7C14F7CBE32	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	5	10	7.071	---	0.1831	21.26%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	8	-0.07405	2.227	0.2275	CDF	0.7758	Non-Significant Effect
		5	8	0.613	2.227	0.2275	CDF	0.4947	Non-Significant Effect
		10*	8	8.387	2.227	0.2275	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.65059	0.883529	3	33.87	<1.0E-05	Significant Effect
Error	0.417401	0.0260876	16			
Total	3.06799		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	9.827	11.34	0.0201	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9475	0.866	0.3301	Normal Distribution

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8614	0.7879	0.9348	0.8907	0.7760	0.9189	0.0265	6.87%	0.00%
2.5		5	0.8671	0.7970	0.9372	0.8913	0.7705	0.9130	0.0253	6.51%	-0.66%
5		5	0.8155	0.7269	0.9042	0.8087	0.7104	0.9043	0.0319	8.75%	5.32%
10		5	0.1566	0.0000	0.3977	0.0492	0.0000	0.4550	0.0868	124.01%	81.82%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1950	1.0910	1.2990	1.2340	1.0780	1.2820	0.0376	7.03%	0.00%
2.5		5	1.2030	1.1060	1.3000	1.2350	1.0710	1.2710	0.0349	6.49%	-0.63%
5		5	1.1330	1.0170	1.2480	1.1180	1.0030	1.2560	0.0416	8.21%	5.24%
10		5	0.3384	-0.0183	0.6952	0.2236	0.0370	0.7404	0.1285	84.89%	71.68%
20		5	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0000	0.00%	96.91%
40		5	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0000	0.00%	96.91%

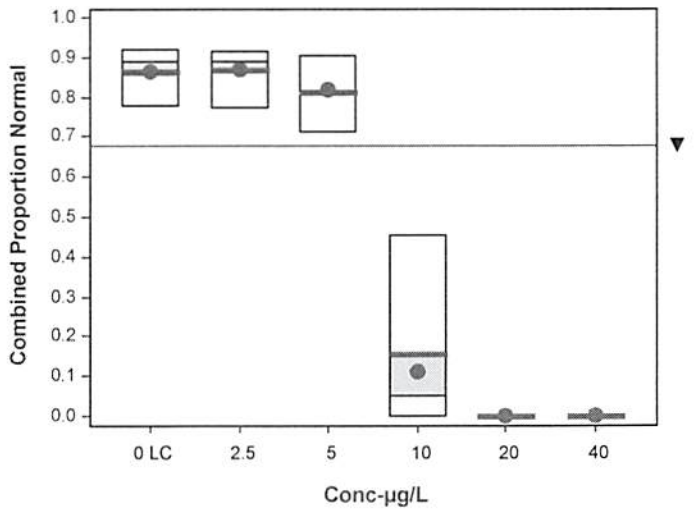
Combined Proportion Normal Binomials

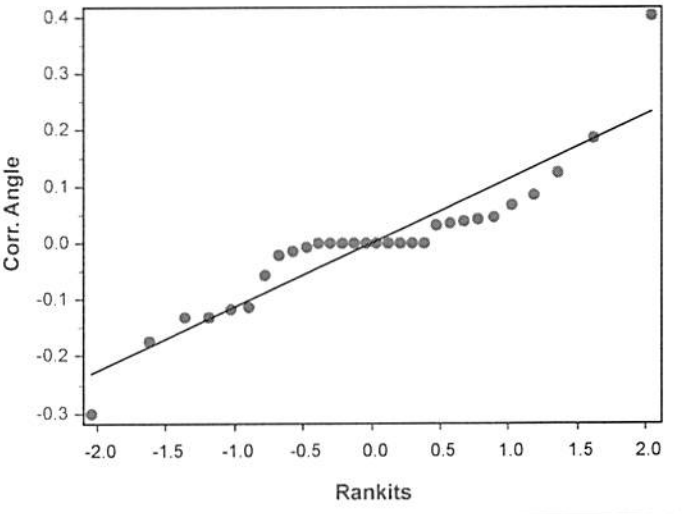
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/183	151/183	142/183	163/183	170/185
2.5		168/184	164/184	169/195	177/198	141/183
5		147/183	170/188	148/183	130/183	177/208
10		86/189	48/191	9/183	5/183	0/183
20		0/183	0/183	0/183	0/183	0/183
40		0/183	0/183	0/183	0/183	0/183

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	05-5097-2236	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:35	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	0D7D7E46D0A7D6931FF9C7C14F7CBE32	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test

Wood E&IS

Analysis ID:	05-1195-9949	Endpoint:	Proportion Normal	CETIS Version:	CETISv2.1.3
Analyzed:	09 Feb-23 15:36	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	09 Feb-23 15:31	MD5 Hash:	8833C98F08C9DE26800BA2DC6AB5FF0E	Editor ID:	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	5	10	7.071	---	0.152	16.80%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	8	22	17	0	CDF	0.2647	Non-Significant Effect
		5	8	19	17	0	CDF	0.0921	Non-Significant Effect
		10*	8	15	17	0	CDF	0.0123	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.93399	0.977998	3	44.33	<1.0E-05	Significant Effect
Error	0.352988	0.0220617	16			
Total	3.28698		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	20.49	11.34	0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8878	0.866	0.0245	Normal Distribution

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9051	0.8713	0.9390	0.9189	0.8659	0.9318	0.0122	3.02%	0.00%
2.5		5	0.8829	0.8519	0.9138	0.8913	0.8494	0.9130	0.0112	2.82%	2.46%
5		5	0.8588	0.8100	0.9077	0.8510	0.8075	0.9043	0.0176	4.58%	5.12%
10		5	0.1575	0.0000	0.3977	0.0511	0.0000	0.4550	0.0865	122.85%	82.60%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2600	1.2030	1.3170	1.2820	1.1960	1.3070	0.0204	3.63%	0.00%
2.5		5	1.2230	1.1750	1.2710	1.2350	1.1720	1.2710	0.0173	3.17%	2.94%
5		5	1.1880	1.1180	1.2590	1.1740	1.1170	1.2560	0.0255	4.80%	5.69%
10		5	0.3412	-0.0131	0.6954	0.2281	0.0384	0.7404	0.1276	83.63%	72.92%
20		5	0.0381	0.0376	0.0386	0.0384	0.0375	0.0384	0.0002	1.03%	96.98%
40		5	0.1039	0.0784	0.1295	0.0982	0.0846	0.1295	0.0092	19.81%	91.75%

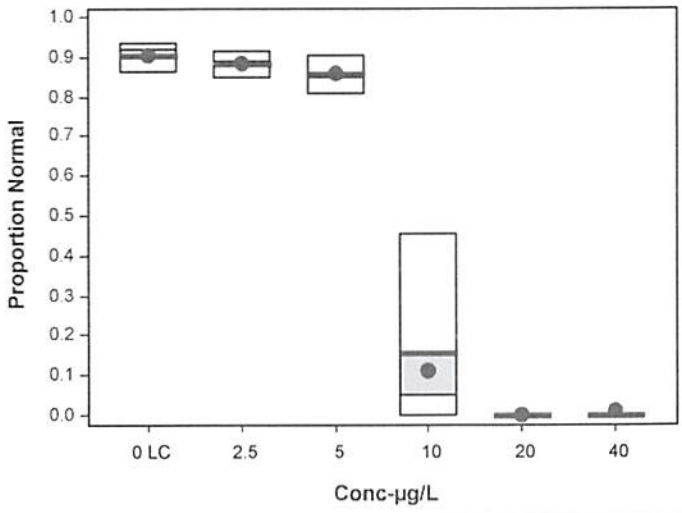
Proportion Normal Binomials

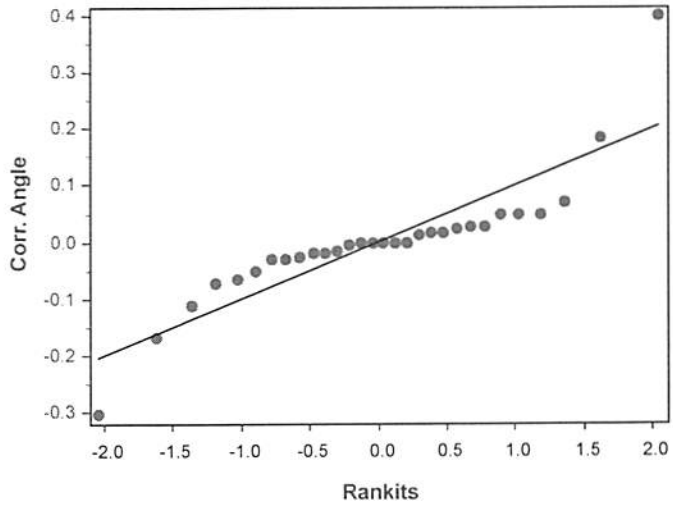
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/176	151/170	142/164	163/177	170/185
2.5		168/184	164/184	169/195	177/198	141/166
5		147/175	170/188	148/166	130/161	177/208
10		86/189	48/191	9/176	5/167	0/170
20		0/174	0/170	0/170	0/170	0/178
40		0/26	0/15	0/34	0/17	0/35

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	05-1195-9949	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:36	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	8833C98F08C9DE26800BA2DC6AB5FF0E	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	04-7549-6049	Endpoint:	Survival Rate	CETIS Version:	CETISv2.1.3
Analyzed:	09 Feb-23 15:36	Analysis:	Parametric-Control vs Treatments	Status Level:	1
Edit Date:	09 Feb-23 15:31	MD5 Hash:	50C087EE7F2484A9ED642935CB82431C	Editor ID:	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	20	40	28.28	---	0.07956	8.37%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	8	-1.6	2.362	0.1642	CDF	0.9973	Non-Significant Effect
		5	8	-0.1881	2.362	0.1642	CDF	0.8829	Non-Significant Effect
		10	8	-0.4976	2.362	0.1642	CDF	0.9397	Non-Significant Effect
		20	8	0.5329	2.362	0.1642	CDF	0.6325	Non-Significant Effect
		40*	8	14.25	2.362	0.1642	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.35713	0.871427	5	72.09	<1.0E-05	Significant Effect
Error	0.290128	0.0120887	24			
Total	4.64726		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	5.252	15.09	0.3859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9741	0.9031	0.6550	Normal Distribution

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9508	0.9017	1.0000	0.9617	0.8962	1.0000	0.0177	4.16%	0.00%
2.5		5	0.9814	0.9298	1.0000	1.0000	0.9071	1.0000	0.0186	4.23%	-3.22%
5		5	0.9486	0.8812	1.0000	0.9563	0.8798	1.0000	0.0243	5.73%	0.23%
10		5	0.9607	0.9109	1.0000	0.9617	0.9126	1.0000	0.0179	4.17%	-1.03%
20		5	0.9421	0.9178	0.9664	0.9290	0.9290	0.9727	0.0087	2.08%	0.92%
40		5	0.1388	0.0758	0.2018	0.1421	0.0820	0.1913	0.0227	36.57%	85.40%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.3680	1.2320	1.5040	1.3740	1.2430	1.5340	0.0491	8.02%	0.00%
2.5		5	1.4790	1.3280	1.6310	1.5340	1.2610	1.5340	0.0546	8.25%	-8.13%
5		5	1.3810	1.1960	1.5660	1.3600	1.2170	1.5340	0.0665	10.77%	-0.96%
10		5	1.4030	1.2470	1.5580	1.3740	1.2710	1.5340	0.0561	8.95%	-2.53%
20		5	1.3310	1.2740	1.3880	1.3010	1.3010	1.4050	0.0205	3.44%	2.71%
40		5	0.3770	0.2837	0.4702	0.3865	0.2904	0.4526	0.0336	19.92%	72.44%

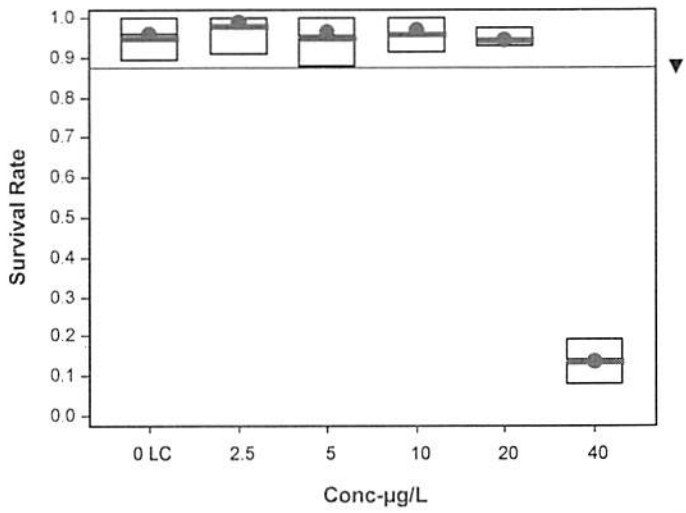
Survival Rate Binomials

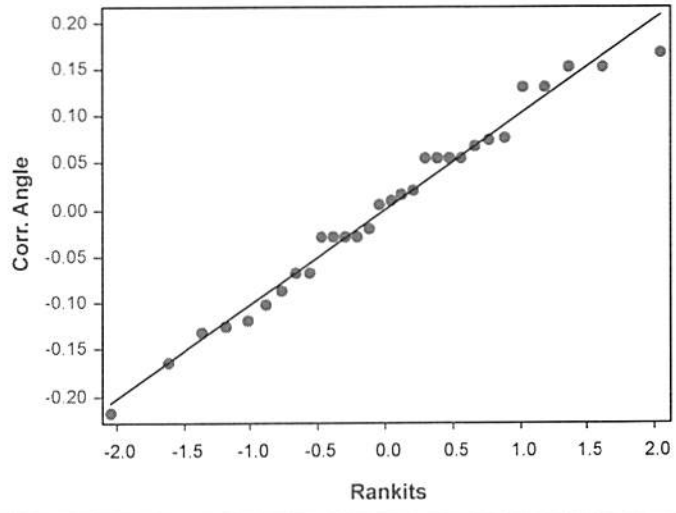
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	176/183	170/183	164/183	177/183	183/183
2.5		183/183	183/183	183/183	183/183	166/183
5		175/183	183/183	166/183	161/183	183/183
10		183/183	183/183	176/183	167/183	170/183
20		174/183	170/183	170/183	170/183	178/183
40		26/183	15/183	34/183	17/183	35/183

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	04-7549-6049	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	50C087EE7F2484A9ED642935CB82431C	**Editor ID:**	002-883-387-8

Graphics





CETIS Analytical Report

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	07-0010-2705	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:35	**Analysis:**	Untrimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	0D7D7E46D0A7D6931FF9C7C14F7CBE32	**Editor ID:**	002-883-387-8

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.1385	0.00%	0.8884	0.004433	7.734	7.577	7.893

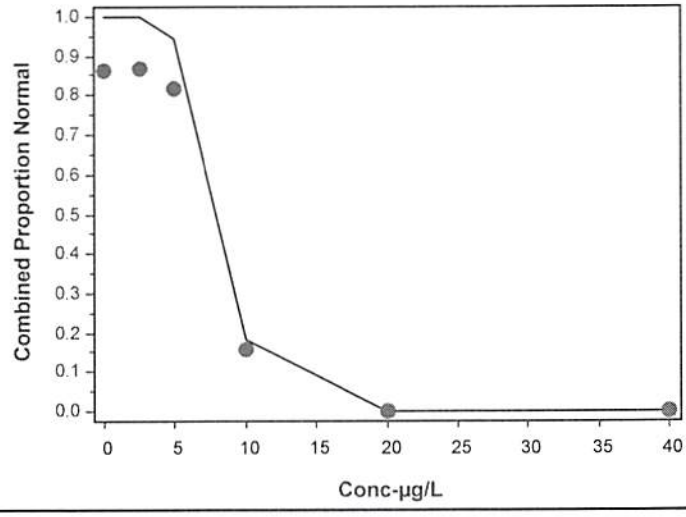
Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	ΣA/ΣB	Mean	%Effect
0	LC	5	0.8614	0.8907	0.7760	0.9189	6.87%	0.00%	790/917	0.8645	0.00%
2.5		5	0.8671	0.8913	0.7705	0.9130	6.51%	-0.66%	819/944	0.8645	0.00%
5		5	0.8155	0.8087	0.7104	0.9043	8.75%	5.32%	772/945	0.8169	5.51%
10		5	0.1566	0.0492	0.0000	0.4550	124.01%	81.82%	148/929	0.1593	81.57%
20		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/915	0.0000	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/915	0.0000	100.00%

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/183	151/183	142/183	163/183	170/185
2.5		168/184	164/184	169/195	177/198	141/183
5		147/183	170/188	148/183	130/183	177/208
10		86/189	48/191	9/183	5/183	0/183
20		0/183	0/183	0/183	0/183	0/183
40		0/183	0/183	0/183	0/183	0/183

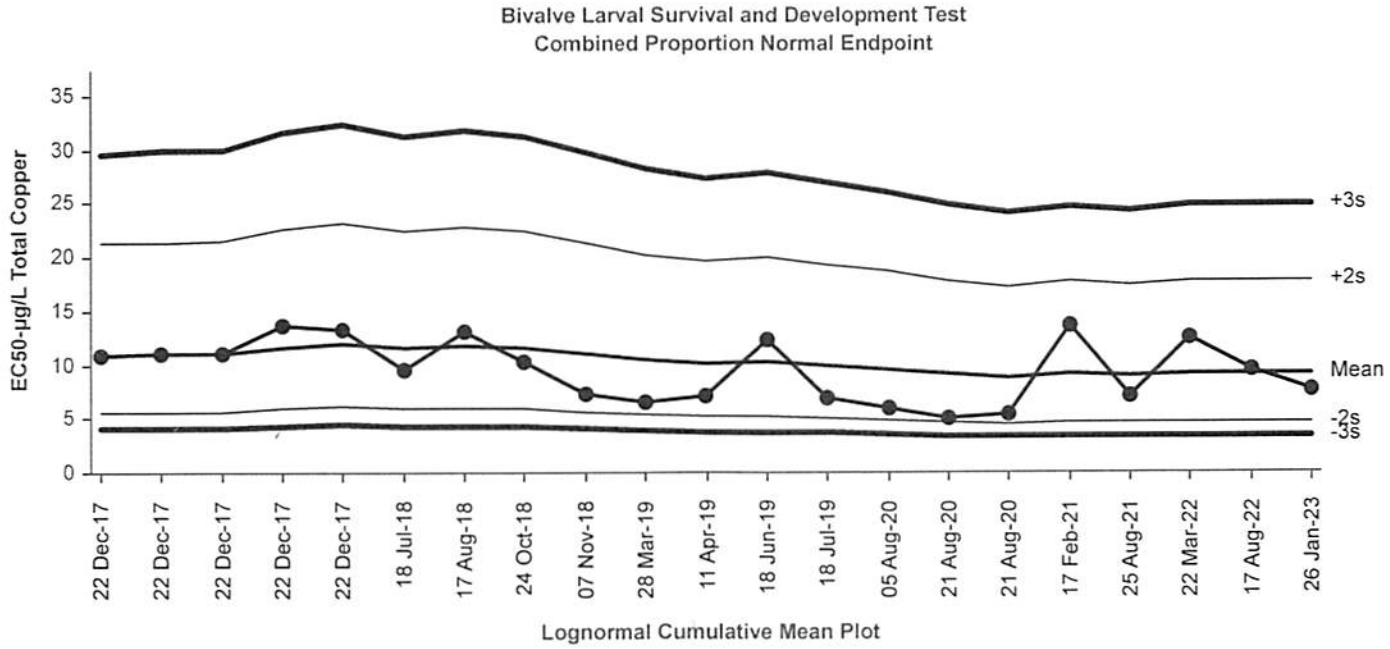
Graphics



CETIS QC Plot

Bivalve Larval Survival and Development Test — **All Matching Labs**

Test Type:	Development-Survival	**Organism:**	Mytilis galloprovincialis	**Material:**	Total Copper
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	9.171	**Count:**	20	**-2s Warning Limit:**	4.72	**-3s Action Limit:**	3.38
Sigma:	NA	**CV:**	34.20%	**+2s Warning Limit:**	17.8	**+3s Action Limit:**	24.9

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	Dec	22	15:00	10.95	1.776	0.5325			13-8076-0092	04-7666-8867	Wood E&IS
2			22	15:00	11.1	1.934	0.5757			18-9173-1279	00-8804-3805	Wood E&IS
3			22	15:00	11.13	1.958	0.5822			19-1537-3013	20-7428-0259	Wood E&IS
4			22	15:10	13.69	4.517	1.205			05-2148-4604	14-2190-9809	Wood E&IS
5			22	15:10	13.26	4.091	1.11			07-4924-1298	02-9536-6591	Wood E&IS
6	2018	Jul	18	12:30	9.593	0.4228	0.1356			17-4700-2672	19-1834-7581	Wood E&IS
7		Aug	17	18:15	13.11	3.937	1.074			06-6531-4070	03-3159-5721	Wood E&IS
8		Oct	24	14:25	10.37	1.203	0.3707			10-5049-1350	21-2167-7967	Wood E&IS
9		Nov	7	14:40	7.288	-1.882	-0.6911			21-2560-8966	08-1725-7308	Wood E&IS
10	2019	Mar	28	15:00	6.57	-2.6	-1.003			01-1205-3490	09-9916-0601	Wood E&IS
11		Apr	11	15:05	7.2	-1.97	-0.7276			09-5126-5022	11-0264-5925	Wood E&IS
12		Jun	18	15:35	12.33	3.159	0.8905			20-1050-4622	12-9168-6963	Wood E&IS
13		Jul	18	14:55	7	-2.171	-0.8125			14-0843-5203	16-2395-2147	Wood E&IS
14	2020	Aug	5	16:15	5.97	-3.2	-1.291			01-5363-1852	03-9719-1127	Wood E&IS
15			21	17:45	4.994	-4.176	-1.828			02-6167-5910	09-0147-8078	Wood E&IS
16			21	17:45	5.371	-3.799	-1.609			09-7758-0702	07-5383-0657	Wood E&IS
17	2021	Feb	17	16:05	13.75	4.58	1.219			02-0888-9810	19-5282-1839	Wood E&IS
18		Aug	25	16:50	7.088	-2.083	-0.775			01-4286-8892	09-6353-7527	Wood E&IS
19	2022	Mar	22	16:15	12.55	3.376	0.943			07-3402-8050	17-5105-1124	Wood E&IS
20		Aug	17	15:45	9.552	0.3814	0.1226			19-5652-2899	07-5236-6337	Wood E&IS
21	2023	Jan	26	0:00	7.734	-1.437	-0.5127			03-3591-1122	07-0010-2705	Wood E&IS

CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:19 (p 1 of 1)
Test Code/ID: 230123mgrd / 03-3591-1122

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	230123mgrd
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	26 Jan-23	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			1			170	0	AG 2/8/23
			2			35	0	
			3			191	48	
			4			34	0	
			5			167	5	
			6			164	142	
			7			185	170	
			8			176	9	
			9			26	0	
			10			170	151	
			11			198	177	
			12			184	168	
			13			177	163	
			14			176	164	
			15			170	0	
			16			188	170	
			17			175	147	
			18			166	141	
			19			174	0	
			20			189	86	
			21			208	177	
			22			17	0	
			23			195	169	
			24			170	0	
			25			166	148	
			26			15	0	
			27			178	0	
			28			161	130	
			29			184	164	
			30			170	0	

CETIS Test Data Worksheet

Test Code/ID: 230123mgrd / 03-3591-1122

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	230123mgrd
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	26 Jan-23	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	14					
0	LC	2	10			143	130	* recount after settle
0	LC	3	6					
0	LC	4	13					
0	LC	5	7					
2.5		1	12					
2.5		2	29					
2.5		3	23					
2.5		4	11					
2.5		5	18					
5		1	17					
5		2	16					
5		3	25					
5		4	28					
5		5	21					
10		1	20					
10		2	3					
10		3	8					
10		4	5					
10		5	15					
20		1	19					
20		2	24					
20		3	1					
20		4	30					
20		5	27					
40		1	9					
40		2	26					
40		3	4					
40		4	22					
40		5	2					

QC: AG

Analyst: AG QA: JC

Water Quality for Bivalve Development

Client: Internal
Project ID: Cu Reftox
Test No. 230126mgrd

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~28/2023 1600

Test Conc. (µg/L Cu)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.5	15.5	15.4
	Salinity (ppt)	33.4	33.3	33.5
	pH (units)	7.80	7.64	7.70
	DO (mg/L)	8.1	8.4	8.4
2.5	Temp. (°C)	15.7	15.3	15.4
	Salinity (ppt)	33.4	33.4	33.6
	pH (units)	7.86	7.70	7.74
	DO (mg/L)	8.1	8.5	8.4
5	Temp. (°C)	15.6	15.3	15.3
	Salinity (ppt)	33.6	33.5	33.6
	pH (units)	7.87	7.73	7.75
	DO (mg/L)	8.2	8.5	8.5
10	Temp. (°C)	15.7	15.3	15.3
	Salinity (ppt)	33.4	33.5	33.6
	pH (units)	7.87	7.75	7.77
	DO (mg/L)	8.2	8.5	8.5
20	Temp. (°C)	15.6	15.3	15.3
	Salinity (ppt)	33.4	33.3	33.5
	pH (units)	7.86	7.77	7.79
	DO (mg/L)	8.2	8.5	8.4
40	Temp. (°C)	15.6	15.3	15.3
	Salinity (ppt)	33.5	33.4	33.6
	pH (units)	7.86	7.79	7.80
	DO (mg/L)	8.2	8.6	8.5
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	HK	RV	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

QC Check: AG 2/9/23
Final Review: SC 3/9/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

~~X~~ = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

Acute Menidia

Reference Toxicant Test

CETIS Summary Report

Report Date: 09 Feb-23 13:20 (p 1 of 1)
Test Code/ID: 230127mbra / 17-6301-6665

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Batch ID:	08-1283-4876	**Test Type:**	Survival (96h)	**Analyst:**			
Start Date:	27 Jan-23 11:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Diluted Natural Seawater		
Ending Date:	31 Jan-23 10:50	**Species:**	Menidia beryllina	**Brine:**	Not Applicable		
Test Length:	95h	**Taxon:**		**Source:**	Aquatic Biosystems, CO	**Age:**	~~12d~~ 13d RV

Sample ID:	20-0011-8211	**Code:**	230127mbra	**Project:**	
Sample Date:	27 Jan-23	**Material:**	Total Copper	**Source:**	Reference Toxicant
Receipt Date:	27 Jan-23	**CAS (PC):**		**Station:**	
Sample Age:	11h	**Client:**	Internal		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
06-4106-3274	96h Survival Rate	Steel Many-One Rank Sum Test		100	200	141.4	26.1%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
20-8516-7388	96h Survival Rate	Trimmed Spearman-Kärber		LC50	168.3	142.4	198.9	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
06-4106-3274	96h Survival Rate	Control Resp	1	0.9	<<	Yes	Passes Criteria
20-8516-7388	96h Survival Rate	Control Resp	1	0.9	<<	Yes	Passes Criteria

96h Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		4	0.9500	0.7909	1.1090	0.8000	1.0000	0.0500	0.1000	10.53%	5.00%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		4	0.9500	0.7909	1.1090	0.8000	1.0000	0.0500	0.1000	10.53%	5.00%
200		4	0.3000	-0.2512	0.8512	0.0000	0.6000	0.1732	0.3464	115.47%	70.00%
400		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

96h Survival Rate Detail

MD5: B54F7C8F91CF838BE7F4684E90F258C4

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	1.0000	1.0000	1.0000	1.0000
25		0.8000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	0.8000	1.0000	1.0000
200		0.0000	0.0000	0.6000	0.6000
400		0.0000	0.0000	0.0000	0.0000

Inland Silverside 96-h Acute Survival Test — WSP Laboratory

Analysis ID:	06-4106-3274	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 13:18	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 13:14	**MD5 Hash:**	B54F7C8F91CF838BE7F4684E90F258C4	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	100	200	141.4	---	0.2609	26.09%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		25	6	16	10	1	CDF	0.5661	Non-Significant Effect
		50	6	18	10	1	CDF	0.8000	Non-Significant Effect
		100	6	16	10	1	CDF	0.5661	Non-Significant Effect
		200*	6	10	10	0	CDF	0.0350	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.86114	0.465285	4	13.39	7.7E-05	Significant Effect
Error	0.521406	0.0347604	15			
Total	2.38255		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.8456	0.866	0.0045	Non-Normal Distribution

96h Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		4	0.9500	0.7909	1.0000	1.0000	0.8000	1.0000	0.0500	10.53%	5.00%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		4	0.9500	0.7909	1.0000	1.0000	0.8000	1.0000	0.0500	10.53%	5.00%
200		4	0.3000	0.0000	0.8512	0.3000	0.0000	0.6000	0.1732	115.47%	70.00%
400		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

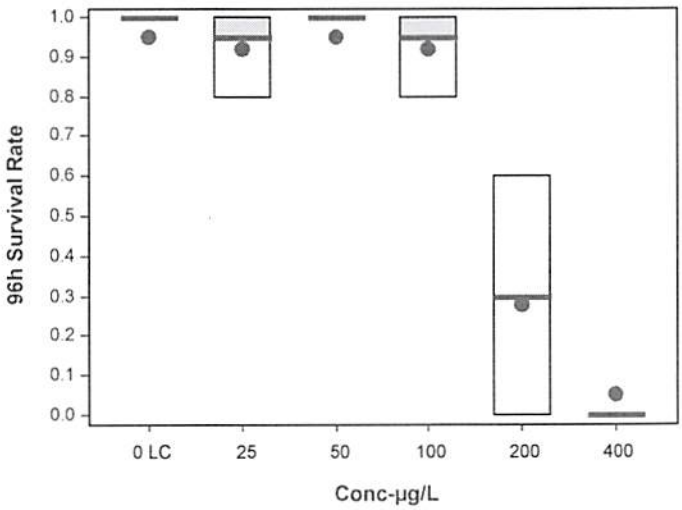
Angular (Corrected) Transformed Summary

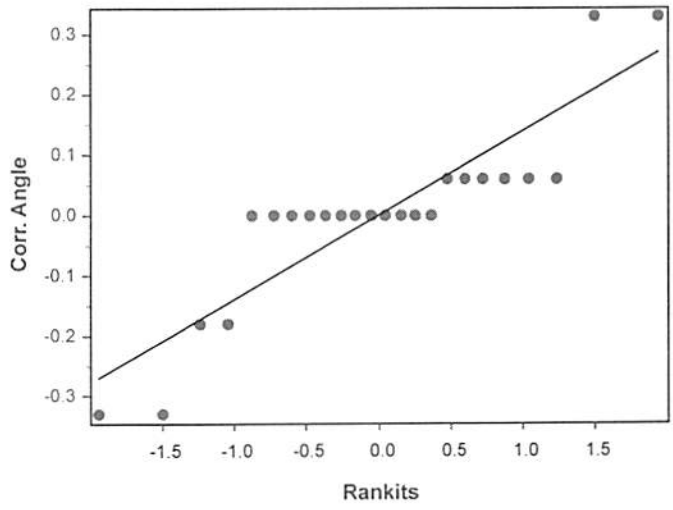
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
25		4	1.2860	1.0960	1.4750	1.3450	1.1070	1.3450	0.0595	9.26%	4.43%
50		4	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
100		4	1.2860	1.0960	1.4750	1.3450	1.1070	1.3450	0.0595	9.26%	4.43%
200		4	0.5558	-0.0511	1.1630	0.5558	0.2255	0.8861	0.1907	68.62%	58.69%
400		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0.0000	0.00%	83.24%

