# Los Angeles County Municipal Storm Water Permit (Order No. R4-2012-0175 as amended by Order WQ 2015-0075) NPDES No. CAS004001

# Annual Report Individual Form Reporting Year 15-16

This form includes items to be reported individually by each Permittee.

Permittee Name	City of Malibu
Permittee Program Contact	Jennifer Voccola Brown
Title	Senior Environmental Programs Coordinator
Address	23825 Stuart Ranch Road
City	Malibu
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# 1. Legal Authority and Certification

Complete the items on this page.

1.1 Answer the following questions on Legal Authority [VI.A.2.b]

	Yes	No
Is there a current statement certified by the Permittee's chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and the Permit?		
Has the above statement been developed or updated within the reporting year? If yes, attach the updated legal authority statement to this report.		

1.2 Completed the required certification below [Attachment D, V.B.5]:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of either a principal executive officer, ranking elected official, or by a duly authorized representative of a principal executive officer or ranking elected official. A person is a duly authorized representative only if:

- a. The authorization is made in writing by a principal executive officer or ranking elected official.
- b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
- c. The written authorization is submitted to the Regional Board.

I. Brager.

If an authorization of a duly authorized representative is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization will be submitted to the Regional Board prior to or together with any reports, information, or applications, to be signed by an authorized representative.

Signature

Title: Public Works Director

Date: December 14, 2016

## 2. Fiscal Section

#### Complete the following items in this section.

2.1 Source(s) of funds used in the past year, and proposed for the coming year, to meet necessary expenditures on the Permittee's stormwater management program. [Fiscal Resources (VI.A.3.b)]

Funding to implement the program elements comes from the City of Malibu (City) General Fund, Solid Waste Fund, and Legacy Park Fund.

Various accounts in the General Fund are set up per Capital Improvement Project (CIP) process, wherein City funds from various sources (Community Development Block Grants, Parkland Funds, Reserve Funds, General Fund, Special Revenue Funds, etc.) are allocated and grant funds are designated when awarded to a project's budget. When the City Council formally accepts a project as a CIP, a dedicated account is set up.

The City also has a long history of seeking and being awarded grant funds to offset the cost of water quality improvement projects, and will continue to seek such opportunities. An application was submitted in January 2016 for funding from the Santa Monica Bay Restoration Commission to construct a project included in the North Santa Monica Bay Coastal Watersheds (NSMBCW) Enhanced Watershed Management Program (EWMP) Plan at Winter Canyon and Civic Center Way; the City was recently notified that it would not be awarded this grant. The City's grant writer continues to actively seek solicitations for applicable grant programs. The NSMBCW EWMP Group consists of the City, County of Los Angeles, and the Los Angeles County Flood Control District.

2.2 Complete the table on program expenditures below [Attachment D - VII]

Table 2a: Program Expenditures					
	Category	Expenditures for Reporting Year (15-16)	Anticipated Expenditures for Next Reporting Year (16-17)		
(1) Program Mana	agement	211,994	164,698		
	Public Information and Participation Program	38,253	39,807		
	Industrial / Commercial Facilities Program	33,253	34,807		
(2) Minimum	Planning and Land Development Program	39,386	47,543		
Control Measures (MCMs)	Development Construction Program	51,655	51,257		
	Public Agency Activities Program	495,189	532,556		
	Illicit Connections and Illicit Discharges Program	62,132	64,357		
	Additional Institutional BMPs / "Enhanced" MCMs	0	0		
	Distributed Projects and Green Streets	0	25,000		
(3) Projects	Regional Projects	0	0		
	Restoration Projects	0	0		
(4) Monitoring		159,611	143,504		
(5) Other <sup>1</sup>		324,966	92,400		

<sup>&</sup>lt;sup>1</sup> Categories may be added to the table as necessary

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TOTAL	1,416,440	1,195,929
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2.3 Please add any additional comments on stormwater expenditures below:

Provide information within this space.

# 3. Discharge Prohibitions and Receiving Water Limitations

#### Complete the following items in this section.

3.1 Did you develop and implement procedures to ensure that a discharger, if not a named Permittee in this Order, fulfilled the requirements of Part III.A.4.a.i-vi? If so, provide a link to where the procedures may be found or attach to the Annual Report. [III.A.4.a]

Yes, there is a procedure. In simplest terms, the City does not allow discharges to its Municipal Separate Storm Sewer System (MS4) unless in compliance with a separate National Pollutant Discharge Elimination System (NPDES) permit or through a conditional exemption from the Regional Water Quality Control Board (Regional Board) or the State Water Resources Control Board (State Board). The municipal codes listing prohibited discharges, exemptions, and conditional exemptions are available online at <a href="http://qcode.us/codes/malibu/">http://qcode.us/codes/malibu/</a> in Chapter 13.04.

If the City is notified of a request for a planned discharge that is exempt or conditionally exempt under the permit, it will consider a variety of factors in whether to permit the discharge, including the size of the discharge, source of the water, and what receiving water is closest. If there is an existing water quality monitoring site reasonably near to the discharge that could be affected by that volume of water, the water quality data for the applicable sites would be looked at and used to determine whether to allow the discharge or if it needs to be contained and/or additional best management practices (BMPs) need to be implemented. However, there are very few actual discharge instances that the City would permit. There are few storm drain outlets from the City's MS4 that actually discharge on the shoreline. Most City drains convey water under a road to a dry canyon hillside. The City has authority to, and would, place conditions on the discharge as appropriate to the request. Regardless, more often than not, the City requires discharges to be trucked offsite and disposed in other ways such as at a wastewater treatment plant, for dust control, to landscaping, or to a retention or detention pond. The City's MS4 is mostly rural culverts and under road drains that collect small areas of individual public streets, and not an interconnected system. Therefore, it is not likely that a discharge would reach the shore or be above a water quality objective (WQO) if discharged a sufficient distance from the shore.

3.2 Did you develop and implement procedures that minimize the discharge of landscape irrigation water into the MS4? If so, provide a link to where the procedures may be found or attach to the Annual Report. [*Prohibitions – Non-Stormwater Control Measures (III.A.4.a.b.)*]

Yes. The Malibu Municipal Code prohibits the discharge of landscape irrigation into the MS4 (9.20.020 Regulation of irrigation practices and 13.04.060 Prohibited activities). The Malibu Municipal Code is available online at http://qcode.us/codes/malibu/.

The City maintains an online Water Waster Report (<a href="www.malibucity.org/waterwaster">www.malibucity.org/waterwaster</a>) where anyone may notify the City of water violations, including the discharge of landscape irrigation water into the MS4. This online reporting form is in addition to the City's 24/7 Pollution Prevention Hotline, so incidents of irrigation water reaching the MS4 may be reported online or by phone at any time, or by calling or emailing staff directly during business hours. Most of the Water Waster reports are related to irrigation.

When a report comes in, the information is entered in the City's Illicit Connections/Illicit Discharge (IC/ID) database module. City staff then mails the property a warning letter notifying them of the reported issue and reminding them of the City's codes, the water quality impacts of urban runoff, and the current drought conditions. If applicable, information about the Area of Special Biological Significance (ASBS) and discharge prohibition is also provided. Outreach materials and staff contact information are included with the letter so the recipient may receive assistance if desired. If the City receives another complaint about the same problem after the initial warning letter, then staff will investigate the complaint further. If staff confirms that landscape water is reaching the MS4, the City issues a Notice to Comply letter. If the property still does not comply, the City will issue a notice to Cease and Desist Illicit Discharge, and the property owner will be required to submit a compliance report by a specific date or attend an office conference to set a compliance schedule. From the time that the Notice to Comply is sent until the resolution, staff will monitor the irrigation runoff for the case. If a property

fails to remedy the irrigation runoff and refuses to work with City staff towards a solution, then City staff will engage the City Attorney for additional code enforcement (which could include office conferences, issuance of administrative citations, criminal prosecution, or civil litigation against the property owner). Additionally, the City refers water wasting cases to Los Angeles County Waterworks District 29 and they also provide notice to the property. City field staff is also trained to look out for irrigation runoff while working in the field and they are often a source of identifying irrigation runoff cases. When a staff member initially observes the irrigation runoff, they will try to notify someone at the property while they are onsite. If no one can be reached, the same steps as listed above are followed with the exception of confirming the complaint in the field. The City also offers a variety of educational resources and workshops to educate the public about protecting the environment, many of which also include best management practices for eliminating runoff due to irrigation.

3.3 Where Receiving Water Limitations were exceeded, describe efforts that were taken to determine whether discharges from the MS4 caused or contributed to the exceedances and all efforts that were taken to control the discharge of pollutants from the MS4 to those receiving waters in response to the exceedances. [Integrated Monitoring Compliance Report (Attachment E – XVIII.A.5.e)]

Receiving water monitoring identified per the Coordinated Integrated Monitoring Program (CIMP) (i.e., designated paired outfall and receiving water monitoring sites) began after the reporting period in July 2016; thus, there are no monitoring data or exceedances to report for this reporting period. The City has an approved EWMP in place to address exceedances identified through monitoring activities as approved in the CIMPs. Exceedances will generally be addressed though the implementation of the adaptive management process.

The NSMBCW EWMP Group understands this question to apply only to event monitoring data for paired outfall and receiving water sites identified in the CIMP. However, for water bodies subject to Total Maximum Daily Loads (TMDLs) the results from coordinated water quality monitoring programs were also considered (see response to Section 6.5 in the Watershed Form). Actions taken in response to TMDL coordinated monitoring observations are described in the response to Section 6.6 in the Watershed Form.

3.4 If receiving water limitations were exceeded, describe the BMPs that are currently being implemented and additional BMPs, including modifications to current BMPs that will be implemented to prevent or reduce any pollutants that are causing or contributing to the exceedances of receiving water limitations. [Receiving Water Limitations (Integrated Monitoring Compliance Report) (V.A.3.a)]

Receiving water monitoring identified per the CIMP (i.e., designated paired outfall and receiving water monitoring sites) began after the reporting period in July 2016; thus, there is no monitoring data or exceedances to report for this reporting period. See Section 5 for summary of Minimum Control Measures and programs. Current BMPs and additional BMPs to be implemented are described in the City of Malibu's approved EWMP. As data becomes available, review of BMP implementation will be evaluated to address receiving water limitations.

The NSMBCW EWMP Group understands this question to apply only to event monitoring data for paired outfall and receiving water sites identified in the CIMP. However, for water bodies subject to TMDLs the results from coordinated water quality monitoring programs were also considered (see response to Section 6.5 in the Watershed Form). Actions taken in response to TMDL coordinated monitoring observations are described in the response to Section 6.6 in the Watershed Form, and additional information regarding the City's BMPs is provided in response to Section 12.

# 4. Monitoring

Complete the following items in this section.

4.1 Complete the following tables regarding your Non-Storm Water Outfall Based Screening and Monitoring Program [Attachment E – XVIII.A.3.a-g]: Note: The following information is repeated in the Watershed Form.

Table 4a: Summary of Non-Storm Water Based Screening and Monitoring							
Total No. Significant Non-					ant Non-St	Stormwater Discharges <sup>2</sup>	
Receiving Water	No. of Major Outfalls	No. of Outfalls Screened	Since Total Total to Dec 28, Confirmed Abated Allowab	Total Total Attributed to		Total No. Being Monitored	
Santa Monica Bay	10	3 (this reporting year)	10	0	N/A	N/A	0
Total	10	3	10	0	0	0	0

Table 4b: Summary of Non-Stormwater Discharges Abated				
Abatement Method	Total No.			
Low Flow Diversion	0			
IC/ID Eliminated	0			
Permitted	0			
Retention	0			
Treatment	0			
Other (describe below)	0			

4.2 How many of the conditionally exempt non-stormwater discharges in Part III.A.2.b of the Permit did you determine to be sources of pollutants that caused or contributed to an exceedance of receiving water limitations or WQBELs? If you made that determination, which type(s) of non-stormwater discharges in Part III.A.2.b were sources of pollutants? [Permittee Requirements, Discharge Prohibitions (III.A.4.d)]

None. Non-stormwater based screening was conducted in August 2014, October, 2014, and November 2015. No significant flows were observed at the major outfalls; therefore, water quality monitoring was not required or conducted. As a result, there were no conditionally exempt non-stormwater discharges (as per Part III.A.2.b of the Permit) determined to cause or contribute to an exceedance of receiving water limitations or water quality based effluent limitations (WQBELs).

4.3 Document changes to non-stormwater outfall based screening and monitoring program, if applicable. (must be reassessed once during the permit term) [Outfall Screening and Monitoring Plan Re-assessment (Attachment E – IX.B.2)]

Not applicable. No changes were made to the non-stormwater outfall based screening and monitoring program.

<sup>&</sup>lt;sup>2</sup> "Significant Non-Storm Water Discharges" as identified by the Permittee per Part IX.C.1 of the MRP

<sup>&</sup>lt;sup>3</sup> "Allowable Sources" include NPDES permitted discharges, discharges subject to a Record of Decisions approved by USEPA pursuant to section 121 of CERCLA, conditionally exempt essential non-storm water discharges, and natural flows as defined in Part III.A.d of the permit.

## 5. Minimum Control Measures

Complete the following items in this section.

### 5.1 Public Information and Participation Program [VI.D.5]

Complete the following items regarding the Public Information and Participation Program.

5.1a) Summarize stormwater pollution prevention public service announcements and advertising campaigns. What pollutants were targeted? What audiences were targeted? Note whether activities were performed by the jurisdiction or as part of a watershed, regional, or county-wide group.

The following efforts were performed by the City specifically for its jurisdiction. However, there are benefits to the NSMBCW EWMP and Malibu Creek EWMP areas as well, since many marketing and outreach techniques expand beyond jurisdictional borders.

Targeted audiences include general residential community, local businesses, and students. Pollutants targeted are usually bacteria and nutrients from animal waste, nutrients from fertilizers, toxins from pesticides/herbicides, oil and grease (petroleum or fat-based) from businesses or vehicles, landscape greenwaste, litter, and water waste that carries deposited pollutants, among others.

Malibu Area Conservation Coalition: Cooperative effort of agencies responsible for water conservation, energy conservation, and natural resource protection. The City promoted outreach projects including the Landscaping Irrigation Efficiency Program, and Indoor and Outdoor Water Use Surveys.

"Keep It Clean, Malibu" campaign: Included the storm drain art project depicting ocean wildlife and rain gardens on four local storm drains and four public service announcements (PSAs) on urban runoff, which can be viewed at <a href="https://www.keepitcleanmalibu.com">www.keepitcleanmalibu.com</a>. The campaign launched in 2014, but continues to be promoted.

Clean Bay Restaurant Program: The City, the Bay Foundation, and other partners designed an inspection program that recognizes restaurants that choose to go above and beyond what is required by law to prevent ocean pollution <a href="https://www.malibucity.org/cleanbayeats">www.malibucity.org/cleanbayeats</a>.

Living Lightly Guide: The City and other partners updated the printed booklet and launched an electronic platform this reporting year <a href="www.livinglightlyquide.org">www.livinglightlyquide.org</a>.

City of Malibu Quarterly Newsletter and Recreation Guide: Articles on stormwater pollution prevention, water conservation, the ASBS and other related topics are published.

Environmental Videos: Content includes topics such as watersheds, Smart Gardening, and plastic debris; aired on the government access channel, on monitors in the City Hall lobby, and YouTube <a href="https://www.youtube.com/user/CityofMalibu/videos">www.youtube.com/user/CityofMalibu/videos</a>.

Malibu's One Water Festival: A large community celebration of Malibu's water resources with extensive educational information for children and adults on a wide variety of water topics, including stormwater pollution prevention. There were over 100 attendees, which is the greatest attendance for any City sponsored environmental event.

Social Media: The City regularly posts information related to stormwater pollution prevention on its social media accounts, which include Facebook, Twitter and Instagram.

5.1b) Which of the following public education materials did you distribute? (check yes or no)

	Yes	No
Information on the proper handling (i.e., disposal, storage and/or use) of Vehicle waste fluids?	$\boxtimes$	
Household waste materials (i.e., trash and household hazardous waste, including personal care products and pharmaceuticals)?	$\boxtimes$	
Construction waste materials?	$\boxtimes$	
Pesticides and fertilizers (including integrated pest management practices [IPM] to promote reduced use of pesticides)?	$\boxtimes$	
Green waste (including lawn clippings and leaves)?	$\boxtimes$	
Animal wastes?	$\boxtimes$	

5.1c) Did you distribute activity specific stormwater pollution prevention public education materials at the following points of purchase? If yes, provide the number of points of purchase within each category (if available).

Category	Yes	No	Number of Points of Purchase (if available)
Automotive Part Stores		$\boxtimes$	
Home Improvement Centers, Lumber Yards, Hardware Stores, Paint Stores		$\boxtimes$	
Landscaping, Gardening Centers		$\boxtimes$	
Pet Shops, Feed Stores		$\boxtimes$	
*Materials are provided to business representatives during inspection for their own use, but extras were not provided for general distribution during this reporting year.			

5.1d) Did you maintain stormwater websites or provide links to stormwater websites via your website, which included educational material and opportunities for the public to participate in stormwater pollution prevention and clean-up activities listed in Part VI.D.4? Provide links to the stormwater websites that you maintained and/or the location on your website where you provide links to stormwater websites.

Yes. www.malibucity.org/cleanwater

5.1e) Did you provide materials to educate school children (K-12) on stormwater pollution?

City staff attends community events and distributes information and giveaways related to stormwater pollution, including items that target school children. Staff engages children with a watershed model that shows how non-point source pollution can reach waterways and the ocean. Giveaways include coloring books and materials from the Keep it Clean, Malibu campaign which focuses on eliminating non-point source pollution and celebrating Malibu's coastal resources. This past year, City staff attended seven (7) events, including the Malibu Arts Festival, Malibu Farmers Market, Pepperdine University's Earth Day Festival, and the inaugural Malibu One Water Festival. Many school-aged children attend these events and are drawn to the watershed model and giveaways at the City's Environmental Programs booth. The One Water Festival also included a student competition that was promoted to all area schools for kids prior to the event to prepare a project – which could be a presentation, a study, a video, or art piece – based on watershed, pollution prevention, conservation, or other water issues.

Additionally, City staff notifies school principals and teachers of learning opportunities presented at the Los Angeles NPDES Permittee Public Education Quarterly meetings, so they may take advantage of free assemblies, field trips, and other unique activities.

5.1f) Did you tailor your public education and outreach program to address watershed priorities since the previous reporting year? If so, identify the watershed priorities addressed. Optional: If you made any changes to your program, elaborate.

Yes, the City's public education and outreach program addressed watershed priorities. Watershed priorities include:

- · Bacteria and nutrients from animal waste
- · Nutrients from fertilizers
- · Toxins from pesticides, herbicides and rodenticides
- Oil and grease from businesses or vehicles
- Litter and green waste
- Dry weather runoff

The City's outreach programs target a broad range of constituents including residents, visitors, local businesses and students through a number of mechanisms including outreach materials, social media, web content, special events, workshops, the commercial inspection program, and the IC/ID program. Several enhancements were made to the program this year.

This year, City staff worked with a graphic designer to create an "Ocean Friendly Cleaning Tips" handout that addresses the key watershed priorities by providing residents with best practices to avoid causing or contributing to pollution. The handout is in English and Spanish.

The increase in water waste reporting during the drought provided an additional opportunity to educate residents and businesses about water quality in addition to water waste. Water waste potentially can flow off of a property as dry weather runoff, so the property received information about preventing urban runoff for water quality, as well as information about conserving water during the drought.

The commercial inspection program includes ongoing education and outreach for businesses and their staff. This year, additional outreach was provided on integrated pest management to reduce or eliminate the use of poisons, which is a priority for the Malibu City Council and the community. Additionally, nurseries received targeted outreach on the use of fertilizers, pesticides and herbicides.

#### 5.2 Industrial and Commercial Facilities Program [VI.D.6]

Complete the following items regarding the Industrial and Commercial Facilities Program.

#### 5.2a) Answer the questions below:

	Yes	No
Did you maintain and update a watershed-based inventory or database containing the latitude / longitude coordinates of all industrial and commercial facilities within its jurisdiction that are critical sources <sup>4</sup> of stormwater pollution?	$\boxtimes$	
	Num	ber
How many commercial facilities identified in Part VI.D.6.b did you inspect? If none, explain.	70	)
	Yes	No
As part of the inspections conducted, did you evaluate that stormwater and non-stormwater BMPs are being effectively implemented in compliance with municipal ordinances?	$\boxtimes$	
	Num	ber
How many initial mandatory compliance inspections did you conduct of industrial facilities identified in Part VI.D.6.b ? If none, explain. *There are not any industrial facilities within the City of Malibu.	0	

available on-site? \*There are not any industrial facilities within the City of Malibu.

How many facilities did you refer to the Regional Board for failing to obtain coverage under the

Industrial General Permit and/or failure to have a Stormwater Pollution Prevention Plan (SWPPP)

0

<sup>&</sup>lt;sup>4</sup> Part VI.D.6.b.i of the LA County MS4 Permit summarizes "critical sources" to be tracked

5.2b) Describe the number and nature of any enforcement actions taken related to the industrial and commercial facilities program.

Some of the issues observed during the commercial inspections this past reporting year include lack of secondary containment and proper maintenance of grease disposal, lack of BMP signage for employees, and failure to keep trash areas clean with trash bin lids closed. The City is conservative on these matters and the inspector is directed to treat all issues as a violation, whether severe or minor. Additionally, businesses are held to very high quality standards when determining if a correction must be made. The City requires all issues to be corrected immediately following the inspection (with a reasonable time to cure if necessary), and educational materials are provided to the business. A notice is written by the inspector for each item that the business does not meet during its inspection and includes a date by which the correction must be completed. City staff conducts follow-up visits and communicates with the businesses to ensure the corrections are made.

A total of forty-five (45) restaurants, seven (7) retail gasoline outlets (RGOs) and automotive facilities, and three (3) nurseries received notices this reporting year. About 35% of 181 issued restaurant corrections were related to appropriately posting BMP signage and training staff in stormwater BMPs. Proper maintenance of the grease disposal area, including secondary containment and keeping the area free of spills, accounted for 24% of the restaurant corrections. Failure to use dry cleaning methods and drain liquid waste into an approved system only accounted for about 4% of restaurant corrections and less than 2% of the corrections were in response to an observed discharge to the storm drain system. There were a total of twenty-eight (28) notices written for RGOs and automotive facilities. The most common correction for RGO and automotive facilities was the failure to properly manage and dispose of waste materials and hazardous waste with six (6) corrections. About 43% of the RGO/automotive facility corrections were related to proper maintenance of the trash area, including keeping the area free of litter and keeping lids closed. Only one (1) instance of a discharge to the storm drain system was observed. A total of nine (9) notices were issued to nurseries. The corrections were primarily related to proper maintenance of trash areas. There was one (1) instance of an observed discharge to the storm drain system and two (2) instances where evidence of a past spill or illicit discharge was observed.

The Industrial/Commercial Facilities Inspection program is overseen by the City's Environmental Programs staff. However, Code Enforcement Officers, Public Works Inspector, and the Building Safety Inspectors have been trained to watch for stormwater BMPs infractions and are authorized to issue Correction Notices in the field. Repeat offenses are subject to increased enforcement procedures. Some violations may be subject to the City's administrative citation ordinance exposing the violator to civil penalties as well as traditional enforcement remedies. The City also implements a policy for the Clean Bay Certified Restaurant program whereby a business that has been certified is subject to having its Clean Bay Certified status rescinded for failing to maintain the program's criteria. Information on the program's criteria can be viewed at <a href="https://www.malibucity.org/cleanbayeats">www.malibucity.org/cleanbayeats</a>.

5.2c) Did you tailor your Industrial and Commercial Facilities Program to address watershed water quality concerns since the previous reporting year? If so, identify the water quality concerns and describe how the program was tailored to address each concern.

Optional: If you made any changes to your program, elaborate. [Selection of Watershed Control Measures (VI.C.5.b.iv.)]

Yes. The Industrial and Commercial Facilities Program is designed to address any non-compliance with the suite of inspection criteria selected to prevent possible pollutants from reaching nearby waterways and thus protects water quality. The City strives for continuous improvement of the program and facility compliance. The program is inherently tailored to site-specific improvements at each facility based on the criteria that it did not meet during its inspection. By regularly surpassing the frequency of inspection minimum requirements in the Permit and continually improving the efficacy of the Industrial and Commercial Facilities Program, the City aims to target all water quality concerns that could arise from these businesses. The City's program specifically addresses pollutants with TMDLs, which include bacteria, marine debris (trash) and toxics (DDT and PCBs). By more frequently inspecting trash and recycling areas, oil and grease disposal, water runoff, storage of hazardous materials, and other stormwater BMPs than required in the Permit, businesses are held to high standards to prevent them from contributing to water quality concerns. By expanding the commercial inspection program to include nurseries this year, the inspection program better protects against toxics including fertilizers, pesticides and herbicides from running off into nearby waterways or storm drains.

Since the adoption of the General Exception to the California Ocean Plan for Areas of Special Biological Significance Waste Discharge Prohibition for Storm Water and Nonpoint Source Discharges, with Special Protections, the City inspects each commercial facility that is tributary to the ASBS a minimum of two (2) times during the rainy season, as required by the Special Protections. This year, the City elected to expand this higher frequency of inspections to all facilities in the City limits, so that each facility receives a minimum of two (2) inspections per year. City staff is continually

developing relationships and improving communication with facility owners and managers in order to have more frequent contact and resolve any issues more easily. Staff has increased its communication with shopping center managers as well in order to address center-wide issues that may not be captured in an inspection of a single facility or may be beyond the capacity of a single facility to remedy. These relationships and improved communication with facility staff allows the City to successfully promote beneficial programs and rebates that may help the facilities be more sustainable.

City staff is also working to improve the administration of this program. This past reporting year, a new database module was created to better track the Industrial and Commercial Facilities Program and new inspection forms were created for RGOs/Automotive Facilities and Nurseries. These new inspection forms are attached for reference in Appendix A.

## 5.3 Planning and Land Development Program [VI.D.7 and Attachment E-XVIII]

Complete the following items regarding the Planning and Land Development Program.

5.3a) New Development Projects: Complete the table below. Reporting new development projects by categories is optional. If different categories are used by the Permittee or new development and redevelopment activities are combined, the table may be edited to include those categories and/or information.

Table 5a: Summary of New Development Projects

Category (optional)⁵	Number of Projects Completed <sup>6</sup>	Number of Projects Addressed by Alternative Compliance Measures <sup>7</sup>	Area Addressed by Projects	Est. Total Volume (SWQDv) Retained Onsite  (Not Including Alternative Compliance Projects)
Development Projects (≥ 1 acre disturbed area; adding ≥ 10,000 sf impervious area)	1	1	1.54 AC	0*
Industrial Parks (≥ 10,000 sf surface area)	0	NA	NA	NA
Commercial Malls (≥ 10,000 sf surface area)	0	NA	NA	NA
Retail Gasoline Outlets (≥ 5,000 sf surface area)	0	NA	NA	NA
Restaurants (≥ 5,000 sf surface area)	0	NA	NA	NA
Parking Lots (≥ 5,000 sf surface area or ≥ 25 parking spaces)	0	NA	NA	NA
Street and Road Construction (≥ 10,000 sf impervious surface area)	0	NA	NA	NA
Automotive Service Facilities (≥ 5,000 sf surface area)	0	NA	NA	NA
Applicable Projects near Significant Ecological Areas	0	NA	NA	NA
Single-family Hillside Homes	0	NA	NA	NA
TOTAL	1	1	1.54 AC	0*

\*Please note that this project was approved in 2008 before the City Low Impact Development (LID) ordinance required redevelopment projects' BMPs to be designed using SWQDv. Onsite retention of the SWQDv for New Development/Redevelopment projects, as stated in Section VI.D.6.c.i.2, is impossible for most projects in Malibu due to high groundwater, geotechnical hazards and geologic instability, or due to conflicts with adjacent onsite wastewater treatment systems (OWTS). For similar reasons, offsite infiltration or bioretention is also usually infeasible. The only feasible option for most projects in the City is onsite biofiltration.

5.3b) Redevelopment Projects. Complete the table below. Reporting redevelopment projects by categories is optional. If different categories are used by the Permittee or new development and redevelopment activities are combined, the table may be edited to include those categories and/or information.

<sup>&</sup>lt;sup>5</sup> Reporting new development projects by categories is optional. If different categories are used by the Permittee or new development and redevelopment activities are combined, the table may be edited to include those categories and/or information.

<sup>&</sup>lt;sup>6</sup> "Number of Projects Completed" should only include projects that are completed and signed off by the Permittee during the reporting year. In progress projects that have been issued a permit but are not completed should not be included.

<sup>&</sup>lt;sup>7</sup> "Alternative Compliance Measures" refer to the mitigation options listed in Part VI.D.7 of the permit. These options include: on-site biofiltration, offsite infiltration, groundwater replenishment projects, offsite retrofits of existing developments, and areas covered by a regional storm water mitigation program.

Table 5b: Summary of Redevelopment Projects

Category (optional) <sup>8</sup>	Number of Projects Completed <sup>9</sup>	Number of Projects Addressed by Alternative Compliance Measures	Area Addressed by Projects	Est. Total Volume (SWQDv) Retained Onsite*  (Not Including Alternative Compliance Projects)
Industrial Parks	0	NA	NA	NA
Commercial Malls	0	NA	NA	NA
Retail Gasoline Outlets	0	NA	NA	NA
Restaurants	0	NA	NA	NA
Parking Lots	0	NA	NA	NA
Street and Road Construction	0	NA	NA	NA
Automotive Service Facilities	0	NA	NA	NA
Applicable Projects near Significant Ecological Areas	0	NA	NA	NA
Other	0	NA	NA	NA
TOTAL	0	0	0	0

<sup>\*</sup> Onsite retention of the SWQDv, for New Development/Redevelopment projects, as stated in Section VI.D.6.c.i.2, is impossible for most projects in Malibu due to high groundwater, geotechnical hazards and geologic instability, or where there are adjacent OWTS. For similar reasons, offsite infiltration or bioretention is also usually infeasible. The only feasible option for most projects in the City is onsite biofiltration.

5.3c) Planning and Land Development Efforts beyond Permit Requirements. If applicable, describe Planning and Land Development activities that went above and beyond the permit requirements (e.g. stricter LID ordinance, small-site LID). **Tables 5a and 5b** above may be edited or an additional table may be included here to include these activities.

The City's LID ordinance requires more New Development/Redevelopment project types than specified in the Permit to prepare Water Quality Mitigation Plans (WQMPs) to design, install, and maintain BMPs conforming to Permit requirements. Additional project types required to prepare WQMPs include: (a) beachfront residential New Development/Redevelopment and (b) all New Development/Redevelopment projects that result in the creation, addition, or replacement of 2,500 square feet of impervious surface area that discharge directly to or adjacent to an ASBS or is tributary to an ASBS.

The City of Malibu LID ordinance (Municipal Code Chapter 13.04) can be found at:

http://qcode.us/codes/malibu/

5.3d) Summary of New and Redevelopment Projects using Alternative Compliance Measures: Complete the table below.

<sup>&</sup>lt;sup>8</sup> Reporting redevelopment projects by categories is optional. If different categories are used by the Permittee, the table may be edited to include those categories.

<sup>&</sup>lt;sup>9</sup> "Number of Projects Completed" should only include projects that are completed and signed off by the Permittee during the reporting year. In progress projects that have been issued a permit but are not completed should not be included.

Table 5c: Alternative Compliance Measures for Development/Redevelopment Projects (where onsite retention of the SWQDv is infeasible)\*

Category <sup>10</sup>	Number of Projects Constructed	Area Addressed by Projects	Est. Volume Retained	Area Addressed by Biofiltration	Volume Addressed by Biofiltration <sup>11</sup>
Onsite Biofiltration	1	1.54 AC	none	1.54	Unknown*
Offsite Infiltration	0	NA	NA	NA	NA
Ground Water Replenishment Projects	0	NA	NA	NA	NA
Offsite Project – Retrofit Existing Development	0	NA	NA	NA	NA
Regional Storm Water Mitigation Program	0	NA	NA	NA	NA
TOTAL	1	1.54 AC	none	1.54	Unknown*

<sup>\*</sup> Please note that this project was approved in 2008 before City LID ordinance required redevelopment projects' BMPs to be designed using stormwater quality design volume (SWQDv). Onsite retention of the SWQDv, as stated in Section VI.D.6.c.i.2, is impossible for most projects in Malibu due to high groundwater, geotechnical hazards and geologic instability, or where there are adjacent OWTS. For similar reasons, offsite infiltration or bioretention is also usually infeasible. The only feasible option for most projects in the City is onsite biofiltration.

5.3e) Alternative Compliance Measures – Offsite Projects<sup>12</sup> [VI.D.7.c.iii.5.f]: (If Applicable) Complete the table below.

Table 5	Table 5d: Alternative Compliance Measures – Offsite Projects						
Total Offsite Project Funds Raised to Date	0	0					
Pending Offsite Projects	Location	General Design Concept	Volume of Water Expected to Be Retained	Total Estimated Budget			
Pending Offsite Project 1	NA	NA	NA	NA			
Pending Offsite Project 2	NA	NA	NA	NA			
(Add rows as needed)	NA	NA	NA	NA			

5.3f) Alternative Compliance Measures – Regional Storm Water Mitigation Program<sup>13</sup> [VI.D.7.c.vi]: (If Applicable) Complete the table below.

Table 5e	Table 5e: Alternative Compliance Measures – Regional Storm Water Mitigation Program						
Mitigation Program	Description	Area Addressed by Mitigation Program (in Acres)	Estimated Flow Reduction (from submitted design specifications)	Cumulative Number of New and Redevelopment Projects Addressed by Project	Flow Reduction Which Would Have Been Achieved by Retaining SWQDv on- site		
Mitigation Project 1	NA	NA	NA	NA	NA		

<sup>&</sup>lt;sup>10</sup> Alternative Compliance Measures refer only to the alternative measures used to comply with Planning and Land Development Program requirements as described in Part VI.D.7.c.iii.(1)-(7)

<sup>&</sup>lt;sup>11</sup> Volume Addressed by Biofiltration should represent the biofiltration volume (Bv), not the SWQDv.

<sup>&</sup>lt;sup>12</sup> "Offsite projects" refers only to offsite projects being used as an alternative compliance measure for development/redevelopment project applicants that have demonstrated technical infeasibility for on-site retention of the SWQDv. This does not include on-site biofiltration; however it does include off-site biofiltration projects.

<sup>&</sup>lt;sup>13</sup> "Regional Storm Water Mitigation Programs" are only applicable where the Permittee (or Permittee Group) has received approval of such a program from the Regional Water Board.

(Add rows as needed)	NA	NA	NA	NA	NA
TOTA	۸L	0	0	0	0

5.3g) Control Measures for Projects Greater than 50 Acres [Attachment E – XVIII.A.6.e]: (If Applicable) Provide a detailed description of control measures to be applied to new development or redevelopment projects disturbing more than 50 acres:

Projects greater than 50 acres must comply with Malibu Municipal Code Chapter 13.04. This chapter includes LID, water quality, and hydromodification standards. Projects larger than 50 acres are required to undergo a rigorous grading permit approval process including ensuring that all stormwater best management practices are addressed in accordance to the MS4 Permit and LID Ordinance requirements.

For the reporting period, there were no new development or redevelopment projects disturbing more than 50 acres in the City of Malibu.

5.3h) Describe the number and nature of any enforcement actions taken related to the planning and land development program.

Although there are many ways in which the City requires correction of design and construction issues related to stormwater quality management, there is currently no centralized tracking of enforcement actions taken related to the Planning and Land Development Program. See response to Section 5.3i.

5.3i) If any of the requested information cannot be obtained, provide a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts.

The City does not currently perform centralized tracking of enforcement actions related to the Planning and Land Development Program (i.e., "enforcement" as indicated in Section 5.3h is not coordinated between various department's land development reviews). If a post-construction BMP (i.e. LID or priority project requirement) is not designed or installed correctly, this can be (and is) addressed during the Development Planning process in several ways: prior to the correction of noted design and construction issues, Public Works will not approve the project design, Building & Safety Inspectors will not approve construction permits, and Planning will not provide final approval of the construction. Correction notices are issued by the various City departments to applicants, contractors, and property owners throughout the development process to ensure projects are built to conform with City requirements and specifications in the approved plans. Each City department independently tracks its own reviews and inspections; thus it has been impractical to globally track all issues, and doing so would not provide any valuable insight into the compliance status of the final construction.

#### 5.4 Development Construction Program [VI.D.8]

Complete the following items regarding the Development Construction Program.

5.4a) Answer the questions below regarding construction sites 1 acre and greater [VI.D.8.e-j]:

	Yes	No
Did you use an electronic system to inventory grading permits, encroachment permits, demolition permits, building permits, or construction permits (and any other municipal authorization to move soil and/ or construct or destruct that involves land disturbance) that you issued?	$\boxtimes$	
Did you track the date that you approved the Erosion and Sediment Control Plans (ESCP) or CGP SWPPPs for new sites permitted and sites completed?	$\boxtimes$	
	Num	ber

How many inspections for the inventoried <sup>14</sup> construction sites were conducted during the reporting period?	19	)
How many sites within your jurisdiction discharge to a tributary listed by the state as an impaired water for sediment or turbidity under the CWA § 303(d)? If not zero, answer questions (a) - (c) below.	0	
(a) How many inspections did you conduct during the reporting period when two or more consecutive days with greater than 50% chance of rainfall were predicted by NOAA?		
(b) How many inspections did you conduct within 48 hours of a ½-inch rain event?		
(c) How many additional inspections did you conduct to meet the at least once every two weeks inspection frequency requirement?		
How many sites within your jurisdiction were determined to be a significant threat to water quality? If not zero, answer questions (d) – (f) below.	0	
(d) How many inspections did you conduct during the reporting period when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA		
(e) How many inspections did you conduct within 48 hours of a ½-inch rain event,		
(f) How many additional inspections did you conduct to meet the at least once every two weeks inspection frequency requirement?		
How many construction sites within your jurisdiction posed no significant threat to water quality and did not discharge to a tributary listed by the state as an impaired water for sediment or turbidity under the CWA § 303(d)? If not zero, answer question (g) below.	7	
(g) How many inspections of those sites did you conduct during the reporting period to meet the minimum monthly inspection frequency requirement?	19	)
How many completed construction sites did you inspect to ensure that all graded areas have reached final stabilization and that all trash, debris, and construction materials, and temporary erosion and sediment BMPs have been removed?	0	
	Yes	No
Did you develop procedures to review and approve an ESCP (or a SWPPP prepared in accordance with the requirements of the Construction General Permit) that contains appropriate site-specific construction site BMPs that meet the minimum requirements of a Permittee's erosion and sediment control ordinance?	$\boxtimes$	

5.4b) Answer the following question regarding construction sites less than 1 acre in area [VI.D.8.d]:

	Yes	No
For construction sites less than 1 acre, did you require the implementation of an effective combination of erosion and sediment control BMPs from Table 12 of the LA County MS4 Permit to prevent erosion and sediment loss, and the discharge of construction wastes through the use of the Permittee's erosion and sediment control ordinance or building permit?	$\boxtimes$	

5.4c) How did you ensure that all staff whose primary job duties are related to implementing the construction stormwater program is adequately trained? [VI.D.8.I]

The City of Malibu provides regular in-house training opportunities and promotes staff attendance at a variety of conferences and workshops. The City held a two-day NPDES training session for targeted staff in accordance with permit requirements. The stormwater certification training focused on the Clean Water Act, NPDES permit requirements, protocols for inspecting sites, BMPs, proper inspection documentation (with emphasis on illicit discharges), outreach and education. All staff that spends time in the field attended.

<sup>&</sup>lt;sup>14</sup> "Inventoried" refers to sites included in the Permittee's electronic system to inventory grading permits, encroachment permits, demolition permits, building permits, or construction permits.

- 5.4d) Describe the number and nature of any enforcement actions taken related to the development construction program.
- 3 verbal warnings for inadequate construction BMPs.
- 1 Notice of Violation for inadequate construction BMPs.
- 5.4e) Did you tailor your Development Construction Program to address watershed water quality concerns since the previous reporting year? If so, identify the water quality concerns and describe how the program has been tailored to address each concern. Optional: If you made any changes to your program, elaborate. [Selection of Watershed Control Measures (VI.C.5.b.iv.)]

The City of Malibu's Development Construction Program focused on inspections of construction sites for implementation of applicable BMPs as described in the MS4 Permit. The City did not revise its Development Construction Program to address watershed water quality concerns since the previous reporting year.

#### 5.5 Public Agency Activities Program (VI.D.9)

Complete the following items regarding the Public Agency Activities Program.

5.5a) Answer the following questions:

	Yes	No
Did you maintain an updated inventory of all Permittee-owned or operated (i.e., public) facilities within your jurisdiction that are potential sources of stormwater pollution?		
Did you develop an inventory of retrofitting opportunities that meets the requirements of Part VI.D.9.d. of the LA MS4 Permit?		$\boxtimes$
Were all Permittee-owned parking lots exposed to storm water cleaned at least once per month?		

5.5b) What did you do to ensure effective source control BMPs for the activities listed in Table 18 of the LA MS4 Permit were implemented at Permittee-owned or operated facilities?:

Staff are trained annually in stormwater requirements and pollution control measures. Additionally, the City is not a full service agency, so it does not directly provide local essential services such as police, fire, water, wastewater, transit, or solid waste collection, nor does the City own or operate the facilities associated with such services. Many of those services are provided through County-operated districts. All CIP contracts include language that require preparation and implementation of a SWPPP, and staff monitors contractor activities. The City's ongoing general maintenance contractor is specifically required to comply with the municipal stormwater permit, and language to this effect is included in the City's service agreement with this contractor.

5.5c) What procedures (or standardized protocol) did you implement to try to ensure there was no application of pesticides or fertilizers (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA, (2) within 48 hours of a ½-inch rain event, or (3) when water is flowing off the area where the application is to occur?

The City requires its landscape maintenance contractor to refrain from fertilizing during wet conditions or prior to expected rainfall that may lead to runoff. To ensure fertilizers are applied at the appropriate time, the applications are coordinated by City staff. Irrigation is scheduled accordingly and weather conditions are monitored and considered. The City implements an IPM program and pesticides are not applied in City parks at any time.

5.5d) How did you ensure employees in targeted positions (whose interactions, jobs, and activities affect stormwater quality) were trained on the requirements of the overall stormwater management program, and contractors performing privatized/contracted municipal services were appropriately trained?

The City provides multiple opportunities for staff to be trained in environmental protections, including pollution prevention and best management practices, annually. There is not a large number of staff and the City is not full service, so there are few opportunities for public agency activities to affect stormwater quality. It is manageable to ensure all of those in targeted positions are appropriately trained. Conditions are placed in Professional Services Agreements for municipal services requiring that contractors comply with training and pollution prevention requirements.

5.5e) Public Agency Retrofit Projects: (If Applicable) Complete **Table 5f** below.

Table 5f. Public Agency Retrofit Projects and Other Projects that Intercept Runoff					
	Number of Projects Constructed	Acres of Effective Impervious Area disconnected from MS4	Est. Total Runoff Volume retained onsite		
Retrofit Projects	0	NA	NA		
Other Projects that intercept runoff	0	NA	NA		
Watershed TMDL related projects <sup>15</sup>	0	NA	NA		

5.5f) Catch Basin Inspection and Cleaning Schedule (VI.D.9.h.vii.). Complete the table below for areas with no Trash TMDL:

Table 5	Table 5g. Summary of Catch Basin Inspections and Cleaning Program (areas with no Trash TMDL)						
Priority	Number of Catch Basins	Inspections Performed	Number Cleaned				
Α	0	0	0				
В	23	46	Minimum 23, as needed (quantity during 2 <sup>nd</sup> inspection not documented)				
С	407	Minimum 407	Minimum 407, and as needed				

5.5g) In areas that are not subject to a trash TMDL and when outfall trash capture is provided, provide any revisions to the schedule for inspection and cleanout of catch basins:

The City of Malibu did not utilize outfall trash capture systems.

5.5h) Channels and Drainage Structures: Complete the table below.

Table 5h.	Table 5h. Summary of Publicly Owned Channels and Other Drainage Structures Inspections and Cleaning						
Туре	Miles of Open Channel	Description of Structure(s)	Frequency of Inspection	Debris Removed Prior to Wet Season (pounds)	Additional Notes		
Open Channel	0		NA	NA	Only channel within City limits is owned and operation by the County FCD.		
Other							

5.5i) Street Sweeping: Complete the table below:

<sup>15</sup> Report information regarding regional projects for which the regional project MOU has assigned the Permittee responsibility for reporting.

Table 5i. Summary of Street Sweeping Activities						
Priority A  (greater than once per month)  *weekly sweeping of PCH under shared contract and reimbursement with Caltrans  Priority B  (once per month)  (once per month)  (as needed, once per year minimum)					once per year	
Total Curb Miles	Curb Miles Swept	Total Curb Miles	Curb Miles Swept	Total Curb Miles	Curb Miles Swept	
42	42	90	90	NA	NA	

5.5j) Did you tailor your Public Agency Activities Program to address watershed water quality concerns since the previous reporting year? If so, identify the water quality concerns and describe how the program has been tailored to address each concern. Optional: If you made any changes to your program, elaborate. [Selection of Watershed Control Measures (VI.C.5.b.iv.)]

The City operates two facilities that actively treat dry weather flows (Paradise Cove Stormwater Treatment Facility and Civic Center Stormwater Treatment Facility/Legacy Park). As such, maintenance of these facilities may be considered part of the City's public agency activities. The Paradise Cove Stormwater Treatment Facility must undergo routine maintenance to replace the filter media material and thoroughly clean related underground and above ground stormwater tanks. The stormwater filter media is scheduled for replacement every several years. While the most recent maintenance was performed outside the reporting year (September 2016), this activity is an example of how the program is being tailored by adding more extensive maintenance as a new element of the program. For the Civic Center Stormwater Treatment Facility/Legacy Park, stormwater diversion pumps systems were upgraded during the reporting year to optimize stormwater capture and treatment.

## 5.6 Illicit Connections and Illicit Discharges Elimination Program (VI.D.10)

Complete the following items regarding the Illicit Connections and Illicit Discharges Elimination Program.

5.6a) Answer the following questions regarding Illicit Discharges [VI.D.10.b]<sup>16</sup>

	Number
How many reports of illicit discharges did you respond to?	31
How many investigation(s) did you initiate to identify and locate the source of reported illicit discharges?	31

5.6b) Provide summary of actions taken to eliminate illicit discharges consistent with IC/ID requirements.

The City of Malibu generally follows a modified version of the procedures in the Los Angeles County Model Program for the IC/ID Elimination Program. The model program is available online at <a href="http://ladpw.org/wmd/NPDES/model\_links.cfm">http://ladpw.org/wmd/NPDES/model\_links.cfm</a>. The City has procedures for the variety of issues staff responds to and the actions that are taken to eliminate illicit discharges. The standard procedures and actions of the City used to eliminate illicit discharges are included below. These will be combined and updated into a formal plan. They are summarized below.

#### Illicit Discharge & Connection Response Procedure

The City implements requirements as a result of Order No. R4-2012-0175, and revisions were considered as part of the development of the NSMBCW EWMP. In general, the City takes a more proactive and restrictive approach to runoff to protect the Area of Special Biological Significance and to reduce discharges that could affect TMDL objectives. The City also began documenting community reports (received by phone, online, by hotline, and through staff observations) and compiling resulting investigations of illicit discharges, illicit connections, water wasting, and other environmental concerns in a new database module.

Potential illicit discharges and illicit connections are investigated by Environmental Sustainability staff, the Public Works Inspector, Code Enforcement Officer, or maintenance staff. Enforcement is incident specific. In general, a report is

<sup>&</sup>lt;sup>16</sup> Illicit discharges and connections detected through other inspection programs should be included.

investigated, a warning/violation notice or letter requiring corrective actions is either provided onsite or mailed, education is provided, and a follow-up inspection is scheduled.

Staff direct dischargers to cease improper activities by providing notices in person (when dischargers are caught in the act) and in writing. Staff also provide educational material relative to the nature of the discharge. Further enforcement actions are pursued, if necessary to obtain compliance. If the discharge persists, staff issue a second written notice explaining the legal action that will be taken if the discharge does not cease. After second notice, the City will take legal action to abate, enjoin or otherwise compel the cessation of the illicit discharge.

Illicit connection investigations are handled similarly to illicit discharges initially. The tenant and/or property owner is directed to immediately cease the illicit connection and stop the use of all plumbing fixtures that are, or may be, connected to the drain until the fixtures are connected in a permitted manner. The source and type of discharge is investigated and confirmed. The discharger is responsible for the cleanup and disinfection of the affected drains and areas, and also for the cleanup of any future discharges. When compliance has been verified, the discharger is notified in the most appropriate manner, depending on the issue.

If an illicit discharge and/or connection is suspected to be coming from an illicit graywater source, the City requires inspection of the graywater connection and OWTS by a City of Malibu registered OWTS inspector. The inspection must be documented on the City's official inspection form (as part of the Comprehensive OWTS Inspection and Operating Permit Program; see below). This form is included at the end of the document. The inspector must also provide a separate report on the illicit graywater discharge, and identify how the illicit flows will be reconnected to an approved greywater system or OWTS. The reconnection must be documented before the illicit discharge is considered eliminated.

#### Water Wasting Response Procedure

In addition to the City's IC/ID program, staff receives and responds to water waste complaints. During the 2015-2016 reporting period, there were forty-two (42) water waste cases, independent of IC/ID cases. Complaints can include watering outside of allowable hours, as well as observed runoff or puddled water. This program not only helps conserve water during drought conditions, but it also helps reduce potential illicit discharges from water wasting activities. The City does not currently have a way to quantify how many water waste cases were due to runoff caused by excessive water use (as compared with other causes such as damaged irrigation systems). When a water waste complaint is received, the City mails a warning letter with educational materials to the property owner and/or tenant. If the water waste continues, enforcement action is taken and the case may become an illicit discharge case depending on the specific violation.

#### Sewage Spills from Onsite Wastewater Treatment Systems Response Procedure

The City has a program to prevent discharge of sewage to the MS4 and surface waters in the unlikely event of a spill. The City does not own or operate a municipal sanitary sewer system. The majority of private properties, residential and commercial, utilize septic systems, OWTS, or small privately operated treatment plants. Therefore, the information provided in response to this question refers only to septic systems, OWTS, or small privately operated treatment plants. Any potential discharge associated with one of these systems is likely of very small volume and localized where it can be contained, as opposed to the large, difficult to control spills that are experienced by agencies with large collection systems conveying sewage to a centralized wastewater treatment plant.

In addition, the City provides educational materials to OWTS owners, and the City's Environmental Health office has implemented a comprehensive program with a database to track OWTS' status (inspections, installation, upgrades etc.). More information follows in this document.

The following spill response program has been implemented to address the event of a septic/OWTS spill that is reported to the City. When notified of a potential spill, a City inspector is immediately dispatched. Upon confirmation that a spill has occurred, the following occurs:

- 1. The incident is investigated by the City.
- Order immediate pumping of the OWTS; require that a copy of the pump receipt be provided to City by a date certain.
- 3. Order that the owner provide a report by a City registered OWTS inspector detailing the condition, location, and construction of the system and recommendation for repair, if any.
- 4. Order that any spilled effluent be properly cleaned up by a licensed professional, with necessary removal and disinfection of materials/surfaces without causing illicit discharge.
- 5. Code Enforcement issues a notice of violation and follows an enforcement response plan.

If the flow is continual, reaching a storm drain or other body of water, and the responsible party is unavailable, staff contacts the contract City street maintenance crew for assistance to contain the flow and a sewage pumping company

is called upon to respond. The Los Angeles County Department of Public Health (LACDPH) is notified, and they have the authority to have the water shut off to terminate the continued flow of sewage, or close the business if at a commercial property and public health is threatened. Notifications are made consistent with the LACDPH protocol, including reporting to the Regional Water Quality Control Board. Requirements #2-4 listed above are then directed to the property owner.

Malibu's OWTS program also helps prevent spills. Ordinance 321 a Comprehensive Onsite Wastewater Treatment System Inspection and Operating Permit Program Scheme was adopted on March 10, 2008 by the Malibu City Council. Following EPA guidance regarding management options, this program provides a means of OWTS inventory, assurance of system functionality and system sustainability. This program requires that owners of real property served by OWTS obtain an inspection of the OWTS, apply for an operating permit, and make any necessary repairs or upgrades in accordance with the following schedule:

- New Developments before a certificate of occupancy is issued
- Existing properties:
  - o Whenever a permit for repair, alteration, replacement, renovation or relocation of an existing OWTS occurs
  - Whenever a remodeling or repair results in addition of plumbing fixtures or increase in load to the existing OWTS
  - o Prior to any purchase or change in ownership

Once issued, renewal of operating permits, including a required inspection, must occur according to the following schedule:

- Commercial or multifamily uses every two years
- Single-family uses with alternative OWTS technology every three years
- Single-family uses with conventional OWTS technology every five years

All Inspectors must be registered and approved by the City of Malibu. To qualify as an Inspector they must possess a valid California License as a Certified Engineering Geologist, Registered Professional Geotechnical, Civil Engineer, or a Registered Environmental Health Specialist, or a specialty sewage systems contractor (A or C-42 contractor license). All inspectors must have attended specific OWTS inspection training provided by a nationally recognized entity and a City sponsored training. Each OWTS component requires the successful completion of an examination.

More information about the City's wastewater management program is available online at www.malibucity.org/septic.

## 5.6c) Answer the following questions regarding Illicit Connections [VI.D. 10.c]<sup>17</sup>

	Number			
How many investigations did you initiate upon discovery or upon receiving a report of a suspected illicit connection?	0			
There were no investigations because no illicit connections were discovered nor reported.				
For the reported illicit connections for which you initiated an investigation, how many were eliminated within 180 days of completion of the illicit connection investigation?	0			
There were no investigations because no illicit connections were discovered nor reported.				
If the number of illicit connections investigated does not equal the number of illicit connections eliminated, explain when the number of illicit connections eliminated elimina				
Not applicable.				

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<sup>&</sup>lt;sup>17</sup> Illicit discharges and connections detected through other inspection programs should be included.

For inve	For investigations initiated, for how many inspections did you determine the following:				
(1)	(1) Source of the connection.				
	No investigations were initiated because there were not any illicit connections discovered or reported.	0			
(2)	Nature and volume of discharge through the connection.				
	No investigations were initiated because there were not any illicit connections discovered or reported.	0			
(3)	Responsible party for the connection.				
	No investigations were initiated because there were not any illicit connections discovered or reported.	0			

5.6d) Answer the following questions regarding Public Hotline and Training [VI.D.10.d and VI.D.10.f]

	Yes	No
Did you maintain or provide access to a hotline to enable the public to report illicit discharges/connections?	$\boxtimes$	
Did you continue to implement a training program regarding the identification of IC/IDs for all municipal field staff, who, as part of their normal job responsibilities (e.g., street sweeping, storm drain maintenance, collection system maintenance, road maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4?	$\boxtimes$	

5.6e) Describe the number and nature of any enforcement actions taken related to the illicit connections and illicit discharges elimination program.

Of the thirty-one (31) illicit discharge cases over the last reporting year, one was determined to have no evidence of discharge, and the remaining thirty (30) received enforcement action from the City. The City broadly interprets enforcement action as any action by staff to facilitate the termination of the illicit discharge and prevent it from happening again. This can include letters, phone calls, emails, site visits, office conferences, compliance reports and monitoring, as well as more aggressive enforcement including stop work orders, citations, or involvement by the City Attorney. City staff uses whichever tools will be most effective on the particular case. Most illicit discharge cases in Malibu are from residential properties and occur unintentionally or because the person is unaware of the illicit discharge rules. In these instances, City staff informs the property owner of the illicit discharge and how to comply, which is usually enough to terminate the discharge and gain compliance. Half (15) of the cases this reporting year were swimming pool-related discharges, including draining a pool, washing filters, or overfilling the pool. Eight cases were the result of outdoor cleaning activities, such as washing a car, hosing down an outdoor area, or cleaning equipment outside. Three cases were related to over-irrigation or a broken irrigation line. One case resulted from the discharge of graywater from a laundry machine, which concluded in the permitting and installation of a laundry-to-landscape graywater reuse system after enforcement action by City staff. Three cases were septic overflows, two from the same commercial property and one from a residential property. These received stringent code enforcement action and followed the City of Malibu specific procedure regarding sewage spills from OWTS described in Section 5.6b.

5.6f) Did you tailor your Illicit Connections and Illicit Discharges Elimination Program to address watershed water quality concerns since the previous reporting year? If so, identify the water quality concerns and describe how the program has been tailored to address each concern. Optional: If you made any changes to your program, elaborate. [Selection of Watershed Control Measures (VI.C.5.b.iv.)]

The City's Illicit Connections and Illicit Discharge (IC/ID) Elimination Program addressed watershed water quality concerns. The primary water quality concerns include:

- Dry weather runoff that can carry deposited pollutants to a storm drain or waterway
- Bacteria and detergents from cleaning activities
- · Oil and grease from businesses

The IC/ID Elimination Program addressed dry weather runoff by utilizing a pollution prevention hotline, water waster online report form, and field staff observations to identify dry weather runoff. Staff contacted the responsible party and

provided education and outreach to assist with abating the dry weather runoff. Dry weather runoff within the City of Malibu most frequently occurs on residential property and is often related to irrigation, cleaning, or pool maintenance activities, which are easily remedied once the property owner is made aware of the issue. In rare cases where the property or person was not immediately responsive, code enforcement was used to gain compliance.

The commercial inspection program incorporates the IC/ID Elimination Program by tailoring the inspections to identify and eliminate any illicit discharges. If an illicit discharge is present at a commercial business, it most commonly results from cleaning activities that could convey bacteria, detergents and oil/grease. The City inspector looks for signs of past or presently occurring illicit discharges while conducting inspections and provides outreach to staff on proper cleaning practices and disposal of oil/grease and wash water. If there is evidence of a past or present illicit discharge, the business is issued a notice and must immediately cease and desist the illicit discharge, as well as clean up the area.

No changes were made to the IC/ID Elimination Program implementation process during the reporting year.

#### 5.7 Enhanced MCMs and MCM Modifications

Complete the following items regarding modified or additional MCMs.

5.7a) (If applicable) Describe any "enhanced" or other MCMs or additional institutional controls that were implemented during the reporting year, including, at a minimum, all commitments related to MCM implementation specifically identified in a WMP/EWMP with deadlines within the reporting year.

The following Enhanced MCMs were implemented during the reporting year:

- The new Living Lightly in the Santa Monica Mountains website was launched. It includes pages that are more information- and feature-rich than the hard copy guide.
- Malibu Area Conservation Coalition (MACC). The MACC continued to meet to plan public outreach and as a result, multiple events and incentive programs were developed and implemented
- Commercial businesses are now inspected twice annually with extra outreach and enforcement conducted related to trash area maintenance. Nurseries were added to the list of inspected businesses.
- Integrated Pest Management (IPM) information provided. There is more information on the City's website, and the Poison-Free brochure is provided to businesses during inspections. This brochure includes information about proper outdoor sanitation practices and alternatives to pesticides.
- The City's LID ordinance now requires more New Development/Redevelopment project types than specified in the Permit to prepare Water Quality Mitigation Plans (WQMPs) to design, install, and maintain BMPs conforming to Permit requirements. Additional project types being required to prepare WQMPs include: (a) beachfront residential New Development/Redevelopment and (b) New Development/Redevelopment projects that result in the creation, addition, or replacement of 2,500 square feet of impervious surface area that discharge directly to or adjacent to an ASBS or is tributary to an ASBS.
- Requirements of the City of Malibu's Local Coastal Program were implemented for New Development/Redevelopment projects, including water conservation, protection of native vegetation, and landscaping with native vegetation.
- 5.7b) (If applicable) Describe any anticipated changes to MCMs next year requiring Regional Water Board approval:

There are no anticipated changes to MCMs next year.

# 6. Stormwater Control Measures Summary

Complete the following items in this section.

If the information on stormwater control measure implementation requested in the following section will be included in a Watershed Form submitted by the Permittee, the Permittee may reference the Watershed Form and skip those items.

Aside from the calculation of *Effective Impervious Area* and the *Summary of Projects that Retain Runoff*, items in this section cover projects that are not part of the Planning and Land Development Program.

The tables within this section outline minimum information for reporting. The Permittee may reformat the sections regarding projects completed in the reporting year to include additional project descriptions and information (e.g. pictures, maps, funding information, etc.).

If any of the requested information cannot be obtained, please note in Subsection 6.10 below.

6.1 Effective Impervious Area [Attachment E, XVIII.A.1]: Summarize the estimated cumulative change in percent EIA since the effective date of the Permit for the entire area covered by the WMP/EWMP and, if possible, the estimated change in the stormwater runoff volume during the 85th percentile, 24-hour storm event for the entire area covered by the WMP/EWMP. Complete the table below.

Table 6a: Effective Impervious Area <sup>18</sup> within Jurisdiction								
Receiving Water	Date	Effective Impervious Area (acres)	Estimated Stormwater Runoff Volume During 85 <sup>th</sup> Percentile, 24-hour Storm (if available)					
RW 1 Santa	Dec. 28, 2012 (baseline)	not available	not available					
Monica Bay- All	Current	not available	not available					
(Add rows as	Dec. 28, 2012 (baseline)							
needed)	Current							

City of Malibu staff seek Regional Board guidance on the methodology that should be used to determine a City-wide baseline Effective Impervious Area (EIA) value and procedures that should be used to track the change in stormwater runoff volume (from the 85<sup>th</sup> percentile storm event) attributable to BMPs, development projects, and redevelopment projects.

See also response to Watershed Form Section 2.1.

6.2 <u>Summary of Projects that Retain Runoff (including New and Redevelopment Projects)</u>; Complete the summary tables below.

<sup>&</sup>lt;sup>18</sup> Effective Impervious Area (EIA) is the portion of the surface area that is hydrologically connected to a drainage system via a hardened conveyance or impervious surface without any intervening median to mitigate the flow volume.

Table 6b: Summary of Projects that Retain Runoff Completed in the Reporting Year								
Receiving Water	Number of New Development/Re- development Projects Completed in Reporting Year	Area Addressed by Projects	Total BMP Retention Capacity of Projects					
Santa Monica Bay 0 NA NA*								

<sup>\*</sup> Onsite retention of the SWQDv for New Development/Redevelopment projects, as stated in Section VI.D.6.c.i.2, is impossible for most projects in Malibu due to high groundwater, geotechnical hazards and geologic instability, or due to conflicts with adjacent OWTS. For similar reasons, offsite infiltration or bioretention is also usually infeasible. The only feasible option for most projects in the City is onsite biofiltration.

Table 6c: Cumulative Summary of Projects that Retain Runoff Completed since the Permit Effective Date

Receiving Water	Number of New Development/Re- development Projects Completed Since Permit Start	Number of Other Projects Designed to Intercept Runoff Completed Since Permit Start	Area Addressed by Projects Completed Since Permit Start	Total BMP Retention Capacity of Projects Completed Since Permit Start	Est. Total Runoff Volume Retained Onsite for the Reporting Year
RW 1	0	NA	NA	NA	NA*
(Add rows as needed)	See data from Tables 6b, 6d, 6e, 6f and 6g (all reporting years)				

<sup>\*</sup> Onsite retention of the SWQDv for New Development/Redevelopment projects, as stated in Section VI.D.6.c.i.2, is impossible for most projects in Malibu due to high groundwater, geotechnical hazards and geologic instability, or due to conflicts with adjacent OWTS. For similar reasons, offsite infiltration or bioretention is also usually infeasible. The only feasible option for most projects in the City is onsite biofiltration.

6.3 <u>Regional Projects Completed in Reporting Year</u>: Complete the table below for any regional projects completed in the reporting year.

Receiving Water	Name of Project	Completion Date	Capacity of BMP	Drainage Area Addressed by Project (in acres)	Est. Total Runoff Volume Retained for the Reporting Year (if available)
Santa Monica Bay - All	0	NA	NA	NA	NA
(Add rows as needed)	(Add rows as needed)				

6.4 <u>Green Streets Completed in Reporting Year</u>: Complete the table below for any green streets projects completed in the reporting year.

Table	Table 6e: Green Streets Projects Completed in the Reporting Year							
Receiving Water	Name of Project	Completion Date	Miles of Street Addressed by Project	Capacity of BMP	Drainage Area Addressed by Project (in acres)	Est. Total Runoff Volume Retained for the Reporting Year (if available)		
Santa Monica Bay- All	Broad Beach Rd. Biofiltration	7/1/2015	1.5	0.0373 cfs	12.3	NA		
Santa Monica Bay- All	Wildlife Rd. Storm Drain Improvements	7/1/2015	N/A	1.62 cfs	16.8	NA		
Santa Monica Bay- All	Malibu Rd. Biofiltration	7/1/2015	N/A	0.0386 cfs	1.85	NA		
Santa Monica Bay- All	Las Flores Cyn. Rd. Biofiltration	7/1/2015	.65	0.055 cfs	4.2	NA		
(Add rows as needed)	(Add rows as needed)							

6.5 <u>Riparian Buffer and Wetland Restoration Projects</u>: Complete the table below for any riparian buffer or wetland restoration projects completed in the reporting year.