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	06-4106-3274	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 13:18	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 13:14	**MD5 Hash:**	B54F7C8F91CF838BE7F4684E90F258C4	**Editor ID:**	002-883-387-8

Graphics





CETIS Analytical Report

Inland Silverside 96-h Acute Survival Test — **WSP Laboratory**

Analysis ID:	20-8516-7388	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 13:18	**Analysis:**	Trimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	09 Feb-23 13:14	**MD5 Hash:**	B54F7C8F91CF838BE7F4684E90F258C4	**Editor ID:**	002-883-387-8

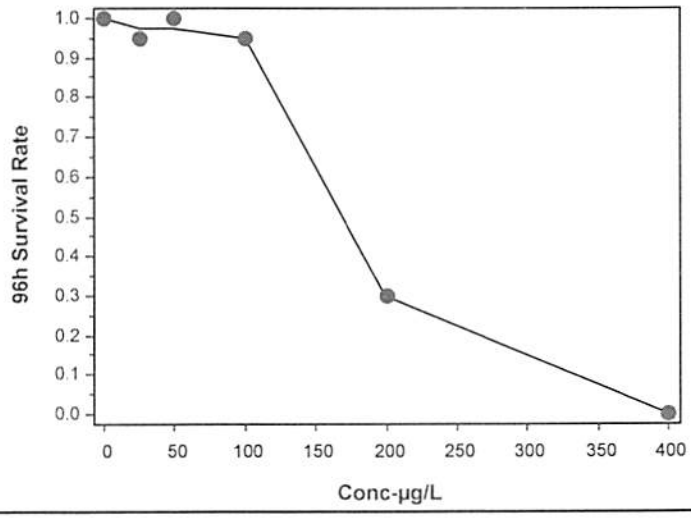
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	2.50%	2.226	0.03628	168.3	142.4	198.9

96h Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	ΣA/ΣB	Mean	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	20/20	1.0000	0.00%
25		4	0.9500	1.0000	0.8000	1.0000	10.53%	5.00%	19/20	0.9750	2.50%
50		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	20/20	0.9750	2.50%
100		4	0.9500	1.0000	0.8000	1.0000	10.53%	5.00%	19/20	0.9500	5.00%
200		4	0.3000	0.3000	0.0000	0.6000	115.47%	70.00%	6/20	0.3000	70.00%
400		4	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/20	0.0000	100.00%

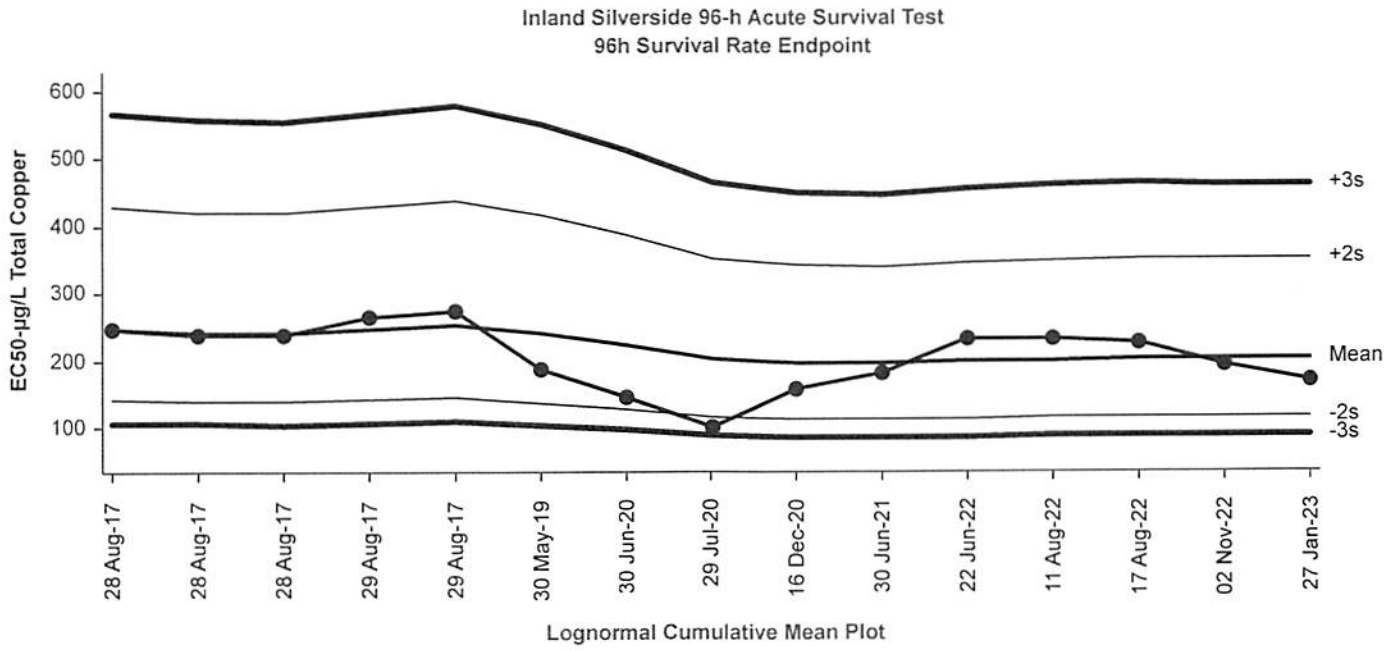
Graphics



CETIS QC Plot

Inland Silverside 96-h Acute Survival Test — **All Matching Labs**

Test Type:	Survival (96h)	**Organism:**	Menidia beryllina	**Material:**	Total Copper
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF



Lognormal Cumulative Mean Plot

Mean:	201.3	**Count:**	14	**-2s Warning Limit:**	116	**-3s Action Limit:**	87.6
Sigma:	NA	**CV:**	28.30%	**+2s Warning Limit:**	351	**+3s Action Limit:**	463

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	Aug	28	14:45	246.2	44.89	0.7253			05-6221-4414	04-6865-3585	Wood E&IS
2			28	15:00	237.8	36.5	0.6004			02-5647-9246	16-8444-3541	Wood E&IS
3			28	15:15	237.8	36.5	0.6004			16-2996-1022	08-5747-0065	Wood E&IS
4			29	14:30	265.3	63.92	0.9936			19-4407-9949	10-4418-8065	Wood E&IS
5			29	14:45	274.8	73.45	1.121			14-6406-6518	18-3021-9635	Wood E&IS
6	2019	May	30	17:05	186.6	-14.73	-0.2739			07-8855-3464	12-7825-1032	Wood E&IS
7	2020	Jun	30	11:45	144	-57.29	-1.207			02-0812-0179	20-8741-5473	Wood E&IS
8		Jul	29	11:10	100	-101.3	-2.522	(-)		19-6384-0247	04-6707-5997	Wood E&IS
9		Dec	16	15:00	156.9	-44.42	-0.8983			15-3442-5827	18-4429-0647	Wood E&IS
10	2021	Jun	30	12:00	182	-19.35	-0.3641			05-6222-4958	12-0440-3448	Wood E&IS
11	2022		22	15:35	232	30.68	0.5112			04-2944-1216	14-9568-5378	Wood E&IS
12		Aug	11	16:30	230.8	29.5	0.4927			10-3814-2317	20-1444-6265	Wood E&IS
13			17	16:05	224.5	23.15	0.3922			19-2363-4565	08-2602-5211	Wood E&IS
14		Nov	2	15:30	193.2	-8.154	-0.149			00-5801-8365	09-9579-7393	WSP Laboratory
15	2023	Jan	27	11:30	168.3	-33.03	-0.6458			17-6301-6665	20-8516-7388	WSP Laboratory

Analyst: RV QA: 3/9/23

96hr Marine Acute Test with 48hr Renewal

Client: Internal
Project ID: Cu Reference Toxicant
Test No. 230127mbra

Test Species: *M. beryllina*
Start Date/Time: 1/27/2023 1130
End Date/Time: 1/31/2023 ~~1100~~ HK 1050

Cu (µg/L)	Rep	Counts				
		0	24	48	72	96
Lab Control	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
25	A	5	5	5	5	4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
50	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	4	4	4
	C	5	5	5	5	5
	D	5	5	5	5	5
200	A	5	0	–	–	–
	B	5	0	–	–	–
	C	5	3	3	3	3
	D	5	3	3	3	3
400	A	5	0	AM Read		
	B	5	0			
	C	5	0			
	D	5	0			
Tech Initials:		JF	AG	~~AG~~ HK	HK	

QC: HK

Date Animals Received: 1/26/23
Age of Animals at Test Start: 13 d

Water Quality						
Parameter	0	24 (QC)	48f	48i	72	96
Temp. (°C)	26.0	26.4	25.0	24.2	25.8	25.9
Salinity (ppt)	30.8	31.0	31.2	~~31.0~~ 30.0	31.5	31.2
pH (units)	7.83	7.74	7.95	7.98	7.95	7.83
DO (mg/L)	7.2	6.8	6.9	7.4	6.9	6.6
Temp. (°C)	26.0	26.5	24.9	~~24.1~~ 24.1	25.9	25.5
Salinity (ppt)	30.5	30.9	31.4	~~30.4~~ 29.9	31.4	31.2
pH (units)	7.89	7.82	7.95	7.98	7.95	7.86
DO (mg/L)	7.2	6.7	6.8	7.3	6.7	6.5
Temp. (°C)	25.9	26.5	24.8	24.1	25.7	25.5
Salinity (ppt)	30.4	30.8	31.5	29.8	31.7	31.9
pH (units)	7.88	7.86	7.95	7.96	7.95	~~6.6~~ HK 7.88
DO (mg/L)	7.2	6.8	6.9	7.3	6.6	6.6
Temp. (°C)	26.0	26.5	25.0	24.2	25.9	25.6
Salinity (ppt)	30.3	30.5	30.9	29.8	31.0	31.1
pH (units)	7.90	7.86	7.93	7.96	7.95	7.88
DO (mg/L)	7.2	6.7	6.8	7.3	6.7	6.6
Temp. (°C)	26.0	26.5	24.7	24.2	25.9	25.7
Salinity (ppt)	30.2	30.4	~~33.1~~ 31.1	~~32.1~~ 31.8	31.1	31.8
pH (units)	7.88	7.85	~~7.93~~ 7.93	7.93	7.93	~~7.88~~ 7.88
DO (mg/L)	7.2	6.7	6.9	7.3	6.7	6.6
Temp. (°C)	26.0	26.5				
Salinity (ppt)	30.1	30.3		AM Read		
pH (units)	7.83	7.85				
DO (mg/L)	7.2	6.3				
Tech Initials:	JF	AG	AG	AG	RV	HK

Feedings	0	24	48	72	96
Initials (AM):		AG	AG	~~AG~~ RV	RV HK
Initials (PM):	RV	AG	AG	~~AG~~ HK RV	OBO AG

Comments:

QC Check: JF 2/9/23

Final Review: RV 3/7/23

Appendix D

2023 Winter Monitoring TIE Technical Memorandum

WSP USA Environment & Infrastructure Inc.
(formerly Wood Environment & Infrastructure Solutions, Inc.)
9177 Sky Park Court
San Diego, CA 92123

April 18, 2023

Ms. Karen Holman
Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

Subject: Mussel Embryo Toxicity Identification Evaluation (TIE) Results for 2023 Winter Monitoring for the SIYB Dissolved Copper TMDL – Site SIYB-1

Sampling and Analysis Methods

A winter monitoring event supporting the Shelter Island Yacht Basin (SIYB) Dissolved Copper Total Maximum Daily Load (TMDL) was conducted on January 25, 2023. Consistent with prior TMDL monitoring efforts, surface water samples (1-meter below the surface) were collected from six stations within SIYB (SIYB-1 at the head of the basin through SIYB-6 at the mouth of the basin) and two reference stations in the main channel of San Diego Bay (SIYB-REF-1 and SIYB-REF-2).

Samples of surface water from Sites SIYB-1 through SIYB-6 and SIYB-REF-1 were tested for toxicity using (1) a 48-hour chronic bioassay test using mussel larvae (*Mytilus galloprovincialis*) and (2) a 96-hour acute bioassay test using inland silverside minnow (*Menidia beryllina*). In addition to toxicity, water samples were also analyzed for total and dissolved copper and zinc, dissolved organic carbon (DOC), total organic carbon (TOC), and total suspended solids (TSS).

Statistically significant effects[1] were observed to mussel embryo development in site water from the inner portion of SIYB during the 2023 winter monitoring event. Toxicity was observed at Sites SIYB-1 and SIYB-2 with a 9.7 and 9.3% effect, respectively relative to that observed in the laboratory controls based on the combined normal/surviving embryo endpoint. Toxicity to mussel embryos or larval fish was not observed in undiluted, unfiltered samples collected from any of the other stations in SIYB or the reference station (SIYB-REF-1). Consistent with previous events, a gradient of dissolved copper was observed in SIYB with the highest concentration of 7.7 micrograms per liter (µg/L) corresponding with the highest percent effect observed for the mussel embryo test at Site SIYB-1.

In addition to routine standard toxicity testing, a Toxicity Identification Evaluation (TIE) was conducted during the winter 2023 monitoring event, following up on a prior TIE performed on water collected from the same location (SIYB-1) in August of 2022. The original TIE treatments were considered Phase I toxicant characterization methods to identify the general characteristics and class(es) of contaminants responsible for toxicity. Based on the specificity of the ethylenediaminetetraacetic acid (EDTA) treatment and supporting results from the other Phase I methods of the initial TIE, there was a high degree of confidence that the toxicant of interest in unmanipulated receiving water from SIYB-1 was a cationic trace metal. Additional evidence

[1] Note that effects were significant using the USEPA 1995 traditional flow-chart statistical methods (i.e., Dunnett multiple comparison test). However, these effects were not significant using the Test of Significant Toxicity (TST) approach (USEPA, 2010).

suggested copper was the primary toxicant of concern based on measured concentrations of dissolved copper in the unmanipulated sample relative to toxicity effects data reported in the literature for mussel embryos, along with concurrent reference toxicant results using copper chloride, both suggesting thresholds for toxicity due to copper were exceeded in the water from the inner portion of SIYB.

Based on the results of the Phase I testing performed in August 2022, a targeted Phase I characterization approach, along with Phase II/III identification/confirmation treatments were applied during the winter 2023 sampling event as summarized herein.

TIE Approach and Methods

Phase I Toxicity Identification Evaluation (Targeted TIE)

Evaluating the cause of toxicity in site water from SIYB was performed in accordance with a set of standardized TIE procedures following United States Environmental Protection Agency (USEPA) guidance (USEPA, 1996). The Phase I TIE treatments conducted in August 2022 consisted of seven different standard treatments, while a more targeted Phase I approach was performed in January 2023 based on results obtained from the initial TIE indicating copper as a primary toxicant of interest (Table 1). The targeted TIE in January 2023 included addition of EDTA due to the high specificity of this treatment for cationic trace metals. These procedures included re-running a 0.45-μm filtered treatment as well as metal chelation treatments (10 and 25 milligrams per liter [mg/L] EDTA) on samples from SIYB-1 and testing concurrently with routine toxicity tests.

Table 1. Phase I Toxicant Characterization Treatments for SIYB

Phase I Procedure	Primary Compounds Addressed/Purpose	Summer 2022	Winter 2023
Baseline (unmanipulated sample)	None. Used for treatment effectiveness comparison. Two baseline samples were tested in different areas among all test chambers.	X	X
Filtration (0.45 μm)	Pollutants associated with particles, and algae and/or microorganism effects	X	X
Aeration	Volatile or oxidizable compounds; surfactants	X	--
C8 Column Solid-Phase Extraction	Non-polar organics and metal chelates. *These columns can remove some metals, so this step helps verify metals versus organics.	X	--
C8 Column Solvent Elution	Recovers toxicity due to non-polar organics	X	--
Cation Exchange Column	Removes cationic compounds including various trace metals	X	--
Oxidant Reduction (STS Addition) – 10 and 25 mg/L	Constituents reduced by sodium thiosulfate; also chelates some cationic trace metals	X	--
Metal Chelation (EDTA Addition) – 10 and 25 mg/L	Divalent cationic metals	X	X

Notes: μm = micrometer(s); EDTA = ethylenediaminetetraacetic acid; mg/L = milligram(s) per liter; -- not tested; SIYB = Shelter Island Yacht Basin; STS = sodium thiosulfate

Each of the Phase I treatments summarized in **Table 1** were performed on both the SIYB-1 sample and clean laboratory water as a method control to assess whether the treatments themselves may cause negative effects. The TIE tests were performed using 5 replicates for each treatment, consistent with that used for the TMDL compliance tests. Each replicate was also assigned a random number, and vials for the entire TIE placed in randomized numeric order in the environmental chamber throughout the test period. The vials remained in random order throughout the scoring process to endure a "blind" unbiased approach.

Phase II/III Toxicity Identification/Confirmation (Copper Spiking Study)

TIE Phases II and III were conducted to specifically define and confirm those constituents responsible for toxicity in a sample following characterization of the class of contaminant during Phase I (USEPA, 1993a,b). Based on the Phase I TIE results for SIYB-1 during the summer 2022 sampling event, a targeted combined Phase II/III approach was performed to specifically further identify and confirm the degree to which copper may or may not be contributing to mussel embryo toxicity in the receiving water collected in the winter of 2023. These steps focused on conducting a series of copper addition experiments to the ambient water of SIYB. A series of 5 concentrations of copper were incrementally added to three samples as follows:

1) Undiluted water from SIYB-1;
2) 50% diluted water from SIYB-1; and
3) Clean filtered laboratory seawater. This third sample is equivalent to a standard copper reference toxicant test used to evaluate the sensitivity of mussel embryos over time at the WSP laboratory as a standard quality assurance (QA) and quality control (QC) measure.

A summary of the Phase II/III Toxicant Identification/Confirmation Copper Spiking Study and associated concentrations is provided in **Table 2**.

Table 2. Phase II/III Toxicant Identification/Confirmation – Copper Spiking Study

Procedure	Concentrations
Cu Spike in 100% Undiluted Water from SIYB-1	0, 2.5, 5.0, 10.0, 20.0, and 40.0 µg/L Cu
Cu Spike in 50% Diluted Water from SIYB-1	0, 2.5, 5.0, 10.0, 20.0, and 40.0 µg/L Cu
Cu Spike in Filtered Laboratory Control Water (Standard Reference Toxicant Test)	0, 2.5, 5.0, 10.0, 20.0, and 40.0 µg/L Cu

Notes: µg/L = microgram(s) per liter; % = percent; Cu = copper

A comparison of the toxic dose responses between these three samples was used to assess the degree of toxicity related specifically to copper in the ambient undiluted seawater. For example, if the median effective concentrations (EC_{50}s) for copper are similar among all three samples, results would suggest that most or all of the observed toxicity in the SIYB-1 water may be attributable to copper. If adding copper to the ambient samples from SIYB results in a flatter curve (less toxic) than that observed in the clean laboratory seawater, then one would conclude that either the site water has a stronger binding capacity for copper, or that some other compound must be contributing to the observed effects. If addition of copper to the site water results in a greater effect than expected, then additive toxicity with other compounds would be suggested.

Measurements of DOC and pH were also measured in both the laboratory control water and all samples from SIYB to assess the potential for copper binding.

TIE Results

Phase I Toxicity Identification Evaluation (Targeted TIE)

A summary of toxicity results for the Phase I TIE conducted in January 2023 is shown in **Figure 1**. A summary of dissolved copper concentrations is provided in **Figure 2** (see **Appendix D**). Raw data and statistical analyses for the Phase I TIE are provided for reference in **Appendix A**. Results for all method controls and unmanipulated laboratory control water resulted in ≥ 90% mean proportion normal embryo development indicating no negative effects on the embryos due to any of the treatments applied. All controls also resulted in > 80% mean combined proportion normal development and survival rate, further demonstrating that treatments did not have detrimental effects to mussel embryos. TIE results presented in **Figure 1** summarize the mean % combined proportion normal development of surviving embryos. Error bars for each treatment represent the 95% confidence intervals.

A baseline test conducted on the unmanipulated SIYB-1 sample resulted in a toxic effect of 13.3% for the combined proportion normal and survival endpoint compared to the laboratory control. This was similar to the effects observed in the separate sample tested at the same time for the routine TMDL winter monitoring toxicity tests, which had an effect of 9.7%. Filtration of the sample to 0.45 micrometers to remove particulates and associated contaminants bound to the particles resulted in a comparable toxic effect of 10.3% for combined proportion normal survivors. This result reconfirms that the toxic compound of interest is in a dissolved water-soluble form. The measured dissolved copper in the filtered sample (7.0 µg/L) was very similar to that measured in the same sample filtered in the field (7.7 µg/L) for the routine TMDL monitoring indicating consistency in the methods.

The EDTA treatment is one of the most contaminant-specific Phase I TIE methods. EDTA is an organic chelating agent that preferentially binds with divalent cationic metals, such as copper, nickel, lead, zinc, cadmium, mercury, and other transition metals (Garvan, 1964). Studies have demonstrated that when a metal is bound to the EDTA molecule, the toxicity of the metal is greatly reduced (e.g., Sunda and Guilliard, 1976).

Consistent with results observed during the TIE conducted in the summer of 2022, toxicity in the winter 2023 sample from SIYB-1 was again removed following the addition of EDTA, as shown in **Figure 1**. The mean proportion of normal surviving embryos in the EDTA-treated samples was comparable to that in the laboratory method controls.

The concentrations of dissolved copper in the 10 and 25 mg/L EDTA treatments were 0.25 and 0.23 µg/L respectively as shown in **Figure 2**, confirming that this treatment effectively bound the freely dissolved fraction of this trace metal. These concentrations of copper are well below that expected to cause toxicity to mussel embryos and corresponded with the reduced effects observed following addition of EDTA to the SIYB-1 sample.

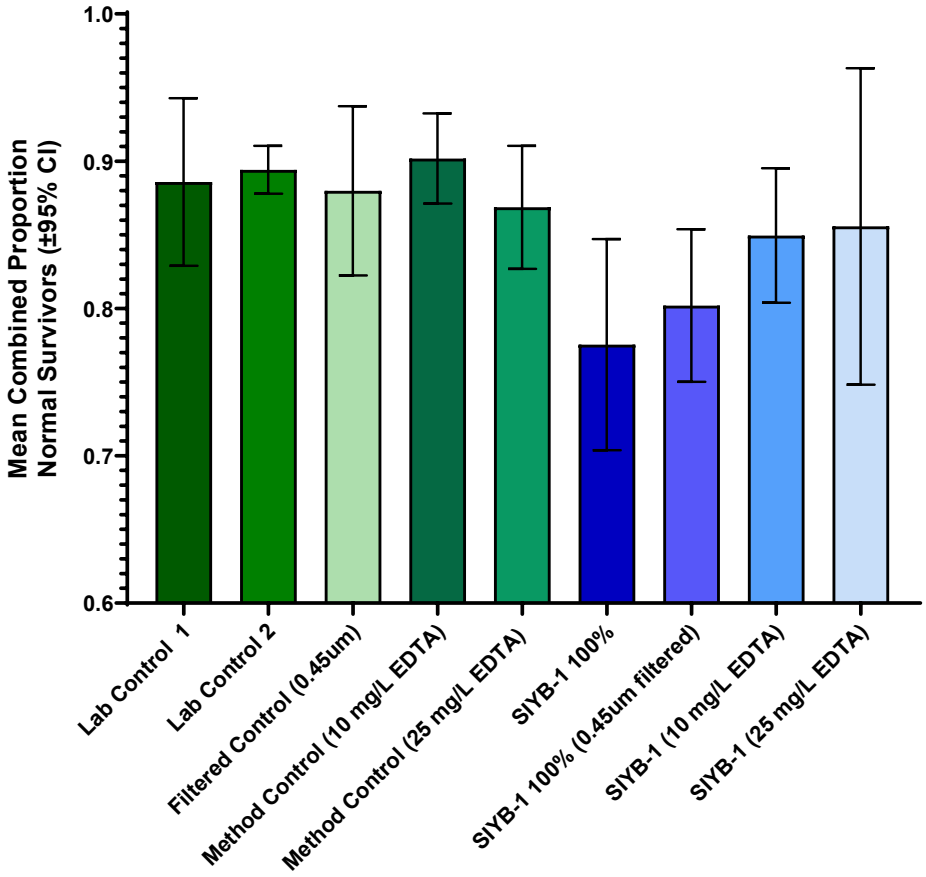


Figure 1. Phase I TIE Results for SIYB-1 (January 2023) – Mean Combined Proportion Normal Surviving Embryos ±95% Confidence Intervals

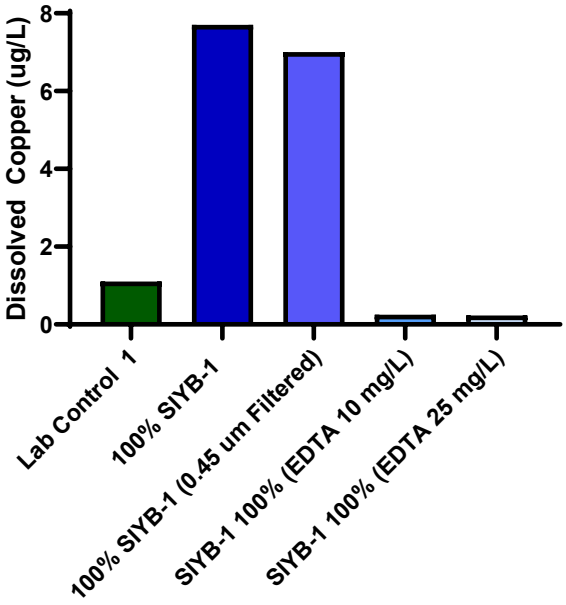


Figure 2. Phase I TIE Results for SIYB-1 (January 2023) – Dissolved Copper Concentrations

Phase II/III Toxicity Identification Evaluation (Copper Spiking Study)

A summary of toxicity results for the Phase II/III TIE copper spiking study is shown in **Figure 3.** Raw data and statistical analyses are provided for reference in **Appendix B**.

The copper toxicity dose response curves for all three treatments tested (laboratory control water, 50% diluted SIYB-1 sample, and undiluted SIYB-1 sample) are shown together on the same figure for comparison. The curves for all three treatments are similar, although a slightly steeper curve was observed for the laboratory control water spiked with copper indicating greater sensitivity. Resulting EC_{50} values for dissolved copper were 9.9 µg/L in the laboratory control water and ranged from 11.3 to 11.9 µg/L in the two copper-spiked SIYB-1 samples.

The sensitivity of mussels to copper was slightly greater in laboratory control water as would be expected given a lower concentration of natural organic material in filtered laboratory water compared to ambient waters thereby reducing the bioavailability and toxicity of copper and other trace metals. The measured concentration of DOC in the laboratory control water (1.1 mg/L) was slightly less than that in the SIYB-1 sample (1.3 mg/L) collected during the winter 2023 sampling event.

The close correspondence between the three different dose response curves and EC_{50} values provides strong evidence that dissolved copper alone is the primary toxicant of concern. If a different toxicant was present in the SIYB sample these curves and EC_{50} values would not be expected to be so similar.

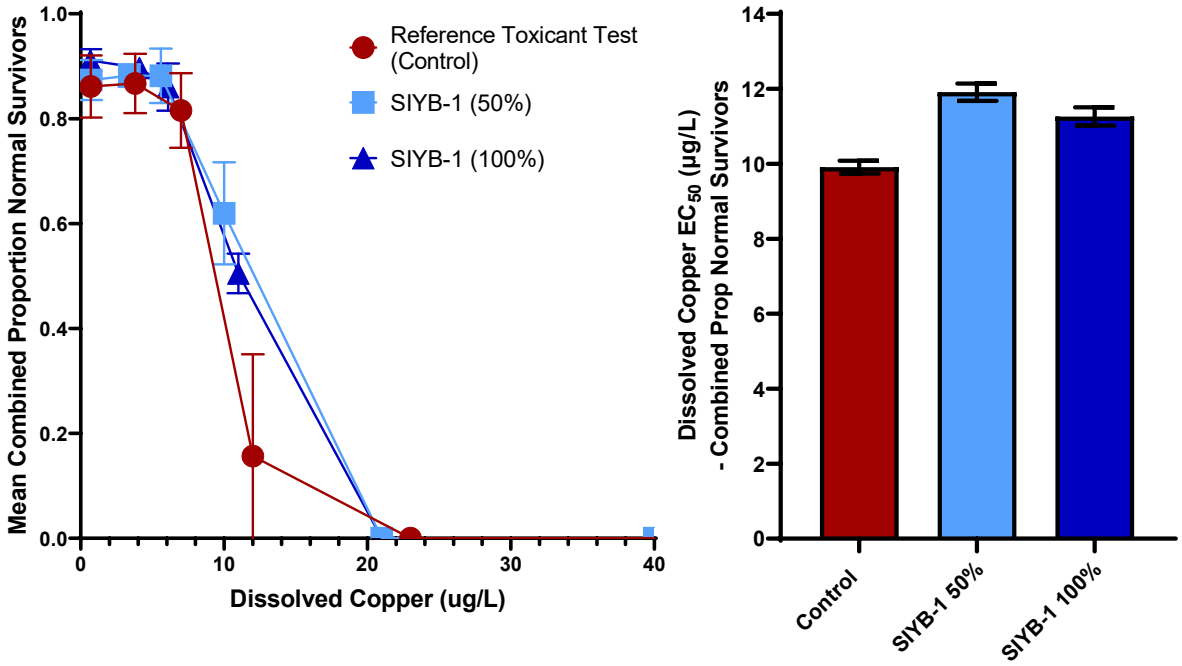


Figure 3. SIYB TIE Phase II\III Copper Spiking Study – Copper Dose Response for Proportion Normal Surviving Embryos (left) and Calculated Copper EC_{50} Values ±95% CI (right)

Conclusions

Multiple lines of evidence indicate that dissolved copper is a principal cause of toxicity to mussel embryos exposed to samples from SIYB-1. Key observations supporting this conclusion are as follows:

1. The addition of EDTA during both the summer 2022 and winter 2023 monitoring events successfully removed toxicity in water from SIYB-1. This treatment is highly specific at chelating and thus reducing the toxicity of cationic trace metals, including copper.
2. Concentrations of dissolved copper are consistently elevated at SIYB-1 above values found to cause toxicity to mussel embryos as reported in the literature and based on results from the TMDL Monitoring Program (**Figure 4**).
3. Addition of copper to clean laboratory water and site water from SIYB-1 (Phase II/III TIE) resulted in comparable dose response curves and EC_{50} values. If another toxicant was present, these curves and EC_{50} values would be expected to diverge from each other.
4. Toxicity of water from SIYB is consistently observed above a threshold of approximately 8 µg/L as shown in **Figure 4**. The dissolved copper measurement of 7.7 µg/L at SIYB-1 during the winter 2023 sampling event is just below this threshold, thus likely explaining why there was only subtle chronic toxicity observed during this event.
5. The statistical correlation between dissolved copper and % effect on mussel embryo development over time is also strong and statistically significant as shown in **Figure 5**.

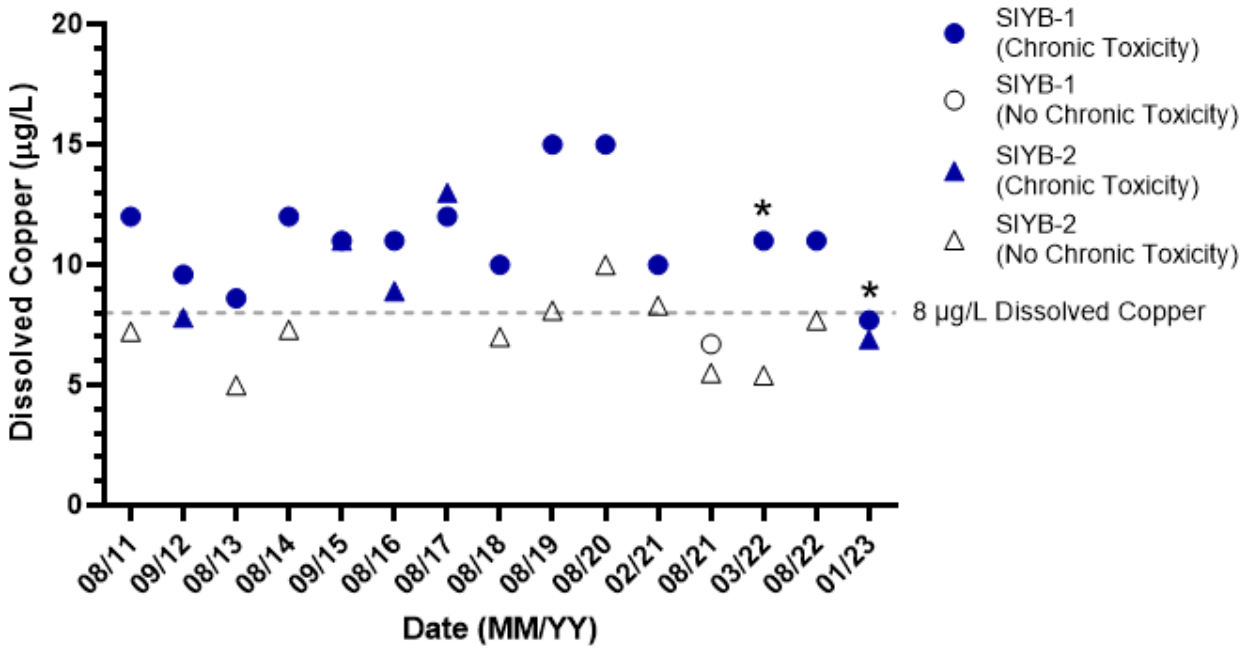


Figure 4. Dissolved Copper Levels and Chronic Toxicity Over Time at SIYB-1 and SIYB-2

* Note that effects on mussel embryo development observed in March 2022 at Site SIYB-1 and at Sites SIYB-1 and SIYB-2 in January 2023 were statistically significant using the traditional USEPA flow-chart statistical methods (i.e., Dunnett multiple comparison test). However, effects were not significant using the TST approach.

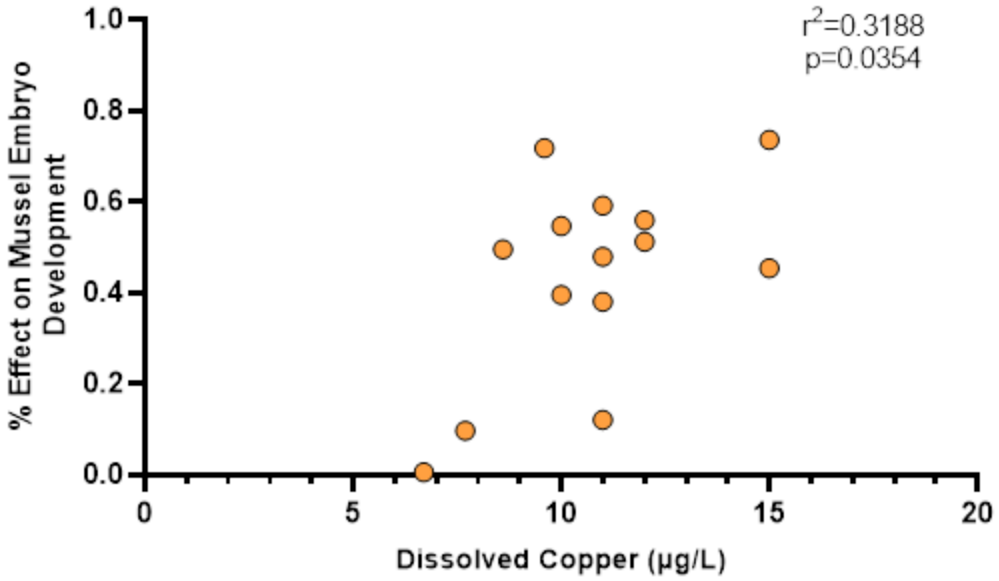


Figure 5. Correlation Between Dissolved Copper at SIYB-1 and % Effects Relative to the Control for Mussel Embryo Development (Combined Normal Survivors)

References Cited

Garvan, FL. 1964. Metal Chelates of Ethylenediaminetetraacetic Acid and Related Substances. Chelating Agents and Metal Chelates. Eds. F.P. Dwyer and D.P. Mellor. New York: Academic Press. 283-333.

Sunda, W. and R.R.L. Guillard. 1976. The Relationship between Cupric Ion Activity and the Toxicity of Copper to Phytoplankton. Journal of Marine Research 34:511-529.

United States Environmental Protection Agency (USEPA). 1993a. Methods for Aquatic Toxicity Identification Evaluations - Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity. EPA-600-R-92-080. National Effluent Toxicity Assessment Center, Duluth, MN.

USEPA. 1993b. Methods for Aquatic Toxicity Identification Evaluations - Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity. EPA-600-R-92-081. National Effluent Toxicity Assessment Center, Duluth, MN.

USEPA. 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. EPA-600-R-95-136. EPA Office of Research and Development. Narragansett, RI.

USEPA. 1996. Marine Toxicity Identification Evaluation (TIE): Phase I Guidance Document. EPA/600/R-96-054. National Health and Environmental Effects Laboratory, Narragansett, RI.

USEPA. 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document. EPA-833-R-10-003. June 2010.

APPENDIX A

Chronic Mussel Development Test

Raw Data & Statistical Analyses

Phase I TIE

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	11-0199-3420	**Test Type:**	Development-Survival	**Analyst:**		
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater	
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable	
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**

Sample ID:	12-4759-1276	**Code:**	23-W026	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 14:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 1 (0.45um filt)
Sample Age:	27h (15.7 °C)	**Client:**	WSP		

Comments: FC = 0.45 um filtered seawater, 100 = 100% SIYB-1, 101 = SIYB-1 (0.45um filtered).

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-7418-5304	Combined Proportion Norma	Equal Variance t Two-Sample Test	0.0007	100% failed combined proportion normal	1
16-1178-1872	Combined Proportion Norma	Equal Variance t Two-Sample Test	0.0103	101% failed combined proportion normal	1
06-9551-1317	Proportion Normal	Equal Variance t Two-Sample Test	0.0005	100% failed proportion normal	1
06-0853-7827	Proportion Normal	Equal Variance t Two-Sample Test	3.7E-05	101% failed proportion normal	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
06-0853-7827	Proportion Normal	Control Resp	0.9193	0.9	<<	Yes	Passes Criteria
06-9551-1317	Proportion Normal	Control Resp	0.9095	0.9	<<	Yes	Passes Criteria
04-7418-5304	Combined Proportion Norma	PMSD	0.04579	<<	0.25	No	Passes Criteria
16-1178-1872	Combined Proportion Norma	PMSD	0.05306	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8942	0.8779	0.9104	0.8743	0.9091	0.0058	0.0131	1.46%	0.00%
0	FC	5	0.8799	0.8224	0.9374	0.8033	0.9185	0.0207	0.0463	5.26%	1.60%
100		5	0.7755	0.7039	0.8471	0.7104	0.8632	0.0258	0.0577	7.44%	13.27%
101		5	0.8020	0.7502	0.8538	0.7486	0.8359	0.0187	0.0417	5.20%	10.31%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9095	0.8867	0.9323	0.8952	0.9412	0.0082	0.0184	2.02%	0.00%
0	FC	5	0.9193	0.9039	0.9347	0.9040	0.9368	0.0055	0.0124	1.35%	-1.07%
100		5	0.8016	0.7433	0.8598	0.7386	0.8632	0.0210	0.0469	5.86%	11.87%
101		5	0.8257	0.7908	0.8606	0.7784	0.8537	0.0126	0.0281	3.41%	9.22%

Combined Proportion Normal Detail — MD5: A43754632401CAED06BECB8B50922531

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9015	0.8743	0.8907	0.8952	0.9091
0	FC	0.8743	0.9126	0.9185	0.8033	0.8907
100		0.7104	0.7957	0.7486	0.8632	0.7596
101		0.8306	0.8299	0.8359	0.7486	0.7650

Proportion Normal Detail — MD5: 0BAD970FBAD50A6920CFC5316A4977FA

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9015	0.9412	0.9006	0.8952	0.9091
0	FC	0.9040	0.9126	0.9185	0.9245	0.9368
100		0.7386	0.7957	0.7829	0.8632	0.8274
101		0.8306	0.8299	0.8359	0.7784	0.8537

Bivalve Larval Survival and Development Test — WSP Laboratory

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	183/203	160/183	163/183	188/210	170/187
0	FC	160/183	167/183	169/184	147/183	163/183
100		130/183	148/186	137/183	183/212	139/183
101		152/183	161/194	163/195	137/183	140/183

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	183/203	160/170	163/181	188/210	170/187
0	FC	160/177	167/183	169/184	147/159	163/174
100		130/176	148/186	137/175	183/212	139/168
101		152/183	161/194	163/195	137/176	140/164

CETIS Analytical Report

FC vs 100% Filtered (Combined)

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	16-1178-1872	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:40	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:38	**MD5 Hash:**	F5B8CDC54B67C5025FC2B14C8762A7E9	**Editor ID:**	002-883-387-8

Comments: FC = 0.45 um filtered seawater, 100 = 100% SIYB-1, 101 = SIYB-1 (0.45um filtered).

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	101% failed combined proportion normal endpoint	5.31%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	8	2.875	1.86	0.07101	CDF	0.0103	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0301455	0.0301455	1	8.268	0.0207	Significant Effect
Error	0.0291684	0.0036460	8			
Total	0.0593139		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.724	23.15	0.6108	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8915	0.7411	0.1762	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.8799	0.8224	0.9374	0.8907	0.8033	0.9185	0.0207	5.26%	0.00%
101		5	0.8020	0.7502	0.8538	0.8299	0.7486	0.8359	0.0187	5.20%	8.85%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.2210	1.1370	1.3050	1.2340	1.1110	1.2810	0.0304	5.56%	0.00%
101		5	1.1110	1.0470	1.1760	1.1460	1.0460	1.1540	0.0231	4.66%	8.99%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	FC	0.8743	0.9126	0.9185	0.8033	0.8907
101		0.8306	0.8299	0.8359	0.7486	0.7650

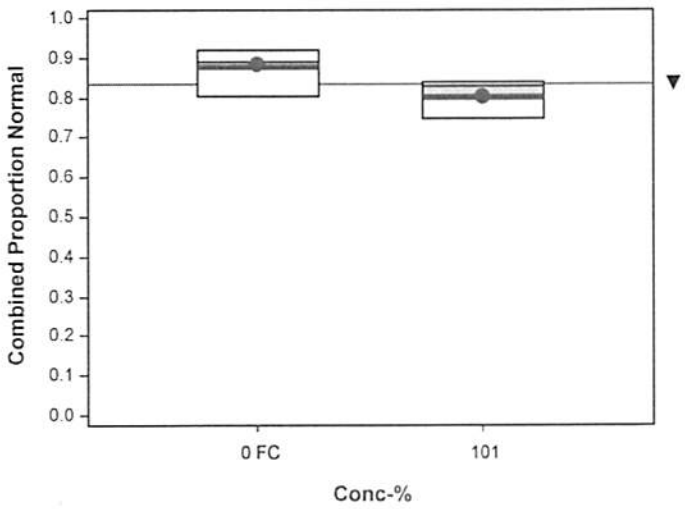
Angular (Corrected) Transformed Detail

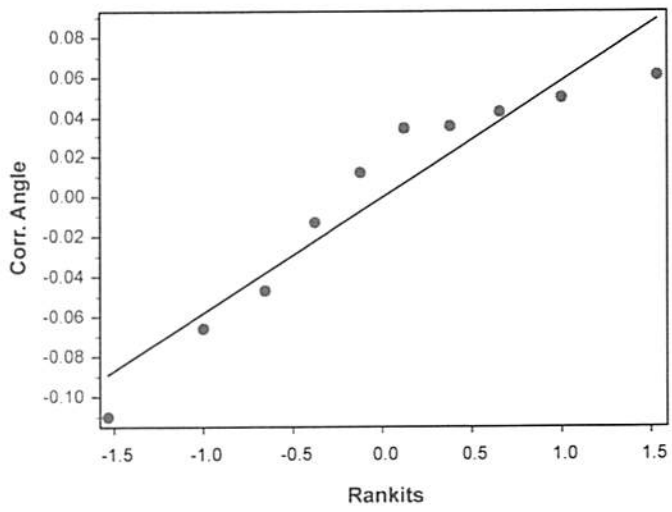
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	FC	1.2080	1.2710	1.2810	1.1110	1.2340
101		1.1470	1.1460	1.1540	1.0460	1.0650

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	16-1178-1872	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:40	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:38	**MD5 Hash:**	F5B8CDC54B67C5025FC2B14C8762A7E9	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	04-7418-5304	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:40	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:38	**MD5 Hash:**	7DA75BB99CBD2F6715AAE9930EB93D68	**Editor ID:**	002-883-387-8

Comments: FC = 0.45 um filtered seawater, 100 = 100% SIYB-1, 101 = SIYB-1 (0.45um filtered).

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% failed combined proportion normal endpoint	4.58%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	8	4.773	1.86	0.06227	CDF	0.0007	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0638847	0.0638847	1	22.79	0.0014	Significant Effect
Error	0.0224298	0.0028037	8			
Total	0.0863145		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	11.66	23.15	0.0355	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9231	0.7411	0.3831	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8942	0.8779	0.9104	0.8952	0.8743	0.9091	0.0058	1.46%	0.00%
100		5	0.7755	0.7039	0.8471	0.7596	0.7104	0.8632	0.0258	7.44%	13.27%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2400	1.2140	1.2660	1.2410	1.2080	1.2650	0.0094	1.70%	0.00%
100		5	1.0800	0.9908	1.1690	1.0580	1.0030	1.1920	0.0321	6.65%	12.89%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9015	0.8743	0.8907	0.8952	0.9091
100		0.7104	0.7957	0.7486	0.8632	0.7596

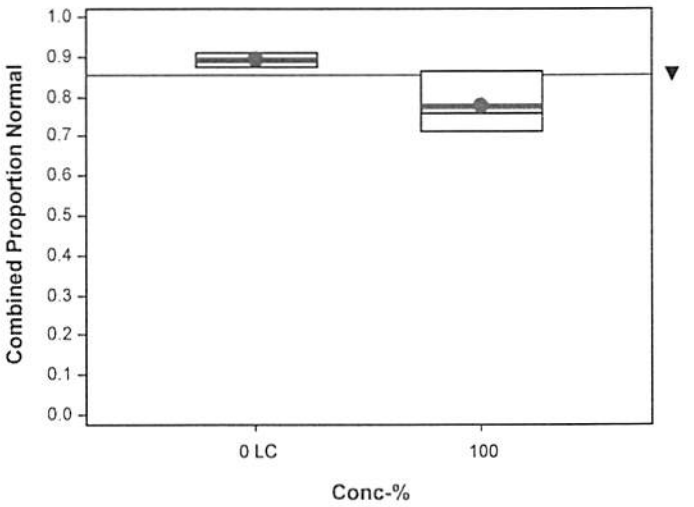
Angular (Corrected) Transformed Detail

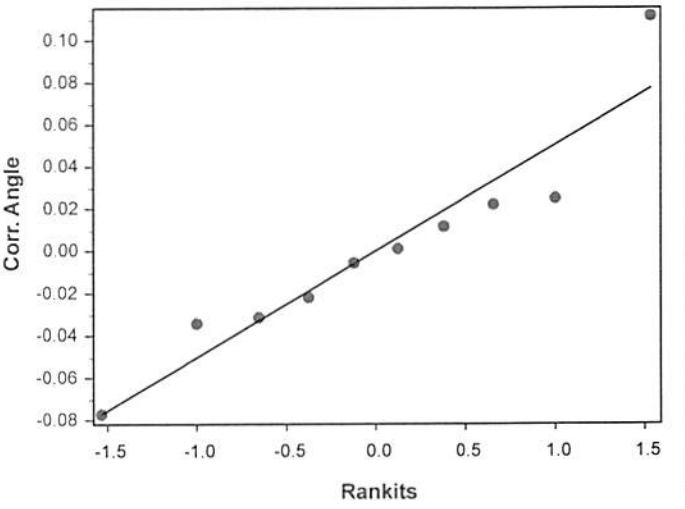
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.2520	1.2080	1.2340	1.2410	1.2650
100		1.0030	1.1020	1.0460	1.1920	1.0580

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	04-7418-5304	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:40	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:38	**MD5 Hash:**	7DA75BB99CBD2F6715AAE9930EB93D68	**Editor ID:**	002-883-387-8

Graphics





CETIS Analytical Report

FC vs 100% Filtered (Proportion Normal)

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	06-0853-7827	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:40	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:38	**MD5 Hash:**	DE88D85F6830DA4A87C2BB1286B32989	**Editor ID:**	002-883-387-8

Comments: FC = 0.45 um filtered seawater, 100 = 100% SIYB-1, 101 = SIYB-1 (0.45um filtered).

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	101% failed proportion normal endpoint	2.19%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Filter Control		101*	8	7.419	1.86	0.03568	CDF	3.7E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0506639	0.0506639	1	55.04	7.5E-05	Significant Effect
Error	0.0073643	0.0009205	8			
Total	0.0580282		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.469	23.15	0.4028	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9332	0.7411	0.4803	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	0.9193	0.9039	0.9347	0.9185	0.9040	0.9368	0.0055	1.35%	0.00%
101		5	0.8257	0.7908	0.8606	0.8306	0.7784	0.8537	0.0126	3.41%	10.18%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	FC	5	1.2830	1.2550	1.3120	1.2810	1.2560	1.3170	0.0103	1.80%	0.00%
101		5	1.1410	1.0960	1.1860	1.1470	1.0810	1.1780	0.0162	3.17%	11.09%

Proportion Normal Detail

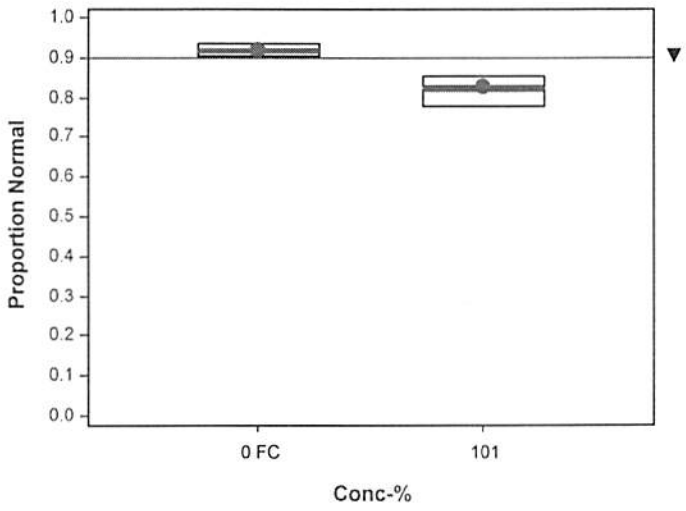
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	FC	0.9040	0.9126	0.9185	0.9245	0.9368
101		0.8306	0.8299	0.8359	0.7784	0.8537

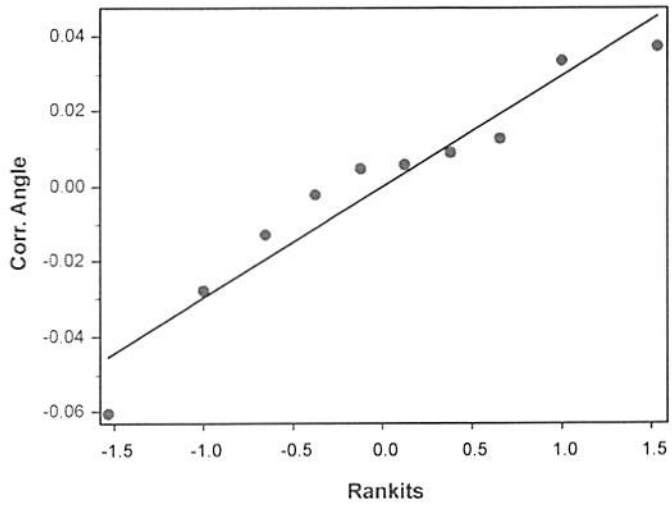
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	FC	1.2560	1.2710	1.2810	1.2920	1.3170
101		1.1470	1.1460	1.1540	1.0810	1.1780

Bivalve Larval Survival and Development Test					WSP Laboratory
Analysis ID:	06-0853-7827	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:40	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:38	**MD5 Hash:**	DE88D85F6830DA4A87C2BB1286B32989	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test (proportion normal) **WSP Laboratory**

Analysis ID:	06-9551-1317	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:40	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:38	**MD5 Hash:**	B89743E3AB3FDE937456F5FD71B5E9B5	**Editor ID:**	002-883-387-8

Comments: FC = 0.45 um filtered seawater, 100 = 100% SIYB-1, 101 = SIYB-1 (0.45um filtered).

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% failed proportion normal endpoint	3.78%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	8	5.066	1.86	0.05702	CDF	0.0005	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0603298	0.0603298	1	25.67	0.0010	Significant Effect
Error	0.0188039	0.0023505	8			
Total	0.0791337		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	3.034	23.15	0.3077	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9327	0.7411	0.4749	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9095	0.8867	0.9323	0.9015	0.8952	0.9412	0.0082	2.02%	0.00%
100		5	0.8016	0.7433	0.8598	0.7957	0.7386	0.8632	0.0210	5.86%	11.87%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2670	1.2240	1.3090	1.2520	1.2410	1.3260	0.0153	2.70%	0.00%
100		5	1.1110	1.0370	1.1850	1.1020	1.0340	1.1920	0.0266	5.35%	12.26%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9015	0.9412	0.9006	0.8952	0.9091
100		0.7386	0.7957	0.7829	0.8632	0.8274

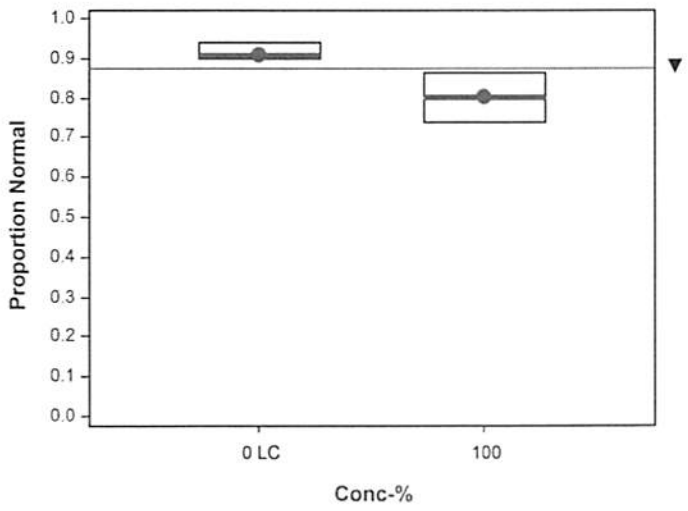
Angular (Corrected) Transformed Detail

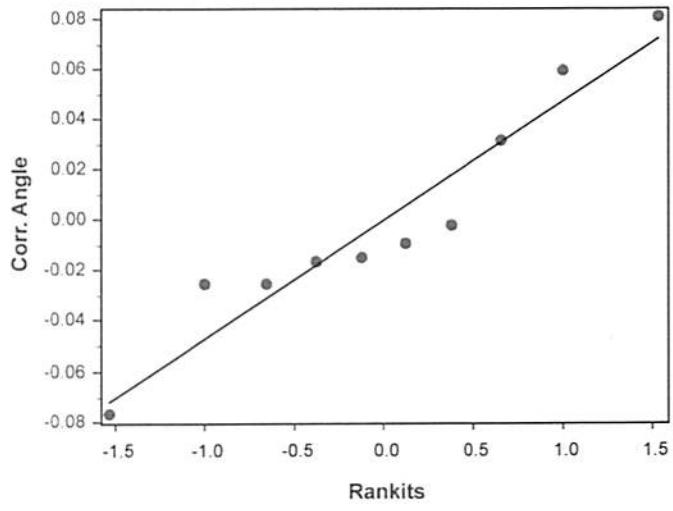
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.2520	1.3260	1.2500	1.2410	1.2650
100		1.0340	1.1020	1.0860	1.1920	1.1420

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	06-9551-1317	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:40	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:38	**MD5 Hash:**	B89743E3AB3FDE937456F5FD71B5E9B5	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Report Date: 25 Jan-23 18:04 (p 1 of 1)
Test Code/ID: 5209B041 / 13-7636-6657

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	4A5CBB6C
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 1 (0.45um filt)

Comments: FC = 0.45 um filtered seawater, 100 = 100% SIYB-1, 101 = SIYB-1 (0.45um filtered)

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			410			203	183	
			411			195	163	11 curved shells
			412			184	169	
			413			175	137	16 curved shells
			414			168	139	9 curved shells
			415			176	137	12 curved shells
			416			177	160	
			417			183	167	
			418			164	140	7 curved shells
			419			183	152	15 curved shells
			420			181	163	
			421			174	163	
			422			170	160	
			423			212	183	9 curved shells
			424			176	130	20 curved shells
			425			194	161	13 curved shells
			426			187	170	
			427			210	188	
			428			159	147	
			429			186	148	13 curved shells

Analyst: [signature] QA: [signature]

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	4A5CBB6C
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 1 (0.45um filt)

Comments: FC = 0.45 um filtered seawater, 100 = 100% SIYB-1, 101 = SIYB-1 (0.45um filtered)

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	416			177	160	AG
0	FC	2	417					
0	FC	3	412					
0	FC	4	428					
0	FC	5	421					
0	LC	1	410			203	183	
0	LC	2	422					
0	LC	3	420					
0	LC	4	427					
0	LC	5	426					
100		1	424			176	130	20 curved shells
100		2	429					
100		3	413					
100		4	423					
100		5	414					
101		1	419			183	152	15 curved shells
101		2	425					
101		3	411					
101		4	415					
101		5	418					

QC = TD

Analyst: AG QA: JL

Water Quality for Bivalve Development

Client: POSD
Project ID: SIYB (TIE) Treatment Controls
Test No. 23-01-017 ~~a~~ a+b AG

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/28/2023 ~~1600~~ AG

Test Conc. (~~ug/L Cu~~ AG Sample ID)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	15.3	15.4
	Salinity (ppt)	33.6	33.6	33.7
	pH (units)	7.93	7.61	7.70
	DO (mg/L)	8.2	8.4	8.3
Filter Control (0.45um)	Temp. (°C)	15.8	15.1	15.3
	Salinity (ppt)	33.3	RV ~~34~~ 34.0	34.1
	pH (units)	7.89	7.71	7.74
	DO (mg/L)	7.7	8.6	8.5
10 mg/L EDTA Control	Temp. (°C)	15.8	15.2	15.3
	Salinity (ppt)	34.1	34.1	34.2
	pH (units)	7.89	7.74	7.77
	DO (mg/L)	8.0	8.3	8.4
25 mg/L EDTA Control	Temp. (°C)	15.8	15.3	15.3
	Salinity (ppt)	34.0	33.8	34.0
	pH (units)	7.74	7.69	AG ~~7.6~~ 7.71
	DO (mg/L)	7.8	8.2	8.3
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	HK	RV	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