Table 6f: Riparian Buffer/Wetland Restoration Projects Completed						
Receiving Water Name of Project Completion Date Description of Project <sup>19</sup>						
NA	None	NA	NA			
(Add rows as needed)	(Add rows as needed)					

6.6 <u>Additional Projects Completed During the Reporting Year</u>: Complete the table below for other projects (not included above) that were completed in the reporting year.

Table 6g: Additional Projects (e.g. Biofiltration) Completed in the Reporting Year						
Receiving Water	Name of Project	Type of Project	Completion Date	Drainage Area Addressed by Project (in acres)	Est. Total Runoff Volume Retained for the Reporting Year (if available)	BMP Capacity and Additional Notes
Malibu Creek and Lagoon	Optimization of Collection Pumps for Legacy Park	retention	7/1/2015	310	not available	Collection system optimized to increase stormwater capture.
(Add rows as needed)	(Add rows as needed)					

6.7 <u>Status of Multi-Year Efforts</u>: Provide the status of multi-year efforts, including TMDL implementation (not including Trash TMDLs), that were not completed in the current year and will continue into the subsequent year(s).

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<sup>&</sup>lt;sup>19</sup> For riparian buffer projects include width, length and vegetation type; for wetland restoration projects include acres restored, enhanced or created

For multi-year efforts, report on progress towards future milestones related to multi-year projects. Include the status of the project, which includes the status with regard to standard project implementation steps. These steps include, but are not limited to, adopted or potential future changes to municipal ordinances to implement the project, site selection, environmental review and permitting, project design, acquisition of grant or loan funding and/or municipal approval of project funding, contractor selection, construction schedule, start-up, and effectiveness evaluation (once operational), where applicable.

If applicable, for green streets implementation, Permittees shall report on progress toward a structured approach identifying a sufficient number of green streets projects to meet compliance milestones (e.g., a green streets master plan).

Also, include the following information:

- Name
- Subwatershed
- Receiving Water
- Project Type
- Location / Latitude and Longitude
- Permittee(s) Involved
- Status
- Expected Completion Date

The NSMBCW EWMP establishes multi-year implementation milestones for structural distributed BMPs, trash capture devices, and downspout retrofit incentives (see also Section 9 of this form). The implementation status of each of these projects is provided below.

Project	Funding Status <sup>1</sup>	Anticipated Planning/ Design Schedule <sup>2</sup>	Anticipated Construction/ Implementation Schedule <sup>3</sup>
Trash Capture Systems	Funding for storm drain trash screens allocated in FY 16-17 CIP budget	Dec. 2016 – Dec. 2018	Apr. 2017 – Jun. 2020
Downspout Retrofit Program	Part of regular staff budget	Dec. 2016 – Mar. 2018	Apr. 2018 – Jun. 2021
Ramirez Cyn. Green Street	Pending	Jul 2017. – Dec. 2019	Jan. 2020 – Jun. 2021
Latigo Cyn. Green Street	Pending	Jul 2017. – Dec. 2019	Jan. 2020 – Jun. 2021
Corral Cyn. Green Street	Pending	Jul 2018. – Dec. 2019	Jan. 2020 – Jun. 2021
Marie Cyn. Green Street	Funding for initial BMP project allocated in FY 16-17 CIP budget	Dec. 2016 – Dec. 2019	Jan. 2020 – Jun. 2021
Winter Cyn. Green Street	Funding for initial BMP project allocated in FY 16-17 CIP budget (part of Civic Center Way improvements)	Dec. 2016 – Dec. 2019	Jan. 2020 – Jun. 2021
Sweetwater Cyn. Green Street	Pending	Jul 2018. – Dec. 2019	Jan. 2020 – Jun. 2021
Las Flores Cyn. (W1-14)	Pending	Jul 2018. – Dec. 2019	Jan. 2020 – Jun. 2021
Las Flores Cyn. (S1-14)		Jul 2018. – Dec. 2019	Jan. 2020 – Jun. 2021

<sup>&</sup>lt;sup>1</sup> Includes acquisition of grant or loan funding and/or approval of municipal sources of project funding.

<sup>&</sup>lt;sup>2</sup> Includes adopted or potential future changes to municipal ordinances to implement the project, site selection, environmental review and permitting, and project design.

<sup>3</sup> Includes contractor selection, construction, start-up, and effectiveness evaluation.

#### 6.8 Effectiveness Assessment of Stormwater Control Measures [Attachment E - XVIII.A.2]: Provide the following:

- An assessment as to whether the quality of stormwater discharges as measured at designated outfalls is improving, staying the same or declining;
- An assessment as to whether wet-weather receiving water quality within the jurisdiction of the Permittee is improving, staying the same or declining, when normalized for variations in rainfall patterns.
- A description of efforts that were taken to address stormwater discharges that exceeded one or more applicable water quality based effluent limitation, or caused or contributed to aquatic toxicity:
- · Additional information on the status multi-year efforts not provided in the previous sections of this report.
- Any additional information on storm water control measure effectiveness that the Permittee would like to highlight.

Implementation of the CIMP began in July 2016 after the reporting period ended; thus there are no event monitoring data or exceedances to report for designated outfalls during this period. It is too early to evaluate the effectiveness or ineffectiveness of related control measures implemented due to limited availability of the monitoring data.

The NSMBCW EWMP Group understands this question to apply only to event monitoring data for paired outfall and receiving water sites identified in the CIMP. However, for water bodies subject to TMDLs the results from coordinated water quality monitoring programs were also considered (see response to Section 6.5 in the Watershed Form). Actions taken in response to TMDL coordinated monitoring observations are described in the response to Section 6.6 in the Watershed Form.

Evaluation of priority water quality concerns in the NSMBCW EWMP identified bacteria levels at Santa Monica Bay Beaches and Malibu Creek and Lagoon as key indicators of overall water quality status in the jurisdictional area. The results of analysis performed using bacteria TMDL monitoring data, as presented in Watershed Form Section 6.5, provide a basis upon which to assess whether water quality is improving, staying the same, or declining. For bacteria in Santa Monica Bay during wet weather, the results suggest that water quality conditions are improving because, overall, bacteria concentrations are decreasing. Similar overall trends were observed for dry weather (both summer and winter). For Malibu Creek and Lagoon, overall trends in bacteria concentrations were less consistent. This suggests that water quality is generally staying about the same. City staff is not aware of reliable methods for normalizing wet weather receiving water monitoring results for variations in rainfall patters, but would welcome guidance from the Regional Board on how to address this issue in future annual reports.

Despite the City's intensive and ongoing actions to control non-exempt non-stormwater flows, some bacteria concentrations in adjacent water bodies have been difficult to eliminate. Some of these conditions may be due to factors beyond the City's control (e.g., natural sources), and staffs of the City and Regional Board have discussed ways that such conditions might be addressed from a regulatory perspective in the future.

6.9 Integrated Monitoring Compliance Report, Stormwater Control Measures [Attachment E – XVIII.A.5.d]: Provide a description of efforts that were taken to address stormwater discharges that exceeded one or more applicable water quality based effluent limitation, or caused or contributed to aquatic toxicity:

Implementation of the CIMP began in July 2016 after the reporting period ended; thus there are no event monitoring data or exceedances to report for this reporting period. It is too early to evaluate the effectiveness or ineffectiveness of control measures implemented due to limited availability of the monitoring data.

6.10 <u>Data Limitations</u>: If any of the requested information cannot be obtained, provide a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts.

City of Malibu staff seek Regional Board guidance on: (a) the methodology that should be used to determine a City-wide baseline EIA value; (b) procedures that should be used to track the change in stormwater runoff volume (from the 85<sup>th</sup> percentile storm event) attributable to BMPs, development projects, and redevelopment projects; and (c) methods for calculating runoff volumes retained by BMPs for particular years and cumulatively for the permit term.

Please see Section 2.1 of the Watershed Form for more information related to EIA.

6.11 (optional) Additional Information: If available, the Permittee may include / attach the following items to their report:

- <u>Hydrographs and Flow Data</u>: Hydrographs or flow data of pre- and post-control activity for the 85th percentile, 24-hour rain event, if control measures were designed to reduce impervious cover or stormwater peak flow and flow duration.
- Reference Watershed Flow <u>Duration Curves</u>: For natural drainage systems, develop a reference watershed flow duration curve and compare it to a flow duration curve for the subwatershed under current conditions.
- <u>GIS Project Files</u>: If available, submit a GIS project file that maps all implementation of on-the-ground projects (e.g. riparian buffer/wetland restoration; distributed/green streets; regional projects; new development and redevelopment on-site; and new development and redevelopment off-site).

# 7. Non-Stormwater Control Measures Summary

## Complete the following items in this section.

7.1 Summarize actions and projects related to addressing non-stormwater discharges. Include the specific non-stormwater actions completed within the WMG's jurisdictional area during the reporting year and, if applicable, the estimated total runoff volume retained on site by the implemented projects:

City actions to address non-stormwater discharges during the reporting year included the following preventative and response programs: extensive community outreach; a proactive illicit detection, response, and elimination program; providing multiple methods for the public to report discharges (via email, phone, or online 24 hours a day); implementation of the ASBS Compliance Plan, Pollution Prevention Plan, and other Special Protections requirements; implementing a robust water conservation outreach program that emphasizes efficiency measures that eliminate runoff; and increased frequency of commercial and construction inspections.

The City is proactive and forward thinking in its planning and implementation of stormwater and non-stormwater control projects. Projects addressing non-stormwater discharges completed this reporting year include: Broad Beach Road Green Street Improvements; Wildlife Road Green Street Improvements; Pump Capacity Upgrades to Legacy Park; Las Flores Canyon Road Biofilter; and Malibu Road Biofilter. Projects addressing non-stormwater discharges completed in previous reporting years which continue to address non-stormwater discharges include: Civic Center Stormwater Treatment Facility; Legacy Park; Paradise Cove Water Quality Improvement Facility; and Cross Creek Road LID Improvements (which have all been explained at great length in prior annual reports). Ongoing benefits of the City's completed projects include preventing non-stormwater discharges from reaching receiving waters, such as with LID features that treat stormwater (e.g. biofiltration, filtration, or disinfection) prior to discharge or reuse. Ongoing City efforts in connection with completed projects include operation and maintenance activities.

7.2 Provide a description of efforts that were taken to mitigate and/or eliminate all non-stormwater discharges that exceeded one or more applicable water quality based effluent limitations, non-stormwater action levels, or caused or contributed to Aquatic Toxicity [Attachment E – XVIII.A.5.c]:

The non-stormwater outfall monitoring program as described in the approved CIMPs has just begun. It is expected that future annual reports will include a detailed description of efforts made to mitigate non-stormwater discharges, if discharges exceed effluent limits and action levels as more data is collected and analyzed. Any exceedances found and attributed to non-stormwater discharges will be addressed through the EWMP adaptive management process or the IC/ID program. For additional information regarding the CIMPs and adaptive management through EWMP, see response to Section 3.3.

During the first round of screening major outfalls no significant non-stormwater discharges were observed; therefore no sampling was performed, and no water quality based effluent limitations, non-stormwater action levels, or Aquatic Toxicity limits were found to be exceeded. Hence, for this reporting period the City was not required to perform specific actions relevant to this question.

7.3 Provide the status of multi-year efforts, including TMDL implementation, related to the implementation or effectiveness assessment of non-stormwater control measures, that were not completed in the current year and will continue into the subsequent year(s) [Attachment E – XVIII.A.3]:

Please refer to Sections 6.7 and 9.1.

7.4 Provide an assessment of the effectiveness of the Permittee control measures in effectively prohibiting non-stormwater discharges through the MS4 to the receiving water. Additionally, include information quantifying the effectiveness of Storm Water Control Measures (Section 6 of this form) in addressing non-storm water discharges. This information should include the estimated amount of non-storm water flows captured by the storm water control measures

implemented throughout the watershed and a description of the methodology and assumptions used to quantify effectiveness. [Attachment E – XVIII.A.4]:

Through its ordinances and extensive outreach and enforcement programs, the City prohibits all unauthorized non-stormwater discharges through its MS4. The outfall screening and monitoring program is expected to further reduce the possibility of significant non-exempt discharges being conveyed through the MS4. During the reporting year the City operated its existing stormwater control facilities (i.e., structural BMPs described in the NSMBCW EWMP and in the response to Section 6 above). These BMPs are considered to be generally effective for controlling non-stormwater flows. For the reporting year, the City has actively implemented its illicit detection, response, and elimination program. See responses in Section 5 for quantified measures of these activities' effectiveness. The City has not estimated non-stormwater flow amounts diverted as a result of its control measures, and seeks Regional Board guidance on appropriate methodologies for doing so.

See also responses to Section 7.2.

7.5 Provide an assessment as to whether the quality of non-stormwater discharges as measured at monitored outfalls is improving, staying the same or declining:

There were no significant non-stormwater discharges observed during outfall screening; therefore, no samples were collected and there is no analytical data for monitored outfalls. However, as a result of the City's strong water quality protection program including extensive outreach, structural BMPs, and restrictive development standards, the City believes water quality of non-stormwater discharges is not declining. In fact, there is a decreasing likelihood that any non-stormwater discharges will reach an outfall due to an informed community, proactive response program, and, to some extent, a disconnected and naturalized drainage area.

Furthermore, additional event monitoring for EWMP/CIMP implementation began after the end of the reporting period – the implementation program commenced in July 2016. Any resulting information pertinent to this question will be reported in the next annual report.

7.6 Provide an assessment as to whether receiving water quality within the jurisdiction of the Permittee is impaired, improving, staying the same or declining during dry-weather conditions. Each Permittee may compare water quality data from the reporting year to previous years with similar dry-weather flows, conduct trends analysis, draw from regional bioassessment studies, or use other means to develop and support its conclusions:

The non-stormwater outfall monitoring program as described in the approved CIMPs has just begun. It is expected that future annual reports will include a detailed description of efforts made to mitigate non-stormwater discharges that are above WQOs as more data is collected and analyzed. Any exceedances found and attributed to non-stormwater discharges will be addressed through the EWMP adaptive management process or the Illicit Connections/Illicit Discharges program. However, the City believes that as a result of its strong water quality protection program including extensive outreach, structural BMPs, and restrictive development standards, water quality during dry weather in this area is not declining.

The analysis performed using bacteria TMDL monitoring data, as presented in Watershed Form Section 6.5, provides a basis upon which to assess whether water quality is improving, staying the same, or declining. Evaluation of priority water quality concerns in the EWMP identified bacteria levels at Santa Monica Bay Beaches and Malibu Creek and Lagoon as key indicators of overall water quality status in the jurisdictional area. For bacteria in Santa Monica Bay during dry weather (both summer and winter), the analysis results suggest that water quality conditions are improving because, overall, bacteria concentrations are decreasing. For Malibu Creek and Lagoon, overall trends in bacteria concentrations were less consistent. This suggests that water quality in Malibu Creek and Lagoon is generally staying about the same.

Despite the City's intensive and ongoing actions to control non-exempt non-stormwater flows, some bacteria concentrations in adjacent water bodies remain above dry weather WQOs. Some of these conditions may be due to factors beyond the City's control (e.g., natural sources), and staffs of the City and Regional Board have discussed ways that such conditions might be addressed from a regulatory perspective in the future.

7.7 Describe sources of significant non-stormwater discharges determined to be a NPDES permitted discharge, a discharge subject to A Record of Decision approved by USEPA pursuant to section 121 of CERCLA, a conditional exempt essential non-stormwater discharge, or entirely comprised of natural flows. [Attachment E – IX.F.2]

Since there were no significant flows observed during screening at the major outfalls and no applicable illicit discharge response investigations, no specific sources of exempt or conditionally exempt non-stormwater discharges were identified. The NSMBCW EWMP Group will conduct additional non-stormwater screenings as required to ensure that there are no new significant non-stormwater discharges.

# 8. TMDL Reporting

Complete the following items in this section.

#### 8.1 Trash TMDL Compliance Report [VI.E.5.c.i]

For Permittees subject to Trash TMDLs, submit a Trash TMDL Compliance Report detailing compliance with applicable interim and/or final effluent limitations. For Permittees demonstrating compliance using full capture systems, partial capture systems, and/or institutional controls, use the Excel worksheet found at:

http://www.waterboards.ca.gov/losangeles/water\_issues/programs/stormwater/municipal/trash/index.shtml

#### 8.2 TMDL Reporting [Attachment E, XIX]

Report on progress towards achieving interim or final milestones/WQBELs/RWLs based on applicable compliance schedules in Attachments L-R and any additional milestones and corresponding deadlines in an approved WMP/EWMP. If this information is reported in another document (e.g. Annual Report Watershed Form) or an attachment, clearly state and provide a reference to the pertinent document and section.

TMDL reporting items required per the applicable schedules outlined in Attachment E, Section XIX.A through XIX.G of the Permit may be provided here or as an attachment to this report.

See Section 6 of the Watershed Form.

# 9. WMP/EWMP Schedules and Implementation (If Applicable)

If you are participating in a WMP or EWMP, complete the following items in this section.

If the requested information will be included in a Watershed Form to be submitted, you may simply reference the Watershed Form and skip the corresponding item.

9.1 (If applicable) Provide comparison of control measures completed to date with control measures projected to be completed to date in the Permittee's jurisdictional area. List control measures projected to be completed within the next two years and the projected completion dates, as well as the status of implementation and funding. This also includes additional "enhanced" MCMs, institutional controls, and nonstructural BMPs that are not part of the permit's minimum control measures. [Watershed Management Program Adaptive Management Process (VI.C.8.a)]:

Table 9a: WMP/EWMP Schedules									
Control Measure	Projected Completion (Date)	Actual Completion (Date)	Status of Implementation	Status of Funding					
Trash Capture Systems	Apr. 2018 – Jun. 2020	not applicable	Planning/Design	Funding allocated in FY 16-17 CIP budget					
Downspout Retrofit Program	Apr. 2018 – Jun. 2021	not applicable	Planning/Design	Part of regular staff budget					
Marie Cyn. Green Street	Jun. 2021	not applicable	Planning/Design  City is working with Pepperdine University and Los Angeles County to document existing BMPs and identify additional project opportunities.	Funding for initial BMP project allocated in FY 16-17 CIP budget. City is working with Pepperdine University and Los Angeles County to identify additional funding opportunities.					
Winter Cyn. Green Street	Jun. 2021	not applicable	Planning/Design	Funding for initial BMP project allocated in FY 16-17 CIP budget (part of Civic Center Way improvements).  City is seeking grant funding to assist in paying for additional BMP projects.					
(Add rows as needed)									

9.2 (If applicable) Describe any modifications, including where appropriate new compliance deadlines and interim milestones, with the exception of those compliance deadlines established in a TMDL, necessary to improve the effectiveness of the WMP/EWMP:

N	0	n	e

# 10. Watershed Hydrology

Complete the following items in this section.

If the information on watershed hydrology requested in the following section is included in a Watershed Form or was previously included in a WMP or EWMP, you may simply reference those documents.

10.1 (<u>If Applicable</u>) <u>Watershed Summary Information</u>, <u>Organization</u>, <u>and Content</u>: Provide the information below in the odd year Annual Report (e.g., Year 1, 3, 5)<sup>20</sup>, or any updates to the information below if previously provided. The requested information shall be provided for each watershed within the Permittee's jurisdiction [*Attachment E – XVII*]:

Provide the following information related to the Watershed Management Area:

- Description of effective TMDLs, applicable WQBELs, receiving water limitations, implementation and reporting requirements, and compliance dates;
- 2) List of CWA Section 303(d) listings not addressed by TMDLs.
- 3) Results of regional bioassessment monitoring. (If applicable, a reference to the SMC will suffice here.)
- 4) Description of known hydromodification effects to receiving waters.
- 5) Description and location of natural drainage systems.
- 6) Description of groundwater recharge areas, including number and acres.
- Maps and/or aerial photographs identifying ESAs, ASBS, natural drainage systems, and groundwater recharge areas.

Watershed information was developed as part of the EWMP for the NSMBCW and approved by the Regional Board on April 19, 2016. Additionally, as this Annual Report, Year 2015-2016, is an even year report, updates to the information requested will be provided in next odd year's annual report or future updates to the EWMPs as necessary.

Provide the following information related to the Subwatershed (HUC-12):

- 1) Description including HUC-12 number, name and a list of all tributaries named in the Basin Plan.
- 2) Land Use map of the HUC-12 subwatershed.
- 85th percentile, 24-hour rainfall isohyetal map for the HUC-12 subwatershed, with identification of 85<sup>th</sup> percentile, 24-hour volume for the HUC-12 subwatershed.
- 4) One-year, one-hour storm intensity isohyetal map for the HUC-12 subwatershed, with identification of the one-year, one-hour storm intensity for the HUC-12 subwatershed.
- 5) MS4 map for the subwatershed, including major MS4 outfalls (as defined in Attachment A of the permit) and all low flow diversions, and corresponding table with identification numbers, geographic coordinates, jurisdiction, size of outfall, outfall catchment area (as available), and size and operational period/conditions of corresponding low-flow diversions.

See above response.

Provide the following information related to the Permittee(s) Drainage Area(s) within the Subwatershed:

- A subwatershed map depicting the Permittee(s) jurisdictional area and the MS4, including major outfalls (with identification numbers), and low flow diversions (with identifying names or numbers) located, within the Permittee's jurisdiction.
- 2) Provide the estimated baseline percent of effective impervious area (EIA) within the Permittee(s) jurisdictional area as existed at the time that this Order became effective and, if possible, the estimated change in the stormwater runoff volume during the 85<sup>th</sup> percentile, 24-hour storm event.

See above response.

10.2 <u>Rainfall Summary</u>: Provide a rainfall summary for the reporting year including: (1) A summary of the number of storm events; (2) The highest volume event (inches/24 hours); (3) The highest number of consecutive days with measureable rainfall; and (4) The total rainfall during the reporting year compared to average annual rainfall for the subwatershed [Attachment E – XVIII.A.2]:

<sup>&</sup>lt;sup>20</sup> Year 1 = 2012-13 Annual Report; Year 2 = 13-14; Year 3 = 14-15; Year 4 = 15-16; Year 5 = 16-17;...

Refer to Section 6 of the Watershed Form.

10.3 <u>SW Monitoring Event Summary</u>: Provide a summary table describing rainfall during stormwater outfall and wet-weather receiving water monitoring events. The summary description shall include the date, time that the storm commenced and the storm duration in hours, the highest 15-minute recorded storm intensity (converted to inches/hour), the total storm volume (inches), and the time between the storm event sampled and the end of the previous storm event.

Table 10a: Summary of Storm Water Outfall and Wet Weather Receiving Water Monitoring Events								
Event	Date	Storm start time (AM/PM)	Storm Duration (hrs)	Highest storm intensity - 15min (in/hr)	TOTAL Storm Volume (in)	Span between sample event & previous storm event (hr)		
Event 1	NA	NA	NA	NA	NA	NA		
Event 2								
(Add rows as needed)								

Implementation of stormwater outfall monitoring began in the 2016-2017 storm season; thus there is no event monitoring data or exceedances to report for this reporting period.

# 11. Adaptive Management Strategies

Include the following information on Adaptive Management Strategies as required in Section XVIII.A.6 of the MRP.

#### 11.1 Program Assessment

This section shall summarize the most effective and least effective control measures, as well as receiving water quality results in comparison to RAA projections.

#### (a) Control Measure Effectiveness

Assess the effect of control measures implemented within the Permittee's jurisdiction and include the following:

- Identification of the most effective control measures and a description of why the measures were effective.
- Identification of the least effective control measures and a description of why the measures were deemed ineffective.

It is too early to evaluate the relative effectiveness of specific EWMP control measures due to the current early position on the implementation timeline (i.e., there is currently limited availability of data and planned distributed BMP projects have not yet been constructed). However, BMP projects already constructed, and other water quality programs implemented by the City prior to the adoption of the current permit and development of the EWMP, are considered effective overall in preventing discharges and reducing the discharge of pollutants.

See response to Watershed Form Section 7.1(a) for information about the effectiveness of structural BMPs. With respect to receiving water quality results, the City attributes observed long term improvements in receiving water bacteriological quality (see response to Watershed Form Section 6.5) to its proactive approach to planning and implementing non-stormwater control and stormwater control measures.

## 11.2 Modifications and Changes to Control Measures

Describe changes to control measures, including the following (where applicable):

- For those control measures identified as least effective, describe how the control measures will be modified
  or replaced.
- Identification of significant changes to control measures during the prior year and the rationale for the changes.
- Description of all significant changes to control measures anticipated to be made in the next year and the
  rationale for the changes. <u>Those changes requiring approval of the Regional Board or its Executive</u>
  <u>Officer shall be clearly identified at the beginning of the Annual Report.</u>
- The status of all multi-year efforts that were not completed in the current year and will continue into the subsequent year(s).
- An implementation schedule for additional BMPs, including modifications to current BMPs that will be implemented to prevent or reduce any pollutants that are causing or contributing to the exceedances of receiving water limitations.

NA

#### 11.3 Adaptive Management Process

- (a) <u>Adaptive Management Reporting</u>: If the Group implemented an adaptive management process during this reporting year, provide the following information:
  - On-the-ground structural control measures completed
  - Non-structural control measures completed
  - Monitoring data that evaluates the effectiveness of implemented control measures in improving water quality
  - Comparison of the effectiveness of the control measures to the results projected by the RAA
  - Comparison of control measures completed to date with control projected by the RAA
  - Comparison of control measures completed to date with control measures projected to be completed to date pursuant to the EWMP
  - Control measures proposed to be completed in the next two years pursuant to the EWMP and the schedule for completion of those control measures
  - Status of funding and implementation for control measures proposed to be completed in the next two years

No adaptive management processes were implemented during the reporting year.

#### 12. Additional Information (Optional)

Provide any additional information in this section.

You may use this section to report any additional information not specified in the Individual Permittee Report Form or to report any information in the Individual Form that is better presented outside of the report form structure.

You may also provide an additional detailed summary table describing control measures that are not otherwise described in the reporting requirements.

Appendix B includes additional information on the control measures the City has taken to address runoff within its jurisdiction.

Appendix C includes the ASBS Special Protections Monitoring Report conducted by the City. A summary of this report is included in Section 6.3 of the Watershed Form

# Appendix A: Industrial and Commerical Facilities Inspection Forms — Retail Gasoline Outlets (RGOs)/Automative Facilities and Nurseries

Stormwater Inspection Checklist for Automotive Related Business						
Business Name:  Type of Business:	OF MALLER					
Site Address:						
Mailing Address:	THE OF THE PARTY O					
Owner/Operator:				Porated March 200		
Staff Onsite During Inspection:		<u> </u>	! 	ASBS: Yes No		
Phone Number:				Date:		
Email:				Time:		
Activities Inspected (minimum BMPs required)		BMI ective N	eness N/A	Comments		
Storm drain inlets are labeled						
Storm drain inlets are routinely inspected and cleaned (min. once per year)			<u> </u>			
Area is free of visible discharges to the storm drain system	_					
Facility area is dry and staff understands that wash down of facility area to the storm drain is illegal						
Facility area does not have evidence of excessive staining			<u> </u>			
Fuel dispensing areas are routinely swept for removal of litter and debris			'			
Leaks and drips are routinely cleaned at outdoor trash receptacles, fuel-dispensing areas, and air/water supply areas						
Rags and absorbents are ready for use in case of leaks and spills			'			
Watertight receptacles are used and lids are kept closed			'			
Garbage container area is free of trash			<u> </u>			
Dumpsters and surrounding area are free of leakage and liquid waste		<u> </u>	'			
Dumpster bin lids are closed		<u> </u>	<u> </u>			
Outdoor work and storage areas are protected to prevent contact of pollutants with rainfall and runoff			<u> </u>			
Signs are posted near fuel dispensers warning customers against "topping off" of fuel tanks						
Automatic shutoff fuel dispensing nozzles are installed			'			
Waste waters are discharged to a sanitary sewer or onsite wastewater treatment system or transferred to a legal point of disposal			<u> </u>			
Waste materials and hazardous waste are properly managed and disposed			'			
Housekeeping BMPs prevent spills and leaks in work/repair areas		<u> </u>	'			
Employees are trained to properly manage hazardous materials and wastes	<u> </u>	<u> </u>	<u> </u> '			
Employees are trained in storm water pollution prevention practices			'			
CORRECTIONS / ADDITIONAL COMMENTS				DUE DATE		
Inspector Signature	-			Date		

Stormwater Inspection Checklist for Nurseries						
Business Name:				OF MALIA		
Type of Business:						
Site Address:						
Mailing Address:				Toomorated March 28,100		
Owner/Operator:						
Staff Onsite During Inspection:	ASBS: Yes No					
Phone Number:	Date:					
Email:	Time:					
Activities Inspected (minimum Best Management Practices (BMPs) required)		BMI ective N	eness N/A	Comments		
Storm drain inlets are labeled						
Storm drain inlets are routinely inspected and cleaned (min. once per year)						
Area is free of visible discharges to the storm drain system						
Site is kept free of litter, debris, and sediment using dry methods						
Outdoor areas are free of spills, leaks, excessive staining, and evidence of past spills or illicit discharges						
Roof downspouts are directed away from areas of potential pollutants						
Water from washing and maintenance activities is disposed of appropriately and does not enter the MS4						
Pesticides and fertilizer are properly managed; IPM used where feasible						
Adequate erosion prevention measures (vegetation or physical stabilization) are employed						
Over-watering/over-irrigation is eliminated						
Stockpiles are properly stored to prevent material transport						
Green waste is stored and disposed of properly						
Garbage container area is free of litter and debris						
Dumpsters and surrounding area are free of leakage and liquid waste						
Dumpster bin lids are kept closed						
Materials stored outside are covered to prevent contact from run-on						
Outdoor storage containers are labeled						
Liquid storage containers are equipped with secondary containment						
Secondary containment and surrounding area are kept free of spills						
There is an accessible, functional spill response kit onsite						
Loading and unloading areas are kept free of debris  Employees are trained to properly manage hazardous materials and wastes						
Employees are trained to properly manage nazardous materials and wastes  Employees are trained in storm water pollution prevention practices						
CORRECTIONS / ADDITIONAL COMMENTS				DUE DATE		
Inspector Signature				Date		

## **Appendix B: Additional Information**

Presented in this appendix is additional information about the City's stormwater and non-stormwater control measures, including details which extend the information provided in responses to questions in the Individual Form.

#### **Clean Water Program Highlights and Accomplishments**

The following is a list of highlights and accomplishments of the City's Clean Water Program

- Malibu Civic Center Stormwater Treatment Facility This high capacity facility was constructed with active bacteria disinfection technologies including filtration and ozone treatment. Complete and Operational
- Legacy Park the City's central park that includes stormwater detention basins linked to the Civic Center Stormwater Treatment Facility, intermittent wetlands, subsurface wetlands, restoration of riparian habitat and environmental education opportunities. This park has received seven prestigious awards since it was completed, including the American Society of Civil Engineers' prestigious Project of the Year Award
- Trancas Canyon Park this City park has an area designated for walking dogs, and thus incorporates BMPs including permeable paving in parking area and a detention basin in the field, along with native plantings in the landscaping.
- Stream restoration projects Solstice Creek Bridge Replacement, and Las Flores Canyon Creek Restoration and Park Project
- Paradise Cove Clean Ocean Facility this facility includes active bacteria disinfection technologies including filtration and ultraviolet light. The facility treats dry-weather and stormwater flows from Ramirez Creek. Complete and Operational.
- Marie Canyon Water Quality Improvement Project this County owned and operated County owned and operated facility includes six filtration units and an ultraviolet light disinfection system capable of treating 100 gallons per minute of dry-weather runoff. Operational.
- Cross Creek Road Improvements (with native vegetation landscaping and permeable surfaces)
   Complete
- Broad Beach Road Biofiltration Complete and Operational
- Wildlife Road Treatment and award-winning ASBS Focused Outreach Project Complete and Operational
- Robust public outreach program (printed and online) with frequent notifications through newsletters, community calendars, social media, and the environmental programs section of the City's website.

#### Strengths of the City's Clean Water Program

The following is a list of the City of Malibu's Clean Water Program's major strengths

- Committed City Council, management and staff
- Progressive policy and regulations Malibu Municipal Code includes: Storm Water Management and Discharge Control Ordinance; a restrictive zoning ordinance and Local Coastal Program; litter reducing ordinances banning smoking on beaches, polystyrene packaging and foodservice ware, and plastic shopping bags; OWTS point of sale inspections ordinance; and an administrative fines ordinance
- Malibu Area Conservation Coalition efforts focusing on water quality protection and energy conservation through water conservation
- Robust and proactive commercial facilities inspection program in particular the Clean Bay Restaurant Certification program, and that all targeted commercial facilities inspections are conducted annually rather than the required two times per permit cycle
- Responsive and active community
- Innovative use of technology to deliver public education messages, including through social media (Facebook, Instagram, and Twitter) and other content management systems
- Active collaboration between multiple City departments, several public agencies, and nongovernment organizations
- Extensive review process for all new development and construction to ensure projects are held to high environmental protection standards
- Continuous efforts to improve and develop the City's environmental programs with focus on Clean Water Program and sustainability projects
- In-house staff training includes sessions on internal procedures and documentation, construction BMPs, and low impact development, goes above minimum requirements by involving as many staff as possible and not just target employees
- Ongoing environmental professional development training for staff
- Continued improvements to complaint response and documentation procedures
- Continued improvements to construction inspection documentation.

#### **Interagency Coordination**

The City is involved in at least 13 interagency partnerships and committees which help to improve the City's storm water management program, and actively participates when these groups convene.

- 1. Malibu Creek Watershed Management Committee
- 2. LA County EWMP Coordinators meetings
- 3. LA County CIMP Coordinators meetings
- 4. LA County Public Outreach Strategy meetings
- 5. North Santa Monica Bay Coastal Watersheds EWMP & CIMP coordination meetings
- 6. Leadership Committee of the Greater Los Angeles County Integrated Regional Water Management Planning (IRWMP) Planning Group
- 7. North Santa Monica Bay Watersheds Steering Committee of the Greater Los Angeles County IRWMP Group
- 8. Malibu Creek Watershed Monitoring Technical Advisory Committee
- 9. LA Stormwater Permit Group
- 10. Bight ASBS Subcommittee (anticipated to reconvene by 2018).
- 11. Malibu Area Conservation Coalition
- 12. Beach Water Quality Work Group
- 13. LA Marine Protected Area (MPA) Collaborative.

#### **Rural Storm Drainage System and Natural Creek Outlets**

In Malibu, there are approximately 232 total catch basins/culverts that the City maintains (cleans and marks with a "No Dumping" message), there are no open channels in Malibu's MS4, only a couple small channels in Malibu that are part of Los Angeles County Flood Control District's (LACFCD) MS4, and the City has approximately 21,755 feet of closed storm drain. Despite having other agencies and private entities own portions of MS4 in Malibu, the system is unlike most areas of Los Angeles County (where there is an elaborate system of co-mingled jurisdictions throughout the countywide MS4). Unlike most of the County, much of the City's MS4 is in rural and rugged settings and consists of a series of singular inlet structures (sometimes with an under-road connector pipe), which outfall to the sides of vegetated canyons.

The natural creek and storm drainage outlets adjacent to shoreline monitoring stations sampled as part of the Santa Monica Bay Beaches Bacteria TMDL Coordinated Shoreline Monitoring program are not owned or operated by the City. Most water quality monitoring in this program occurs at the shoreline next to mouths of natural creeks and gullies from canyons. Some of these subwatersheds have no contribution whatsoever from the City's MS4. There is minimal infrastructure in many of these areas, and the City does not own or operate an extensive or modern system of curb and gutter, drainage pipes or flood control channels.

#### **Natural Sources of Fecal Indicator Bacteria**

Scientific research continues to provide significant information on natural sources of bacteria. From these studies, the City and stakeholders are gaining a better understanding of MS4 discharges relative to water quality. For example, studies performed by the United States Geological Survey (USGS) in Santa Barbara and Malibu both showed kelp wrack as a major contributor of elevated fecal indicator bacteria (FIB) in environmental media.<sup>1,2</sup> The USGS Malibu study evaluated the occurrence. distribution and sources of FIB and nutrients in shallow groundwater, Malibu Lagoon and near-shore ocean waters in dry and wet weather. USGS also found that tide, temperature, wind and the time of day samples are collected all affected bacteria concentrations in Malibu. The results provided evidence that in dry weather, environmental FIB sources included surface deposits along the berm and nearby sand, as well as sediment at the bottom of Malibu Lagoon. The USGS also found that bacteria in the near-shore ocean were associated with tidal fluxes, with highest bacteria concentrations occurring during high tide. This correlated with wave run-up on the beach washing FIB from the wrack line and beach sands. Water movement through the berm at the mouth of the Lagoon was found to be a source of FIB to the near-shore ocean during low tide, and groundwater bacteria concentrations were low at low tide. Bacteria counts were higher at night when there is less chance for solar disinfection and much lower in the afternoon after the sun's heat penetrated the water to kill the bacteria. Bacteria counts were also highest during high tide. In summary, USGS found that natural and environmental sources of bacteria, in connection with tidal and temporal influences, impact the occurrence of bacteria in the near-shore environment. This likely affects the occurrence of FIB observed at the shoreline monitoring near the outlet of Malibu Creek and Lagoon. Tidal influences in concert with natural sources of FIB also may explain other shoreline exceedances.

The City's Paradise Cove Clean Ocean Facility has a total treatment capacity of 3,600 gpm for gross solids and sediment removal, and up to 900 gpm capacity for disinfection.<sup>3</sup> The treatment facility was designed to meet the water quality objectives set forth in the Santa Monica Bay Beaches Bacteria TMDL for summer and winter dry weather, and wet weather periods for all but the wettest of rainfall years.<sup>4</sup> Flow monitoring in the private channel upstream of the facility in the first wet season post-construction showed that the facility has the capacity to treat all dry weather flows and most wet weather events, with highest flows peaking around 4,000 gpm with some isolated un-sustained peaks of 10,000 gpm or greater (suspected due to higher storm flows or debris fouling the measurements). Even with all dry weather flows being treated, exceedances of FIB recreational standards in the wave wash at the beach persist. Additional sampling conducted over two years showed that once the treated water contacted the sand and kelp wrack, fecal indicator bacteria levels increased dramatically. This is another example of fecal indicator bacteria occurring on the beach at a creek outlet as a result of uncontrollable natural influences which are not related

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<sup>&</sup>lt;sup>1</sup> J.A. Izbicki et al., 2009. *Sources of Fecal Indicator Bacteria in Urban Streams and Ocean Beaches, Santa Barbara, California*. Annals of Environmental Science. Vol 3, 139-178

<sup>&</sup>lt;sup>2</sup> Izbicki et al., 2012. Sources of Fecal Indicator Bacteria to Groundwater, Malibu Lagoon and the Near-Shore Ocean, Malibu, California. Annals of Environmental Science. Vol 6, 35-86

<sup>&</sup>lt;sup>3</sup> Prior to construction of the facility in 2006, daily stream flows (as measured by Santa Monica Baykeeper) only exceeded 900 gallons per minute (gpm) following rain storms of greater than 1 inch, and stream flows dropped below 900 gpm approximately 24 hours following the rain events.

<sup>&</sup>lt;sup>4</sup> J. Brown, 2011. Final Project Certification for the Paradise Cove Stormwater Treatment System Project. Prepared for: State Water Resources Control Board State Revolving Fund Project No. C-06-6969-110, Agreement. October 2011 No. 08-354-550 (Previously Agreement No. 06-298-550-0).

to discharges from the MS4. There are no City/County owned MS4 drainage facilities in the watershed tributary to this facility.

Using bacteria source identification tools, other scientific researchers have found that in both wet and dry weather, non-human influenced beaches have high bacteria levels even when there are no storm drain discharges present. Published research undertaken by UCLA and Stanford<sup>5</sup> confirms the USGS results that kelp and bird and brine fly feces deposited in the kelp wrack directly influence water quality. The studies have shown that the source or combination of sources of FIB to near-shore ocean water is not precisely known, but includes sources other than stormwater. Concurrently, the USEPA and a growing body of experts with peer-reviewed research have a greater understanding of the level of public health risk associated with natural and non-human sources of bacteria. Because the emerging science is critical to local decisions, the City is active in the State Board's Beach Water Quality Work Group that keeps track of best available science related to public health.

In an April 18, 2013 letter to the Regional Board Executive Officer, the City explained its desire to pursue a regulatory mechanism for removing obligations to control natural sources of bacteria under the Santa Monica Bay Beaches and Malibu Creek and Lagoon bacteria TMDLs. Environmental influences and sources of elevated bacteria in the rural watersheds of North Santa Monica Bay are complex. The City recognizes that in order for all stakeholders to fully understand these issues it is important to collaborate with other organizations and recognized experts.

<sup>&</sup>lt;sup>5</sup> Imamura et. al., 2011. *Wrack Promotes the Persistence of Fecal Indicator Bacteria in Marine Sands and Seawater*. FEMS Microbiol Ecology. Vol 77, 40–49.

## Appendix C: City of Malibu Special Protections Monitoring for Areas of Special Biological Significance

2015-2016 Season

## December 2016



## CITY OF MALIBU

**Areas of Special Biological Significance Special Protections Monitoring** 

## **Monitoring Report**

2015 - 2016 Season

# City of Malibu: Areas of Special Biological Significance Special Protections Monitoring

2015-2016 Season

**Monitoring Report** 

December 2016

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 $<sup>^{\</sup>rm 1}\, {\rm Tables}$  are included at the end of the report.

#### I. Introduction

Area of Special Biological Significance (ASBS) 24, which stretches from Latigo Point to Laguna Point, was established in 1974 by the State Water Resources Control Board (Water Board) to preserve sensitive marine habitat. Part of ASBS 24 is within the City of Malibu (City). The City is responsible for stormwater and non-stormwater discharges that flow to the ASBS through its storm drain system and must conduct water quality monitoring to comply with the Water Board's General Exception to the California Ocean Plan (COP) for Selected Discharges Into Areas Of Special Biological Significance, Including Special Protections For Beneficial Uses (General Exception) Attachment B entitled Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges (Special Protections).

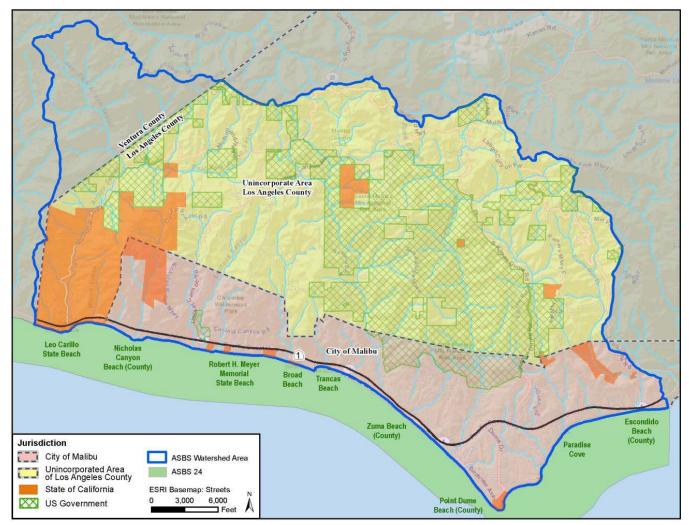


Figure 1. ASBS 24 Watershed and Jurisdictional Boundaries Map

In general, the Special Protections were developed to eliminate dry weather runoff, ensure that wet weather runoff does not alter natural water quality in the ASBS, and ensure that adequate monitoring be conducted to determine if natural water quality and the marine life beneficial use are protected.<sup>2</sup> The Special Protections include provisions that incentivize participation in a regional monitoring program, including the requirement to sample for one storm season. The City participated in the 2008 and 2013 Southern California Bight Regional Monitoring Program ASBS project led by the Southern California Coastal Water Research Project (SCCWRP). The lack of sufficient rain or safe access during the 2013-2014 wet weather season<sup>3</sup> prevented the City from successfully sampling three storm events all in one storm season.

In comments to the September 20, 2014 ASBS 24 Draft Compliance Plan for the County of Los Angeles and City of Malibu (Compliance Plan), the Water Board requested that additional monitoring be conducted in order to more fully understand any potential water quality impacts from stormwater runoff to the ocean receiving water of ASBS 24. The City continued its receiving water and associated outfall monitoring through the 2014-2015 storm season and 2015-2016 storm season for a total of four successful sampling events during the three storm seasons that span 2013-2016. Monitoring was conducted in accordance with the methods and requirements set forth in the Special Protections. Monitoring results and assessment from the two storm events in February 2014 and December 2014 were included in the revised Compliance Plan dated September 20, 2015 and submitted to the Water Board. The 2015-2016 monitoring results from the two storm events in January 2016 and March 2016 are presented in this report along with the February 2014 and December 2014 monitoring results and an analysis of compliance with water quality protection requirements set forth in the Special Protections.

#### II. Objectives and Design

This ASBS 24 monitoring report is intended to supplement previous data collected during the 2013-2014 and 2014-2015 storm seasons in order to meet the monitoring requirements of the Special Protections, and to be consistent with the broader Regional ASBS Workplan<sup>4</sup> which the City participated in. The Special Protections set forth requirements for two types of monitoring: core discharge monitoring and ocean receiving water monitoring. Core discharge monitoring

<sup>&</sup>lt;sup>2</sup> State Water Resources Control Board (SWRCB). "Consideration of a proposed Resolution approving an exception to the California Ocean Plan for Selected Discharges into Areas of Special Biological Significance, including Special Protections to protect beneficial uses, and approving a program environmental impact report." SWRCB Board Meeting Session – Division of Water Quality, Agenda Item 6. October 18, 2011. Accessed December 14, 2016. http://www.waterboards.ca.gov/board\_info/agendas/2011/oct/101811\_6res.pdf.

<sup>&</sup>lt;sup>3</sup> Winter of 2012-2013 was the first opportunity to conduct a regional monitoring program past the March 20, 2012 adoption of the General Exception and Special Protections. There were no storms successfully sampled by Malibu that year, or few by other agencies participating in the Bight '13 ASBS study. Sampling was continued into 2013-2014. On January 17, 2014, Governor Brown declared a Drought State of Emergency.

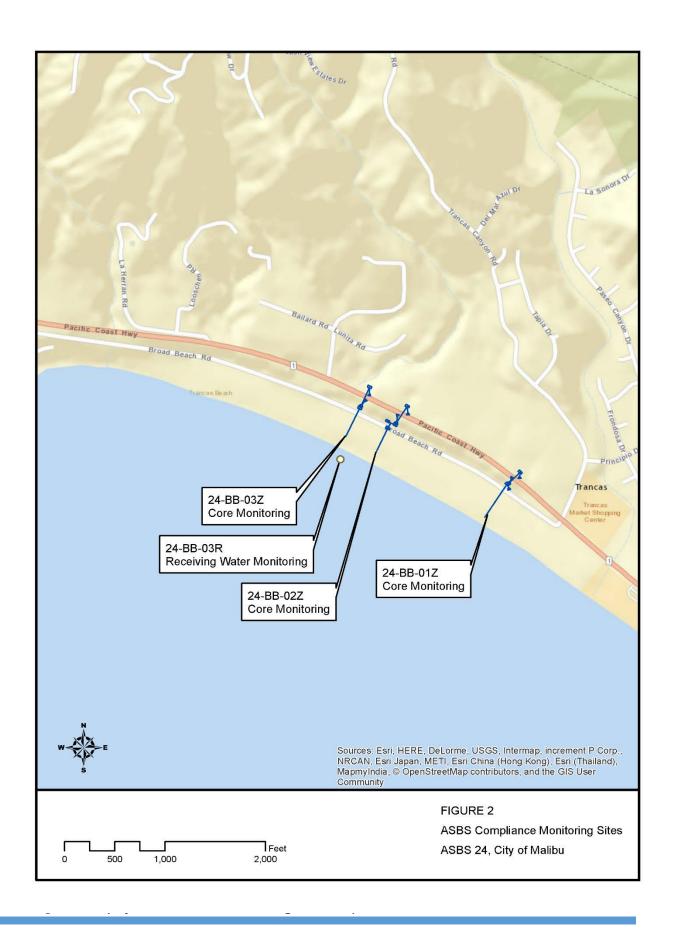
<sup>&</sup>lt;sup>4</sup> Bight '13 ASBS Planning Committee. "Southern California Bight 2013 Regional Monitoring Survey: Areas of Special Biological Significance Workplan." December 24, 2014.

included collecting and analyzing wet weather discharges from private storm drain outfalls that discharge to ASBS 24 during storm events, and ocean receiving water monitoring included collecting and analyzing samples from the ocean before and after<sup>5</sup> a storm event at two locations. Receiving water monitoring included one sample site directly in front of the outfall and one reference site at the mouth of a stream in an undeveloped watershed intended to represent natural water quality. A map of the sample sites is shown on Figure 2. These are the same sample sites used in the Bight 2008 (Bight '08) and Bight 2013 (Bight '13) regional monitoring studies. Table 1 summarizes the characteristics and locations of the sites that were monitored during the 2015-2016 storm season.

This report presents an evaluation of the results from core discharge monitoring and ocean receiving water monitoring during the 2015-2016 storm season in combination with available data from prior storm events and reference site monitoring data. The reference site monitoring was completed by SCCWRP as part of the Southern California Bight '13 Regional Monitoring Survey, and included data from five sampling events during the 2008-2009 and 2013-2014 storm seasons from the City's reference site at Nicholas Canyon<sup>6</sup>. The 2015-2016 monitoring includes ocean receiving water monitoring pre- and post-storm directly in front of the outfall. The core discharge site 24-BB-03Z and its linked ocean receiving water site 24-BB-03R were monitored for two storm events and the core discharge site 24-BB-03Z was monitored for one storm event. With the addition of these sampling events, the City surpassed the Special Protections requirement to monitor for three storm events with a total of four monitored storm events. As previously reported to the Water Board, although the City maintains ownership of the inlets for each of the storm drains monitored as part of core discharge monitoring, the ownership status of the outfalls is privately owned.

<sup>&</sup>lt;sup>5</sup> Core samples for post-storm events are actually collected during the event, or within relatively few minutes of it ending. The outfalls drain a small area and cease to flow shortly after rain ends.

<sup>&</sup>lt;sup>6</sup> Schiff, Kenneth and Jeff Brown. "South Coast Areas of Special Biological Significance Regional Monitoring Program Year 2 Results." Southern California Coastal Water Research Project: Technical Report 852. February 2015. Accessed December 14, 2016. http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/852 SouthCoastASBS FinalRep.pdf.



According to guidance provided in the Special Protections, core discharge monitoring must include sampling for oil and grease and total suspended solids (TSS) at storm drain outfalls that are greater than 18 inches and less than 36 inches in diameter. None of the outfalls in the City's ASBS monitoring program are 36 inches or greater in diameter. If there are not any outfalls 36 inches or greater in diameter, then the Special Protections instruct that the storm drain outfall linked with the ocean receiving water site must be sampled for oil and grease, TSS, total metals, PAHs, pyrethroids, organophosphorus (OP) pesticides, ammonia, nitrate as N, and total phosphorus during each storm event. Additionally, the Special Protections require that chronic toxicity be measured during one storm event at each outfall. For the 2015-2016 storm season, outfall 24-BB-03Z with a 30" diameter was analyzed for the full list of constituents because it is the outfall linked with ocean receiving water site, while outfall 24-BB-02Z with a diameter of 18" was analyzed for oil and grease and TSS. The toxicity testing required for these outfalls was performed during the previous storm seasons, but the City chose to conduct additional toxicity analysis at 24-BB-03Z during the 2015-2016 storm season. As previously reported to the Water Board, although the City maintains ownership of the inlets for each of the storm drains monitored for toxicity as part of core discharge monitoring, the ownership status of the outfalls is privately owned.

As per the guidance in the Special Protections, ocean receiving water monitoring results representing conditions in the ASBS near major discharges are compared to natural or reference conditions prior to and immediately following a storm event. In the Bight '08 and Bight '13 Regional ASBS workplans, the concentrations of constituents observed at reference sites located at the mouths of streams in un-urbanized watersheds along the Southern California coast were used to define the range of "natural water quality". Input from the Natural Water Quality Committee further refined this approach by advising that a threshold level equivalent to the 85th percentile of reference site post-storm concentrations must be applied to eliminate uncertainty associated with outliers, thereby being more protective of water quality.<sup>7</sup>

The City's ocean receiving water monitoring included analysis of water chemistry, water toxicity and biological integrity. For the 2015-2016 storm season, ocean receiving water monitoring was conducted at site 24-BB-03R both prior to and during each storm event<sup>8</sup>. Ocean receiving water was analyzed both pre-storm and post-storm for the same constituents as the core discharge monitoring for the outfall linked to the receiving water site: oil and grease, TSS, total metals, PAHs, pyrethroids, OP pesticides, ammonia, nitrate as N, and total phosphorus. Chronic toxicity

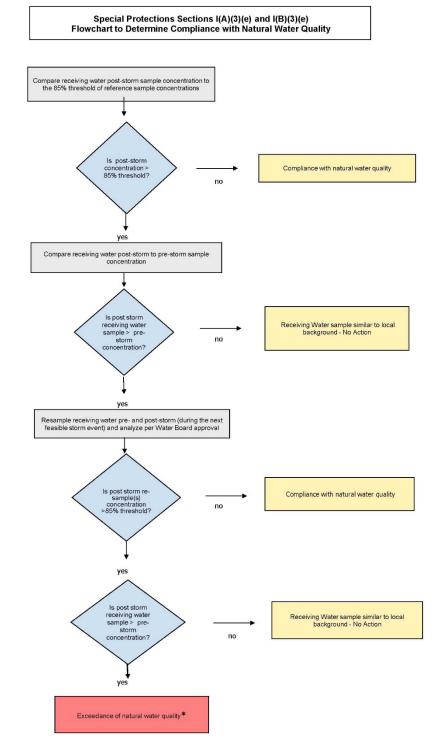
<sup>&</sup>lt;sup>7</sup> Dickson, Andrew et al. "Summation of Findings Natural Water Quality Committee 2006-2009." Southern California Coastal Water Research Project: Technical Report 625. September 2010. Accessed December 2, 2016. ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/625\_NWQC\_FindingsSummary.pdf.

<sup>&</sup>lt;sup>8</sup> Post-storm samples were collected during the storm events to ensure that stormwater discharge from the outfall was flowing into the receiving water. The City's ASBS outfalls drain small areas and will often cease to flow shortly after it stops raining, which prevents samplers from waiting until the storm stops to collect post-storm samples.

for three species (bivalve embryos, echinoderms, and kelp) was measured in one pre-storm sample and two post-storm samples.

The ocean receiving water monitoring results were then used to determine if natural water quality in the ASBS is being maintained. The process to determine compliance with natural water quality thresholds is depicted in the flowchart from the Special Protections (see Figure 3). The post-storm receiving water concentrations are compared to the pre-storm sample concentrations and the 85<sup>th</sup> percentile reference threshold for natural water quality determined by the Bight '08 and Bight '13 studies. If the post-storm concentration is greater than both the pre-storm concentration and the reference threshold, then the analyte is considered to cause or contribute to an alteration of natural ocean water quality in the ASBS, according to the Special Protections. If this condition occurs for the same analyte in two consecutive storms, including the one most recently sampled, then the Special Protections considers this an alteration of natural water quality and indicates that pollutant reductions may be necessary.

Pollutant reductions are required to result in discharge constituent concentrations below either the Table 1 Instantaneous Maximum Water Quality Objectives (WQOs) in Chapter II of the California Ocean Plan (COP) or a 90% reduction in pollutant loading during storm events for the applicant's total discharge. Constituents that are above the natural water quality threshold for the ASBS, and that also have an associated COP Table 1 Instantaneous Maximum WQO value, are compared with the Table 1 Instantaneous Maximum WQOs in order to determine the appropriate pollutant load reduction for compliance with the Special Protections.



<sup>\*</sup> When an exceedance of natural water quality occurs, the discharger must comply with section I.A.2.h (for permitted storm water) or section I.B.2.c (for nonpoint sources). Note, when sampling data is available, end-of-pipe effluent concentrations will be considered by the Water Boards in making this determination.

Figure 3. Natural Water Quality Flowchart

#### III. 2015-2016 Monitoring Results

The City conducted additional core discharge monitoring and ocean receiving water monitoring over two storm events during the 2015-2016 Storm Season. The first storm occurred on January 31, 2016 and the second storm occurred on March 11, 2016. Monitoring was successfully completed at the outfall and receiving water locations. The analyses performed for samples collected at each site are listed in Table 2.

#### A. Core Discharge Monitoring

Core discharge samples were collected from outfalls 24-BB-03Z and 24-BB-02Z during the storm events. Outfall 24-BB-01Z was not sampled because there was not sufficient flow during either storm. All of the core discharge sample sites are at outfalls with diameters between 18 and 36 inches. In accordance with the Special Protections, outfall 24-BB-02Z is sampled for oil and grease and TSS, while outfall 24-BB-03Z is affiliated with the receiving water sample site 24-BB-03R and is therefore sampled for oil and grease, TSS, total metals, PAHs, pyrethroids, OP pesticides, ammonia, nitrate as N, and total phosphorus.

The detected analyte concentrations from core discharge samples are shown in Table 3. When results were above the natural water quality threshold of the ASBS, and there is an associated COP Table 1 Instantaneous Maximum WQO, the post-storm sample result was compared with the Table 1 Instantaneous Maximum WQO in order to determine if pollutant load reduction is needed. If the constituent concentration is less than the COP Table 1 Instantaneous Maximum WQO, then additional BMPs are not required by the Special Protections.

#### January 31, 2016 Storm Event

During this storm event, 24-BB-02Z and 24-BB-03Z were successfully sampled. Copper was the only constituent with a concentration greater than the COP Table 1 Instantaneous Maximum WQO from the 24-BB-03Z sample. PAHs and pyrethroids were present in the sample, but there is not an instantaneous maximum value in the COP to compare these values to for reference.

#### March 11, 2016 Storm Event

During this storm event, 24-BB-03Z was successfully sampled. Outfall 24-BB-02Z was not sampled because stormwater did not flow from the outfall and reach the receiving water. None of the constituents were greater than the COP Table 1 Instantaneous Maximum WQOs.

PAHs and pyrethroids were present in the sample, but there is not an instantaneous maximum value in the COP to compare these values to for reference.

#### B. Ocean Receiving Water Monitoring

Ocean receiving water samples were collected at BB-24-03R in front of outfall BB-24-03Z during each of the storm events while stormwater runoff from the outfall was flowing into the receiving water. As per the Special Protections, constituent concentrations from ocean receiving water samples were compared to reference threshold concentrations, as defined by the 85<sup>th</sup> percentile of sample concentrations taken from reference sites in southern California during the Bight '08 and Bight '13 studies. A summary of the Receiving water analytical results for general chemistry, metals, PAHs, organophosphorus pesticides, and pyrethroid pesticides are presented in Tables 4, 5, 6, and 7, respectively. Aquatic toxicity results are presented in Tables 8 and 9.The full chemistry and aquatic toxicity reports are in Appendix A and Appendix B.

#### i. General Chemistry

#### January 31, 2016 Storm Event

General chemistry constituents included ammonia as N, nitrate as N, oil and grease, total orthophosphate as P, and TSS. The concentration of post-storm ammonia at 24-BB-03R was greater than the 85<sup>th</sup> percentile reference threshold, and slightly above the pre-storm concentration. Oil and grease and Nitrate as N concentrations were below the method detection limits (MDL). Orthophosphate as P had the same concentration in the pre-storm and post-storm samples, and was below the reference threshold. The TSS was a little higher in the pre-storm sample than the post-storm sample, and both values were well below the reference threshold.

#### March 11, 2016 Storm Event

The concentrations of ammonia as N and oil and grease were below the MDL. The prestorm concentration of nitrate as N was double the post-storm concentration, and both were below the reference threshold. The post-storm concentration of orthophosphate as P was slightly above the pre-storm concentration and below the reference threshold. The post-storm TSS concentration was greater than the pre-storm concentration and below the reference threshold.

#### ii. Total Metals

#### January 1, 2016 Storm Event

In general, the post-storm metals concentrations in ocean receiving water samples at 24-BB-03R were either below the 85<sup>th</sup> percentile reference threshold or were below pre-storm concentrations. Selenium and silver were the only two metals with concentrations greater than the reference threshold and pre-storm samples. The concentrations for silver were close to one another with the 85<sup>th</sup> percentile threshold value at 0.08  $\mu$ /L, the pre-storm concentration 0.09  $\mu$ /L, and the post-storm concentration 0.10  $\mu$ /L.

#### March 11, 2016 Storm Event

Concentrations of arsenic, lead and selenium in the ocean receiving water samples at 24-BB-03R were above the 85<sup>th</sup> percentile reference threshold values. The pre-storm concentration of selenium was also greater than the 85<sup>th</sup> percentile reference threshold value. The concentration of silver was above the reference threshold, but the pre-storm concentration was greater than the post-storm concentration so the receiving water sample was similar to the local background concentration.

#### iii. Polynuclear Aromatic Hydrocarbons

Reference threshold concentrations for PAHs are expressed as totals for all individual PAH species combined. Calculated total PAH concentrations for the City's ocean receiving water monitoring are presented in Table 5.

#### January 1, 2016 Storm Event

The concentrations of PAHs from the January 31, 2016 post-storm sampling event were all below the MDL. Therefore, the total concentration of PAHs was not greater than the 85<sup>th</sup> percentile threshold value.

#### March 11, 2016 Storm Event

The calculated Total PAH concentrations for the pre-storm and post-storm samples both were greater than the 85<sup>th</sup> percentile reference threshold. The pre-storm sample concentration was greater than the post-storm sample concentration, so the post-storm receiving water sample was similar to the local background concentration.

#### iv. Organophosphorus Pesticides

Reference threshold concentrations for organophosphorus pesticides are expressed as totals for all individual species combined. Calculated total organophosphorus pesticide concentrations for the City's ocean receiving water monitoring are presented in Table 6.

#### January 31, 2016 Storm Event

The concentrations of pre-storm and post-storm organophosphorus pesticides from the January 31, 2016 sampling event were all below the MDL. Therefore, the total concentration of OP pesticides was not greater than the 85<sup>th</sup> percentile threshold value.

#### March 11, 2016 Storm Event

The concentrations of pre-storm and post-storm organophosphorus pesticides from the March 11, 2016 sampling event were all below the MDL. Therefore, the total concentration of OP pesticides did was not greater than the 85<sup>th</sup> percentile threshold value.

#### v. Pyrethroid Pesticides

Reference threshold concentrations for pyrethroid pesticides are expressed as totals for all individual species combined. Calculated total pyrethroid pesticide concentrations for the City's ocean receiving water monitoring are presented in Table 7.

#### January 31, 2016

The concentrations of pre-storm and post-storm pyrethroids from the January 31, 2016 sampling event were all below the detection limits. Therefore, the total concentration of pyrethroids was not greater than the 85<sup>th</sup> percentile threshold value.

#### March 11, 2016

Bifenthrin was the only pyrethroid with a concentration above the method detection limit, but below the reporting limit, in the post-storm sample collected from 24-BB-03Z on March 11, 2016. The concentration of Total PAHs remained below the 85<sup>th</sup> percentile reference threshold because the method detection limits for danitol

(fenpropathrin), cis-permethrin and trans-permethrin decreased. The concentration for each of these pyrethroids was below the method detection limit, so half of the method detection limit was used, which was less than half of the method detection limit used in the Bight '13 study to establish the reference threshold.

#### vi. Aquatic Toxicity

Toxicity samples were collected during each storm event. Toxicity of ocean receiving water and the associated outfall 24-BB-03Z were tested for: Mytilis galloprovincialis (bivalve) development, Strongylocentrotus purpuratus (sea urchin) fertilization, and Macrocystis pyrifera (giant kelp) germination and growth. The toxicity results are presented in Table 8 and Table 9. The full toxicity reports for each storm event are provided in Appendix B.

In the aquatic toxicity testing results, no toxicity was observed for bivalve development, sea urchin fertilization, or giant kelp germination or growth in any of the samples taken from each monitored storm event during the 2014-2016 storm seasons. This is reflected in Table 8 which shows each result was greater than the evaluation threshold (80% of the control sample), and in Table 9 which shows the no observed effect concentration (NOEC) values of 100% for each of the bioassay tests for every sample taken.

#### IV. Determination of Compliance with Natural Water Quality Limits

The Compliance Plan sets forth natural water quality limits as criteria for compliance with requirements of the Special Protections. Compliance with these criteria for maintaining natural water quality was assessed by comparing post-storm receiving water data to the prestorm data from the same site and to the 85<sup>th</sup> percentile reference threshold as shown in the flow chart depicted in Attachment 1 of the Special Protections (Figure 3). In order to comply with natural water quality criteria, the post-storm concentration must be equal to or less than the 85<sup>th</sup> percentile reference threshold, or the pre-storm concentration must be greater than the post-storm concentration (in the latter case the receiving water sample is considered similar to local background conditions). As per the flow chart, an exceedance of natural water quality criteria occurs when the post-storm concentration is greater than the 85<sup>th</sup> percentile, greater than the pre-storm concentration, and this occurs on two consecutive storm events, including the most recent sampling event.