QC Check: AG 3/22/23
Final Review: SC 3/31/23

Water Quality for Bivalve Development

Client: POSD
Project ID: SIYB (TIE) SIYB-1 Treated
Test No. 23-01-07~~B~~a+b AG

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/28/2023 1600

Test Conc. (Sample ID)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
100% SIYB-1 (Baseline)	Temp. (°C)	15.8	15.2	15.3
	Salinity (ppt)	32.8	32.9	33.0
	pH (units)	7.88	7.73	7.77
	DO (mg/L)	8.6	8.4	8.3
100% SIYB 1 (10 mg/L EDTA)	Temp. (°C)	15.8	15.4	15.3
	Salinity (ppt)	33.1	33.3	33.4
	pH (units)	7.85	7.71	7.75
	DO (mg/L)	8.1	8.7	8.6
100% SIYB 1 (25 mg/L EDTA)	Temp. (°C)	15.8	15.5	15.4
	Salinity (ppt)	33.9	33.6	33.8
	pH (units)	7.72	7.71	7.75
	DO (mg/L)	7.9	8.7	8.6
100% SIYB-1 (0.45um filt)	Temp. (°C)	15.8	15.5	15.4
	Salinity (ppt)	32.6	32.8	33.0
	pH (units)	7.82	7.71	7.75
	DO (mg/L)	7.9	8.5	8.6
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	HK	RN	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

QC Check: AG 3/22/23
Final Review: JL 3/31/23

WSP Environmental Laboratory, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density: 800 / 500 Dil Factor: 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T0₁ = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

X = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

Bivalve Larval Survival and Development Test — WSP Laboratory

Batch ID:	11-7305-7447	**Test Type:**	Development-Survival	**Analyst:**		
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater	
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable	
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**

Sample ID:	11-3912-9510	**Code:**	23-W026	**Project:**	SIYB TMDL Monitoring
Sample Date:	25 Jan-23 14:00	**Material:**	Seawater	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB 1 (Treatments)
Sample Age:	27h (15.7 °C)	**Client:**	WSP		

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment (0.25 ug/L dissolved Cu), 25 = 25 mg/L EDTA treatment (0.23 ug/L dissolved Cu)

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-2974-8877	Combined Proportion Norma	Equal Variance t Two-Sample Test	0.0143	10% failed combined proportion normal	1
14-7196-2390	Combined Proportion Norma	Equal Variance t Two-Sample Test	0.4424	25% passed combined proportion normal	1
05-3309-7051	Proportion Normal	Equal Variance t Two-Sample Test	0.1040	10% passed proportion normal	1
15-6792-6178	Proportion Normal	Equal Variance t Two-Sample Test	0.7797	25% passed proportion normal	1

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
05-4713-6136	Combined Proportion Norma	Dunnett Multiple Comparison Test		0	>0	---	5.41%		1
19-9555-3475	Proportion Normal	Dunnett Multiple Comparison Test		0	>0	---	3.22%		1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
05-3309-7051	Proportion Normal	Control Resp	0.9028	0.9	<<	Yes	Passes Criteria
15-6792-6178	Proportion Normal	Control Resp	0.8952	0.9	<<	Yes	Below Criteria
19-9555-3475	Proportion Normal	Control Resp	0.8952	0.9	<<	Yes	Below Criteria
	Proportion Normal	Control Resp	0.9028	0.9	<<	Yes	Passes Criteria
	Proportion Normal	Control Resp	0.9139	0.9	<<	Yes	Passes Criteria
05-2974-8877	Combined Proportion Norma	PMSD	0.03784	<<	0.25	No	Passes Criteria
05-4713-6136	Combined Proportion Norma	PMSD	0.05407	<<	0.25	No	Passes Criteria
14-7196-2390	Combined Proportion Norma	PMSD	0.09295	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8859	0.8291	0.9428	0.8306	0.9231	0.0205	0.0458	5.17%	0.00%
0	M1	5	0.9019	0.8713	0.9325	0.8743	0.9368	0.0110	0.0246	2.73%	-1.80%
0	M2	5	0.8687	0.8269	0.9104	0.8251	0.9081	0.0150	0.0336	3.87%	1.95%
10		5	0.8495	0.8039	0.8952	0.8033	0.8907	0.0165	0.0368	4.33%	4.11%
25		5	0.8557	0.7484	0.9631	0.7377	0.9358	0.0387	0.0865	10.10%	3.41%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9139	0.8879	0.9398	0.8786	0.9333	0.0094	0.0209	2.29%	0.00%
0	M1	5	0.9028	0.8738	0.9318	0.8791	0.9368	0.0105	0.0234	2.59%	1.21%
0	M2	5	0.8952	0.8672	0.9232	0.8615	0.9213	0.0101	0.0226	2.52%	2.05%
10		5	0.8837	0.8586	0.9088	0.8610	0.9091	0.0090	0.0202	2.29%	3.30%
25		5	0.9075	0.8721	0.9429	0.8654	0.9358	0.0128	0.0285	3.14%	0.70%

Bivalve Larval Survival and Development Test — WSP Laboratory

Combined Proportion Normal Detail — MD5: 73D2375E67266FBD2732AC7BBF64D16F

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9231	0.8415	0.9140	0.8306	0.9204
0	M1	0.8900	0.9368	0.9162	0.8919	0.8743
0	M2	0.8251	0.9081	0.8962	0.8525	0.8615
10		0.8610	0.8730	0.8033	0.8907	0.8197
25		0.7377	0.9208	0.7923	0.8919	0.9358

Proportion Normal Detail — MD5: 78CF6E935332C606546E2E372D85711A

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9231	0.9333	0.9140	0.8786	0.9204
0	M1	0.8900	0.9368	0.9162	0.8919	0.8791
0	M2	0.8882	0.9081	0.9213	0.8966	0.8615
10		0.8610	0.8730	0.8750	0.9006	0.9091
25		0.8654	0.9208	0.9236	0.8919	0.9358

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	180/195	154/183	170/186	152/183	185/201
0	M1	178/200	178/190	175/191	165/185	160/183
0	M2	151/183	168/185	164/183	156/183	168/195
10		161/187	165/189	147/183	163/183	150/183
25		135/183	186/202	145/183	165/185	175/187

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	180/195	154/165	170/186	152/173	185/201
0	M1	178/200	178/190	175/191	165/185	160/182
0	M2	151/170	168/185	164/178	156/174	168/195
10		161/187	165/189	147/168	163/181	150/165
25		135/156	186/202	145/157	165/185	175/187

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	05-2974-8877	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:18	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	C06B8D4CFC70D08C669C15EB9ED6704	**Editor ID:**	002-883-387-8

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment (0.25 ug/L dissolved Cu), 25 = 25 mg/L EDTA treatment (0.23 ug/L dissolved Cu)

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	10% failed combined proportion normal endpoint	3.78%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Method Control	1	10*	8	2.665	1.86	0.05559	CDF	0.0143	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0158678	0.0158678	1	7.103	0.0286	Significant Effect
Error	0.0178726	0.0022341	8			
Total	0.0337404		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.435	23.15	0.7349	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9376	0.7411	0.5267	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	M1	5	0.9019	0.8713	0.9325	0.8919	0.8743	0.9368	0.0110	2.73%	0.00%
10		5	0.8495	0.8039	0.8952	0.8610	0.8033	0.8907	0.0165	4.33%	5.80%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	M1	5	1.2540	1.2010	1.3070	1.2360	1.2080	1.3170	0.0192	3.42%	0.00%
10		5	1.1740	1.1110	1.2380	1.1890	1.1110	1.2340	0.0230	4.37%	6.35%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	M1	0.8900	0.9368	0.9162	0.8919	0.8743
10		0.8610	0.8730	0.8033	0.8907	0.8197

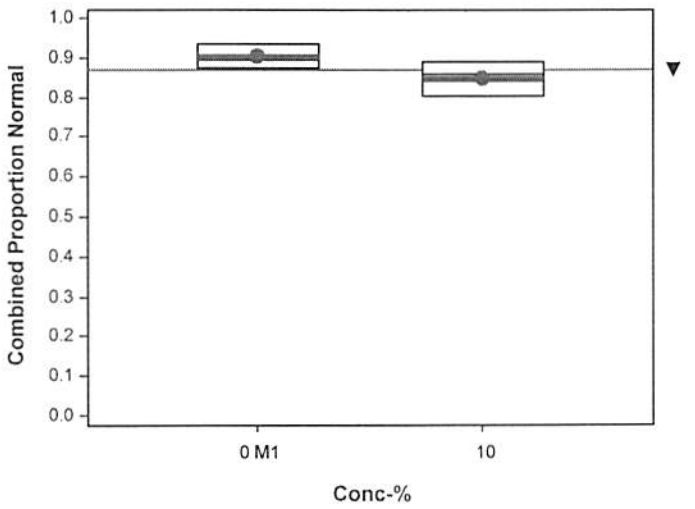
Angular (Corrected) Transformed Detail

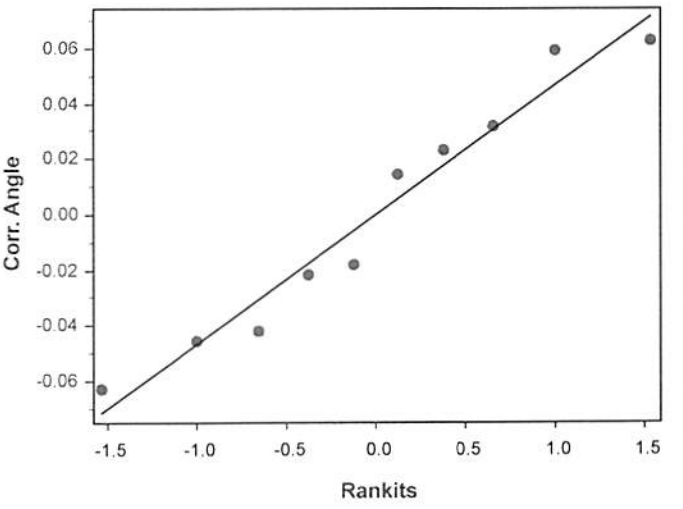
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	M1	1.2330	1.3170	1.2770	1.2360	1.2080
10		1.1890	1.2060	1.1110	1.2340	1.1320

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	05-2974-8877	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:18	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	C06B8D4CFC70D08C669C15EB9ED6704	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test					WSP Laboratory
Analysis ID:	14-7196-2390	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:18	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	69F0A3A1BB3654E24394A16DA3DE8E1D	**Editor ID:**	002-883-387-8

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment (0.25 ug/L dissolved Cu), 25 = 25 mg/L EDTA treatment (0.23 ug/L dissolved Cu)

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	25% passed combined proportion normal endpoint	9.29%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Method Control 2		25	8	0.1497	1.86	0.11	CDF	0.4424	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001959	0.0001959	1	0.02241	0.8847	Non-Significant Effect
Error	0.0699297	0.0087412	8			
Total	0.0701256		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	5.936	23.15	0.1127	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9688	0.7411	0.8799	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	M2	5	0.8687	0.8269	0.9104	0.8615	0.8251	0.9081	0.0150	3.87%	0.00%
25		5	0.8557	0.7484	0.9631	0.8919	0.7377	0.9358	0.0387	10.10%	1.49%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	M2	5	1.2020	1.1400	1.2650	1.1900	1.1390	1.2630	0.0225	4.18%	0.00%
25		5	1.1930	1.0410	1.3450	1.2360	1.0330	1.3150	0.0547	10.25%	0.74%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	M2	0.8251	0.9081	0.8962	0.8525	0.8615
25		0.7377	0.9208	0.7923	0.8919	0.9358

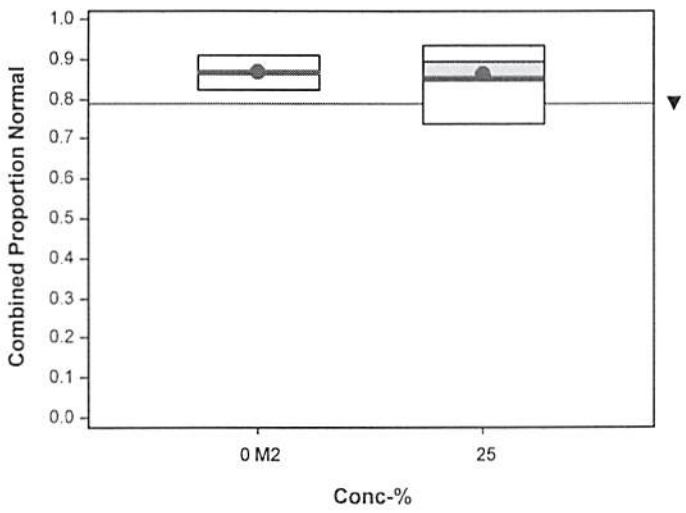
Angular (Corrected) Transformed Detail

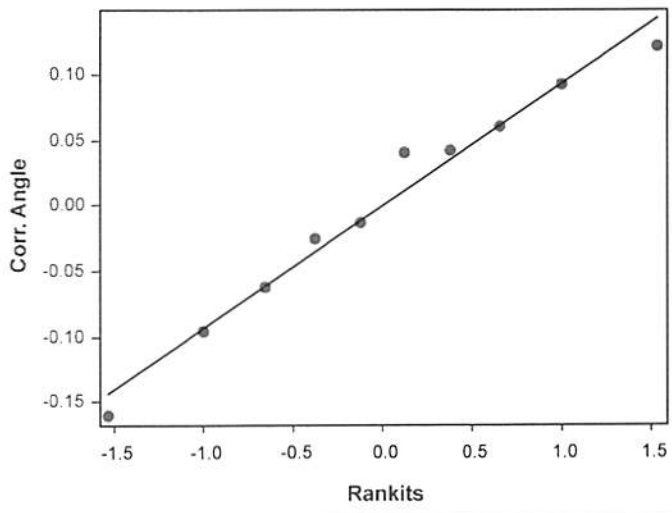
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	M2	1.1390	1.2630	1.2430	1.1770	1.1900
25		1.0330	1.2860	1.0980	1.2360	1.3150

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	14-7196-2390	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:18	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	69F0A3A1BB3654E24394A16DA3DE8E1D	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	05-4713-6136	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:19	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	095EABD9F95D69EF8915D9001AC90162	**Editor ID:**	002-883-387-8

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment (0.25 ug/L dissolved Cu), 25 = 25 mg/L EDTA treatment (0.23 ug/L dissolved Cu)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	0	>0	---	---	0.0479	5.41%

Dunnett Multiple Comparison Test

Control I	vs	Control II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		Method Control 2	8	0.8182	2.108	0.07454	CDF	0.3312	Non-Significant Effect
		Method Control 1	8	-0.6515	2.108	0.07454	CDF	0.8690	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0067806	0.0033903	2	1.085	0.3690	Non-Significant Effect
Error	0.0375114	0.003126	12			
Total	0.0442921		14			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	0.9857	9.21	0.6109	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.905	0.8328	0.1134	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8859	0.8291	0.9428	0.9140	0.8306	0.9231	0.0205	5.17%	0.00%
0	M1	5	0.9019	0.8713	0.9325	0.8919	0.8743	0.9368	0.0110	2.73%	-1.80%
0	M2	5	0.8687	0.8269	0.9104	0.8615	0.8251	0.9081	0.0150	3.87%	1.95%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2310	1.1430	1.3190	1.2730	1.1470	1.2900	0.0317	5.76%	0.00%
0	M1	5	1.2540	1.2010	1.3070	1.2360	1.2080	1.3170	0.0192	3.42%	-1.87%
0	M2	5	1.2020	1.1400	1.2650	1.1900	1.1390	1.2630	0.0225	4.18%	2.35%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9231	0.8415	0.9140	0.8306	0.9204
0	M1	0.8900	0.9368	0.9162	0.8919	0.8743
0	M2	0.8251	0.9081	0.8962	0.8525	0.8615

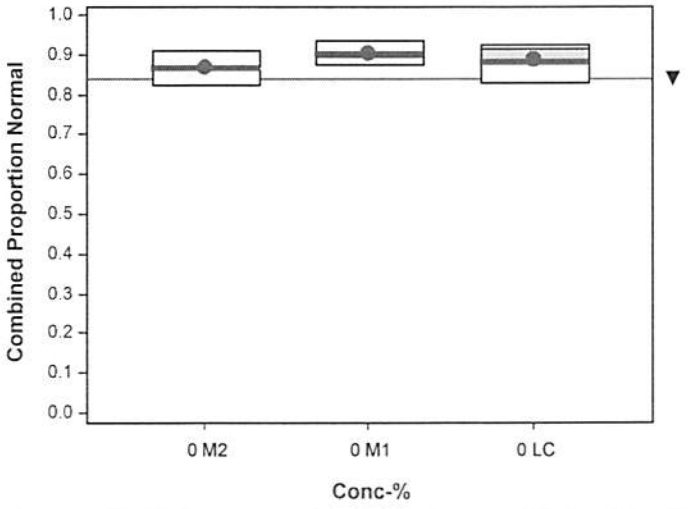
Angular (Corrected) Transformed Detail

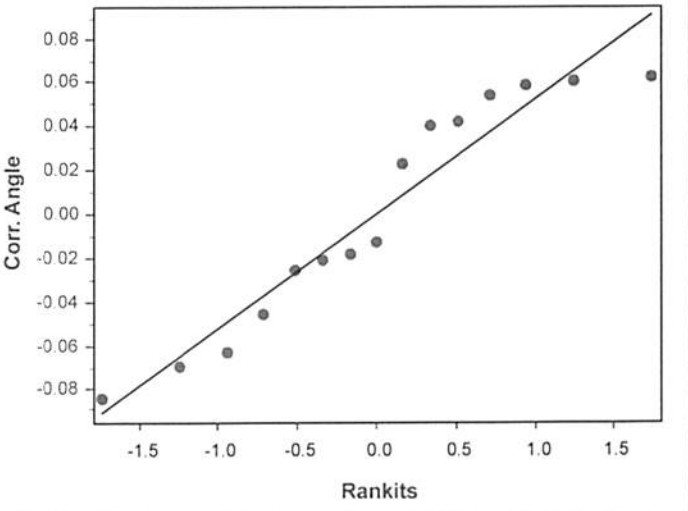
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.2900	1.1610	1.2730	1.1470	1.2850
0	M1	1.2330	1.3170	1.2770	1.2360	1.2080
0	M2	1.1390	1.2630	1.2430	1.1770	1.1900

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	05-4713-6136	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:19	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	095EABD9F95D69EF8915D9001AC90162	**Editor ID:**	002-883-387-8

Graphics





MC1 vs 10 mg/L EDTA (proportion normal)

Bivalve Larval Survival and Development Test — WSP Laboratory

Analysis ID:	05-3309-7051	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:18	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	E514D0657C7FC9D6524E341DB0940ED0	**Editor ID:**	002-883-387-8

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment (0.25 ug/L dissolved Cu), 25 = 25 mg/L EDTA treatment (0.23 ug/L dissolved Cu)

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	10% passed proportion normal endpoint	2.86%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Method Control	1	10	8	1.369	1.86	0.04321	CDF	0.1040	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0025307	0.0025307	1	1.875	0.2081	Non-Significant Effect
Error	0.0107972	0.0013497	8			
Total	0.013328		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.644	23.15	0.6418	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9012	0.7411	0.2256	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	M1	5	0.9028	0.8738	0.9318	0.8919	0.8791	0.9368	0.0105	2.59%	0.00%
10		5	0.8837	0.8586	0.9088	0.8750	0.8610	0.9091	0.0090	2.29%	2.11%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	M1	5	1.2560	1.2050	1.3060	1.2360	1.2160	1.3170	0.0183	3.26%	0.00%
10		5	1.2240	1.1840	1.2630	1.2090	1.1890	1.2650	0.0143	2.61%	2.53%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	M1	0.8900	0.9368	0.9162	0.8919	0.8791
10		0.8610	0.8730	0.8750	0.9006	0.9091

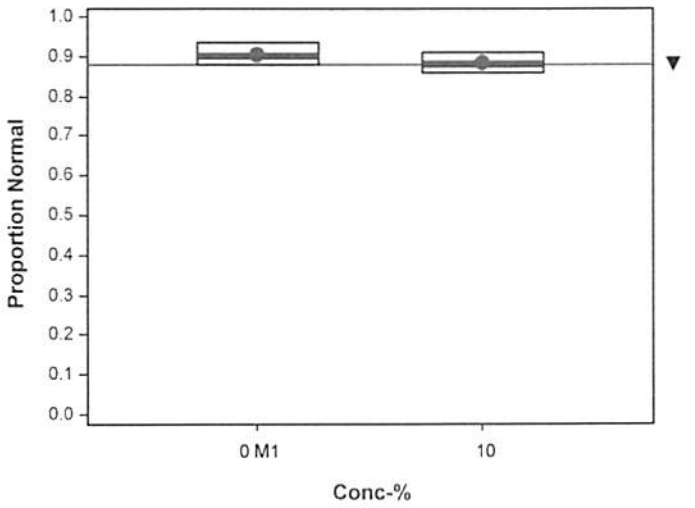
Angular (Corrected) Transformed Detail

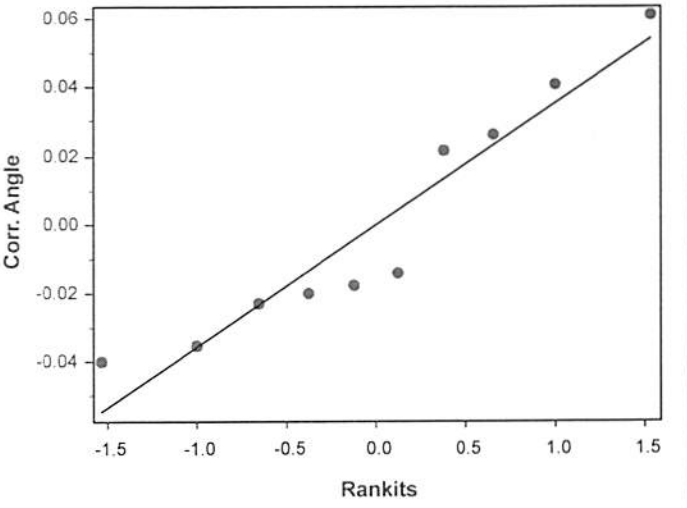
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	M1	1.2330	1.3170	1.2770	1.2360	1.2160
10		1.1890	1.2060	1.2090	1.2500	1.2650

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	05-3309-7051	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:18	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	E514D0657C7FC9D6524E341DB0940ED0	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test **WSP Laboratory**

Analysis ID:	15-6792-6178	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:18	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	6599975B68F7E70DC86BF1F9832279C8	**Editor ID:**	002-883-387-8

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment (0.25 ug/L dissolved Cu), 25 = 25 mg/L EDTA treatment (0.23 ug/L dissolved Cu)

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	25% passed proportion normal endpoint	3.55%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Method Control 2		25	8	-0.8115	1.86	0.05024	CDF	0.7797	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012018	0.0012018	1	0.6585	0.4406	Non-Significant Effect
Error	0.0146014	0.0018252	8			
Total	0.0158031		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.746	23.15	0.6025	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9406	0.7411	0.5600	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	M2	5	0.8952	0.8672	0.9232	0.8966	0.8615	0.9213	0.0101	2.52%	0.00%
25		5	0.9075	0.8721	0.9429	0.9208	0.8654	0.9358	0.0128	3.14%	-1.38%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	M2	5	1.2420	1.1970	1.2880	1.2430	1.1900	1.2870	0.0163	2.93%	0.00%
25		5	1.2640	1.2050	1.3240	1.2860	1.1950	1.3150	0.0216	3.81%	-1.76%

Proportion Normal Detail

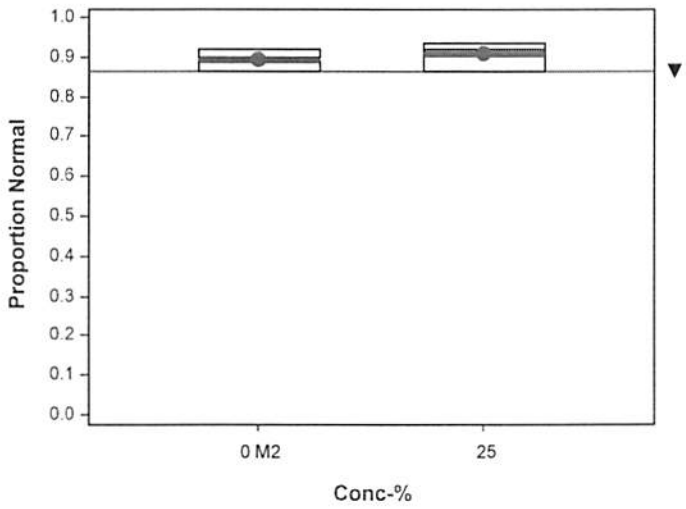
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	M2	0.8882	0.9081	0.9213	0.8966	0.8615
25		0.8654	0.9208	0.9236	0.8919	0.9358

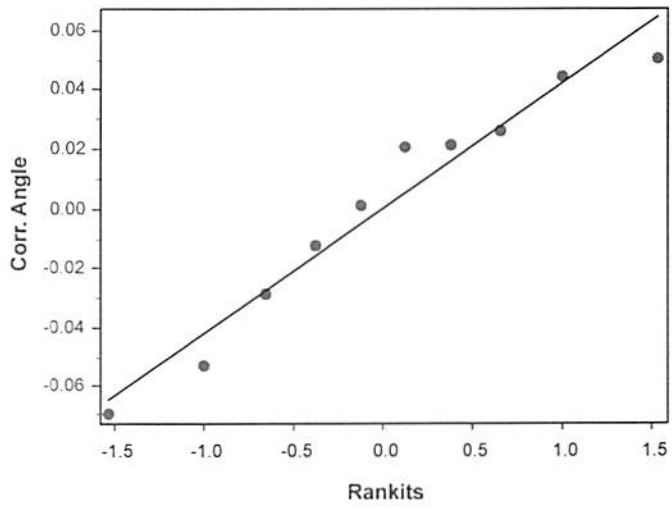
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	M2	1.2300	1.2630	1.2870	1.2430	1.1900
25		1.1950	1.2860	1.2910	1.2360	1.3150

Bivalve Larval Survival and Development Test					WSP Laboratory
Analysis ID:	15-6792-6178	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:18	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	6599975B68F7E70DC86BF1F9832279C8	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	19-9555-3475	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:19	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	D74D169E6953D281704B38AF7162672D	**Editor ID:**	002-883-387-8

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment (0.25 ug/L dissolved Cu), 25 = 25 mg/L EDTA treatment (0.23 ug/L dissolved Cu)

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	0	>0	---	---	0.02938	3.22%

Dunnett Multiple Comparison Test

Control I	vs	Control II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		Method Control 2	8	1.339	2.108	0.05041	CDF	0.1697	Non-Significant Effect
		Method Control 1	8	0.787	2.108	0.05041	CDF	0.3429	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0025893	0.0012947	2	0.9056	0.4302	Non-Significant Effect
Error	0.0171552	0.0014296	12			
Total	0.0197446		14			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	0.07912	9.21	0.9612	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9806	0.8328	0.9731	Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9139	0.8879	0.9398	0.9204	0.8786	0.9333	0.0094	2.29%	0.00%
0	M1	5	0.9028	0.8738	0.9318	0.8919	0.8791	0.9368	0.0105	2.59%	1.21%
0	M2	5	0.8952	0.8672	0.9232	0.8966	0.8615	0.9213	0.0101	2.52%	2.05%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2740	1.2300	1.3190	1.2850	1.2150	1.3100	0.0160	2.81%	0.00%
0	M1	5	1.2560	1.2050	1.3060	1.2360	1.2160	1.3170	0.0183	3.26%	1.48%
0	M2	5	1.2420	1.1970	1.2880	1.2430	1.1900	1.2870	0.0163	2.93%	2.51%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9231	0.9333	0.9140	0.8786	0.9204
0	M1	0.8900	0.9368	0.9162	0.8919	0.8791
0	M2	0.8882	0.9081	0.9213	0.8966	0.8615

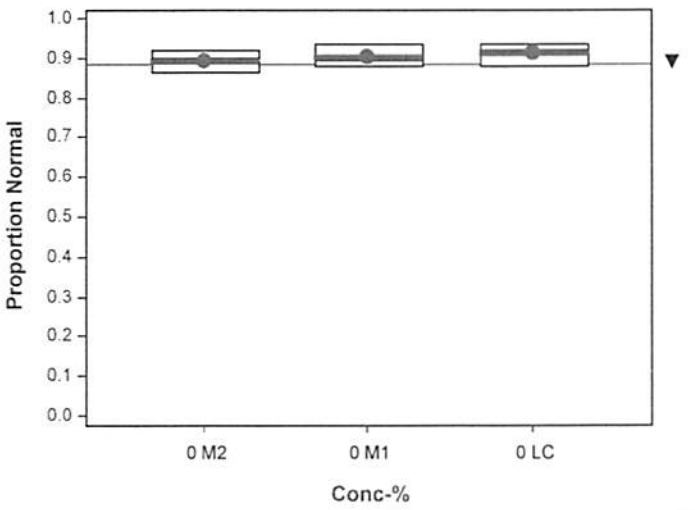
Angular (Corrected) Transformed Detail

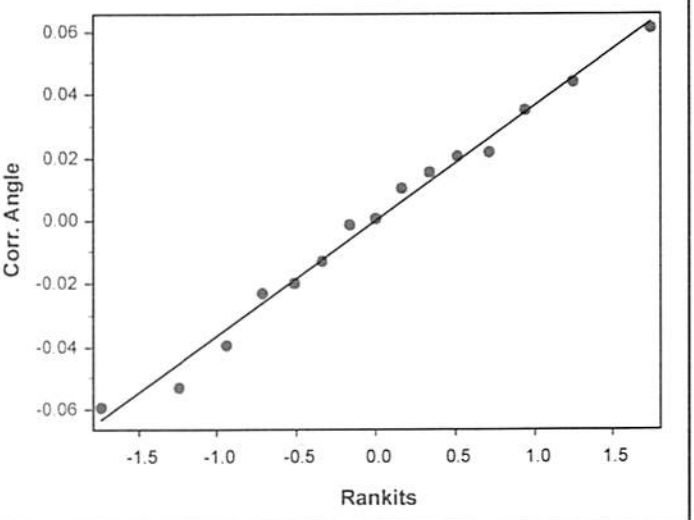
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.2900	1.3100	1.2730	1.2150	1.2850
0	M1	1.2330	1.3170	1.2770	1.2360	1.2160
0	M2	1.2300	1.2630	1.2870	1.2430	1.1900