Following the steps outlined in Attachment 1 of the Special Protections (Figure 3), Tables 10, 11, 12 and 13 present an evaluation of the monitoring data with respect to compliance with natural water quality criteria at receiving water sample site 24-BB-03R. Table 10 first

compares the receiving water post-storm sample concentration to the 85<sup>th</sup> percentile threshold for natural water quality and denotes whether the post-storm sample concentration is greater than the threshold. The constituents with concentrations greater than the reference threshold are carried over into Table 11 where the post-storm concentrations are compared to the pre-storm concentrations. If the pre-storm sample concentration is greater than the post-storm sample concentration result, the post-storm sample is considered similar to local background and therefore does not require any action. If the post-storm sample concentration is greater than the pre-storm sample concentration, then the sequence of results shown in Table 12 and Table 13 is used to determine if this condition occurred during two consecutive storm events, including the most recent storm event, and therefore indicates an alteration of natural water quality criteria as defined by the Special Protections.

Selenium was the only constituent where the concentrations of receiving water samples were higher than the reference threshold for natural water quality (pre- and post-storm at 24-BB-03R). Although the detected concentrations of selenium were greater than the reference threshold, the receiving water sample concentration was four orders of magnitude below the COP Table 1 Instantaneous Maximum WQO value established for the protection of marine aquatic life (see Table 14). The outfall concentration at 24-BB-03Z was three orders of magnitude below the COP Table 1 Instantaneous Maximum WQO value for Selenium. The discussion below provides additional consideration of these results with respect to requirements of the Special Protections.

#### V. Discussion

The Special Protections state that the ASBS Compliance Plan shall describe how the necessary pollutant reductions in stormwater runoff will be achieved through prioritization of outfalls and implementation of BMPs to achieve end-of-pipe pollutant concentrations targets during a design storm. Pollutant reductions are required to result in discharge constituent concentrations below either the Table 1 Instantaneous Maximum Water Quality Objectives (WQOs) in Chapter II of the California Ocean Plan (COP) or a 90% reduction in pollutant loading during storm events for the applicant's total discharge.

For the City's ASBS 24 monitoring results, when the receiving water constituent concentrations exceeded the natural water quality reference threshold (85<sup>th</sup> percentile), and had an associated COP Table 1 Instantaneous Maximum WQO, the post-storm sample concentration was compared with the Table 1 Instantaneous Maximum WQO in order to determine the appropriate pollutant load reduction to meet the requirements of the Special Protections. The post-storm receiving water selenium concentration at 24-BB-03R exceeded the reference threshold for natural water quality. As such, the Special Protections (Section I.A.2.h) require submittal of a report that

describes BMPs that are currently being implemented, BMPs that are identified for future implementation, and any additional BMPs that may be added to address the alteration of natural water quality. This report, along with information contained in the Compliance Plan, is intended to fulfill this requirement.

Prior to adoption of the ASBS General Exception and the Special Protections, and despite having no data that indicate pollutant reductions would be needed, in 2011 the City of Malibu obtained two Proposition 84 grant awards from the Water Board to proactively design and install BMPs at designated priority inlets owned by the City adjacent to the ASBS on Broad Beach Road and Wildlife Road, and to conduct an education and outreach program to increase public understanding of ASBS 24. Information about those two projects and the outreach program were among the BMPs and actions included in the Compliance Plan and Pollution Prevention Plan. Construction of the Broad Beach Road and Wildlife Road BMPs was completed in July 2015 and the City has continued promoting the outreach campaign.

The City, County of Los Angeles, and Los Angeles County Flood Control District jointly submitted an ASBS Compliance Plan and an ASBS Pollution Prevention Plan to the Water Board in accordance with the Special Protections that describe existing BMPs, BMPs to be employed in the future, and other actions by the agencies to protect and maintain natural water quality in ASBS 24 from point and non-point sources of pollution. Water quality data that was available at the time those plans were developed was taken into consideration, including updated data during the September 2015 revised Compliance Plan.

As the City BMPs described above have already been installed, and the outfall selenium concentration measured at 24-BB-03Z was less than the COP Table 1 Instantaneous Maximum WQO, the need for additional BMPs is not indicated. Furthermore, in consideration of relevant environmental factors discussed below, along with the City's ongoing implementation of the ASBS Compliance Plan and an ASBS Pollution Prevention Plan, the pollutant reduction requirements of the Special Protections (Section I.A.2.h) do not warrant the need for the City to develop additional BMPs.

#### A. Selenium Occurrence

Selenium was the only constituent for which monitoring results indicated the need for further consideration under Section I.A.2.h of the Special Protections. Selenium is a naturally occurring element found in sedimentary rocks, shales, coal and phosphate deposits and soils. There are around 40 rare known selenium-containing minerals, and they generally occur with sulfides of metals such as copper, zinc and lead. It often occurs in water due to natural sources like weathering and erosion. <sup>9</sup> Known anthropogenic sources generally include mining, coal-fired

<sup>&</sup>lt;sup>9</sup> Environmental Protection Agency (EPA). "Aquatic Life Criterion – Selenium." Accessed December 7, 2016. https://www.epa.gov/wqc/aquatic-life-criterion-selenium.

power plants, and irrigated agriculture. There are no mines or power plants in Malibu. Further, with the exception of limited small vineyards and agriculturally zoned residential properties, there is not significant irrigated agriculture in Malibu, and certainly not in the nearshore vicinity or tributary to where these samples were taken. Therefore, sources of selenium offshore and in the nearshore environment are predominantly natural in origin.

Selenium is found in high concentrations in the Monterey/Modelo Formation. 10 The Monterey Formation is one of California's most important petroleum source rocks, with large offshore and onshore oil and gas deposits throughout the state. It is also a source of potentially hazardous levels of trace metals according to the US Geological Survey's Water Resources Division. "Elements that are highly positively correlated (r2> 0.75) with organic carbon in these rocks include chromium, copper, nickel, antimony, selenium, uranium, vanadium, and zinc."11 This Miocene-age marine sedimentary formation runs in an east-west band from Santa Barbara to Orange County, with major exposures in the upper Ventura, Santa Clara, Los Angeles and Santa Ana river basins, as documented in a technical report prepared by the Las Virgenes Municipal Water District. 12 That report showed that selenium and many metals are found to be unusually high in both surface and groundwater in the Malibu Creek Watershed as a result of the Monterey/Modelo Formation. In addition to the Malibu Creek Watershed, there are several large deposits of this formation throughout the Santa Monica Mountains and at the headwaters of the coastal streams that outlet at the ocean in Malibu as shown in maps from the USGS (http://pubs.usgs.gov/of/2005/1019/ and http://pubs.usgs.gov/of/2005/1019/la1 map.pdf). The Monterey/Modelo Formation has extensive surface expressions in the study area (Zuma Beach and Point Dume), and may be a natural source for selenium found in receiving water samples.

#### B. Selenium Toxicity

SCCWRP calculated the  $85^{th}$  percentile reference threshold for selenium from the Bight '08 and Bight '13 data. In the reference data set, many of the selenium concentration values were below the method detection limit (MDL). SCCWRP used the value of half of the MDL for samples below the MDL, which led to the  $85^{th}$  percentile reference threshold for selenium also being set at half of the MDL,  $0.0025~\mu g/L$ . As a result, any receiving water sample with a detectable amount of selenium will be greater than the  $85^{th}$  percentile reference threshold. The receiving water sampling results include detectable levels of selenium, and therefore concentrations greater than the  $85^{th}$  percentile reference threshold were observed. As mentioned above, the post-storm sample concentration was greater than the pre-storm sample concentration for two consecutive storm events, including the most recent. Given the reference threshold was set at half of the MDL, it is not surprising that the concentration of selenium found in the receiving water samples

<sup>&</sup>lt;sup>10</sup> Local exposures of the Monterey Formation in the Santa Monica Mountains are also known as the Modelo Formation.

<sup>&</sup>lt;sup>11</sup> Keller, M.A., and Evans, K.J. "Hazardous Trace Element in Petroleum Source Rocks." U.S. Geological Survey 2002. Accessed July 14, 2010. <a href="http://geomaps.wr.usgs.gov/env/monterey.html">http://geomaps.wr.usgs.gov/env/monterey.html</a>.

<sup>&</sup>lt;sup>12</sup> Orton, R., Dougal, J., and Gamble J. "Water quality in the Malibu Creek Watershed, 1971 – 2010: Existing conditions, historical trends and data inter-relationships." Las Virgenes Municipal Water District Report No. 2475.00. June 13, 2012. Accessed December 7, 2016. <a href="http://www.lvmwd.com/i-want-to/read/water-quality-in-the-malibu-creek-watershed">http://www.lvmwd.com/i-want-to/read/water-quality-in-the-malibu-creek-watershed</a>.

was greater than this threshold in both pre-storm and post-storm samples for the four storm events sampled. However, the selenium concentration consistently remained four orders of magnitude below the COP Table 1 Instantaneous Maximum WQO and, with a naturally occurring selenium source as explained above, this concentration is not considered to be indicative of significantly altered natural water quality.

Additionally, the Federal Environmental Protection Agency (EPA) issued recommended selenium criteria for aquatic life toxicity in July 2016. The latest scientific information from EPA's findings indicates that selenium toxicity to aquatic life is based on organisms consuming selenium contaminated food, and not as a result of direct exposure to selenium dissolved in water.<sup>13</sup> Selenium bioaccumulates in the food chain and toxicity in fish occurs primarily through maternal transfer to the eggs. Therefore, they recommend that fish tissue samples take precedence over water samples for determining toxicity. EPA did, however, translate the criteria to a 30-day average water quality criteria to determine situations where elevated levels of selenium could result in bioaccumulation with potentially chronic effects to fish. The criteria are included in Appendix C to this report. The measured selenium concentrations post-storm event on March 11, 2016 at the outfall (0.198 µg/L) and receiving water (pre-storm: 0.01 µg/L, post-storm: 0.021 μg/L) were compared to EPA's recommended criteria, and these concentrations were far below the chronic exposure 30-day average (Lentic<sup>14</sup>: 1.5 µg/L, Lotic<sup>15</sup>: 3.1 µg/L). Additionally, the monitored outfall (24-BB-03Z) is not continuously flowing, and so the receiving water 30 day average selenium concentration attributable to the outfall, relative to the post-storm selenium concentration of 0.198 µg/L, would be very small in comparison to EPA's recommended criteria.

#### C. Bight '13 Study

The South Coast Areas of Special Biological Significance Regional Monitoring Program Year 2 Results final report prepared as part of the SCCWRP Bight '13 program found that "Based on the data reported in this study, water quality in southern California ASBS was generally comparable to natural water quality following storm events. On average, the range of post-storm pollutant concentrations in receiving waters sampled near ASBS discharge sites were not significantly different from post-storm concentrations at reference drainage sites, which included stormwater inputs free of (or minimally influenced by) anthropogenic sources ." Based on these findings, no significant anthropogenic impacts to natural water quality locally in ASBS 24 are expected.

<sup>&</sup>lt;sup>13</sup> Environmental Protection Agency (EPA). "Recommended Aquatic Life Ambient Water Quality for Selenium in Freshwater." Document No. 2016-16585. July 13, 2016. Accessed December 7, 2016. <a href="https://www.federalregister.gov/documents/2016/07/13/2016-16585/recommended-aquatic-life-ambient-water-quality-criterion-for-selenium-in-freshwater.">https://www.federalregister.gov/documents/2016/07/13/2016-16585/recommended-aquatic-life-ambient-water-quality-criterion-for-selenium-in-freshwater.</a>

<sup>&</sup>lt;sup>14</sup> Lentic, pertaining to organisms or habitats, means inhabiting or situated in still, fresh water.

<sup>&</sup>lt;sup>15</sup> Lotic, pertaining to organisms or habitats, means inhabiting or situated in a rapidly moving fresh water.

#### VI. Summary and Conclusion

The City completed additional ASBS core discharge monitoring and ocean receiving water monitoring during the 2015-2016 storm season as requested by the Water Board. The City surpassed the minimum required monitoring of three storm events by sampling a total of four storm events during 2014 and 2016. The additional monitoring data collected during the 2015-2016 storm season allowed the City to more fully understand any potential water quality impacts from stormwater runoff to the ocean receiving water in ASBS 24 and assess whether natural water quality is being maintained as defined in the Special Protections.

The Special Protections require that if the results of the receiving water monitoring indicates that stormwater runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger must submit a report to the State Water Board and Regional Water Board that identifies the constituents in stormwater runoff that alter natural ocean water quality and the sources of these constituents. Additionally, the report shall describe BMPs that are currently being implemented, BMPs that are identified for future implementation, and any additional BMPs to address the alteration of natural water quality, including an implementation schedule. This report, along with the Compliance Plan, is intended to fulfill these requirements.

Aquatic toxicity testing results indicated no toxicity to bivalve development, sea urchin fertilization, or giant kelp germination or growth was observed in receiving water nor outfall samples from any of the four monitored storm events. For all other aspects of the City's Core Discharge and Receiving Water monitoring, except for selenium, no constituents were found at concentrations above the reference thresholds used to indicate an alternation of natural water quality in ASBS 24.

Water quality in ASBS 24 is being maintained in accordance with requirements of the Special Protections. Selenium was the only constituent for which receiving water sample concentrations exceeded the reference threshold for natural water quality. With the City's existing BMPs having already been installed, and with the outfall selenium concentration measured at 24-BB-03Z being less than the COP Table 1 Instantaneous Maximum WQO, the need for additional BMPs is not indicated. Also, because the selenium concentrations observed are likely derived from natural sources, and the results in both receiving water and from the outfall were well below the COP instantaneous maximum and the EPA's recommended criteria for aquatic life toxicity, no new BMPs or modifications to the Compliance Plan are considered necessary.

Evaluation of the ASBS Core Discharge and Receiving Water monitoring results according to criteria set forth in the Special Protections and Compliance Plan, along with other lines of evidence discussed herein, indicate that the City's efforts to control the discharge of pollutants, as detailed in the Compliance Plan and Pollution Prevention Plan, are effective at protecting natural water quality. The City of Malibu is a recognized leader in its proactive approach to protecting the environment and its water quality programs. The City will continue to comply with the General Exception and implement the requirements of the Special Protections.

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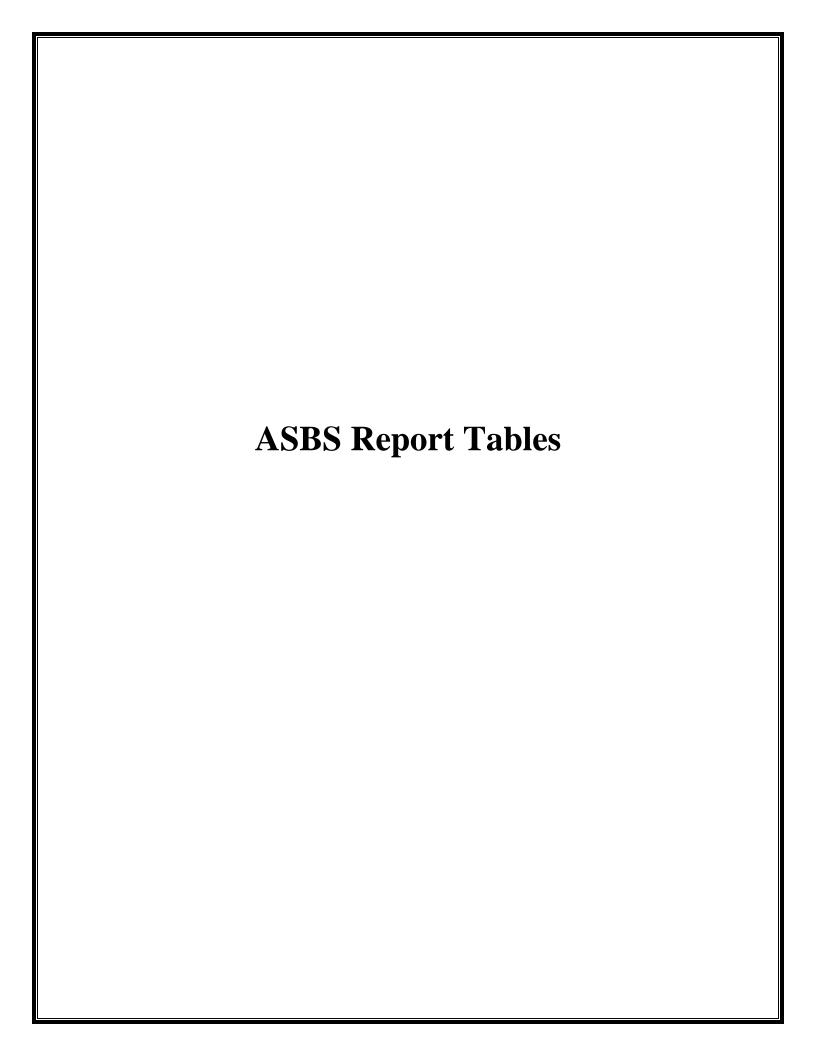


Table 1.

Monitoring Program Sites, Outfall Dimensions and Analysis Completed for the 2015-2016 Wet Weather Season

Monitoring Type	Beach Location	Site Name	Location Latitude	Location Longitude	Pipe Diameter (inches)	Chemical Analysis and Number of Storms Tested	Toxicity Testing and Number of Storms Tested
Core	Broad Beach	24-BB-02Z	34.03302	-118.84988	18	Oil/Grease & TSS 1 storm	None
Monitoring	Broad Beach	24-BB-03Z	34.0334	-118.85082	30	Full List* 2 storms	3 species** 1 storm
Receiving Water Monitoring	Broad Beach	24-BB-03Z	34.0328	-118.85128	N/A	Full List* 2 storms	3 species** 2 storm

<sup>\*</sup>Full constituent list comprises oil and grease, TSS, ammonia, nitrate, total phosphorus, total metals, PAHs, pyrethroids, and OP pesticides

<sup>\*\*</sup> Toxicity species includes bivalves, sea urchins and giant kelp

Table 2.
Summary of Core Discharge and Ocean Receiving Water Sample Collection

	Sample	Outfall or	Storm I	Event 1	Storm	Event 2	Storm	Event 3	Storm	Event 4
Event	Sample Location	Receiving Water	28-Fe	eb-14	2-De	ec-14	31-Ja	n-16	11-M	ar-16
	Location	Receiving water	Chem	Tox	Chem	Tox	Chem	Tox	Chem	Tox
Pre-Storm	24-BB-03R	Receiving Water	х	Х	х		х	Х	х	
	24-BB-03R	Receiving Water	Х	Х	х	Х	Х	Х	Х	х
Post-Storm	24-BB-03Z	Outfall	Х	Х	х	Х	Х	Х	Х	
	24-BB-02Z	Outfall	х	Х	х		х			

Table 3. **Summary of Core Discharge Results from 2014-2016 Monitored Storm Events** 

				(	Outfall Post-S	Storm Conce	ntrations		
	Australia	Links	Storm Event 4	Storm	Event 3	Storm	Event 2	Storm	Event 1
	Analyte	Units	24-BB-03Z	24-BB-03Z	24-BB-02Z	24-BB-03Z	24-BB-02Z	24-BB-03Z	24-BB-022
			3/11/16	1/31/16	1/31/16	12/2/14	12/2/14	2/28/14	2/28/14
General	Chemistry								
	Ammonia as N	mg/L	0.78	0.82		0.76		0.47	
	Nitrate as N	mg/L	0.94	0.76		0.52		0.2	
	Oil & Grease	mg/L	1.7	3	2.4	2.2	<1	<1	<1
	Total Orthophosphate as P	mg/L	0.19	0.13		0.31		0.34	
	Total Suspended Solids	mg/L	211.4	62.6	21.1	480	555	393	82.8
Metals		1 0,	I		ļ				
	Total Arsenic	μg/L	6.203	1.507		3.6		2.598	
	Total Cadmium	μg/L	0.4005	0.1785		0.9106		0.5776	
	Total Chromium	μg/L	13.9122	5.3697		14.335		22.759	
	Total Copper	μg/L	28.952	39.649		43.64		28.435	
	Total Lead	μg/L	11.2257	4.5642		18.316		16.33	
	Total Mercury	μg/L	0.0224	<0.0012		<0.0012		<0.0012	
	Total Nickel	μg/L	10.8771	6.2599		15.933		11.947	
	Total Selenium	μg/L	0.198	0.132		0.304		0.099	
	Total Silver	μg/L	<0.01	<0.01		0.304		0.02	
	Total Zinc	μg/L	112.326	179.33		154.32		177.77	
0		μg/ L	112.520	179.55		134.32		1//.//	
Organo	phosphorus Pesticides								
	None detected								
Polynuc	lear Aromatic Hydrocarbons	1 ,			ı		ı	1 .	1
	Acenaphthene	ng/L	<1	5.6		4 J		<1	
	Acenaphthylene	ng/L	1.4 J	3.2 J		<1		5.3	
	Anthracene	ng/L	7.3	<1		<1		19.3	
	Benz(a)anthracene	ng/L	4.8 J	6.5		15		127.5	
	Benzo(a)pyrene	ng/L	5.1	6.2		16.3		160.5	
	Benzo(b)fluoranthene	ng/L	16.1	20.3		28.4		292.5	
	Benzo(e)pyrene	ng/L	16.8	15.8		46.3		248.1	
	Benzo(g,h,i)perylene	ng/L	15.5	15.7		35.2		141.1	
	Benzo(k)fluoranthene	ng/L	3.7 J	3.5 J		17.4		138.4	
	Biphenyl	ng/L	2.8 J	9.6		8.5		3.8 J	
	Chrysene	ng/L	29.7	31.7		69.2		300	
	Dibenz(a,h)anthracene	ng/L	<1	<1		<1		38	
	Dibenzothiophene	ng/L	7.5	13.9		21.5		<1	
	Dimethylnaphthalene, 2,6-	ng/L	1.1 J	1.8 J		10.1		3.4 J	
	Fluoranthene	ng/L	23.9	21		47.5		210.7	
	Fluorene	ng/L	1.2 J	<1		4.1 J		<1	
	Indeno(1,2,3-c,d)pyrene	ng/L	5.7	5.2		<1		114.8	
	Methylnaphthalene, 1-	ng/L	<1	2.6 J		10.2		3.4 J	
	Methylnaphthalene, 2-	ng/L	1.7 J	1.9 J		9.2		5.3	
	Methylphenanthrene, 1-	ng/L	30.2	7.7		8		14.9	
	Naphthalene	ng/L	3.1 J	10.7		14.1		19.1	
	Perylene	ng/L	11.1	6.3		33.7		43.4	
	Phenanthrene	ng/L	14.8	14.6		33.9		86.5	
	Pyrene	ng/L	27.3	26.8		65.2		209.2	
	Trimethylnaphthalene, 2,3,5-	ng/L	<1	<1		35.3		<1	
Pyrethro	oid Pesticides		•	•			•		
-	Bifenthrin	ng/L	92.5	32.7		34.5		31.6	
	Cyfluthrin	ng/L	<0.5	11.1		<0.5		44.6	
	Danitol (Fenpropathrin)	ng/L	<0.5	12.4		<0.5		<0.5	
	Esfenvalerate	ng/L	<0.5	6.5		<0.5		<0.5	
	Fenvalerate	ng/L	<0.5	7.3		<0.5		<0.5	
	1	10/ -	1		I		I		L

J - The analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

<sup>&</sup>lt; - result is less than the method detection limit

Table 4.
Summary of Ocean Receiving Water Results for General Chemistry and Metals from Monitored Storm Events during the 2014-2016 Storm Seasons

		24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R
Analyte	Units	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm
		2/26/2014	2/28/2014	12/1/2014	12/2/2014	1/30/2016	1/31/2016	3/10/2016	3/11/2016
General Chemistry									
Ammonia as N	mg/L	<0.02	<0.02	<0.02	0.19	0.03	0.04	<0.02	<0.02
Nitrate as N	mg/L	0.04	<0.01	0.03	0.02	<0.01	<0.01	0.1	0.05
Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Total Orthophosphate as P	mg/L	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
Total Suspended Solids	mg/L	10.8	7.1	16.3	4.7	6.9	6.3	4.4	12.3
Metals									
Arsenic	μg/L	1.388	1.322	1.321	1.387	1.537	1.616	1.575	2.607
Cadmium	μg/L	0.0152	0.022	0.0257	0.0168	0.0162	0.0271	0.0294	0.0393
Chromium	μg/L	1.4705	0.6962	0.5345	0.2928	0.6169	0.486	0.2519	1.092
Copper	μg/L	0.167	0.646	0.577	0.317	0.33	0.559	0.239	1.011
Lead	μg/L	<0.0025	0.2159	0.3221	0.2596	0.0836	0.112	0.0575	0.6868
Mercury	μg/L	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012
Nickel	μg/L	0.2951	0.4901	0.6118	0.2955	0.4617	0.4145	0.397	0.715
Selenium	μg/L	0.012	0.026	<0.005	0.01	0.008	0.015	0.01	0.021
Silver	μg/L	0.14	0.12	0.07	0.12	0.09	0.1	0.1	0.09
Zinc	μg/L	2.9144	17.3532	6.6948	7.0005	4.0212	1.7625	2.1802	6.4486

<sup>&</sup>lt; - Result is less than the method detection limit

J - Anaylte was detected at a concentration below the reporting limit. Reported value is estimated.

Table 5.
Calculated Total PAHs in Receiving Water Samples

		Method		Storm	Event 4	Storm	Event 3	Storm	Event 2	Storm	Event 1
Polynuclear Aromatic	Units		Reporting	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R
Hydrocarbons (PAHs)	Utilits	Limit	Limit	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm
		LIIIIIL		3/10/2016	3/11/2016	1/30/2016	1/31/2016	12/1/2014	12/2/2014	2/26/2014	2/28/2014
Acenaphthene	ng/L	1	5	0.5 H	0.5 H						
Acenaphthylene	ng/L	1	5	0.5 H	0.5 H						
Anthracene	ng/L	1	5	0.5 H	0.5 H						
Benz(a)anthracene	ng/L	1	5	1.5 J	1.5 J	0.5 H	0.5 H	1.5 J	1.3 J	0.5 H	0.5 H
Benzo(a)pyrene	ng/L	1	5	0.5 H	0.5 H						
Benzo(b)fluoranthene	ng/L	1	5	22.5	5.5	0.5 H	0.5 H	1.6 J	0.5 H	0.5 H	0.5 H
Benzo(e)pyrene	ng/L	1	5	0.5 H	0.5 H	0.5 H	0.5 H	4.9 J	0.5 H	0.5 H	0.5 H
Benzo(g,h,i)perylene	ng/L	1	5	0.5 H	0.5 H						
Benzo(k)fluoranthene	ng/L	1	5	0.5 H	0.5 H						
Biphenyl	ng/L	1	5	0.5 H	0.5 H						
Chrysene	ng/L	1	5	0.5 H	1.6 J	0.5 H	0.5 H	0.5 H	0.5 H	0.5 H	0.5 H
Dibenz(a,h)anthracene	ng/L	1	5	0.5 H	0.5 H						
Dibenzothiophene	ng/L	1	5	0.5 H	1.6 J	0.5 H	0.5 H	2.2 J	2.1 J	0.5 H	0.5 H
Dimethylnaphthalene, 2,6-	ng/L	1	5	0.5 H	0.5 H	0.5 H	0.5 H	2 J	3.8 J	2.6 J	1.8 J
Fluoranthene	ng/L	1	5	0.5 H	1.2 J	0.5 H	0.5 H	1.1 J	1.9 J	0.5 H	0.5 H
Fluorene	ng/L	1	5	0.5 H	0.5 H	0.5 H	0.5 H	1.2 J	0.5 H	0.5 H	0.5 H
Indeno(1,2,3-c,d)pyrene	ng/L	1	5	0.5 H	0.5 H						
Methylnaphthalene, 1-	ng/L	1	5	0.5 H	0.5 H	0.5 H	0.5 H	1.1 J	1.1 J	0.5 H	0.5 H
Methylnaphthalene, 2-	ng/L	1	5	0.5 H	0.5 H	0.5 H	0.5 H	1.3 J	1.2 J	1.4 J	1.3 J
Methylphenanthrene, 1-	ng/L	1	5	0.5 H	0.5 H						
Naphthalene	ng/L	1	5	0.5 H	1.5 J	0.5 H	0.5 H	2.9 J	3 J	2.3 J	2.4 J
Perylene	ng/L	1	5	0.5 H	0.5 H	1 J	0.5 H	19.3	21.9	0.5 H	1.8 H
Phenanthrene	ng/L	1	5	1.7 J	1.9 J	0.5 H	0.5 H	2.2 J	2.6 J	2.4 J	1.5 J
Pyrene	ng/L	1	5	0.5 H	1.3 J	0.5 H	0.5 H	0.5 H	2.5 J	0.5 H	0.5 H
Trimethylnaphthalene, 2,3,5-	ng/L	1	5	0.5 H	0.5 H	0.5 H	0.5 H	0.5 H	0.5 H	0.5 H	0.5
Total PAHs	ng/L			36.7	24.6	13	12.5	47.8	48.9	19.2	18.8

H - The chemical concentration was below the method detection limit, so the value of half of the method detection limit was used (i.e. ND = 1/2MDL).

Total PAHs were calculated in accordance with SCCWRP's method for establishing the 85th percentile reference threshold. A value of one-half of the method detection limit was used for non-detect values. J-flagged values were used as reported.

J - The chemical was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Table 6.
Calculated Total Organophosphorus Pesticides in Receiving Water Samples

		Mathad		Storm	Event 4	Storm	Event 3	Storm	Event 2	Storm	Event 1	
Organophosphorus Pesticides	Units	Detection Limit	Method	Reporting	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R
Organophosphorus Pesticides	Offics		Limit	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	
				3/10/2016	3/11/2016	1/30/2016	1/31/2016	12/1/2014	12/2/2014	2/26/2014	2/28/2014	
Chlorpyrifos	ng/L	0.5	1	0.25 H	0.25 H							
Diazinon	ng/L	0.5	1	0.25 H	0.25 H							
Ethoprop (Ethoprofos)	ng/L	1	2	0.5 H	0.5 H							
Fenchlorphos (Ronnel)	ng/L	2	4	1 H	1 H	1 H	1 H	1 H	1 H	1 H	1 H	
Malathion	ng/L	3	6	1.5 H	1.5 H							
Methyl parathion	ng/L	1	2	0.5 H	0.5 H							
Tokuthion	ng/L	3	6	1.5 H	1.5 H							
Trichloronate	ng/L	1	2	0.5 H	0.5 H							
Total Organophosphorus Pesticides	ng/L			6	6	6	6	6	6	6	6	

H - The chemical concentration was below the method detection limit, so the value of half of the method detection limit was used (i.e. ND = 1/2MDL).

Total Organophosphorus Pesticides were calculated in accordance with SCCWRP's method for establishing the 85th percentile reference threshold. A value of one-half of the method detection limit was used for non-detect values. J-flagged values were used as reported.

J - The chemical was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Table 7.
Calculated Total Pyrethroid Pesticides in Receiving Water Samples

		Method		Storm	Event 4	Storm	Event 3	Storm	Event 2	Storm	Event 1	
Pyrethroid Pesticides	Units	Detection	Reporting	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	24-BB-03R	
ryletillolu resticides	Units	Limit	Limit	Limit	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm	Pre-Storm	Post-Storm
				3/10/2016	3/11/2016	1/30/2016	1/31/2016	12/1/2014	12/2/2014	2/26/2014	2/28/2014	
Bifenthrin	ng/L	0.5	2	0.25 H	1 J	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	
Cyfluthrin	ng/L	0.5	2	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	
Cyhalothrin, Total Lambda	ng/L	0.5	2	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	
Cypermethrin	ng/L	0.5	2	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	
Danitol (Fenpropathrin)	ng/L	0.5/0.3 <sup>1</sup>	2	0.15 H	0.15 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	
Deltamethrin/Tralomethrin	ng/L	0.5	2	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	
Esfenvalerate/Fenvalerate, total	ng/L	0.5	2	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	0.25 H	
Permethrin, cis-	ng/L	5/2 ²	10/4 ³	1 H	1 H	2.5 H	2.5 H	2.5 H	2.5 H	2.5 H	2.5 H	
Permethrin, trans-	ng/L	5/1 4	10/2 5	0.5 H	0.5 H	2.5 H	2.5 H	2.5 H	2.5 H	2.5 H	2.5 H	
Total Pyrethroid Pesticides	ng/L			3.15	3.9	6.75	6.75	6.75	6.75	6.75	6.75	

H - The chemical concentration was below the method detection limit, so the value of half of the method detection limit was used (i.e. ND = 1/2MDL).

Total Pyrethroid Pesticides were calculated in accordance with SCCWRP's method for establishing the 85th percentile reference threshold. A value of one-half of the method detection limit was used for non-detect values. J-flagged values were used as reported.

J - The chemical was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

<sup>&</sup>lt;sup>1</sup> The MDL for Danitol was 0.5ng/L for Storm Events 1-3 and 0.3ng/L for Storm Event 4

<sup>&</sup>lt;sup>2</sup> The MDL for Permethrin, cis- was 5ng/L for Storm Events 1-3 and 2ng/L for Storm Event 4

<sup>&</sup>lt;sup>3</sup> The RL for Permethrin, cis was 10ng/L for Storm Events 1-3 and 4ng/L for Storm Event 4

<sup>&</sup>lt;sup>4</sup> The MDL for Permethrin, trans- was 5ng/L for Storm Events 1-3 and 1ng/L for Storm Event 4

<sup>&</sup>lt;sup>5</sup> The RL for Permethrin, trans- was 10ng/L for Storm Events 1-3 and 2ng/L for Storm Event 4

Table 8.

Toxicity Results from 2014-2016 Monitored Storm Events

Sample Date	Storm Event	Station ID	Organism	Analyte	Mean	Significant Effect	
			Macrocystis pyrifera	Germination (%)	93.4	NSG	
3/11/2016	Post-Storm	24-BB-03R		Growth (length, mm)	0.01448	NSG	
3/11/2010	P051-3101111	24-66-03K	Mytilis galloprovincialis	Mortality/Normality (%)	97.74	NSG	
			Strongylocentrotus purpuratus	Fertilization	95	NSG	
			Macrocystis pyrifera	Germination (%)	91.9	NSG	
1/30/2016	Pre-Storm	24-BB-03R	Iviaciocystis pyrilera	Growth (length, mm)	0.01455	NSG	
1/30/2016	Pre-Storm	24-66-03K	Mytilis galloprovincialis	Mortality/Normality (%)	95.64	NSG	
			Strongylocentrotus purpuratus	Fertilization	93	NSG	
			Ma are sustis purifore	Germination (%)	94.3	NSG	
		24-BB-03Z	Macrocystis pyrifera	Growth (length, mm)	0.0145	NSG	
		24-66-032	Mytilis galloprovincialis	Mortality/Normality (%)	93.44	NSG	
1/21/2016	Doct Ctorm		Strongylocentrotus purpuratus	Fertilization	100	NSG	
1/31/2016	Post-Storm		Macrocyctic pyrifora	Germination (%)	93.4	NSG	
		24 DD 02D	Macrocystis pyrifera	Growth (length, mm)	0.01437	SG	
		24-BB-03R	Mytilis galloprovincialis	Mortality/Normality (%)	93.04	NSG	
			Strongylocentrotus purpuratus	Fertilization	100	NSG	
	24_R		Ma are sustis purifore	Germination (%)	91.6	NSG	
			24-BB-03Z	Macrocystis pyrifera	Growth (length, mm)	0.016	NSG
		24-00-032	Mytilis galloprovincialis	Mortality/Normality (%)	96.5	NSG	
12/2/2014	Post-Storm		Strongylocentrotus purpuratus	Fertilization	96.5	NSG	
12/2/2014	P051-3101111			Macrocystis pyrifera	Germination (%)	91.8	NSG
		24-BB-03R		Growth (length, mm)	0.01612	NSG	
		24-66-03K	Mytilis galloprovincialis	Mortality/Normality (%)	96.2	NSG	
			Strongylocentrotus purpuratus	Fertilization	96.5	NSG	
			Ma are sustis purifore	Germination (%)	94	NSG	
2/26/2014	Dro Ctorm	24-BB-03R	Macrocystis pyrifera	Growth (length, mm)	0.01592	NSG	
2/26/2014	Pre-Storm	24-66-03K	Mytilis galloprovincialis	Mortality/Normality (%)	95.29	NSG	
			Strongylocentrotus purpuratus	Fertilization	98	NSG	
			Ma are sustis purifore	Germination (%)	93	NSG	
		24 DD 027	Macrocystis pyrifera	Growth (length, mm)	0.01636	NSG	
		1 1	Mytilis galloprovincialis	Mortality/Normality (%)	92.64	NSG	
			Strongylocentrotus purpuratus	Fertilization	100	NSG	
2/28/2014			Macrocystis pyrifera	Germination (%)	91.6	NSG	
		24 00 020	iviaciocystis pyriiera	Growth (length, mm)	0.0162	NSG	
		24-BB-03R	Mytilis galloprovincialis	Mortality/Normality (%)	91.4	NSG	
			Strongylocentrotus purpuratus	Fertilization	100	NSG	
		24-BB-02Z	Strongylocentrotus purpuratus	Fertilization	98	NSG	

NSG = Not statistically significant, AND result is greater than evaluation threshold. SG= Statistically significant, AND result is greater than evaluation threshold.

Table 9.

Summary of Toxicity Results from 2014-2016 Monitored Storm Events

Sample Date	Storm Event	Sample Site	Toxicity Test	NOEC (%)	EC <sub>25</sub> (%)	EC <sub>50</sub> (%)	TUc
			Bivalve Development	100	>100	>100	1
2/26/2014	Pre-Storm	24-BB-03R	Sea Urchin Fertilization	100	>100	>100	1
2/20/2014	Pre-Storiii	24-bb-03K	Kelp Germination	100	>100	>100	1
			Kelp Growth	100	>100	>100	1
			Bivalve Development	100	>100	>100	1
		24-BB-03R	Sea Urchin Fertilization	100	>100	>100	1
		24-bb-03K	Kelp Germination	100	>100	>100	1
			Kelp Growth	100	>100	>100	1
2/28/2014	Post-Storm		Bivalve Development	100	>100	>100	1
		24-BB-03Z	Sea Urchin Fertilization	100	>100	>100	1
		24-66-032	Kelp Germination	100	>100	>100	1
			Kelp Growth	100	>100	>100	1
		24-BB-02Z	Sea Urchin Fertilization	100	>100	>100	1
			Bivalve Development	100	>100	>100	1
		24-BB-03R	Sea Urchin Fertilization	100	>100	>100	1
		24-BB-03K	Kelp Germination	100	>100	>100	1
12/2/2014	12/2/2014 Post-Storm		Kelp Growth	100	>100	>100	1
12/2/2014			Bivalve Development	100	>100	>100	1
		24 DD 027	Sea Urchin Fertilization	100	>100	>100	1
		24-BB-03Z	Kelp Germination	100	>100	>100	1
			Kelp Growth	100	>100	>100	1
			Bivalve Development	100	>100	>100	1
1/20/2016	Pre-Storm	24-BB-03R	Sea Urchin Fertilization	100	>100	>100	1
1/30/2016	Pre-Storiii	24-bb-03K	Kelp Germination	100	>100	>100	1
			Kelp Growth	100	>100	>100	1
			Bivalve Development	100	>100	>100	1
		24-BB-03R	Sea Urchin Fertilization	100	>100	>100	1
		24-bb-03K	Kelp Germination	100	>100	>100	1
1/21/2016	Post-Storm		Kelp Growth	100	>100	>100	1
1/31/2016	1 1051-5101111		Bivalve Development	100	>100	>100	1
		24-BB-03Z	Sea Urchin Fertilization	100	>100	>100	1
		24-88-032	Kelp Germination	100	>100	>100	1
	2/44/2045		Kelp Growth	100	>100	>100	1
			Bivalve Development	100	>100	>100	1
2/11/2016		24 00 020	Sea Urchin Fertilization	100	>100	>100	1
3/11/2016	Post-Storm	I 24-BB-03R ⊢	Kelp Germination	100	>100	>100	1
			Kelp Growth	100	>100	>100	1

<sup>&</sup>gt; = greater than

NOEC = no observed effect concentration

EC<sub>25</sub> = cncentration producing a 25% response

 $EC_{50}$  = concentration producing a 50% response, or median effective concentration

TUc = toxic units chronic

Table 10.

Evaluation of Compliance with Natural Water Quality in Receiving Waters of ASBS #24

Step 1: Compare receiving water post-storm sample concentration to the 85th threshold of reference sample concentrations. Is post-storm concentration > 85% threshold?

		Natural	Storm	Event 1	Storm	Event 2	Storm	Event 3	Storm	Event 4
Analyte	Units	Water Quality 85th Percentile	24-BB-03R Post-Storm 2/28/2014	Post-storm concentration > 85% threshold?	24-BB-03R Post-Storm 12/2/2014	Post-storm concentration > 85% threshold?	24-BB-03R Post-Storm 1/31/2016	Post-storm concentration > 85% threshold?	24-BB-03R Post-Storm 3/11/2016	Post-storm concentration > 85% threshold?
General Chemistry										
Ammonia as N	mg/L	0.015	0.01 H	No	0.19	Yes	0.04	Yes	0.01 H	No
Nitrate as N	mg/L	0.34	0.005 H	No	0.02	No	0.005 H	No	0.05	No
Oil & Grease	mg/L	0.5	0.5 H	No	0.5 H	No	0.5 H	No	0.5 H	No
Total Orthophosphate as P	mg/L	0.1	0.02	No	0.02	No	0.03	No	0.04	No
Total Suspended Solids	mg/L	48	7.1	No	4.7	No	6.3	No	12.3	No
Metals										
Arsenic	μg/L	1.8	1.322	No	1.387	No	1.616	No	2.607	Yes
Cadmium	μg/L	0.15	0.022	No	0.0168	No	0.0271	No	0.0393	No
Chromium	μg/L	1.90	0.6962	No	0.2928	No	0.486	No	1.092	No
Copper	μg/L	1.5	0.646	No	0.317	No	0.559	No	1.011	No
Lead	μg/L	0.5	0.2159	No	0.2596	No	0.112	No	0.6868	Yes
Mercury	μg/L	0.0006	0.0006 H	No	0.0006 H	No	0.0006 H	No	0.0006 H	No
Nickel	μg/L	1.3	0.4901	No	0.2955	No	0.4145	No	0.715	No
Selenium	μg/L	0.0025	0.026	Yes	0.01 J	Yes	0.015	Yes	0.021	Yes
Silver	μg/L	0.08	0.12	Yes	0.12	Yes	0.1	Yes	0.09	Yes
Zinc	μg/L	18.6	17.3532	No	7.0005	No	1.7625	No	6.4486	No
Organophosphorus Pesticides	-									
Total Organophosphorus pesticides	μg/L	0.006	0.006	No	0.006	No	0.006	No	0.006	No
Polynuclear Aromatic Hydrocarbons										
Total PAHs	μg/L	0.0125	0.0188	Yes	0.0489	Yes	0.0125	No	0.0246	Yes
Pyrethroid Pesticides										
Total Pyrethroid pesticides	μg/L	0.00675	0.00675	No	0.00675	No	0.00675	No	0.0039	No

H - The analyte concentration was below the method detection limit, so the value of half of the method detection limit was used (i.e. ND = 1/2MDL).

J - The analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Table 11.

Evaluation of Compliance with Natural Water Quality in Receiving Waters of ASBS #24

Step 2: Compare receiving water post-storm to pre-storm sample concentration. Is post-storm receiving water sample > pre-storm concentration?

			9	Storm Event 1		Storm Event 2				Storm Event 3			Storm Event 4	
	Analyte	Units	24-BB-03R	24-BB-03R	Post-storm >	24-BB-03R	24-BB-03R	Post-storm >	24-BB-03R	24-BB-03R	Post-storm >	24-BB-03R	24-BB-03R	Post-storm >
4	Allalyte	UIIILS	Pre-Storm	Post-Storm	Pre-storm	Pre-Storm	Post-Storm	Pre-storm	Pre-Storm	Post-Storm	Pre-storm	Pre-Storm	Post-Storm	Pre-storm
			2/26/2014	2/28/2014	concentration	12/1/2014	12/2/2014	concentration	1/30/2016	1/31/2016	concentration	3/10/2016	3/11/2016	concentration
General Cl	nemistry	•												
	Ammonia as N	mg/L				0.01 H	0.19	Yes	0.03	0.04	Yes			
Metals														
	Arsenic	μg/L										1.575	2.607	Yes
	Lead	μg/L										0.0575	0.6868	Yes
	Selenium	μg/L	0.012 J	0.026	Yes	0.0025 H	0.01 J	Yes	0.008 J	0.015	Yes	0.01 J	0.021	Yes
	Silver	μg/L	0.14	0.12	No	0.07	0.12	Yes	0.09	0.1	Yes	0.1	0.09	No
Polynuclea	ar Aromatic Hydro	carbons												
	Total PAHs	μg/L	0.0192	0.0188	No	0.0478	0.0489	Yes				0.0367	0.0246	No

H - The analyte concentration was below the method detection limit, so the value of half of the method detection limit was used (i.e. ND = 1/2MDL)

cells are shaded if the post-storm sample concentration did not exceed the 85th percentile threshold and thus demonstrated compliance with natural water quality as shown in Table X-X.

J - The analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

#### Table 12.

#### **Evaluation of Compliance with Natural Water Quality in Receiving Waters of ASBS #24**

Step 3: Are there two consecutive storm events, including the most recent storm event, where an analyte concentration is greater than the 85th percentile reference threshold and greater than the pre-storm concentration? This constitutes an exceedance of natural water quality as defined by the Special Protections.

Constituents with post-storm receiving water concentrations that were greater than the 85th percentile reference threshold and the pre-storm concentration

pre storm concentration										
	24-BB-03R									
	Storm 1	Storm 2	Storm 3	Storm 4						
Analyte	2/28/2014	12/2/2014	1/31/2016	3/11/2016						
	analyte > 859	% threshold and	l > pre-storm co	ncentration?						
Selenium	Yes	Yes	Yes	Yes						
Silver	no	Yes	Yes	no						
Ammonia	no	Yes	Yes	no						
Total PAHs	no	Yes	no	no						
Arsenic	no	no	no	Yes						
Lead	no	no	no	Yes						

# Table 13. Evaluation of Compliance with Natural Water Quality in Receiving Waters of ASBS #24

Step 4: Are there two consecutive storm events, including the most recent storm event, where an analyte concentration is greater than the 85th percentile reference threshold and greater than the pre-storm concentration? This constitutes an exceedance of natural water quality as defined by the Special Protections.

# Exceedance of Natural Water Quality as defined by the Special

**Protections** (exceeds the 85th percentile threshold for 2 consecutive storm events including the most recent event)

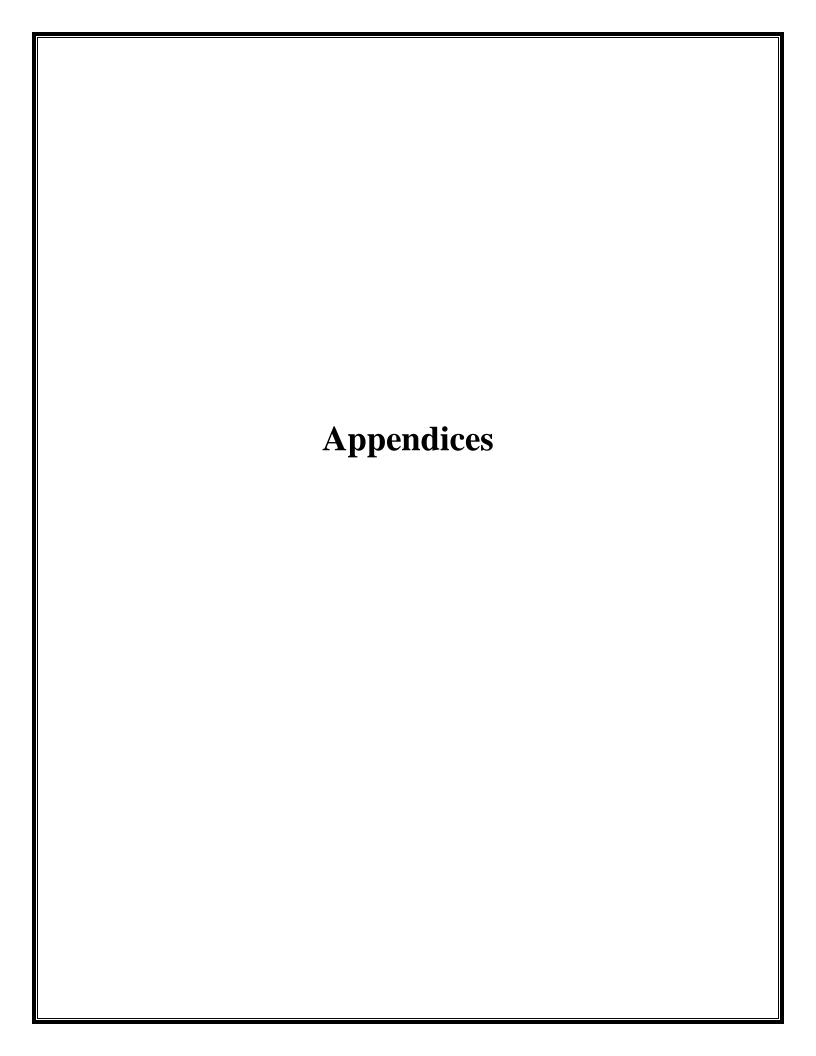
	evenie
Analyte	Exceedance of Natural Water Quality
Ammonia	No
Arsenic	No
Lead	No
Selenium	Yes
Silver	No
Total PAHs	No

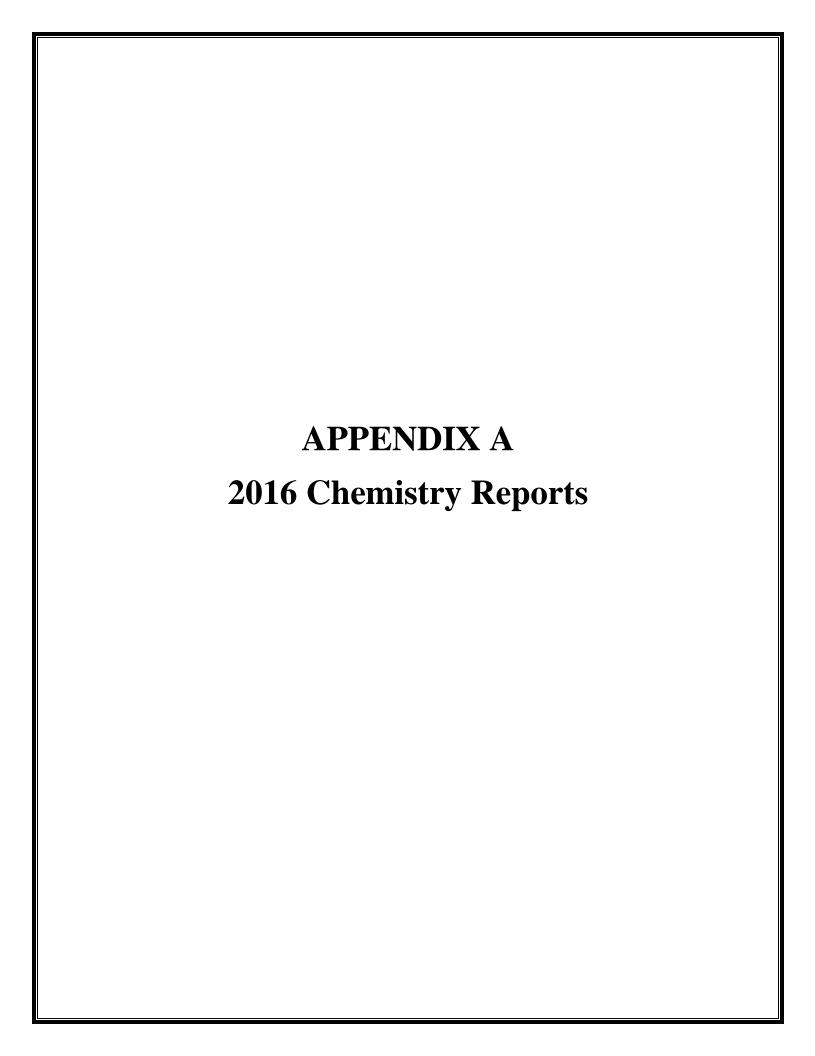
Table 14.

Comparison of 24-BB-03Z Outfall Concentration to Pre-Storm and Post-Storm Ocean Receiving Water

Concentrations for 24-BB-03R

ľ				Natural Water	Outfall 24-BB-03Z	Ocean Receiving	Water 24-BB-03R
ı				Quality 85th	Post-storm	Pre-storm	Post-storm
	Constituent	Units	COP IMAX	Percentile	3/11/16	3/10/16	3/11/16
Ī	Selenium	μg/L	150	0.0025	0.198	0.01	0.021







innovative solutions joi wat

March 14, 2016

Karin Patrick Aquatic Bioassay & Consulting Laboratories, Inc. 29 N. Olive Street Ventura, CA 93001

Project Name: City of Malibu ASBS

Physis Project ID: 1212004-008

Dear Karin,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 2/1/2016. A total of 4 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventionals
Total Suspended Solids by SM 2540 D
Total Orthophosphate as P by SM 4500-P E
Oil & Grease by EPA 1664B
Nitrate as N by SM 4500-NO3 E
Ammonia as N by SM 4500-NH3 D
Elements
Total & Dissolved Trace Metals & Mercury (EPA 1640) by EPA 1640
Organics
Synthetic Pyrethroid Pesticides by EPA 625-NCI
Polynuclear Aromatic Hydrocarbons by EPA 625
Organophosphorus Pesticides by EPA 625

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

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

Regards,

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



#### **PROJECT SAMPLE LIST**

Aquatic Bioassay & Consulting Laboratories, Inc.

PHYSIS Project ID: 1212004-008

City of Malibu ASBS

Total Samples: 4

PH	IYSIS ID	Sample ID	Description	Date	Time	Matrix
	38929	24-BB-02Z		1/31/2016	10:58	Freshwater
	38930	24-BB-03Z		1/31/2016	10:32	Freshwater
;	38931	24-BB-03R		1/30/2016	10:30	Seawater
;	38932	24-BB-03R		1/31/2016	10:50	Seawater



### **ABBREVIATIONS and ACRONYMS**

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS <sub>2</sub>	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

#### **QUALITY ASSURANCE SUMMARY**

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

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

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

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

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

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

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

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to



the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

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



# **PHYSIS QUALIFIER CODES**

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

# TERRA REPORTA AURA ENVIRON RES, INC.

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CA ELAP #2769

Conventionals			ANALYTICAL REPORT				
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE	
Sample ID: 38929-R1	<b>24-BB-02Z</b> Method: SM 2540 D	Matrix: Fresh Batch ID: C-17153		Sampled: 31-Jan-16 Prepared: 04-Feb-16	10:58	Received: 01-Feb-16 Analyzed: 04-Feb-16	
Total Suspended Solids	NA	21.1	0.5	0.5	mg/L		
	Method: EPA 1664B	Batch ID: C-1905	1	Prepared: 23-Feb-16		Analyzed: 23-Feb-16	
Oil & Grease	NA	2.4	1	1	mg/L		
Sample ID: 38930-R1	<b>24-BB-03Z</b> Method: SM 2540 D	Matrix: Fresh Batch ID: C-17153		Sampled: 31-Jan-16 Prepared: 04-Feb-16	10:32	Received: 01-Feb-16 Analyzed: 04-Feb-16	
otal Suspended Solids	NA	62.6	0.5	0.5	mg/L		
	Method: SM 4500-NH3 D	Batch ID: C-18118		Prepared: 16-Feb-16	-	Analyzed: 16-Feb-16	
Ammonia as N	NA	0.82	0.02	0.05	mg/L		
	Method: EPA 1664B	Batch ID: C-1905	1	Prepared: 23-Feb-16		Analyzed: 23-Feb-16	
Oil & Grease	NA	3	1	1	mg/L		
	Method: SM 4500-P E	Batch ID: C-2800	5	Prepared: 01-Feb-16		Analyzed: 01-Feb-16	
otal Orthophosphate as P	NA	0.13	0.01	0.02	mg/L		
	Method: SM 4500-NO3 E	Batch ID: C-2801	9	Prepared: 01-Feb-16		Analyzed: 25-Feb-16	
Nitrate as N	NA	0.76	0.01	0.05	mg/L		
Sample ID: 38931-R1	24-BB-03R	Matrix: Seawater		Sampled: 30-Jan-16	10:30	Received: 01-Feb-16	
	Method: SM 2540 D	Batch ID: C-17153		Prepared: 04-Feb-16		Analyzed: 04-Feb-16	
Total Suspended Solids	NA	6.9	0.5	0.5	mg/L		
	Method: SM 4500-NH3 D	Batch ID: C-18118		Prepared: 16-Feb-16		Analyzed: 16-Feb-16	
Ammonia as N	NA	0.03	0.02	0.05	mg/L	J	
	Method: EPA 1664B	Batch ID: C-1905	1	Prepared: 23-Feb-16		Analyzed: 23-Feb-16	
Oil & Grease	NA	ND	1	1	mg/L		
	Method: SM 4500-P E	Batch ID: C-2800	5	Prepared: 01-Feb-16		Analyzed: 01-Feb-16	
Total Orthophosphate as P	NA	0.03	0.01	0.02	mg/L		
	Method: SM 4500-NO3 E	Batch ID: C-2801	9	Prepared: 01-Feb-16		Analyzed: 25-Feb-16	
Nitrate as N	NA	ND	0.01	0.05	mg/L		
Sample ID: 38932-R1	<b>24-BB-03R</b> Method: SM 2540 D	Matrix: Seaw Batch ID: C-17153		Sampled: 31-Jan-16 Prepared: 04-Feb-16	10:50	Received: 01-Feb-16 Analyzed: 04-Feb-16	
Total Suspended Solids	NA	6.3	0.5	0.5	mg/L	7 11 11 12 2 2 1 2 1 1 1 1 1 1	



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CA ELAP #2769

#### Conventionals **ANALYTICAL REPORT ANALYTE FRACTION RESULT** MDL RL **UNITS QA CODE** Method: SM 4500-NH3 D Batch ID: C-18118 Prepared: 16-Feb-16 Analyzed: 16-Feb-16 J Ammonia as N NA 0.04 0.02 0.05 mg/L Method: EPA 1664B Batch ID: C-19051 Prepared: 23-Feb-16 Analyzed: 23-Feb-16 Oil & Grease NA ND 1 mg/L Prepared: 01-Feb-16 Method: SM 4500-P E Batch ID: C-28005 Analyzed: 01-Feb-16 Total Orthophosphate as P NA 0.03 0.01 0.02 mg/L Method: SM 4500-NO3 E Batch ID: C-28019 Prepared: 01-Feb-16 Analyzed: 25-Feb-16 Nitrate as N NA ND 0.01 0.05 mg/L

1904 E. Wright Circle, Anaheim CA 92806



PHYSIS Project ID: 1212004-008

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CA ELAP #2769

Elements				ANALYTICAL REPORT					
ANALYTE	FRACTION RESULT		MDL	RL	UNITS	QA CODE			
Sample ID: 38930-R1	<b>24-BB-03Z</b> Method: EPA 1640	<b>Matrix: Fre</b> Batch ID: E-10		Sampled: 31-Jan-16 Prepared: 11-Feb-16	10:32	Received: 01-Feb-16 Analyzed: 20-Feb-16			
Arsenic (As)	Total	1.507	0.005	0.015	μg/L				
Arsenic (As)	Dissolved	0.953	0.005	0.015	μg/L				
Cadmium (Cd)	Total	0.1785	0.0025	0.005	μg/L				
Cadmium (Cd)	Dissolved	0.033	0.0025	0.005	μg/L				
Chromium (Cr)	Total	5.3697	0.0125	0.025	μg/L				
Chromium (Cr)	Dissolved	0.7003	0.0125	0.025	μg/L				
Copper (Cu)	Total	39.649	0.005	0.01	μg/L				
Copper (Cu)	Dissolved	24.617	0.005	0.01	μg/L				
Lead (Pb)	Total	4.5642	0.0025	0.005	μg/L				
Lead (Pb)	Dissolved	0.1104	0.0025	0.005	μg/L				
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L				
Mercury (Hg)	Dissolved	ND	0.0012	0.005	μg/L				
Nickel (Ni)	Total	6.2599	0.0025	0.005	μg/L				
Nickel (Ni)	Dissolved	2.0839	0.0025	0.005	μg/L				
Selenium (Se)	Total	0.132	0.005	0.015	μg/L				
Selenium (Se)	Dissolved	0.11	0.005	0.015	μg/L				
Silver (Ag)	Total	ND	0.01	0.02	μg/L				
Silver (Ag)	Dissolved	ND	0.01	0.02	μg/L				
Zinc (Zn)	Total	179.331	0.0025	0.005	μg/L				
Zinc (Zn)	Dissolved	109.8574	0.0025	0.005	μg/L				
Sample ID: 38931-R1	24-BB-03R	Matrix: Se	awater	Sampled: 30-Jan-16	10:30	Received: 01-Feb-16			
	Method: EPA 1640	Batch ID: E-10		Prepared: 11-Feb-16		Analyzed: 20-Feb-16			
Arsenic (As)	Total	1.537	0.005	0.015	μg/L				
Arsenic (As)	Dissolved	1.307	0.005	0.015	μg/L				
Cadmium (Cd)	Total	0.0162	0.0025	0.005	μg/L				
Cadmium (Cd)	Dissolved	0.0147	0.0025	0.005	μg/L				
Chromium (Cr)	Total	0.6169	0.0125	0.025	μg/L				
Chromium (Cr)	Dissolved	0.1679	0.0125	0.025	μg/L				
Copper (Cu)	Total	0.33	0.005	0.01	μg/L				



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CA ELAP #2769

## Elements ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Copper (Cu)	Dissolved	0.19	0.005	0.01	μg/L	
Lead (Pb)	Total	0.0836	0.0025	0.005	μg/L	
Lead (Pb)	Dissolved	ND	0.0025	0.005	μg/L	
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L	
Mercury (Hg)	Dissolved	ND	0.0012	0.005	μg/L	
Nickel (Ni)	Total	0.4617	0.0025	0.005	μg/L	
Nickel (Ni)	Dissolved	0.1919	0.0025	0.005	μg/L	
Selenium (Se)	Total	0.008	0.005	0.015	μg/L	J
Selenium (Se)	Dissolved	0.012	0.005	0.015	μg/L	J
Silver (Ag)	Total	0.09	0.01	0.02	μg/L	
Silver (Ag)	Dissolved	0.08	0.01	0.02	μg/L	
Zinc (Zn)	Total	4.0212	0.0025	0.005	μg/L	
Zinc (Zn)	Dissolved	2.6924	0.0025	0.005	μg/L	

Sample ID: 38932-R1	24-BB-03R	Matrix: Seawater		Sampled: 31-Jan-16	10:50	Received: 01-Feb-16
	Method: EPA 1640	Batch ID: E-10	0074	Prepared: 11-Feb-16		Analyzed: 20-Feb-16
Arsenic (As)	Total	1.616	0.005	0.015	μg/L	
Arsenic (As)	Dissolved	1.475	0.005	0.015	μg/L	
Cadmium (Cd)	Total	0.0271	0.0025	0.005	μg/L	
Cadmium (Cd)	Dissolved	0.0131	0.0025	0.005	μg/L	
Chromium (Cr)	Total	0.486	0.0125	0.025	μg/L	
Chromium (Cr)	Dissolved	0.1806	0.0125	0.025	μg/L	
Copper (Cu)	Total	0.559	0.005	0.01	μg/L	
Copper (Cu)	Dissolved	0.267	0.005	0.01	μg/L	
Lead (Pb)	Total	0.112	0.0025	0.005	μg/L	
Lead (Pb)	Dissolved	ND	0.0025	0.005	μg/L	
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L	
Mercury (Hg)	Dissolved	ND	0.0012	0.005	μg/L	
Nickel (Ni)	Total	0.4145	0.0025	0.005	μg/L	
Nickel (Ni)	Dissolved	0.198	0.0025	0.005	μg/L	
Selenium (Se)	Total	0.015	0.005	0.015	μg/L	
Selenium (Se)	Dissolved	0.008	0.005	0.015	μg/L	J
Silver (Ag)	Total	0.1	0.01	0.02	μg/L	



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Elements	5		ANALYTICAL REPORT				
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE	
Silver (Ag)	Dissolved	0.08	0.01	0.02	μg/L		
Zinc (Zn)	Total	1.7625	0.0025	0.005	μg/L		
Zinc (Zn)	Dissolved	1.5632	0.0025	0.005	μg/L		



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#### **Organophosphorus Pesticides ANALYTICAL REPORT ANALYTE FRACTION RESULT** MDL RL **UNITS QA CODE** Sample ID: 38930-R1 24-BB-03Z Matrix: Freshwater Sampled: 31-Jan-16 Received: 01-Feb-16 10:32 Method: EPA 625 Batch ID: O-9094 Prepared: 01-Feb-16 Analyzed: 03-Mar-16 (PCB030) Total 73 % Recovery (PCB112) Total 76 % Recovery 73 (PCB198) Total % Recovery 69 (TCMX) Total % Recovery 2 Bolstar (Sulprofos) Total ND 4 ng/L ND 0.5 Chlorpyrifos Total ng/L Demeton Total ND 1 2 ng/L 0.5 Diazinon Total ND ng/L Dichlorvos Total ND 3 6 ng/L Dimethoate Total ND 5 10 ng/L Disulfoton Total ND 1 2 ng/L Ethoprop (Ethoprofos) Total ND 2 ng/L Fenchlorphos (Ronnel) Total ND 2 4 ng/L Fensulfothion Total ND 2 ng/L Fenthion Total ND 2 4 ng/L Malathion Total ND 3 6 ng/L Methidathion Total ND 5 10 ng/L ND 2 Methyl parathion Total ng/L Mevinphos (Phosdrin) Total ND 5 10 ng/L ND 5 Phorate Total 10 ng/L Phosmet Total ND 5 10 ng/L ND 2 4 Tetrachlorvinphos (Stirofos) Total ng/L Tokuthion Total ND 3 6 ng/L ND Trichloronate Total ng/L Received: 01-Feb-16 Sample ID: 38931-R1 24-BB-03R Matrix: Seawater Sampled: 30-Jan-16 10:30 Method: EPA 625 Batch ID: O-9094 Prepared: 01-Feb-16 Analyzed: 03-Mar-16 (PCB030) Total 64 % Recovery (PCB112) Total 76 % Recovery

(PCB198)

83

Total

% Recovery



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# **Organophosphorus Pesticides**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
(TCMX)	Total	53			% Recovery	
Bolstar (Sulprofos)	Total	ND	2	4	ng/L	
Chlorpyrifos	Total	ND	0.5	1	ng/L	
Demeton	Total	ND	1	2	ng/L	
Diazinon	Total	ND	0.5	1	ng/L	
Dichlorvos	Total	ND	3	6	ng/L	
Dimethoate	Total	ND	5	10	ng/L	
Disulfoton	Total	ND	1	2	ng/L	
Ethoprop (Ethoprofos)	Total	ND	1	2	ng/L	
Fenchlorphos (Ronnel)	Total	ND	2	4	ng/L	
Fensulfothion	Total	ND	1	2	ng/L	
Fenthion	Total	ND	2	4	ng/L	
Malathion	Total	ND	3	6	ng/L	
Methidathion	Total	ND	5	10	ng/L	
Methyl parathion	Total	ND	1	2	ng/L	
Mevinphos (Phosdrin)	Total	ND	5	10	ng/L	
Phorate	Total	ND	5	10	ng/L	
Phosmet	Total	ND	5	10	ng/L	
Tetrachlorvinphos (Stirofos)	Total	ND	2	4	ng/L	
Tokuthion	Total	ND	3	6	ng/L	
Trichloronate	Total	ND	1	2	ng/L	

Sample ID: 38932-R1	<b>24-BB-03R</b> Method: EPA 625	<b>Matrix: S</b> Batch ID: O		Sampled: Prepared:	•	Received: 01-Feb-16 Analyzed: 03-Mar-16
(PCB030)	Total	55			% Recovery	
(PCB112)	Total	64			% Recovery	
(PCB198)	Total	68			% Recovery	
(TCMX)	Total	43			% Recovery	
Bolstar (Sulprofos)	Total	ND	2	4	ng/L	
Chlorpyrifos	Total	ND	0.5	1	ng/L	
Demeton	Total	ND	1	2	ng/L	
Diazinon	Total	ND	0.5	1	ng/L	
Dichlorvos	Total	ND	3	6	ng/L	



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# **Organophosphorus Pesticides**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Dimethoate	Total	ND	5	10	ng/L	
Disulfoton	Total	ND	1	2	ng/L	
Ethoprop (Ethoprofos)	Total	ND	1	2	ng/L	
Fenchlorphos (Ronnel)	Total	ND	2	4	ng/L	
Fensulfothion	Total	ND	1	2	ng/L	
Fenthion	Total	ND	2	4	ng/L	
Malathion	Total	ND	3	6	ng/L	
Methidathion	Total	ND	5	10	ng/L	
Methyl parathion	Total	ND	1	2	ng/L	
Mevinphos (Phosdrin)	Total	ND	5	10	ng/L	
Phorate	Total	ND	5	10	ng/L	
Phosmet	Total	ND	5	10	ng/L	
Tetrachlorvinphos (Stirofos)	Total	ND	2	4	ng/L	
Tokuthion	Total	ND	3	6	ng/L	
Trichloronate	Total	ND	1	2	ng/L	



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# **Polynuclear Aromatic Hydrocarbons**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 38930-R1	<b>24-BB-03Z</b> Method: EPA 625	<b>Matrix: Fr</b> Batch ID: O-		Sampled: 31 Prepared: 01	_	Received: 01-Feb-16 Analyzed: 24-Feb-16
(d10-Acenaphthene)	Total	90			% Recovery	
(d10-Phenanthrene)	Total	90			% Recovery	
(d12-Chrysene)	Total	113			% Recovery	
(d8-Naphthalene)	Total	89			% Recovery	
1-Methylnaphthalene	Total	2.6	1	5	ng/L	J
1-Methylphenanthrene	Total	7.7	1	5	ng/L	
2,3,5-Trimethylnaphthalene	Total	ND	1	5	ng/L	
2,6-Dimethylnaphthalene	Total	1.8	1	5	ng/L	J
2-Methylnaphthalene	Total	1.9	1	5	ng/L	J
Acenaphthene	Total	5.6	1	5	ng/L	
Acenaphthylene	Total	3.2	1	5	ng/L	J
Anthracene	Total	ND	1	5	ng/L	
Benz[a]anthracene	Total	6.5	1	5	ng/L	
Benzo[a]pyrene	Total	6.2	1	5	ng/L	
Benzo[b]fluoranthene	Total	20.3	1	5	ng/L	
Benzo[e]pyrene	Total	15.8	1	5	ng/L	
Benzo[g,h,i]perylene	Total	15.7	1	5	ng/L	
Benzo[k]fluoranthene	Total	3.5	1	5	ng/L	J
Biphenyl	Total	9.6	1	5	ng/L	
Chrysene	Total	31.7	1	5	ng/L	
Dibenz[a,h]anthracene	Total	ND	1	5	ng/L	
Dibenzothiophene	Total	13.9	1	5	ng/L	
Fluoranthene	Total	21	1	5	ng/L	
Fluorene	Total	ND	1	5	ng/L	
Indeno[1,2,3-c,d]pyrene	Total	5.2	1	5	ng/L	
Naphthalene	Total	10.7	1	5	ng/L	
Perylene	Total	6.3	1	5	ng/L	
Phenanthrene	Total	14.6	1	5	ng/L	
Pyrene	Total	26.8	1	5	ng/L	



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# **Polynuclear Aromatic Hydrocarbons**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 38931-R1	<b>24-BB-03R</b> Method: EPA 625	<b>Matrix: Se</b> Batch ID: O-9		Sampled: 30 Prepared: 01	_	Received: 01-Feb-16 Analyzed: 24-Feb-16
(d10-Acenaphthene)	Total	58			% Recovery	
(d10-Phenanthrene)	Total	79			% Recovery	
(d12-Chrysene)	Total	91			% Recovery	
(d8-Naphthalene)	Total	45			% Recovery	
1-Methylnaphthalene	Total	ND	1	5	ng/L	
1-Methylphenanthrene	Total	ND	1	5	ng/L	
2,3,5-Trimethylnaphthalene	Total	ND	1	5	ng/L	
2,6-Dimethylnaphthalene	Total	ND	1	5	ng/L	
2-Methylnaphthalene	Total	ND	1	5	ng/L	
Acenaphthene	Total	ND	1	5	ng/L	
Acenaphthylene	Total	ND	1	5	ng/L	
Anthracene	Total	ND	1	5	ng/L	
Benz[a]anthracene	Total	ND	1	5	ng/L	
Benzo[a]pyrene	Total	ND	1	5	ng/L	
Benzo[b]fluoranthene	Total	ND	1	5	ng/L	
Benzo[e]pyrene	Total	ND	1	5	ng/L	
Benzo[g,h,i]perylene	Total	ND	1	5	ng/L	
Benzo[k]fluoranthene	Total	ND	1	5	ng/L	
Biphenyl	Total	ND	1	5	ng/L	
Chrysene	Total	ND	1	5	ng/L	
Dibenz[a,h]anthracene	Total	ND	1	5	ng/L	
Dibenzothiophene	Total	ND	1	5	ng/L	
Fluoranthene	Total	ND	1	5	ng/L	
Fluorene	Total	ND	1	5	ng/L	
Indeno[1,2,3-c,d]pyrene	Total	ND	1	5	ng/L	
Naphthalene	Total	ND	1	5	ng/L	
Perylene	Total	1	1	5	ng/L	J
Phenanthrene	Total	ND	1	5	ng/L	
Pyrene	Total	ND	1	5	ng/L	



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# **Polynuclear Aromatic Hydrocarbons**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 38932-R1	<b>24-BB-03R</b> Method: EPA 625	<b>Matrix: Se</b> Batch ID: O-9		Sampled: 31	-	Received: 01-Feb-16 Analyzed: 24-Feb-16
(d10-Acenaphthene)	Total	56			% Recovery	
(d10-Phenanthrene)	Total	74			% Recovery	
(d12-Chrysene)	Total	88			% Recovery	
(d8-Naphthalene)	Total	43			% Recovery	
1-Methylnaphthalene	Total	ND	1	5	ng/L	
1-Methylphenanthrene	Total	ND	1	5	ng/L	
2,3,5-Trimethylnaphthalene	Total	ND	1	5	ng/L	
2,6-Dimethylnaphthalene	Total	ND	1	5	ng/L	
2-Methylnaphthalene	Total	ND	1	5	ng/L	
Acenaphthene	Total	ND	1	5	ng/L	
Acenaphthylene	Total	ND	1	5	ng/L	
Anthracene	Total	ND	1	5	ng/L	
Benz[a]anthracene	Total	ND	1	5	ng/L	
Benzo[a]pyrene	Total	ND	1	5	ng/L	
Benzo[b]fluoranthene	Total	ND	1	5	ng/L	
Benzo[e]pyrene	Total	ND	1	5	ng/L	
Benzo[g,h,i]perylene	Total	ND	1	5	ng/L	
Benzo[k]fluoranthene	Total	ND	1	5	ng/L	
Biphenyl	Total	ND	1	5	ng/L	
Chrysene	Total	ND	1	5	ng/L	
Dibenz[a,h]anthracene	Total	ND	1	5	ng/L	
Dibenzothiophene	Total	ND	1	5	ng/L	
Fluoranthene	Total	ND	1	5	ng/L	
Fluorene	Total	ND	1	5	ng/L	
Indeno[1,2,3-c,d]pyrene	Total	ND	1	5	ng/L	
Naphthalene	Total	ND	1	5	ng/L	
Perylene	Total	ND	1	5	ng/L	
Phenanthrene	Total	ND	1	5	ng/L	
Pyrene	Total	ND	1	5	ng/L	



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Pyrethro	oids			ANA	ANALYTICAL REPORT		
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE	
Sample ID: 38930-R1	<b>24-BB-03Z</b> Method: EPA 625-NCI	<b>Matrix: F</b> I Batch ID: O		Sampled: 31-Jan-16 Prepared: 01-Feb-16	10:32	Received: 01-Feb-16 Analyzed: 02-Mar-16	
Allethrin	Total	ND	0.5	2	ng/L	Allaryzea: 02 Mai 10	
Bifenthrin	Total	32.7	0.5	2	ng/L		
Cyfluthrin	Total	11.1	0.5	2	ng/L		
Cyhalothrin, Total Lambda	Total	ND	0.5	2	ng/L		
Cypermethrin	Total	ND	0.5	2	ng/L		
Danitol (Fenpropathrin)	Total	12.4	0.5	2	ng/L		
Deltamethrin/Tralomethrin	Total	ND	0.5	2	ng/L		
Esfenvalerate	Total	6.5	0.5	2	ng/L		
envalerate	Total	7.3	0.5	2	ng/L		
·luvalinate	Total	6.2	0.5	2	ng/L		
Permethrin, cis-	Total	ND	5	10	ng/L		
Permethrin, trans-	Total	ND	5	10	ng/L		
Prallethrin	Total	ND	0.5	2	ng/L		
Resmethrin	Total	ND	5	10	ng/L		
Sample ID: 38931-R1	<b>24-BB-03R</b> Method: EPA 625-NCI	Matrix: So		Sampled: 30-Jan-16 Prepared: 01-Feb-16	10:30	Received: 01-Feb-16 Analyzed: 02-Mar-16	
Allethrin	Total	ND	0.5	2	ng/L	,	
Bifenthrin	Total	ND	0.5	2	ng/L		
Cyfluthrin	Total	ND	0.5	2	ng/L		
Cyhalothrin, Total Lambda	Total	ND	0.5	2	ng/L		
Cypermethrin	Total	ND	0.5	2	ng/L		
Danitol (Fenpropathrin)	Total	1.5	0.5	2	ng/L	J	
Deltamethrin/Tralomethrin	Total	ND	0.5	2	ng/L		
Esfenvalerate	Total	ND	0.5	2	ng/L		
envalerate	Total	ND	0.5	2	ng/L		
Fluvalinate	Total	ND	0.5	2	ng/L		
Permethrin, cis-	Total	ND	5	10	ng/L		
Permethrin, trans-	Total	ND	5	10	ng/L		



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Pyrethroids ANALYTICAL REPORT							
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE	
Resmethrin	Total	ND	5	10	ng/L		
Sample ID: 38932-R1	<b>24-BB-03R</b> Method: EPA 625-NCI	Matrix: Seawa Batch ID: 0-9094		Sampled: 31-Jan-16 Prepared: 01-Feb-16	-	Received: 01-Feb-16 Analyzed: 02-Mar-16	
Allethrin	Total	ND	0.5	2	ng/L		
Bifenthrin	Total	ND	0.5	2	ng/L		
Cyfluthrin	Total	ND	0.5	2	ng/L		
Cyhalothrin, Total Lambda	Total	ND	0.5	2	ng/L		
Cypermethrin	Total	ND	0.5	2	ng/L		
Danitol (Fenpropathrin)	Total	ND	0.5	2	ng/L		
Deltamethrin/Tralomethrin	Total	ND	0.5	2	ng/L		
Esfenvalerate	Total	ND	0.5	2	ng/L		
Fenvalerate	Total	ND	0.5	2	ng/L		
Fluvalinate	Total	ND	0.5	2	ng/L		
Permethrin, cis-	Total	ND	5	10	ng/L		
Permethrin, trans-	Total	ND	5	10	ng/L		
Prallethrin	Total	ND	0.5	2	ng/L		
Resmethrin	Total	ND	5	10	ng/L		

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	Convention	nals						QL	JALI	TY CONTR	OL R	EPO	ORT	
SAMPLE ID	)	BATCH ID	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	<i>8</i>	CCURACY LIMITS	P %	RECI:	SION IMITS	QA CODE
An	nmonia as N		Method: SM	l 4500-NH3	D	Fractio	n: NA	Pr	epared	: 16-Feb-16	Analy	zed: 1	6-Feb-16	
38927-B1	QAQC Procedural Blank	C-18118	ND	0.02	0.05	mg/L								
38927-BS1	QAQC Procedural Blank	C-18118	0.25	0.02	0.05	mg/L	0.25	0	100	80 - 120% PASS				
38927-BS2	QAQC Procedural Blank	C-18118	0.24	0.02	0.05	mg/L	0.25	0	96	80 - 120% PASS	4	25	PASS	
38931-MS1	24-BB-03R	C-18118	0.28	0.02	0.05	mg/L	0.25	0.03	100	80 - 120% PASS				
38931-MS2	24-BB-03R	C-18118	0.28	0.02	0.05	mg/L	0.25	0.03	100	80 - 120% PASS	0	25	PASS	
38931-R2	24-BB-03R	C-18118	0.03	0.02	0.05	mg/L					0	25	PASS	J
Nit	trate as N		Method: SM	1 4500-NO3	E	Fractio	n: NA	Pr	epared	: 01-Feb-16	Analy	zed: z	25-Feb-16	
38927-B1	QAQC Procedural Blank	C-28019	ND	0.01	0.05	mg/L			•		,			
38927-BS1	QAQC Procedural Blank	C-28019	0.49	0.01	0.05	mg/L	0.5	0	98	80 - 120% PASS				
38927-BS2	QAQC Procedural Blank	C-28019	0.49	0.01	0.05	mg/L	0.5	0	98	80 - 120% PASS	0	25	PASS	
38931-MS1	24-BB-03R	C-28019	0.59	0.01	0.05	mg/L	0.5	0	118	80 - 120% PASS				
38931-MS2	24-BB-03R	C-28019	0.6	0.01	0.05	mg/L	0.5	0	120	80 - 120% PASS	2	25	PASS	
38931-R2	24-BB-03R	C-28019	ND	0.01	0.05	mg/L					0	25	PASS	
Oil	& Grease		Method: EP	A 1664B		Fractio	n: NA	Pr	epared	: 23-Feb-16	Analy:	zed: :	23-Feb-16	
38927-B1	QAQC Procedural Blank	C-19051	ND	1	1	mg/L			сранса		<b>.</b>		.,	
38927-BS1	QAQC Procedural Blank	C-19051	38.4	1	1	mg/L	40	0	96	80 - 120% PASS				
38927-BS2	QAQC Procedural Blank	C-19051	38.6	1	1	mg/L	40	0	96	80 - 120% PASS	0	25	PASS	
To	tal Orthophosphate as	P	Method: SM	4500-P F		Fractio	n• N∆	Dr	enared	: 01-Feb-16	Analy:	ed. (	01-Feb-16	
38927-B1	QAQC Procedural Blank	C-28005	ND	0.01	0.02	mg/L	11. 14/1	• • • • • • • • • • • • • • • • • • • •	Срагса	. 0110010	7 tilaly 2	cu. (	)	
38927-BS1	QAQC Procedural Blank	C-28005	0.22	0.01	0.02	mg/L	0.2	0	110	80 - 120% PASS				
38927-BS2	QAQC Procedural Blank	C-28005	0.22	0.01	0.02	mg/L	0.2	0	110	80 - 120% PASS	0	25	PASS	
38931-MS1	24-BB-03R	C-28005	0.24	0.01	0.02	mg/L	0.2	0.03	105	80 - 120% PASS				
38931-MS2	24-BB-03R	C-28005	0.25	0.01	0.02	mg/L	0.2	0.03	110	80 - 120% PASS	5	25	PASS	
38931-R2	24-BB-03R	C-28005	0.03	0.01	0.02	mg/L					0		PASS	
To	tal Suspended Solids		Method: SM	1 2540 D		Fractio	n· NA	Dr	enared	: 04-Feb-16	Δnalv-	red: (	04-Feb-16	
38927-B1	QAQC Procedural Blank	C-17153	ND	0.5	0.5	mg/L	14/1		cpai cu	. 57 1 65 10	/ tilaly/	.cu. (	7 1 65-16	
38929-R2	24-BB-02Z	C-17153	24.1	0.5	0.5	mg/L					13	25	PASS	
00000110	- ·	3 11 100	- 1.1	0.0	0.0	y, _					.,,		. , .00	



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E	lements							QUALITY	CONTROI	L REPOR	Т
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURAC % LIM		PRECISION LIMITS	QA CODE
Sample ID:		QC Procedura	ıl Blank			: DI Water D: E-10074		Sampled: Prepared: 11-Feb-16		Received: Analyzed: 20-Feb	p-16
Arsenic (As)	Dissolved	ND	0.005	0.015	μg/L			·			
Arsenic (As)	Total	ND	0.005	0.015	μg/L						
Cadmium (Cd)	Dissolved	ND	0.0025	0.005	μg/L						
Cadmium (Cd)	Total	ND	0.0025	0.005	μg/L						
Chromium (Cr)	Dissolved	ND	0.0125	0.025	μg/L						
Chromium (Cr)	Total	ND	0.0125	0.025	μg/L						
Copper (Cu)	Dissolved	ND	0.005	0.01	μg/L						
Copper (Cu)	Total	ND	0.005	0.01	μg/L						
Lead (Pb)	Dissolved	ND	0.0025	0.005	μg/L						
Lead (Pb)	Total	ND	0.0025	0.005	μg/L						
Mercury (Hg)	Dissolved	ND	0.0012	0.005	μg/L						
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L						
Nickel (Ni)	Dissolved	ND	0.0025	0.005	μg/L						
Nickel (Ni)	Total	ND	0.0025	0.005	μg/L						
Selenium (Se)	Dissolved	ND	0.005	0.015	μg/L						
Selenium (Se)	Total	ND	0.005	0.015	μg/L						
Silver (Ag)	Dissolved	ND	0.01	0.02	μg/L						
Silver (Ag)	Total	ND	0.01	0.02	μg/L						
Zinc (Zn)	Dissolved	ND	0.0025	0.005	μg/L						
Zinc (Zn)	Total	ND	0.0025	0.005	μg/L						
C	-001684 044	OCICAL Phys	-!- C		84-4-4					D <del></del>	
Sample ID:		QC LCM - Phys	sis Seawat	er		: Seawate	r :	Sampled:		Received:	
Araonia (As)	Total	hod: EPA 1640 1.755	0.005	0.015		): E-10074		Prepared: 11-Feb-16		Analyzed: 20-Feb	סו־כ
Arsenic (As)	Total	0.0894	0.005	0.015	μg/L						
Cadmium (Cd) Chromium (Cr)	Total	0.0894	0.0025	0.005	μg/L						
Copper (Cu)	Total	0.2109	0.0125	0.025	μg/L						
Lead (Pb)	Total	0.146	0.005	0.005	μg/L						
			0.0025		μg/L						
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L						



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El	ements							QUA	LITY C	ONT	ROLI	REPOR	T
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS		SOURCE RESULT		CCURACY LIMITS		PR	ECISION LIMITS	QA CODE
Nickel (Ni)	Total	0.3479	0.0025	0.005	μg/L								
Selenium (Se)	Total	0.027	0.005	0.015	μg/L								
Silver (Ag)	Total	0.08	0.01	0.02	μg/L								
Zinc (Zn)	Total	0.9216	0.0025	0.005	μg/L								
Sample ID: 3		C LCM - Phy	sis Seawat	er		x: Seawate	r	Sampled:				ceived:	
		od: EPA 1640				D: E-10074		Prepared:			А	nalyzed: 20-Fe	b-16
Arsenic (As)	Total	22.917	0.005	0.015	μg/L	20	1.755	106	75 - 125%				
Cadmium (Cd)	Total	17.0664	0.0025	0.005	μg/L	20	0.0894	85	75 - 125%				
Chromium (Cr)	Total	21.3274	0.0125	0.025	μg/L	20	0.2109	106	75 - 125%				
Copper (Cu)	Total	19.319	0.005	0.01	μg/L	20	0.148	96	75 - 125%				
Lead (Pb)	Total	18.6242	0.0025	0.005	μg/L	20	0.0065	93	75 - 125%				
Mercury (Hg)	Total	8.5729	0.0012	0.005	μg/L	10	0	86	75 - 125%				
Nickel (Ni)	Total	18.6441	0.0025	0.005	μg/L	20	0.3479	91	75 - 125%				
Selenium (Se)	Total	19.737	0.005	0.015	μg/L	20	0.027	99	75 - 125%				
Silver (Ag)	Total	9.52	0.01	0.02	μg/L	10	0.08	94	75 - 125%				
Zinc (Zn)	Total	17.3985	0.0025	0.005	μg/L	20	0.9216	82	75 - 125%	PASS			
Sample ID: 3		C <b>LCM - Phy</b> od: EPA 1640	sis Seawat	er		<b>x: Seawate</b> D: E-10074	r	Sampled: Prepared:	11-Feb-16			c <b>eived:</b> nalyzed: 20-Fe	b-16
Arsenic (As)	Total	21.865	0.005	0.015	μg/L	20	1.755	101	75 - 125%	PASS		25 PASS	
Cadmium (Cd)	Total	16.5135	0.0025	0.005	μg/L	20	0.0894	82	75 - 125%	PASS	4	25 PASS	
Chromium (Cr)	Total	21.1094	0.0125	0.025	μg/L	20	0.2109	104	75 - 125%	PASS	2	25 PASS	
Copper (Cu)	Total	18.904	0.005	0.01	μg/L	20	0.148	94	75 - 125%	PASS	2	25 PASS	
Lead (Pb)	Total	18.2753	0.0025	0.005	μg/L	20	0.0065	91	75 - 125%	PASS	2	25 PASS	
Mercury (Hg)	Total	8.4051	0.0012	0.005	μg/L	10	0	84	75 - 125%	PASS	2	25 PASS	
Nickel (Ni)	Total	18.113	0.0025	0.005	μg/L	20	0.3479	89	75 - 125%	PASS	2	25 PASS	
Selenium (Se)	Total	19.495	0.005	0.015	μg/L	20	0.027	97	75 - 125%	PASS	2	25 PASS	
Silver (Ag)	Total	9.41	0.01	0.02	μg/L	10	0.08	93	75 - 125%	PASS	1	25 PASS	
Zinc (Zn)	Total	16.822	0.0025	0.005	μg/L	20	0.9216	80	75 - 125%	PASS	2	25 PASS	
Sample ID: 3	• •	<b>B-03R</b> od: EPA 1640				<b>x: Seawate</b> D: E-10074	r	Sampled:		10:50	_	c <b>eived: 01-F</b> 0	



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	Elements							QUAL	ITY CO	NTROL	REPO	RT
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE		URACY		RECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	%	LIMITS	
Arsenic (As)	Dissolved	1.425	0.005	0.015	μg/L					3	25 PASS	
Arsenic (As)	Total	1.521	0.005	0.015	μg/L					6	25 PASS	
Cadmium (Cd)	Dissolved	0.012	0.0025	0.005	μg/L					9	25 PASS	
Cadmium (Cd)	Total	0.0275	0.0025	0.005	μg/L					1	25 PASS	
Chromium (Cr)	Dissolved	0.1666	0.0125	0.025	μg/L					8	25 PASS	
Chromium (Cr)	Total	0.4882	0.0125	0.025	μg/L					0	25 PASS	
Copper (Cu)	Dissolved	0.241	0.005	0.01	μg/L					10	25 PASS	
Copper (Cu)	Total	0.544	0.005	0.01	μg/L					3	25 PASS	
Lead (Pb)	Dissolved	ND	0.0025	0.005	μg/L					0	25 PASS	
Lead (Pb)	Total	0.1253	0.0025	0.005	μg/L					11	25 PASS	
Mercury (Hg)	Dissolved	ND	0.0012	0.005	μg/L					0	25 PASS	
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L					0	25 PASS	
Nickel (Ni)	Dissolved	0.1944	0.0025	0.005	μg/L					2	25 PASS	
Nickel (Ni)	Total	0.4397	0.0025	0.005	μg/L					6	25 PASS	
Selenium (Se)	Dissolved	0.009	0.005	0.015	μg/L					12	25 PASS	J
Selenium (Se)	Total	0.01	0.005	0.015	μg/L					40	25 FAIL	J,SL
Silver (Ag)	Dissolved	0.09	0.01	0.02	μg/L					12	25 PASS	
Silver (Ag)	Total	0.1	0.01	0.02	μg/L					0	25 PASS	
Zinc (Zn)	Dissolved	1.5944	0.0025	0.005	μg/L					2	25 PASS	
Zinc (Zn)	Total	1.8951	0.0025	0.005	μg/L					7	25 PASS	



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Orga	nopho	sphoru	s Pesti	cide	es			QUA	LITY C	ONT	ROL	REPOR	Т
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS		SOURCE RESULT		CURACY LIMITS		PI %	RECISION LIMITS	QA CODE
Sample ID: 38927	•	AQC Procedurethod: EPA 625	al Blank			: <b>DI Water</b> : 0-9094		Sampled: Prepared: 3	30-Jan-16			eceived: Analyzed: 03-M	ar-16
(PCB030)	Total	63			% Recovery	100		63	57 - 133%	PASS			
(PCB112)	Total	66			% Recovery	100		66	65 - 133%	PASS			
(PCB198)	Total	71			% Recovery	100		71	69 - 133%	PASS			
(TCMX)	Total	60			% Recovery	100		60	39 - 135%	PASS			
Bolstar (Sulprofos)	Total	ND	2	4	ng/L								
Chlorpyrifos	Total	ND	0.5	1	ng/L								
Demeton	Total	ND	1	2	ng/L								
Diazinon	Total	ND	0.5	1	ng/L								
Dichlorvos	Total	ND	3	6	ng/L								
Dimethoate	Total	ND	5	10	ng/L								
Disulfoton	Total	ND	1	2	ng/L								
Ethoprop (Ethoprofos)	Total	ND	1	2	ng/L								
Fenchlorphos (Ronnel)	Total	ND	2	4	ng/L								
Fensulfothion	Total	ND	1	2	ng/L								
Fenthion	Total	ND	2	4	ng/L								
Malathion	Total	ND	3	6	ng/L								
Methidathion	Total	ND	5	10	ng/L								
Methyl parathion	Total	ND	1	2	ng/L								
Mevinphos (Phosdrin)	Total	ND	5	10	ng/L								
Phorate	Total	ND	5	10	ng/L								
Phosmet	Total	ND	5	10	ng/L								
Tetrachlorvinphos (Stirofos)	Total	ND	2	4	ng/L								
Tokuthion	Total	ND	3	6	ng/L								
Trichloronate	Total	ND	1	2	ng/L								
Sample ID: 38927	•	AQC Procedurethod: EPA 625	al Blank			: <b>DI Water</b> : 0-9094		Sampled: Prepared: 3	30-Jan-16			eceived: Analyzed: 03-M	ar-16
(PCB030)	Total	75			% Recovery	100	0	75	57 - 133%	PASS			
(PCB112)	Total	81			% Recovery	100	0	81	65 - 133%	PASS			



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CA ELAP #2769

### **Organophosphorus Pesticides**

### **QUALITY CONTROL REPORT**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	Α	CCURACY	PR	ECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	%	LIMITS	
(PCB198)	Total	82			% Recovery	100	0	82	69 - 133% PASS			
(TCMX)	Total	75			% Recovery	100	0	75	39 - 135% PASS			
Bolstar (Sulprofos)	Total	600.3	2	4	ng/L	500	0	120	50 - 150% PASS			
Chlorpyrifos	Total	476.9	0.5	1	ng/L	500	0	95	50 - 150% PASS			
Demeton	Total	343.5	1	2	ng/L	500	0	69	50 - 150% PASS			
Diazinon	Total	526.6	0.5	1	ng/L	500	0	105	50 - 150% PASS			
Dichlorvos	Total	445.4	3	6	ng/L	500	0	89	50 - 150% PASS			
Dimethoate	Total	253.3	5	10	ng/L	500	0	51	50 - 150% PASS			
Disulfoton	Total	396.9	1	2	ng/L	500	0	79	50 - 150% PASS			
Ethoprop (Ethoprofos)	Total	478	1	2	ng/L	500	0	96	50 - 150% PASS			
Fenchlorphos (Ronnel)	Total	492.4	2	4	ng/L	500	0	98	50 - 150% PASS			
Fensulfothion	Total	439.7	1	2	ng/L	500	0	88	50 - 150% PASS			
Fenthion	Total	482.7	2	4	ng/L	500	0	97	50 - 150% PASS			
Malathion	Total	477.4	3	6	ng/L	500	0	95	50 - 150% PASS			
Methidathion	Total	539.3	5	10	ng/L	500	0	108	50 - 150% PASS			
Methyl parathion	Total	485.4	1	2	ng/L	500	0	97	50 - 150% PASS			
Mevinphos (Phosdrin)	Total	393.8	5	10	ng/L	500	0	79	50 - 150% PASS			
Phorate	Total	423.7	5	10	ng/L	500	0	85	50 - 150% PASS			
Phosmet	Total	482.2	5	10	ng/L	500	0	96	50 - 150% PASS			
Tetrachlorvinphos (Stirofos)	Total	571.7	2	4	ng/L	500	0	114	50 - 150% PASS			
Tokuthion	Total	547.8	3	6	ng/L	500	0	110	50 - 150% PASS			
Trichloronate	Total	467	1	2	ng/L	500	0	93	50 - 150% PASS			

Sample ID: 38	927-BS2	QAQC Procedura Method: EPA 625	al Blank			: DI Water ): 0-9094		Sampled: Prepared:		_	<b>ceived:</b> nalyzed: 03-Mar-16
(PCB030)	Total	75			% Recovery	100	0	75	57 - 133% PASS	0	30 PASS
(PCB112)	Total	84			% Recovery	100	0	84	65 - 133% PASS	4	30 PASS
(PCB198)	Total	83			% Recovery	100	0	83	69 - 133% PASS	1	30 PASS
(TCMX)	Total	71			% Recovery	100	0	71	39 - 135% PASS	5	30 PASS
Bolstar (Sulprofos)	Total	610.9	2	4	ng/L	500	0	122	50 - 150% PASS	2	25 PASS
Chlorpyrifos	Total	501.5	0.5	1	ng/L	500	0	100	50 - 150% PASS	5	25 PASS
Demeton	Total	367.3	1	2	ng/L	500	0	73	50 - 150% PASS	6	25 PASS



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### **Organophosphorus Pesticides**

### **QUALITY CONTROL REPORT**

8	_											
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	А	CCURACY	PREC	SION	QA CODE
						LEVEL	RESULT	%	LIMITS	% I	LIMITS	
Diazinon	Total	529.5	0.5	1	ng/L	500	0	106	50 - 150% PASS	1 25	PASS	
Dichlorvos	Total	426.5	3	6	ng/L	500	0	85	50 - 150% PASS	5 25	PASS	
Dimethoate	Total	276.7	5	10	ng/L	500	0	55	50 - 150% PASS	8 25	PASS	
Disulfoton	Total	459	1	2	ng/L	500	0	92	50 - 150% PASS	15 25	PASS	
Ethoprop (Ethoprofos)	Total	469.5	1	2	ng/L	500	0	94	50 - 150% PASS	2 25	PASS	
Fenchlorphos (Ronnel)	Total	495	2	4	ng/L	500	0	99	50 - 150% PASS	1 25	PASS	
Fensulfothion	Total	527.4	1	2	ng/L	500	0	105	50 - 150% PASS	18 25	PASS	
Fenthion	Total	513.3	2	4	ng/L	500	0	103	50 - 150% PASS	6 25	PASS	
Malathion	Total	501.3	3	6	ng/L	500	0	100	50 - 150% PASS	5 25	PASS	
Methidathion	Total	536.8	5	10	ng/L	500	0	107	50 - 150% PASS	1 25	PASS	
Methyl parathion	Total	493.5	1	2	ng/L	500	0	99	50 - 150% PASS	2 25	PASS	
Mevinphos (Phosdrin)	Total	414.7	5	10	ng/L	500	0	83	50 - 150% PASS	5 25	PASS	
Phorate	Total	435.3	5	10	ng/L	500	0	87	50 - 150% PASS	2 25	PASS	
Phosmet	Total	474.4	5	10	ng/L	500	0	95	50 - 150% PASS	1 25	PASS	
Tetrachlorvinphos (Stirofos)	Total	585.9	2	4	ng/L	500	0	117	50 - 150% PASS	3 25	PASS	
Tokuthion	Total	576.1	3	6	ng/L	500	0	115	50 - 150% PASS	4 25	PASS	
Trichloronate	Total	477.9	1	2	ng/L	500	0	96	50 - 150% PASS	3 25	PASS	



**ANALYTE** 

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QA CODE

## Polynuclear Aromatic Hydrocarbons QUALITY CONTROL REPO

						LEVEL	RESULT	%	LIMITS	%	LIMITS
Sample ID: 38927-B1		QAQC Procedural	Blank			: DI Water		ampled:			eived:
(112		Method: EPA 625				): O-9094	-		30-Jan-16	Aı	nalyzed: 24-Feb-16
(d10-Acenaphthene)	Total	71			% Recovery	100		71	65 - 113% PASS		
(d10-Phenanthrene)	Total	81			% Recovery	100		81	80 - 111% PASS		
(d12-Chrysene)	Total	73			% Recovery	100		73	60 - 139% PASS		
(d8-Naphthalene)	Total	73			% Recovery	100		73	44 - 119% PASS		
1-Methylnaphthalene	Total	ND	1	5	ng/L						
1-Methylphenanthrene	Total	ND	1	5	ng/L						
2,3,5-Trimethylnaphthalene	Total	ND	1	5	ng/L						
2,6-Dimethylnaphthalene	Total	ND	1	5	ng/L						
2-Methylnaphthalene	Total	ND	1	5	ng/L						
Acenaphthene	Total	ND	1	5	ng/L						
Acenaphthylene	Total	ND	1	5	ng/L						
Anthracene	Total	ND	1	5	ng/L						
Benz[a]anthracene	Total	ND	1	5	ng/L						
Benzo[a]pyrene	Total	ND	1	5	ng/L						
Benzo[b]fluoranthene	Total	ND	1	5	ng/L						
Benzo[e]pyrene	Total	ND	1	5	ng/L						
Benzo[g,h,i]perylene	Total	ND	1	5	ng/L						
Benzo[k]fluoranthene	Total	ND	1	5	ng/L						
Biphenyl	Total	ND	1	5	ng/L						
Chrysene	Total	ND	1	5	ng/L						
Dibenz[a,h]anthracene	Total	ND	1	5	ng/L						
Dibenzothiophene	Total	ND	1	5	ng/L						
Fluoranthene	Total	ND	1	5	ng/L						
Fluorene	Total	ND	1	5	ng/L						
Indeno[1,2,3-c,d]pyrene	Total	ND	1	5	ng/L						
Naphthalene	Total	ND	1	5	ng/L						
Perylene	Total	ND	1	5	ng/L						
Phenanthrene	Total	ND	1	5	ng/L						
Pyrene	Total	ND	1	5	ng/L						



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## Polynuclear Aromatic Hydrocarbons

### **QUALITY CONTROL REPORT**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	Α	CCURACY	PRECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	% LIMITS	
Sample ID: 3892	•	QC Procedural	Blank			: DI Water	. 5	Sampled:		Received:	
		hod: EPA 625				): O-9094		Prepared:	-	Analyzed: 24-Fe	b-16
(d10-Acenaphthene)	Total	84			% Recovery	100	0	84	65 - 113% PASS		
(d10-Phenanthrene)	Total	87			% Recovery	100	0	87	80 - 111% PASS		
(d12-Chrysene)	Total	96			% Recovery	100	0	96	60 - 139% PASS		
(d8-Naphthalene)	Total	78			% Recovery	100	0	78	44 - 119% PASS		
1-Methylnaphthalene	Total	480	1	5	ng/L	500	0	96	50 - 150% PASS		
1-Methylphenanthrene	Total	455.7	1	5	ng/L	500	0	91	50 - 150% PASS		
2,3,5-Trimethylnaphthalene	Total	474.5	1	5	ng/L	500	0	95	50 - 150% PASS		
2,6-Dimethylnaphthalene	Total	478.5	1	5	ng/L	500	0	96	50 - 150% PASS		
2-Methylnaphthalene	Total	483.8	1	5	ng/L	500	0	97	50 - 150% PASS		
Acenaphthene	Total	483.8	1	5	ng/L	500	0	97	50 - 150% PASS		
Acenaphthylene	Total	463.1	1	5	ng/L	500	0	93	50 - 150% PASS		
Anthracene	Total	458.1	1	5	ng/L	500	0	92	50 - 150% PASS		
Benz[a]anthracene	Total	455.3	1	5	ng/L	500	0	91	50 - 150% PASS		
Benzo[a]pyrene	Total	468.4	1	5	ng/L	500	0	94	50 - 150% PASS		
Benzo[b]fluoranthene	Total	456.8	1	5	ng/L	500	0	91	50 - 150% PASS		
Benzo[e]pyrene	Total	481.9	1	5	ng/L	500	0	96	50 - 150% PASS		
Benzo[g,h,i]perylene	Total	541.4	1	5	ng/L	500	0	108	50 - 150% PASS		
Benzo[k]fluoranthene	Total	469.9	1	5	ng/L	500	0	94	50 - 150% PASS		
Biphenyl	Total	490.7	1	5	ng/L	500	0	98	50 - 150% PASS		
Chrysene	Total	470.4	1	5	ng/L	500	0	94	50 - 150% PASS		
Dibenz[a,h]anthracene	Total	494.7	1	5	ng/L	500	0	99	50 - 150% PASS		
Dibenzothiophene	Total	462.5	1	5	ng/L	500	0	93	50 - 150% PASS		
Fluoranthene	Total	443.6	1	5	ng/L	500	0	89	50 - 150% PASS		
Fluorene	Total	464.6	1	5	ng/L	500	0	93	50 - 150% PASS		
Indeno[1,2,3-c,d]pyrene	Total	503.6	1	5	ng/L	500	0	101	50 - 150% PASS		
Naphthalene	Total	470.1	1	5	ng/L	500	0	94	50 - 150% PASS		
Perylene	Total	466.5	1	5	ng/L	500	0	93	50 - 150% PASS		
Phenanthrene	Total	457.1	1	5	ng/L	500	0	91	50 - 150% PASS		
Pyrene	Total	438.2	1	5	ng/L	500	0	88	50 - 150% PASS		



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CA ELAP #2769

## Polynuclear Aromatic Hydrocarbons

### **QUALITY CONTROL REPORT**

ANALYTE	FRACTIO	N RESULT	MDL	RL	UNITS	SPIKE	SOURCE	A	CCURACY	PI	RECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	%	LIMITS	
Sample ID: 38927	•	AQC Procedural	Blank			። DI Water	· s	Sampled:			eceived:	
		ethod: EPA 625				D: O-9094		Prepared:	-		Analyzed: 24-Fe	b-16
(d10-Acenaphthene)	Total	82			% Recovery	100	0	82	65 - 113% PASS	2	30 PASS	
(d10-Phenanthrene)	Total	85			% Recovery	100	0	85	80 - 111% PASS	2	30 PASS	
(d12-Chrysene)	Total	91			% Recovery	100	0	91	60 - 139% PASS	5	30 PASS	
(d8-Naphthalene)	Total	68			% Recovery	100	0	68	44 - 119% PASS	14	30 PASS	
1-Methylnaphthalene	Total	462.6	1	5	ng/L	500	0	93	50 - 150% PASS	3	25 PASS	
1-Methylphenanthrene	Total	449.7	1	5	ng/L	500	0	90	50 - 150% PASS	1	25 PASS	
2,3,5-Trimethylnaphthalene	Total	485.3	1	5	ng/L	500	0	97	50 - 150% PASS	2	25 PASS	
2,6-Dimethylnaphthalene	Total	481.1	1	5	ng/L	500	0	96	50 - 150% PASS	0	25 PASS	
2-Methylnaphthalene	Total	463	1	5	ng/L	500	0	93	50 - 150% PASS	4	25 PASS	
Acenaphthene	Total	483.6	1	5	ng/L	500	0	97	50 - 150% PASS	0	25 PASS	
Acenaphthylene	Total	465.2	1	5	ng/L	500	0	93	50 - 150% PASS	0	25 PASS	
Anthracene	Total	463.1	1	5	ng/L	500	0	93	50 - 150% PASS	1	25 PASS	
Benz[a]anthracene	Total	447.4	1	5	ng/L	500	0	89	50 - 150% PASS	2	25 PASS	
Benzo[a]pyrene	Total	467.1	1	5	ng/L	500	0	93	50 - 150% PASS	1	25 PASS	
Benzo[b]fluoranthene	Total	450.7	1	5	ng/L	500	0	90	50 - 150% PASS	1	25 PASS	
Benzo[e]pyrene	Total	483.1	1	5	ng/L	500	0	97	50 - 150% PASS	1	25 PASS	
Benzo[g,h,i]perylene	Total	553.6	1	5	ng/L	500	0	111	50 - 150% PASS	3	25 PASS	
Benzo[k]fluoranthene	Total	469.5	1	5	ng/L	500	0	94	50 - 150% PASS	0	25 PASS	
Biphenyl	Total	486.1	1	5	ng/L	500	0	97	50 - 150% PASS	1	25 PASS	
Chrysene	Total	464.1	1	5	ng/L	500	0	93	50 - 150% PASS	1	25 PASS	
Dibenz[a,h]anthracene	Total	508.8	1	5	ng/L	500	0	102	50 - 150% PASS	3	25 PASS	
Dibenzothiophene	Total	467.1	1	5	ng/L	500	0	93	50 - 150% PASS	1	25 PASS	
Fluoranthene	Total	439.9	1	5	ng/L	500	0	88	50 - 150% PASS	1	25 PASS	
Fluorene	Total	475.2	1	5	ng/L	500	0	95	50 - 150% PASS	2	25 PASS	
Indeno[1,2,3-c,d]pyrene	Total	514.6	1	5	ng/L	500	0	103	50 - 150% PASS	2	25 PASS	
Naphthalene	Total	424.7	1	5	ng/L	500	0	85	50 - 150% PASS	10	25 PASS	
Perylene	Total	469.5	1	5	ng/L	500	0	94	50 - 150% PASS	1	25 PASS	
Phenanthrene	Total	463	1	5	ng/L	500	0	93	50 - 150% PASS	2	25 PASS	
Pyrene	Total	441.5	1	5	ng/L	500	0	88	50 - 150% PASS	0	25 PASS	



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ANALYTE													
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS						QA CODE		
Sample ID: 38927			Blank				r S	-	30-Jan-16		·-16		
Allethrin	Total	ND	0.5	2	ng/L			•	_				
Bifenthrin	Total	ND	0.5	2	ng/L								
Cyfluthrin	Total	ND	0.5	2	ng/L								
Cyhalothrin, Total Lambda	Total	ND	0.5	2	ng/L								
Cypermethrin	Total	ND	0.5	2	ng/L								
Danitol (Fenpropathrin)	Total	ND	0.5	2	ng/L								
Deltamethrin/Tralomethrin	Total	ND	0.5	2	ng/L								
Esfenvalerate	Total	ND	0.5	2	ng/L								
Fenvalerate	Total	ND	0.5	2	ng/L								
Fluvalinate	Total	ND	0.5	2	ng/L								
Permethrin, cis-	Total	ND	5	10	ng/L								
Permethrin, trans-	Total	ND	5	10	ng/L								
Prallethrin	Total	ND	0.5	2	ng/L								
Resmethrin	Total	ND	5	10	ng/L								
Sample ID: 38927		C Procedural od: EPA 625-NCI	Blank			<b>x: DI Water</b> D: 0-9094	r S	Sampled: Prepared:	30 Jan 16	Received: Analyzed: 01-Mar	:16		
Allethrin	Total	585.7	0.5	2	ng/L	500	0	117	50 - 150% PASS	Analyzed: Ol-Mai	-10		
Bifenthrin	Total	589.6	0.5	2	ng/L	500	0	118	50 - 150% PASS				
Cyfluthrin	Total	597.7	0.5	2	ng/L	500	0	120	50 - 150% PASS				
Cyhalothrin, Total Lambda	Total	582.8	0.5	2	ng/L	500	0	117	50 - 150% PASS				
Cypermethrin	Total	595.6	0.5	2	ng/L	500	0	119	50 - 150% PASS				
Danitol (Fenpropathrin)	Total	592.9	0.5	2	ng/L	500	0	119	50 - 150% PASS				
Deltamethrin/Tralomethrin	Total	1045.2	0.5	2	ng/L	1000	0	105	50 - 150% PASS				
Esfenvalerate	Total	582.7	0.5	2	ng/L	500	0	117	50 - 150% PASS				
Fenvalerate	Total	591.4	0.5	2	ng/L	500	0	118	50 - 150% PASS				
Fluvalinate	Total	589.7	0.5	2	ng/L	500	0	118	50 - 150% PASS				
Permethrin, cis-	Total	209.3	5	10	ng/L	133.5	0	157	50 - 150% PASS	PASS	Q		
Permethrin, trans-	Total	424	5	10	ng/L	358	0	118	50 - 150% PASS				



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	Pyrethroids							QUA	LITY CONTE	ROLI	REPOR	Т
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	A %	CCURACY LIMITS	PRI %	ECISION LIMITS	QA CODE
Prallethrin	Total	571	0.5	2	ng/L	500	0	114	50 - 150% PASS			
Pasmathrin	Total	0	5	10	na/l	500	Λ	0	50 - 150% PASS		DASS	0

Sample ID: 38927-I	BS2	QAQC Procedural I Method: EPA 625-NCI	Blank			rix: DI Water ID: 0-9094		Sampled: Prepared:	30-Jan-16	F	Received: Analyzed: 01-Mar-	16
Allethrin	Total	586.5	0.5	2	ng/L	500	0	117	50 - 150% PASS	0	25 PASS	
Bifenthrin	Total	571.2	0.5	2	ng/L	500	0	114	50 - 150% PASS	3	25 PASS	
Cyfluthrin	Total	591.3	0.5	2	ng/L	500	0	118	50 - 150% PASS	2	25 PASS	
Cyhalothrin, Total Lambda	Total	575.7	0.5	2	ng/L	500	0	115	50 - 150% PASS	2	25 PASS	
Cypermethrin	Total	599.1	0.5	2	ng/L	500	0	120	50 - 150% PASS	1	25 PASS	
Danitol (Fenpropathrin)	Total	593.7	0.5	2	ng/L	500	0	119	50 - 150% PASS	0	25 PASS	
Deltamethrin/Tralomethrin	Total	1034.6	0.5	2	ng/L	1000	0	103	50 - 150% PASS	2	25 PASS	
Esfenvalerate	Total	589.3	0.5	2	ng/L	500	0	118	50 - 150% PASS	1	25 PASS	
Fenvalerate	Total	589.7	0.5	2	ng/L	500	0	118	50 - 150% PASS	0	25 PASS	
Fluvalinate	Total	580.9	0.5	2	ng/L	500	0	116	50 - 150% PASS	2	25 PASS	
Permethrin, cis-	Total	158.8	5	10	ng/L	133.5	0	119	50 - 150% PASS	28	25 PASS	Q
Permethrin, trans-	Total	427.6	5	10	ng/L	358	0	119	50 - 150% PASS	1	25 PASS	
Prallethrin	Total	577.4	0.5	2	ng/L	500	0	115	50 - 150% PASS	1	25 PASS	
Resmethrin	Total	0	5	10	ng/L	500	0	0	50 - 150% PASS	0	25 PASS	Q

# CHAIN OF TERRA GUSTEO DA AURA ENVIRON ESTA DE LA COMPANIES, INC.

Innovative Solutions for Nature

From: Aquatic Bioassay (805) 643-5621 To: Company: PHYSIS Laboratories Phone: and Consulting Labs. (805) 643-2930 Fax: Address: 1904 East Wright Circle 29 N. Olive St. Project ID: City of Malibu ASBS Anaheim, CA 92806 Ventura, CA 93001 Phone: (714) 335-5918 **ANALYSIS** Metals including Hg by EPA 1640 PAHs, OP Pesticides & Pyrethroid Pesticides Orthophosphate Sample I.D. No. Sample Date Time **Matrix** No. Reps Grease Total Metals **Ammonia** ∞ಶ Nitrate ø ISS 24-BB-01Z 2 ۴W 2 24-BB-02Z 1 1 FW 24-BB-03Z 7 2 FW 7 24-BB-03R 1 1 2 24-BB-03 R 1-31-Special Instructions: Please email results to Karin Patrick at karin @aquabio.org DATE: TIME: RECEIVED BY: DATE: TIME: RELINQUISHED BY: // RELINQUISHED BY: DATE: TIME: RECEIVED BY: DATE: TIME:

### Rich Hanken

From: Karin Patrick

Sent: Wednesday, February 03, 2016 12:43 PM

To: Rich Hanken
Cc: Project Managers

**Subject:** RE: ABC City of Malibu ASBS 1212004-008 COC and SRS

Follow Up Flag: Follow up Flag Status: Flagged

Categories: Important

### Hi Rich,

Please analyze both total and dissolved metals. Right before sampling began, the City decided they wanted both analyzed, even though the dissolved fraction wasn't required by ASBS. Sorry about the discrepancy and thank you for checking.

### Karin



From: Rich Hanken [mailto:richhanken@physislabs.com]

Sent: Wednesday, February 03, 2016 11:32 AM

**To:** Karin Patrick **Cc:** Project Managers

Subject: ABC City of Malibu ASBS 1212004-008 COC and SRS

Hello Karin,

I'm sorry but I forgot to check with you first but we have already filtered the 3 metals samples but we did notice that there is a discrepancy between the COC and the bottles.

- COC is asking for Total & Dissolved Metals & Hg by EPA 1640.
- The Bottles have had the Dissolved part of the metals scratched out with a blank sharpie.

So please look at the COC and our SRS and please let us know if you still want us to analyze the Dissolved Metals part of the samples.

Thank you,

Rich

Richard G. Hanken Business Manager - Project Integrator (714) 602-5320 ext. 212



## Sample Receipt Summary

Client: Aquatic Bioassay & Consulting Laborator	es, Inc. Date Received: 2/1/2016 Received I	By: RGH Inspected By: RGH					
Courier:	Cooler:	Temperature:					
☐ Physis ☐ FEDEX ☐ UPS ☐ Client	✓ Cooler ☐ Box Total #: 2	☐ BLUE ✔ WET ☐ DRY					
Start End Other: Area Fast	Other:	☐ None 0.6°C					
Sample Integrity Upon Receipt:							
<ol> <li>All sample containers arrived intact</li> <li>All samples listed on COC(s) are present.</li> <li>Information on containers consistent.</li> <li>Correct containers and volume for all an all samples received within method here.</li> <li>Correct preservation used for all analy.</li> </ol>	vitvith information on COC(s)nalyses indicated	Yes Yes Yes Yes Yes					

Notes:

Each of the Metals bottles had Dissolved scratched out but the COC specifically asked for Dissolved Metals.



May 12, 2016

Karin Patrick Aquatic Bioassay & Consulting Laboratories, Inc. 29 N. Olive Street Ventura, CA 93001

Project Name: City of Malibu ASBS

Physis Project ID: 1212004-009

Dear Karin,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 3/12/2016. A total of 3 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventionals
Total Suspended Solids by SM 2540 D
Total Orthophosphate as P by SM 4500-P E
Nitrate as N by SM 4500-NO3 E
Ammonia as N by SM 4500-NH3 D
Elements
Total Trace Metals & Mercury (EPA 1640) by EPA 1640
Organics
Synthetic Pyrethroid Pesticides by EPA 625-NCI
Polynuclear Aromatic Hydrocarbons by EPA 625
Organophosphorus Pesticides by EPA 625
Oil & Grease by EPA 1664B

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

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

Regards,

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



### **PROJECT SAMPLE LIST**

PHYSIS Project ID: 1212004-009 Aquatic Bioassay & Consulting Laboratories, Inc.

City of Malibu ASBS

Total Samples: 3

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
39567	24-BB-03R		3/10/2016	13:30	Seawater
39568	24-BB-03Z		3/11/2016	14:26	Freshwater
39569	24-BB-03R		3/11/2016	14:31	Seawater



### **ABBREVIATIONS and ACRONYMS**

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



### QUALITY ASSURANCE SUMMARY

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

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

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

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

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

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

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

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to



the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

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



### **PHYSIS QUALIFIER CODES**

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

## TERRA REPORTA AURA ENVIRON RES, INC.

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Convent		ANALYTICAL REPORT				
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 39567-R1	<b>24-BB-03R</b> Method: SM 4500-NH3 D	<b>Matrix: Se</b> Batch ID: C-1		Sampled: 10-Mar-16 Prepared: 07-Apr-16	13:30	Received: 12-Mar-16 Analyzed: 07-Apr-16
Ammonia as N	NA	ND	0.02	0.05	mg/L	
	Method: SM 4500-P E	Batch ID: C-2	8033	Prepared: 12-Mar-16		Analyzed: 12-Mar-16
Total Orthophosphate as P	NA	0.03	0.01	0.02	mg/L	
	Method: SM 4500-NO3 E	Batch ID: C-2	8045	Prepared: 12-Mar-16		Analyzed: 05-Apr-16
Nitrate as N	NA	0.1	0.01	0.02	mg/L	
	Method: SM 2540 D	Batch ID: C-2	9018	Prepared: 17-Mar-16		Analyzed: 17-Mar-16
Total Suspended Solids	NA	4.4	0.5	0.5	mg/L	
Sample ID: 39568-R1	<b>24-BB-03Z</b> Method: SM 4500-NH3 D	<b>Matrix: Fr</b> o		Sampled: 11-Mar-16 Prepared: 07-Apr-16	14:26	Received: 12-Mar-16 Analyzed: 07-Apr-16
Ammonia as N	NA NA	0.78	0.02	0.05	mg/L	
	Method: SM 4500-P E	Batch ID: C-2	.8033	Prepared: 12-Mar-16		Analyzed: 12-Mar-16
Total Orthophosphate as P	NA	0.19	0.01	0.02	mg/L	
	Method: SM 4500-NO3 E	Batch ID: C-2	8045	Prepared: 12-Mar-16		Analyzed: 05-Apr-16
Nitrate as N	NA	0.94	0.01	0.02	mg/L	
	Method: SM 2540 D	Batch ID: C-2	9018	Prepared: 17-Mar-16		Analyzed: 17-Mar-16
Total Suspended Solids	NA	211.4	0.5	0.5	mg/L	
Sample ID: 39569-R1	<b>24-BB-03R</b> Method: SM 4500-NH3 D	<b>Matrix: Se</b> Batch ID: C-1		Sampled: 11-Mar-16 Prepared: 07-Apr-16	14:31	Received: 12-Mar-16 Analyzed: 07-Apr-16
Ammonia as N	NA	ND	0.02	0.05	mg/L	
	Method: SM 4500-P E	Batch ID: C-2	8033	Prepared: 12-Mar-16		Analyzed: 12-Mar-16
Total Orthophosphate as P	NA	0.04	0.01	0.02	mg/L	
	Method: SM 4500-NO3 E	Batch ID: C-2	8045	Prepared: 12-Mar-16		Analyzed: 05-Apr-16
Nitrate as N	NA	0.05	0.01	0.02	mg/L	
	Method: SM 2540 D	Batch ID: C-2	9018	Prepared: 17-Mar-16		Analyzed: 17-Mar-16
Total Suspended Solids	NA	12.3	0.5	0.5	mg/L	



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Elements					ANALYTICAL REPORT			
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE		
Sample ID: 39567-R1	<b>24-BB-03R</b> Method: EPA 1640		<b>Matrix: Seawater</b> Batch ID: E-10140		13:30	Received: 12-Mar-16 Analyzed: 05-May-16		
Arsenic (As)	Total	1.575	0.005	0.015	μg/L			
Cadmium (Cd)	Total	0.0294	0.0025	0.005	μg/L			
Chromium (Cr)	Total	0.2519	0.0125	0.025	μg/L			
Copper (Cu)	Total	0.239	0.005	0.01	μg/L			
Lead (Pb)	Total	0.0575	0.0025	0.005	μg/L			
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L			
Nickel (Ni)	Total	0.397	0.0025	0.005	μg/L			
Selenium (Se)	Total	0.01	0.005	0.015	μg/L	J		
Silver (Ag)	Total	0.1	0.01	0.02	μg/L			
Zinc (Zn)	Total	2.1802	0.0025	0.005	μg/L			
Sample ID: 39568-R1	24-BB-03Z	Matrix: Freshwater		Sampled: 11-Mar-16	14:26	Received: 12-Mar-16		
Arsenic (As)	Method: EPA 1640  Total	Batch ID: E-1 6.203	0.005	Prepared: 02-May-16 0.015	μg/L	Analyzed: 05-May-16		
Cadmium (Cd)	Total	0.4005	0.003	0.005	μg/L			
Chromium (Cr)	Total	13.9122	0.0025	0.025	μg/L			
Copper (Cu)	Total	28.952	0.0123	0.023	μg/L			
Lead (Pb)	Total	11.2257	0.003	0.005	μg/L μg/L			
Mercury (Hg)	Total	0.0224	0.0023	0.005	μg/L			
Nickel (Ni)	Total	10.8771	0.0012	0.005	μg/L			
Selenium (Se)	Total	0.198	0.0025	0.015	μg/L			
Silver (Ag)	Total	ND	0.003	0.02	μg/L			
Zinc (Zn)	Total	112.326	0.0025	0.005	μg/L			
(		112.020	0.0020	3.000	P9' L			
Sample ID: 39569-R1	<b>24-BB-03R</b> Method: EPA 1640	<b>Matrix: Se</b> Batch ID: E-1		Sampled: 11-Mar-16 Prepared: 02-May-16	14:31	Received: 12-Mar-16 Analyzed: 05-May-16		
Arsenic (As)	Total	2.607	0.005	0.015	μg/L			
Cadmium (Cd)	Total	0.0393	0.0025	0.005	μg/L			
Chromium (Cr)	Total	1.092	0.0125	0.025	μg/L			
Copper (Cu)	Total	1.011	0.005	0.01	μg/L			



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Elements					ANALYTICA	L REPORT
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Lead (Pb)	Total	0.6868	0.0025	0.005	μg/L	
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L	
Nickel (Ni)	Total	0.715	0.0025	0.005	μg/L	
Selenium (Se)	Total	0.021	0.005	0.015	μg/L	
Silver (Ag)	Total	0.09	0.01	0.02	μg/L	
Zinc (Zn)	Total	6.4486	0.0025	0.005	μg/L	



Trichloronate

(PCB030)

(PCB112)

(PCB198)

Sample ID: 39568-R1

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ng/L

% Recovery

% Recovery

% Recovery

CA ELAP #2769

### **Organophosphorus Pesticides ANALYTICAL REPORT ANALYTE FRACTION RESULT** MDL RL **UNITS QA CODE** Sample ID: 39567-R1 24-BB-03R Matrix: Seawater Sampled: 10-Mar-16 13:30 Received: 12-Mar-16 Method: EPA 625 Batch ID: O-10002 Prepared: 14-Mar-16 Analyzed: 02-Apr-16 (PCB030) Total 59 % Recovery (PCB112) Total 85 % Recovery 82 (PCB198) Total % Recovery Total 36 (TCMX) % Recovery Bolstar (Sulprofos) ND 2 Total 4 ng/L 0.5 Chlorpyrifos Total ND 1 ng/L Demeton Total ND 1 2 ng/L Diazinon Total ND 0.5 1 ng/L Dichlorvos Total ND 3 6 ng/L Dimethoate Total ND 5 10 ng/L Disulfoton Total ND 2 ng/L Ethoprop (Ethoprofos) Total ND 2 1 ng/L Fenchlorphos (Ronnel) Total ND 2 ng/L Fensulfothion Total ND 1 2 ng/L Fenthion Total ND 2 4 ng/L Malathion Total ND 3 6 ng/L Methidathion Total ND 5 10 ng/L Methyl parathion Total ND 2 ng/L Mevinphos (Phosdrin) Total ND 5 10 ng/L ND Phorate Total 5 10 ng/L Phosmet Total ND 5 10 ng/L ND 2 Tetrachlorvinphos (Stirofos) Total 4 ng/L **Tokuthion** Total ND 3 6 ng/L

Matrix: Freshwater

Batch ID: O-10002

Total

Total

Total

Total

24-BB-03Z

Method: EPA 625

ND

57

66

69

Sampled: 11-Mar-16 14:26

Prepared: 14-Mar-16

2

Received: 12-Mar-16

Analyzed: 02-Apr-16



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### **Organophosphorus Pesticides**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
(TCMX)	Total	51			% Recovery	
Bolstar (Sulprofos)	Total	ND	2	4	ng/L	
Chlorpyrifos	Total	ND	0.5	1	ng/L	
Demeton	Total	ND	1	2	ng/L	
Diazinon	Total	ND	0.5	1	ng/L	
Dichlorvos	Total	ND	3	6	ng/L	
Dimethoate	Total	ND	5	10	ng/L	
Disulfoton	Total	ND	1	2	ng/L	
Ethoprop (Ethoprofos)	Total	ND	1	2	ng/L	
Fenchlorphos (Ronnel)	Total	ND	2	4	ng/L	
Fensulfothion	Total	ND	1	2	ng/L	
Fenthion	Total	ND	2	4	ng/L	
Malathion	Total	ND	3	6	ng/L	
Methidathion	Total	ND	5	10	ng/L	
Methyl parathion	Total	ND	1	2	ng/L	
Mevinphos (Phosdrin)	Total	ND	5	10	ng/L	
Phorate	Total	ND	5	10	ng/L	
Phosmet	Total	ND	5	10	ng/L	
Tetrachlorvinphos (Stirofos)	Total	ND	2	4	ng/L	
Tokuthion	Total	ND	3	6	ng/L	
Trichloronate	Total	ND	1	2	ng/L	