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	19-9555-3475	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 13:19	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	17 Mar-23 13:15	**MD5 Hash:**	D74D169E6953D281704B38AF7162672D	**Editor ID:**	002-883-387-8

Graphics





CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	43E5BCA6
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 1 (Treatments)

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment, 25 = 25 mg/L EDTA treatment

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			430			181	163	
			431			182	160	
			432			201	185	
			433			165	154	
			434			189	165	
			435			157	145	
			436			202	186	
			437			195	168	
			438			187	175	
			439			187	161	1 curved shell
			440			174	156	
			441			195	180	
			442			190	178	
			443			185	165	
			444			186	170	
			445			173	152	
			446			185	165	1 curved shell
			447			165	150	
			448			170	151	
			449			156	135	1 curved shell
			450			185	~~168~~ 168 AG	
			451			178	164	
			452			200	178	
			453			191	175	
			454			168	147	

Analyst: AG QA:

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	43E5BCA6
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Seawater	**Sample Station:**	SIYB 1 (Treatments)

Comments: M1 = 10 mg/L EDTA method control, M2 = 25 mg/L EDTA method control. 10 = 10 mg/L treatment, 25 = 25 mg/L EDTA treatment

Conc-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	441			195	180	
0	LC	2	433					
0	LC	3	444					
0	LC	4	445					
0	LC	5	432					
0	M1	1	452			200	178	
0	M1	2	442					
0	M1	3	453					
0	M1	4	446					
0	M1	5	431					
0	M2	1	448			170	151	
0	M2	2	450					
0	M2	3	451					
0	M2	4	440					
0	M2	5	437					
10		1	439			187	161	1 curved shell, plankton observed
10		2	434					
10		3	454					
10		4	430					
10		5	447					
25		1	449			156	135	1 curved shell, plankton + copepods observed
25		2	436					
25		3	435					
25		4	443					
25		5	438					

QC = TP

Analyst: AB QA: JC

Water Quality for Bivalve Development

Client: POSD
Project ID: SIYB (TIE) Treatment Controls
Test No. 23-01-017~~ab~~ a+b AG

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/28/2023 1600

Test Conc. (~~µg/L Cu~~ AG Sample ID)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	15.3	15.4
	Salinity (ppt)	33.6	33.6	33.7
	pH (units)	7.93	7.61	7.70
	DO (mg/L)	8.2	8.4	8.3
Filter Control (0.45um)	Temp. (°C)	15.8	15.1	15.3
	Salinity (ppt)	33.3	RV ~~33~~ 34.0	34.1
	pH (units)	7.89	7.71	7.74
	DO (mg/L)	7.7	8.6	8.5
10 mg/L EDTA Control	Temp. (°C)	15.8	15.2	15.3
	Salinity (ppt)	34.1	34.1	34.2
	pH (units)	7.89	7.74	7.77
	DO (mg/L)	8.0	8.3	8.4
25 mg/L EDTA Control	Temp. (°C)	15.8	15.3	15.3
	Salinity (ppt)	34.0	33.8	34.0
	pH (units)	7.74	7.69	AG ~~7.6~~ 7.71
	DO (mg/L)	7.8	8.2	8.3
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	HK	RV	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

QC Check: AG 3/22/23
Final Review: SC 3/31/23

WSP Environmental Laboratory, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Water Quality for Bivalve Development

Client: POSD
Project ID: SIYB (TIE) SIYB-1 Treated
Test No. 23-01-07~~B~~A a+b

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/28/2023 1600

Test Conc. (Sample ID)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
100% SIYB-1 (Baseline)	Temp. (°C)	15.8	15.2	15.3
	Salinity (ppt)	32.8	32.9	33.0
	pH (units)	7.88	7.73	7.77
	DO (mg/L)	8.6	8.4	8.3
100% SIYB 1 (10 mg/L EDTA)	Temp. (°C)	15.8	15.4	15.3
	Salinity (ppt)	33.1	33.3	33.4
	pH (units)	7.85	7.71	7.75
	DO (mg/L)	8.1	8.7	8.6
100% SIYB 1 (25 mg/L EDTA)	Temp. (°C)	15.8	15.5	15.4
	Salinity (ppt)	33.9	33.6	33.8
	pH (units)	7.72	7.71	7.75
	DO (mg/L)	7.9	8.7	8.6
100% SIYB-1 (0.45um filt)	Temp. (°C)	15.8	15.5	15.4
	Salinity (ppt)	32.4	32.8	33.0
	pH (units)	7.82	7.71	7.75
	DO (mg/L)	7.9	8.5	8.6
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	HK	RV	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

QC Check: AG 3/22/23
Final Review: [illegible] 3/31/23

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID: 1/26/23 Mission Bay Collection
Test Type: 48hr Bivalve Development

Test Date: 1/26/2023
Analyst: AG

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: TØ1 = 195, TØ2 = ~~175~~ 168, TØ3 = 175, TØ4 = 192, TØ5 = 184
X̄ = 183

QA Review: AG 2/9/23

Final Review: SC 3/9/23

APPENDIX B

Chronic Mussel Development Test

Raw Data & Statistical Analyses

Phase II TIE

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	03-3101-3021	**Test Type:**	Development-Survival	**Analyst:**		
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Diluted Natural Seawater	
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable	
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**

Sample ID:	03-1218-4809	**Code:**	23-W026	**Project:**	Toxicity Identification Evaluation
Sample Date:	25 Jan-23 14:00	**Material:**	Total Copper	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB-1
Sample Age:	27h (15.7 °C)	**Client:**	SIYB		

Comments: Reference toxicant test made with undiluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
19-4753-7454	Combined Proportion Norma	Dunnett Multiple Comparison Test	✓	4.1	6.1	5.001	4.08%	1
09-4361-6980	Proportion Normal	Dunnett Multiple Comparison Test		6.1	11	8.191	2.71%	1
10-0501-9283	Survival Rate	Dunnett Multiple Comparison Test		11	21	15.2	3.41%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
02-0518-2934	Combined Proportion Norma	Trimmed Spearman-Kärber	✓	EC50	11.26	11.02	11.51	1
12-6759-8198	Proportion Normal	Trimmed Spearman-Kärber		EC50	11.48	11.24	11.72	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
09-4361-6980	Proportion Normal	Control Resp	0.9131	0.9	<<	Yes	Passes Criteria
12-6759-8198	Proportion Normal	Control Resp	0.9131	0.9	<<	Yes	Passes Criteria
10-0501-9283	Survival Rate	Control Resp	0.9978	0.5	<<	Yes	Passes Criteria
19-4753-7454	Combined Proportion Norma	PMSD	0.0408	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0.68	LC	5	0.9111	0.8842	0.9380	0.8907	0.9466	0.0097	0.0217	2.38%	0.00%
4.1		5	0.8967	0.8758	0.9176	0.8689	0.9105	0.0075	0.0168	1.87%	1.58%
6.1		5	0.8602	0.8044	0.9161	0.7869	0.9086	0.0201	0.0450	5.23%	5.58%
11		5	0.5048	0.4576	0.5520	0.4645	0.5519	0.0170	0.0380	7.53%	44.59%
21		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
44		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0.68	LC	5	0.9131	0.8886	0.9376	0.8971	0.9466	0.0088	0.0197	2.16%	0.00%
4.1		5	0.9036	0.8957	0.9115	0.8955	0.9105	0.0028	0.0063	0.70%	1.04%
6.1		5	0.8916	0.8750	0.9082	0.8778	0.9086	0.0060	0.0134	1.50%	2.35%
11		5	0.5124	0.4603	0.5644	0.4677	0.5739	0.0187	0.0419	8.18%	43.89%
21		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
44		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0.68	LC	5	0.9978	0.9917	1.0040	0.9891	1.0000	0.0022	0.0049	0.49%	0.00%
4.1		5	0.9923	0.9711	1.0140	0.9617	1.0000	0.0077	0.0171	1.72%	0.55%
6.1		5	0.9650	0.8998	1.0300	0.8743	1.0000	0.0235	0.0525	5.44%	3.29%
11		5	0.9858	0.9615	1.0100	0.9617	1.0000	0.0087	0.0196	1.98%	1.20%
21		5	0.9388	0.8905	0.9871	0.9016	1.0000	0.0174	0.0389	4.14%	5.91%
44		5	0.4721	0.3524	0.5918	0.3607	0.5902	0.0431	0.0964	20.42%	52.68%

Bivalve Larval Survival and Development Test — WSP Laboratory

Combined Proportion Normal Detail MD5: 6B206F5477C174024A135BE39D7147E3

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	0.9126	0.9466	0.9086	0.8971	0.8907
4.1		0.8995	0.9091	0.9105	0.8955	0.8689
6.1		0.7869	0.8634	0.8789	0.9086	0.8634
11		0.4677	0.5130	0.4645	0.5271	0.5519
21		0.0000	0.0000	0.0000	0.0000	0.0000
44		0.0000	0.0000	0.0000	0.0000	0.0000

Proportion Normal Detail MD5: C75B9081063F4C8B0C0F0C5557F8E1C9

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	0.9126	0.9466	0.9086	0.8971	0.9006
4.1		0.8995	0.9091	0.9105	0.8955	0.9034
6.1		0.9000	0.8927	0.8789	0.9086	0.8778
11		0.4677	0.5130	0.4802	0.5271	0.5739
21		0.0000	0.0000	0.0000	0.0000	0.0000
44		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail MD5: D86DD0318C36882C0D04AE3961D6F659

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	1.0000	1.0000	1.0000	1.0000	0.9891
4.1		1.0000	1.0000	1.0000	1.0000	0.9617
6.1		0.8743	0.9672	1.0000	1.0000	0.9836
11		1.0000	1.0000	0.9672	1.0000	0.9617
21		0.9508	0.9016	1.0000	0.9126	0.9290
44		0.4918	0.3880	0.5301	0.3607	0.5902

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	167/183	195/206	179/197	183/204	163/183
4.1		170/189	170/187	173/190	180/201	159/183
6.1		144/183	158/183	167/190	179/197	158/183
11		87/186	99/193	85/183	107/203	101/183
21		0/183	0/183	0/184	0/183	0/183
44		0/183	0/183	0/183	0/183	0/183

Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	167/183	195/206	179/197	183/204	163/181
4.1		170/189	170/187	173/190	180/201	159/176
6.1		144/160	158/177	167/190	179/197	158/180
11		87/186	99/193	85/177	107/203	101/176
21		0/174	0/165	0/184	0/167	0/170
44		0/90	0/71	0/97	0/66	0/108

Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	183/183	183/183	183/183	183/183	181/183
4.1		183/183	183/183	183/183	183/183	176/183
6.1		160/183	177/183	183/183	183/183	180/183
11		183/183	183/183	177/183	183/183	176/183
21		174/183	165/183	183/183	167/183	170/183
44		90/183	71/183	97/183	66/183	108/183

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	19-4753-7454	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 12:49	**MD5 Hash:**	6B206F5477C174024A135BE39D7147E3	**Editor ID:**	002-883-387-8

Comments: Reference toxicant test made with undiluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	4.1	6.1	5.001	---	0.03717	4.08%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		4.1	8	0.92	2.227	0.06217	CDF	0.3635	Non-Significant Effect
		6.1*	8	2.834	2.227	0.06217	CDF	0.0155	Significant Effect
		11*	8	17.19	2.227	0.06217	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.758299	0.252766	3	129.8	<1.0E-05	Significant Effect
Error	0.031166	0.0019479	16			
Total	0.789465		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.693	11.34	0.4414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9591	0.866	0.5251	Normal Distribution

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.68	LC	5	0.9111	0.8842	0.9380	0.9086	0.8907	0.9466	0.0097	2.38%	0.00%
4.1		5	0.8967	0.8758	0.9176	0.8995	0.8689	0.9105	0.0075	1.87%	1.58%
6.1		5	0.8602	0.8044	0.9161	0.8634	0.7869	0.9086	0.0201	5.23%	5.58%
11		5	0.5048	0.4576	0.5520	0.5130	0.4645	0.5519	0.0170	7.53%	44.59%
21		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
44		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.68	LC	5	1.2700	1.2200	1.3200	1.2640	1.2340	1.3380	0.0181	3.19%	0.00%
4.1		5	1.2440	1.2110	1.2780	1.2480	1.2000	1.2670	0.0120	2.16%	2.02%
6.1		5	1.1910	1.1130	1.2690	1.1920	1.0910	1.2640	0.0282	5.29%	6.23%
11		5	0.7902	0.7430	0.8375	0.7984	0.7498	0.8374	0.0170	4.82%	37.78%
21		5	0.0370	0.0369	0.0370	0.0370	0.0369	0.0370	0.0000	0.12%	97.09%
44		5	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0000	0.00%	97.09%

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	0.9126	0.9466	0.9086	0.8971	0.8907
4.1		0.8995	0.9091	0.9105	0.8955	0.8689
6.1		0.7869	0.8634	0.8789	0.9086	0.8634
11		0.4677	0.5130	0.4645	0.5271	0.5519
21		0.0000	0.0000	0.0000	0.0000	0.0000
44		0.0000	0.0000	0.0000	0.0000	0.0000

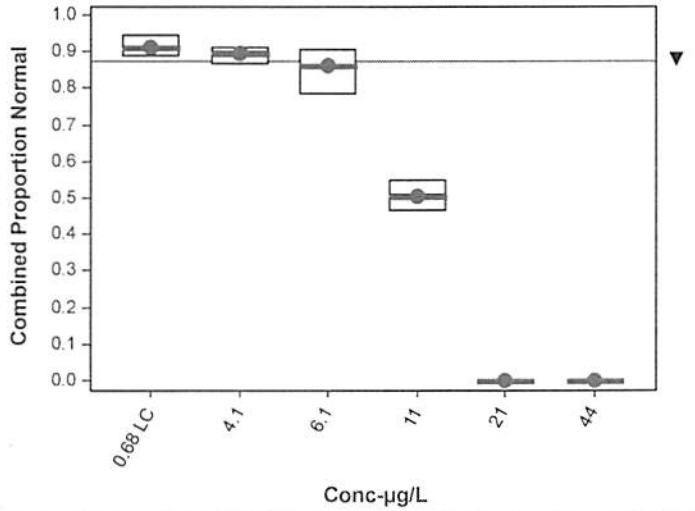
Bivalve Larval Survival and Development Test — **WSP Laboratory**

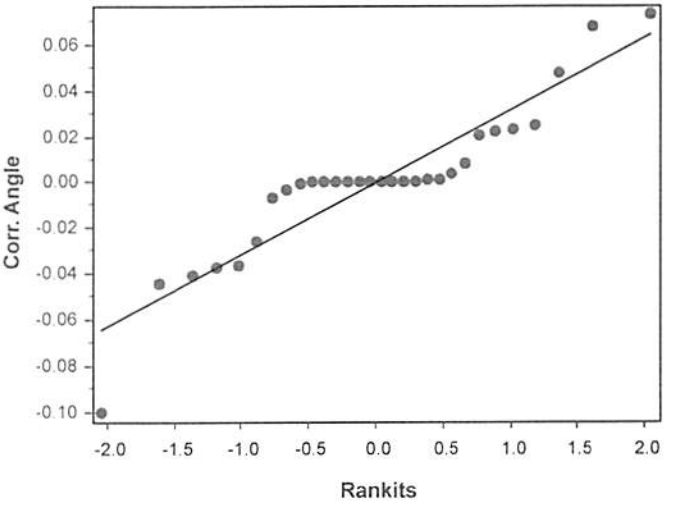
Analysis ID:	19-4753-7454	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 12:49	**MD5 Hash:**	6B206F5477C174024A135BE39D7147E3	**Editor ID:**	002-883-387-8

Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	1.2710	1.3380	1.2640	1.2440	1.2340
4.1		1.2480	1.2650	1.2670	1.2420	1.2000
6.1		1.0910	1.1920	1.2150	1.2640	1.1920
11		0.7531	0.7984	0.7498	0.8125	0.8374
21		0.0370	0.0370	0.0369	0.0370	0.0370
44		0.0370	0.0370	0.0370	0.0370	0.0370

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	09-4361-6980	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 12:49	**MD5 Hash:**	C75B9081063F4C8B0C0F0C5557F8E1C9	**Editor ID:**	002-883-387-8

Comments: Reference toxicant test made with undiluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	6.1	11	8.191	---	0.02475	2.71%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		4.1	8	0.9288	2.227	0.04314	CDF	0.3599	Non-Significant Effect
		6.1	8	1.933	2.227	0.04314	CDF	0.0844	Non-Significant Effect
		11*	8	24.54	2.227	0.04314	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.786392	0.262131	3	279.5	<1.0E-05	Significant Effect
Error	0.0150082	0.0009380	16			
Total	0.8014		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	6.386	11.34	0.0943	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9282	0.866	0.1426	Normal Distribution

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.68	LC	5	0.9131	0.8886	0.9376	0.9086	0.8971	0.9466	0.0088	2.16%	0.00%
4.1		5	0.9036	0.8957	0.9115	0.9034	0.8955	0.9105	0.0028	0.70%	1.04%
6.1		5	0.8916	0.8750	0.9082	0.8927	0.8778	0.9086	0.0060	1.50%	2.35%
11		5	0.5124	0.4603	0.5644	0.5130	0.4677	0.5739	0.0187	8.18%	43.89%
21		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
44		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.68	LC	5	1.2730	1.2270	1.3200	1.2640	1.2440	1.3380	0.0168	2.95%	0.00%
4.1		5	1.2550	1.2420	1.2690	1.2550	1.2420	1.2670	0.0048	0.85%	1.41%
6.1		5	1.2360	1.2090	1.2630	1.2370	1.2140	1.2640	0.0096	1.75%	2.94%
11		5	0.7978	0.7457	0.8500	0.7984	0.7531	0.8595	0.0188	5.27%	37.34%
21		5	0.0382	0.0371	0.0392	0.0384	0.0369	0.0389	0.0004	2.14%	97.00%
44		5	0.0545	0.0474	0.0616	0.0527	0.0481	0.0616	0.0026	10.51%	95.72%

Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	0.9126	0.9466	0.9086	0.8971	0.9006
4.1		0.8995	0.9091	0.9105	0.8955	0.9034
6.1		0.9000	0.8927	0.8789	0.9086	0.8778
11		0.4677	0.5130	0.4802	0.5271	0.5739
21		0.0000	0.0000	0.0000	0.0000	0.0000
44		0.0000	0.0000	0.0000	0.0000	0.0000

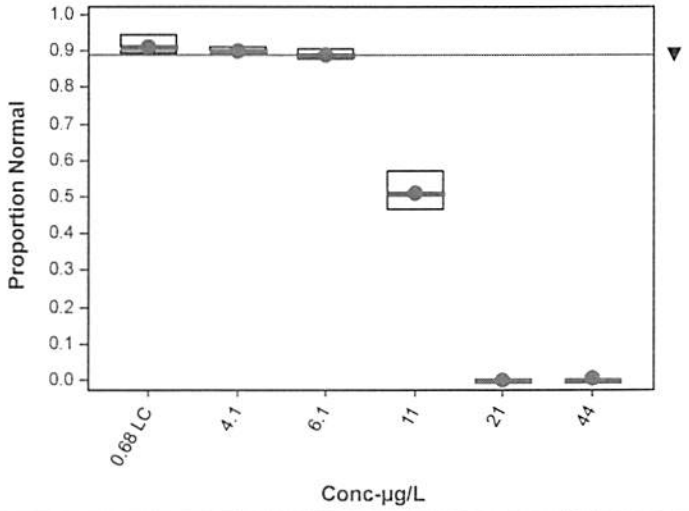
Bivalve Larval Survival and Development Test — **WSP Laboratory**

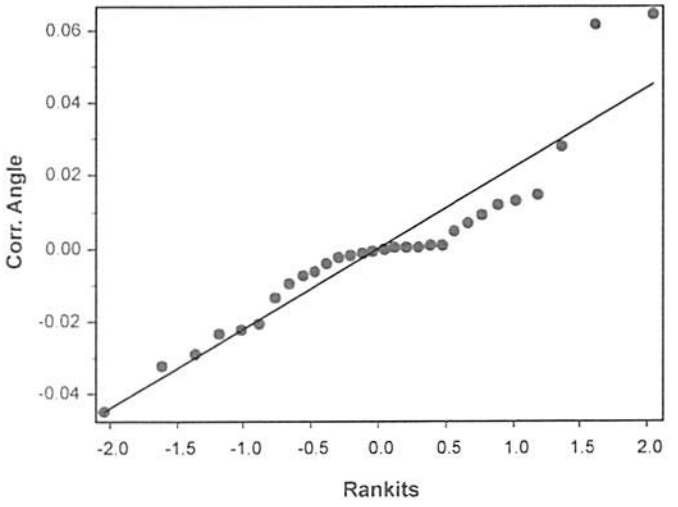
Analysis ID:	09-4361-6980	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 12:49	**MD5 Hash:**	C75B9081063F4C8B0C0F0C5557F8E1C9	**Editor ID:**	002-883-387-8

Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	1.2710	1.3380	1.2640	1.2440	1.2500
4.1		1.2480	1.2650	1.2670	1.2420	1.2550
6.1		1.2490	1.2370	1.2150	1.2640	1.2140
11		0.7531	0.7984	0.7656	0.8125	0.8595
21		0.0379	0.0389	0.0369	0.0387	0.0384
44		0.0527	0.0594	0.0508	0.0616	0.0481

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	10-0501-9283	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 12:49	**MD5 Hash:**	D86DD0318C36882C0D04AE3961D6F659	**Editor ID:**	002-883-387-8

Comments: Reference toxicant test made with undiluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	11	21	15.2	---	0.03406	3.41%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		4.1	8	0.3085	2.362	0.141	CDF	0.7266	Non-Significant Effect
		6.1	8	1.655	2.362	0.141	CDF	0.1772	Non-Significant Effect
		11	8	0.7946	2.362	0.141	CDF	0.5134	Non-Significant Effect
		21*	8	3.004	2.362	0.141	CDF	0.0126	Significant Effect
		44*	8	12.78	2.362	0.141	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.11336	0.422673	5	47.42	<1.0E-05	Significant Effect
Error	0.21391	0.0089129	24			
Total	2.32727		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	7.042	15.09	0.2176	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9718	0.9031	0.5881	Normal Distribution

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.68	LC	5	0.9978	0.9917	1.0000	1.0000	0.9891	1.0000	0.0022	0.49%	0.00%
4.1		5	0.9923	0.9711	1.0000	1.0000	0.9617	1.0000	0.0077	1.72%	0.55%
6.1		5	0.9650	0.8998	1.0000	0.9836	0.8743	1.0000	0.0235	5.44%	3.29%
11		5	0.9858	0.9615	1.0000	1.0000	0.9617	1.0000	0.0087	1.98%	1.20%
21		5	0.9388	0.8905	0.9871	0.9290	0.9016	1.0000	0.0174	4.14%	5.91%
44		5	0.4721	0.3524	0.5918	0.4918	0.3607	0.5902	0.0431	20.42%	52.68%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.68	LC	5	1.5200	1.4830	1.5580	1.5340	1.4660	1.5340	0.0136	1.99%	0.00%
4.1		5	1.5020	1.4130	1.5910	1.5340	1.3740	1.5340	0.0320	4.76%	1.21%
6.1		5	1.4210	1.2550	1.5880	1.4420	1.2080	1.5340	0.0601	9.45%	6.50%
11		5	1.4730	1.3690	1.5770	1.5340	1.3740	1.5340	0.0374	5.68%	3.12%
21		5	1.3410	1.2000	1.4820	1.3010	1.2520	1.5340	0.0509	8.48%	11.80%
44		5	0.7571	0.6362	0.8779	0.7772	0.6442	0.8761	0.0435	12.85%	50.20%

Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	1.0000	1.0000	1.0000	1.0000	0.9891
4.1		1.0000	1.0000	1.0000	1.0000	0.9617
6.1		0.8743	0.9672	1.0000	1.0000	0.9836
11		1.0000	1.0000	0.9672	1.0000	0.9617
21		0.9508	0.9016	1.0000	0.9126	0.9290
44		0.4918	0.3880	0.5301	0.3607	0.5902

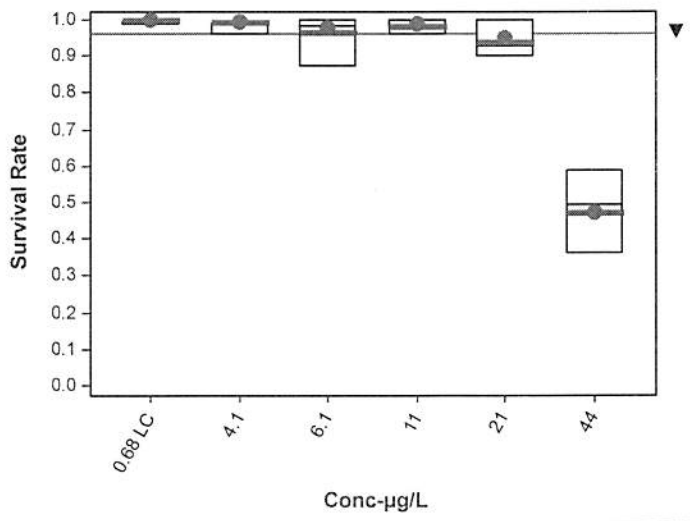
Bivalve Larval Survival and Development Test — **WSP Laboratory**

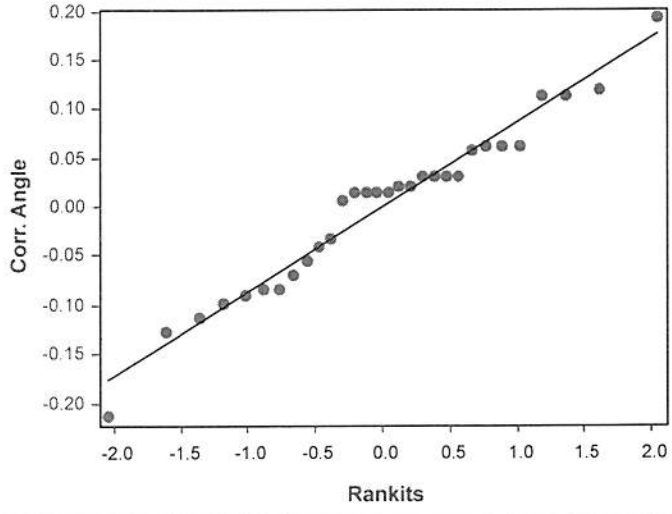
Analysis ID:	10-0501-9283	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 12:49	**MD5 Hash:**	D86DD0318C36882C0D04AE3961D6F659	**Editor ID:**	002-883-387-8

Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	1.5340	1.5340	1.5340	1.5340	1.4660
4.1		1.5340	1.5340	1.5340	1.5340	1.3740
6.1		1.2080	1.3890	1.5340	1.5340	1.4420
11		1.5340	1.5340	1.3890	1.5340	1.3740
21		1.3470	1.2520	1.5340	1.2710	1.3010
44		0.7772	0.6724	0.8155	0.6442	0.8761

Graphics





CETIS Analytical Report

Test Code/ID: 23-01-072a / 08-8498-1995

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	02-0518-2934	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:36	**Analysis:**	Trimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	10 Mar-23 12:49	**MD5 Hash:**	6B206F5477C174024A135BE39D7147E3	**Editor ID:**	002-883-387-8

Comments: Reference toxicant test made with undiluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.08839	1.62%	1.052	0.004787	11.26	11.02	11.51

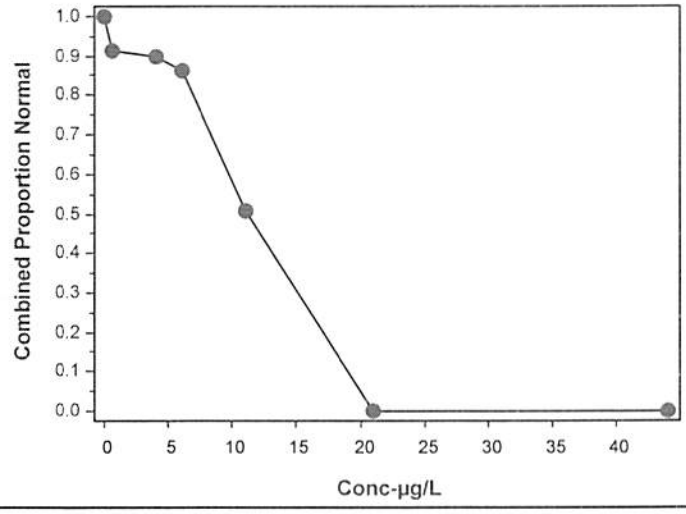
Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	ΣA/ΣB	Mean	%Effect
0.68	LC	5	0.9111	0.9086	0.8907	0.9466	2.38%	0.00%	887/973	0.9116	0.00%
4.1		5	0.8967	0.8995	0.8689	0.9105	1.87%	1.58%	852/950	0.8968	1.62%
6.1		5	0.8602	0.8634	0.7869	0.9086	5.23%	5.58%	806/936	0.8611	5.54%
11		5	0.5048	0.5130	0.4645	0.5519	7.53%	44.59%	479/948	0.5053	44.57%
21		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/916	0.0000	100.00%
44		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/915	0.0000	100.00%

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.68	LC	0.9126	0.9466	0.9086	0.8971	0.8907
4.1		0.8995	0.9091	0.9105	0.8955	0.8689
6.1		0.7869	0.8634	0.8789	0.9086	0.8634
11		0.4677	0.5130	0.4645	0.5271	0.5519
21		0.0000	0.0000	0.0000	0.0000	0.0000
44		0.0000	0.0000	0.0000	0.0000	0.0000

Graphics



CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	129B8FE9
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Total Copper	**Sample Station:**	SIYB-1