Sample ID: 39569-R1	<b>24-BB-03R</b> Method: EPA 625	<b>Matrix: S</b> Batch ID: C	Seawater O-10002	Sampled: 1 Prepared: 1		Received: 12-Mar-16 Analyzed: 02-Apr-16
(PCB030)	Total	61			% Recovery	
(PCB112)	Total	76			% Recovery	
(PCB198)	Total	74			% Recovery	
(TCMX)	Total	36			% Recovery	
Bolstar (Sulprofos)	Total	ND	2	4	ng/L	
Chlorpyrifos	Total	ND	0.5	1	ng/L	
Demeton	Total	ND	1	2	ng/L	
Diazinon	Total	ND	0.5	1	ng/L	
Dichlorvos	Total	ND	3	6	ng/L	



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### **Organophosphorus Pesticides**

FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Total	ND	5	10	ng/L	
Total	ND	1	2	ng/L	
Total	ND	1	2	ng/L	
Total	ND	2	4	ng/L	
Total	ND	1	2	ng/L	
Total	ND	2	4	ng/L	
Total	ND	3	6	ng/L	
Total	ND	5	10	ng/L	
Total	ND	1	2	ng/L	
Total	ND	5	10	ng/L	
Total	ND	5	10	ng/L	
Total	ND	5	10	ng/L	
Total	ND	2	4	ng/L	
Total	ND	3	6	ng/L	
Total	ND	1	2	ng/L	
	Total	Total         ND           Total         ND	Total         ND         5           Total         ND         1           Total         ND         1           Total         ND         2           Total         ND         1           Total         ND         2           Total         ND         3           Total         ND         5           Total         ND         1           Total         ND         5           Total         ND         5           Total         ND         5           Total         ND         5           Total         ND         2           Total         ND         3	Total         ND         5         10           Total         ND         1         2           Total         ND         1         2           Total         ND         2         4           Total         ND         1         2           Total         ND         3         6           Total         ND         5         10           Total         ND         3         6	Total         ND         5         10         ng/L           Total         ND         1         2         ng/L           Total         ND         1         2         ng/L           Total         ND         2         4         ng/L           Total         ND         1         2         ng/L           Total         ND         2         4         ng/L           Total         ND         3         6         ng/L           Total         ND         5         10         ng/L           Total         ND         2 <td< td=""></td<>



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## **Polynuclear Aromatic Hydrocarbons**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 39567-R1	<b>24-BB-03R</b> Method: EPA 625	Matrix: Se Batch ID: O-		Sampled: 10 Prepared: 14	- <b>Mar-16 13:30</b> -Mar-16	Received: 12-Mar-16 Analyzed: 02-Apr-16
(d10-Acenaphthene)	Total	71			% Recovery	
(d10-Phenanthrene)	Total	98			% Recovery	
(d12-Chrysene)	Total	121			% Recovery	
(d8-Naphthalene)	Total	49			% Recovery	
1-Methylnaphthalene	Total	ND	1	5	ng/L	
1-Methylphenanthrene	Total	ND	1	5	ng/L	
2,3,5-Trimethylnaphthalene	Total	ND	1	5	ng/L	
2,6-Dimethylnaphthalene	Total	ND	1	5	ng/L	
2-Methylnaphthalene	Total	ND	1	5	ng/L	
Acenaphthene	Total	ND	1	5	ng/L	
Acenaphthylene	Total	ND	1	5	ng/L	
Anthracene	Total	ND	1	5	ng/L	
Benz[a]anthracene	Total	1.5	1	5	ng/L	J
Benzo[a]pyrene	Total	ND	1	5	ng/L	
Benzo[b]fluoranthene	Total	22.5	1	5	ng/L	
Benzo[e]pyrene	Total	ND	1	5	ng/L	
Benzo[g,h,i]perylene	Total	ND	1	5	ng/L	
Benzo[k]fluoranthene	Total	ND	1	5	ng/L	
Biphenyl	Total	ND	1	5	ng/L	
Chrysene	Total	ND	1	5	ng/L	
Dibenz[a,h]anthracene	Total	ND	1	5	ng/L	
Dibenzothiophene	Total	ND	1	5	ng/L	
Fluoranthene	Total	ND	1	5	ng/L	
Fluorene	Total	ND	1	5	ng/L	
Indeno[1,2,3-c,d]pyrene	Total	ND	1	5	ng/L	
Naphthalene	Total	ND	1	5	ng/L	
Perylene	Total	ND	1	5	ng/L	
Phenanthrene	Total	1.7	1	5	ng/L	J
Pyrene	Total	ND	1	5	ng/L	



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### **Polynuclear Aromatic Hydrocarbons**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 39568-R1	<b>24-BB-03Z</b> Method: EPA 625	<b>Matrix: Fr</b> Batch ID: O-		Sampled: 11 Prepared: 14	•	Received: 12-Mar-16 Analyzed: 02-Apr-16
(d10-Acenaphthene)	Total	59			% Recovery	
(d10-Phenanthrene)	Total	80			% Recovery	
(d12-Chrysene)	Total	99			% Recovery	
(d8-Naphthalene)	Total	42			% Recovery	
1-Methylnaphthalene	Total	ND	1	5	ng/L	
1-Methylphenanthrene	Total	30.2	1	5	ng/L	
2,3,5-Trimethylnaphthalene	Total	ND	1	5	ng/L	
2,6-Dimethylnaphthalene	Total	1.1	1	5	ng/L	J
2-Methylnaphthalene	Total	1.7	1	5	ng/L	J
Acenaphthene	Total	ND	1	5	ng/L	
Acenaphthylene	Total	1.4	1	5	ng/L	J
Anthracene	Total	7.3	1	5	ng/L	
Benz[a]anthracene	Total	4.8	1	5	ng/L	J
Benzo[a]pyrene	Total	5.1	1	5	ng/L	
Benzo[b]fluoranthene	Total	16.1	1	5	ng/L	
Benzo[e]pyrene	Total	16.8	1	5	ng/L	
Benzo[g,h,i]perylene	Total	15.5	1	5	ng/L	
Benzo[k]fluoranthene	Total	3.7	1	5	ng/L	J
Biphenyl	Total	2.8	1	5	ng/L	J
Chrysene	Total	29.7	1	5	ng/L	
Dibenz[a,h]anthracene	Total	ND	1	5	ng/L	
Dibenzothiophene	Total	7.5	1	5	ng/L	
Fluoranthene	Total	23.9	1	5	ng/L	
Fluorene	Total	1.2	1	5	ng/L	J
Indeno[1,2,3-c,d]pyrene	Total	5.7	1	5	ng/L	
Naphthalene	Total	3.1	1	5	ng/L	J
Perylene	Total	11.1	1	5	ng/L	
Phenanthrene	Total	14.8	1	5	ng/L	
Pyrene	Total	27.3	1	5	ng/L	



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### **Polynuclear Aromatic Hydrocarbons**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 39569-R1	<b>24-BB-03R</b> Method: EPA 625	<b>Matrix: Se</b> Batch ID: O-		Sampled: 11 Prepared: 14		Received: 12-Mar-16 Analyzed: 02-Apr-16
(d10-Acenaphthene)	Total	65			% Recovery	
(d10-Phenanthrene)	Total	87			% Recovery	
(d12-Chrysene)	Total	110			% Recovery	
(d8-Naphthalene)	Total	45			% Recovery	
1-Methylnaphthalene	Total	ND	1	5	ng/L	
1-Methylphenanthrene	Total	ND	1	5	ng/L	
2,3,5-Trimethylnaphthalene	Total	ND	1	5	ng/L	
2,6-Dimethylnaphthalene	Total	ND	1	5	ng/L	
2-Methylnaphthalene	Total	ND	1	5	ng/L	
Acenaphthene	Total	ND	1	5	ng/L	
Acenaphthylene	Total	ND	1	5	ng/L	
Anthracene	Total	ND	1	5	ng/L	
Benz[a]anthracene	Total	1.5	1	5	ng/L	J
Benzo[a]pyrene	Total	ND	1	5	ng/L	
Benzo[b]fluoranthene	Total	5.5	1	5	ng/L	
Benzo[e]pyrene	Total	ND	1	5	ng/L	
Benzo[g,h,i]perylene	Total	ND	1	5	ng/L	
Benzo[k]fluoranthene	Total	ND	1	5	ng/L	
Biphenyl	Total	ND	1	5	ng/L	
Chrysene	Total	1.6	1	5	ng/L	J
Dibenz[a,h]anthracene	Total	ND	1	5	ng/L	
Dibenzothiophene	Total	1.6	1	5	ng/L	J
Fluoranthene	Total	1.2	1	5	ng/L	J
Fluorene	Total	ND	1	5	ng/L	
Indeno[1,2,3-c,d]pyrene	Total	ND	1	5	ng/L	
Naphthalene	Total	1.5	1	5	ng/L	J
Perylene	Total	ND	1	5	ng/L	
Phenanthrene	Total	1.9	1	5	ng/L	J
Pyrene	Total	1.3	1	5	ng/L	J



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Pyrethroids				ANALYTICAL REPORT			
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE	
Sample ID: 39567-R1	<b>24-BB-03R</b> Method: EPA 625-NCI	<b>Matrix: S</b> Batch ID: O		Sampled: 10-Mar-16 Prepared: 14-Mar-16	13:30	Received: 12-Mar-16 Analyzed: 07-Apr-16	
Allethrin	Total	ND	0.5	2	ng/L		
Bifenthrin	Total	ND	0.5	2	ng/L		
Cyfluthrin	Total	ND	0.5	2	ng/L		
Cyhalothrin, Total Lambda	Total	ND	0.5	2	ng/L		
Cypermethrin	Total	ND	0.5	2	ng/L		
Danitol (Fenpropathrin)	Total	ND	0.3	2	ng/L		
Deltamethrin/Tralomethrin	Total	ND	0.5	2	ng/L		
Esfenvalerate	Total	ND	0.5	2	ng/L		
Fenvalerate	Total	ND	0.5	2	ng/L		
Fluvalinate	Total	ND	0.5	2	ng/L		
Permethrin, cis-	Total	ND	2	4	ng/L		
Permethrin, trans-	Total	ND	1	2	ng/L		
Prallethrin	Total	ND	0.5	2	ng/L		
Resmethrin	Total	ND	5	10	ng/L		
Sample ID: 39568-R1	<b>24-BB-03Z</b> Method: EPA 625-NCI	<b>Matrix: F</b> Batch ID: O	reshwater -10002	Sampled: 11-Mar-16 Prepared: 14-Mar-16	14:26	Received: 12-Mar-16 Analyzed: 07-Apr-16	
Allethrin	Total	ND	0.5	2	ng/L		
Bifenthrin	Total	92.5	0.5	2	ng/L		
Cyfluthrin	Total	ND	0.5	2	ng/L		
Cyhalothrin, Total Lambda	Total	ND	0.5	2	ng/L		
Cypermethrin	Total	ND	0.5	2	ng/L		
Danitol (Fenpropathrin)	Total	ND	0.3	2	ng/L		
Deltamethrin/Tralomethrin	Total	ND	0.5	2	ng/L		
Esfenvalerate	Total	ND	0.5	2	ng/L		
Fenvalerate	Total	ND	0.5	2	ng/L		
		ND	0.5	2	ng/L		
Fluvalinate	Total	ND	0.5	2	119/ =		
Fluvalinate Permethrin, cis-	Total Total	ND ND	2	4	ng/L		
					_		



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Pyrethro	oids				ANALYTICAL REPORT		
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE	
Resmethrin	Total	ND	5	10	ng/L		
Sample ID: 39569-R1	<b>24-BB-03R</b> Method: EPA 625-NCI	Matrix: Seav Batch ID: O-100		Sampled: 11-l Prepared: 14-l		Received: 12-Mar-16 Analyzed: 07-Apr-16	
Allethrin	Total	ND	0.5	2	ng/L		
Bifenthrin	Total	1	0.5	2	ng/L	J	
Cyfluthrin	Total	ND	0.5	2	ng/L		
Cyhalothrin, Total Lambda	Total	ND	0.5	2	ng/L		
Cypermethrin	Total	ND	0.5	2	ng/L		
Danitol (Fenpropathrin)	Total	ND	0.3	2	ng/L		
Deltamethrin/Tralomethrin	Total	ND	0.5	2	ng/L		
Esfenvalerate	Total	ND	0.5	2	ng/L		
Fenvalerate	Total	ND	0.5	2	ng/L		
Fluvalinate	Total	ND	0.5	2	ng/L		
Permethrin, cis-	Total	ND	2	4	ng/L		
Permethrin, trans-	Total	ND	1	2	ng/L		
Prallethrin	Total	ND	0.5	2	ng/L		
Resmethrin	Total	ND	5	10	ng/L		



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Total Ex	tractable Organics				ANALYTIC	AL REPORT
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 39567-R1	<b>24-BB-03R</b> Method: EPA 1664B		<b>Seawater</b> 0: C-19057	Sampled: 1	1 <b>0-Mar-16 13:30</b> 06-Apr-16	Received: 12-Mar-16 Analyzed: 06-Apr-16
Oil & Grease	NA	ND	1	1	mg/L	
Sample ID: 39568-R1	<b>24-BB-03Z</b> Method: EPA 1664B		: Freshwater D: C-19057	Sampled: 1 Prepared: 0	•	Received: 12-Mar-16 Analyzed: 06-Apr-16
Oil & Grease	NA	1.7	1	1	mg/L	
Sample ID: 39569-R1	<b>24-BB-03R</b> Method: EPA 1664B		<b>:: Seawater</b> D: C-19057	Sampled: 1 Prepared: 0		Received: 12-Mar-16 Analyzed: 06-Apr-16
Oil & Grease	NA	ND	1	1	mg/L	

## LITY CONTRO

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	Convention	nals						QL	JALI	TY CONTR	OL R	EPORT	
SAMPLE ID	)	BATCH ID	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	%	ACCURACY LIMITS	P %	RECISION LIMITS	QA CODE
Am	nmonia as N		Method: SM	4500-NH3	D	Fractio	n: NA	Pr	epared	l: 07-Apr-16	Analy	zed: 07-Apr-	16
39565-B1	QAQC Procedural Blank	C-18128	ND	0.02	0.05	mg/L							
39565-BS1	QAQC Procedural Blank	C-18128	0.24	0.02	0.05	mg/L	0.25	0	96	80 - 120% PASS			
39565-BS2	QAQC Procedural Blank	C-18128	0.26	0.02	0.05	mg/L	0.25	0	104	80 - 120% PASS	8	25 PASS	
39567-MS1	24-BB-03R	C-18128	0.29	0.02	0.05	mg/L	0.25	0.01	112	80 - 120% PASS			
39567-MS2	24-BB-03R	C-18128	0.25	0.02	0.05	mg/L	0.25	0.01	96	80 - 120% PASS	15	25 PASS	
39567-R2	24-BB-03R	C-18128	0.02	0.02	0.05	mg/L					0	25 PASS	J
Nit	rate as N		Method: SM	4500-NO3	E	Fractio	n: NA	Pr	epared	l: 12-Mar-16	Analy	zed: 05-Apr-	16
39565-B1	QAQC Procedural Blank	C-28045	ND	0.01	0.02	mg/L			•		,		
39565-BS1	QAQC Procedural Blank	C-28045	0.56	0.01	0.02	mg/L	0.5	0	112	80 - 120% PASS			
39565-BS2	QAQC Procedural Blank	C-28045	0.56	0.01	0.02	mg/L	0.5	0	112	80 - 120% PASS	0	25 PASS	
39567-MS1	24-BB-03R	C-28045	0.67	0.01	0.02	mg/L	0.5	0.1	114	80 - 120% PASS			
39567-MS2	24-BB-03R	C-28045	0.67	0.01	0.02	mg/L	0.5	0.1	114	80 - 120% PASS	0	25 PASS	
39567-R2	24-BB-03R	C-28045	0.1	0.01	0.02	mg/L					0	25 PASS	
To	tal Orthophosphate as	Р	Method: SM	4500-P E		Fractio	n: NA	Pr	epared	: 12-Mar-16	Analy	zed: 12-Mar-	16
39565-B1	QAQC Procedural Blank	C-28033	ND	0.01	0.02	mg/L			•		,		
39565-BS1	QAQC Procedural Blank	C-28033	0.22	0.01	0.02	mg/L	0.2	0	110	80 - 120% PASS			
39565-BS2	QAQC Procedural Blank	C-28033	0.21	0.01	0.02	mg/L	0.2	0	105	80 - 120% PASS	5	25 PASS	
39567-MS1	24-BB-03R	C-28033	0.24	0.01	0.02	mg/L	0.2	0.03	105	80 - 120% PASS			
39567-MS2	24-BB-03R	C-28033	0.25	0.01	0.02	mg/L	0.2	0.03	110	80 - 120% PASS	5	25 PASS	
39567-R2	24-BB-03R	C-28033	0.03	0.01	0.02	mg/L					0	25 PASS	
To	tal Suspended Solids		Method: SM	2540 D		Fractio	n: NA	Pr	epared	: 17-Mar-16	Analy	zed: 17-Mar-	16
39565-B1	QAQC Procedural Blank	C-29018	ND	0.5	0.5	mg/L							
39568-R2	24-BB-03Z	C-29018	203.2	0.5	0.5	mg/L					4	25 PASS	



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CA ELAP #2769

1907 2. 11	viigiit Circle, Ananeimi		1114111. (/14)	702 7720	14X. (/14)	002 ))21	ттт.р	Hysisiaus.com	11110@	physisiaus.com	G(LD() #2/0	9
El	lements							QUAL	ITY C	ONTRO	L REPOR	T
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURC RESUL		JRACY LIMITS		PRECISION LIMITS	QA CODE
Sample ID:		QC Procedura	al Blank			<b>x: DI Water</b> D: E-10140		Sampled: Prepared: 02-	May-16		Received: Analyzed: 05-Ma	ıy-16
Arsenic (As)	Total	ND	0.005	0.015	μg/L							
Cadmium (Cd)	Total	ND	0.0025	0.005	μg/L							
Chromium (Cr)	Total	ND	0.0125	0.025	μg/L							
Copper (Cu)	Total	ND	0.005	0.01	μg/L							
Lead (Pb)	Total	ND	0.0025	0.005	μg/L							
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L							
Nickel (Ni)	Total	ND	0.0025	0.005	μg/L							
Selenium (Se)	Total	ND	0.005	0.015	μg/L							
Silver (Ag)	Total	ND	0.01	0.02	μg/L							
Zinc (Zn)	Total	ND	0.0025	0.005	μg/L							
Sample ID:		.QC LCM - Phy thod: EPA 1640	sis Seawat	er		<b>x: Seawate</b> D: E-10140	r	Sampled: Prepared: 02-	May 16		Received: Analyzed: 05-Ma	ny 46
Arsenic (As)	Total	1.659	0.005	0.015	µg/L	D. L-10140		Trepared: 02-1	iviay-10		Analyzed: 05-Ma	19-10
Cadmium (Cd)	Total	0.0921	0.0025	0.005	μg/L							
Chromium (Cr)	Total	0.019	0.0125	0.025	μg/L							
Copper (Cu)	Total	0.108	0.005	0.01	μg/L							
Lead (Pb)	Total	0.0029	0.0025	0.005	μg/L							
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L							
Nickel (Ni)	Total	0.3422	0.0025	0.005	μg/L							
Selenium (Se)	Total	0.028	0.005	0.015	μg/L							
Silver (Ag)	Total	0.08	0.01	0.02	μg/L							
Zinc (Zn)	Total	ND	0.0025	0.005	μg/L							
Sample ID:	39566-LCS1 QA	.QC LCM - Phy thod: EPA 1640			Matri	<b>x: Seawate</b> D: E-10140	r	Sampled: Prepared: 02-1	Mav-16		Received: Analyzed: 05-Ma	ıv-16
Arsenic (As)	Total	22.404	0.005	0.015	μg/L	20	1.659		5 - 125%	PASS	, 200. 0) 1110	.,
Cadmium (Cd)	Total	18.0335	0.0025	0.005	μg/L	20	0.0921		5 - 125%			
Chromium (Cr)	Total	20.0541	0.0125	0.025	μg/L	20	0.019		5 - 125%			
Copper (Cu)	Total	19.05	0.005	0.01	μg/L	20	0.108		5 - 125%			
coppor (ou)	Total	10.00	0.000	0.01	P9'-	20	0.100	- 00 7	12070	17.00		



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	Elements							QUA	LITY C	ONTR	OL I	REPOR	RT
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	. AC	CURACY		PR	ECISION	QA CODE
						LEVEL	RESULT		LIMITS		%	LIMITS	
Lead (Pb)	Total	18.6986	0.0025	0.005	μg/L	20	0.0029	93	75 - 125%	PASS			
Mercury (Hg)	Total	8.0247	0.0012	0.005	μg/L	10	0	80	75 - 125%	PASS			
Nickel (Ni)	Total	18.3229	0.0025	0.005	μg/L	20	0.3422	90	75 - 125%	PASS			
Selenium (Se)	Total	19.067	0.005	0.015	μg/L	20	0.028	95	75 - 125%	PASS			
Silver (Ag)	Total	7.51	0.01	0.02	μg/L	10	0.08	74	75 - 125%	PASS		PASS	Q
Zinc (Zn)	Total	19.2456	0.0025	0.005	μg/L	20	0	96	75 - 125%	PASS			
Sample ID	: 39566-LCS2 QAG	QC LCM - Phy	sis Seawat	er	Matrix	: Seawate	r	Sampled:			Re	ceived:	
•	Met	hod: EPA 1640			Batch II	D: E-10140		Prepared: o	2-May-16		А	nalyzed: 05-M	lay-16
Arsenic (As)	Total	22.421	0.005	0.015	μg/L	20	1.659	104	75 - 125%	PASS	0	25 PASS	
Cadmium (Cd)	Total	18.1639	0.0025	0.005	μg/L	20	0.0921	90	75 - 125%	PASS	0	25 PASS	
Chromium (Cr)	Total	20.3097	0.0125	0.025	μg/L	20	0.019	101	75 - 125%	PASS	1	25 PASS	
Copper (Cu)	Total	19.044	0.005	0.01	μg/L	20	0.108	95	75 - 125%	PASS	0	25 PASS	
Lead (Pb)	Total	18.0551	0.0025	0.005	μg/L	20	0.0029	90	75 - 125%	PASS	3	25 PASS	
Mercury (Hg)	Total	7.8574	0.0012	0.005	μg/L	10	0	79	75 - 125%	PASS	1	25 PASS	
Nickel (Ni)	Total	18.2737	0.0025	0.005	μg/L	20	0.3422	90	75 - 125%	PASS	0	25 PASS	
Selenium (Se)	Total	18.863	0.005	0.015	μg/L	20	0.028	94	75 - 125%	PASS	1	25 PASS	
Silver (Ag)	Total	7.53	0.01	0.02	μg/L	10	0.08	75	75 - 125%	PASS	0	25 PASS	
Zinc (Zn)	Total	20.0188	0.0025	0.005	μg/L	20	0	100	75 - 125%	PASS	4	25 PASS	
Sample ID	: 39567-R2 24-E	3B-03R			Matrix	: Seawate	r	Sampled: 1	o-Mar-16	13:30	Re	ceived: 12-N	Nar-16
	Met	hod: EPA 1640			Batch II	D: E-10140		Prepared: 0	2-May-16		А	nalyzed: 05-M	lay-16
Arsenic (As)	Total	1.572	0.005	0.015	μg/L						0	25 PASS	
Cadmium (Cd)	Total	0.0257	0.0025	0.005	μg/L						13	25 PASS	
Chromium (Cr)	Total	0.2929	0.0125	0.025	μg/L						15	25 PASS	
Copper (Cu)	Total	0.253	0.005	0.01	μg/L						6	25 PASS	
Lead (Pb)	Total	0.0655	0.0025	0.005	μg/L						13	25 PASS	
Mercury (Hg)	Total	ND	0.0012	0.005	μg/L						0	25 PASS	
Nickel (Ni)	Total	0.3771	0.0025	0.005	μg/L						5	25 PASS	
Selenium (Se)	Total	0.012	0.005	0.015	μg/L						18	25 PASS	J
Silver (Ag)	Total	0.09	0.01	0.02	μg/L						11	25 PASS	
Zinc (Zn)	Total	3.3321	0.0025	0.005	μg/L						42	25 FAIL	R



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CA ELAP #2769

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El	ements							QUA	LITY (	CONT	ROL	REF	POR	Т
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT		CURACY LIMIT	S	P %	RECISIO LI <i>N</i>	ON NITS	QA CODE
Sample ID:		<b>B-03Z</b> od: EPA 1640				x: Freshwa D: E-10140	ter	Sampled: Prepared:		14:26	R		<b>d: 12-M</b> a d: 05-Ma	
Arsenic (As)	Total	5.361	0.005	0.015	μg/L						15	25 P.	ASS	
Cadmium (Cd)	Total	0.5092	0.0025	0.005	μg/L						24	25 P.	ASS	
Chromium (Cr)	Total	14.0812	0.0125	0.025	μg/L						1	25 P.	ASS	
Copper (Cu)	Total	29.222	0.005	0.01	μg/L						1	25 P.	ASS	
Lead (Pb)	Total	11.2382	0.0025	0.005	μg/L						0	25 P.	ASS	
Mercury (Hg)	Total	0.0308	0.0012	0.005	μg/L						32	25 F	AIL	SL
Nickel (Ni)	Total	10.923	0.0025	0.005	μg/L						0	25 P.	ASS	
Selenium (Se)	Total	0.179	0.005	0.015	μg/L						10	25 P.	ASS	
Silver (Ag)	Total	0.01	0.01	0.02	μg/L						0	25 P.	ASS	J
Zinc (Zn)	Total	111.5703	0.0025	0.005	μg/L						1	25 P	ASS	



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A FLAP #2760

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Orga	nopho	sphoru	s Pesti	cide	es			QUA	LITY C	ONT	ROL	REPOR	Т
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT		CCURACY LIMITS		P %	RECISION LIMITS	QA CODE
Sample ID: 39565	•	AQC Procedur	al Blank			: DI Water :: O-10002		Sampled: Prepared:	11-Mar-16		R	<b>eceived:</b> Analyzed: 02-Ap	pr-16
(PCB030)	Total	74			% Recovery	100		74	57 - 133%	PASS			
(PCB112)	Total	97			% Recovery	100		97	65 - 133%	PASS			
(PCB198)	Total	106			% Recovery	100		106	69 - 133%	PASS			
(TCMX)	Total	67			% Recovery	100		67	39 - 135%	PASS			
Bolstar (Sulprofos)	Total	ND	2	4	ng/L								
Chlorpyrifos	Total	ND	0.5	1	ng/L								
Demeton	Total	ND	1	2	ng/L								
Diazinon	Total	ND	0.5	1	ng/L								
Dichlorvos	Total	ND	3	6	ng/L								
Dimethoate	Total	ND	5	10	ng/L								
Disulfoton	Total	ND	1	2	ng/L								
Ethoprop (Ethoprofos)	Total	ND	1	2	ng/L								
Fenchlorphos (Ronnel)	Total	ND	2	4	ng/L								
Fensulfothion	Total	ND	1	2	ng/L								
Fenthion	Total	ND	2	4	ng/L								
Malathion	Total	ND	3	6	ng/L								
Methidathion	Total	ND	5	10	ng/L								
Methyl parathion	Total	ND	1	2	ng/L								
Mevinphos (Phosdrin)	Total	ND	5	10	ng/L								
Phorate	Total	ND	5	10	ng/L								
Phosmet	Total	ND	5	10	ng/L								
Tetrachlorvinphos (Stirofos)	Total	ND	2	4	ng/L								
Tokuthion	Total	ND	3	6	ng/L								
Trichloronate	Total	ND	1	2	ng/L								
Sample ID: 39565	•	AQC Procedur	al Blank			: <b>DI Water</b> : O-10002		Sampled: Prepared:	11-Mar-16		R	eceived: Analyzed: 02-Ap	pr-16
(PCB030)	Total	79			% Recovery	100	0	79	57 - 133%	PASS			
(PCB112)	Total	110			% Recovery	100	0	110	65 - 133%	PASS			



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CA ELAP #2769

# **Organophosphorus Pesticides**

## **QUALITY CONTROL REPORT**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	Α	CCURACY	PR	ECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	%	LIMITS	
(PCB198)	Total	114			% Recovery	100	0	114	69 - 133% PASS			
(TCMX)	Total	82			% Recovery	100	0	82	39 - 135% PASS			
Bolstar (Sulprofos)	Total	479.7	2	4	ng/L	500	0	96	50 - 150% PASS			
Chlorpyrifos	Total	463.6	0.5	1	ng/L	500	0	93	50 - 150% PASS			
Demeton	Total	333.6	1	2	ng/L	500	0	67	50 - 150% PASS			
Diazinon	Total	404.6	0.5	1	ng/L	500	0	81	50 - 150% PASS			
Dichlorvos	Total	340.4	3	6	ng/L	500	0	68	50 - 150% PASS			
Dimethoate	Total	380.4	5	10	ng/L	500	0	76	50 - 150% PASS			
Disulfoton	Total	280.2	1	2	ng/L	500	0	56	50 - 150% PASS			
Ethoprop (Ethoprofos)	Total	403.2	1	2	ng/L	500	0	81	50 - 150% PASS			
Fenchlorphos (Ronnel)	Total	454.5	2	4	ng/L	500	0	91	50 - 150% PASS			
Fensulfothion	Total	612	1	2	ng/L	500	0	122	50 - 150% PASS			
Fenthion	Total	450.7	2	4	ng/L	500	0	90	50 - 150% PASS			
Malathion	Total	421.1	3	6	ng/L	500	0	84	50 - 150% PASS			
Methidathion	Total	455.9	5	10	ng/L	500	0	91	50 - 150% PASS			
Methyl parathion	Total	580.4	1	2	ng/L	500	0	116	50 - 150% PASS			
Mevinphos (Phosdrin)	Total	322.9	5	10	ng/L	500	0	65	50 - 150% PASS			
Phorate	Total	439.8	5	10	ng/L	500	0	88	50 - 150% PASS			
Phosmet	Total	421.5	5	10	ng/L	500	0	84	50 - 150% PASS			
Tetrachlorvinphos (Stirofos)	Total	474.6	2	4	ng/L	500	0	95	50 - 150% PASS			
Tokuthion	Total	472.2	3	6	ng/L	500	0	94	50 - 150% PASS			
Trichloronate	Total	445.4	1	2	ng/L	500	0	89	50 - 150% PASS			

Sample ID: 399	565-BS2	QAQC Procedura Method: EPA 625	l Blank			<b>c: DI Water</b> D: O-10002		Sampled: Prepared:	11-Mar-16		<b>eceived:</b> Analyzed: 02-Apr-16
(PCB030)	Total	77			% Recovery	100	0	77	57 - 133% PASS	3	30 PASS
(PCB112)	Total	89			% Recovery	100	0	89	65 - 133% PASS	21	30 PASS
(PCB198)	Total	89			% Recovery	100	0	89	69 - 133% PASS	25	30 PASS
(TCMX)	Total	79			% Recovery	100	0	79	39 - 135% PASS	4	30 PASS
Bolstar (Sulprofos)	Total	473.7	2	4	ng/L	500	0	95	50 - 150% PASS	1	25 PASS
Chlorpyrifos	Total	469.8	0.5	1	ng/L	500	0	94	50 - 150% PASS	1	25 PASS
Demeton	Total	331.6	1	2	ng/L	500	0	66	50 - 150% PASS	2	25 PASS



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# **Organophosphorus Pesticides**

## **QUALITY CONTROL REPORT**

				تتنس				7-			
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	А	CCURACY	PRECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	% LIMITS	
Diazinon	Total	397.3	0.5	1	ng/L	500	0	79	50 - 150% PASS	2 25 PASS	
Dichlorvos	Total	330.5	3	6	ng/L	500	0	66	50 - 150% PASS	3 25 PASS	
Dimethoate	Total	393.8	5	10	ng/L	500	0	79	50 - 150% PASS	4 25 PASS	
Disulfoton	Total	248.8	1	2	ng/L	500	0	50	50 - 150% PASS	11 25 PASS	
Ethoprop (Ethoprofos)	Total	400.1	1	2	ng/L	500	0	80	50 - 150% PASS	1 25 PASS	
Fenchlorphos (Ronnel)	Total	448	2	4	ng/L	500	0	90	50 - 150% PASS	1 25 PASS	
Fensulfothion	Total	642.3	1	2	ng/L	500	0	128	50 - 150% PASS	5 25 PASS	
Fenthion	Total	445.8	2	4	ng/L	500	0	89	50 - 150% PASS	1 25 PASS	
Malathion	Total	427.3	3	6	ng/L	500	0	85	50 - 150% PASS	1 25 PASS	
Methidathion	Total	446.8	5	10	ng/L	500	0	89	50 - 150% PASS	2 25 PASS	
Methyl parathion	Total	581.7	1	2	ng/L	500	0	116	50 - 150% PASS	0 25 PASS	
Mevinphos (Phosdrin)	Total	332.7	5	10	ng/L	500	0	67	50 - 150% PASS	3 25 PASS	
Phorate	Total	438.8	5	10	ng/L	500	0	88	50 - 150% PASS	0 25 PASS	
Phosmet	Total	410.9	5	10	ng/L	500	0	82	50 - 150% PASS	2 25 PASS	
Tetrachlorvinphos (Stirofos)	Total	475.5	2	4	ng/L	500	0	95	50 - 150% PASS	0 25 PASS	
Tokuthion	Total	465.1	3	6	ng/L	500	0	93	50 - 150% PASS	1 25 PASS	
Trichloronate	Total	449.8	1	2	ng/L	500	0	90	50 - 150% PASS	1 25 PASS	



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CA ELAP #2769

# Polynuclear Aromatic Hydrocarbons QUALITY CONTROL REPORT

								_					
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	A	CCURACY		PRE	CISION	QA CODE
						LEVEL	RESULT	%	LIMITS		%	LIMITS	
Sample ID: 39565-I	-	QC Procedural hod: EPA 625	Blank			<b>c: DI Water</b> D: O-10002		ampled: Prepared:	11-Mar-16			e <b>ived:</b> nalyzed: 02-A <sub>l</sub>	or-16
(d10-Acenaphthene)	Total	63			% Recovery	100		63	65 - 113%	FAIL			R
(d10-Phenanthrene)	Total	86			% Recovery	100		86	80 - 111%	PASS			
(d12-Chrysene)	Total	07			% Pecovery	100		97	60 - 130%	DASS			

Control   Total   86   % Recovery   100   86   80 - 111%   PASS
(d8-Naphthalene)         Total         44         % Recovery         100         44         44 - 119% PASS           1-Methylnaphthalene         Total         ND         1         5         ng/L           2-3,5-Trimethylnaphthalene         Total         ND         1         5         ng/L           2,6-Dimethylnaphthalene         Total         ND         1         5         ng/L           2-Methylnaphthalene         Total         ND         1         5         ng/L           Acenaphthene         Total         ND         1         5         ng/L           Acenaphthylene         Total         ND         1         5         ng/L           Benz(alphylene         Total         ND         1         5         ng/L           Benz(alphylene         Total         ND         1         5         ng/L           Benz(billyincranthene         Total         ND         1         5<
1-Methylnaphthalene         Total         ND         1         5         ng/L           1-Methylphenanthrene         Total         ND         1         5         ng/L           2,3,5-Trimethylnaphthalene         Total         ND         1         5         ng/L           2,6-Dimethylnaphthalene         Total         ND         1         5         ng/L           2-Methylnaphthalene         Total         ND         1         5         ng/L           Acenaphthylene         Total         ND         1         5         ng/L           Acenaphthylene         Total         ND         1         5         ng/L           Anthracene         Total         ND         1         5         ng/L           Benzo[a]pyrene         Total         ND         1         5         ng/L           Benzo[b]fluoranthene         Total         ND         1         5         ng/L           Benzo[c]pyrene         Total         ND         1         5         ng/L           Benzo[c]h,i]perylene         Total         ND         1         5         ng/L           Benzo[c]h,ipprylene         Total         ND         1         5         ng/L
1-Methylphenanthrene         Total         ND         1         5         ng/L           2,3,5-Trimethylnaphthalene         Total         ND         1         5         ng/L           2-Methylnaphthalene         Total         ND         1         5         ng/L           2-Methylnaphthalene         Total         ND         1         5         ng/L           Acenaphthene         Total         ND         1         5         ng/L           Acenaphthylene         Total         ND         1         5         ng/L           Anthracene         Total         ND         1         5         ng/L           Benz(ajanthracene         Total         ND         1         5         ng/L           Benz(ajintracene         Total         ND         1         5         ng/L <tr< td=""></tr<>
2,3,5-Trimethylnaphthalene         Total         ND         1         5         ng/L           2,6-Dimethylnaphthalene         Total         ND         1         5         ng/L           2-Methylnaphthalene         Total         ND         1         5         ng/L           Acenaphthene         Total         ND         1         5         ng/L           Acenaphthylene         Total         ND         1         5         ng/L           Anthracene         Total         ND         1         5         ng/L           Benz(ajanthracene         Total         ND         1         5         ng/L
2,6-Dimethylnaphthalene         Total         ND         1         5         ng/L           2-Methylnaphthalene         Total         ND         1         5         ng/L           Acenaphthene         Total         ND         1         5         ng/L           Acenaphthylene         Total         ND         1         5         ng/L           Anthracene         Total         ND         1         5         ng/L           Benz(ajanthracene         Total         ND         1         5         ng/L           Benzo(ajpyrene         Total         ND         1         5         ng/L           Benzo(bjfluoranthene         Total         ND         1         5         ng/L           Benzo(bjfluoranthene         Total         ND         1         5         ng/L           Benzo(kjfluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Dibenz(a, h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L
2-Methylnaphthalene         Total         ND         1         5         ng/L           Acenaphthene         Total         ND         1         5         ng/L           Acenaphthylene         Total         ND         1         5         ng/L           Anthracene         Total         ND         1         5         ng/L           Benz(a)anthracene         Total         ND         1         5         ng/L           Benzo(a)pyrene         Total         ND         1         5         ng/L           Benzo(b)fluoranthene         Total         ND         1         5         ng/L           Benzo(a)pyrene         Total         ND         1         5         ng/L           Benzo(b)fluoranthene         Total         ND         1         5         ng/L           Benzo(b)fluoranthene         Total         ND         1         5         ng/L           Benzo(b)fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenzo
Acenaphthene         Total         ND         1         5         ng/L           Acenaphthylene         Total         ND         1         5         ng/L           Anthracene         Total         ND         1         5         ng/L           Benzo[a]pyrene         Total         ND         1         5         ng/L           Benzo[b]fluoranthene         Total         ND         1         5         ng/L           Benzo[e]pyrene         Total         ND         1         5         ng/L           Benzo[g,h,i]perylene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L           Fluoranthene
Acenaphthylene         Total         ND         1         5         ng/L           Anthracene         Total         ND         1         5         ng/L           Benzo[a]anthracene         Total         ND         1         5         ng/L           Benzo[a]pyrene         Total         ND         1         5         ng/L           Benzo[e]pyrene         Total         ND         1         5         ng/L           Benzo[e]pyrene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Anthracene         Total         ND         1         5         ng/L           Benz[a]anthracene         Total         ND         1         5         ng/L           Benzo[a]pyrene         Total         ND         1         5         ng/L           Benzo[e]pyrene         Total         ND         1         5         ng/L           Benzo[g,h,i]perylene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Benz[a]anthracene         Total         ND         1         5         ng/L           Benzo[a]pyrene         Total         ND         1         5         ng/L           Benzo[b]fluoranthene         Total         ND         1         5         ng/L           Benzo[g,h,i]perylene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Benzo[a]pyrene         Total         ND         1         5         ng/L           Benzo[b]fluoranthene         Total         ND         1         5         ng/L           Benzo[g,h,i]perylene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Benzo[b]fluoranthene         Total         ND         1         5         ng/L           Benzo[e]pyrene         Total         ND         1         5         ng/L           Benzo[g,h,i]perylene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Benzo[e]pyrene         Total         ND         1         5         ng/L           Benzo[k,i]perylene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Benzo[g,h,i]perylene         Total         ND         1         5         ng/L           Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Benzo[k]fluoranthene         Total         ND         1         5         ng/L           Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Biphenyl         Total         ND         1         5         ng/L           Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Chrysene         Total         ND         1         5         ng/L           Dibenz[a,h]anthracene         Total         ND         1         5         ng/L           Dibenzothiophene         Total         ND         1         5         ng/L           Fluoranthene         Total         ND         1         5         ng/L
Dibenz[a,h]anthracene Total ND 1 5 ng/L Dibenzothiophene Total ND 1 5 ng/L Fluoranthene Total ND 1 5 ng/L
Dibenzothiophene Total ND 1 5 ng/L Fluoranthene Total ND 1 5 ng/L
Fluoranthene Total ND 1 5 ng/L
· · · · · · · · · · · · · · · · · · ·
Fluorene Total ND 1 5 ng/L
Indeno[1,2,3-c,d]pyrene Total ND 1 5 ng/L
Naphthalene Total ND 1 5 ng/L
Perylene Total ND 1 5 ng/L
Phenanthrene Total ND 1 5 ng/L
Pyrene Total ND 1 5 ng/L

PHYSIS Project ID: 1212004-009



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CA ELAP #2769

# Polynuclear Aromatic Hydrocarbons

## **QUALITY CONTROL REPORT**

ANALYTE	FRACTIO	N RESULT	MDL	RL	UNITS	SPIKE	SOURCE	A	CCURACY	PRECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	% LIMITS	
Sample ID: 39565		AQC Procedural ethod: EPA 625	Blank			<b>c: DI Wate</b> D: O-10002	· s	Sampled: Prepared:	11-Mar-16	Received: Analyzed: 02-Ap	r-16
(d10-Acenaphthene)	Total	77			% Recovery	100	0	77	65 - 113% PASS		
(d10-Phenanthrene)	Total	97			% Recovery	100	0	97	80 - 111% PASS		
(d12-Chrysene)	Total	117			% Recovery	100	0	117	60 - 139% PASS		
(d8-Naphthalene)	Total	58			% Recovery	100	0	58	44 - 119% PASS		
1-Methylnaphthalene	Total	307.2	1	5	ng/L	500	0	61	50 - 150% PASS		
1-Methylphenanthrene	Total	545.2	1	5	ng/L	500	0	109	50 - 150% PASS		
2,3,5-Trimethylnaphthalene	Total	404.1	1	5	ng/L	500	0	81	50 - 150% PASS		
2,6-Dimethylnaphthalene	Total	354.1	1	5	ng/L	500	0	71	50 - 150% PASS		
2-Methylnaphthalene	Total	871.6	1	5	ng/L	1500	0	58	50 - 150% PASS		
Acenaphthene	Total	1076.6	1	5	ng/L	1500	0	72	50 - 150% PASS		
Acenaphthylene	Total	1097.2	1	5	ng/L	1500	0	73	50 - 150% PASS		
Anthracene	Total	1707.5	1	5	ng/L	1500	0	114	50 - 150% PASS		
Benz[a]anthracene	Total	1883.1	1	5	ng/L	1500	0	126	50 - 150% PASS		
Benzo[a]pyrene	Total	1993.4	1	5	ng/L	1500	0	133	50 - 150% PASS		
Benzo[b]fluoranthene	Total	1912.3	1	5	ng/L	1500	0	127	50 - 150% PASS		
Benzo[e]pyrene	Total	702	1	5	ng/L	500	0	140	50 - 150% PASS		
Benzo[g,h,i]perylene	Total	1744.1	1	5	ng/L	1500	0	116	50 - 150% PASS		
Benzo[k]fluoranthene	Total	1982.9	1	5	ng/L	1500	0	132	50 - 150% PASS		
Biphenyl	Total	349.6	1	5	ng/L	500	0	70	50 - 150% PASS		
Chrysene	Total	1887.5	1	5	ng/L	1500	0	126	50 - 150% PASS		
Dibenz[a,h]anthracene	Total	1814.3	1	5	ng/L	1500	0	121	50 - 150% PASS		
Dibenzothiophene	Total	523.3	1	5	ng/L	500	0	105	50 - 150% PASS		
Fluoranthene	Total	1703.7	1	5	ng/L	1500	0	114	50 - 150% PASS		
Fluorene	Total	1306.1	1	5	ng/L	1500	0	87	50 - 150% PASS		
Indeno[1,2,3-c,d]pyrene	Total	1734.4	1	5	ng/L	1500	0	116	50 - 150% PASS		
Naphthalene	Total	743.1	1	5	ng/L	1500	0	50	50 - 150% PASS		
Perylene	Total	706.2	1	5	ng/L	500	0	141	50 - 150% PASS		
Phenanthrene	Total	1478.9	1	5	ng/L	1500	0	99	50 - 150% PASS		
Pyrene	Total	1704.6	1	5	ng/L	1500	0	114	50 - 150% PASS		



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CA ELAP #2769

# Polynuclear Aromatic Hydrocarbons

## **QUALITY CONTROL REPORT**

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	А	CCURACY	Р	RECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	%	LIMITS	
Sample ID: 39565	-BS2 QA	QC Procedural	Blank		Matrix	። DI Water	- s	Sampled:		R	eceived:	
	Me	thod: EPA 625			Batch II	D: O-10002		Prepared:	11-Mar-16		Analyzed: 02-Ap	ır-16
(d10-Acenaphthene)	Total	75			% Recovery	100	0	75	65 - 113% PASS	3	30 PASS	
(d10-Phenanthrene)	Total	96			% Recovery	100	0	96	80 - 111% PASS	1	30 PASS	
(d12-Chrysene)	Total	116			% Recovery	100	0	116	60 - 139% PASS	1	30 PASS	
(d8-Naphthalene)	Total	56			% Recovery	100	0	56	44 - 119% PASS	4	30 PASS	
1-Methylnaphthalene	Total	295.6	1	5	ng/L	500	0	59	50 - 150% PASS	3	25 PASS	
1-Methylphenanthrene	Total	536.3	1	5	ng/L	500	0	107	50 - 150% PASS	2	25 PASS	
2,3,5-Trimethylnaphthalene	Total	386.9	1	5	ng/L	500	0	77	50 - 150% PASS	5	25 PASS	
2,6-Dimethylnaphthalene	Total	339.3	1	5	ng/L	500	0	68	50 - 150% PASS	4	25 PASS	
2-Methylnaphthalene	Total	843.1	1	5	ng/L	1500	0	56	50 - 150% PASS	4	25 PASS	
Acenaphthene	Total	1052.1	1	5	ng/L	1500	0	70	50 - 150% PASS	3	25 PASS	
Acenaphthylene	Total	1074.5	1	5	ng/L	1500	0	72	50 - 150% PASS	1	25 PASS	
Anthracene	Total	1688.6	1	5	ng/L	1500	0	113	50 - 150% PASS	1	25 PASS	
Benz[a]anthracene	Total	1840.7	1	5	ng/L	1500	0	123	50 - 150% PASS	2	25 PASS	
Benzo[a]pyrene	Total	1946.2	1	5	ng/L	1500	0	130	50 - 150% PASS	2	25 PASS	
Benzo[b]fluoranthene	Total	1887.1	1	5	ng/L	1500	0	126	50 - 150% PASS	1	25 PASS	
Benzo[e]pyrene	Total	678	1	5	ng/L	500	0	136	50 - 150% PASS	3	25 PASS	
Benzo[g,h,i]perylene	Total	1685.2	1	5	ng/L	1500	0	112	50 - 150% PASS	4	25 PASS	
Benzo[k]fluoranthene	Total	1969	1	5	ng/L	1500	0	131	50 - 150% PASS	1	25 PASS	
Biphenyl	Total	335	1	5	ng/L	500	0	67	50 - 150% PASS	4	25 PASS	
Chrysene	Total	1860.3	1	5	ng/L	1500	0	124	50 - 150% PASS	2	25 PASS	
Dibenz[a,h]anthracene	Total	1750.8	1	5	ng/L	1500	0	117	50 - 150% PASS	3	25 PASS	
Dibenzothiophene	Total	506.4	1	5	ng/L	500	0	101	50 - 150% PASS	4	25 PASS	
Fluoranthene	Total	1687.1	1	5	ng/L	1500	0	112	50 - 150% PASS	2	25 PASS	
Fluorene	Total	1275.8	1	5	ng/L	1500	0	85	50 - 150% PASS	2	25 PASS	
Indeno[1,2,3-c,d]pyrene	Total	1694.9	1	5	ng/L	1500	0	113	50 - 150% PASS	3	25 PASS	
Naphthalene	Total	716.6	1	5	ng/L	1500	0	48	50 - 150% PASS	4	25 PASS	Q
Perylene	Total	680.6	1	5	ng/L	500	0	136	50 - 150% PASS	4	25 PASS	
Phenanthrene	Total	1447.8	1	5	ng/L	1500	0	97	50 - 150% PASS	2	25 PASS	
Pyrene	Total	1701.9	1	5	ng/L	1500	0	113	50 - 150% PASS	1	25 PASS	



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Pyre	throids							QUA	LITY CONT	ROL REPOR	Т
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	<b>A</b> %	CCURACY LIMITS	PRECISION % LIMITS	QA CODE
Sample ID: 39565		QC Procedural hod: EPA 625-NCI				<b>c: DI Water</b> D: O-10002	· S	Sampled: Prepared:	11-Mar-16	<b>Received:</b> Analyzed: o6-Ap	r-16
Allethrin	Total	ND	0.5	2	ng/L						
Bifenthrin	Total	ND	0.5	2	ng/L						
Cyfluthrin	Total	ND	0.5	2	ng/L						
Cyhalothrin, Total Lambda	Total	ND	0.5	2	ng/L						
Cypermethrin	Total	ND	0.5	2	ng/L						
Danitol (Fenpropathrin)	Total	ND	0.3	2	ng/L						
Deltamethrin/Tralomethrin	Total	ND	0.5	2	ng/L						
Esfenvalerate	Total	ND	0.5	2	ng/L						
Fenvalerate	Total	ND	0.5	2	ng/L						
Fluvalinate	Total	ND	0.5	2	ng/L						
Permethrin, cis-	Total	ND	2	4	ng/L						
Permethrin, trans-	Total	ND	1	2	ng/L						
Prallethrin	Total	ND	0.5	2	ng/L						
Resmethrin	Total	ND	5	10	ng/L						
Sample ID: 39565	-BS1 QA	QC Procedural	Blank		Matri	ง: DI Water	r <u>S</u>	Sampled:		Received:	
•	Met	hod: EPA 625-NCI			Batch II	D: O-10002		Prepared:	11-Mar-16	Analyzed: o6-Ap	r-16
Allethrin	Total	500.5	0.5	2	ng/L	500	0	100	50 - 150% PASS		
Bifenthrin	Total	428	0.5	2	ng/L	500	0	86	50 - 150% PASS		
Cyfluthrin	Total	596.5	0.5	2	ng/L	500	0	119	50 - 150% PASS		
Cyhalothrin, Total Lambda	Total	572.4	0.5	2	ng/L	500	0	114	50 - 150% PASS		
Cypermethrin	Total	579.1	0.5	2	ng/L	500	0	116	50 - 150% PASS		
Danitol (Fenpropathrin)	Total	598.9	0.3	2	ng/L	500	0	120	50 - 150% PASS		
Deltamethrin/Tralomethrin	Total	519.3	0.5	2	ng/L	500	0	104	50 - 150% PASS		
Esfenvalerate	Total	590	0.5	2	ng/L	500	0	118	50 - 150% PASS		
Fenvalerate	Total	578	0.5	2	ng/L	500	0	116	50 - 150% PASS		
Fluvalinate	Total	553.1	0.5	2	ng/L	500	0	111	50 - 150% PASS		
Permethrin, cis-	Total	183.8	2	4	ng/L	133.5	0	138	50 - 150% PASS		
Permethrin, trans-	Total	402.4	1	2	ng/L	358	0	112	50 - 150% PASS		



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	Pyrethroids		QUALITY CONTROL REPORT								Т	
ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	P	CCURACY	PR	ECISION	QA CODE
						LEVEL	RESULT	%	LIMITS	%	LIMITS	
Prallethrin	Total	496.6	0.5	2	ng/L	500	0	99	50 - 150% PASS			
Resmethrin	Total	0	5	10	ng/L	500	0	0	50 - 150% PASS		PASS	Q

Sample ID: 39565-	BS2	<b>QAQC</b> Procedural	Blank		Matr	ix: DI Water		Sampled:		R	Received:	
		Method: EPA 625-NC	l		Batch	ID: O-10002		Prepared: 1	11-Mar-16		Analyzed: o6-Apr-	16
Allethrin	Total	463.8	0.5	2	ng/L	500	0	93	50 - 150% PASS	7	25 PASS	
Bifenthrin	Total	401.9	0.5	2	ng/L	500	0	80	50 - 150% PASS	7	25 PASS	
Cyfluthrin	Total	521.6	0.5	2	ng/L	500	0	104	50 - 150% PASS	13	25 PASS	
Cyhalothrin, Total Lambda	Total	553.6	0.5	2	ng/L	500	0	111	50 - 150% PASS	3	25 PASS	
Cypermethrin	Total	527.6	0.5	2	ng/L	500	0	106	50 - 150% PASS	9	25 PASS	
Danitol (Fenpropathrin)	Total	575.2	0.3	2	ng/L	500	0	115	50 - 150% PASS	4	25 PASS	
Deltamethrin/Tralomethrin	Total	451.2	0.5	2	ng/L	500	0	90	50 - 150% PASS	14	25 PASS	
Esfenvalerate	Total	525.2	0.5	2	ng/L	500	0	105	50 - 150% PASS	12	25 PASS	
Fenvalerate	Total	498.4	0.5	2	ng/L	500	0	100	50 - 150% PASS	15	25 PASS	
Fluvalinate	Total	468.9	0.5	2	ng/L	500	0	94	50 - 150% PASS	17	25 PASS	
Permethrin, cis-	Total	139.8	2	4	ng/L	133.5	0	105	50 - 150% PASS	27	25 PASS	Q
Permethrin, trans-	Total	385.7	1	2	ng/L	358	0	108	50 - 150% PASS	4	25 PASS	
Prallethrin	Total	458.5	0.5	2	ng/L	500	0	92	50 - 150% PASS	7	25 PASS	
Resmethrin	Total	0	5	10	ng/L	500	0	0	50 - 150% PASS	0	25 PASS	Q



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To	otal Extr	actable O	rganio	CS				QUALITY CON	TROL REPORT	
ANALYTE	FRACTI	ON RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY % LIMITS	PRECISION Q % LIMITS	A CODE
Sample ID: 3	9565-B1	QAQC Procedura Method: EPA 1664B	l Blank			<b>x: DI Water</b> D: C-19057	9	Sampled: Prepared: 06-Apr-16	<b>Received:</b> Analyzed: o6-Apr-16	
Oil & Grease	NA	ND	1	1	mg/L					
Sample ID: 3	9565-BS1	QAQC Procedura Method: EPA 1664B	l Blank			<b>x: DI Water</b> D: C-19057	9	Sampled: Prepared: o6-Apr-16	<b>Received:</b> Analyzed: 06-Apr-16	
Oil & Grease	NA	35.1	1	1	mg/L	40	0	88 80 - 120% PASS		
Sample ID: 3	9565-BS2	QAQC Procedura Method: EPA 1664B	l Blank			<b>x: DI Water</b> D: C-19057	9	Sampled: Prepared: 06-Apr-16	<b>Received:</b> Analyzed: 06-Apr-16	
Oil & Grease	NA	36.2	1	1	mg/L	40	0	91 80 - 120% PASS	2 25 PASS	

# CHAIN OF TERRA GUSTEO DA AURA ENVIRON ESTA DE LA COMPANIES, INC.

Innovative Solutions for Nature

From: Aquatic Bioassay Phone: (805) 643-5621 To: Company: PHYSIS Laboratories and Consulting Labs. (805) 643-2930 Address: 1904 East Wright Circle Fax: Anaheim, CA 92806 29 N. Olive St. Project ID: City of Malibu ASBS Phone: (714) 335-5918 Ventura, CA 93001 **ANALYSIS** þ PAHs, OP Pesticides & Pyrethroid Pesticides Total Metals Metals including Hg b EPA 1640 Nitrate & Orthophosphate Sample I.D. No. Time Matrix No. Sample Date Reps & Grease Ammonia ō 03/10/16 1330 24-BB-03R 7 1 sw Please email results to Karin Patrick at karin @aquabio.org Special Instructions: RELINQUISHED/BY: DATE: TIME: RECEIVED BY: DATE: TIME: RELINQUISHED BY: DATE: TIME: RECEIVED BY: DATE: TIME: 3-11-16 1/3.12.16 q.30 AM

#### Chai f Custody

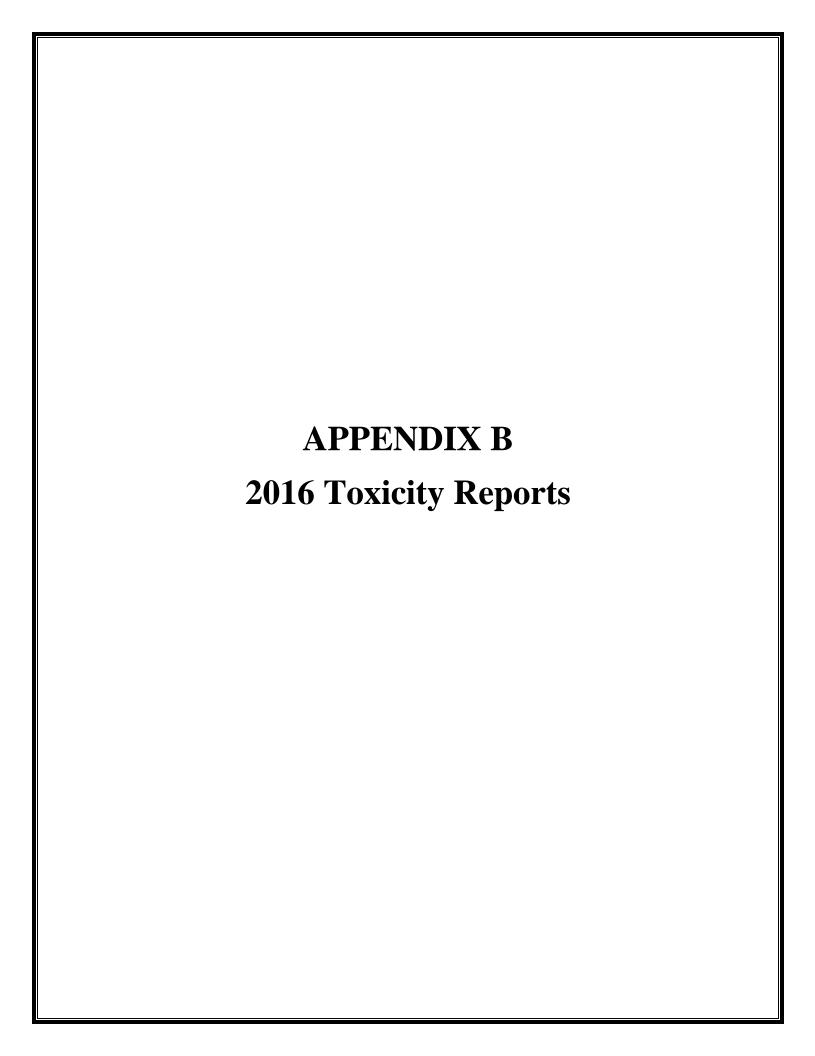
From: Aquatic Bioassay (805) 643-5621 Phone: Company: PHYSIS Laboratories To: and Consulting Labs. (805) 643-2930 Address: Fax: 1904 East Wright Circle 29 N. Olive St. Project ID: City of Malibu ASBS Anaheim, CA 92806 Ventura, CA 93001 Phone: (714) 335-5918 **ANALYSIS** b PAHs, OP Pesticides & Pyrethroid Pesticides Total Metals Metals including Hg b EPA 1640 Nitrate & Orthophosphate Sample I.D. No. Sample Date No. Time Matrix Reps & Grease Ammonia 24-BB-01Z FW-24-BB-02Z FW 03.11-16 1426 24-BB-03Z 7 2 1 FW 03.11.16 1435 24-BB-03R 7 1 1 2 sw Special Instructions: Please email results to Karin Patrick at karin @aquabio.org RELINQUISHED BY: DATE: TIME: RECEIVED BY: DATE: TIME: RELINQUISHED BY: DATE: TIME: RECEIVED BY: DATE: TIME: 3 12 16 q: 30 031016 31.16.86 1700



# Sample Receipt Summary

Client: A	quatic Bioassa	y & Consult	Date Receive	d: 3/12/2	2016 I	Received	Ву: К	(C	Inspected E	By: RGH			
	C	ourier:				Cooler:				Temperati	ıre:		
Physis	FEDEX	UPS	Client	<b>✓</b> Coo	ler 🗌 I	ox To	otal#:	2		BLUE	<b>✓</b> WET	☐ DRY	,
Start	End	Other:	Area Fast	Oth	er:					None		0.4°C	
				Sa	mple Integrity	pon Rece	eipt:						
1. CO	1. COC(s) included and completely filled out												
2. All	2. All sample containers arrived intactYes												
3. All	samples list	ed on COC	(s) are prese	nt					Yes	S			
4. Inf	ormation on	ı container:	s consistent	with info	rmation on	OC(s)			Yes	S			
5. Correct containers and volume for all analyses indicated													
6. All	6. All samples received within method holding timeYes												
	rrect preserv												
8. Na	8. Name of sampler included on COC(s)												

Notes:





March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03R

DATE RECEIVED:

01/30/2016

ABC LAB. NO.:

COM0116.219

001110110.219

#### CHRONIC MYTILUS 48 HOUR DEVELOPMENT BIOASSAY

NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 %

EC50 = >100.00 %

Yours very truly,

Scott Johnson

Laboratory Director

CETIS	Summary	Report
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Report Date:

03 Mar-16 10:23 (p 1 of 1)

Test Code:

COM0116.219myt | 12-4500-3651

							Te	est Code:	COM0116	5.219myt   12	2-4500-365
Mussel Shell I	Development Te	st						Aquatic	Bioassay &	Consulting	Labs, Inc.
Batch ID:	06-8899-9690	Test	Туре:	Developmen	t-Survival		А	nalyst:			
Start Date:	30 Jan-16 12:01		ocol:		95/136 (1995)				aboratory Wa	ter	
Ending Date:	01 Feb-16 12:01	l Spe	cies:	Mytilis gallop			В	rine:			
Duration:	48h	Sou	rce:	Carlsbad Aq	uafarms CA		A	ge: 			
Sample ID:	00-5377-5397	Cod		COM0116.2					ity of Malibu		
	30 Jan-16 10:30		erial:	Sample Wat			Р	roject: A	SBS		
	30 Jan-16 12:15			Bioassay Re	port						
Sample Age:	91m	Stat	ion:	24-BB-03R							
Comparison S	Summary										
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Method			
02-9880-1606	Combined Prop	ortion <b>N</b> orm	100	>100	NA	1.77%	1	Wilcoxo	n Rank Sum	Two-Sample	e Test
Point Estimate	e Summary										
Analysis ID	Endpoint		Levei	%	95% LCL	95% UCL	TU	Method	<u></u>		
01-1828-9773	Combined Prop	ortion Norm	EC5	>100	N/A	N/A	<1	Linear I	nterpolation (	ICPIN)	
			EC10	>100	N/A	N/A	<1				
			EC15	>100	N/A	N/A	<1				
			EC20	>100	N/A	N/A	<1				
			EC25	>100	N/A	N/A	<1				
			EC40	>100	N/A	N/A	<1				
			EC50	>100	N/A	N/A	<1		_		
Test Acceptab	ility										
Analysis ID	Endpoint		Attrib		Test Stat	TAC Lim	its	Overla			,
02-9880-1606	Combined Prop	ortion Norm	PMSE	)	0.01772	NL - 0.25		No	Passes A	Acceptability	Criteria
Combined Pro	portion Normal	Summary									
	Control Type	Count	Mean	95% LC	CL 95% UCL	Min	Max	Std Err		CV%	%Effect
	Negative Control	10	0.9609	9 0.9431	0.9787	0.9318	0.9955			2.59%	0.0%
100		10	0.956	4 0.9423	0.9704	0.9318	0.9955	0.0062	0.01966	2.06%	0.47%
Combined Pro	portion Normal	Detail									
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0.9909	0.959	1 0.9364	0.9955	0.9318	0.9591	0.9455	0.9955	0.9364	0.9591
100		0.9455	0.959	1 0.981 <b>8</b>	0.9591	0.95	0.9318	0.9455	0.9955	0.9591	0.9364
Combined Pro	portion Normal	Binomials			_						
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	218/220	211/22	20 206/220	219/220	205/220	211/22	208/220	219/220	206/220	211/220
100	_	208/220	211/2	20 216/220	211/220	209/220	205/22	208/220	219/220	211/220	206/220

Analyst: \_\_\_\_\_\_QA:\_\_

Report Date:

03 Mar-16 10:23 (p 1 of 2)

Test Code:

COM0116.219myt | 12-4500-3651

							Tes	t Code:	COM0116.2	219myt   12	2-4500-3651
Mussel Shell	Development Te	st						Aquatic E	Bioassay & C	onsulting	Labs, Inc.
Analysis ID: Analyzed:	02-9880-1606 03 Mar-16 8:19		•	mbined Prop				IS Versions		8.7	
Batch ID: Start Date: Ending Date: Duration:	06-8899-9690 30 Jan-16 12:0 01 Feb-16 12:0 48h	1 Pro 1 Spe	tocol: EP	velopment-S A/600/R-95/ tilis gallopro rlsbad Aqual	136 (1995) vincialis		Ana Dilu Brir Age	ie:	ooratory Wate	er	
•	00-5377-5397 : 30 Jan-16 10:30 e: 30 Jan-16 12:19 91m	5 Sou	erial: Sa irce: Bio	0M0116.219r mple Water passay Repo -BB-03R			Clie Proj	-	y of Malibu BS		
Data Transfo	rm	Zeta –	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Angular (Corre		NA	C > T	NA	NA		1.77%		ombined prop	oortion nor	mal
	nk Sum Two-San	nple Test									
Control	vs C-%		Test Stat	Critical	Ties DF	P-Value	P-Type	Decision	ι(α:5%)		
Negative Conf	trol 100		101	NA	6 18	0.3897	Exact	Non-Sign	ificant Effect		
Test Accepta	bility Criteria										
Attribute	Test Stat	TAC Limi	ts	Overlap	Decision						
PMSD	0.01772	NL - 0.25		No	Passes A	cceptability	Criteria				
ANOVA Table	•							_			
Source	Sum Squa	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision	ι(α:5%)		
Between	0.0015933	26	0.001593	326	1	0.3282	0.5738	Non-Sign	ificant Effect		
Error	0.087387		0.004854	833	18						
Total	0.0889803	3			19	-					
Distributiona	l Tests					_					
Attribute	Test			Test Stat	Critical	P-Value	Decision	ι(α:1%)			
Variances	Variance	Ratio F		1.726	6.541	0.4286	Equal Va	riances			
Variances	Mod Leve	ne Equality	of Variance	e 0.6321	8.285	0.4369	Equal Va	riances			
Variances	Levene E	quality of V	ariance	1.864	8.285	0.1890	Equal Va	riances			
Distribution	Shapiro-V	Vilk W Norr	nality	0.8582	0.866	0.0073	Non-norn	nal Distribut	ion		
Distribution	Kolmogor	ov-Smirnov	D	0.254	0.2235	0.0015	Non-norn	nal Distribut	ion		
Distribution	D'Agostin	o Skewnes	s	1.823	2.576	0.0683	Normal D	istribution			
Distribution	D'Agostin	o Kurtosis		0.2344	2.576	0.8147	Normal D	istribution			
Distribution	D'Agostin	o-Pearson	K2 Omnibus	s 3.379	9.21	0.1846	Normal D	Distribution			
Distribution	Anderson	-Darling A2	Normality	1.315	3.878	0.0016	Non-norn	nal Distribut	ion 		
Combined Pr	oportion Normal	Summary									
C-%	Control Type	Count	Mean	95% LCL			Min	Max	Std Err	CV%	%Effect
0 100	Negative Contro	1 10 10	0.9609 0.9564	0.9431 0.9423	0.9787 0.9704	0.9591 0.9545	0.9318 0.9318	0.9955 0.9955	0.007879 0.006218	2.59% 2.06%	0.0% 0.47%
	rected) Transfori				<u> </u>						
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	10	1.386	1.33	1.442	1.367	1.307	1.503	0.02479	5.66%	0.0%
100	110gative Conti	10	1.368	1.325	1.411	1.356	1.307	1.503	0.01887	4.36%	1.29%
Combined Pr	oportion Normal	Detail									
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Contro	<del></del> _	0.9591	0.9364	0.9955	0.9318	0.9591	0.9455	0.9955	0.9364	0.9591
100		0.9455	0.9591	0.9818	0.9591	0.95	0.9318	0.9455	0.9955	0.9591	0.9364

Analyst: QA:

Report Date:

03 Mar-16 10:23 (p 2 of 2)

Test Code:

COM0116.219myt | 12-4500-3651

Mussel Shell Development Test	Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-9880-1606 Endpoint: Combined Proportion Normal
Analyzed: 03 Mar-16 8:19 Analysis: Nonparametric-Two Sample

CETIS Version: CETISv1.8.7
Official Results: Yes

Angular (Corrected) Transformed Detail

C-%	Control Type Rep	1 Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control 1.475	1.367	1.316	1.503	1.307	1.367	1.335	1.503	1.316	1.367
100	1.33	1.367	1.436	1.367	1.345	1.307	1.335	1.503	1.367	1.316

**Combined Proportion Normal Binomials** 

	•									
C-%	Control Type Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control 218/220	211/220	206/220	219/220	205/220	211/220	208/220	219/220	206/220	211/220
100	208/220	211/220	216/220	211/220	209/220	205/220	208/220	219/220	211/220	206/220

Analyst: QA:

<b>CETIS</b>	<b>Analytical</b>	Report
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Report Date:

03 Mar-16 10:23 (p 1 of 1)

Test Code:

COM0116.219myt | 12-4500-3651

									Tes	t Code:	COM0116	.219myt   12	2-4500-3651
Musse	Shell I	Development Te	est							Aquatic	Bioassay &	Consulting	Labs, Inc.
Analys	is ID:	01-1828-9773		End	point:	Combined Pro	portion Norn	nal	CEI	IS Version	: CETISv1	.8.7	
Analyz	ed:	03 Mar-16 8:20	)	Anal	ysi <b>s</b> :	Linear Interpol			Offi	cial Result	s: Yes		
Batch	ID:	06-8899-9690		Test	Type:	Development-S	Survival		Ana	lyst:			
Start D	ate:	30 Jan-16 12:0	1	Prot	ocol:	EPA/600/R-95	/136 (1995)		Dilu	ent: La	boratory Wat	er	
Ending	Date:	01 Feb-16 12:0	1	Spec	cies:	Mytilis gallopro	vincialis		Brin	ie:			
Duratio	on:	48h		Soul	rce:	Carlsbad Aqua	ıfarms CA		Age	:			
Sample	e ID:	00-5377-5397		Code	e:	COM0116.219	m		Clie	nt: Cit	y of Malibu		
Sample	e Date:	30 Jan-16 10:3	0	Mate	rial:	Sample Water			Pro	ect: AS	BS ·		
Receiv	e Date:	30 Jan-16 12:1	5	Soul	rce:	Bioassay Repo	ort						
Sample	e Age:	91m		Stati	on:	24-BB-03 <b>R</b>							
Linear	Interpo	lation Options				_					_		
X Trans	sform	Y Transform	1	Seed	ł	Resamples	Exp 95%	CL Meth	od				
Linear	_	Linear		0		280	Yes	Two-	Point Interp	oolation			
Point E	stimate	es											
Level	%	95% LCL	95%	UCL	TU	95% LCL	95% UCL						
EC5	>100	N/A	N/A		<1	NA	NA						
EC10	>100	N/A	N/A		<1	NA	NA						
EC15	>100	N/A	N/A		<1	NA	NA						
EC20	>100	N/A	N/A		<1	NA	NA						
EC25	>100	N/A	N/A		<1	NA	NA						
EC40	>100	N/A	N/A		<1	NA	NA						
EC50	>100	N/A	N/A		<1	NA	NA						
Combi	ned Pro	portion Normal	Sumr	mary			Calcu	lated Variat	te(A/B)				
C-%_	С	ontrol Type	Cour	nt	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Ν	egative Control	10		0.960	9 0.9318	0.9955	0.007879	0.02492	2.59%	0.0%	2114	2200
100			10		0.956	4 0.9318	0.9955	0.006218	0.01966	2.06%	0.47%	2104	2200
Combi	ned Pro	portion Normal	Detai	I									
C-%		ontrol Type	Rep	1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	egative Control	0.990	9	0.959	1 0.9364	0.9955	0.9318	0.9591	0.9455	0.9955	0.9364	0.9591
100			0.945	55	0.959	1 0.9818	0.9591	0.95	0.9318	0.9455	0.9955	0.9591	0.9364
Combi	ned Pro	portion Normal	Binor	mials									
C-%		Control Type	Rep	1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0		Negative Contro	1 218/2	220	211/2	20 206/220	219/220	205/220	211/220	208/220	219/220	206/220	211/220
100			208/2	220	211/2	20 216/220	211/220	209/220	205/220	208/220	219/220	211/220	206/220

Analyst: M QA: P

## **CETIS Measurement Report**

Report Date:

03 Mar-16 10:23 (p 1 of 2)

Test Code:

COM0116.219myt | 12-4500-3651

								Test Code:	COM0116	CV% 5.57% 1.08%  CV% 0.0% 1.73%  CV% 0.0% CV%	12-4500-3651
Mussel Shell	Development T	est						Aquatic	Bioassay &	Consultin	g Labs, Inc.
Batch ID: Start Date:	06-8899-9690 30 Jan-16 12:0	)1	Test Type: Protocol:	Development-				Analyst: Diluent: La	boratory Wa	ter	
<b>Ending Date:</b>	01 Feb-16 12:0	)1	Species:	Mytilis gallopro	vincialis			Brine:			
Duration:	48h		Source:	Carlsbad Aqua	ıfarms CA			Age:			
Sample ID:	00-5377-5397		Code:	COM0116.219	m			Client: Ci	ty of Malibu		
Sample Date:	30 Jan-16 10:3	80	Material:	Sample Water				Project: AS	SBS		
Receive Date:	: 30 Jan-16 12:1	5	Source:	Bioassay Repo	ort						
Sample Age:	91m		Station:	24-BB-03R							
Dissolved Ox	ygen-mg/L										
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.35	3.173	9.527	6.1	6.6	0.25	0.3536	5.57%	0
100		2	6.55	5.915	7.185	6.5	6.6	0.04999	0.0707	1.08%	0
Overall		4	6.45			6.1	6.6				0 (0%)
Total Ammon	ia (N)-mg/L										
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		_1	0			0	0	0	0		0
Overall		2	0			0	0			_	0 (0%)
pH-Units											
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	8.2	6.929	9.471	8.1	8.3	0.1	0.1414	1.73%	0
Overall		4	8.05			7.9	8.3				0 (0%)
Salinity-ppt											
C-%	Control Type	Coun	t Mean	95% <b>L</b> CL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
100		2	34	34	34	34	34	0	0	0.0%	0
Overall		4	34			34	34				0 (0%)
Temperature-	°C										
C-%	Control Type	Coun	t Mean	95% LCL	95 <u>%</u> UCL	Min _	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
100		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
Overall		4	14.75			14.7	14.8				0 (0%)

<b>CETIS</b>	Measurement	Report
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Report Date:

03 Mar-16 10:23 (p 2 of 2)

Test Code:

COM0116.219myt | 12-4500-3651

				Test Code. Colvio 110.215/ffyt   12-4300-3031
Mussel S	Shell Development Te	est		Aquatic Bioassay & Consulting Labs, Inc.
Dissolve	d Oxygen-mg/L			
C-%	Control Type	1	2	
0	Negative Contr	6.6	6.1	
100		6.5	6.6	
Total Am	monia (N)-mg/L			
C-%	Control Type	1	2	
0	Negative Contr	0		
100		0		
pH-Units				
C-%	Control Type	1	2	
0	Negative Contr	7.9	7.9	
100		8.3	8.1	
Salinity-ր	opt			
C-%	Control Type	1	2	
0	Negative Contr	34	34	
100		34	34	
Tempera	ture-°C			
C-%	Control Type	1	2	
0	Negative Contr	14.8	14.7	
100		14.8	14.7	



#### CHRONIC MYTILUS DEVELOPMENT BIOASSAY

DATE:

January 30, 2016

STANDARD TOXICANT:

Unionized Ammonia

NOEC =

0.05 mg/l

EC25 =

0.07992 mg/l

EC50 =

0.09689 mg/l

Yours very truly,

Scott Johnson

Laboratory Director

#### **CETIS Summary Report**

Report Date:

03 Mar-16 13:08 (p 1 of 1)

Test Code: MYT013016 | 04-7534-0938 Mussel Shell Development Test Aquatic Bioassay & Consulting Labs, Inc. Batch ID: 17-2069-8179 Test Type: Development-Survival Analyst: EPA/600/R-95/136 (1995) Diluent: Laboratory Seawater Start Date: 30 Jan-16 12:00 Protocol: Mytilis galloprovincialis Brine: Not Applicable Ending Date: 01 Feb-16 12:00 Species: Carlsbad Aquafarms CA Duration: 48h Source: Age: 03-0576-7469 Internal Lab Sample ID: Code: MYT013016m Client: Sample Date: 30 Jan-16 12:00 Copper chloride Project: **REF TOX** Material: Receive Date: Source: Reference Toxicant Sample Age: NA Station: **REF TOX** Comparison Summary Method Analysis ID Endpoint NOEL LOEL TOEL **PMSD** TU **Dunnett Multiple Comparison Test** 15-4254-6458 Combined Proportion Norm 0.05 0.075 0.06124 3.71% Point Estimate Summary Method Analysis ID **Endpoint** 95% LCL 95% UCL TU Level μg/L Linear Interpolation (ICPIN) 17-5392-8572 Combined Proportion Norm EC5 0.05473 0.04952 0.05878 0.06267 0.05781 0.06785 EC10 0.06456 EC15 0.07062 0.07743 0.07652 0.07179 0.07933 EC20 EC25 0.07992 0.07679 0.08252 EC40 0.0901 0.08731 0.09268 EC50 0.09689 0.09311 0.1005 **Test Acceptability** Analysis ID Endpoint Attribute **Test Stat** TAC Limits Overlap Decision NL - 0.25 Νo Passes Acceptability Criteria 15-4254-6458 Combined Proportion Norm PMSD 0.03709 **Combined Proportion Normal Summary** C-µg/L Control Type Count Mean 95% LCL 95% UCL Min Max Std Err Std Dev CV% %Effect 0 Negative Control 5 0.9582 0.9301 0.9862 0.9364 0.9955 0.0101 0.02259 2.36% 0.0% 2.51% -1.42% 0.028 5 0.9718 0.9416 0.9364 0.9955 0.01089 0.02435 0.9666 0.9591 0.007606 0.01701 1.8% 1.33% 0.05 5 0.9455 0.9243 0.9182 5 0.7936 0.8392 0.75 0.8455 0.01643 0.03673 4.63% 17.17% 0.075 0.748 49.81% 5 0.4809 0.5227 0.0203 0.04539 9.44% 0.097 0.4246 0.5373 0.4045 0.119 5 0.2327 0.1736 0.2918 0.1727 0.2818 0.02129 0.04761 20.46% 75.71% **Combined Proportion Normal Detail Control Type** Rep 1 Rep 3 Rep 4 Rep 5 C-µg/L Rep 2 0 Negative Control 0.9591 0.9455 0.9955 0.9364 0.9545 0.028 0.9773 0.9955 0.9591 0.9364 0.9909 0.05 0.9409 0.95 0.9591 0.9182 0.9591 0.075 0.8455 0.8045 0.7682 8.0 0.75 0.097 0.4909 0.5045 0.4818 0.5227 0.4045 0.119 0.2818 0.2318 0.2 0.2773 0.1727 **Combined Proportion Normal Binomials** Control Type Rep 1 Rep 3 Rep 4 Rep 5 C-µg/L Rep 2 0 Negative Control 211/220 208/220 219/220 206/220 210/220 206/220 219/220 218/220 0.028 215/220 211/220 0.05 207/220 209/220 202/220 211/220 211/220 0.075 186/220 177/220 169/220 176/220 165/220 0.097 108/220 111/220 106/220 115/220 89/220

Analyst: QA:

000-055-186-6 CETIS™ v1.8.7.11

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		ct						Aquatic F	Bioassay & C	Consulting	Labs, In
Mussel Shell [	Development Te	sι						, 1944410 2	oronoon, or o		
Analysis ID:	15-4254-6458	End	dpoint: C	ombined Prop	ortion Norm	nal	CET	IS Version:	CETISv1.	8.7	
Analyzed:	03 Mar-16 8:18	Ana	alysis: Pa	arametric-Cor	itrol vs Trea	tments	Offic	ial Results	s: Yes		
Batch ID:	17-2069-8179	Tes	st Type: D	evelopment-S	urvival		Anal	yst:			
Start Date:	30 Jan-16 12:00	) Pro	otocol: E	PA/600/R-95/	136 (1995)		Dilue	ent: Lab	oratory Seav	vater	
Ending Date:	01 Feb-16 12:00	) Spe	ecies: M	ytilis galloprov	/incialis		Brin	e: Not	Applicable		
Duration:	48h	Soi	urce: C	arlsbad Aquat	arms CA		Age:				
Sample ID:	03-0576-7469		de: M	YT013016m			Clie		ernal Lab		
-	30 Jan-16 12:00			opper chloride			Proj	ect: RE	F TOX		
Receive Date:				eference Toxi	cant						
Sample Age:	NA	Sta	ition: R	EF TOX							
Data Transforr	m	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Correc	cted)	NA	C > T	NA	NA		3.71%	0.05	0.075	0.06124	
Dunnett Multip	ple Comparison	Test								_	
Control	vs C-µg/L		Test Sta	t Critical	MSD DF	P-Value	P-Type	Decision	(α:5%)		
Negative Contro	ol 0.028		-1.113	2.362	0.087 8	0.9879	CDF	Non-Sign	ificant Effect		
	0.05		1.047	2.362	0.087 8	0.3992	CDF	-	ificant Effect		
	0.075*		7.507	2.362	0.087 8	<0.0001	CDF	Significar			
	0.097*		16.63	2.362	0.087 8	<0.0001	CDF	Significar			
	0.119* 		23.85	2.362	0.087 8	<0.0001	CDF	Significar	nt Effect —————		
Test Acceptab	ility Criteria										
Attribute	Test Stat	TAC Lim	its _	Overlap	Decision						
	7est Stat 0.03709	TAC Lim		Overlap No		cceptability	Criteria				
PMSD						cceptability	Criteria				
PMSD ANOVA Table		NL - 0.25		No		cceptability F Stat	Criteria P-Value	Decision	ι(α:5%)		
PMSD ANOVA Table Source	0.03709	NL - 0.25		No	Passes A	<u> </u>		<b>Decision</b> Significan	<del></del>		
PMSD  ANOVA Table  Source  Between	0.03709 Sum Squa	NL - 0.25	Mean So	No quare 78	DF 5 24	F Stat	P-Value		<del></del>		
PMSD ANOVA Table Source Between Error	0.03709 Sum Squa 3.498189	NL - 0.25	Mean So	No quare 78	Passes Ad	F Stat	P-Value		<del></del>		
PMSD ANOVA Table Source Between Error Total	0.03709 Sum Squa 3.498189 0.0804980 3.578687	NL - 0.25	Mean So	No quare 78	DF 5 24	F Stat	P-Value		<del></del>		_
PMSD ANOVA Table Source Between Error Total Distributional	0.03709  Sum Squa 3.498189 0.0804980 3.578687  Tests  Test	NL - 0.25	Mean Sc 0.69963 0.003354	No quare 78 4087 Test Stat	DF 5 24 29	F Stat	P-Value	Significar	<del></del>		
PMSD ANOVA Table Source Between Error Total Distributional Attribute Variances	0.03709  Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed	NL - 0.25  ares  9  quality of V	Mean Sc 0.69963 0.003354	No quare 78 4087  Test Stat 3.154	DF 5 24 29  Critical 15.09	F Stat 208.6  P-Value 0.6762	P-Value <0.0001 Decision	Significar (α:1%) iances	<del></del>		
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances	0.03709  Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed  Mod Leve	NL - 0.25  ares  9  quality of V ne Equality	Mean So 0.69963 0.003354 /ariance y of Variance	No  quare 78 4087  Test Stat 3.154 ce 0.8286	DF 5 24 29 Critical 15.09 4.248	F Stat 208.6 P-Value 0.6762 0.5458	P-Value <0.0001 Decision Equal Var	Significar (α:1%) iances iances	<del></del>		
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances	0.03709  Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ec  Mod Leve Levene Ec	NL - 0.25  ares  9  quality of V ne Equality quality of V	Mean So 0.69963 0.003356 Variance y of Variance	No Test Stat 3.154 0.8286 0.765	DF 5 24 29 Critical 15.09 4.248 3.895	P-Value 0.6762 0.5458 0.5840	P-Value <0.0001 Decision Equal Var Equal Var Equal Var	Significar (α:1%) iances iances iances	<del></del>		
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances  Distribution	0.03709  Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ec  Mod Leve Levene Ec Shapiro-W	nu - 0.25  nres  quality of V ne Equality quality of V Vilk W Nori	Mean So 0.69963 0.003354 /ariance y of Variance /ariance mality	No Test Stat 3.154 2.0 0.8286 0.765 0.9869	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031	P-Value 0.6762 0.5458 0.5840 0.9651	P-Value <0.0001 Decision Equal Var Equal Var Normal D	Significar (α:1%) iances iances iances istribution	<del></del>		
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances  Distribution  Distribution	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed  Mod Leve Levene Ed  Shapiro-W  Kolmogore	NL - 0.25  Ares  9  quality of V ne Equality quality of V Vilk W Noriov-Smirnov	Mean So 0.69963: 0.003354  /ariance y of Variance mality y D	No Test Stat 3.154 3.154 3.0.765 0.9869 0.07386	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853	P-Value 0.6762 0.5458 0.5840 0.9651 1.0000	P-Value <0.0001 Decision Equal Var Equal Var Normal D Normal D	Significar (α:1%) iances iances istribution istribution	<del></del>		
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances  Distribution  Distribution  Distribution	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed Mod Leve Levene Ed Shapiro-W Kolmogori D'Agostine	nu - 0.25  quality of V ne Equality quality of V Vilk W Non ov-Smirnor o Skewnes	Mean So 0.69963: 0.003354  /ariance y of Variance mality y D	No Test Stat 3.154 3.154 3.0.765 0.9869 0.07386 0.6561	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576	P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118	P-Value <0.0001  Decision Equal Var Equal Var Normal D Normal D Normal D	Significar (α:1%) iances iances iances istribution istribution	<del></del>		
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances  Distribution  Distribution  Distribution  Distribution  Distribution	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed Mod Leve Levene Ed Shapiro-W Kolmogori D'Agostine D'Agostine	quality of V ne Equality quality of V Vilk W Non ov-Smirnor o Skewnes o Kurtosis	Mean So 0.69963 0.003354 /ariance y of Variance /ariance mality v D	No Test Stat 3.154 3.154 3.0.765 0.9869 0.07386 0.6561 0.1005	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576	P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199	P-Value <0.0001  Decision Equal Var Equal Var Rormal D Normal D Normal D Normal D	Significar (α:1%) iances iances iances istribution istribution istribution	<del></del>		
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ec Mod Leve Levene Ec Shapiro-W Kolmogoro D'Agostino D'Agostino	nuality of Vollet Workship Norway Nor	Mean So 0.69963; 0.003354  Variance y of Variance mality y D ss K2 Omnibu	Test Stat 3.154 3.154 4.087  0.8286 0.765 0.9869 0.07386 0.6561 0.1005 0.4406	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21	P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199 0.8023	P-Value <0.0001  Decision Equal Var Equal Var Normal D Normal D Normal D	Significar  (a:1%) iances iances iances istribution istribution istribution istribution	<del></del>		
PMSD ANOVA Table Source Between Error Total Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed Mod Leve Levene Ed Shapiro-W Kolmogor D'Agostine D'Agostine Anderson	quality of V ne Equality quality of V Vilk W Norro ov-Smirnoro o Skewnes o Kurtosis o-Pearson -Darling A2	Mean So 0.69963: 0.003354  /ariance y of Variance mality y D ss  K2 Omnibu 2 Normality	No Test Stat 3.154 3.154 3.0.765 0.9869 0.07386 0.6561 0.1005	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576	P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199	P-Value <0.0001  Decision Equal Var Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D	Significar  (a:1%) iances iances iances istribution istribution istribution istribution	<del></del>		
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Ustribution  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution  Combined Pro	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ec Mod Leve Levene Ec Shapiro-W Kolmogoro D'Agostino D'Agostino D'Agostino Anderson- Oportion Normal	quality of V ne Equality quality of V vilk W Norroov-Smirnor o Skewnes o Kurtosis o-Pearson -Darling A2	Mean So 0.69963 0.003354 Variance y of Variance /ariance mality v D ss K2 Omnibu 2 Normality	No  Quare 78 4087  Test Stat 3.154 20 0.8286 0.765 0.9869 0.07386 0.6561 0.1005 31s 0.4406 0.1774	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878	P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199 0.8023 0.9764	P-Value <0.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D Normal D	Significar  (α:1%)  iances iances iances istribution istribution istribution istribution istribution	nt Effect	CV%	%Fffe
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution  Distribution  Combined Pro	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed Mod Leve Levene Ed Shapiro-W Kolmogore D'Agostine D'Agostine Anderson- oportion Normal Control Type	quality of V ne Equality quality of V vilk W Norr ov-Smirnor o Skewnes o Kurtosis o-Pearson -Darling A2 Summary	Mean So 0.699633 0.003356  Variance y of Variance mality y D ss K2 Omnibu 2 Normality	No  Quare 78 4087  Test Stat 3.154 20 0.8286 0.765 0.9869 0.07386 0.6561 0.1005 31s 0.4406 0.1774	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878	F-Stat 208.6 P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199 0.8023 0.9764	P-Value <0.0001  Decision Equal Var Equal Var Normal D	Significar (α:1%) iances iances iances istribution istribution istribution istribution istribution	Std Err	CV%	
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances  Distribution  Distribution  Distribution  Distribution  Combined Pro	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ec Mod Leve Levene Ec Shapiro-W Kolmogoro D'Agostino D'Agostino D'Agostino Anderson- Oportion Normal	quality of V ne Equality quality of V vilk W Nori ov-Smirnov o Skewnes o Kurtosis o-Pearson -Darling A2 Summary Count	Mean So 0.69963 0.003354 /ariance y of Variance /ariance mality v D ss K2 Omnibu 2 Normality / Mean 0.9582	No  Quare 78 4087  Test Stat 3.154 20 0.8286 0.765 0.9869 0.07386 0.6561 0.1005 0.4406 0.1774  95% LCL 0.9301	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878 95% UCL 0.9862	F Stat 208.6 P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199 0.8023 0.9764 Median 0.9545	P-Value <0.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D Normal D O Normal D	Significar  (α:1%)  iances iances iances istribution istribution istribution istribution  Max  0.9955	Std Err 0.0101	2.36%	0.0%
PMSD  ANOVA Table  Source  Between  Error  Total  Distributional  Attribute  Variances  Variances  Variances  Distribution  Distribution  Distribution  Distribution  Combined Pro  C-µg/L  0  0.028	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed Mod Leve Levene Ed Shapiro-W Kolmogore D'Agostine D'Agostine Anderson- oportion Normal Control Type	number of NL - 0.25  quality of V ne Equality quality of V vilk W Nori ov-Smirnor o Skewnes o Kurtosis o-Pearson -Darling A2 Summary Count 5 5	Mean So 0.69963: 0.003354  Variance y of Variance mality y D ss K2 Omnibu 2 Normality  Mean 0.9582 0.9718	No Test Stat 3.154 20.8286 0.765 0.9869 0.07386 0.6561 0.1005 0.4406 0.1774  95% LCL 0.9301 0.9416	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878 95% UCL 0.9862 1	F Stat 208.6 P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199 0.8023 0.9764 Median 0.9545 0.9773	P-Value <0.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D 0.9364 0.9364	Significar  (a:1%) itances ita	Std Err 0.0101 0.01089	2.36% 2.51%	0.0% -1.42%
PMSD  ANOVA Table Source Between Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Combined Pro C-µg/L 0 0.028 0.05	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed Mod Leve Levene Ed Shapiro-W Kolmogore D'Agostine D'Agostine Anderson- oportion Normal Control Type	nres  9  quality of V ne Equality quality of V Vilk W Norro ov-Smirnor o Skewnes o Kurtosis o-Pearson -Darling A2 Summary Count 5 5 5	Mean So 0.69963: 0.003354 /ariance y of Variance /ariance mality v D ss K2 Omnibu 2 Normality / Mean 0.9582 0.9718 0.9455	No    Test Stat     3.154     20.8286     0.765     0.9869     0.07386     0.1005     0.4406     0.1774     95% LCL     0.9301     0.9416     0.9243	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878 95% UCL 0.9862 1 0.9666	F Stat 208.6 P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199 0.8023 0.9764 Median 0.9545 0.9773 0.95	P-Value <0.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D 0.9364 0.9364 0.9364	Significar  (a:1%) iances iances iances istribution istribution istribution istribution  Max  0.9955 0.9955 0.9591	Std Err 0.0101 0.01089 0.007606	2.36% 2.51% 1.8%	0.0% -1.42% 1.33%
ANOVA Table Source Between Error Total Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution Combined Pro	Sum Squa 3.498189 0.0804980 3.578687  Tests  Test  Bartlett Ed Mod Leve Levene Ed Shapiro-W Kolmogore D'Agostine D'Agostine Anderson- oportion Normal Control Type	number of NL - 0.25  quality of V ne Equality quality of V vilk W Nori ov-Smirnor o Skewnes o Kurtosis o-Pearson -Darling A2 Summary Count 5 5	Mean So 0.69963: 0.003354  Variance y of Variance mality y D ss K2 Omnibu 2 Normality  Mean 0.9582 0.9718	No Test Stat 3.154 20.8286 0.765 0.9869 0.07386 0.6561 0.1005 0.4406 0.1774  95% LCL 0.9301 0.9416	DF 5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878 95% UCL 0.9862 1	F Stat 208.6 P-Value 0.6762 0.5458 0.5840 0.9651 1.0000 0.5118 0.9199 0.8023 0.9764 Median 0.9545 0.9773	P-Value <0.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D 0.9364 0.9364	Significar  (a:1%) itances ita	Std Err 0.0101 0.01089	2.36% 2.51%	%Effe 0.0% -1.42% 17.179 49.819

Analyst: M QA: P

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Report Date: Test Code: 03 Mar-16 13:08 (p 2 of 2) MYT013016 | 04-7534-0938

							res	t Code:	IVIYI	013016   04	1-7534-093
Mussel Shell	Development Te	st						Aquatic Bi	oassay &	Consulting	Labs, Inc
Analysis ID: Analyzed:	15-4254-6458 03 Mar-16 8:18		•	Combined Prop Parametric-Cor				ΠS Version: cial Results:	CETISv1 Yes	.8.7	
Angular (Cor	rected) Transform	ned Sumr	mary							_	
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.375	1.283	1.468	1.356	1.316	1.503	0.03316	5.39%	0.0%
0.028	-	5	1.416	1.321	1.512	1.419	1.316	1.503	0.03434	5.42%	-2.96%
0.05		5	1.337	1.292	1.382	1.345	1.281	1.367	0.01611	2.69%	2.79%
0.075		5	1.1	1.043	1.158	1.107	1.047	1.167	0.02056	4.18%	19.99%
0.097		5	0.7662	0.7095	0.8229	0.7763	0.6894	0.8081	0.02041	5.96%	44.3%
0.119		5	0.5018	0.4311	0.5724	0.5023	0.4286	0.5596	0.02544	11.34%	63.52%
Combined Pr	roportion Normal	Detail									
C-μg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Negative Control	0.9591	0.9455	0.9955	0.9364	0.9545					
0.028		0.9773	0.9955	0.9591	0.9364	0.9909					
0.05		0.9409	0.95	0.9591	0.9182	0.9591					
0.075		0.8455	0.8045	0.7682	0.8	0.75					
0.097		0.4909	0.5045	0.4818	0.5227	0.4045					
0.119		0.2818	0.2318	0.2	0.2773	0.1727					
Angular (Cor	rected) Transforn	ned Detai	l -								-
C-μg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Negative Control	1.367	1.335	1.503	1.316	1.356					
0.028		1.419	1.503	1.367	1.316	1.475					
0.05		1.325	1.345	1.367	1.281	1.367					
0.075		1.167	1.113	1.068	1.107	1.047					
0.097		0.7763	0.7899	0.7672	0.8081	0.6894					
0.119		0.5596	0.5023	0.4636	0.5546	0.4286					
Combined Pr	oportion Normal	Binomial	s		_		_	_	_		
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Negative Control	211/220	208/220	0 219/220	206/220	210/220					
0.028		215/220	219/220	0 211/220	206/220	218/220					
0.05		207/220	209/220	0 211/220	202/220	211/220					
0.075		186/220	177/220	0 169/220	176/220	165/220					
0.097		108/220	111/220		115/220	89/220					
.007		100/220	111/220	0 100/220	110/220	USIZZU					

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Report Date:

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Test Code: MYT013016 | 04-7534-0938

								estC	oae:	IVIYI	1013016	04-7534-093
Musse	Shell Development T	est							Aquatic B	ioassay &	Consultir	ng Labs, Inc.
Analys Analyz			point: lysis:	Combined Pro Linear Interpol	•				Version: I Results		1.8.7	
Batch I	D: 17-2069-8179	Test	Type:	Development-	Survival			Analys	 :t:			
Start D	ate: 30 Jan-16 12:0		ocol:	EPA/600/R-95				Diluen		oratory Sea	water	
Ending	Date: 01 Feb-16 12:0	00 Spe	cies:	Mytilis gallopro	ovincialis		ı	3rine:		Applicable		
Duratio	on: 48h	Sou	rce:	Carlsbad Aqua	afarms CA		,	Age:				
Sample	e ID: 03-0576-7469	Cod	e:	MYT013016m				Client:	Inte	rnal Lab		
Sample	e Date: 30 Jan-16 12:0	0 Mate	erial:	Copper chlorid	le		ı	rojec	t: REF	TOX		
Receiv	e Date:	Sou	rce:	Reference Tox	kicant							
Sample	Age: NA	Stat	ion:	REF TOX								
Linear	Interpolation Options											
X Trans	sform Y Transform	n Seed	t	Resamples	Exp 95%	6 CL Me	thod					
Linear	Linear	0		280	Yes	Tw	o-Point In	terpola	ation	_	-	
Point E	stimates											
Level	μg/L 95% LCL	95% UCL										
EC5	0.05473 0.04952	0.05878										
EC10	0.06267 0.05781	0.06785										
EC15	0.07062 0.06456	0.07743										
EC20	0.07652 0.07179	0.07933										
EC25	0.07992 0.07679	0.08252										
EC40 EC50	0.0901 0.08731 0.09689 0.09311	0.09268 0.1005										
	ned Proportion Norma	•			Calci	ulated Vari	iate(A/B)				-	
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std D		CV%	%Effect	A	В
0	Negative Control	5	0.9582		0.9955	0.0101	0.022		2.36%	0.0%	1054	1100
0.028 0.05		5 5	0.9718		0.9955 0.9591	0.01089			2.51% 1.8%	-1.42% 1.33%	1069 1040	1100 1100
0.075		5	0.7936		0.8455	0.00760			4.63%	17.17%	873	1100
0.097		5	0.4809		0.5227	0.0203	0.045		9.44%	49.81%	528	1100
0.119		5	0.2327		0.2818	0.02129	0.047		20.46%	75.71%	256	1100
Combin	ned Proportion Norma	l Detail										
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
0	Negative Control	0.9591	0.9455		0.9364	0.9545					_	
0.028	3	0.9773	0.9955		0.9364	0.9909						
0.05		0.9409	0.95	0.9591	0.9182	0.9591						
0.075		0.8455	0.8045		0.8	0.75						
0.097		0.4909	0.5045		0.5227	0.4045						
0.119		0.2818	0.2318	0.2	0.2773	0.1727						
Combin	ed Proportion Normal	Binomials		_								
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
0	Negative Contro	I 211/220	208/22	219/220	206/220	210/220						
0.028		215/220	219/22	20 211/220	206/220	218/220						
0.05		207/220	209/22	20 211/220	202/220	211/220						
0.075		186/220	177/22	169/220	176/220	165/220						
0.097		108/220	111/22	0 106/220	115/220	89/220						
0.119		62/220	51/220	44/220	61/220	38/220						

Analyst: WA QA:

000-055-186-4

CETIS™ v1.8.7.11

Report Date:

03 Mar-16 13:08 (p 2 of 2)

Test Code:

MYT013016 | 04-7534-0938

Mussel Shell Development Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

17-5392-8572 03 Mar-16 8:18

Endpoint: Combined Proportion Normal Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

Analyst: PA QA:

#### **CETIS Measurement Report**

Report Date:

03 Mar-16 13:08 (p 1 of 2)

CETIS Mea	asurement	Repo	rt					Report Date:			3:08 (p 1 of 2) 04-7534-0938
Mussel Shell	Development T	est							c Bioassay &		
Batch ID: Start Date: Ending Date: Duration:	17-2069-8179 30 Jan-16 12:0 01 Feb-16 12:0 48h		Test Type: Protocol: Species: Source:	Development- EPA/600/R-95 Mytilis gallopro Carlsbad Aqua	5/136 (1995) ovincialis				_aboratory Sea		
Receive Date		00	Code: Material: Source:	MYT013016m Copper chloric Reference Tox	le				nternal Lab REF TOX		
Sample Age:			Station:	REF TOX				_			
Dissolved Ox				2/							
C-µg/L	Control Type	Count		95% LCL	95% UCL	Min	Max	Std Err		CV%	QA Coun
0	Negative Contr		6.35	3.173	9.527	6.1	6.6	0.25	0.3536	5.57%	0
0.028		2	6.3	3.759	8.841	6.1	6.5	0.2	0.2828	4.49%	0
0.05		2	6.3	6.298	6.302	6.3	6.3	0	0	0.0%	0
0.075		2	6.2	6.187	6.213	6.2	6.2	0	0	0.0%	0
0.097		2	6.2	4.929	7.471	6.1	6.3	0.1	0.1414	2.28%	0
0.119		2	6.3	6.298	6.302	6.3	6.3	0	0	0.0%	0 (201)
Overall		12	6.275			6.1	6.6				0 (0%)
Total Ammon											
C-µg/L	Control Type	Count		95% LCL	95% UCL		Max	Std Err		CV%	QA Coun
0	Negative Contr	1	0			0	0	0	0		0
0.028		1	1.58			1.58	1.58	0	0	0.0%	0
0.05		1	2.88			2.88	2.88	0	0	0.0%	0
0.075		1	4.27			4.27	4.27	0	0	0.0%	0
0.097		1	5.56			5.56	5.56	0	0	0.0%	0
0.119		1	6.79			6.79	6.79	0	0	0.0%	0
Overall		6	3.513	_		0	6.79				0 (0%)
pH-Units											
C-µg/L	Control Type	Count		95% LCL	95% UCL	Min	Max	Std Err		CV%	QA Coun
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.028		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.05		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.075		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.097		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.119		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
Overall		12	7.9			7.9	7.9				0 (0,%)
Salinity-ppt											
C-μg/L	Control Type	Count		95% LCL	95% UCL	Min	Max	Std Err		CV%	QA Count
0	Negative Contr		34	34	34	34	34	0	0	0.0%	0
0.028		2	34	34	34	34	34	0	0	0.0%	0
0.05		2	34	34	34	34	34	0	0	0.0%	0
0.075		2	34	34	34	34	34	0	0	0.0%	0
0.097		2	34	34	34	34	34	0	0	0.0%	0
0.119		2	34	34	34	34	34	0	0	0.0%	_ 0
Overall		12	34			34	34				0 (0%)
Temperature-											
C-μg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
0.028	_	2	14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
0.05		2	14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
0.075		2	14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
0.097		2	14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
0.119		2	14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
Overall		12	14.75	1-1.11	10.00	14.7	14.0	5.00002	. 0.07070	0.4070	0 (09/)

Overall

12

14.75

14.7

14.8

Report Date: Test Code: 03 Mar-16 13:08 (p 2 of 2) MYT013016 | 04-7534-0938

				Test Code.
Mussel She	ell Development T	est		Aquatic Bioassay & Consulting Labs, Inc.
Dissolved (	Oxygen-mg/L			
C-µg/L	Control Type	1	2	
0	Negative Contr		6.1	
0.028	•	6.5	6.1	
0.05		6.3	6.3	
0.075		6.2	6.2	
0.097		6.3	6.1	
0.119		6.3	6.3	
Total Amm	onia (N)-mg/L			
C-µg/L	Control Type	1		
0	Negative Contr	0		
0.028		1.58		
0.05		2.88		
0.075		4.27		
0.097		5.56		
0.119		6.79		
pH-Units				
C-µg/L	Control Type	1	2	
0	Negative Contr	7.9	7.9	
0.028		7.9	7.9	
0.05		7.9	7.9	
0.075		7.9	7.9	
0.097		7.9	7.9	
0.119		7.9	7.9	
Salinity-ppt	:			
C-µg/L	Control Type	1	2	
0	Negative Contr	34	34	
0.028		34	34	
0.05		34	34	
0.075		34	34	
0.097		34	34	
0.119		34	34	
Temperatui	·e-°C			
C-µg/L	Control Type	1	2	
0	Negative Contr	14.8	14.7	
0.028		14.8	14.7	
0.05		14.8	14.7	
0.075		14.8	14.7	
0.097		14.8	14.7	
0.119	•	14.8	14.7	

Analyst: QA:



March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03R

DATE RECEIVED:

01/30/2016

ABC LAB. NO.:

COM0116.219

#### CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 %

EC50 = >100.00 %

Yours very truly,

Scott Johnson

Laboratory Director

## **CETIS Summary Report**

Report Date:

03 Mar-16 10:24 (p 1 of 1)

Test Code:

COM0116.219urc | 19-8391-2816

								rest ooue.		COMOTIO		0 000 1 20 1	
Purple Sea Ur	chin Sperm Cell	l Fertiliza	ition Test					Aqua	atic B	ioassay & C	Consulting	Labs, Inc	
Batch ID: Start Date: Ending Date: Duration:	19-0666-4603 30 Jan-16 15:15 30 Jan-16 15:55 40m	5 Pr 5 Sp	est Type: rotocol: pecies: purce:					Analyst: Diluent: Brine: Age:	Laboratory Seawater  Not Applicable				
Sample ID:	21-2142-5786	Co	ode:	COM0116.219t	1			Client:	City	of Malibu			
•	30 Jan-16 10:30		aterial:	Sample Water				Project:	ASB				
-	30 Jan-16 12:15		ource:	Bioassay Repo	rt			•					
Sample Age:	5h	St	ation:	24-BB-03R									
Comparison S	Summary					_							
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Meth	nod				
02-2624-8228	Fertilization Rat	е	100	>100	NA	1.62%	1	Equa	al Vari	ance t Two-Sample Test			
Point Estimate	e Summary												
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	nod				
20-5841-5407	Fertilization Rat	е	EC5	>100	N/A	N/A	<1	Line	ar Inte	erpolation (IC	CPIN)		
			EC10	>100	N/A	N/A	<1						
			EC15	>100	N/A	N/A	<1						
			EC20	>100	N/A	N/A	<1						
			EC25	>100	N/A	N/A	<1						
			EC40	>100	N/A	N/A	<1						
			EC50	>100	N/A	N/A 	<1						
Test Acceptab	ility												
Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Limi	its	Ove	rlap	Decision			
02-2624-8228	Fertilization Rat	е	Contro	ol Resp	0.9363	0.7 - NL		Yes		Passes A			
20-5841-5407	Fertilization Rat	е	Contro	ol Resp	0.9363	0.7 - NL		Yes		Passes A			
02-2624-8228	Fertilization Rate	е	PMSE	)	0.01615	NL - 0.25		No		Passes A	ceptability	Criteria	
Fertilization R	ate Summary												
	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std	Err	Std Dev	CV%	%Effec	
0	Negative Control	8	0.936		0.9503	0.91	0.96		5957	0.01685	1.8%	0.0%	
100		8	0.93	0.9152	0.9448	0.91	0.96	0.00	6268	0.01773	1.91%	0.67%	
Fertilization R	ate Detail												
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep			Rep 8			
0	Negative Control	0.92	0.95	0.93	0.91	0.96	0.95	0.93		0.94			
100		0.93	0.91	0.92	0.96	0.93	0.95	0.91		0.93			
Fertilization R	ate Binomials												
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep	6 Rep	7	Rep 8			
0	Negative Control	02/100	95/10	93/100	91/100	96/100	95/10	00 93/1	00 <u> </u>	94/100		_	
	Negative Control	32/100	00/10	0 00/100	31/100	30/100	55/10	0 33/1	00	37/100			

Analyst: VA QA:

CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:24 (p 1 of 2)

Test Code:

COM0116.219urc | 19-8391-2816

							Test	Code:	COM0116.	219urc   1	9-8391-281
Purple Sea U	Irchin Sperm Cel	l Fertiliza	ation Test			_	_	Aquatic B	ioassay & C	Consulting	Labs, Inc
Analysis ID:	02-2624-8228	Er	ndpoint: Fe	tilization Ra	 te		CET	S Version:	CETISv1.	8.7	
Analyzed:	03 Mar-16 8:19		•	rametric-Two	Sample		Offic	ial Results	: Yes		
Batch ID:	19-0666-4603	Te	est Type: Fe	tilization		_	Anal	vst·			
Start Date:	30 Jan-16 15:1			A/600/R-95/	136 (1995)		Dilu	•	oratory Seav	vater	
Ending Date:				ongylocentro	, ,	tus	Brin		Applicable		
Duration:	40m			vid Gutoff	rao parpara		Age		, , , , , , , , , , , , , , , , , , , ,		
Sample ID:	21-2142-5786		ode: CC	M0116.219ı			Clie		of Malibu		
•	: 30 Jan-16 10:30			mple Water	4		Proj	,			
-	: 30 Jan-16 12:1			assay Repo	rt		110)	. , , , , , ,	,,,		
Sample Age:				BB-03R							
					- Cood		PMSD	Test Resu			
Data Transfo Angular (Corre		Zeta NA	Alt Hyp	Trials NA	Seed NA		1.62%		rtilization rat		
Angular (Corre	<u> </u>						1.0270	——————————————————————————————————————		<del>_</del>	
Equal Varian	ce t Two-Sample	Test									
Control	vs C-%		Test Stat			P-Value	P-Type	Decision(			
Negative Con	trol 100		0.6993	1.761	0.031 14	0.2479	CDF	Non-Signi	ficant Effect		
Test Accepta	bility Criteria										
Attribute	Test Stat	TAC Lin	nits	Overlap	Decision						
Control Resp	0.9363	0.7 - NL		Yes	Passes Ad	cceptability	Criteria				
PMSD	0.01615	NL - 0.2	5	No	Passes Ad	cceptability	Criteria				
ANOVA Table	<del></del>			_				_			
Source	Sum Squa	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision(	a:5 <u>%)</u>		
Between	0.0006184	599	0.0006184	1599	1	0.489	0.4958	Non-Signi	ficant Effect		
Error	0.0177068	37	0.001264	776	14	_					
Total	0.0183253	3			15						
Distributiona	l Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a:1%)			
Variances	Variance	Ratio F		1.094	8.885	0.9085	Equal Var	iances			
Variances	Mod Leve	ne Equali	ity of Variance	0.09029	8.862	0.7682	Equal Var	riances			
Variances	Levene E	quality of	Variance	0.04753	8.862	0.8306	Equal Var	riances			
Distribution	Shapiro-V	Vilk W No	ormality	0.9561	0.8408	0.5918	Normal D	istribution			
Distribution	Kolmogor	ov-Smirne	ov D	0.1479	0.2471	0.4796	Normal D	istribution			
Distribution	D'Agostin	o Skewne	ess	0.7371	2.576	0.4610		istribution			
Distribution	Anderson	-Darling A	A2 Normality	0.3335	3.878	0.5183	Normal D	istribution			
Fertilization F	Rate Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contro	1 8	0.9363	0.9222	0.9503	0.935	0.91	0.96	0.005957	1.8%	0.0%
100		8	0.93	0.9152	0.9448	0.93	0.91	0.96	0.006268	1.91%	0.67%
Angúlar (Cor	rected) Transfori	ned Sum	mary			_					
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	8	1.317	1.288	1.346	1.313	1.266	1.369	0.01229	2.64%	0.0%
100	- "	8	1.305	1.275	1.335	1.303	1.266	1.369	0.01285	2.79%	0.94%
Fertilization F	Rate Detail						_				
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Negative Contro		0.95	0.93	0.91	0.96	0.95	0.93	0.94		
100	_	0.93	0.91	0.92	0.96	0.93	0.95	0.91	0.93		
Angular (Cor	rected) Transfori	ned Deta	il							_	
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Negative Contro	_ <del>-</del>	1.345	1.303	1.266	1.369	1.345	1.303	1.323	_	
100		1.303	1.266	1.284	1.369	1.303	1.345	1.266	1.303		
		•			<u></u>			=		Vm	0
										WV	

Analyst:\_\_\_\_\_QA:\_\_\_\_

Report Date:

03 Mar-16 10:24 (p 2 of 2)

Test Code:

COM0116.219urc | 19-8391-2816

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID:

02-2624-8228

Endpoint: Fertilization Rate

**CETIS Version:** 

CETISv1.8.7

Analyzed:

03 Mar-16 8:19

Analysis: Parametric-Two Sample

Official Results: Yes

Fertilization Rate Binomials

Rep 2 **Control Type** Rep 4 Rep 1 Rep 3 Rep 5 Rep 6 Rep 7 Rep 8 0 Negative Control 92/100 95/100 95/100 93/100 94/100 93/100 91/100 96/100 100 93/100 91/100 93/100 93/100 92/100 96/100 95/100 91/100

CETIS Analytical Report
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Report Date:

03 Mar-16 10:24 (p 1 of 2)

Test Code:

COM0116.219urc | 19-8391-2816

								T	est Code:	COM0116	6.219urc	19-8391-2816
Purple	Sea Ur	chin Sperm Cel	Fertilization	on Test	t	_			Aqua	tic Bioassay &	Consult	ing Labs, Inc.
Analys	is ID:	20-5841-5407	End	point:	Fertilization Ra	te	•	С	ETIS Vers	ion: CETISv	1.8.7	_
Analyz	ed:	03 Mar-16 8:19	Ana	lysis:	Linear Interpola	ation (ICPIN	])	0	fficial Res	sults: Yes		
Batch		19-0666-4603	Test	Туре:	Fertilization			A	nalyst:			
Start D		30 Jan-16 15:1		ocol:	EPA/600/R-95/	136 (1995)		D	iluent:	Laboratory Sea		
	g Date:	30 Jan-16 15:5	5 Spe	cies:	Strongylocentro	otus purpura	atus	В	rine:	Not Applicable		
Duratio	on:	40m	Sou ———	rce:	David Gutoff			Α,	ge: 			
Sample		21-2142-5786	Cod		COM0116.219	ı			lient:	City of Malibu		
•		30 Jan-16 10:3		erial:	Sample Water			Р	roject:	ASBS		
		30 Jan-16 12:1			Bioassay Repo	rt						
	e Age:		Stat	ion:	24-BB-03R							
		lation Options										
X Tran	sform	Y Transform		<u></u>	Resamples	Exp 95%						
Linear		Linear	0		280 ———————	Yes	Two	-Point Inte	erpolation ———			
Test A	cceptab	ility Criteria										
Attribu		Test Stat	TAC Limit	<u>s</u>	Overlap	Decision						
Control	Resp	0.9363	0.7 - NL		Yes	Passes A	cceptability	Criteria				
Point E	Stimate	es										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
EC5	>100	N/A	N/A	<1	NA	NA						`
EC10	>100	N/A	N/A	<1	NA	NA						
EC15	>100	N/A	N/A	<1	NA	NA						
EC20	>100	N/A	N/A	<1	NA	NA						
EC25	>100	N/A	N/A	<1	NA	NA						
EC40 EC50	>100 >100	N/A N/A	N/A N/A	<1	NA	NA						
			N/A	<1 ———	NA -	NA 						
		ate Summary		-			ılated Varia				-	
C-%		ontrol Type	Count	Mean		Max	Std Err	Std De		%Effect	Α	B
0	N	egative Control	8	0.936		0.96	0.005957				749	800
100			<u>8</u>	0.93	0.91	0.96	0.006268	0.0177	3 1.91%	% 0.67% ————	744	800
	ation R	ate Detail										
		ontrol Type	Rep 1	Rep 2		Rep 4	Rep 5	Rep 6	Rep 7			
0	N	egative Control	0.92	0.95	0.93	0.91	0.96	0.95	0.93	0.94		
100			0.93	0.91	0.92	0.96	0.93 —	0.95	0.91	0.93		
Fertiliz	ation R	ate Binomials										
C-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0		Negative Control	92/100	95/100	93/100	91/100	96/100	95/100	93/10	0 94/100		
100			93/100	91/100	92/100	96/100	93/100	95/100	91/10	0 93/100		

Analyst: P QA:

000-055-186-4

CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:24 (p 2 of 2)

Test Code:

COM0116.219urc | 19-8391-2816

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

20-5841-5407 03 Mar-16 8:19

Endpoint: Fertilization Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

## **CETIS Measurement Report**

Report Date:

03 Mar-16 10:24 (p 1 of 1)

Test Code:

COM0116.219urc | 19-8391-2816

Negative Control Type	Purple Sea U	rchin Sperm Ce	II Ferti	lization Tes	t					est Code: Aqua	tic Bioassay		ng Labs, Inc.
Sample Age: 30 Jan-16 103   Jan-16 103   Jan-16 103   Sources: 8   Sources: 8   Sources: 8   Sources: 9   S	Start Date: Ending Date:	30 Jan-16 15:1 30 Jan-16 15:5		Protocol: Species:	EPA/ Stron	600/R-95 gylocentr	, ,	atus	D B	iluent: rine:	-		
Parameter	Sample Date: Receive Date:	30 Jan-16 10:3 : 30 Jan-16 12:1		Material: Source:	Samp Bioas	ole Water say Repo					-		
Parameter			eria										
Temperal	Parameter			Min	Max	Acc	ceptability	Limits	Overlap	Decisi	on		
C-%         Control Type         Count         Mean         95% LCL         95% LCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Court         2         6.4         3.859         8.941         6.2         6.6         0.2         0.2828         4.42%         0           Overall         4         6.25         4.54         8.356         6.2         6.6         0.15         0.2121         3.29%         0           PH-Units         4         6.425         ***         5.2         6.6         0.5         5.0121         3.29%         0         0           PH-Units         ***         4         6.425         ***         ***         6.2         6.6         0.5         7.9         0 <td< td=""><td>•</td><td>C</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>,</td><td></td></td<>	•	C										,	
Negative Control Type	Dissolved Ox	ygen-mg/L											
100         2         6.45         4.544         8.36         6.3         6.6         0.15         0.2121         3.29%         0           Overall         4         6.425         -         6.2         6.6         -         -         0 <th< td=""><td>C-%</td><td></td><td>Coun</td><td></td><td>9</td><td>5% LCL</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	C-%		Coun		9	5% LCL							
PH-Units	-	Negative Contr			_								
PH-Units					4	.544	8.356			0.15	0.2121	3.29%	
C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Control         2         7.9         7.884         7.91         7.9         0         0         0.0%         0           Overall         4         7.975         7.415         8.685         8         8.1         0.05001         0.0703         0.886         0           Salfinity-pt         4         7.975         7.9         8.1         0.05001         0.0703         0.886         0           C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           100         Negative Control         2         34         34         34         34         0         0         0.0%         0         0           Coverall         4         34         34         34         34         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0			-	0.423				0.2					0 (070)
One of the control of the c	_	Cambral Trus	0	4 B4		F0/ 1 C1	0.50/ 1101	N/I:	D.C	C44 E	Ctd Dov	CV/9/	OA Count
100         2         8.05         7.415         8.685         8         8.1         0.0901         0.07073         0.88%         0           Overall         4         7.975         -         7.9         8.1         -         -         0 (0%)           Salinity-pt           C%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Contr         2         34         34         34         34         0         0         0.0%         0           100         -         4         34         34         34         34         0         0         0.0%         0           Overall         4         34         34         34         34         0         0         0.0%         0           Temperature***           C*         Ontrol Type         Mean         95% LCL         95% UCL         Min         Max         14.9         0.05004         0.0707         0.48%         0           Overall         1         2         14.85         14.21													
Salinity-ppt	_	Negative Conti								-			
C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Contr         2         34         34         34         34         0         0         0.0%         0           Overall         4         34         34         34         34         0         0         0.0%         0           Overall         4         34         34         34         34         0         0         0.0%         0           Temperature**C           C**         Control Type         6         0         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           C**         Negative Contr         2         14.85         14.21         15.49         14.8         14.9         0.05004         0.07077         0.48%         0           Overall         4         14.85         14.21         15.49         14.8         14.9         0.05004         0.07077         0.48%         0         0         0         0         0         0         0         0						.,	0.000						
C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Contr         2         34         34         34         34         0         0         0.0%         0           Overall         4         34         34         34         34         0         0         0.0%         0           Overall         4         34         34         34         34         0         0         0.0%         0           Temperature**C           C**         Control Type         6         0         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           C**         Negative Contr         2         14.85         14.21         15.49         14.8         14.9         0.05004         0.07077         0.48%         0           Overall         4         14.85         14.21         15.49         14.8         14.9         0.05004         0.07077         0.48%         0         0.05004         0.07077         0.48%         0         0.05004         0.07	Salinity-ppt												
Negative Control Type	•	Control Type	Coun	t Mean	9	5% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
100         2         34         34         34         34         34         34         0         0         0.0%         0           Overall         4         34         34         34         34         34         34         0         0         0.0%         0           Temperature-°C           C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QAC count           0         Negative Contr         2         14.85         14.21         15.49         14.8         14.9         0.05004         0.07077         0.48%         0           Overall         4         14.85         14.21         15.49         14.8         14.9         0.05004         0.07077         0.48%         0													
Control Type	100			34				34	34	0	0	0.0%	0
C-%   Control Type   Count   Mean   95% LCL   95% UCL   Min   Max   Std Err   Std Dev   CV%   QA Count	Overall		4	34				34	34				0 (0%)
Negative Control   14.85	Temperature-	°C											
100         2         14.85         14.21         15.49         14.8         14.9         0.05004         0.07077         0.48%         0           Overall         4         14.85         14.8         14.9         0.05004         0.07077         0.48%         0           Dissolved Owners         Control Type         1         2         2         2         2         2         2         2         2         2         2         2         2         3         4	C-%	Control Type	Coun	t Mean	9	5% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
Negative Control Type	0	Negative Contr	2	14.85	1	4.21	15.49	14.8	14.9	0.050			0
Dissolved Oxygen-mg/L           C-%         Control Type         1         2           0         Negative Control Type         6.6         6.2           100         Vegative Control Type         1         2           0         Negative Control Type         7.9         7.9           100         8.1         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Control Type         34         34           100         34         34           100         34         34           Temperature-℃         Control Type         1         2           0         Negative Contr         14.9         14.8					1	4.21	15.49			0.050	0.07077	0.48%	
C-%         Control Type         1         2           0         Negative Contr         6.6         6.2           100         6.6         6.3           pH-Units         Control Type         1         2           0         Negative Contr         7.9         7.9           100         8.1         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Contr         34         34           100         34         34         34           Temperature-°C         Control Type         1         2           0         Negative Contr         14.9         14.8			4	14.85				14.8	14.9				0 (0%)
0         Negative Contr         6.6         6.2           100         6.6         6.3           pH-Units           C-%         Control Type         1         2           0         Negative Contr         7.9         7.9           100         8.1         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Contr         34         34           100         34         34           Temperature-°C         Control Type         1         2           0         Negative Contr         14.9         14.8	Dissolved Ox	ygen-mg/L											
100       6.6       6.3         pH-Units         C-%       Control Type       1       2         0       Negative Contr       7.9       7.9         100       8.1       8         Salinity-ppt         C-%       Control Type       1       2         0       Negative Contr       34       34         100       34       34         Temperature-°C       Control Type       1       2         0       Negative Contr       14.9       14.8													
pH-Units           C-%         Control Type         1         2           0         Negative Control Type         7.9         7.9           100         8.1         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Control Type         34         34           100         34         34           Temperature-°C         Control Type         1         2           0         Negative Contr         14.9         14.8	•	Negative Contr											
C-%         Control Type         1         2           0         Negative Control Type         7.9         7.9           100         8.1         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Control Type         34         34           100         34         34           Temperature-°C         Control Type         1         2           0         Negative Control Type         14.9         14.8			6.6	6.3									
0         Negative Control Type         7.9         7.9           100         8.1         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Control 34         34           100         34         34           Temperature-℃         Control Type         1         2           0         Negative Contr         14.9         14.8	pH-Units												
100     8.1     8       Salinity-ppt       C-%     Control Type     1     2       0     Negative Contr     34     34       100     34     34       Temperature-°C       C-%     Control Type     1     2       0     Negative Contr     14.9     14.8									_				
Salinity-ppt           C-%         Control Type         1         2           0         Negative Control Type         34         34           100         34         34           Temperature-°C           C-%         Control Type         1         2           0         Negative Control Type         14.9         14.8	•	Negative Contr											
C-%         Control Type         1         2           0         Negative Control Type         34         34           100         34         34           Temperature-°C           C-%         Control Type         1         2           0         Negative Control Type         14.9         14.8			8.1	8									
0       Negative Contr       34       34         100       34       34         Temperature-°C         C-%       Control Type       1       2         0       Negative Contr       14.9       14.8													
100     34     34       Temperature-°C       C-%     Control Type     1     2       0     Negative Contr     14.9     14.8													
Temperature-°C  C-% Control Type 1 2  0 Negative Contr 14.9 14.8	·	Negative Contr											
C-%         Control Type         1         2           0         Negative Contr         14.9         14.8		°C	54	34									
0 Negative Contr 14.9 14.8			4	•									
·													
	100	regative Conti	14.9	14.8									

Analyst: P QA:



### CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

DATE:

January 30, 2016

STANDARD TOXICANT:

Copper Chloride

NOEC =

18.00 ug/l

EC25 =

35.63 ug/l

EC50 =

46.44 ug/l

Yours very truly,

Scott Johnson Laboratory Director

# **CETIS Summary Report**

Report Date:

03 Mar-16 13:08 (p 1 of 1)

Test Code:

URC013016 | 19-1929-7816

								Test Code	<b>:</b>	URC	013016   19	9-1929-781
Purple Sea U	rchin Sperm Cell	l Fertiliz	zation Test					Aqu	atic B	ioassay &	Consulting	Labs, Inc
Batch ID: Start Date: Ending Date: Duration:	03-7479-0296 30 Jan-16 15:10 30 Jan-16 15:50 40m	) F	Fest Type: Protocol: Species: Source:	Fertilization EPA/600/R-95/ Strongylocentro David Gutoff	, ,	itus		Analyst: Diluent: Brine: Age:		oratory Sea Applicable	water	_
Sample ID: Sample Date: Receive Date Sample Age:		) [	Code: Material: Source: Station:	URC013016u Copper chloride Reference Toxi REF TOX		,		Client: Project:	Inter	rnal Lab		
Comparison	Summary											_
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Met	hod			
	Fertilization Rate	<u>—</u>	18	32	24	4.51%				lultiple Com	parison Te	st
Point Estimat	-			,,	0=0/ 1 01	0.70/ 1101		8.6				
Analysis ID	Endpoint		Level	μg/L	95% LCL	95% UCL	TU		hod		ODINI	
06-9720-2779	Fertilization Rate	е	EC5 EC10	22.22 26.43	21.59 25.24	22.8 27.6		Line	ear inte	erpolation (I	CPIN)	
			EC15	30.65	28.96	32.4						
			EC20	33.47	32.45	34.39						
			EC25	35.63	34.62	36.57						
			EC40	42.12	41.09	43.17						
			EC50	46.44	45.22	47.82						
Test Acceptal	bility	_							_			
Analysis ID	Endpoint		Attrib	uto	Test Stat	TAC Limi	te	Ove	erlap	Decision		
02-5665-8892	<u></u>			ol Resp	0.93	0.7 - NL		Yes			cceptability	Criteria
06-9720-2779				ol Resp	0.93	0.7 - NL		Yes			cceptability	
	Fertilization Rate		PMSE		0.04509	NL - 0.25		No	•		cceptability	
Fertilization F	Rate Summary											
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	c Std	Err	Std Dev	CV%	%Effect
0 - 149/2	Negative Control		0.93	0.904	0.956	0.91	0.95		08165	0.01633	1:76%	0.0%
18	rroganivo control	4	0.952		0.9923	0.92	0.98			0.025	2.63%	-2.42%
32		4	0.785	0.7691	0.8009	0.77	0.79			0.01	1.27%	15.59%
56		4	0.262		0.3226	0.21	0.29		1887	0.03775	14.38%	71.77%
100		4	0.065	0.0229	0.1071	0.03	0.09		1323	0.02646	40.7%	93.01%
180		4	0	0	0	0	0	0		0		100.0%
Fertilization F	Rate Detail											
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4							
0	Negative Control	<u> </u>	0.93	0.95	0.93							
18		0.96	0.98	0.95	0.92							
32		0.77	0.79	0.79	0.79							
56		0.26	0.29	0.29	0.21							
100		0.06	0.08	0.09	0.03							
180		0	0	0	0							
	Poto Dinamiala											
Fertilization R	tate billoilliais											
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4							
C-µg/L_					Rep 4 93/100							
C-μg/L 0	Control Type		93/100	95/100	_ <del>-</del>		_				_	
C-μg/L 0 18	Control Type	91/100	93/100 98/100	95/100 95/100	93/100					_		
C-μg/L 0 18 32	Control Type	91/100 96/100	93/100 98/100 79/100	95/100 95/100 95/100 79/100	93/100 92/100 79/100							
Fertilization F C-µg/L 0 18 32 56 100	Control Type	91/100 96/100 77/100	93/100 98/100 79/100	95/100 95/100 95/100 79/100	93/100 92/100							