Comments: Reference toxicant test made With undiluted SIYB water from SIYB-1

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			350			66	0	
			351			160	144	3 curved shells
			352			206	195	
			353			203	107	55 curved shells
			354			187	170	
			355			190	173	
			356			190	167	1 curved shell
			357			193	99	36 curved shells
			358			71	0	
			359			201	180	
			360			197	179	
			361			97	0	
			362			197	179	2 curved shells
			363			176	159	
			364			108	0	
			365			174	0	
			366			90	0	
			367			176	101	36 curved shells
			368			181	163	
			369			204	183	
			370			186	87	56 curved shells
			371			165	0	
			372			183	167	
			373			167	0	
			374			177	85	44 curved shells
			375			189	170	
			376			184	0	
			377			170	0	
			378			180	158	
			379			177	158	2 curved shells

CETIS Test Data Worksheet

Report Date: 25 Jan-23 10:37 (p 1 of 1)
Test Code/ID: 34BFC0EB / 08-8498-1995

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	129B8FE9
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Total Copper	**Sample Station:**	SIYB-1

Comments: Reference toxicant test made With undiluted SIYB water from SIYB-1

Conc-µg/L		Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0.68	0	LC	1	372			183	167	
	0	LC	2	352					
	0	LC	3	360					
	0	LC	4	369					
	0	LC	5	368					
4.1	2.5		1	375			189	170	
	2.5		2	354					
	2.5		3	355					
	2.5		4	359					
	2.5		5	363					
6.1	5		1	351			160	144	3 curved shells
	5		2	379					
	5		3	356					
	5		4	362					
	5		5	378					
11	10		1	370			186	87	56 curved shells
	10		2	357					
	10		3	374					
	10		4	353					
	10		5	367					
21	20		1	365			174	0	
	20		2	371					
	20		3	376					
	20		4	373					
	20		5	377					
44	40		1	366			90	0	
	40		2	358					
	40		3	361					
	40		4	350					
	40		5	364					

QC = TD

Water Quality for Bivalve Development

Client: POSD
Project ID: SIYB (TIE) 100% SIYB-1 RT
Test No. 23-01-072a

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/28/2023 1600

Test Conc. (~~ug/L Cu~~)	Water Quality Measurements			
	Parameter	0hr	24hr RV	48hr
Lab Control	Temp. (°C)	15.8	15.52	15.3
	Salinity (ppt)	33.3	33.05 RV	33.7
	pH (units)	7.93	7.57	7.65
	DO (mg/L)	8.3	8.54 RV	8.3
2.5 (100% SIYB 1)	Temp. (°C)	15.8	15.2 RV	15.3
	Salinity (ppt)	33.5	33.8 RV	33.7
	pH (units)	7.90	7.695	7.68
	DO (mg/L)	8.3	8.75 RV	8.4
5 (100% SIYB 1)	Temp. (°C)	15.8	15.2 RV	15.3
	Salinity (ppt)	33.5	33.6	33.7
	pH (units)	7.90	7.769 RV	7.70
	DO (mg/L)	8.4	8.47 RV	8.5
10 (100% SIYB 1)	Temp. (°C)	15.8	15.31 RV	15.3
	Salinity (ppt)	33.4	33.25 RV	33.7
	pH (units)	7.89	7.741 RV	7.73
	DO (mg/L)	8.5	8.75 RV	8.5
20 (100% SIYB 1)	Temp. (°C)	15.8	15.42 RV	15.2
	Salinity (ppt)	33.4	33.0	33.5
	pH (units)	7.89	7.732 RV	7.74
	DO (mg/L)	8.3	8.5	8.5
40 (100% SIYB 1)	Temp. (°C)	NR	15.42 RV	15.2
	Salinity (ppt)	NR	32.9	33.3
	pH (units)	NR	7.73	7.75
	DO (mg/L)	NR	8.75 RV	8.5
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	HK	RV	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments: NR: Not Recorded

QC Check: AG 3/22/23
Final Review: JC 3/31/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts **# per ~~100~~ 20 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

X = 183

QA Review: AG 2/9/23 **Final Review:** SC 3/9/23

CETIS Summary Report

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Batch ID:	19-8763-2112	**Test Type:**	Development-Survival	**Analyst:**			
Start Date:	26 Jan-23 17:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Diluted Natural Seawater		
Ending Date:	28 Jan-23 16:00	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable		
Test Length:	46h	**Taxon:**		**Source:**	Field Collected	**Age:**	

Sample ID:	07-9263-5687	**Code:**	23-W026	**Project:**	Toxicity Identification Evaluation
Sample Date:	25 Jan-23 14:00	**Material:**	Total Copper	**Source:**	Shelter Island Yacht Basin
Receipt Date:	25 Jan-23 17:00	**CAS (PC):**		**Station:**	SIYB-1 (50%)
Sample Age:	27h (15.7 °C)	**Client:**	SIYB		

Comments: Reference toxicant test made with 50% diluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
11-2777-5035	Combined Proportion Norma	Dunnett Multiple Comparison Test	✓	5.6	10	7.483	8.32%	1
17-5076-2065	Proportion Normal	Dunnett Multiple Comparison Test	✓	5.6	10	7.483	5.55%	1
09-8693-5722	Survival Rate	Dunnett Multiple Comparison Test		21	40	28.98	7.49%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
02-2014-4036	Combined Proportion Norma	Spearman-Kärber		EC50	11.91	11.68	12.14	1
05-6296-9304	Proportion Normal	Trimmed Spearman-Kärber	✓	EC50	11.77	11.52	12.02	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
05-6296-9304	Proportion Normal	Control Resp	0.9164	0.9	<<	Yes	Passes Criteria
17-5076-2065	Proportion Normal	Control Resp	0.9164	0.9	<<	Yes	Passes Criteria
09-8693-5722	Survival Rate	Control Resp	0.9541	0.5	<<	Yes	Passes Criteria
11-2777-5035	Combined Proportion Norma	PMSD	0.0832	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0.74	LC	5	0.8737	0.8265	0.9210	0.8142	0.9048	0.0170	0.0381	4.35%	0.00%
3.4		5	0.8820	0.8549	0.9091	0.8634	0.9183	0.0098	0.0218	2.47%	-0.95%
5.6		5	0.8819	0.8174	0.9464	0.7923	0.9179	0.0232	0.0519	5.89%	-0.94%
10		5	0.6195	0.4987	0.7403	0.5359	0.7817	0.0435	0.0973	15.70%	29.10%
21		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0.74	LC	5	0.9164	0.8986	0.9342	0.9010	0.9371	0.0064	0.0144	1.57%	0.00%
3.4		5	0.8999	0.8756	0.9243	0.8833	0.9240	0.0088	0.0196	2.18%	1.80%
5.6		5	0.8941	0.8608	0.9273	0.8529	0.9179	0.0120	0.0268	3.00%	2.44%
10		5	0.6363	0.5192	0.7535	0.5359	0.7817	0.0422	0.0943	14.83%	30.56%
21		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0.74	LC	5	0.9541	0.8860	1.0220	0.8689	1.0000	0.0245	0.0549	5.75%	0.00%
3.4		5	0.9803	0.9476	1.0130	0.9344	1.0000	0.0118	0.0264	2.69%	-2.75%
5.6		5	0.9858	0.9463	1.0250	0.9290	1.0000	0.0142	0.0318	3.22%	-3.32%
10		5	0.9738	0.9179	1.0300	0.8962	1.0000	0.0201	0.0450	4.62%	-2.06%
21		5	0.9541	0.8980	1.0100	0.8962	1.0000	0.0202	0.0452	4.73%	0.00%
40		5	0.5967	0.5013	0.6921	0.5191	0.6995	0.0344	0.0768	12.88%	37.46%

Bivalve Larval Survival and Development Test — WSP Laboratory

Combined Proportion Normal Detail MD5: F6B65DF2931440263535768A06C16D80

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	0.9048	0.8907	0.8579	0.9010	0.8142
3.4		0.8852	0.8634	0.9183	0.8743	0.8689
5.6		0.7923	0.9179	0.9016	0.8830	0.9149
10		0.5359	0.5738	0.5721	0.6339	0.7817
21		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Proportion Normal Detail MD5: 8B1DDE97B7FE4C81088A7FCC01C5AC35

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	0.9048	0.9209	0.9181	0.9010	0.9371
3.4		0.8901	0.9240	0.9183	0.8840	0.8833
5.6		0.8529	0.9179	0.9016	0.8830	0.9149
10		0.5359	0.6402	0.5721	0.6517	0.7817
21		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail MD5: A7E19B4CDB687D3AA35422D5FAEF7BE4

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	1.0000	0.9672	0.9344	1.0000	0.8689
3.4		0.9945	0.9344	1.0000	0.9891	0.9836
5.6		0.9290	1.0000	1.0000	1.0000	1.0000
10		1.0000	0.8962	1.0000	0.9727	1.0000
21		0.8962	1.0000	0.9344	0.9399	1.0000
40		0.5246	0.6393	0.6995	0.6011	0.5191

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	171/189	163/183	157/183	173/192	149/183
3.4		162/183	158/183	191/208	160/183	159/183
5.6		145/183	190/207	165/183	166/188	172/188
10		112/209	105/183	119/208	116/183	154/197
21		0/183	0/192	0/183	0/183	0/191
40		0/183	0/183	0/183	0/183	0/183

Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	171/189	163/177	157/171	173/192	149/159
3.4		162/182	158/171	191/208	160/181	159/180
5.6		145/170	190/207	165/183	166/188	172/188
10		112/209	105/164	119/208	116/178	154/197
21		0/164	0/192	0/171	0/172	0/191
40		0/96	0/117	0/128	0/110	0/95

Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	183/183	177/183	171/183	183/183	159/183
3.4		182/183	171/183	183/183	181/183	180/183
5.6		170/183	183/183	183/183	183/183	183/183
10		183/183	164/183	183/183	178/183	183/183
21		164/183	183/183	171/183	172/183	183/183
40		96/183	117/183	128/183	110/183	95/183

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	11-2777-5035	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:49	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 13:02	**MD5 Hash:**	F6B65DF2931440263535768A06C16D80	**Editor ID:**	002-883-387-8

Comments: Reference toxicant test made with 50% diluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	5.6	10	7.483	---	0.07269	8.32%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		3.4	8	-0.2438	2.227	0.1018	CDF	0.8286	Non-Significant Effect
		5.6	8	-0.3274	2.227	0.1018	CDF	0.8513	Non-Significant Effect
		10*	8	6.594	2.227	0.1018	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.361247	0.120416	3	23.06	<1.0E-05	Significant Effect
Error	0.0835644	0.0052228	16			
Total	0.444811		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	4.14	11.34	0.2467	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9577	0.866	0.4995	Normal Distribution

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.74	LC	5	0.8737	0.8265	0.9210	0.8907	0.8142	0.9048	0.0170	4.35%	0.00%
3.4		5	0.8820	0.8549	0.9091	0.8743	0.8634	0.9183	0.0098	2.47%	-0.95%
5.6		5	0.8819	0.8174	0.9464	0.9016	0.7923	0.9179	0.0232	5.89%	-0.94%
10		5	0.6195	0.4987	0.7403	0.5738	0.5359	0.7817	0.0435	15.70%	29.10%
21		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.74	LC	5	1.2100	1.1410	1.2790	1.2340	1.1250	1.2570	0.0248	4.58%	0.00%
3.4		5	1.2210	1.1770	1.2650	1.2080	1.1920	1.2810	0.0158	2.90%	-0.92%
5.6		5	1.2250	1.1320	1.3180	1.2520	1.0980	1.2800	0.0335	6.12%	-1.24%
10		5	0.9088	0.7789	1.0390	0.8594	0.8213	1.0850	0.0468	11.51%	24.91%
21		5	0.0366	0.0361	0.0372	0.0370	0.0361	0.0370	0.0002	1.24%	96.97%
40		5	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0000	0.00%	96.95%

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	0.9048	0.8907	0.8579	0.9010	0.8142
3.4		0.8852	0.8634	0.9183	0.8743	0.8689
5.6		0.7923	0.9179	0.9016	0.8830	0.9149
10		0.5359	0.5738	0.5721	0.6339	0.7817
21		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

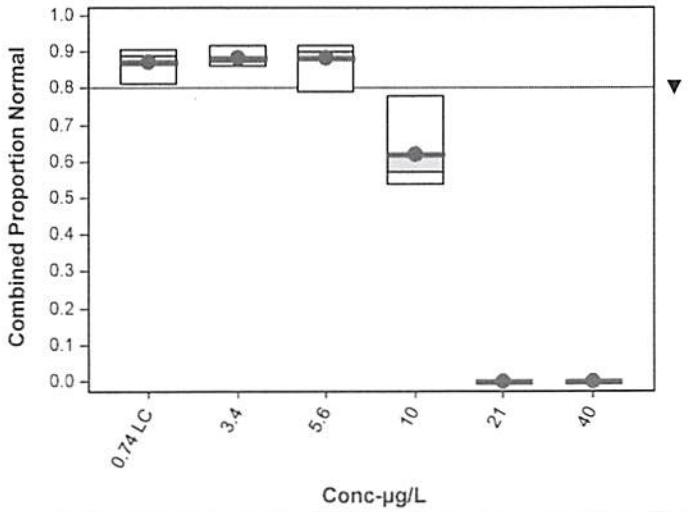
Bivalve Larval Survival and Development Test — **WSP Laboratory**

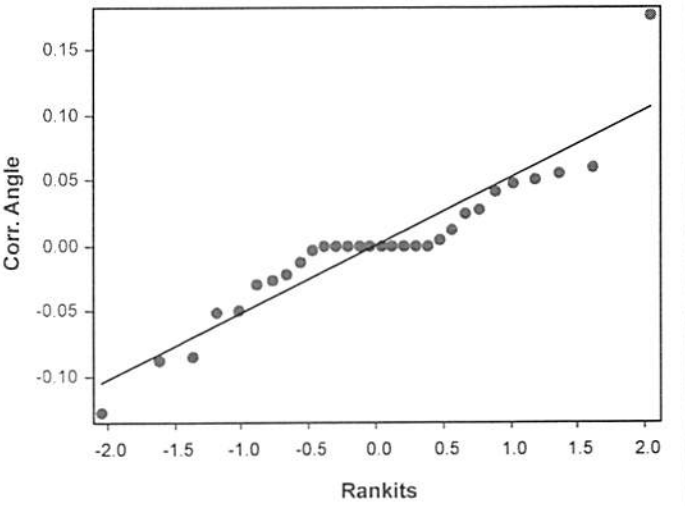
Analysis ID:	11-2777-5035	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:49	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 13:02	**MD5 Hash:**	F6B65DF2931440263535768A06C16D80	**Editor ID:**	002-883-387-8

Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	1.2570	1.2340	1.1840	1.2510	1.1250
3.4		1.2250	1.1920	1.2810	1.2080	1.2000
5.6		1.0980	1.2800	1.2520	1.2220	1.2750
10		0.8213	0.8594	0.8578	0.9209	1.0850
21		0.0370	0.0361	0.0370	0.0370	0.0362
40		0.0370	0.0370	0.0370	0.0370	0.0370

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	17-5076-2065	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:49	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 13:02	**MD5 Hash:**	8B1DDE97B7FE4C81088A7FCC01C5AC3	**Editor ID:**	002-883-387-8

Comments: Reference toxicant test made with 50% diluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	5.6	10	7.483	---	0.05083	5.55%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		3.4	8	0.7564	2.227	0.08292	CDF	0.4320	Non-Significant Effect
		5.6	8	0.9985	2.227	0.08292	CDF	0.3323	Non-Significant Effect
		10*	8	9.458	2.227	0.08292	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.413007	0.137669	3	39.72	<1.0E-05	Significant Effect
Error	0.055449	0.0034656	16			
Total	0.468456		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	8.355	11.34	0.0392	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9126	0.866	0.0714	Normal Distribution

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.74	LC	5	0.9164	0.8986	0.9342	0.9181	0.9010	0.9371	0.0064	1.57%	0.00%
3.4		5	0.8999	0.8756	0.9243	0.8901	0.8833	0.9240	0.0088	2.18%	1.80%
5.6		5	0.8941	0.8608	0.9273	0.9016	0.8529	0.9179	0.0120	3.00%	2.44%
10		5	0.6363	0.5192	0.7535	0.6402	0.5359	0.7817	0.0422	14.83%	30.56%
21		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.74	LC	5	1.2780	1.2460	1.3110	1.2810	1.2510	1.3170	0.0118	2.07%	0.00%
3.4		5	1.2500	1.2090	1.2920	1.2330	1.2220	1.2910	0.0149	2.67%	2.20%
5.6		5	1.2410	1.1880	1.2940	1.2520	1.1770	1.2800	0.0190	3.43%	2.91%
10		5	0.9262	0.8005	1.0520	0.9275	0.8213	1.0850	0.0453	10.93%	27.55%
21		5	0.0375	0.0359	0.0392	0.0381	0.0361	0.0391	0.0006	3.54%	97.06%
40		5	0.0481	0.0443	0.0519	0.0477	0.0442	0.0513	0.0014	6.40%	96.24%

Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	0.9048	0.9209	0.9181	0.9010	0.9371
3.4		0.8901	0.9240	0.9183	0.8840	0.8833
5.6		0.8529	0.9179	0.9016	0.8830	0.9149
10		0.5359	0.6402	0.5721	0.6517	0.7817
21		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

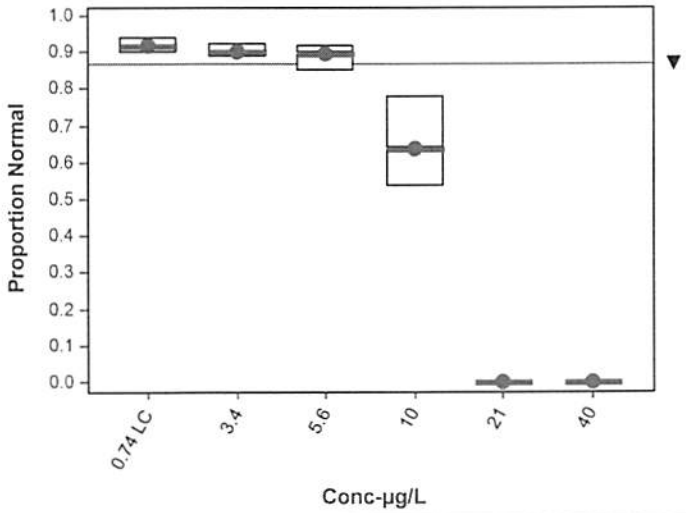
Bivalve Larval Survival and Development Test — **WSP Laboratory**

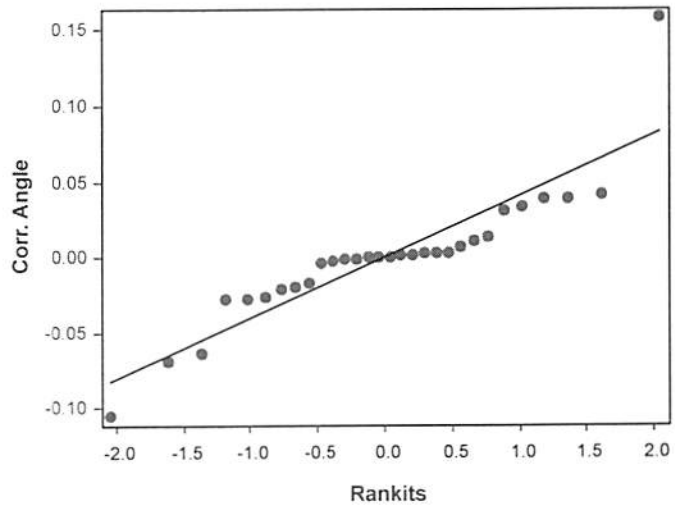
Analysis ID:	17-5076-2065	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:49	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 13:02	**MD5 Hash:**	8B1DDE97B7FE4C81088A7FCC01C5AC3	**Editor ID:**	002-883-387-8

Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	1.2570	1.2860	1.2810	1.2510	1.3170
3.4		1.2330	1.2910	1.2810	1.2230	1.2220
5.6		1.1770	1.2800	1.2520	1.2220	1.2750
10		0.8213	0.9275	0.8578	0.9395	1.0850
21		0.0391	0.0361	0.0383	0.0381	0.0362
40		0.0511	0.0462	0.0442	0.0477	0.0513

Graphics





Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	09-8693-5722	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:49	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 13:02	**MD5 Hash:**	A7E19B4CDB687D3AA35422D5FAEF7BE	**Editor ID:**	002-883-387-8

Comments: Reference toxicant test made with 50% diluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	21	40	28.98	---	0.07143	7.49%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		3.4	8	-0.7735	2.362	0.1725	CDF	0.9693	Non-Significant Effect
		5.6	8	-1.281	2.362	0.1725	CDF	0.9926	Non-Significant Effect
		10	8	-0.768	2.362	0.1725	CDF	0.9689	Non-Significant Effect
		21	8	0.06333	2.362	0.1725	CDF	0.8139	Non-Significant Effect
		40*	8	6.981	2.362	0.1725	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.29639	0.259277	5	19.44	<1.0E-05	Significant Effect
Error	0.320123	0.0133385	24			
Total	1.61651		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.208	15.09	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9362	0.9031	0.0717	Normal Distribution

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.74	LC	5	0.9541	0.8860	1.0000	0.9672	0.8689	1.0000	0.0245	5.75%	0.00%
3.4		5	0.9803	0.9476	1.0000	0.9891	0.9344	1.0000	0.0118	2.69%	-2.75%
5.6		5	0.9858	0.9463	1.0000	1.0000	0.9290	1.0000	0.0142	3.22%	-3.32%
10		5	0.9738	0.9179	1.0000	1.0000	0.8962	1.0000	0.0201	4.62%	-2.06%
21		5	0.9541	0.8980	1.0000	0.9399	0.8962	1.0000	0.0202	4.73%	0.00%
40		5	0.5967	0.5013	0.6921	0.6011	0.5191	0.6995	0.0344	12.88%	37.46%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.74	LC	5	1.3940	1.2140	1.5730	1.3890	1.2000	1.5340	0.0646	10.36%	0.00%
3.4		5	1.4500	1.3450	1.5550	1.4660	1.3120	1.5340	0.0378	5.83%	-4.05%
5.6		5	1.4870	1.3580	1.6170	1.5340	1.3010	1.5340	0.0466	7.00%	-6.71%
10		5	1.4500	1.2900	1.6090	1.5340	1.2430	1.5340	0.0575	8.87%	-4.03%
21		5	1.3890	1.2210	1.5580	1.3230	1.2430	1.5340	0.0607	9.77%	0.33%
40		5	0.8838	0.7857	0.9819	0.8872	0.8045	0.9906	0.0353	8.94%	36.59%

Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	1.0000	0.9672	0.9344	1.0000	0.8689
3.4		0.9945	0.9344	1.0000	0.9891	0.9836
5.6		0.9290	1.0000	1.0000	1.0000	1.0000
10		1.0000	0.8962	1.0000	0.9727	1.0000
21		0.8962	1.0000	0.9344	0.9399	1.0000
40		0.5246	0.6393	0.6995	0.6011	0.5191

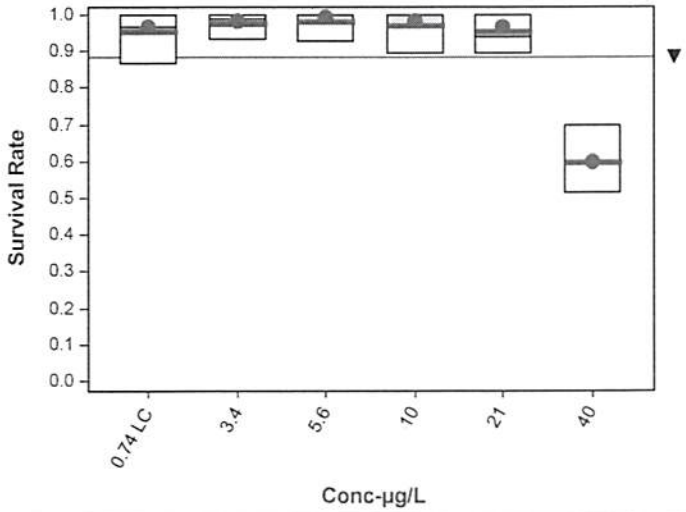
Bivalve Larval Survival and Development Test — **WSP Laboratory**

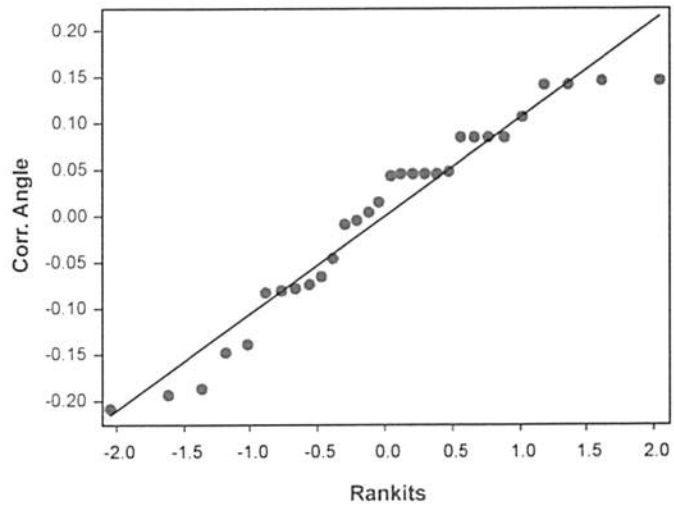
Analysis ID:	09-8693-5722	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:49	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	10 Mar-23 13:02	**MD5 Hash:**	A7E19B4CDB687D3AA35422D5FAEF7BE	**Editor ID:**	002-883-387-8

Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	1.5340	1.3890	1.3120	1.5340	1.2000
3.4		1.4970	1.3120	1.5340	1.4660	1.4420
5.6		1.3010	1.5340	1.5340	1.5340	1.5340
10		1.5340	1.2430	1.5340	1.4050	1.5340
21		1.2430	1.5340	1.3120	1.3230	1.5340
40		0.8100	0.9266	0.9906	0.8872	0.8045

Graphics





CETIS Analytical Report

Bivalve Larval Survival and Development Test — **WSP Laboratory**

Analysis ID:	02-2014-4036	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	17 Mar-23 12:49	**Analysis:**	Untrimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	10 Mar-23 13:02	**MD5 Hash:**	F6B65DF2931440263535768A06C16D80	**Editor ID:**	002-883-387-8

Comments: Reference toxicant test made with 50% diluted SIYB water from SIYB-1. For analysis, nominal copper concentrations were replaced with actual concentrations measured by Weck Laboratories.