Analyst: QA:

Report Date: Test Code:

03 Mar-16 13:08 (p 1 of 2) URC013016 | 19-1929-7816

							rest	Code:	UNC	713016   18	9-1929-781
Purple Sea Ur	chin Sperm Cel	l Fertil	ization Test			_		Aquatic B	ioassay & C	Consulting	Labs, Inc
Analysis ID:	02-5665-8892		Endnoint:	Fertilization Ra			CET	IS Version:	CETISv1.	8 7	_
Analyzed:	03 Mar-16 8:19	)	Analysis:	Parametric-Co		tments		ial Results:			
Batch ID:	03-7479-0296		Test Type:	Fertilization			Anal	yst:			
Start Date:	30 Jan-16 15:1	0	Protocol:	EPA/600/R-95	/136 (1995)		Dilu	ent: Labo	oratory Seav	vater	
Ending Date:	30 Jan-16 15:5	0	Species:	Strongylocentr	otus purpura	tus	Brin	e: Not	Applicable		
Duration:	40m		Source:	David Gutoff			Age:				
Sample ID:	08-6019-1671		Code:	URC013016u			Clie	nt: Inter	nal Lab		
Sample Date:	30 Jan-16 15:1	0	Material:	Copper chlorid	е		Proj	ect:			
Receive Date:			Source:	Reference Tox	icant						
Sample Age:	NA		Station:	REF TOX							
Data Transforr	n	Zeta	Alt Hy	p Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Correc	cted)	NA	C > T	NA	NA		4.51%	18	32	24	
Dunnett Multip	ole Comparison	Test		<u> </u>							
Control	vs C-μg/L		Test S	tat Critical	MSD DF	P-Value	P-Type	Decision(	α:5%)		
Negative Contro	ol 18		-1.657	2.356	0.075 6	0.9956	CDF	Non-Signif	icant Effect		
	32*		6.801	2.356	0.075 6	< 0.0001	CDF	Significant	Effect		
	56*		24.2	2.356	0.075 6	< 0.0001	CDF	Significant	Effect		
	100*		33.15	2.356	0.075 6	<0.0001	CDF	Significant	Effect		
Test Acceptab	ility Criteria										
Attribute	Test Stat	TAC I	Limits	Overlap	Decision						
Control Resp	0.93	0.7 - 1	NL	Yes	Passes A	ceptability	Criteria				
PMSD	0.04509	NL - (	0.25	No	Passes A	cceptability	Criteria				
ANOVA Table											
_				0					a·5%)		
Source	Sum Squa	ares	Mean	Square	DF	F Stat	P-Value	Decision(	4.070)		
	Sum Squa 3.830179	ares	0.9575		4	476.2	P-Value <0.0001	Decision( Significant			
Between				447							
Between Error	3.830179		0.9575	447	4						
Between Error Total	3.830179 0.0301608 3.86034		0.9575	447	4 15						
Between Error Total Distributional	3.830179 0.0301608 3.86034 Tests	31	0.9575 0.0020	1072	4 15			Significant			
Between Error Total Distributional Attribute	3.830179 0.0301608 3.86034 Tests Test Bartlett E	31 quality	0.9575 0.0020 of Variance	1447 11072 Test Stat 5.916	4 15 19 Critical 13.28	P-Value 0.2055	<0.0001  Decision Equal Var	Significant (α:1%) iances			
Between Error Total  Distributional Attribute Variances Variances	3.830179 0.0301608 3.86034 Tests Test Bartlett E Mod Leve	quality	0.9575 0.0020 of Variance ality of Varia	Test Stat 5.916 nce 1.228	4 15 19 Critical 13.28 4.893	P-Value 0.2055 0.3405	<0.0001 Decision Equal Var Equal Var	Significant (α:1%) iances iances			
Between Error Total  Distributional Attribute Variances Variances Variances	3.830179 0.0301608 3.86034 Tests Test Bartlett E Mod Leve Levene E	quality ene Equ quality	0.9575 0.0020 of Variance ality of Varia of Variance	Test Stat 5.916 nce 1.228 1.275	4 15 19 Critical 13.28 4.893 4.893	P-Value 0.2055 0.3405 0.3232	O.0001  Decision  Equal Var  Equal Var  Equal Var	Significant (α:1%) iances iances iances			
Between Error Total  Distributional Attribute Variances Variances Variances Distribution	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E-  Mod Leve  Levene E  Shapiro-V	quality ene Equ quality Vilk W	0.9575 0.0020 of Variance rality of Varia of Variance Normality	Test Stat 5.916 nce 1.228 1.275 0.9534	4 15 19 Critical 13.28 4.893 4.893 0.866	P-Value 0.2055 0.3405 0.3232 0.4210	Occision Equal Var Equal Var Equal Var Normal D	Significant (α:1%) iances iances istribution			
Between Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor	quality ene Equ quality Vilk W	0.9575 0.0020 of Variance rality of Varia of Variance Normality	Test Stat 5.916 nce 1.228 1.275 0.9534 0.1423	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605	Occision Equal Var Equal Var Equal Var Normal D	Significant (α:1%) iances iances istribution istribution			
Between Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin	quality quality ene Equ quality Vilk W vov-Smi o Skew	0.9575 0.0020 of Variance vality of Variance Normality irnov D	Test Stat 5.916 nce 1.228 1.275 0.9534 0.1423 0.9319	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514	Occision Equal Var Equal Var Equal Var Normal D Normal D	Significant  (a:1%)  iances iances istribution istribution			
Between Error Total  Distributional Attribute Variances Variances Distribution Distribution Distribution Distribution Distribution	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin	quality ene Equ quality Vilk W ov-Smi o Skew o Kurto	0.9575 0.0020 of Variance rality of Varia of Variance Normality irnov D vness	Test Stat 5.916 nce 1.228 1.275 0.9534 0.1423 0.9319 0.2377	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121	O.0001  Decision Equal Var Equal Var Equal Var Normal D Normal D Normal D Normal D	Significant (a:1%) iances iances istribution istribution istribution			
Between Error Total  Distributional Attribute Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin	quality ene Equ quality Vilk W rov-Smi o Skew o Kurto o-Pears	0.9575 0.0020 of Variance vality of Varia of Variance Normality irnov D vness ssis	Test Stat 5.916 1.228 1.275 0.9534 0.1423 0.9319 0.2377 bus 0.925	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576 9.21	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121 0.6297	O.0001  Decision Equal Var Equal Var Rormal D Normal D Normal D Normal D Normal D	Significant (a:1%) iances iances istribution istribution istribution istribution			
Between Error Total  Distributional Attribute Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E-  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin D'Agostin Anderson	quality ene Equ quality Vilk W rov-Smi o Skew o Kurto o-Pears	0.9575 0.0020 of Variance rality of Varia of Variance Normality irnov D vness	Test Stat 5.916 1.228 1.275 0.9534 0.1423 0.9319 0.2377 bus 0.925	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121	O.0001  Decision Equal Var Equal Var Equal Var Normal D Normal D Normal D Normal D	Significant (a:1%) iances iances istribution istribution istribution istribution			
Between Error Total Distributional Attribute Variances Variances Distribution	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin D'Agostin Anderson	quality ene Equ quality Vilk W ov-Smi o Skew o Kurto o-Pears -Darling	0.9575 0.0020 of Variance vality of Varia of Variance Normality irnov D vness sis son K2 Omni	Test Stat 5.916 nce 1.228 1.275 0.9534 0.1423 0.9319 0.2377 bus 0.925 ly 0.4915	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576 9.21 3.878	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121 0.6297 0.2229	O.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D Normal D	Significant (α:1%) riances riances riances ristribution ristribution ristribution ristribution ristribution ristribution	Effect	CM	0/ [56]
Between Error Total Distributional Attribute Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution Distribution Fertilization Ra C-µg/L	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin D'Agostin Anderson  ate Summary  Control Type	quality ene Equ quality Vilk W oov-Smi o Skew o Kurto o-Pears -Darling	0.9575 0.0020 of Variance nality of Variance Normality irnov D vness sis son K2 Omni g A2 Normali t Mean	Test Stat 5.916 nce 1.228 1.275 0.9534 0.1423 0.9319 0.2377 bus 0.925 ly 0.4915	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576 9.21 3.878	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121 0.6297 0.2229  Median	O.0001  Decision Equal Var Equal Var Normal D	Significant  (α:1%)  riances  riances  riances  riances  ristribution  ristribution  ristribution  ristribution  ristribution  ristribution  ristribution  ristribution  ristribution	Effect Std Err	CV%	
Between Error Total Distributional Attribute Variances Variances Ustribution Distribution Distribution Distribution Distribution Distribution Distribution Extribution Distribution Distribution Distribution Distribution Ci-pg/L C	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin D'Agostin Anderson	quality ene Equ quality Vilk W ov-Smi o Skew o Kurto o-Pears -Darling	0.9575 0.0020 of Variance nality of Varia of Variance Normality irnov D ness sis son K2 Omni g A2 Normali t Mean 0.93	Test Stat 5.916 1.228 1.275 0.9534 0.1423 0.9319 0.2377 bus 0.925 ly 0.4915	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576 9.21 3.878	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121 0.6297 0.2229  Median 0.93	Decision Equal Var Equal Var Equal Var Normal D Normal D Normal D Normal D	Significant  (a:1%)  iances iances iances istribution istribution istribution istribution  Max  0.95	Std Err 0.008165	1.76%	0.0%
Between Error Total Distributional Attribute Variances Variances Ustribution Distribution Distribution Distribution Distribution Distribution Distribution Extribution Distribution Distribution Distribution Distribution	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin D'Agostin Anderson  ate Summary  Control Type	quality ene Equ quality Vilk W ov-Smi o Skew o Kurto o-Pears -Darling Coun	0.9575 0.0020 of Variance nality of Varia of Variance Normality irnov D ness sis son K2 Omni g A2 Normali t Mean 0.93 0.9525	Test Stat 5.916 1.228 1.275 0.9534 0.1423 0.9319 0.2377 bus 0.925 ly 0.4915  95% LCL 0.904 0.9127	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576 9.21 3.878 95% UCL 0.956 0.9923	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121 0.6297 0.2229  Median 0.93 0.955	O.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D O.91 0.92	Significant  (a:1%) iances iances iances istribution istribution istribution istribution  Max  0.95  0.98	Std Err 0.008165 0.0125	1.76% 2.63%	0.0%
Between Error Total Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution Ertilization Ra C-µg/L 0 18 32	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin D'Agostin Anderson  ate Summary  Control Type	quality quality ene Equ quality Vilk W ov-Smi o Skew o Kurto o-Pears -Darling  Coun 1 4 4 4	0.9575 0.0020 of Variance nality of Variance Normality irnov D ness sis son K2 Omni g A2 Normali t Mean 0.93 0.9525 0.785	Test Stat 5.916 nce 1.228 1.275 0.9534 0.1423 0.9319 0.2377 bus 0.925 ly 0.4915  95% LCL 0.904 0.9127 0.7691	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576 9.21 3.878 95% UCL 0.956 0.9923 0.8009	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121 0.6297 0.2229  Median 0.93 0.955 0.79	O.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Ormal	Significant  (a:1%) iances iances iances istribution istribution istribution istribution  Max  0.95  0.98  0.79	Std Err 0.008165 0.0125 0.005	1.76% 2.63% 1.27%	-2.42% 15.59%
<del></del>	3.830179 0.0301608 3.86034  Tests  Test  Bartlett E  Mod Leve Levene E  Shapiro-V  Kolmogor D'Agostin D'Agostin D'Agostin Anderson  ate Summary  Control Type	quality ene Equ quality Vilk W ov-Smi o Skew o Kurto o-Pears -Darling Coun	0.9575 0.0020 of Variance nality of Varia of Variance Normality irnov D ness sis son K2 Omni g A2 Normali t Mean 0.93 0.9525	Test Stat 5.916 nce 1.228 1.275 0.9534 0.1423 0.9319 0.2377 bus 0.925 ly 0.4915  95% LCL 0.904 0.9127 0.7691	4 15 19 Critical 13.28 4.893 4.893 0.866 0.2235 2.576 2.576 9.21 3.878 95% UCL 0.956 0.9923	P-Value 0.2055 0.3405 0.3232 0.4210 0.3605 0.3514 0.8121 0.6297 0.2229  Median 0.93 0.955	O.0001  Decision Equal Var Equal Var Normal D Normal D Normal D Normal D Normal D O.91 0.92	Significant  (a:1%) iances iances iances istribution istribution istribution istribution  Max  0.95  0.98	Std Err 0.008165 0.0125	1.76% 2.63%	0.0%

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 13:08 (p 2 of 2)

Test Code:	URC013016   19-1929-7816
Aquatic B	ioassay & Consulting Labs, Inc.

Purple Sea U	rchin Sperm Cell Fe	rtilization Tes	t	Aquatic Bi	oassay & Consi
Analysis ID:	02-5665-8892	Endpoint:	Fertilization Rate	CETIS Version:	CETISv1.8.7
Analyzed:	03 Mar-16 8:19	Analysis:	Parametric-Control vs Treatments	Official Results:	Yes

C-μg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	4	1.304	1.253	1.356	1.303	1.266	1.345	0.01618	2.48%	0.0%
18		4	1.357	1.262	1.452	1.357	1.284	1.429	0.02998	4.42%	-4.03%
32		4	1.089	1.07	1.108	1.095	1.071	1.095	0.006036	1.11%	16.53%
56		4	0.5371	0.4676	0.6066	0.5519	0.476	0.5687	0.02185	8.14%	58.82%
100		4	0.2532	0.1611	0.3454	0.2671	0.1741	0.3047	0.02897	22.88%	80.58%
180		4	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.17%

#### Fertilization Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.91	0.93	0.95	0.93
18		0.96	0.98	0.95	0.92
32		0.77	0.79	0.79	0.79
56		0.26	0.29	0.29	0.21
100		0.06	0.08	0.09	0.03
180		0	0	0	0

### Angular (Corrected) Transformed Detail

C-μg/L	<b>Control Type</b>	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1.266	1.303	1.345	1.303
18		1.369	1.429	1.345	1.284
32		1.071	1.095	1.095	1.095
56		0.5351	0.5687	0.5687	0.476
100		0.2475	0.2868	0.3047	0.1741
180		0.05002	0.05002	0.05002	0.05002

### Fertilization Rate Binomials

000-055-186-4

C-µg/L	<b>Control Type</b>	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	91/100	93/100	95/100	93/100
18		96/100	98/100	95/100	92/100
32		77/100	79/100	79/100	79/100
56		26/100	29/100	29/100	21/100
100		6/100	8/100	9/100	3/100
180		0/100	0/100	0/100	0/100

Analyst: QA:

CETIS™ v1.8.7.11

Report Date: Test Code: 03 Mar-16 13:08 (p 1 of 2) URC013016 | 19-1929-7816

Purple Sea U	rchin Sperm Cell Fer	Aquatic Bi	oassay & Consulting Labs, Inc.		
Analysis ID:	06-9720-2779	Endpoint:	Fertilization Rate	CETIS Version:	CETISv1.8.7

Analyzed: 03 Mar-16 8:19 Analysis: Linear Interpolation (ICPIN) Official Results: Yes

Batch ID: 03-7479-0296 Test Type: Fertilization Analyst: EPA/600/R-95/136 (1995) Diluent: Laboratory Seawater Start Date: 30 Jan-16 15:10 Protocol: Not Applicable Ending Date: 30 Jan-16 15:50 Species: Strongylocentrotus purpuratus Brine: Source: David Gutoff Age: Duration: 40m

Sample ID: 08-6019-1671 Code: URC013016u Client: Internal Lab

Sample Date: 30 Jan-16 15:10 Material: Copper chloride Project:

Receive Date: Source: Reference Toxicant

Sample Age: NA Station: REF TOX

#### Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

#### Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.93	0.7 - NL	Yes	Passes Acceptability Criteria

#### Point Estimates

Level	µg/L	95% LCL	95% UC
EC5	22.22	21.59	22.8
EC10	26.43	25.24	27.6
EC15	30.65	28.96	32.4
EC20	33.47	32.45	34.39
EC25	35.63	34.62	36.57
EC40	42.12	41.09	43.17
EC50	46.44	45.22	47.82

Fertilization Rate Summary		Calculated Variate(A/B)									
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Negative Control	4	0.93	0.91	0.95	0.008165	0.01633	1.76%	0.0%	372	400
8		4	0.9525	0.92	0.98	0.0125	0.025	2.63%	-2.42%	381	400
2		4	0.785	0.77	0.79	0.005	0.01	1.27%	15.59%	314	400
6		4	0.2625	0.21	0.29	0.01887	0.03775	14.38%	71.77%	105	400
00		4	0.065	0.03	0.09	0.01323	0.02646	40.7%	93.01%	26	400
80		4	0	0	0	0	0		100.0%	0	400

### Fertilization Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.91	0.93	0.95	0.93
18		0.96	0.98	0.95	0.92
32		0.77	0.79	0.79	0.79
56		0.26	0.29	0.29	0.21
100		0.06	0.08	0.09	0.03
180		0	0	0	0

### Fertilization Rate Binomials

000-055-186-4

C-µg/L	<b>Control Type</b>	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	91/100	93/100	95/100	93/100
18		96/100	98/100	95/100	92/100
32		77/100	79/100	79/100	79/100
56		26/100	29/100	29/100	21/100
100		6/100	8/100	9/100	3/100
180		0/100	0/100	0/100	0/100

Analyst: M QA:

CETIS™ v1.8.7.11

Report Date:

03 Mar-16 13:08 (p 2 of 2)

Test Code:

URC013016 | 19-1929-7816

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analyzed:

Analysis ID: 06-9720-2779 03 Mar-16 8:19

Endpoint: Fertilization Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

# **CETIS Measurement Report**

Report Date: Test Code: 03 Mar-16 13:08 (p 1 of 2) URC013016 | 19-1929-7816

								16	est Code:	UK	20130101	19-1929-7010
Purple Sea U	Jrchin Sperm Ce	Fertili:	zation Test	t					Aquat	ic Bioassay &	Consultin	g Labs, Inc.
Batch ID: Start Date: Ending Date Duration:	03-7479-0296 30 Jan-16 15:5 30 Jan-16 15:5 40m	0 I	Test Type: Protocol: Species: Source:	Fertilization EPA/600/R Strongyloc David Guto	:-95/ entro	136 (1995) otus purpur	atus	Di Br		Laboratory Sea	awater	
Sample ID:	08-6019-1671 :: 30 Jan-16 15:1		Code: Material:	URC01301 Copper chl					ient: oject:	Internal Lab		
Receive Date			Source:	Reference				FI	oject.			
Sample Age:			Station:	REF TOX	IUX	carr						
Parameter A	cceptability Crite	eria					_					
Parameter		1	Min	Max	Acc	eptability	Limits	Overlap	Decisio	n		
Salinity-ppt			34		32 -			Yes	Results	Within Limits		
Temperature-	-°C		14.8	14.9	11 -	13		Yes	Results	Above Limit		
Dissolved Ox	xygen-mg/L						_					
C-µg/L	Control Type	Count	Mean	95% L	CL	95% UCL	Min	Max	Std Er	std Dev	CV%	QA Count
0	Negative Contr	2	6.4	3.859		8.941	6.2	6.6	0.2	0.2828	4.42%	0
18		2	6.6	4.059		9.141	6.4	6.8	0.2	0.2828	4.29%	0
32		2	6.45	4.544		8.356	6.3	6.6	0.15	0.2121	3.29%	0
56		2	6.45	3.273		9.627	6.2	6.7	0.25	0.3536	5.48%	0
100		2	6.45	2.003		10.9	6.1	6.8	0.35	0.495	7.67%	0
180		2	6.5	3.959		9.041	6.3	6.7	0.2	0.2828	4.35%	0
Overall		12	6.475				6.1	6.8				0 (0%)
pH-Units										_		
C-µg/L	Control Type	Count	Mean	95% L	CL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884		7.916	7.9	7.9	0	0	0.0%	0
18	_	2	7.9	7.884		7.916	7.9	7.9	0	0	0.0%	0
32		2	7.9	7.884		7.916	7.9	7.9	0	0	0.0%	0
56		2	7.9	7.884		7.916	7.9	7.9	0	0	0.0%	0
100		2	7.9	7.884		7.916	7.9	7.9	0	0	0.0%	0
180		2	7.9	7.884		7.916	7.9	7.9	0	0	0.0%	0
Overall		12	7.9				7.9	7.9				0 (0%)
Salinity-ppt												
C-µg/L	Control Type	Count	Mean	95% L	CL	95% UCL	Min	Max	Std Er	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34		34	34	34	0	0	0.0%	0
18		2	34	34		34	34	34	0	0	0.0%	0
32		2	34	34		34	34	34	0	0	0.0%	0
56		2	34	34		34	34	34	0	0	0.0%	0
100		2	34	34		34	34	34	0	0	0.0%	0
180		2	34	_ 34		34	34	34	0	0	0.0%	0
Overall		12	34				34	34				0 (0%)
Temperature												
C-µg/L	Control Type	Count	Mean_	95% L	CL_	95% UCL	Min	Max	Std Er		CV%	QA Count
0	Negative Contr	2	14.85	14.21		15.49	14.8	14.9	0.0500	4 0.07077	0.48%	0
18		2	14.85	14.21		15.49	14.8	14.9	0.0500	4 0.07077	0.48%	0
32		2	14.85	14.21		15.49	14.8	14.9	0.0500	4 0.07077	0.48%	0
56		2	14.85	14.21		15.49	14.8	14.9	0.0500		0.48%	0
100		2	14.85	14.21		15.49	14.8	14.9	0.0500		0.48%	0
180		2	14.85	14.21		15.49	14.8	14.9	0.0500	4 0.07077	0.48%	0

14.8

14.9

0 (0%)

14.85

Overall

# **CETIS Measurement Report**

CETIS M	easurement F	Report		Report Date: Test Code:	03 Mar-16 13:08 (p 2 of 2) URC013016   19-1929-7816
Purple Sea	Urchin Sperm Cel	l Fertiliza	tion Test	Aquatic Bi	oassay & Consulting Labs, Inc.
Dissolved (	Oxygen-mg/L				
C-µg/L	Control Type	1	2		
0	Negative Contr	6.6	6.2		
18		6.8	6.4		
32		6.6	6.3		
56		6.7	6.2		
100		6.8	6.1		
180		6.7	6.3		
pH-Units					
C-µg/L	Control Type	1	2		
0	Negative Contr	7.9	7.9		
18		7.9	7.9		
32		7.9	7.9		
56		7.9	7.9		
100		7.9	7.9		
180		7.9	7.9		
Salinity-ppt	t				,
C-µg/L	Control Type	1	2		
0	Negative Contr	34	34		
18	· ·	34	34		
32		34	34		
56		34	34		
100		34	34		
180		34	34		
Temperatui	re-°C				
C-µg/L	Control Type	1	2		
0	Negative Contr	14.9	14.8		
18	-	14.9	14.8		
32		14.9	14.8		
56		14.9	14.8		
100		14.9	14.8		
180		14.9	14.8		



March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136.* Results were as follows:

CLIENT: City of Malibu SAMPLE I.D.: 24-BB-03R DATE RECEIVED: 01/30/2016

ABC LAB. NO.: COM0116.219

### CHRONIC KELP GERMINATION & GROWTH BIOASSAY

GERMINATION NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 % EC50 = >100.00 %

GROWTH NOEC = 100.00 %

TUc = 1.00

IC25 = >100.00 %IC50 = >100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

## **CETIS Summary Report**

Report Date:

03 Mar-16 10:23 (p 1 of 2)

Test Code:

COM0116.219klp | 05-6869-6179

							1000 0000.	0011101110	5.2 TOMP   0	0 0000 017
Macrocystis (	Germination and	Germ Tube Gro	wth Test			Aquatic E	lioassay &	Consulting	g Labs, Inc.	
Batch ID: Start Date: Ending Date: Duration:	11-9831-0006 30 Jan-16 13:00 01 Feb-16 13:00 48h	Protocol:	Macrocystis	95/136 (1995)	llection			uent: Laboratory Seawater ne: Not Applicable		
-	19-7888-4798 30 Jan-16 10:30 30 Jan-16 12:15 2h		COM0116.2 Sample Wate Bioassay Re 24-BB-03R	er			Client: City Project: ASE	of Malibu 3S		
Comparison S	Summary									
Analysis ID	Endpoint	NOE	L LOEL	TOEL	PMSD	TU	Method			
19-3233-4902			>100	NA	1.29%	1		riance t Two-Sample Test		
17-6217-6370		100	>100	NA	1.06%	1		iance t Two		
Point Estimat	e Summary									
Analysis ID	Endpoint	Leve	el %	95% LCL	95% UCL	TU	Method			
11-1856-9860	Germination Rat	e EC5	>100	N/A	N/A	<1	Linear Inte	nterpolation (ICPIN)		
		EC1	0 >100	N/A	N/A	<1				
		EC1	5 >100	N/A	N/A	<1				
		EC2	0 >100	N/A	N/A	<1				
		EC2	5 >100	N/A	N/A	<1				
		EC4	0 >100	N/A	N/A	<1				
		EC5	0 >100	N/A	N/A	<1				
04-0833-9360	Mean Length	IC5	>100	N/A	N/A	<1	Linear Int	erpolation (I	CPIN)	
		IC10	>100	N/A	N/A	<1				
		IC15	>100	N/A	N/A	<1				
		IC20	>100	N/A	N/A	<1				
		IC25	>100	N/A	N/A	<1				
		IC40	>100	N/A	N/A	<1				
		IC50	>100	N/A	N/A	<1				
Test Acceptab	oility									
Analysis ID	Endpoint	Attri	bute	Test Stat	TAC Limi	its	Overlap	Decision		
1-1856-9860	Germination Rat	e Cont	rol Resp	0.911	0.7 - NL		Yes	Passes A	cceptability	/ Criteria
9-3233-4902	Germination Rat	e Cont	rol Resp	0.911	0.7 - NL		Yes	Passes A	cceptability	Criteria
4-0833-9360	Mean Length	Cont	rol Resp	14.42	10 - NL		Yes		cceptability	
7-6217-6370	Mean Length	Cont	rol Resp	14.42	10 - NL		Yes	Passes A	cceptability	/ Criteria
9-3233-4902	Germination Rate			0.01293	NL - 0.2		No		cceptability	
7-6217-6370	Mean Length	PMS	D	0.01061	NL - 0.2		No	Passes A	cceptability	Criteria
Germination F	Rate Summary									
		Count Mean				Max		Std Dev	CV%_	%Effec
) 100	Negative Control	10 0.91 10 0.91		0.9202 0.9304	0.89 0.9	0.93		0.01287 0.01595	1.41% 1.74%	0.0% -0.88%
						0.80				-0.0076
Mean Length	-	Count M	0.60/ 1.0	1 050/ 1101	Min	Mari	C+4 E	Ctd Day	CV9	0/ Effa-
		Count Mean				Max		Std Dev	CV%	%Effec
	Negative Control			14.58	14	14.7		0.23	1.6%	0.0%
100		10 14.5	5 14.44	14.66	14.4	14.9	0.05	0.1581	1.09%	-0.9%

Analyst: QA:

## **CETIS Summary Report**

Report Date:

03 Mar-16 10:23 (p 2 of 2)

Test Code:

COM0116.219klp | 05-6869-6179

Macrocy	stis Germination and	Germ Tu	be Growth	Test				Aquatic Bioassay & Consulting Labs, Inc.				
Germina	tion Rate Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
0	Negative Control	0.91	0.9	0.89	0.93	0.91	0.9	0.92	0.91	0.93	0.91	
100		0.9	0.93	0.91	0.95	0.93	0.92	0.91	0.93	0.91	0.9	
Mean Le	ngth Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
0	Negative Control	14	14.7	14.3	14.4	14.6	14.4	14.6	14.5	14.6	14.1	
100		14.4	14.4	14.5	14.5	14.9	14.6	14.5	14.4	14.6	14.7	
Germinat	tion Rate Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
0	Negative Control	91/100	90/100	89/100	93/100	91/100 -	90/100	92/100	91/100	93/100	91/100	
100		90/100	93/100	91/100	95/100	93/100	92/100	91/100	93/100	91/100	90/100	

Analyst: QA:

CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:23 (p 1 of 3)

Test Code:

COM0116.219klp | 05-6869-6179

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Macrocystis (	Germination and	Germ 1	ube Growth	Test				Aquatic E	Bioassay & C	onsulting	Labs, inc		
Analysis ID:	19-3233-4902		-	Bermination Ra	ermination Rate rrametric-Two Sample			CETIS Version: CETISv1.8.7					
Analyzed:	03 Mar-16 8:19						Official Results: Yes						
Batch ID:	11-9831-0006		-		owth-Germination			Analyst:					
Start Date:	30 Jan-16 13:00				PA/600/R-95/136 (1995)			Diluent: Laboratory Seawater					
Ending Date:			-	facrocystis py			Brine: Not Applicable						
Duration:	48h ————————		Source: A	quatic Bioass	ay Labs Col	ection ———	Age: 						
Sample ID:	19-7888-4798			OM0116.219k	(		Clier	-	of Malibu				
•	30 Jan-16 10:30			ample Water			Proje	ect: ASE	3S				
	: 30 Jan-16 12:1			lioassay Repo	rt								
Sample Age:	2h - <del></del>		Station: 2	4-BB-03R 									
Data Transfor		Zeta	Alt Hyp		Seed		PMSD_	Test Res					
Angular (Corre	ected)	NA	C > T	NA	NA		1.29%	Passes g	ermination ra	te	· ·		
Equal Variand	ce t Two-Sample	Test	•										
Control	vs C-%		Test Sta	at Critical	MSD DF	P-Value	P-Type	Decision	(α:5%)				
Negative Cont	rol 100		-1.247	1.734	0.021 18	0.8858	CDF	Non-Sign	ificant Effect		·		
Test Acceptal	bility Criteria												
Attribute	Test Stat	TAC L	imits	Overlap	Decision								
Control Resp	0.911	0.7 - N		Yes	Passes A	cceptability	Criteria						
PMSD	0.01293	NL - 0.	2	No	Passes A	cceptability	Criteria						
ANOVA Table	,				_								
Source	Sum Squa	ares	Mean S	guare	DF	F Stat	P-Value	Decision	(α:5%)				
Between	0.0011172	7231	1	1.555	0.2283		ificant Effect						
Error	0.0129299	83314	18										
Total	0.0140472	_			19	_							
Distributional	Tests												
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)					
Variances	Variance	Ratio F		1.759	6.541	0.4128	Equal Var						
Variances	Mod Leve	ne Equa	ality of Varian	ce 1.162	8.285	0.2953	Equal Var	riances					
<b>V</b> ariances	Levene E	quality o	of Variance	1.138	8.285	0.3002	Equal Var	riances					
Distribution	Shapiro-V	Vilk W N	lormality	0.9404	0.866	0.2442	Normal D	istribution					
Distribution	Kolmogor	ov-Smir	nov D	0.1474	0.2235	0.3067	Normal D	istribution					
Distribution	D'Agostin	o Skewr	ness	1.235	2.576	0.2169	Normal D	istribution					
Distribution	D'Agostin			0.2746	2.576	0.7836	Normal D						
Distribution	-		on K2 Omnib		9.21	0.4494	Normai D						
Distribution	Anderson	-Darling	A2 Normality	0.5033	3.878	0.2088	Normal D	istribution ————					
Germination F	Rate Summary												
C-%	Control Type	Count		95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	Negative Contro		0.911	0.9018	0.9202	0.91	0.89	0.93	0.004069	1.41%	0.0%		
100 —————		10	0.919	0.9076	0.9304	0.915	0.9	0.95	0.005044	1.74%	-0.88%		
Angular (Corr	ected) Transforr	ned Sur	mmary										
C-%	Control Type	Count		95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
)	Negative Contr	10	1.269	1.252	1.285	1.266	1.233	1.303	0.007216	1.8%	0.0%		
100		10	1.283	1.262	1.305	1.275	1.249	1.345	0.009571	2.36%	-1.18% 		
Germination F	Rate Detail												
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10		
C- <u>%</u>	<del> </del>												
C-% 0 100	Negative Contro	0.91	0.9 0.93	0.89 0.91	0.93 0.95	0.91 0.93	0.9 0.92	0.92 0.91	0.91 0.93	0.93 0.91	0.91 0.9		

Analyst:\_\_\_\_\_\_QA:\_\_\_\_

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:23 (p 2 of 3)

**Test Code:** COM0116.219klp | 05-6869-6179

										1 1 1		
Macrocystis	Germination and	Germ	Tube Grow	th Test		Aquatic Bioassay & Consulting Labs, Inc						
Analysis ID: Analyzed:	19-3233-4902 03 Mar-16 8:19		Endpoint: Analysis:	Germination Rate Parametric-Two Sample				CETIS Version: Official Results:		CETISv1.8.7 : Yes		
Angular (Cor	rected) Transform	ned De	tail								_	
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
0	Negative Control	1.266	1.249	1.233	1.303	1.266	1.249	1.284	1.266	1.303	1.266	
100		1.249	1.303	1.266	1.345	1.303	1.284	1.266	1.303	1.266	1.249	
Germination	Rate Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
0	Negative Control	91/10	0 90/100	0 89/100	93/100	91/100	90/100	92/100	91/100	93/100	91/100	
100		90/10	0 93/100	0 91/100	95/100	93/100	92/100	91/100	93/100	91/100	90/100	

Report Date:

03 Mar-16 10:23 (p 3 of 3)

Test Code:

COM0116.219klp | 05-6869-6179

							Test	Code:	COM0116	.219kip   0	5-6869-6179	
Macrocystis	Germination and	Germ Tu	be Growth T	est				Aquatic E	Bioassay & 0	Consulting	g Labs, Inc.	
Analysis ID:	17-6217-6370	En	dpoint: Me	an Length			CET	IS Version:	CETISv1	.8.7		
Analyzed:	03 Mar-16 8:19	An	alysis: Pa	rametric-Two	o Sample		Offic	ial Results	: Yes			
Batch ID:	11-9831-0006	Te	st Type: Gr	owth-Germin	nation		Ana	Analyst:				
Start Date:	30 Jan-16 13:00	) Pr	otocol: EP	A/600/R-95/	136 (1995)		Dilu	Diluent: Laboratory Seawater				
Ending Date:	: 01 Feb-16 13:0	0 Sp	ecies: Ma	crocystis py	rifera		Brine: Not Applicable					
Duration:	48h	So	urce: Aq	uatic Bioass	ay Labs Col	lection	Age:					
Sample ID:	19-7888-4798	Co	de: CC	M0116.219	k		Clie	nt: City	of Malibu			
Sample Date	: 30 Jan-16 10:30	O Ma	terial: Sa	mple Water			Proj	ect: ASI	3S			
Receive Date	e: 30 Jan-16 12:18	5 So	urce: Bio	assay Repo	rt							
Sample Age:	2h	Sta	ation: 24	-BB-03R								
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult			
Untransforme		NA	C > T	NA	NA		1.06%	Passes n	nean length			
Egual Varian	ice t Two-Sample	Test			<u> </u>							
Control	vs C-%		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	(α:5%)			
Negative Con			-1.473	1.734	0.153 18	0.9210	CDF		ificant Effect			
Test Accepta	bility Criteria				-							
Attribute	Test Stat	TAC Lim	its	Overlap	Decision							
Control Resp	14.42	10 - NL		Yes	Passes A	cceptability	Criteria					
PMSD	0.01061	NL - 0.2		No	Passes A	cceptability	Criteria					
ANOVA Table	e					_						
Source	Sum Squa	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision	(α:5%)			
Between	0.0844997	8	0.084499	78	1	2.17	0.1580	Non-Sign	ificant Effect			
Error	0.7010002		0.038944	45	18							
Total	0.7854999				19							
Distributiona	al Tests											
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)				
Variances	Variance	Ratio F		2.116	6.541	0.2796	Equal Va	rian <b>ce</b> s				
Variances			y of Variance		8.285	0.2334	Equal Va					
Variances	Levene E			1.391	8.285	0.2537	Equal Va					
Distribution	Shapiro-V		•	0.9755	0.866	0.8631		stribution				
Distribution	Kolmogor			0.1174	0.2235	0.7091	Normal D					
Distribution	*	o Skewne		0.5556	2.576	0.5785	Normal D					
Distribution	D'Agostin			0.3198	2.576	0.7491		stribution				
Distribution	-		K2 Omnibus		9.21	0.8142		istribution				
Distribution	Anderson	-Darling A	2 Normality	0.2755	3.878	0.6875	Normal D	istribution				
Mean Length	Summary											
C-%	Control Type	Count	Mean	95% LCL			Min	Max	Std Err	CV%	%Effect	
100	Negative Contro	I 10 10	14.42	14.26 14.44	14.58 14.66	14.45 14.5	14 14.4	14.7 14.9	0.07272 0.05	1.6% 1.09%	0.0% -0.9%	
100			14.55	14.44	14.00	14.5		14.5		1.0970	-0.970	
Mean Length		Day 4	Dog 0	Don 1	Day 4	Dow "	Don	Don 7	Don 9	Do: 0	Bon 40	
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8 14.5	Rep 9 14.6	Rep 10 14.1	
100	Negative Control		14.7	14.3	14.4 14.5	14.6 14.0	14.4 14.6	14.6 14.5			14.1	
100		14.4	14.4	14.5	14.5	14.9	14.6	14.5	14.4	14.6	14.7	

Analyst: QA:

<b>CETIS Analytical Repo</b>	rt
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Report Date:

03 Mar-16 10:23 (p 1 of 3)

Test Code:

COM0116.219klp | 05-6869-6179

									est Code.		0.2.0	J-0009-0179
Macro	cystis C	Germination and	Germ Tub	e Grow	rth Test				Aqua	tic Bioassay &	Consulting	Labs, Inc.
Analys Analyz		11-1856-9860 03 Mar-16 8:19		point: lysis:	Germination Ra		)		ETIS Vers		1.8.7	
Batch		11-9831-0006			Growth-Germin				nalyst:			
Start D		30 Jan-16 13:00		ocol:	EPA/600/R-95/	, ,			iluent:	Laboratory Sea	awater	
Ending		01 Feb-16 13:0	_	cies:	Macrocystis py				Brine:	Not Applicable		
Duratio	on:	48h	Sou 	rce:	Aquatic Bioass	ay Labs Col ——	lection		.ge: 			
Sampl		19-7888-4798	Cod	e:	COM0116.219	(			lient:	City of Malibu		
-		30 Jan-16 10:30		erial:	Sample Water			P	roject:	ASBS		
		30 Jan-16 12:1			Bioassay Repo	rt						
Sampl	e Age:	2h	Stat	ion:	24-BB-03R							
Linear	Interpo	lation Options										
X Tran	sform	Y Transform	See	d	Resamples	Exp 95%	CL_ Me	thod				
Linear		Linear	0		280	Yes	Two	o-Point Int	terpolation			
Test A	cceptab	oility Criteria										
Attribu	ite	Test Stat	TAC Limit	:s	Overlap	Decision						
Control	Resp	0.911	0.7 - NL		Yes	Passes A	cceptabilit	y Criteria				
Point E	Eștimat							_				
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
EC5	>100	N/A	N/A	<1	NA	NA						
EC10	>100	N/A	N/A	<1	NA	NA						
EC15	>100	N/A	N/A	<1	NA	NA						
EC20	>100	N/A	N/A	<1	NA	NA						
EC25	>100	N/A	N/A	<1	NA	NA						
EC40	>100	N/A	N/A	<1	NA	NA						
EC50	>100	N/A	N/A	<1	NA ————————————————————————————————————	NA 						
Germin	nation F	Rate Summary				Calcu	lated Vari	iate(A/B)				
C-%	С	ontrol Type	Count	Mean	Min	Max	Std Err	Std D	ev CV%	%Effect	Α	В
0	N	egative Control	10	0.911	0.89	0.93	0.00406	9 0.0128	37 1.41%	6 0.0%	911	1000
100			10	0.919	0.9	0.95	0.00504	4 0.0159	95 1.74%	% -0.88%	919	1000
Germin	nation F	Rate Detail										
C-%	С	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep	7 Rep 8	Rep 9	Rep 10
0	N	egative Control	0.91	0.9	0.89	0.93	0.91	0.9	0.92	0.91	0.93	0.91
100			0.9	0.93	0.91	0.95	0.93	0.92	0.91	0.93	0.91	0.9
Germin	nation F	Rate Binomials										
C-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep	7 Rep 8	Rep 9	Rep 10
0		Negative Contro		90/10		93/100	91/100	90/100			93/100	91/100
100		•	90/100	93/10		95/100	93/100	92/100			91/100	90/100

Analyst: DQA:

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:23 (p 2 of 3)

Test Code:

COM0116.219klp | 05-6869-6179

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

11-1856-9860 03 Mar-16 8:19

Endpoint: Germination Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

0 E T 10		
CETIS	Analytical	Report

Report Date:

03 Mar-16 10:23 (p 3 of 3)

Test Code:

COM0116.219klp | 05-6869-6179

									lest Code:		COMOTTO	1.219KIP   U	5-6869-6179
Macro	cystis G	ermination and	Germ Tub	e Grow	th Test				Aqua	itic Bio	oassay &	Consulting	J Labs, Inc.
Analys	is ID:	04-0833-9360	End	point:	Mean Length				CETIS Vers	sion:	CETISv1	.8.7	
Analyz		03 Mar-16 8:19		lysis:	Linear Interpola	tion (ICPIN	)	(	Official Re	sults:	Yes		
Batch	ID:	11-9831-0006	Test	Type:	Growth-Germin	ation			Analyst:				
Start D	ate:	30 Jan-16 13:0	0 Prot	ocol:	EPA/600/R-95/	136 (1995)		1	Diluent:	Labor	ratory Sea	water	
Ending	g Date:	01 Feb-16 13:0	0 Spe	cies:	Macrocystis pyr	rifera		Ŧ	Brine:	Not A	pplicable		
Duratio	on:	48h	Sou	rce:	Aquatic Bioassa	ay Labs Col	llection	,	Age:				
Sampl	e ID:	19-7888-4798	Cod	e:	COM0116.219k	(		(	Client:		of Malibu		
Sample	e Date:	30 Jan-16 10:3	0 Mate	erial:	Sample Water			F	Project:	ASBS	3		
Receiv	e Date:	30 Jan-16 12:1	5 <b>Sou</b>	rce:	Bioassay Repo	rt							
Sampl	e Age:	2h	Stat	ion:	24-BB-03R								_
Linear	Interpo	lation Options											
X Tran	sform	Y Transform	n See	d	Resamples	Exp 95%	CL Me	ethod					
Linear		Linear	2007	7649	280	Yes	Tν	vo-Point In	terpolation				
Test A	cceptab	ility Criteria											
Attribu	ite	Test Stat	TAC Limit	s	Overlap	Decision							
Control	Resp	14.42	10 - NL		Yes	Passes A	cceptabili	ty Criteria					
Point E	Estimate	es											
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL							
IC5	>100	N/A	N/A	<1	NA	NA							
IC10	>100	N/A	N/A	<1	NA	NA							
IC15	>100	N/A	N/A	<1	NA	NA							
IC20	>100	N/A	N/A	<1	NA	NA							
IC25	>100	N/A	N/A	<1	NA	NA							
IC40	>100	N/A	N/A	<1	NA	NA							
IC50	>100	N/A	N/A	<1	NA	NA							
Mean L	_ength \$	Summary				Ca	Iculated \	Variate					
C-%	C	ontrol Type	Count	Mean	Min	Max	Std Err				%Effect		
0	N	egative Control	10	14.42	14	14.7	0.07272	2 0.23	1.6%	)	0.0%		
100			10	14.55	14.4	14.9	0.05	0.158	1 1.09	%	-0.9%		
Mean L	_ength [	Detail							· · · · · · · · · · · · · · · · · · ·				
C-%	С	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	S Rep	7	Rep 8	Rep 9	Rep 10
0	N	egative Control	14	14.7	14.3	14.4	14.6	14.4	14.6		14.5	14.6	14.1
100			14.4	14.4	14.5	14.5	14.9	14.6	14.5		14.4	14.6	14.7

Analyst: QA: P

000-055-186-4 CETIS™ v1.8.7.11

# **CETIS Measurement Report**

Report Date:

03 Mar-16 10:23 (p 1 of 1)

Test Code:

COM0116.219klp | 05-6869-6179

Macrocystis (	Germination and	d Germ	Tube Grow	th Test				Aquatic	Bioassay &	Consultin	g Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	11-9831-0006 30 Jan-16 13:0 01 Feb-16 13:0 48h		Test Type: Protocol: Species: Source:	Growth-Germination EPA/600/R-95/136 (1995) Macrocystis pyrifera Aquatic Bioassay Labs Collection					boratory Sea ot Applicable		
•	19-7888-4798 30 Jan-16 10:3 30 Jan-16 12:1 2h		Code: Material: Source: Station:	COM0116.219k Sample Water Bioassay Report 24-BB-03R					ty of Malibu		
Dissolved Ox	ygen-mg/L										
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.4	3.859	8.941	6.2	6.6	0.2	0.2828	4.42%	0
100		2	6.45	4.544	8.356	6.3	6.6	0.15	0.2121	3.29%	0 (0%)
Overall		4	6.425			6.2	6.6				U (U%)
pH-Units											
C-%	Control Type	Coun		95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0 100	Negative Contr		7.9	7.884	7.916	7.9	7.9	0 0.05001	0 0.07073	0.0% 0.88%	0 0
Overall		4	8.05 7.975	7.415	8.685	7.9	8.1 8.1	0.05001	0.07073	0.0070	0 (0%)
			7.070			7.0					
Salinity-ppt	0 ( 17	•		0.50/ 1.01	0.50/ 1101			044.5	Otal Davi	C) /0/	04.0
<u>C-%</u>	Control Type Negative Contr	Coun 2	t Mean 34	95% LCL 34	95% UCL 34	Min	<u>Max</u> 34	Std Err 0	Std Dev 0	0.0%	QA Count
100	Negative Conti	2	34	34	34	34	34	0	0	0.0%	0
Overall		4	34			34	34				0 (0%)
Temperature-	.°C			_							
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr		14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		4	14.85			14.8	14.9				0 (0%)
Dissolved Ox	ygen-mg/L										
C-%	Control Type	1	2								
0	Negative Contr	6.6	6.2								
100		6.6	6.3								
pH-Units											
C-%	Control Type	1	2								
0	Negative Contr	7.9	7.9								
100		8.1	8								
Salinity-ppt											
C-%	Control Type	1	2								
0	Negative Contr	34	34								
100		34	34								
Temperature-											
C-%	Control Type	1	2								
0	Negative Contr	14.9	14.8								
100		14.9	14.8								



### CHRONIC KELP GERMINATION & GROWTH BIOASSAY

DATE:

January 30, 2016

STANDARD TOXICANT: Copper Chloride

ENDPOINT:

**GERMINATION** 

NOEC =

32.0 ug/l

EC25 =

109.5 ug/l

EC50 =

154.0 ug/l

ENDPOINT:

**GROWTH-LENGTH** 

NOEC =

32.0 ug/l

IC25 =

92.37 ug/l

IC50 =

212.9 ug/l

Yours very truly,

Scott Johnson

Laboratory Director

# **CETIS Summary Report**

15-2841-7232 Mean Length

Report Date: Test Code:

03 Mar-16 13:08 (p 1 of 2) KLP013016 | 15-3205-1944

							Test Code:	KLP013016   15-3205-194
Macrocystis G	ermination and Ger	m Tube Grow	th Test				Aquatic B	ioassay & Consulting Labs, Inc
Batch ID: Start Date: Ending Date: Duration:	12-6412-6186 30 Jan-16 00:01 01 Feb-16 00:01 48h	Test Type: Protocol: Species: Source:	Growth-Germ EPA/600/R-99 Macrocystis p David Gutoff	5/136 (1995)		_		oratory Seawater Applicable
Sample ID: Sample Date: Receive Date: Sample Age:	01-4313-1739 30 Jan-16 1m	Code: Material: Source: Station:	KLP013016k Copper chloric Reference To REF TOX				Client: Inter Project:	rnal Lab
Comparison S	ummary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method	
19-8846-5278 15-2841-7232	Germination Rate Mean Length	32 32	100 100	56.57 56.57	4.98% 2.75%			lultiple Comparison Test lultiple Comparison Test
Point Estimate	Summary							
Analysis ID	Endpoint	Level	μg/L	95% LCL	95% UCL	TU	Method	
20-5784-4435 02-6683-0227	Germination Rate  Mean Length	EC5 EC10 EC15 EC20 EC25 EC40 EC50 IC5 IC10	83.61 100.6 109.5 136.2	39.42 55.03 69.05 83.31 99.11 127.2 142.5 39.66 52.01 63.84	54.29 76.59 102.2 109.7 118.8 148.6 169.6 44.72 57.44 70.23			erpolation (ICPIN)
Test Acceptab		IC20 IC25 IC40 IC50	80.3 92.37 191.5 212.9	75.8 87.56 184.1 206.8	82.98 95.72 198.6 218.9			
Analysis ID	Endpoint	Attrib	ute	Test Stat	TAC Limi	ts	Overlap	Decision
19-8846-5278 20-5784-4435 02-6683-0227 15-2841-7232	Germination Rate Germination Rate Mean Length Mean Length	Contro Contro Contro	ol Resp ol Resp ol Resp ol Resp	0.92 0.92 14.5 14.5	0.7 - NL 0.7 - NL 10 - NL 10 - NL		Yes Yes Yes Yes	Passes Acceptability Criteria Passes Acceptability Criteria Passes Acceptability Criteria Passes Acceptability Criteria
15-2841-7232 19-8846-5278	Mean Length Germination Rate	NOEL PMSE		32 0.04976	NL - 35 NL - 0.2		No No	Passes Acceptability Criteria Passes Acceptability Criteria

0.0275 NL - 0.2

Analyst: QA:

Passes Acceptability Criteria

No

000-055-186-6 CETIS™ v1.8.7.11

PMSD

Report Date:

03 Mar-16 13:08 (p 2 of 2)

CE HS S	E 118 Summary Report								Test Code: KLP013016   15-3205					
Macrocyst	is Germination and	Germ Tu	be Growth	Test			Aquatic Bioassay & Consulting Labs, Inc.							
Germinatio	on Rate Summary													
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect			
0	Negative Contro	5	0.92	0.9076	0.9324	0.91	0.93	0.004472	0.01	1.09%	0.0%			
5.6		5	0.934	0.9083	0.9597	0.91	0.96	0.009274	0.02074	2.22%	-1.52%			
10		5	0.94	0.9109	0.9691	0.91	0.96	0.01049	0.02345	2.5%	-2.17%			
18		5	0.928	0.8997	0.9563	0.9	0.95	0.0102	0.0228	2.46%	-0.87%			
32		5	0.93	0.9037	0.9563	0.9	0.95	0.009487	0.02121	2.28%	-1.09%			
100		5	0.748	0.6958	0.8002	0.7	8.0	0.01881	0.04207	5.63%	18.7%			
180		5	0.33	0.2322	0.4278	0.26	0.44	0.03521	0.07874	23.86%	64.13%			
320		5	0	0	0	0	0	0	0	_	100.0%			
Mean Leng	gth Summary													
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL		Max	Std Err	Std Dev	CV%	%Effect			
0	Negative Control	15	14.5	14.16	14.84	14.1	14.8	0.1225	0.2739	1.89%	0.0%			
5.6		5	14.46	14.22	14.7	14.2	14.7	0.08718	0.1949	1.35%	0.28%			
10		5	14.58	14.3	14.86	14.3	14.9	0.102	0.228	1.56%	-0.55%			
18		5	14.52	14.25	14.79	14.2	14.7	0.09695	0.2168	1.49%	-0.14%			
32		5	14.6	14.4	14.8	14.4	14.8	0.07071	0.1581	1.08%	-0.69%			
100		5	10.44	10.2	10.68	10.2	10.7	0.08718	0.1949	1.87%	28.0%			
180		5	9.5	8.938	10.06	9	10.1	0.2025	0.4528	4.77%	34.48%			
320		5	0	0	0	0	0	0	0		100.0%			
Germinatio	on Rate Detail													
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5								
0	Negative Control		0.92	0.93	0.93	0.91								
5.6		0.96	0.95	0.93	0.92	0.91								
10		0.96	0.92	0.95	0.96	0.91								
18		0.93	0.95	0.9	0.91	0.95								
32		0.95	0.9	0.92	0.95	0.93								
100		0.77	8.0	0.76	0.7	0.71								
180		0.26	0.31	0.38	0.44	0.26								
320		0	0	0	0	0								
Mean Leng	ıth Detail													
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5								
0	Negative Control	14.7	14.5	14.8	14.4	14.1								
5.6		14.2	14.7	14.4	14.4	14.6								
10		14.5	14.3	14.9	14.5	14.7								
18		14.7	14.2	14.6	14.7	14.4								
32		14.4	14.8	14.7	14.6	14.5								
100		10.5	10.5	10.3	10.7	10.2								
180		9.1	9.6	9	10.1	9.7								
320		0	0	0	0	0								
Germinatio	on Rate Binomials										_			
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5								
0	Negative Control		92/100	93/100	93/100	91/100								
5.6	•	96/100	95/100	93/100	92/100	91/100								
10		96/100	92/100	95/100	96/100	91/100								
18		93/100	95/100	90/100	91/100	95/100								
32		95/100	90/100	92/100	95/100	93/100								
100		77/100	80/100	76/100	70/100	71/100								

31/100

0/100

38/100

0/100

44/100

0/100

26/100

0/100

26/100

0/100

180

320

Report Date: Test Code: 03 Mar-16 13:07 (p 1 of 4) KLP013016 | 15-3205-1944

							Test	Code:	KLP	013016   1	5-3205-194			
Macrocystis C	Germination and	Germ	Tube Growt	h Test				Aquatic	Bioassay & C	Consulting	Labs, Inc			
Analysis ID:	19-8846-5278		Endpoint:	Germination Ra	ate		CET	IS Version	: CETISv1.	8.7				
Analyzed:	03 Mar-16 8:18		Analysis:	Parametric-Cor	ntrol vs Trea	itments	Offic	cial Result	s: Yes					
Batch ID:	12-6412-6186		Test Type:	Growth-Germin	ation		Ana	Analyst:						
Start Date:	30 Jan-16 00:0	1	Protocol:	EPA/600/R-95/	PA/600/R-95/136 (1995)				Diluent: Laboratory Seawater					
Ending Date:	01 Feb-16 00:0	1	Species:	Macrocystis pyr	rifera		Brine: Not Applicable							
Duration:	48h		Source:	David Gutoff			Age	:						
Sample ID:	01-4313-1739			KLP013016k			Clie		ernal Lab					
Sample Date:				Copper chloride			Proj	ect:						
Receive Date:				Reference Toxi	cant									
Sample Age:	1m		Station:	REF TOX										
Data Transfor	m	Zeta	Alt Hy		Seed		PMSD	NOEL	LOEL	TOEL	TU			
Angular (Corre	cted)	NA	C > T	NA	NA		4.98%	32 	100	56.57				
Dunnett Multi	ple Comparison	Test												
Control	vs C-μg/L		Test St			P-Value	P-Type	Decision	<del></del>					
Negative Contr	rol 5.6		-0.9198		0.076 8	0.9844	CDF		nificant Effect					
	10		-1.339	2.407	0.076 8	0.9957	CDF	-	nificant Effect					
	18		-0.5461		0.076 8	0.9572	CDF	-	nificant Effect					
	32		-0.6594		0.076 8	0.9680	CDF	-	nificant Effect					
	100*		7.534	2.407	0.076 8	<0.0001	CDF	Significa						
	180* 		21.3	2.407	0.076 8	<0.0001	CDF	Significa	nt Effect					
Test Acceptab	oility Criteria													
Attribu <u>te</u>	Test Stat			Overlap	Decision									
Control Resp 0.92 0.7 - NL			Yes		cceptability									
PMSD	0.04976	NL - 0	).2 	No	Passes A	cceptability	Criteria							
ANOVA Table														
Source	Sum Squa	ires	Mean S	Square	DF	F Stat	P-Value	Decision	η(α:5%)					
Between	2.114767		0.3524		6	140.7	<0.0001	Significa	nt Effect					
Error	0.0701508	4	0.0025	05387	28									
Total ————	2.184918 ——————				34									
Distributional	Tests													
Attribute	Test			Test Stat		P-Value	Decision							
Variances			of Variance	7.398	16.81	0.2856	Equal Va							
Variances			ality of Varia		3.812	0.0423	Equal Va							
Variances			of Variance	2.84	3.528	0.0275	Equal Va							
Distribution	Shapiro-V			0.964	0.9146	0.3001		istribution						
Distribution	Kolmogor			0.09613	0.1723	0.5558	Normal D	istribution						
Distribution	D'Agostin			0.5984	2.576	0.5496								
Distribution Distribution	D'Agostin		ısıs son K2 Omnil	0.4408	2.576 9.21	0.6594 0.7587	Normal D Normal D							
Distribution	-		g A2 Normalit		3.878	0.7367	Normal D							
	Rate Summary													
	Control Type	Coun	t Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect			
	Negative Control		0.92	0.9076	0.9324	0.92	0.91	0.93	0.004472	1.09%	0.0%			
5.6		5	0.934	0.9083	0.9597	0.93	0.91	0.96	0.009274	2.22%	-1.52%			
10		5	0.94	0.9109	0.9691	0.95	0.91	0.96	0.01049	2.5%	-2.17%			
18		5	0.928	0.8997	0.9563	0.93	0.9	0.95	0.0102	2.46%	-0.87%			
32		5	0.93	0.9037	0.9563	0.93	0.9	0.95	0.009487	2.28%	-1.09%			
100		5	0.748	0.6958	0.8002	0.76	0.7	0.8	0.01881	5.63%	18.7%			
180		5	0.33	0.2322	0.4278	0.31	0.26	0.44	0.03521	23.86%	64.13%			
320		5	0	0	0	0	0	0	0		100.0%			

Report Date:

1.345

1.107

0.7253

0.05002

0.01846

0.02173

0.0373

3.16%

4.65%

13.67%

0.0%

-1.63%

18.57%

52.51%

96.11%

03 Mar-16 13:07 (p 2 of 4)

Test Code: KLP013016 | 15-3205-1944 Macrocystis Germination and Germ Tube Growth Test Aquatic Bioassay & Consulting Labs, Inc. 19-8846-5278 Analysis ID: Endpoint: Germination Rate CETIS Version: CETISv1.8.7 Analyzed: 03 Mar-16 8:18 Analysis: Parametric-Control vs Treatments Official Results: Yes Angular (Corrected) Transformed Summary Control Type Count 95% LCL 95% UCL Median Min Std Err CV% %Effect Mean Max 0 **Negative Contr** 5 1.284 1.262 1.307 1.284 1.266 1.303 0.008258 1.44% 0.0% 5.6 5 -2.27% 1.314 1.26 1.367 1.303 1.266 1.369 0.01919 3.27% 10 5 1.327 1.266 -3.3% 1.387 1.345 1.266 1.369 0.02178 3.67% 18 5 1.302 1.247 1.357 1.303 1.249 1.345 0.0198 3.4% -1.35%

1.357

1.106

0.7136

0.05003

1.303

1.059

0.5905

0.05002

1.249

0.9912

0.5351

0.05002

Germination	Rate	Detail

32

100

180

320

C-µg/L	<b>Control Type</b>	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.91	0.92	0.93	0.93	0.91
5.6		0.96	0.95	0.93	0.92	0.91
10		0.96	0.92	0.95	0.96	0.91
18		0.93	0.95	0.9	0.91	0.95
32		0.95	0.9	0.92	0.95	0.93
100		0.77	8.0	0.76	0.7	0.71
180		0.26	0.31	0.38	0.44	0.26
320		0	0	0	0	0

#### Angular (Corrected) Transformed Detail

5

5

5

5

1.305

1.046

0.61

0.05002

1.254

0.9856

0.5064

0.05001

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	I 1.266	1.284	1.303	1.303	1.266
5.6		1.369	1.345	1.303	1.284	1.266
10		1.369	1.284	1.345	1.369	1.266
18		1.303	1.345	1.249	1.266	1.345
32		1.345	1.249	1.284	1.345	1.303
100		1.071	1.107	1.059	0.9912	1.002
180		0.5351	0.5905	0.6642	0.7253	0.5351
320		0.05002	0.05002	0.05002	0.05002	0.05002

### **Germination Rate Binomials**

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	91/100	92/100	93/100	93/100	91/100
5.6		96/100	95/100	93/100	92/100	91/100
10		96/100	92/100	95/100	96/100	91/100
18		93/100	95/100	90/100	91/100	95/100
32		95/100	90/100	92/100	95/100	93/100
100		77/100	80/100	76/100	70/100	71/100
180		26/100	31/100	38/100	44/100	26/100
320		0/100	0/100	0/100	0/100	0/100

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

Report Date: Test Code: 03 Mar-16 13:07 (p 3 of 4) KLP013016 I 15-3205-1944

	.,								Test	Code:	KLP	013016   1	5-3205-194
Macrocystis G	ermi	nation and	Germ	Tube G	rowth T	est				Aquatic	Bioassay & 0	Consulting	g Labs, Inc
Analysis ID:	15-2	2841-7232		Endpoi	nt: Mea	an Length			CET	IS Version	: CETISv1	.8.7	
Analyzed:		Mar-16 8:18		Analysi		_	ntrol vs Trea	tments		ial Result			
Batch ID:	12-6	3412-6186		Test Tv	ne: Gro	wth-Germin	ation		Anal	vst:			
Start Date:		an-16 00:01		Protoco		4/600/R-95/			Dilu	-	boratory Seav	water	
		eb-16 00:01		Species		crocystis py	, ,		Brin		t Applicable		
Duration:	48h			Source:		id Gutoff			Age		,,		
Sample ID:	01-4	313-1739		Code:	KLF	P013016k			Clie	nt: Inte	ernal Lab	_	
Sample Date:				Materia	I: Cor	per chloride	e		Proj	ect:			
Receive Date:				Source		erence Toxi							
Sample Age:	1m			Station:	REI	F TOX							
Data Transforr	n		Zeta	AI	t Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Untransformed			NA		> T	NA	NA		2.75%	32	100	56.57	
Dunnett Multip	ole C	omparison	Test										
Control	vs	C-μg/L		Te	st Stat	Critical	MSD DF	P-Value	P-Type	Decision	n(α:5%)		
Negative Contro		5.6			2415	2.407	0.399 8	0.7816	CDF		nificant Effect		
. regulare comm	•	10			.483	2.407	0.399 8	0.9499	CDF		nificant Effect		
		18			.1208	2.407	0.399 8	0.8873	CDF	-	nificant Effect		
		32			.6038	2.407	0.399 8	0.9630	CDF	_	nificant Effect		
		100*			.51	2.407	0.399 8	< 0.0001	CDF	Significa			
		180*			.19	2.407	0.399 8	<0.0001	CDF	Significa			
Test Acceptab	ility (	Criteria				_							_
Attribute		Test Stat	TAC	Limits		Overlap	Decision						
Control Resp		14.5	10 - 1	NL		Yes	Passes A	cceptability	Criteria		_		
NOEL		32	NL -	35		No	Passes A	cceptability	Criteria				
PMSD		0.0275	NL -	0.2		No	Passes A	cceptability	Criteria				
ANOVA Table													
Source		Sum Squa	res_	M	ean Squ	ıare	DF	F Stat_	P-Value	Decision	<del></del>		
Between		150.9314		25	.15524		6	366.8	< 0.0001	Significa	nt Effect		
Error		1.92		0.0	0685714	13	34						
Total		152.8514											
Distributional '	Test												
Attribute		Test	u = 121.	06 \ /==!=		Test Stat		P-Value	Decision				
Variances		Bartlett Ed				6.06	16.81	0.4165	Equal Va				
Variances		Mod Leve		•			3.812	0.1802	Equal Va				
Variances		Levene Ed				1.889	3.528	0.1180	Equal Va				
Distribution		Shapiro-W			У	0.983	0.9146	0.8507		istribution istribution			
Distribution		Kolmogor				0.08538	0.1723	0.7645					
Distribution		D'Agostino				0.0297	2.576	0.9763	Normal D Normal D				
Distribution		D'Agostino			)mnihua	0.3216	2.576	0.7478		istribution			
Distribution Distribution		D'Agostino Anderson-				0.1043 0.2639	9.21 3.878	0.9492 0.7253		istribution			
	2			.9 , 12 1401									
Mean Length S		-	Ca	nt BA	oon	05%   01	05% 1101	Madian	Min	May	Std Err	CV%	%Effec
		rol Type itive Control	Cour	14	ean	95% LCL 14.16	95% UCL 14.84	Median 14.5	Min	Max 14.8	0.1225	1.89%	0.0%
5.6	ivega		5		.46	14.10	14.04	14.5	14.1	14.7	0.08718	1.35%	0.28%
						14.22			14.2	14.7	0.102	1.56%	-0.55%
10 10			5		.58		14.86	14.5 14.6	14.3	14.9	0.102	1.49%	-0.33%
18 32			5	14	.52	14.25 14.4	14.79 14.8	14.6 14.6	14.4	14.7	0.09695	1.49%	-0.14%
32			5	14		14.4	14.8	10.5	14.4	14.0	0.07071	1.00%	28.0%