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.1258	0.00%	1.076	0.004191	11.91	11.68	12.14

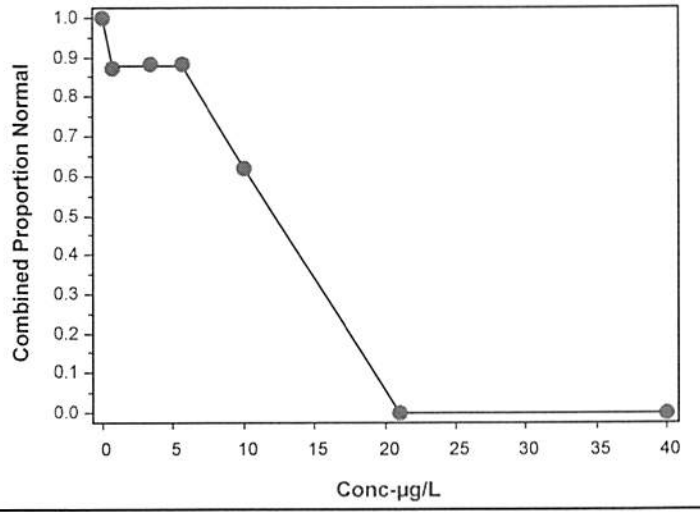
Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	ΣA/ΣB	Mean	%Effect
0.74	LC	5	0.8737	0.8907	0.8142	0.9048	4.35%	0.00%	813/930	0.8801	0.00%
3.4		5	0.8820	0.8743	0.8634	0.9183	2.47%	-0.95%	830/940	0.8801	0.00%
5.6		5	0.8819	0.9016	0.7923	0.9179	5.89%	-0.94%	838/949	0.8801	0.00%
10		5	0.6195	0.5738	0.5359	0.7817	15.70%	29.10%	606/980	0.6184	29.74%
21		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/932	0.0000	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/915	0.0000	100.00%

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.74	LC	0.9048	0.8907	0.8579	0.9010	0.8142
3.4		0.8852	0.8634	0.9183	0.8743	0.8689
5.6		0.7923	0.9179	0.9016	0.8830	0.9149
10		0.5359	0.5738	0.5721	0.6339	0.7817
21		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Graphics



CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	2F3EA927
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Total Copper	**Sample Station:**	SIYB-1 (50%)

Comments: Reference toxicant test made with 50% diluted SIYB water from SIYB-1

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			380			128	0	
			381			191	0	
			382			164	0	
			383			170	145	2 curved shells
			384			182	162	
			385			95	0	
			386			181	160	
			387			171	0	
			388			192	173	
			389			172	0	
			390			171	158	
			391			188	172	1 curved shell
			392			207	190	1 curved shell
			393			208	119	46 curved shells
			394			117	0	
			395			208	191	
			396			183	165	
			397			171	157	
			398			159	149	
			399			180	159	
			400			189	171	
			401			164	105	27 curved shells
			402			178	116	28 curved shells
			403			188	166	
			404			110	0	
			405			177	163	
			406			192	0	
			407			209	112	55 curved shells
			408			197	154	19 curved shells
			409			96	0	

Analyst: AC QA: KC

CETIS Test Data Worksheet

Report Date: 25 Jan-23 10:39 (p 1 of 1)
Test Code/ID: 3EFB11A9 / 10-5664-1449

Bivalve Larval Survival and Development Test — **Wood E&IS**

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	2F3EA927
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	25 Jan-23	**Material:**	Total Copper	**Sample Station:**	SIYB-1 (50%)

Comments: Reference toxicant test made with 50% diluted SIYB water from SIYB-1

Conc-µg/L		Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0.74	0	LC	1	400			189	171	
	0	LC	2	405					
	0	LC	3	397					
	0	LC	4	388					
	0	LC	5	398					
3.4	2.5		1	384			182	162	
	2.5		2	390					
	2.5		3	395					
	2.5		4	386					
	2.5		5	399					
5.6	5		1	383			170	145	2 curved shells
	5		2	392					
	5		3	396					
	5		4	403					
	5		5	391					
10	10		1	407			209	112	55 curved shells
	10		2	401					
	10		3	393					
	10		4	402					
	10		5	408					
21	20		1	382			164	0	
	20		2	406					
	20		3	387					
	20		4	389					
	20		5	381					
40	40		1	409			96	0	
	40		2	394					
	40		3	380					
	40		4	404					
	40		5	385					

QC: TD

Analyst: AV QA: [illegible]

Water Quality for Bivalve Development

Client: POSD
Project ID: SIYB (TIE) 50% SIYB-1 RT
Test No. 23-01-0720

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/28/2023 1600

Test Conc. (µg/L Cu)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	15.5	15.3
	Salinity (ppt)	33.4	33.0	33.2
	pH (units)	7.86	7.57	7.66
	DO (mg/L)	8.0	8.5	8.4
2.5 (50% SIYB 1)	Temp. (°C)	15.8	15.2	15.3
	Salinity (ppt)	33.5	33.0	33.2
	pH (units)	7.91	7.69	7.71
	DO (mg/L)	8.1	8.7	8.5
5 (50% SIYB 1)	Temp. (°C)	15.8	15.2	15.3
	Salinity (ppt)	33.6	33.1	33.3
	pH (units)	7.91	7.73	7.75
	DO (mg/L)	8.2	8.6	8.5
10 (50% SIYB 1)	Temp. (°C)	15.8	15.3	15.4
	Salinity (ppt)	33.5	33.2	33.3
	pH (units)	7.90	7.74	7.75
	DO (mg/L)	8.2	8.7	8.6
20 (50% SIYB 1)	Temp. (°C)	15.8	15.4	15.4
	Salinity (ppt)	33.4	33.1	33.4
	pH (units)	7.89	7.73	7.74
	DO (mg/L)	8.2	8.5	8.5
40 (50% SIYB 1)	Temp. (°C)	15.8	15.4	15.4
	Salinity (ppt)	33.3	32.7	33.2
	pH (units)	7.88	7.73	7.74
	DO (mg/L)	~~33.3~~ HK 8.2	8.7	8.5
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	HK	RV	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

QC Check: AG 3/22/23
Final Review: JE 3/31/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID: 1/26/23 Mission Bay Collection
Test Type: 48hr Bivalve Development

Test Date: 1/26/2023
Analyst: AG

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts **# per ~~100~~ 20 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184
X = 183

QA Review: AG 2/9/23

Final Review: SC 3/9/23

CETIS Summary Report

Bivalve Larval Survival and Development Test

WSP ~~Wood E~~&IS

Batch ID:	17-5344-3019	Test Type:	Development-Survival	Analyst:	
Start Date:	26 Jan-23 1730	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Diluted Natural Seawater
Ending Date:	28 Jan-23 1600	Species:	Mytilis galloprovincialis	Brine:	Not Applicable
Test Length:	48h	Taxon:		Source:	Field Collected Age:

Sample ID:	01-3858-4478	Code:	230123mgrd	Project:	SIYB-TMDL Monitoring
Sample Date:	26 Jan-23	Material:	Total Copper	Source:	Reference Toxicant
Receipt Date:	26 Jan-23	CAS (PC):		Station:	
Sample Age:	---	Client:	Internal		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
05-5097-2236	Combined Proportion Norma	Dunnett Multiple Comparison Test	✓	5	10	7.071	21.3%	1
05-1195-9949	Proportion Normal	Steel Many-One Rank Sum Test	✓	5	10	7.071	16.8%	1
04-7549-6049	Survival Rate	Dunnett Multiple Comparison Test		20	40	28.28	8.37%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
07-0010-2705	Combined Proportion Norma	Spearman-Kärber		EC50	7.734	7.577	7.893	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
05-1195-9949	Proportion Normal	Control Resp	0.9051	0.9	<<	Yes	Passes Criteria
04-7549-6049	Survival Rate	Control Resp	0.9508	0.5	<<	Yes	Passes Criteria
05-5097-2236	Combined Proportion Norma	PMSD	0.2126	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8614	0.7879	0.9348	0.7760	0.9189	0.0265	0.0591	6.87%	0.00%
2.5		5	0.8671	0.7970	0.9372	0.7705	0.9130	0.0253	0.0565	6.51%	-0.66%
5		5	0.8155	0.7269	0.9042	0.7104	0.9043	0.0319	0.0714	8.75%	5.32%
10		5	0.1566	-0.0845	0.3977	0.0000	0.4550	0.0868	0.1942	124.01%	81.82%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9051	0.8713	0.9390	0.8659	0.9318	0.0122	0.0273	3.02%	0.00%
2.5		5	0.8829	0.8519	0.9138	0.8494	0.9130	0.0112	0.0249	2.82%	2.46%
5		5	0.8588	0.8100	0.9077	0.8075	0.9043	0.0176	0.0393	4.58%	5.12%
10		5	0.1575	-0.0827	0.3977	0.0000	0.4550	0.0865	0.1935	122.85%	82.60%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9508	0.9017	1.0000	0.8962	1.0000	0.0177	0.0396	4.16%	0.00%
2.5		5	0.9814	0.9298	1.0330	0.9071	1.0000	0.0186	0.0415	4.23%	-3.22%
5		5	0.9486	0.8812	1.0160	0.8798	1.0000	0.0243	0.0543	5.73%	0.23%
10		5	0.9607	0.9109	1.0100	0.9126	1.0000	0.0179	0.0400	4.17%	-1.03%
20		5	0.9421	0.9178	0.9664	0.9290	0.9727	0.0087	0.0196	2.08%	0.92%
40		5	0.1388	0.0758	0.2018	0.0820	0.1913	0.0227	0.0508	36.57%	85.40%

Combined Proportion Normal Detail MD5: 0D7D7E46D0A7D6931FF9C7C14F7CBE32

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8962	0.8251	0.7760	0.8907	0.9189
2.5		0.9130	0.8913	0.8667	0.8939	0.7705
5		0.8033	0.9043	0.8087	0.7104	0.8510
10		0.4550	0.2513	0.0492	0.0273	0.0000
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Proportion Normal Detail MD5: 8833C98F08C9DE26800BA2DC6AB5FF0E

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9318	0.8882	0.8659	0.9209	0.9189
2.5		0.9130	0.8913	0.8667	0.8939	0.8494
5		0.8400	0.9043	0.8916	0.8075	0.8510
10		0.4550	0.2513	0.0511	0.0299	0.0000
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail MD5: 50C087EE7F2484A9ED642935CB82431C

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9617	0.9290	0.8962	0.9672	1.0000
2.5		1.0000	1.0000	1.0000	1.0000	0.9071
5		0.9563	1.0000	0.9071	0.8798	1.0000
10		1.0000	1.0000	0.9617	0.9126	0.9290
20		0.9508	0.9290	0.9290	0.9290	0.9727
40		0.1421	0.0820	0.1858	0.0929	0.1913

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/183	151/183	142/183	163/183	170/185
2.5		168/184	164/184	169/195	177/198	141/183
5		147/183	170/188	148/183	130/183	177/208
10		86/189	48/191	9/183	5/183	0/183
20		0/183	0/183	0/183	0/183	0/183
40		0/183	0/183	0/183	0/183	0/183

Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/176	151/170	142/164	163/177	170/185
2.5		168/184	164/184	169/195	177/198	141/166
5		147/175	170/188	148/166	130/161	177/208
10		86/189	48/191	9/176	5/167	0/170
20		0/174	0/170	0/170	0/170	0/178
40		0/26	0/15	0/34	0/17	0/35

Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	176/183	170/183	164/183	177/183	183/183
2.5		183/183	183/183	183/183	183/183	166/183
5		175/183	183/183	166/183	161/183	183/183
10		183/183	183/183	176/183	167/183	170/183
20		174/183	170/183	170/183	170/183	178/183
40		26/183	15/183	34/183	17/183	35/183

CETIS Analytical Report

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	05-5097-2236	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:35	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	0D7D7E46D0A7D6931FF9C7C14F7CBE32	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	5	10	7.071	---	0.1831	21.26%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	8	-0.07405	2.227	0.2275	CDF	0.7758	Non-Significant Effect
		5	8	0.613	2.227	0.2275	CDF	0.4947	Non-Significant Effect
		10*	8	8.387	2.227	0.2275	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.65059	0.883529	3	33.87	<1.0E-05	Significant Effect
Error	0.417401	0.0260876	16			
Total	3.06799		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	9.827	11.34	0.0201	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9475	0.866	0.3301	Normal Distribution

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8614	0.7879	0.9348	0.8907	0.7760	0.9189	0.0265	6.87%	0.00%
2.5		5	0.8671	0.7970	0.9372	0.8913	0.7705	0.9130	0.0253	6.51%	-0.66%
5		5	0.8155	0.7269	0.9042	0.8087	0.7104	0.9043	0.0319	8.75%	5.32%
10		5	0.1566	0.0000	0.3977	0.0492	0.0000	0.4550	0.0868	124.01%	81.82%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.1950	1.0910	1.2990	1.2340	1.0780	1.2820	0.0376	7.03%	0.00%
2.5		5	1.2030	1.1060	1.3000	1.2350	1.0710	1.2710	0.0349	6.49%	-0.63%
5		5	1.1330	1.0170	1.2480	1.1180	1.0030	1.2560	0.0416	8.21%	5.24%
10		5	0.3384	-0.0183	0.6952	0.2236	0.0370	0.7404	0.1285	84.89%	71.68%
20		5	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0000	0.00%	96.91%
40		5	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0000	0.00%	96.91%

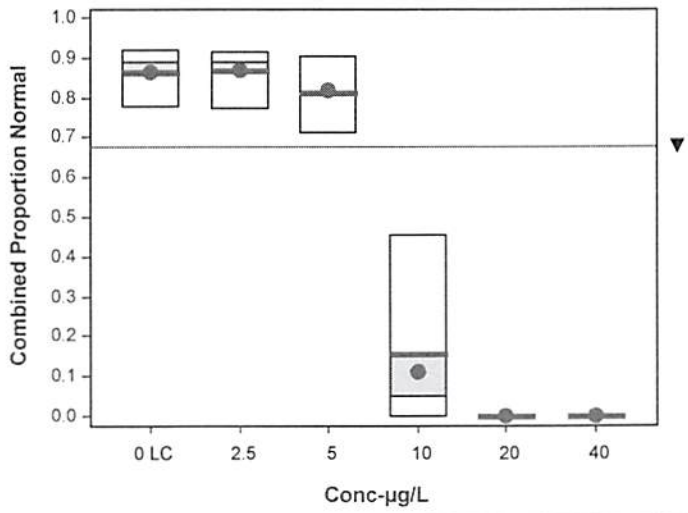
Combined Proportion Normal Binomials

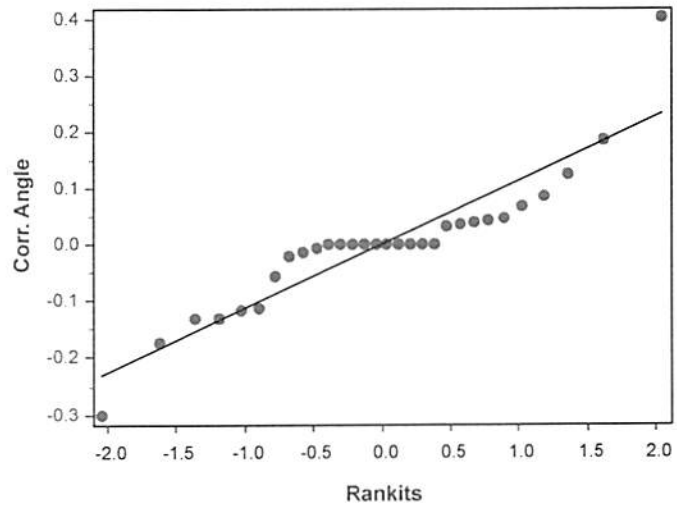
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/183	151/183	142/183	163/183	170/185
2.5		168/184	164/184	169/195	177/198	141/183
5		147/183	170/188	148/183	130/183	177/208
10		86/189	48/191	9/183	5/183	0/183
20		0/183	0/183	0/183	0/183	0/183
40		0/183	0/183	0/183	0/183	0/183

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	05-5097-2236	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:35	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	0D7D7E46D0A7D6931FF9C7C14F7CBE32	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test

Wood E&IS

Analysis ID:	05-1195-9949	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:36	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	8833C98F08C9DE26800BA2DC6AB5FF0E	**Editor ID:**	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	5	10	7.071	---	0.152	16.80%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	8	22	17	0	CDF	0.2647	Non-Significant Effect
		5	8	19	17	0	CDF	0.0921	Non-Significant Effect
		10*	8	15	17	0	CDF	0.0123	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.93399	0.977998	3	44.33	<1.0E-05	Significant Effect
Error	0.352988	0.0220617	16			
Total	3.28698		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	20.49	11.34	0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8878	0.866	0.0245	Normal Distribution

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9051	0.8713	0.9390	0.9189	0.8659	0.9318	0.0122	3.02%	0.00%
2.5		5	0.8829	0.8519	0.9138	0.8913	0.8494	0.9130	0.0112	2.82%	2.46%
5		5	0.8588	0.8100	0.9077	0.8510	0.8075	0.9043	0.0176	4.58%	5.12%
10		5	0.1575	0.0000	0.3977	0.0511	0.0000	0.4550	0.0865	122.85%	82.60%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.2600	1.2030	1.3170	1.2820	1.1960	1.3070	0.0204	3.63%	0.00%
2.5		5	1.2230	1.1750	1.2710	1.2350	1.1720	1.2710	0.0173	3.17%	2.94%
5		5	1.1880	1.1180	1.2590	1.1740	1.1170	1.2560	0.0255	4.80%	5.69%
10		5	0.3412	-0.0131	0.6954	0.2281	0.0384	0.7404	0.1276	83.63%	72.92%
20		5	0.0381	0.0376	0.0386	0.0384	0.0375	0.0384	0.0002	1.03%	96.98%
40		5	0.1039	0.0784	0.1295	0.0982	0.0846	0.1295	0.0092	19.81%	91.75%

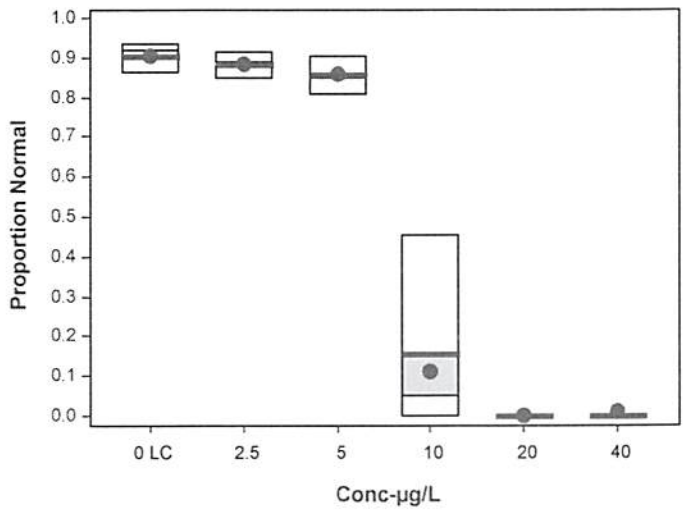
Proportion Normal Binomials

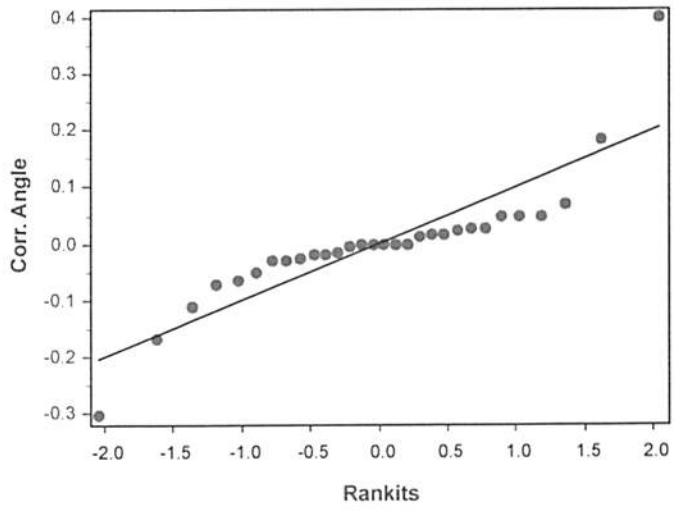
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/176	151/170	142/164	163/177	170/185
2.5		168/184	164/184	169/195	177/198	141/166
5		147/175	170/188	148/166	130/161	177/208
10		86/189	48/191	9/176	5/167	0/170
20		0/174	0/170	0/170	0/170	0/178
40		0/26	0/15	0/34	0/17	0/35

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	05-1195-9949	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:36	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	8833C98F08C9DE26800BA2DC6AB5FF0E	**Editor ID:**	002-883-387-8

Graphics





Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	04-7549-6049	Endpoint:	Survival Rate	CETIS Version:	CETISv2.1.3
Analyzed:	09 Feb-23 15:36	Analysis:	Parametric-Control vs Treatments	Status Level:	1
Edit Date:	09 Feb-23 15:31	MD5 Hash:	50C087EE7F2484A9ED642935CB82431C	Editor ID:	002-883-387-8

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corrected)	C > T	20	40	28.28	---	0.07956	8.37%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	8	-1.6	2.362	0.1642	CDF	0.9973	Non-Significant Effect
		5	8	-0.1881	2.362	0.1642	CDF	0.8829	Non-Significant Effect
		10	8	-0.4976	2.362	0.1642	CDF	0.9397	Non-Significant Effect
		20	8	0.5329	2.362	0.1642	CDF	0.6325	Non-Significant Effect
		40*	8	14.25	2.362	0.1642	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.35713	0.871427	5	72.09	<1.0E-05	Significant Effect
Error	0.290128	0.0120887	24			
Total	4.64726		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	5.252	15.09	0.3859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9741	0.9031	0.6550	Normal Distribution

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9508	0.9017	1.0000	0.9617	0.8962	1.0000	0.0177	4.16%	0.00%
2.5		5	0.9814	0.9298	1.0000	1.0000	0.9071	1.0000	0.0186	4.23%	-3.22%
5		5	0.9486	0.8812	1.0000	0.9563	0.8798	1.0000	0.0243	5.73%	0.23%
10		5	0.9607	0.9109	1.0000	0.9617	0.9126	1.0000	0.0179	4.17%	-1.03%
20		5	0.9421	0.9178	0.9664	0.9290	0.9290	0.9727	0.0087	2.08%	0.92%
40		5	0.1388	0.0758	0.2018	0.1421	0.0820	0.1913	0.0227	36.57%	85.40%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.3680	1.2320	1.5040	1.3740	1.2430	1.5340	0.0491	8.02%	0.00%
2.5		5	1.4790	1.3280	1.6310	1.5340	1.2610	1.5340	0.0546	8.25%	-8.13%
5		5	1.3810	1.1960	1.5660	1.3600	1.2170	1.5340	0.0665	10.77%	-0.96%
10		5	1.4030	1.2470	1.5580	1.3740	1.2710	1.5340	0.0561	8.95%	-2.53%
20		5	1.3310	1.2740	1.3880	1.3010	1.3010	1.4050	0.0205	3.44%	2.71%
40		5	0.3770	0.2837	0.4702	0.3865	0.2904	0.4526	0.0336	19.92%	72.44%

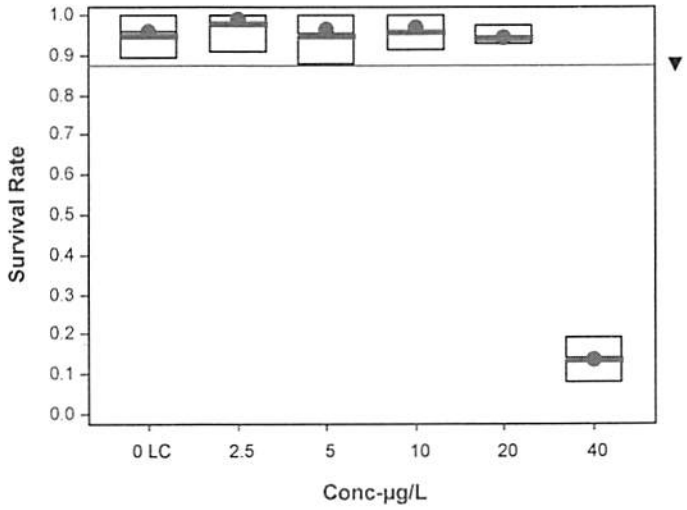
Survival Rate Binomials

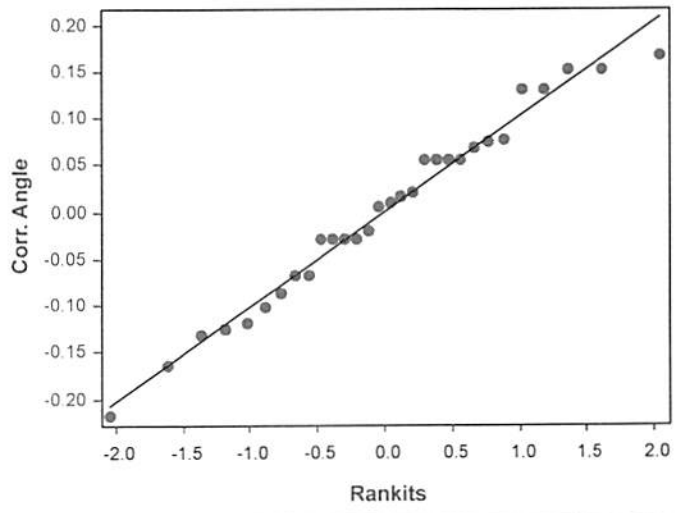
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	176/183	170/183	164/183	177/183	183/183
2.5		183/183	183/183	183/183	183/183	166/183
5		175/183	183/183	166/183	161/183	183/183
10		183/183	183/183	176/183	167/183	170/183
20		174/183	170/183	170/183	170/183	178/183
40		26/183	15/183	34/183	17/183	35/183

Bivalve Larval Survival and Development Test — **Wood E&IS**

Analysis ID:	04-7549-6049	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	50C087EE7F2484A9ED642935CB82431C	**Editor ID:**	002-883-387-8

Graphics





CETIS Analytical Report

Test Code/ID: 230123mgrd / 03-3591-1122

Bivalve Larval Survival and Development Test — Wood E&IS

Analysis ID:	07-0010-2705	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv2.1.3
Analyzed:	09 Feb-23 15:35	**Analysis:**	Untrimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	09 Feb-23 15:31	**MD5 Hash:**	0D7D7E46D0A7D6931FF9C7C14F7CBE32	**Editor ID:**	002-883-387-8

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.1385	0.00%	0.8884	0.004433	7.734	7.577	7.893

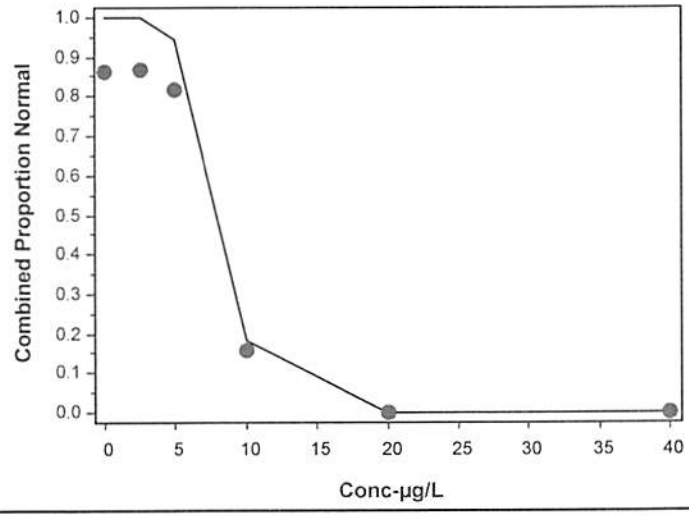
Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	ΣA/ΣB	Mean	%Effect
0	LC	5	0.8614	0.8907	0.7760	0.9189	6.87%	0.00%	790/917	0.8645	0.00%
2.5		5	0.8671	0.8913	0.7705	0.9130	6.51%	-0.66%	819/944	0.8645	0.00%
5		5	0.8155	0.8087	0.7104	0.9043	8.75%	5.32%	772/945	0.8169	5.51%
10		5	0.1566	0.0492	0.0000	0.4550	124.01%	81.82%	148/929	0.1593	81.57%
20		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/915	0.0000	100.00%
40		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/915	0.0000	100.00%

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	164/183	151/183	142/183	163/183	170/185
2.5		168/184	164/184	169/195	177/198	141/183
5		147/183	170/188	148/183	130/183	177/208
10		86/189	48/191	9/183	5/183	0/183
20		0/183	0/183	0/183	0/183	0/183
40		0/183	0/183	0/183	0/183	0/183

Graphics

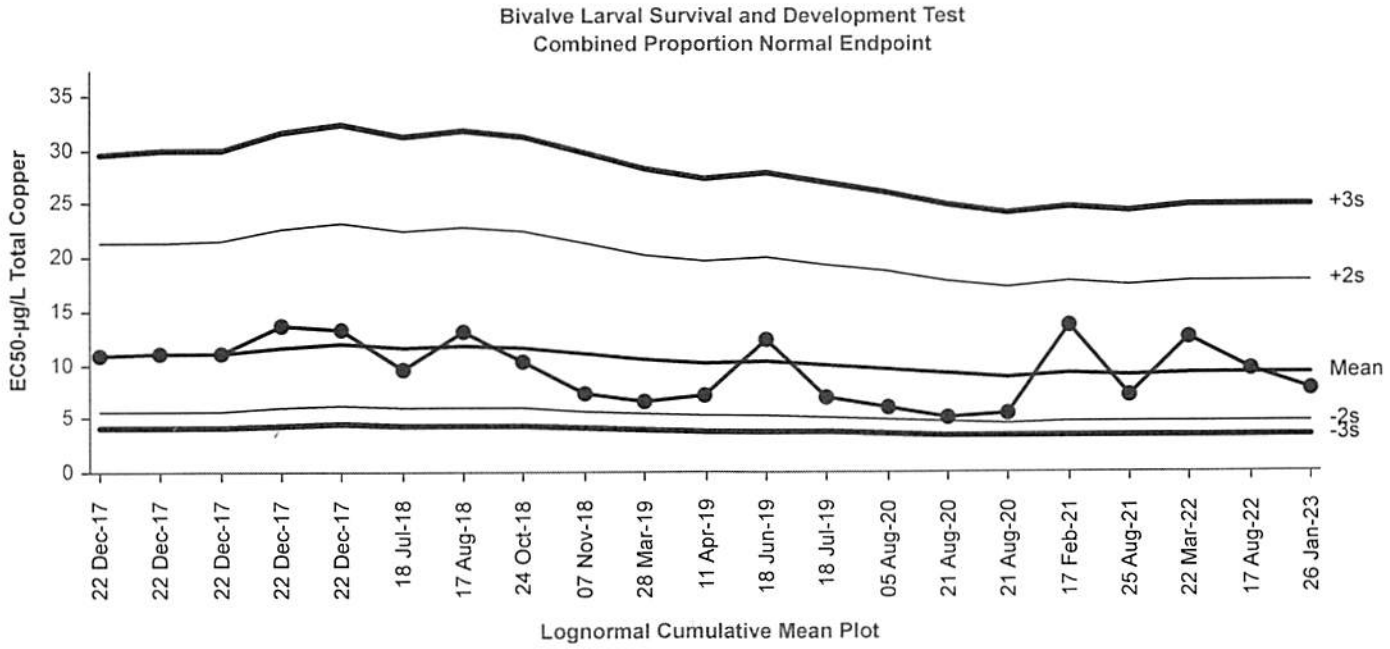


CETIS QC Plot

Report Date: 09 Feb-23 15:44 (1 of 1)

Bivalve Larval Survival and Development Test — All Matching Labs

Test Type:	Development-Survival	**Organism:**	Mytilis galloprovincialis	**Material:**	Total Copper
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	9.171	**Count:**	20	**-2s Warning Limit:**	4.72	**-3s Action Limit:**	3.38
Sigma:	NA	**CV:**	34.20%	**+2s Warning Limit:**	17.8	**+3s Action Limit:**	24.9

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	Dec	22	15:00	10.95	1.776	0.5325			13-8076-0092	04-7666-8867	Wood E&IS
2			22	15:00	11.1	1.934	0.5757			18-9173-1279	00-8804-3805	Wood E&IS
3			22	15:00	11.13	1.958	0.5822			19-1537-3013	20-7428-0259	Wood E&IS
4			22	15:10	13.69	4.517	1.205			05-2148-4604	14-2190-9809	Wood E&IS
5			22	15:10	13.26	4.091	1.11			07-4924-1298	02-9536-6591	Wood E&IS
6	2018	Jul	18	12:30	9.593	0.4228	0.1356			17-4700-2672	19-1834-7581	Wood E&IS
7		Aug	17	18:15	13.11	3.937	1.074			06-6531-4070	03-3159-5721	Wood E&IS
8		Oct	24	14:25	10.37	1.203	0.3707			10-5049-1350	21-2167-7967	Wood E&IS
9		Nov	7	14:40	7.288	-1.882	-0.6911			21-2560-8966	08-1725-7308	Wood E&IS
10	2019	Mar	28	15:00	6.57	-2.6	-1.003			01-1205-3490	09-9916-0601	Wood E&IS
11		Apr	11	15:05	7.2	-1.97	-0.7276			09-5126-5022	11-0264-5925	Wood E&IS
12		Jun	18	15:35	12.33	3.159	0.8905			20-1050-4622	12-9168-6963	Wood E&IS
13		Jul	18	14:55	7	-2.171	-0.8125			14-0843-5203	16-2395-2147	Wood E&IS
14	2020	Aug	5	16:15	5.97	-3.2	-1.291			01-5363-1852	03-9719-1127	Wood E&IS
15			21	17:45	4.994	-4.176	-1.828			02-6167-5910	09-0147-8078	Wood E&IS
16			21	17:45	5.371	-3.799	-1.609			09-7758-0702	07-5383-0657	Wood E&IS
17	2021	Feb	17	16:05	13.75	4.58	1.219			02-0888-9810	19-5282-1839	Wood E&IS
18		Aug	25	16:50	7.088	-2.083	-0.775			01-4286-8892	09-6353-7527	Wood E&IS
19	2022	Mar	22	16:15	12.55	3.376	0.943			07-3402-8050	17-5105-1124	Wood E&IS
20		Aug	17	15:45	9.552	0.3814	0.1226			19-5652-2899	07-5236-6337	Wood E&IS
21	2023	Jan	26	0:00	7.734	-1.437	-0.5127			03-3591-1122	07-0010-2705	Wood E&IS

Analyst: AG QA: JC 3/6/1

CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:19 (p 1 of 1)
Test Code/ID: 230123mgrd / 03-3591-1122

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	230123mgrd
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	26 Jan-23	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			1			170	0	AG 2/8/23
			2			35	0	
			3			191	48	
			4			34	0	
			5			167	5	
			6			164	142	
			7			185	170	
			8			176	9	
			9			26	0	
			10			170	151	
			11			198	177	
			12			184	168	
			13			177	163	
			14			176	164	
			15			170	0	
			16			188	170	
			17			175	147	
			18			166	141	
			19			174	0	
			20			189	86	
			21			208	177	
			22			17	0	
			23			195	169	
			24			170	0	
			25			166	148	
			26			15	0	
			27			178	0	
			28			161	130	
			29			184	164	
			30			170	0	

Analyst: AG QA: JC

CETIS Test Data Worksheet

Report Date: 20 Jan-23 13:19 (p 1 of 1)
Test Code/ID: 230123mgrd / 03-3591-1122

Bivalve Larval Survival and Development Test — Wood E&IS

Start Date:	26 Jan-23	**Species:**	Mytilis galloprovincialis	**Sample Code:**	230123mgrd
End Date:	28 Jan-23	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	26 Jan-23	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	14					
0	LC	2	10			143	130	*recount after settle
0	LC	3	6					
0	LC	4	13					
0	LC	5	7					
2.5		1	12					
2.5		2	29					
2.5		3	23					
2.5		4	11					
2.5		5	18					
5		1	17					
5		2	16					
5		3	25					
5		4	28					
5		5	21					
10		1	20					
10		2	3					
10		3	8					
10		4	5					
10		5	15					
20		1	19					
20		2	24					
20		3	1					
20		4	30					
20		5	27					
40		1	9					
40		2	26					
40		3	4					
40		4	22					
40		5	2					

QC: N

Analyst: AG QA: JC

Water Quality for Bivalve Development

Client: Internal
Project ID: Cu Reftox
Test No. 230126mgrd

Test Species: *M. galloprovincialis*
Start Date/Time: 1/26/2023 1730
End Date/Time: 1/~~30~~28/2023 1600

Test Conc. (µg/L Cu)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.5	15.5	15.4
	Salinity (ppt)	33.4	33.3	33.5
	pH (units)	7.80	7.64	7.70
	DO (mg/L)	8.1	8.4	8.4
2.5	Temp. (°C)	15.7	15.3	15.4
	Salinity (ppt)	33.4	33.4	33.6
	pH (units)	7.86	7.70	7.74
	DO (mg/L)	8.1	8.5	8.4
5	Temp. (°C)	15.6	15.3	15.3
	Salinity (ppt)	33.6	33.5	33.6
	pH (units)	7.87	7.73	7.75
	DO (mg/L)	8.2	8.5	8.5
10	Temp. (°C)	15.7	15.3	15.3
	Salinity (ppt)	33.4	33.5	33.6
	pH (units)	7.87	7.75	7.77
	DO (mg/L)	8.2	8.5	8.5
20	Temp. (°C)	15.6	15.3	15.3
	Salinity (ppt)	33.4	33.3	33.5
	pH (units)	7.86	7.77	7.79
	DO (mg/L)	8.2	8.5	8.4
40	Temp. (°C)	15.6	15.3	15.3
	Salinity (ppt)	33.5	33.4	33.6
	pH (units)	7.86	7.79	7.80
	DO (mg/L)	8.2	8.6	8.5
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	HK	RV	AG

Source of Animals: Mission Bay
Date Received: 1/26/23

Comments:

QC Check: AG 2/9/23
Final Review: SC 3/9/23

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 1/26/2023

Batch ID: 1/26/23 Mission Bay Collection **Analyst:** AG

Test Type: 48hr Bivalve Development

Task	
Spawning Induction	1430
Spawning Begins	1510
# Males/# Females	5 | 5
Spawn Condition	good
Fertilization Initiated	1600
Fertilzation End/Eggs Rinsed	1620/1640
Embryo Counts	1700
Test Initiation	1730

Embryo Density Counts # per ~~100~~ 20 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2	500						
Stock 3	500	21	19	11	13	16	800

Cell Division:

	% Divided
Stock 1	
Stock 2	90
Stock 3	98

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density 800 / 500 **Dil Factor** 1.6

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: T01 = 195, T02 = ~~175~~ 168, T03 = 175, T04 = 192, T05 = 184

~~X~~ = 183

QA Review: AG 2/9/23 **Final Review:** JC 3/9/23

APPENDIX C

Sample Receipt Information

& Chain of Custody Form

Sample Check-In: Effluent/Water

WSP Environmental Laboratory
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: POSD - SIYB
Project Name: 2023 SIYB TMDL Winter
Test ID Numbers: 23-01-043 to -0516

Sample ID:	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF-1	
Sample Number:	23-W026	23-W027	23-W028	23-W029	23-W030	23-W031	23-W032	
Collection Date/Time:	1/25/23 1400	1/25/23 1300	1/25/23 1200	1/25/23 1100	1/25/23 1000	1/25/23 0900	1/25/23 0800	
Receipt Date/Time:	1/25/23 1700	1/25/23 1700	1/25/23 1700	1/25/23 1240	1/25/23 1240	1/25/23 1240	1/25/23 1240	
Total Sample Volume (L):	~~30~~ 14L RV	14L	14L	14L	14L	14L	14L	
Receipt Temp (°C):	15.7	15.7	14.9	17.8	15.8	16.1	15.6	
Appropriate Temp (Y/N)[1]:	Y	Y	Y	Y	Y	Y	Y	
pH (units):	7.83	7.83	7.92	7.92	7.92	7.88	7.90	
DO (mg/L):	~~RV~~ 9.1	8.5	8.8	8.4	8.2	8.1	7.8	
Conductivity (µS/cm)[2]:	51	~~RV~~ 51	51	50	50	50	49	
Salinity (ppt):	32.9	32.8	32.7	32.8	32.7	32.6	~~RV 7.8~~ 32.3	
Alkalinity (mg/L):	109	112	111	108	~~RV 111~~ 110	114	107	
Hardness (mg/L)[2]:	—	—	—	—	—	—	—	
Total Chlorine (mg/L)[3]:	0.03	<0.02	NR	0.02	<0.02	0.06	0.02	
Free Chlorine (mg/L)[3]:	—	—	—	—	—	—	—	
Technician Initials:	RV	RV	RV	RV	RV	RV	RV	

Notes:

[1] Temperature should be 0 - 6°C if received > 24 hours past collection

[2] Only measured on samples with less than 3 ppt salinity

[3] If total chlorine is above 0.10 mg/L, the free chlorine will be measured

[4] Debris, odor, and color is described only if observed in the sample

Sample Descriptions[4]:
All Samples: clear & colorless

Test Organism: M. Berrylling Dilution Water: Nat-SW, Art-SW, RW, DMW, Other_____ Salinity_____
M. galloprovincialis
Additional Control: ~~ASI~~ RV Salinity_____

Initial QC: JF 2/9/23
Final Review: RV 3/7/23

WSP Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Client/Send Report To:

Company: WSP USA E & I, Inc.
Address: 9177 Sky Park Court
San Diego, CA 92123
Contact/PM: Marisa Swiderski
Phone Number: (808) 772-8740
Email Address: marisa.swiderski@wsp.com

Project Information (if needed):

Project Name: 2023 SIYB TMDL Winter Monitoring
Project No.: 2015100118.0007
PO Number: N/A

Personal Cooler Shipped:
Return Requested: YES_____ NO_____.

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Analysis Requested: Mb-a	Mg-dv	Mg-dv TIE (SOW attached)					Receipt Temp (°C)
~~MS SIYB-REF-1~~			~~14L~~	~~Grab~~		~~X~~	~~X~~						
~~MS SIYB-6~~			~~14L~~	~~Grab~~		~~X~~	~~X~~						
~~MS SIYB-5~~			~~14L~~	~~Grab~~		~~X~~	~~X~~						
~~MS SIYB-4~~			~~14L~~	~~Grab~~		~~X~~	~~X~~						
SIYB-3	01/25/2023	1200	14L	Grab		X	X						14.9
SIYB-2	"	1300	14L	Grab		X	X						15.7
SIYB-1	"	1400	30L	Grab		X	X	X					15.7

Samples Collected By:
MS/KB

Additional Comments: Concurrent ref. tox. test for all species (copper concentrations of 0, 25, 50, 100, 200, 400 ug/L for Menidia and 0, 2.5, 5.0, 10, 20 and 40 µg/L for bivalve).
Menidia tests at 3 concentrations (25, 50, 100%) and a control; 6 reps/sample.
Bivalve tests at 5 concentrations (6.25, 12.5, 25, 50, and 100%), and a control; and a 100% filtered undiluted sample (Look for Noctiluca sp.); 5 reps/sample.

Samples Shipped via:

Condition Upon Receipt:

Relinquished/Shipped By:	Received By:	Relinquished By:	Received By:
Signature: Marisa Swiderski	Signature: [signature]	Signature:	Signature:
Print Name: Marisa Swiderski	Print Name: Alex Gabriel	Print Name:	Print Name:
Date/Time: 01/25/2023 1700	Date/Time: 1/25/23 1700	Date/Time:	Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

APPENDIX D

TIE Chemistry Results

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	3A27061	**Report Date:**	3/13/2023
		Received Date:	1/27/2023
Project:	Shelter Island Yacht Basin TIE (Port of San Diego)	**Turnaround Time:**	Normal
		Phones:	(858) 278-3600
		Fax:	(858) 278-5300
Attn:	Chris Stransky	**P.O. #:**	
Client:	WSP USA E&I Inc. - San Diego 9177 Sky Park Court, Ste A San Diego, CA 92123	**Billing Code:**	

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • ISO17025 ANAB #L2457.01 • LACSD #10143

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Chris Stransky,

Enclosed are the results of analyses for samples received 1/27/23 with the Chain-of-Custody document. The samples were received in good condition, at 3.3 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TIE (Port of San Diego)

Project Manager: Chris Stransky

Reported: 03/13/2023 16:26

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SIYB-TIE-LC	Chris Stransky	3A27061-01	Water	01/26/23 14:55	
SIYB-TIE-Filt-001	Chris Stransky	3A27061-02	Water	01/26/23 15:10	
SIYB-TIE-EDTA10-001	Chris Stransky	3A27061-03	Water	01/26/23 14:30	
SIYB-TIE-EDTA25-001	Chris Stransky	3A27061-04	Water	01/26/23 14:35	
SIYB-TIE-RW-100-A	Chris Stransky	3A27061-05	Water	01/26/23 15:40	
SIYB-TIE-RW-100-B	Chris Stransky	3A27061-06	Water	01/26/23 15:45	
SIYB-TIE-RW-100-C	Chris Stransky	3A27061-07	Water	01/26/23 15:50	
SIYB-TIE-RW-100-D	Chris Stransky	3A27061-08	Water	01/26/23 15:55	
SIYB-TIE-RW-100-E	Chris Stransky	3A27061-09	Water	01/26/23 16:00	
SIYB-TIE-RW-100-F	Chris Stransky	3A27061-10	Water	01/26/23 16:05	
SIYB-TIE-RW-50-A	Chris Stransky	3A27061-11	Water	01/26/23 14:00	
SIYB-TIE-RW-50-B	Chris Stransky	3A27061-12	Water	01/26/23 14:05	
SIYB-TIE-RW-50-C	Chris Stransky	3A27061-13	Water	01/26/23 14:10	
SIYB-TIE-RW-50-D	Chris Stransky	3A27061-14	Water	01/26/23 14:15	
SIYB-TIE-RW-50-E	Chris Stransky	3A27061-15	Water	01/26/23 14:20	
SIYB-TIE-RW-50-F	Chris Stransky	3A27061-16	Water	01/26/23 14:25	
SIYB-RT-A	Chris Stransky	3A27061-17	Water	01/26/23 11:05	
SIYB-RT-B	Chris Stransky	3A27061-18	Water	01/26/23 11:10	
SIYB-RT-C	Chris Stransky	3A27061-19	Water	01/26/23 11:15	
SIYB-RT-D	Chris Stransky	3A27061-20	Water	01/26/23 11:20	
SIYB-RT-E	Chris Stransky	3A27061-21	Water	01/26/23 11:25	
SIYB-RT-F	Chris Stransky	3A27061-22	Water	01/26/23 11:30	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TIE (Port of San Diego)

Project Manager: Chris Stransky

Reported: 03/13/2023 16:26

Sample Results

Sample: SIYB-TIE-LC — Sampled: 01/26/23 14:55 by Chris Stransky

3A27061-01 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 5310B			**Instr:** TOC02				
Batch ID: W3B0440 — **Preparation:** _NONE (TOC/TOX)			**Prepared:** 02/06/23 13:21				**Analyst:** ajc
Dissolved Organic Carbon	**1.1**	0.15	0.30	mg/l	1	02/07/23	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 — **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**1.1**	0.0038	0.010	ug/l	1	02/16/23	

Sample Results

Sample: SIYB-TIE-Filt-001 — Sampled: 01/26/23 15:10 by Chris Stransky

3A27061-02 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 — **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**7.0**	0.0038	0.010	ug/l	1	02/16/23	

Sample Results

Sample: SIYB-TIE-EDTA10-001 — Sampled: 01/26/23 14:30 by Chris Stransky

3A27061-03 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 — **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**0.25**	0.0038	0.010	ug/l	1	02/16/23	

Sample Results

Sample: SIYB-TIE-EDTA25-001 — Sampled: 01/26/23 14:35 by Chris Stransky

3A27061-04 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 — **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**0.23**	0.0038	0.010	ug/l	1	02/17/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TIE (Port of San Diego)

Project Manager: Chris Stransky

Reported: 03/13/2023 16:26

Sample Results (Continued)

Sample: SIYB-TIE-RW-100-A — Sampled: 01/26/23 15:40 by Chris Stransky

3A27061-05 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**0.68**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-100-B — Sampled: 01/26/23 15:45 by Chris Stransky

3A27061-06 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**4.1**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-100-C — Sampled: 01/26/23 15:50 by Chris Stransky

3A27061-07 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**6.1**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-100-D — Sampled: 01/26/23 15:55 by Chris Stransky

3A27061-08 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**11**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-100-E — Sampled: 01/26/23 16:00 by Chris Stransky

3A27061-09 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:26				**Analyst:** ALN
Copper, Dissolved	**21**	0.0038	0.010	ug/l	1	02/17/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TIE (Port of San Diego)

Project Manager: Chris Stransky

Reported: 03/13/2023 16:26

Sample Results (Continued)

Sample: SIYB-TIE-RW-100-F — Sampled: 01/26/23 16:05 by Chris Stransky

3A27061-10 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1447	**Preparation:** EPA 1640#Preconcentration		**Prepared:** 02/16/23 12:26			**Analyst:** ALN	
Copper, Dissolved	**44**	0.019	0.050	ug/l	5	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-50-A — Sampled: 01/26/23 14:00 by Chris Stransky

3A27061-11 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448	**Preparation:** EPA 1640#Preconcentration		**Prepared:** 02/16/23 12:28			**Analyst:** ALN	
Copper, Dissolved	**0.74**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-50-B — Sampled: 01/26/23 14:05 by Chris Stransky

3A27061-12 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448	**Preparation:** EPA 1640#Preconcentration		**Prepared:** 02/16/23 12:28			**Analyst:** ALN	
Copper, Dissolved	**3.4**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-50-C — Sampled: 01/26/23 14:10 by Chris Stransky

3A27061-13 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448	**Preparation:** EPA 1640#Preconcentration		**Prepared:** 02/16/23 12:28			**Analyst:** ALN	
Copper, Dissolved	**5.6**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-50-D — Sampled: 01/26/23 14:15 by Chris Stransky

3A27061-14 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448	**Preparation:** EPA 1640#Preconcentration		**Prepared:** 02/16/23 12:28			**Analyst:** ALN	
Copper, Dissolved	**10**	0.0038	0.010	ug/l	1	02/17/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TIE (Port of San Diego)

Project Manager: Chris Stransky

Reported: 03/13/2023 16:26

Sample Results (Continued)

Sample: SIYB-TIE-RW-50-E — Sampled: 01/26/23 14:20 by Chris Stransky

3A27061-15 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:28				**Analyst:** ALN
Copper, Dissolved	**21**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-TIE-RW-50-F — Sampled: 01/26/23 14:25 by Chris Stransky

3A27061-16 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:28				**Analyst:** ALN
Copper, Dissolved	**40**	0.019	0.050	ug/l	5	02/17/23	

Sample Results (Continued)

Sample: SIYB-RT-A — Sampled: 01/26/23 11:05 by Chris Stransky

3A27061-17 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:28				**Analyst:** ALN
Copper, Dissolved	**0.71**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-RT-B — Sampled: 01/26/23 11:10 by Chris Stransky

3A27061-18 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:28				**Analyst:** ALN
Copper, Dissolved	**3.8**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-RT-C — Sampled: 01/26/23 11:15 by Chris Stransky

3A27061-19 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:28				**Analyst:** ALN
Copper, Dissolved	**7.0**	0.0038	0.010	ug/l	1	02/17/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TIE (Port of San Diego)

Project Manager: Chris Stransky

Reported: 03/13/2023 16:26

Sample Results (Continued)

Sample: SIYB-RT-D — Sampled: 01/26/23 11:20 by Chris Stransky

3A27061-20 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:28				**Analyst:** ALN
Copper, Dissolved	**12**	0.0038	0.010	ug/l	1	02/17/23	

Sample Results (Continued)

Sample: SIYB-RT-E — Sampled: 01/26/23 11:25 by Chris Stransky

3A27061-21 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:28				**Analyst:** ALN
Copper, Dissolved	**23**	0.019	0.050	ug/l	5	02/17/23	

Sample Results (Continued)

Sample: SIYB-RT-F — Sampled: 01/26/23 11:30 by Chris Stransky

3A27061-22 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640			**Instr:** ICPMS03				
Batch ID: W3B1448 **Preparation:** EPA 1640#Preconcentration			**Prepared:** 02/16/23 12:28				**Analyst:** ALN
Copper, Dissolved	**47**	0.019	0.050	ug/l	5	02/17/23	

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TIE (Port of San Diego)

Project Manager: Chris Stransky

Reported: 03/13/2023 16:26

Quality Control Results

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

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W3B0440 - SM 5310B											
Blank (W3B0440-BLK1)					**Prepared: 02/06/23 Analyzed: 02/07/23**						
Dissolved Organic Carbon	ND	0.15	0.30	mg/l							
Blank (W3B0440-BLK2)					**Prepared: 02/06/23 Analyzed: 02/07/23**						
Dissolved Organic Carbon	ND	0.15	0.30	mg/l							A-01
LCS (W3B0440-BS1)					**Prepared: 02/06/23 Analyzed: 02/07/23**						
Dissolved Organic Carbon	2.01	0.15	0.30	mg/l	2.00		100	74-120		20	
Matrix Spike (W3B0440-MS1)	**Source: 3A26102-09**				**Prepared: 02/06/23 Analyzed: 02/07/23**						
Dissolved Organic Carbon	3.39	0.15	0.30	mg/l	2.00	1.26	107	74-120		20	
Matrix Spike Dup (W3B0440-MSD1)	**Source: 3A26102-09**				**Prepared: 02/06/23 Analyzed: 02/07/23**						
Dissolved Organic Carbon	3.43	0.15	0.30	mg/l	2.00	1.26	109	74-120	1	20	

Quality Control Results

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W3B1447 - EPA 1640											
Blank (W3B1447-BLK1)					**Prepared & Analyzed: 02/16/23**						
Copper, Dissolved	0.00480	0.0038	0.010	ug/l							J
LCS (W3B1447-BS1)					**Prepared & Analyzed: 02/16/23**						
Copper, Dissolved	4.09	0.0038	0.010	ug/l	4.00		102	70-130		30	
Matrix Spike (W3B1447-MS1)	**Source: 3A27061-01**				**Prepared & Analyzed: 02/16/23**						
Copper, Dissolved	4.97	0.0038	0.010	ug/l	4.00	1.13	96	70-130		30	
Matrix Spike Dup (W3B1447-MSD1)	**Source: 3A27061-01**				**Prepared & Analyzed: 02/16/23**						
Copper, Dissolved	5.15	0.0038	0.010	ug/l	4.00	1.13	101	70-130	4	30	
Batch: W3B1448 - EPA 1640											
Blank (W3B1448-BLK1)					**Prepared: 02/16/23 Analyzed: 02/17/23**						
Copper, Dissolved	0.00856	0.0038	0.010	ug/l							J
LCS (W3B1448-BS1)					**Prepared: 02/16/23 Analyzed: 02/17/23**						
Copper, Dissolved	3.82	0.0038	0.010	ug/l	4.00		96	70-130		30	
Matrix Spike (W3B1448-MS1)	**Source: 3A27061-11**				**Prepared: 02/16/23 Analyzed: 02/17/23**						
Copper, Dissolved	4.67	0.0038	0.010	ug/l	4.00	0.744	98	70-130		30	
Matrix Spike (W3B1448-MS2)	**Source: 3A27061-22**				**Prepared: 02/16/23 Analyzed: 02/17/23**						
Copper, Dissolved	50.4	0.0038	0.010	ug/l	4.00	46.7	93	70-130		30	
Matrix Spike Dup (W3B1448-MSD1)	**Source: 3A27061-11**				**Prepared: 02/16/23 Analyzed: 02/17/23**						
Copper, Dissolved	4.57	0.0038	0.010	ug/l	4.00	0.744	96	70-130	2	30	
Matrix Spike Dup (W3B1448-MSD2)	**Source: 3A27061-22**				**Prepared: 02/16/23 Analyzed: 02/17/23**						
Copper, Dissolved	48.4	0.0038	0.010	ug/l	4.00	46.7	43	70-130	4	30	MS-02

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

WSP USA E&I Inc. - San Diego
9177 Sky Park Court, Ste A
San Diego, CA 92123

Project Number: Shelter Island Yacht Basin TIE (Port of San Diego)

Project Manager: Chris Stransky

Reported: 03/13/2023 16:26

Notes and Definitions

Item	Definition
A-01	filtered and acidified 01/25/2023
J	Estimated conc. detected <MRL and >MDL.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
%REC	Percent Recovery
Dil	Dilution
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Standard CHAIN OF CUSTODY RECORD

Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964
14859 Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

WECK WKO# 3A27001

CLIENT NAME: WSP USA Environment & Infrastructure Inc.	PROJECT: Shelter Island Yacht Basin TIE (Port of San Diego)
ADDRESS: 9177 Sky Park Court, San Diego, CA 92123	PHONE: 858-775-5547 FAX: EMAIL: chris.stransky@wsp.com, marisa.swiderski@wsp.com
PROJECT MANAGER: Chris Stransky	SAMPLER: Chris Stransky (CS); Marisa Swiderski (MS)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl_2 Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Dissolved Copper[1,2] (EPA1640)	Dissolved Organic Carbon[3] (SM5310B)
	01/26/2023	1455	SW	N	SIYB-TIE-LC	3	X	X
		1510	SW	N	SIYB-TIE-Filt-001	1	X	
		1430	SW	N	SIYB-TIE-EDTA10-001	1	X	
		1435	SW	N	SIYB-TIE-EDTA25-001	1	X	
		1540	SW	N	SIYB-TIE-RW-100-A	1	X	
		1545	SW	N	SIYB-TIE-RW-100-B	1	X	
		1550	SW	N	SIYB-TIE-RW-100-C	1	X	
		1555	SW	N	SIYB-TIE-RW-100-D	1	X	
		1600	SW	N	SIYB-TIE-RW-100-E	1	X	
		1605	SW	N	SIYB-TIE-RW-100-F	1	X	
		1400	SW	N	SIYB-TIE-RW-50-A	1	X	
		1405	SW	N	SIYB-TIE-RW-50-B	1	X	

RELINQUISHED BY: Hannah Kranz	DATE / TIME: 1/27/23 0839	RECEIVED BY:	DATE / TIME: 1-27-23 0839
RELINQUISHED BY:	DATE / TIME: 1-27-23 1120	RECEIVED BY: Jamman	DATE / TIME: 01/27/23 1120
RELINQUISHED BY:	DATE / TIME:	RECEIVED BY:	DATE / TIME:

SAMPLE CONDITION:

Actual Temperature: 3.3°C	Thermometer #: T0269	
Received On Ice		Y / N
Samples Preserved		Y / N
Evidence Seals Present		Y / N
Container Attacked		Y / N

SAMPLE TYPE CODE:

DW = Drinking Water
WW = Waste Water
GW = Ground Water
SF = Surface Water
SW = Sea Water
SO = Solid/Soil
SL = Sludge
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY OVER UNSCHEDULED RUSH REQUESTS

Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) **LAB ACTION**: PRESERVE Cu SAMPLES IMMEDIATELY. HDPE Metals bottles have NO acid (HNO3) in bottle.
2) Diss. metals were field filtered using 0.45 um bottletop filt. system.
3) DOC samples were field filtered through 0.45 um Nylon filters.
4) Please contact WSP PM within 24 hours if any sample anomalies are found.

Please submit invoices to APInvoice.US@woodplc.com (cc: chris.stransky@wsp.com, marisa.swiderski@wsp.com, & marissa.cuevas@wsp.com) and include the following information:
1) Project #: 2015100118.0002B.WECK
(2) PO #: C015102550
(3) Org: 3151
(4) GL: 573000

Standard CHAIN OF CUSTODY RECORD

Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964

14859 Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

WECK WKO# 3A27061

CLIENT NAME: WSP USA Environment & Infrastructure Inc.	PROJECT: Shelter Island Yacht Basin TIE (Port of San Diego)
ADDRESS: 9177 Sky Park Court, San Diego, CA 92123	PHONE: 858-775-5547 FAX: EMAIL: chris.stransky@wsp.com, marisa.swiderski@wsp.com
PROJECT MANAGER: Chris Stransky	SAMPLER: Chris Stransky (CS); Marisa Swiderski (MS)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:
COMMENTS

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl_2 Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Dissolved Copper[1,2] (EPA1640)
	01/26/2023	1410	SW	N	SIYB-TIE-RW-50-C	1	X
		1415	SW	N	SIYB-TIE-RW-50-D	1	X
		1420	SW	N	SIYB-TIE-RW-50-E	1	X
		1425	SW	N	SIYB-TIE-RW-50-F	1	X
		1105	SW	N	SIYB-RT-A	1	X
		1110	SW	N	SIYB-RT-B	1	X
		1115	SW	N	SIYB-RT-C	1	X
		1120	SW	N	SIYB-RT-D	1	X
		1125	SW	N	SIYB-RT-E	1	X
		1130	SW	N	SIYB-RT-F	1	X

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
Hannah Kraft	1/27/23 0840		1-27-23 0839
	1-27-23 1120	Jandman	01/27/23 1120

SAMPLE CONDITION:

Actual Temperature: 3.3°C	Thermometer #: T0269	
Received On Ice	Y	N
Samples Preserved	Y	N
Evidence Seals Present	Y	N
Container Attacked	Y	N

SAMPLE TYPE CODE:
DW = Drinking Water
WW = Waste Water
GW = Ground Water
SF = Surface Water
SW = Sea Water
SO = Solid/Soil
SL = Sludge
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY OVER UNSCHEDULED RUSH REQUESTS

Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) **LAB ACTION**: PRESERVE Cu SAMPLES IMMEDIATELY. HDPE Metals bottles have NO acid (HNO3) in bottle.
2) Diss. metals were field filtered using 0.45 um bottletop filt. system.
3) DOC samples were field filtered through 0.45 um Nylon filters.
4) Please contact WSP PM within 24 hours if any sample anomalies are found.

Please submit invoices to APInvoice.US@woodplc.com (cc: chris.stransky@wsp.com, marisa.swiderski@wsp.com, & marissa.cuevas@wsp.com) and include the following information:
1) Project #: 2015100118.0002B.WECK
(2) PO #: C015102550
(3) Org: 3151
(4) GL: 573000

WECK LABORATORIES, INC.

Sample Receipt Checklist

Weck WKO: 3A27061
WKO Logged by: Jaime Gomez
Samples Checked by: Jaime Gomez
Date/Time Received: 01/27/23 @ 11:20
# of Samples: 22
Delivered by: Hector Sanchez

	Task	Yes	No	N/A	Comments
COC	COC present at receipt?	☒	☐		
	COC properly completed?	☒	☐		
	COC matches sample labels?	☒	☐		
		☒	☐		
	Project Manager notified?	☐	☐	☒	
Receipt Information	Sample Temperature	3.3 °C			
	Samples received on ice?	☒	☐		
	Ice Type (Blue/Wet)				
	All samples intact?	☒	☐		
	Samples in proper containers?	☒	☐		
	Sufficient sample volume?	☒	☐		
	Samples intact?	☒	☐		
	Received within holding time?	☒	☐		
		☐	☐		
	Project Manager notified?	☐	☐	☒	
Sample Preservation Verification?	Sample labels checked for correct preservation?	☒	☐	☐	
	VOC Headspace: (No) none, If Yes (See comment) 524.2, 524.3, 624.1, 8260, 1666 P/T, LUFT	☐	☐	☒	☐ <6mm/Pea size?
	pH verified upon receipt? Metals <2; H2SO4 pres tests <2; 522<4; TOC <2; 508.1, 525.2<2; 6710B<2; 608.3 5-9	☐	☐	☒	pH paper Lot# 2071882
	Free Chlorine Tested <0.1	☐	☒	☐	Cl Test Strip Lot# 061221E
	O&G pH <2 verified?	☐	☐	☐	pH paper Lot#
					pH Reading:
	pH adjusted for O&G	☐	☐	☐	Acid Lot#
					Amt added:
	Project Manager notified?	☐	☐	☐	

PM Comments

Sample Receipt Checklist Prepared by:
Signature: Jaime Gomez Date: 01/27/23