Analyst: QA:

1.87%

4.77%

28.0%

34.48%

100.0%

0.08718

0.2025

10.7

10.1

0

10.44

9.5

0

10.2

8.938

0

10.68

10.06

0

10.5

9.6

10.2

9

0

5

5

5

100

180

320

Report Date: Test Code:

03 Mar-16 13:07 (p 4 of 4)

KLP013016 | 15-3205-1944

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

15-2841-7232 03 Mar-16 8:18 Endpoint: Mean Length

Analysis: Parametric-Control vs Treatments

CETIS Version: Official Results: Yes

CETISv1.8.7

Mean Length Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	Negative Contro	1 14.7	14.5	14.8	14.4	14.1	
5.6		14.2	14.7	14.4	14.4	14.6	
10		14.5	14.3	14.9	14.5	14.7	
18		14.7	14.2	1 <b>4</b> .6	14.7	14.4	
32		14.4	14.8	14.7	14.6	14.5	
100		10.5	10.5	10.3	10.7	10.2	
180		9.1	9.6	9	10.1	9.7	
320		0	0	0	0	0	

Report Date:

03 Mar-16 13:08 (p 1 of 4) KLP013016 L15-3205-1944

Macrocystis Germination and Germ Tube Growth Test  Aquatic Bioassay & Aquatic Bioassay & Analysis ID: 20-5784-4435	v1.8.7	ing Labs, Inc
Analyzed: 03 Mar-16 8:18 Analysis: Linear Interpolation (ICPIN) Official Results: Yes	<del>_</del>	
Analyzed: 03 Mar-16 8:18 Analysis: Linear Interpolation (ICPIN) Official Results: Yes	eawater	
Ratch ID: 12-6412-6186 Test Type: Growth-Germination Analysts	eawater	
Batch 10. 12-0412-0100 Test type. Glowth-Gennination Analyst.	eawater	
Start Date: 30 Jan-16 00:01 Protocol: EPA/600/R-95/136 (1995) Diluent: Laboratory Se		
Ending Date: 01 Feb-16 00:01 Species: Macrocystis pyrifera Brine: Not Applicable	e	
Duration: 48h Source: David Gutoff Age:		
Sample ID: 01-4313-1739 Code: KLP013016k Client: Internal Lab		
Sample Date: 30 Jan-16 Material: Copper chloride Project:		
Receive Date: Source: Reference Toxicant		
Sample Age: 1m Station: REF TOX		
Linear Interpolation Options		
X Transform Y Transform Seed Resamples Exp 95% CL Method		
Linear Linear 0 280 Yes Two-Point Interpolation		
Test Acceptability Criteria		
Attribute Test Stat TAC Limits Overlap Decision		
Control Resp 0.92 0.7 - NL Yes Passes Acceptability Criteria		
Point Estimates		
Level μg/L 95% LCL 95% UCL		
EC5 48.62 39.42 54.29		
EC10 66.11 55.03 76.59		
EC15 83.61 69.05 102.2		
EC20 100.6 83.31 109.7		
EC25 109.5 99.11 118.8		
EC40 136.2 127.2 148.6		
EC50 154 142.5 169.6		
Germination Rate Summary Calculated Variate(A/B)	_	
C-µg/L Control Type Count Mean Min Max Std Err Std Dev CV% %Effec	t A	В
0 Negative Control 5 0.92 0.91 0.93 0.004472 0.009999 1.09% 0.0%	460	500
5 0.934 0.91 0.96 0.009274 0.02074 2.22% -1.52%		500
10 5 0.94 0.91 0.96 0.01049 0.02345 2.5% -2.17%	470	500
18 5 0.928 0.9 0.95 0.0102 0.0228 2.46% -0.87%	464	500
5 0.93 0.9 0.95 0.009487 0.02121 2.28% -1.09%	465	500
100         5         0.748         0.7         0.8         0.01881         0.04207         5.63%         18.7%	374	500
180 5 0.33 0.26 0.44 0.03521 0.07874 23.86% 64.13%		500
5 0 0 0 0 0 100.0%	0	500
Germination Rate Detail		
C-µg/L Control Type Rep 1 Rep 2 Rep 3 Rep 4 Rep 5		

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.91	0.92	0.93	0.93	0.91
5.6		0.96	0.95	0.93	0.92	0.91
10		0.96	0.92	0.95	0.96	0.91
18		0.93	0.95	0.9	0.91	0.95
32		0.95	0.9	0.92	0.95	0.93
100		0.77	8.0	0.76	0.7	0.71
180		0.26	0.31	0.38	0.44	0.26
320		0	0	0	0	0

Analyst: QA: V

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 13:08 (p 2 of 4)

Test Code:

KLP013016 | 15-3205-1944

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID:

20-5784-4435

Endpoint: Germination Rate

CETIS Version: CETISv1.8.7

Analyzed:

03 Mar-16 8:18

Analysis: Linear Interpolation (ICPIN)

Official Results: Yes

Germina	tion	Rate	Binomials
---------	------	------	-----------

C-μg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	91/100	92/100	93/100	93/100	91/100
5.6		96/100	95/100	93/100	92/100	91/100
10		96/100	92/100	95/100	96/100	91/100
18		93/100	95/100	90/100	91/100	95/100
32		95/100	90/100	92/100	95/100	93/100
100		77/100	80/100	76/100	70/100	71/100
180		26/100	31/100	38/100	44/100	26/100
320		0/100	0/100	0/100	0/100	0/100

Report Date:

03 Mar-16 13:08 (p 3 of 4) KLP013016 | 15-3205-1944

							T	est Code:		KLP013016   15-3205-
Macro	cystis G	ermination and	Germ Tube Gro	wth Test				Aquat	ic Bio	assay & Consulting Labs,
Analys		02-6683-0227	Endpoint:	•				ETIS Versi		CETISv1.8.7
Analyz	ed:	03 Mar-16 8:18	Analysis:	Linear Interpo	lation (ICPIN	)	0	fficial Res	ults:	Yes
Batch	ID:	12-6412-6186	Test Type	: Growth-Germ	ination		Α	nalyst:		
Start D	ate:	30 Jan-16 00:0	1 Protocol:	EPA/600/R-95	5/136 (1995)		D	iluent:	Labor	atory Seawater
Ending	Date:	01 Feb-16 00:0	1 Species:	Macrocystis p	yrifera		В	rine:	Not A	pplicable
Duratio	on:	48h	Source:	David Gutoff			Α	ge:		
Sample	e ID:	01-4313-1739	Code:	KLP013016k			С	lient:	Intern	al Lab
Sample	e Date:	30 Jan-16	Material:	Copper chloric	de		Р	roject:		
Receiv	e Date:		Source:	Reference To	xicant					
Sample	e Age:	1m	Station:	REF TOX						
Linear	Interpo	lation Options								
X Tran	sform	Y Transform	n Seed	Resamples	Exp 95%	CL Me	thod			
Linear		Linear	1306663	280	Yes	Tw	o-Point Int	erpolation		
Test A	cceptab	ility Criteria								
Attribu	te	Test Stat	TAC Limits	Overlap	Decision					
Control	Resp	14.5	10 - NL	Yes	Passes A	cceptabilit	ty Criteria			
Point E	Estimate	es								
Level	μg/L	95% LCL	95% UCL							
IC5	44.07	39.66	44.72		-					
IC10	56.15	52.01	57.44							
IC15	68.22	63.84	70.23							
IC20	80.3	75.8	82.98							
IC25	92.37	87.56	95.72							
IC40	191.5	184.1	198.6							
IC50	212.9	206.8	218.9							
Mean L	ength :	Summary			Cal	Iculated V	/ariate			
C-µg/L	С	ontrol Type	Count Mea	n Min	Max	Std Err	Std De	v CV%		%Effect
0	N	egative Control	5 14.5	14.1	14.8	0.1225	0.2739	1.89%	,	0.0%
5.6			5 14.4	6 14.2	14.7	0.08718	0.1949	1.35%	, D	0.28%
10			5 14.5	8 14.3	14.9	0.102	0.228	1.56%	ò	-0.55%

Mean Len	gth Summary		Calculated Variate							
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	Negative Control	5	14.5	14.1	14.8	0.1225	0.2739	1.89%	0,0%	
5.6		5	14.46	14.2	14.7	0.08718	0.1949	1.35%	0.28%	
10		5	14.58	14.3	14.9	0.102	0.228	1.56%	-0.55%	
18		5	14.52	14.2	14.7	0.09695	0.2168	1.49%	-0.14%	
32		5	14.6	14.4	14.8	0.07071	0.1581	1.08%	-0.69%	
100		5	10.44	10.2	10.7	0.08718	0.1949	1.87%	28.0%	
180		5	9.5	9	10.1	0.2025	0.4528	4.77%	34.48%	
320		5	0	0	0	0	0		100.0%	

### Mean Length Detail

000-055-186-4

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	14.7	14.5	14.8	14.4	14.1
5.6		14.2	14.7	14.4	14.4	14.6
10		14.5	14.3	14.9	14.5	14.7
18		14.7	14.2	14.6	14.7	14.4
32		14.4	14.8	14.7	14.6	14.5
100		10.5	10.5	10.3	10.7	10.2
180		9.1	9.6	9	10.1	9.7
320		0	0	0	0	0

CETIS™ v1.8.7.11



Report Date:

03 Mar-16 13:08 (p 4 of 4)

Test Code:

· KLP013016 | 15-3205-1944

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

02-6683-0227 03 Mar-16 8:18 Endpoint: Mean Length

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes

### **CETIS Measurement Report**

Report Date: Test Code:

03 Mar-16 13:08 (p 1 of 2) KLP013016 | 15-3205-1944

Aquatic Bioassay & Consulting Labs, Inc.

12-6412-6186 Test Type: Growth-Germination

Batch ID: Analyst:

Start Date: EPA/600/R-95/136 (1995) Laboratory Seawater 30 Jan-16 00:01 Protocol: Diluent: Ending Date: 01 Feb-16 00:01 Brine: Not Applicable Species: Macrocystis pyrifera

Duration: Source: David Gutoff Age:

Sample ID: 01-4313-1739 KLP013016k Internal Lab Code: Client:

Sample Date: 30 Jan-16 Material: Copper chloride Project:

Receive Date: Source: Reference Toxicant Sample Age: 1m Station: **REF TOX** 

Macrocystis Germination and Germ Tube Growth Test

### Dissolved Oxygen-mg/L

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.4	3.859	8.941	6.2	6.6	0.2	0.2828	4.42%	0
5.6		2	6.3	3.759	8.841	6.1	6.5	0.2	0.2828	4.49%	0
10		2	6.6	2.788	10.41	6.3	6.9	0.3	0.4243	6.43%	0
18		2	6.6	4.059	9.141	6.4	6.8	0.2	0.2828	4.29%	0
32		2	6.45	4.544	8.356	6.3	6.6	0.15	0.2121	3.29%	0
100		2	6.45	2.003	10.9	6.1	6.8	0.35	0.495	7.67%	0
180		2	6.5	3.959	9.041	6.3	6.7	0.2	0.2828	4.35%	0
320		2	6.35	3.173	9.527	6.1	6.6	0.25	0.3536	5.57%	0
Overall		16	6.456			6.1	6.9				0 (0%)

### pH-Units

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
5.6		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
10		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
18		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
32		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
180		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
320		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
Overall		16	7.9			7.9	7.9				0 (0%)

#### Salinity-ppt

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
5.6		2	34	34	34	34	34	0	0	0.0%	0
10		2	34	34	34	34	34	0	0	0.0%	0
18		2	34	34	34	34	34	0	0	0.0%	0
32		2	34	34	34	34	34	0	0	0.0%	0
100		2	34	34	34	34	34	0	0	0.0%	0
180		2	34	34	34	34	34	0	0	0.0%	0
320		2	34	34	34	34	34	0	0	0.0%	0
Overall		16	34			34	34				0 (0%)

### Temperature-°C

C-μg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
5.6		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
10		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
18		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
32		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
180		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
320		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		16	14.85			14.8	14.9				0 (0%)

000-055-186-6

CETIS™ v1.8.7.11

Report Date: Test Code: 03 Mar-16 13:08 (p 2 of 2) KLP013016 | 15-3205-1944

Macrocysti	s Germination and	d Germ Tu	ube Growth Test	Aquatic Bioassay & Consulting Labs, Inc.
Dissolved	Oxygen-mg/L			
C-µg/L	Control Type	1	2	
0	Negative Contr	6.6	6.2	
5.6		6.5	6.1	
10		6.9	6.3	
18		6.8	6.4	
32		6.6	6.3	
100		6.8	6.1	
180		6.7	6.3	
320	_	6.6	6.1	
pH-Units				
C-µg/L	Control Type	1	2	
0	Negative Contr	7.9	7.9	
5.6		7.9	7.9	
10		7.9	7.9	
18		7.9	7.9	
32		7.9	7.9	•
100		7.9	7.9	
180		7.9	7.9	
320		7.9	7.9	
Salinity-pp	t			
C-µg/L	Control Type	1	2	
0	Negative Contr	34	34	
5.6		34	34	
10		34	34	
18		34	34	
32		34	34	
100		34	34	
180		34	34	
320		34	34	
Temperatu	re-°C			
C-µg/L	Control Type	1	2	
0	Negative Contr	14.9	14.8	
5.6		14.9	14.8	
10		14.9	14.8	
18		14.9	14.8	
32		14.9	14.8	
100		14.9	14.8	
180		14.9	14.8	
320		14.9	14.8	

Analyst: QA: QA:



March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT: City of Malibu SAMPLE I.D.: 24-BB-03Z DATE RECEIVED: 01/31/2016 COM0116.224

### CHRONIC MYTILUS 48 HOUR DEVELOPMENT BIOASSAY

NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 %EC50 = >100.00 %

Yours very truly,

Scott Johnson Laboratory Director

### **CETIS Summary Report**

Report Date:

03 Mar-16 10:25 (p 1 of 1)

Test Code:

COM0116.224myt | 06-2367-2583

							1	rest Code:		COMOTTO.	224myt   00	)-230/ <b>-</b> 230
Mussel Shell	Development Tes	st						Aqua	tic B	ioassay & 0	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	19-5816-0492 01 Feb-16 10:01 03 Feb-16 10:01 48h	Prot	ocol: cies:	Development- EPA/600/R-95 Mytilis gallopro Carlsbad Aqua	7/136 (1995) ovincialis		[ E	Analyst: Diluent: Brine: Age:	Labo	Laboratory Water		
•	09-9984-3885 31 Jan-16 10:32 : 31 Jan-16 12:40		erial: rce:	COM0116.224 Sample Water Bioassay Repo				Client: Project:	City ASB	of Malibu		
Comparison S												
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Meth	od			
09-3248-2028	Combined Propo	ortion Norm		>100	NA	1.61%	1			iance t Two	-Sample Te	st
Point Estimat	e Summary									_		
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	od			
12-4479-5443	Combined Propo	rtion Norm		>100	N/A	N/A	<1	Linea	ır Inte	erpolation (I	CPIN)	
			EC10		N/A	N/A	<1				,	
			EC15	>100	N/A	N/A	<1					
			EC20	>100	N/A	N/A	<1					
			EC25	>100	N/A	N/A	<1					
			EC40	>100	N/A	N/A	<1					
			EC50	>100	N/A	N/A	<1					
Test Acceptab	oility											
Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Limi	ts	Over	lap	Decision		
09-3248-2028	Combined Propo	ortion Norm	PMSE	)	0.0161	NL - 0.25		No		Passes A	cceptability	Criteria
Combined Pro	oportion Normal	Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	Err	Std Dev	CV%	%Effect
0	Negative Control	10	0.932	1 0.9197	0.9445	0.9018	0.964	3 0.005	48	0.01733	1.86%	0.0%
100		10	0.934	4 0.9211	0.9477	0.9107	0.977	7 0.005	879	0.01859	1.99%	-0.24%
Combined Pro	oportion Normal	Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep	7	Rep 8	Rep 9	Rep 10
0	Negative Control	0.942	0.928	6 0.9643	0.933	0.9018	0.942	0.919	96	0.933	0.9152	0.942
100		0.9286	0.977	7 0.942	0.9196	0.942	0.910	7 0.928	86	0.942	0.933	0.9196
Combined Pro	oportion Normal	Binomials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep	7	Rep 8	Rep 9	Rep 10
0	Negative Control	211/224	208/2	24 216/224	209/224	202/224	211/2	24 206/2	224	209/224	205/224	211/224
							00.110			0.4.4.00.4	0001001	0001001

208/224 219/224 211/224 206/224 211/224 204/224

208/224 211/224

206/224

209/224

100

Report Date:

03 Mar-16 10:25 (p 1 of 2)

Test Code:

COM0116.224myt | 06-2367-2583

		_					Ies	t Code:	COM0116.	224myt   0	6-2367-258
Mussel Shell	Development Te	est						Aquatic	Bioassay & 0	Consulting	g Labs, Inc.
Analysis ID: Analyzed:	09-3248-2028 03 Mar-16 8:22		-	Combined Pro Parametric-Tw	•	nal		'IS Versior cial Result		.8.7	
Batch ID: Start Date: Ending Date: Duration:	19-5816-0492 01 Feb-16 10:0 03 Feb-16 10:0 48h	1 I	Protocol: Species:	Development-S EPA/600/R-95 Mytilis gallopro Carlsbad Aqua	/136 (1995) ovincialis		Ana Dilu Brin Age	ent: La ie:	boratory Wate	er	
	09-9984-3885 : 31 Jan-16 10:3: : 31 Jan-16 12:4 23h	2 <b>!</b> 0 \$	Material: Source:	COM0116.224 Sample Water Bioassay Repo 24-BB-03Z			Clie Proj		y of Malibu SBS		
Data Transfo	rm	Zeta	Alt Hy	p Trials	Seed		PMSD	Test Res	sult		
Angular (Corre		NA	C > T	NA	NA		1.61%		combined pro	portion no	rmal
Egual Varian	ce t Two-Sample	Test		_							
Control	vs C-%		Test S	tat Critical	MSD DF	P-Value	P-Type	Decision	n(α:5%)		
Negative Cont			-0.312			0.6208	CDF		nificant Effect		
Test Accepta	bility Criteria										
Attribute	Test Stat	TAC L	imits	Overlap	Decision						
PMSD	0.0161	NL - 0.		No		cceptability	Criteria				
ANOVA Table											
			P.0	0	DE	F 04-4	D. Valera	D. delete	- / = 50/ )		
Source	Sum Squa 0.0001501			Square	DF	F Stat	P-Value	Decision	<del></del>		
Between Error	0.0276864		0.0001		18	0.0976	0.7583	Non-Sigi	nificant Effect		
Total	0.0278365	_	0.0013	30130	19	-					
Distributional					-						
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a:1%)			
Variances	Variance	Ratio F		1.455	6.541	0.5854	Equal Va				
Variances			ality of Varia		8.285	0.8435	Equal Va				
Variances		-	of Variance	0.09251	8.285	0.7645	Equal Va				
Distribution	Shapiro-V			0.9005	0.866	0.0421	-	istribution			
Distribution	Kolmogor		-	0.216	0.2235	0.0152		istribution			
Distribution	D'Agostin			2.297	2.576	0.0216		istribution			
Distribution	D'Agostin			1.893	2.576	0.0583	Normal D	istribution			
Distribution	D'Agostin	o-Pears	on K2 Omni		9.21	0.0119		istribution			
Distribution	Anderson	-Darling	A2 Normalii	ty 0.7683	3.878	0.0455	Normal D	istribution			
Combined Pre	oportion Normal	Summa	ary								
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contro	l 10	0.9321	0.9197	0.9445	0.933	0.9018	0.9643	0.00548	1.86%	0.0%
100		10	0.9344	0.9211	0.9477	0.9308	0.9107	0.9777	0.005879	1.99%	-0.24%
Angular (Corr	rected) Transforr	ned Sur	nmary								
C-%_	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	10	1.309	1.284	1.335	1.309	1.252	1.381	0.01119	2.7%	0.0%
100		10	1.315	1.284	1.345	1.305	1.267	1.421	0.0135	3.25%	-0.42%
Combined Pro	oportion Normal	Detail									
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0.9286	0.9643	0.933	0.9018	0.942	0.9196	0.933	0.9152	0.942	
100		0.9777	0.942	0.9196	0.942	0.9107	0.9286	0.942	0.933	0.9196	

Analyst: M QA:

Report Date:

03 Mar-16 10:25 (p 2 of 2)

Test Code: COM0116.224myt | 06-2367-2583

Mussel Shell	Development Te	st			Aquatic Bioassay & Consulting Labs, Inc.							
Analysis ID: Analyzed:	09-3248-2028 03 Mar-16 8:22		'	Combined Prop Parametric-Tw		nal		IS Version: cial Results		.8.7		
Angular (Cor	rected) Transforn	ned Detai	ı	_								
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
0	Negative Control	1.327	1.3	1.381	1.309	1.252	1.327	1.283	1.309	1.275	1.327	
100		1.3	1.421	1.327	1.283	1.327	1.267	1.3	1.327	1.309	1.283	
Combined Pr	roportion Normal	Binomial	s									
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
0	Negative Control	211/224	208/224	1 216/224	209/224	202/224	211/224	206/224	209/224	205/224	211/224	
100		208/224	219/224	211/224	206/224	211/224	204/224	208/224	211/224	209/224	206/224	

<b>CETIS</b>	Analy	/fical	Report
	AHAH	LIVAI	IVOPOIL

Report Date:

03 Mar-16 10:25 (p 1 of 1)

Test Code:

COM0116.224myt | 06-2367-2583

								Tes	t Code:	COM0116	.224myt   06	-2367-258				
Musse	l Shell I	Development Te	st						Aquatic	Bioassay &	Consulting	Labs, Inc.				
Analys	is ID:	12-4479-5443	En	dpoint:	Combined Prop	ortion Norn	nal	CE.	 ΓIS Version	n: CETISv1	1.8.7					
Analyz		03 Mar-16 8:22	An	alysis:	Linear Interpola			Off	cial Result	ts: Yes						
Batch	ID:	19-5816-0492	Te	st Type:	Development-S	Survival		Ana	Analyst:							
Start D	ate:	01 Feb-16 10:0°	1 Pr	otocol:	EPA/600/R-95/	136 (1995)		Dilt	Diluent: Laboratory Water							
Ending	Date:	03 Feb-16 10:01	1 Sp	ecies:	Mytilis gallopro	vincialis		Bri	ne:							
Duratio	on:	48h	So	urce:	Carlsbad Aqua	farms CA		Age	<b>:</b>							
Sample	e ID:	09-9984-3885	Co	de:	COM0116.224r	n		Clie	Client: City of Malibu							
Sampl	e Date:	31 Jan-16 10:32	2 <b>M</b> a	terial:	Sample Water			Pro	ject: AS	SBS						
Receiv	e Date:	31 Jan-16 12:40	) So	urce:	Bioassay Repo	rt										
Sample	e Age:	23h	Sta	ition:	24-BB-03Z											
Linear	Interpo	lation Options				-					_					
X Tran	sform	Y Transform	Se	ed	Resamples	Exp 95%	CL Meth	od								
Linear		Linear	0		280	Yes	Two-	Point Inter	polation							
Point E	Estimate	es —														
Level	%	95% LCL	95% UC	_ TU	95% LCL	95% UCL					_					
EC5	>100	N/A	N/A	<1	NA	NA										
EC10	>100	N/A	N/A	<1	NA	NA										
EC15	>100	N/A	N/A	<1	NA	NA										
EC20	>100	N/A	N/A	<1	NA	NA										
EC25	>100	N/A	N/A	<1	NA	NA										
EC40	>100	N/A	N/A	<1	NA	NA										
EC50	>100	N/A	N/A	<1	NA	NA										
Combi	ned Pro	portion Normal	Summar	/		Calcu	ılated Varia	te(A/B)	_							
C-%	С	ontrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	В				
0	N	egative Control	10	0.932	1 0.9018	0.9643	0.00548	0.01733	1.86%	0.0%	2088	2240				
100			10	0.934	4 0.9107	0.9777	0.005879	0.01859	1.99%	-0.24%	2093	2240				
Combi	ned Pro	portion Normal	Detail													
C-%	С	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10				
0	N	egative Control	0.942	0.928	6 0.9643	0.933	0.9018	0.942	0.9196	0.933	0.9152	0.942				
100			0.9286	0.977	7 0.942	0.9196	0.942	0.9107	0.9286	0.942	0.933	0.9196				
Combi	ned Pro	portion Normal	Binomia	s	_	_	_			_	_	_				
C-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10				
0 Negative Control 211/224				208/2	24 216/224	209/224	202/224	211/224	206/224	209/224	205/224	211/224				
100	<b>3</b>			219/2	24 211/224	206/224	211/224	204/224	208/224	211/224	209/224	206/224				

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

### **CETIS Measurement Report**

Report Date:

03 Mar-16 10:25 (p 1 of 2)

Test Code:

COM0116.224myt | 06-2367-2583

								Test Code:	COM0116	5.224myt	06-2367-2583
Mussel Shell	Development T	est						Aqua	tic Bioassay &	Consultin	ng Labs, Inc.
Batch ID:	19-5816-0492		Test Type:	Development-	Survival			Analyst:			
Start Date:	01 Feb-16 10:0	01	Protocol:	EPA/600/R-95	/136 (1995)			Diluent:	Laboratory Wa	ter	
<b>Ending Date:</b>	03 Feb-16 10:0	01	Species:	Mytilis gallopro	vincialis			Brine:			
Duration:	48h		Source:	Carlsbad Aqua	afarms CA			Age:			
Sample ID:	09-9984-3885		Code:	COM0116.224	m			Client:	City of Malibu		
Sample Date:	31 Jan-16 10:3	32	Material:	Sample Water				Project:	ASBS		
Receive Date	: 31 Jan-16 12:4	10	Source:	Bioassay Repo	ort						
Sample Age:	23h		Station:	24-BB-03Z							
Dissolved Ox	ygen-mg/L			•							
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
0	Negative Contr	2	6.5	1.418	11.58	6.1	6.9	0.4	0.5657	8.7%	0
100		2	6.25	3.073	9.427	6	6.5	0.25	0.3536	5.66%	0
Overall		4	6.375			6	6.9				0 (0%)
Total Ammon	ia (N)-mg/L										
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
0	Negative Contr	1	0		_	0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)
pH-Units											
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	8.05	7.415	8.685	8	8.1	0.0500	0.07073	0.88%	0
Overall		4	7.975			7.9	8.1				0 (0%)
Salinity-ppt											
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
100		2	34	34	34	34	34	0	0	0.0%	0
Overall		4	34			34	34				0 (0%)
Temperature-	°C										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
0	Negative Contr	2	14.75	14.11	15.39	14.7	14.8	0.0500	0.07075	0.48%	0
100		2	14.75	14.11	15.39	14.7	14.8	0.0500	0.07075	0.48%	0
Overall		4	14.75			14.7	14.8				0 (0%)

Analyst: YA QA:

### **CETIS Measurement Report**

Report Date:

03 Mar-16 10:25 (p 2 of 2)

Test Code:

COM0116.224myt | 06-2367-2583

Mussel SI	hell Development Te	est		Aquatic Bioassay & Consulting Labs, Inc.
Dissolved	d Oxygen-mg/L			
C-%	Control Type	1	2	
0	Negative Contr	6.9	6.1	
100		6.5	6	
Total Amr	monia (N)-mg/L			
C-%	Control Type	1		
0	Negative Contr	0		
100		0		
pH-Units				
C-%	Control Type	1	2	
0	Negative Contr	7.9	7.9	
100		8.1	8	
Salinity-p	pt			
C-%	Control Type	1	2	
0	Negative Contr	34	34	
100		34	34	
Temperat	ure-°C			
C-%	Control Type	1	2	
0	Negative Contr	14.8	14.7	
100		14.8	14.7	



March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03R

DATE RECEIVED:

01/31/2016

ABC LAB. NO.:

COM0116.225

#### CHRONIC MYTILUS 48 HOUR DEVELOPMENT BIOASSAY

NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 %

EC50 = >100.00 %

Yours very truly,

Scott Johnson

Laboratory Director

### **CETIS Summary Report**

Report Date:

03 Mar-16 10:27 (p 1 of 1)

Test Code: COM0116 225mvt L03-3436-3037

							T	est Code:	COM0116	5.225myt   00	3-3436-303
Mussel Shell	Development Te	st			-	_		Aquati	c Bioassay &	Consulting	Labs, Inc.
Batch ID:	16-5281-0763	Test	Type:	Development-S	Survival			Analyst:			
Start Date:	01 Feb-16 10:02	2 Prot	ocol:	EPA/600/R-95/	136 (1995)			Diluent: L	aboratory Wa	ter	
Ending Date:	03 Feb-16 10:02	2 Spe	cies:	Mytilis gallopro	vincialis		E	Brine:			
Duration:	48h	Sou	rce:	Carlsbad Aqua	farms CA		A	Age:			
Sample ID:	03-2165-9156	Cod	e:	COM0116.225i	m			Client: (	City of Malibu		
Sample Date:	31 Jan-16 10:50	Mate	erial:	Sample Water			F	Project: A	ASBS		
Receive Date:	31 Jan-16 12:40	Sou	rce:	Bioassay Repo	ort						
Sample Age:	23h	Stat	ion:	24-BB-03R							
Comparison S	Summary										
Analysis ID	Endpoint		NOEL	. LOEL	TOEL	PMSD	TU	Metho	d		
03-7352-3969	Combined Propo	ortion Norm	100	>100	NA	1.77%	1	Equal	Variance t Two	Sample Te	st
Point Estimate	e Summary										
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Metho	d		
06-3689-1034	Combined Propo	ortion Norm	EC5	>100	N/A	N/A	<1	Linear	Interpolation (	ICPIN)	
			EC10	>100	N/A	N/A	<1				
			EC15	>100	N/A	N/A	<1				
			EC20	>100	N/A	N/A	<1				
			EC25	>100	N/A	N/A	<1				
			EC40	>100	N/A	N/A	<1				
			EC50	>100	N/A	N/A	<1 				
Test Acceptab	oility										
Analysis ID	Endpoint		Attrib	_	Test Stat	TAC Limi	ts	Overla	p Decision		
03-7352-3969	Combined Propo	ortion Norm	PMSE	) 	0.01766	NL - 0.25		No	Passes A	cceptability	Criteria
Combined Pro	portion Normal	Summary									
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	_Std Er	r Std Dev	CV%	%Effect
0	Negative Control	10	0.932	1 0.9197	0.9445	0.9018	0.9643	0.0054	8 0.01733	1.86%	0.0%
100		10	0.930	4 0.9145 —————	0.9462	0.9063	0.9777	7 0.0070	18 0.02219	2.39%	0.19%
Combined Pro	portion Normal	Detail									
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0.942	0.928	0.9643	0.933	0.9018	0.942	0.9196	0.933	0.9152	0.942
100		0.9375	0.942	0.9152	0.9777	0.9063	0.942	0.9196	0.9152	0.9063	0.942
Combined Pro	portion Normal	Binomials						<u>.</u>			
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	211/224	208/22	24 216/224	209/224	202/224	211/22	24 206/22	4 209/224	205/224	211/224
100		210/224	211/22	24 205/224	219/224	203/224	211/22	24 206/22	4 205/224	203/224	211/224

CETIS™ v1.8.7.11

000-055-186-6

Report Date:

03 Mar-16 10:27 (p 1 of 2)

Test Code:

COM0116.225myt | 03-3436-3037

Mussel Shel	l Development Te	est						Aquatic E	Bioassay & C	Consulting	Labs, Inc.		
Analysis ID:	03-7352-3969		Endpoint:	Combined Pro	portion Norn	 nal	CET	IS Version:	CETISv1.	.8.7			
Analyzed:	03 Mar-16 8:22	2	Analysis:	Parametric-Tw	o Sample		Offic	cial Results	; Yes				
Batch ID:	16-5281-0763		Test Type:	Development-S	Survival		Ana	yst:		_			
Start Date:	01 Feb-16 10:0			EPA/600/R-95/			Dilu	-	nt: Laboratory Water				
Ending Date	: 03 Feb-16 10:0	2	Species:	Mytilis gallopro	vincialis		Brin	e:					
Duration:	48h		•	Carlsbad Aqua			Age	:					
Sample ID:	03-2165-9156		Code:	COM0116.225	m		Client: City of Malibu						
Sample Date	: 31 Jan-16 10:5	0	Material:	Sample Water			Proj	ect: ASE	3\$				
Receive Date	e: 31 Jan-16 12:4	0	Source:	Bioassay Repo	ort								
Sample Age	: 23h		Station:	24-BB-03R									
Data Transfo	orm	Zeta	Alt Hy	p Trials	Seed		PMSD	Test Res	ult				
Angular (Corr	rected)	NA	C > T	NA	NA		1.77%	Passes co	ombined pro	portion nor	mal		
Equal Variar	nce t Two-Sample	Test											
Control	vs C-%		Test S	tat Critical	MSD DE	P-Value	P-Type	Decision	(α:5%)				
Negative Cor		_	0.0923		0.033 18	0.4637	CDF		ificant Effect		_		
Test Accepta	ability Criteria						_						
Attribute	Test Stat	TAC L	imits.	Overlap	Decision								
PMSD	0.01766	NL - 0	.25	No	Passes A	cceptability	Criteria						
ANOVA Tabl	e												
Source	Sum Squa	ares	Mean	Square	DF	F Stat	P-Value	Decision	(a:5%)				
Between	1.547618E			18E-05	1	0.008524	0.9275		ificant Effect				
Error	0.0326799	96	0.0018	15553	18								
Total	0.0326954	3			19	_							
Distributiona	al Tests								_		-		
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)					
Variances	Variance	Ratio F		1.898	6.541	0.3539	Equal Va						
Variances	Mod Leve	ne Equ	ality of Varia	nce 0.9181	8.285	0.3507	Equal Va	riances					
Variances	Levene E	quality o	of Variance	0.9461	8.285	0.3436	Equal Va	riances					
Distribution	Shapiro-V	Vilk W N	Normality	0.901	0.866	0.0431	Normal D	istribution					
Distribution	Kolmogor	ov-Smi	rnov D	0.2145	0.2235	0.0165	Normal D	istribution					
Distribution	D'Agostin	o Skew	ness	2.068	2.576	0.0386	Normal D	istribution					
Distribution	D'Agostin	o Kurto	sis	1.602	2.576	0.1091	Normal D	istribution					
Distribution	D'Agostin	o-Pears	son K2 Omni	bus 6.845	9.21	0.0326	Normal D						
Distribution	Anderson	-Darling	A2 Normali	ty 0.754	3.878	0.0495	Normal D	istribution					
Combined P	roportion Normal	Summ	ary										
C-%	Control Type	Count		95% LCL			Min	Max	Std Err	CV%	%Effect		
0	Negative Contro		0.9321		0.9445	0.933	0.9018	0.9643	0.00548	1.86%	0.0%		
100		10	0.9304	0.9145	0.9462	0.9286	0.9063	0.9777	0.007018	2.39%	0.19% ————		
	rected) Transfori		-										
C-%	Control Type	Count		95% LCL			Min	Max	Std Err	CV%	%Effect		
0 100	Negative Contr	10 10	1.309 1.307	1.284 1.273	1.335 1.342	1.309 1.301	1.252 1.26	1.381 1.421	0.01119 0.01542	2.7% 3.73%	0.0% 0.13%		
	ronortion Nous-												
	roportion Normal		Da 0	Rep 3	Don 4	Don F	Don 6	Don 7	Don 9	Don 1	Pon 40		
C-% 0	Control Type Rep 1 Rep 2  Negative Control 0.942 0.9286				Rep 4 0.933	Rep 5 0.9018	Rep 6 0.942	Rep 7 0.9196	Rep 8 0.933	Rep 9 0.9152	Rep 10 0.942		
100	.10946170 001100	0.9375		0.9643 0.9152	0.933	0.9063	0.942	0.9196	0.9152	0.9063	0.942		
			<b>-</b>						<del>-</del>		<del>-</del>		

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:27 (p 2 of 2)

Test Code:

COM0116.225myt | 03-3436-3037

							l est	Code:	COMUTTO	.225myt   03	3-3436-3037		
Mussel Shell	Development Te	st					Aquatic Bioassay & Consulting Labs, Inc.						
Analysis ID: Analyzed:	03-7352-3969 03 Mar-16 8:22		Endpoint: Analysis:	Combined Pro Parametric-Tw	•	nal		IS Version: cial Results		.8.7			
Angular (Cor	rected) Transforn	ned De	tail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10		
0	Negative Control	1.327	1.3	1.381	1.309	1.252	1.327	1.283	1.309	1.275	1.327		
100		1.318	1.327	1.275	1.421	1.26	1.327	1.283	1.275	1.26	1.327		
Combined Pr	roportion Normal	Binon	nials		_	_		_					
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10		
0	Negative Control	211/2	24 208/2	24 216/224	209/224	202/224	211/224	206/224	209/224	205/224	211/224		
100		210/2	24 211/2	24 205/224	219/224	203/224	211/224	206/224	205/224	203/224	211/224		

Report Date:

03 Mar-16 10:27 (p 1 of 1)

Test Code:

COM0116.225myt | 03-3436-3037

Mussel S	Shell [	Development Te	est								Aquatic Bioassay & Consulting Labs, Inc.						
Analysis	ID:	06-3689-1034		End	point:	Cor	nbined Prop	ortion Norn	nal		CETIS Ve	rsion:	CETISv1	.8.7	_		
Analyzed	d:	03 Mar-16 8:22		Anal	ysis:	Line	ear Interpola	tion (ICPIN	)		Official R	esults:	Yes				
Batch ID	):	16-5281-0763		Test	Туре:	Dev	elopment-S	Survival			Analyst:						
Start Dat	te:	01 Feb-16 10:0	2	Prot	ocol:	EP/	A/600/R-95/	136 (1995)			Diluent:	Labo	ratory Wat	er			
Ending [	Date:	03 Feb-16 10:0	2	Spec	cies:	Myt	ilis gallopro	vincialis			Brine:						
Duration	ı: 	48h		Soul	rce:	Car	lsbad Aquat	farms CA			Age:						
Sample I	ID:	03-2165-9156		Code	е:	COM0116.225m					Client: City of Malibu						
Sample [	Date:	31 Jan-16 10:50	0	Mate	rial:	Sar	nple Water				Project: ASBS						
Receive	Date:	31 Jan-16 12:40	0	Sour	ce:	Bio	assay Repo	rt									
Sample A	Age:	23h		Stati	on:	24-	BB-03R										
Linear In	iterpo	lation Options															
X Transfe	orm	Y Transform	ı	Seed	i	Res	amples	Exp 95%	CL Meth	nod		١					
Linear		Linear		0		280	_	Yes	Two-	-Point Ir	nterpolatio	n					
Point Est	timate	es					_								_		
Level	%	95 <u>%</u> LCL	95%	UCL	TU	_	95% LCL	95% UCL									
EC5	>100	N/A	N/A		<1		NA	NA									
	>100	N/A	N/A		<1		NA	NA									
	>100	N/A	N/A		<1		NA	NA									
	>100	N/A	N/A		<1		NA	NA									
	>100	N/A	N/A		<1		NA	NA									
	>100	N/A	N/A		<1		NA	NA									
EC50	>100	N/A	N/A		<1		NA	NA									
Combine	ed Pro	portion Normal	Sumn	nary				Calcu	ılated Varia	te(A/B)							
C-%	C	ontrol Type	Coun	nt	Mean		Min	Max	Std Err	Std E	Dev CV	<b>%</b>	%Effect	<u>A</u>	В		
0	N	egative Control	10		0.932	1	0.9018	0.9643	0.00548	0.017	'33 1.86	6%	0.0%	2088	2240		
100			10		0.930	4	0.9063	0.9777	0.007018	0.022	2.39	9%	0.19%	2084	2240		
Combine	d Pro	portion Normal	Detail				<u>-</u>			_							
C-%		ontrol Type	Rep 1	1	Rep 2	2	Rep 3	Rep 4	Rep 5	Rep	6 Rep	7	Rep 8	Rep 9	Rep 10		
0	Ne	egative Control	0.942	2	0.928	6	0.9643	0.933	0.9018	0.942	0.91	96	0.933	0.9152	0.942		
100			0.937	'5	0.942		0.9152	0.9777	0.9063	0.942	0.91	196	0.9152	0.9063	0.942		
Combine	d Pro	portion Normal	Binon	nials										_			
C-%	_	Control Type	Rep 1		Rep 2	2	Rep 3	Rep 4	Rep 5	Rep	6 Rep	7	Rep 8	Rep 9	Rep 10		
0	ı	Negative Control			208/22		216/224	209/224	202/224	211/2		/224	209/224	205/224	211/224		
100			210/2	224	211/22	24	205/224	219/224	203/224	211/2	24 206	/224	205/224	203/224	211/224		

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

### **CETIS Measurement Report**

Report Date:

03 Mar-16 10:27 (p 1 of 2)

Test Code:

COM0116.225myt | 03-3436-3037

								Test Code:	COM0116	5.225myt   0	03-3436-3037
Mussel Shell	Development T	est						Aquati	c Bioassay &	Consultin	g Labs, Inc.
Batch ID:	16-5281-0763		Test Type:	Development-S	Survival			Analyst:			
Start Date:	01 Feb-16 10:0	)2	Protocol:	EPA/600/R-95	/136 (1995)			Diluent: I	_aboratory Wa	ter	
Ending Date:	03 Feb-16 10:0	)2	Species:	Mytilis gallopro	vincialis			Brine:			
Duration:	48h		Source:	Carlsbad Aqua	afarms CA			Age:			
Sample ID:	03-2165-9156		Code:	COM0116.225	m			Client:	City of Malibu		
Sample Date:	31 Jan-16 10:5	0	Material:	Sample Water				Project:	ASBS		
Receive Date:	31 Jan-16 12:4	10	Source:	Bioassay Repo	ort						
Sample Age:	23h		Station:	24-BB-03R							
Dissolved Oxy	ygen-mg/L				_						
C-%	Control Type	Count	t Mean	95% LCL	9 <b>5% UCL</b>	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.5	1.418	11.58	6.1	6.9	0.4	0.5657	8.7%	0
100		2	6.4	3.859	8.941	6.2	6.6	0.2	0.2828	4.42%	0
Overall		4	6.45			6.1	6.9				0 (0%)
Total Ammoni	ia (N)-mg/L										
C-%	Control Type	Count	t Mean	95% LCL	95% UCL	Min	Max	Std En	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)
pH-Units											
C-%	Control Type	Count	t Mean	95% LCL	95% UCL	Min	Max	Std En	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	8.25	6.344	10.16	8.1	8.4	0.15	0.2121	2.57%	0
Overall		4	8.075			7.9	8.4				0 (0%)
Salinity-ppt											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Eri	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
100		2	34	34	34	34	34	00	0	0.0%	0
Overall		4	34			34	34				0 (0%)
Temperature-	C,C										
	Control Type	Count	Mean_	95% LCL	95% UCL	Min	Max	Std Eri		CV%	QA Count
0	Negative Contr	2	14.75	14.11	15.39	14.7	14.8	0.0500	2 0.07075	0.48%	0
100		2	14.75	14.11	15.39	14.7	14.8	0.0500	2 0.07075	0.48%	0
Overall		4	14.75			14.7	14.8				0 (0%)

Report Date:

03 Mar-16 10:27 (p 2 of 2)

Test Code:

COM0116.225myt | 03-3436-3037

				rest oode.	001110110.220111yt   00 0100 0001
Mussel She	II Development Te	est		Aquatio	Bioassay & Consulting Labs, Inc.
Dissolved (	Dxygen-mg/L				
C-%	Control Type	1	2		
0	Negative Contr	6.9	6.1		
100		6.6	6.2		
Total Ammo	onia (N)-mg/L				
C-%	Control Type	1			
0	Negative Contr	0			
100		0			
pH-Units					
C-%	Control Type	1	2		
0	Negative Contr	7.9	7.9		
100		8.1	8.4		
Salinity-ppt					
C-%	Control Type	1	2		
0	Negative Contr	34	34		
100		34	34		
Temperatur	e-°C			_	
C-%	Control Type	1	2		
0	Negative Contr	14.8	14.7		
100		14.8	14.7		



#### CHRONIC MYTILUS DEVELOPMENT BIOASSAY

DATE:

February 1, 2016

STANDARD TOXICANT:

Unionized Ammonia

NOEC =

0.051 mg/l

EC25 =

0.08264 mg/l

EC50 =

0.1005 mg/l

Yours very truly,

Scott Johnson

Laboratory Director

### **CETIS Summary Report**

Report Date:

03 Mar-16 13:09 (p 1 of 1)

Test Code:

MYT020116 | 03-9971-1783

								Test Cod	te:	MYI	020116   03	3-9971-1783
Mussel Shel	Development Te	est						Aq	uatic B	ioassay &	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date Duration:	15-4694-9349 01 Feb-16 10:0 03 Feb-16 10:0 48h	0 Pro	tocol: cies:	Development EPA/600/R-9 Mytilis gallop Carlsbad Aqu	5/136 (1995) rovincialis			Analyst: Diluent: Brine: Age:		oratory Sea Applicable	water	
Sample ID: Sample Date Receive Date	15-9110-5695 : 01 Feb-16 10:0		le: erial: rce:	MYT020116r Copper chlori Reference To	ide			Client: Project:		rnal Lab TOX		
Sample Age:		Stat		REF TOX	Alcant							
Comparison											<u> </u>	
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	M	ethod			
15-7317-4648	<del></del>	ortion Norm			0.06267	4.24%			_	lultiple Com	parison Tes	
Point Estima	te Summary									<u>-</u>		
Analysis ID	Endpoint		Level	μg/L	95% LCL	95% UCL	TU	M	ethod			
20-9709-5571		ortion Norm		0.05717		0.06092				erpolation (I	CPIN)	
	,		EC10	0.06548	0.06137	0.07106					,	
			EC15	0.07379	0.06836	0.07992						
			EC20	0.07915	0.07637	0.08201						
			EC25	0.08264	0.08031	0.08499						
			EC40		0.09154	0.09527						
			EC50	0.1005	0.09822	0.1032						
Test Accepta	bility											
Analysis ID	Endpoint		Attrib		Test Stat	TAC Limi	its		erlap	Decision		
15-7317-4648			PMSE		0.04236	NL - 0.25		No		Passes A	cceptability	Criteria ————
	roportion Normal	Summary										
C-μg/L	Control Type	Count	Mean				Max		d Err	Std Dev	CV%	%Effect
0	Negative Contro		0.930		0.9431	0.9196	0.94		004596	0.01028	1.11%	0.0%
0.026		5	0.942		0.9789	0.8973	0.97		1332	0.02978	3.16%	-1.25%
0.051		5	0.924		0.9459	0.9018	0.94		00786	0.01758	1.9%	0.67%
0.077		5	0.777		0.8194	0.7455	0.83		1503	0.03362	4.32%	16.41%
0.098		5	0.496		0.5286	0.4732	0.54		1159	0.02592	5.22%	46.64%
0.121		5	0.235	7 0.1615	0.3099	0.1518	0.29	46 0.0	)2673	0.05976	25.35% 	74.66% ———
	oportion Normal											
C-µg/L	Control Type	Rep 1	Rep 2		Rep 4	Rep 5						
0	Negative Control		0.919		0.9196	0.9375						
0.026		0.942	0.964		0.8973	0.9732						
0.051		0.942	0.919		0.942	0.9018						
0.077		0.8304	0.790		0.7634	0.7589						
0.098		0.5402	0.495		0.4911	0.4732						
0.121		0.2768	0.2589	9 0.1964	0.2946	0.1518						
	oportion Normal								_			
C-µg/L	Control Type	Rep 1	Rep 2		Rep 4	Rep 5						
0	Negative Control		206/22		206/224	210/224						
0.026		211/224	216/2		201/224	218/224			`			
0.051		211/224	206/22		211/224	202/224						
0.077		186/224	177/2		171/224	170/224						
0.098		121/224	111/22	24 108/224	110/224	106/224						
0.121		62/224	58/22		66/224	34/224						

Analyst: QA:

000-055-186-6 CETIS™ v1.8.7.11

Report Date: Test Code:

03 Mar-16 13:09 (p 1 of 2) MYT020116 | 03-9971-1783

Mussel Shell													
	Develo	pment Te	est					_		Aquatic I	Bioassay & C	onsulting	Labs, In
Analysis ID:		17-4648		Endpoint:		nbined Prop				S Version		8.7	
Analyzed:	03 Ma	ar-16 8:20		Analysis:	Para	ametric-Con	itroi vs Trea	tments	Offic	ial Results	s: Yes		
Batch ID:	15-46	94-9349		Test Type:	Dev	elopment-S	urvival		Anal	yst:			
Start Date:	01 Fe	b-16 10:0	0	Protocol:	EPA	4/600/R-95/	136 (1995)		Dilue	ent: Lab	oratory Seav	vater	
Ending Date:	03 Fe	b-16 10:0	0	Species:	Myti	ilis galloprov	vincialis		Brine	e: No	t Applicable		
Duration:	48h			Source:	Car	lsbad Aquaf	arms CA		Age:				
Sample ID:		10-5695		Code:		T020116m			Clier		ernal Lab		
Sample Date:	01 Fe	b-16 10:0	0	Material:		per chloride			Proje	ect: RE	F TOX		
Receive Date:				Source:		erence Toxi	cant						
Sample Age:	NA —			Station:	REF	TOX							
Data Transfor	m		Zeta	Alt H	ур	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre	ected)		NA_	C > T		NA	NA		4.24%	0.051	0.077	0.06267	
Dunnett Multi	ple Co	mparison	Test										
Control	vs	C-µg/L		Test	Stat	Critical	MSD DF	P-Value	P-Type	Decision	ι(α:5%)		
Negative Conti	rol	0.026		-0.990	01	2.362	0.070 8	0.9829	CDF	Non-Sign	nificant Effect		
		0.051		0.375	9	2.362	0.070 8	0.6995	CDF	-	nificant Effect		
		0.077*		7.539		2.362	0.070 8	<0.0001	CDF	Significa	nt Effect		
		0.098*		17.62		2.362	0.070 8	<0.0001	CDF	Significa			
		0.121*		26.98		2.362	0.070 8	<0.0001	CDF	Significa	nt Effect		
Test Acceptab	bility Cı	riteria											
Attribute	_ 1	Test Stat	TAC	Limits		Overlap	Decision						
PMSD	(	0.04236	NL -	0.25		No	Passes A	cceptability	Criteria				
ANOVA Table													
AMOVA Table													
		Sum Squa	ares	Mean	Squ	are	DF	F Stat	P-Value	Decision	n(α:5%)		
Source		Sum Squa 2.87492	ares	<b>M</b> ean 0.574			DF 5	F Stat 261.6	P-Value <0.0001	Decision Significa	<del></del>		
Source Between					9839		5 24				<del></del>		
Source Between Error	2	2.87492		0.574	9839		5				<del></del>		
Source Between Error Total	2	2.87492 0.0527574		0.574	9839		5 24				<del></del>		
Source Between Error Total Distributional	Z C Z Tests	2.87492 0.0527574 2.927677 Test	4	0.574 0.002	9839	27 Test Stat	5 24 29 Critical	261.6 P-Value	<0.0001  Decision(	Significar	<del></del>		
Source Between Error Total Distributional Attribute Variances	2 (C 2 Tests	2.87492 0.0527574 2.927677 Test Bartlett Ed	4 quality	0.574 0.002 of Variance	9839 1982	Test Stat 8.466	5 24 29 Critical 15.09	P-Value 0.1324	<0.0001  Decision( Equal Var	Signification (a:1%)	<del></del>		
Source Between Error Total Distributional Attribute Variances Variances	Z	2.87492 0.0527574 2.927677 Test Bartlett Ed	quality	0.574 0.002 of Variance uality of Vari	9839 1982	27 Test Stat 8.466 1.785	5 24 29 Critical 15.09 4.248	P-Value 0.1324 0.1669	<0.0001  Decision( Equal Var  Equal Var	Signification (a:1%) iances iances	<del></del>		
Source Between Error Total Distributional Attribute Variances Variances Variances	2 (C	2.87492 0.0527574 2.927677 Test Bartlett Ed Mod Leve Levene E	quality ene Eq	0.574 0.002 of Variance uality of Variance	9839 1982	Test Stat 8.466 1.785 3.004	5 24 29 Critical 15.09 4.248 3.895	P-Value 0.1324 0.1669 0.0303	Oecision Equal Var Equal Var Equal Var	Significal (α:1%) iances iances iances	<del></del>		
Source Between Error Total Distributional Attribute Variances Variances Variances Distribution	2 (C	2.87492 2.0527574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V	quality ene Eq quality Vilk W	0.574 0.002 of Variance uality of Variance of Variance Normality	9839 1982	Test Stat 8.466 1.785 3.004 0.9632	5 24 29 Critical 15.09 4.248 3.895 0.9031	P-Value 0.1324 0.1669 0.0303 0.3724	Decision Equal Var Equal Var Equal Var Normal Di	Significal (a:1%) iances iances iances istribution	<del></del>		
Source Between Error Total Distributional Attribute Variances Variances Variances Distribution Distribution	2 ( 2 Tests	2.87492 2.0527574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor	quality ene Eq quality Vilk W	0.574 0.002 of Variance uality of Variance Vormality irnov D	9839 1982	Test Stat 8.466 1.785 3.004 0.9632 0.1154	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792	Decision( Equal Var Equal Var Equal Var Normal Di	Significal (a:1%) iances iances istribution istribution	<del></del>		
Source Between Error Total Distributional Attribute Variances Variances Ustribution Distribution Distribution	2 (C 2	2.87492 2.0527574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin	quality ene Eq quality Vilk W rov-Sm o Skev	0.574 0.002 of Variance uality of Variance Vormality irnov D wness	9839 1982	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246	Decision( Equal Var Equal Var Equal Var Normal Di Normal Di	Significal (a:1%) iances iances iances istribution istribution istribution	<del></del>		
Source Between Error Total Distributional Attribute Variances Variances Distribution Distribution Distribution Distribution	2 (C 2 Tests	2.87492 2.0527574 2.927677 Test Bartlett Ed Mod Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin	quality ene Eq quality Vilk W ov-Sm o Skev o Kurte	of Variance uality of Variance Normality irnov D wness osis	9839 1982 ance	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985	Decision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di	Significal  (a:1%)  iances  iances  iances  istribution  istribution  istribution	<del></del>		
Source Between Error Total Distributional Attribute Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution	2 (C 2 Tests	2.87492 2.0527574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin	quality ene Eq quality Vilk W rov-Sm o Skev o Kurto o-Pear	0.574 0.002 of Variance uality of Variance Normality hirnov D wness osis	9839 1982 ance	Test Stat  8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266 0.9148	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985 0.6329	Decision( Equal Var Equal Var Rormal Di Normal Di Normal Di Normal Di Normal Di	Significal  (a:1%)  iances  iances  iances  istribution  istribution  istribution  istribution	<del></del>		
Source Between Error Total Distributional Attribute Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution	2 (C 2 Tests	2.87492 2.0527574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin	quality ene Eq quality Vilk W rov-Sm o Skev o Kurto o-Pear	of Variance uality of Variance Normality irnov D wness osis	9839 1982 ance	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985	Decision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di	Significal  (a:1%)  iances  iances  iances  istribution  istribution  istribution  istribution	<del></del>		-
Source Between Error Total Distributional Attribute Variances Variances Ustribution Distribution	Tests	2.87492 2.00527574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin D'Agostin Anderson	quality ene Equality Vilk W ov-Sm o Skev o Kurto o-Pear -Darlin	of Variance uality of Variance Variance Normality irrnov D wness osis rson K2 Omr	9839 1982 ance	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266 0.9148 0.4087	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985 0.6329 0.3506	Decision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di Normal Di	Significal (a:1%) iances iances iances istribution istribution istribution istribution istribution	nt Effect		
Source Between Error Total Distributional Attribute Variances Variances Distribution Distribution Distribution Distribution Distribution Distribution Combined Pro	Tests oportio	2.87492 2.927574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin D'Agostin Anderson In Normal	quality ene Eq quality Vilk W rov-Sm o Skev o Kurto o-Pear -Darlin Sumr	of Variance uality of Variance Variance Normality virnov D wness osis rson K2 Omr ag A2 Norma mary nt Mean	9839 1982 ance	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266 0.9148 0.4087	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985 0.6329 0.3506	Occision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di Normal Di	(a:1%) iances iances iances istribution istribution istribution istribution	nt Effect	CV%	
Source Between Error Total Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Distribution Combined Pro	Tests oportio	2.87492 2.00527574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin D'Agostin Anderson	quality ene Equality Vilk W ov-Sm o Skev o Kurto o-Pear -Darlin Sumr Cour	of Variance uality of Variance vof Variance Normality nirnov D wness osis rson K2 Omr ng A2 Norma mary nt Mean 0.930	9839 1982 ance lity	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266 0.9148 0.4087	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 9.21 3.878	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985 0.6329 0.3506  Median 0.933	Decision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di Normal Di Normal Di Mormal Di 0.9196	(a:1%) iances iances iances istribution istribution istribution istribution Max 0.942	Std Err 0.004596	1.11%	0.0%
Source Between Error Total Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Distribution Combined Pro C-µg/L 0 0.026	Tests oportio	2.87492 2.927574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin D'Agostin Anderson In Normal	quality ene Equality Vilk W ov-Sm o Skev o Kurte o-Pear -Darlin Sumr Cour	of Variance uality of Variance vof Variance Normality virnov D vness osis rson K2 Omr og A2 Norma mary nt Mean 0.930 0.942	9839 1982 ance lity	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266 0.9148 0.4087  95% LCL 0.9176 0.905	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878 95% UCL 0.9431 0.9789	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985 0.6329 0.3506  Median 0.933 0.942	Occision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di Normal Di Normal Di Occision	(a:1%) iances iances iances istribution istribution istribution istribution  Max  0.942 0.9732	Std Err 0.004596 0.01332	1.11% 3.16%	0.0% -1.25%
Source Between Error Total Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Distribution Combined Pro C-µg/L 0 0.026 0.051	Tests oportio	2.87492 2.927574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin D'Agostin Anderson In Normal	quality ene Equality Vilk W ov-Sm o Skev o Kurte o-Pear -Darlin Sumr Cour I 5 5 5	of Variance uality of Variance Variance Normality virnov D vness osis rson K2 Omr ng A2 Norma mary nt Mean 0.930 0.942 0.924	9839 1982 ance lity	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266 0.9148 0.4087  95% LCL 0.9176 0.905 0.9023	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878 95% UCL 0.9431 0.9789 0.9459	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985 0.6329 0.3506  Median 0.933 0.942 0.9196	Occision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di Normal Di Normal Di 0.9196 0.8973 0.9018	(a:1%) iances iances iances istribution istribution istribution istribution istribution  or Max  0.942 0.9732 0.942	Std Err 0.004596 0.01332 0.00786	1.11% 3.16% 1.9%	0.0% -1.25% 0.67%
0.026 0.051 0.077	Tests oportio	2.87492 2.927574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin D'Agostin Anderson In Normal	quality ene Equality Vilk W ov-Sm o Skev o Kurto o-Peau -Darlin Cour I 5 5 5 5	of Variance uality of Variance Variance Normality virnov D vness osis rson K2 Omr ng A2 Norma mary nt Mean 0.930 0.942 0.924 0.777	9839 1982 ance ance	27  Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266 0.9148 0.4087  95% LCL 0.9176 0.905 0.9023 0.7359	5 24 29 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878 95% UCL 0.9431 0.9789 0.9459 0.8194	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985 0.6329 0.3506  Median 0.933 0.942 0.9196 0.7634	Occision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di Normal Di Normal Di 0.9196 0.8973 0.9018 0.7455	(a:1%) iances iances iances istribution istribution istribution istribution istribution  Max 0.942 0.9732 0.942 0.8304	Std Err 0.004596 0.01332 0.00786 0.01503	1.11% 3.16% 1.9% 4.32%	0.0% -1.25% 0.67% 16.41%
Source Between Error Total- Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Distribution Combined Pro C-µg/L 0 0.026 0.051	Tests oportio	2.87492 2.927574 2.927677 Test Bartlett Ed Mod Leve Levene Ed Shapiro-V Kolmogor D'Agostin D'Agostin D'Agostin Anderson In Normal	quality ene Equality Vilk W ov-Sm o Skev o Kurte o-Pear -Darlin Sumr Cour I 5 5 5	of Variance uality of Variance Variance Normality virnov D vness osis rson K2 Omr ng A2 Norma mary nt Mean 0.930 0.942 0.924	9839 1982 ance ance	Test Stat 8.466 1.785 3.004 0.9632 0.1154 0.7984 0.5266 0.9148 0.4087  95% LCL 0.9176 0.905 0.9023	5 24 29 Critical 15.09 4.248 3.895 0.9031 0.1853 2.576 2.576 9.21 3.878 95% UCL 0.9431 0.9789 0.9459	P-Value 0.1324 0.1669 0.0303 0.3724 0.3792 0.4246 0.5985 0.6329 0.3506  Median 0.933 0.942 0.9196	Occision( Equal Var Equal Var Equal Var Normal Di Normal Di Normal Di Normal Di Normal Di 0.9196 0.8973 0.9018	(a:1%) iances iances iances istribution istribution istribution istribution istribution  or Max  0.942 0.9732 0.942	Std Err 0.004596 0.01332 0.00786	1.11% 3.16% 1.9%	-1.25%

Report Date: Test Code:

03 Mar-16 13:09 (p 2 of 2) MYT020116 | 03-9971-1783

							Tes	t Code:	MYI	020116   03	3-99/1-1/8
Mussel Shell	Development Te	st						Aquatic Bi	oassay & 0	Consulting	Labs, Inc.
Analysis ID: Analyzed:	15-7317-4648 03 Mar-16 8:20		ndpoint: Co	ombined Prop erametric-Cor				TIS Version: cial Results:	CETISv1 Yes	.8.7	
Angular (Cor	rected) Transforn	ned Sun	nmary								
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.304	1.279	1.329	1.309	1.283	1.327	0.009018	1.55%	0.0%
0.026		5	1.334	1.255	1.412	1.327	1.245	1.406	0.02835	4.75%	-2.25%
0.051		5	1.293	1.252	1.335	1.283	1.252	1.327	0.01494	2.58%	0.85%
0.077		5	1.081	1.029	1.132	1.063	1.042	1.146	0.01851	3.83%	17.14%
0.098		5	0.7818	0.7496	0.814	0.7765	0.7586	0.8256	0.0116	3.32%	40.06%
0.121		5	0.5042	0.4141	0.5943	0.5338	0.4002	0.5738	0.03244	14.39%	61.34%
Combined Pr	roportion Normal	Detail									
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Negative Control	0.942	0.9196	0.933	0.9196	0.9375		-			
0.026		0.942	0.9643	0.933	0.8973	0.9732					
0.051		0.942	0.9196	0.9152	0.942	0.9018					
0.077		0.8304	0.7902	0.7455	0.7634	0.7589					
0.098		0.5402	0.4955	0.4821	0.4911	0.4732					
0.121		0.2768	0.2589	0.1964	0.2946	0.1518					
Angular (Cor	rected) Transforn	ned Deta	ail								
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Negative Control	1.327	1.283	1.309	1.283	1.318					
0.026	-	1.327	1.381	1.309	1.245	1.406					
0.051		1.327	1.283	1.275	1.327	1.252					
0.077		1.146	1.095	1.042	1.063	1.058					
0.098		0.8256	0.7809	0.7675	0.7765	0.7586					
0.121		0.554	0.5338	0.4592	0.5738	0.4002					
Combined Pr	roportion Normal	Binomia	als		_		_				_
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Negative Control			209/224	206/224	210/224					
0.026	J	211/224		209/224	201/224	218/224					
0.051		211/224		205/224	211/224	202/224					
0.077		186/224		167/224	171/224	170/224					
0.098		121/224		108/224	110/224	106/224					
0.121		62/224	58/224	44/224	66/224	34/224					

000-055-186-4 CETIS™ v1.8.7.11

CETIS	S Analy	tical Repo	ort		,			_	ort Date:			:09 (p 1 of 2 )3-9971-1783
Musse	I Shell De	velopment Te	st						Aquatic I	Bioassay &	Consultin	g Labs, Inc.
Analys Analyz		0-9709-5571 3 Mar-16 8:20		point: lysis:	Combined Pro Linear Interpol				TS Version		.8.7	
Batch I	ID: 1	 5-4694-9349	Test	Type:	Development-	Survival		Ana	lyst:			
Start D	ate: 0	1 Feb-16 10:0	0 Prot	ocol:	EPA/600/R-95	/136 (1995)		Dilu	ent: Lab	oratory Sea	water	
Ending	Date: 0	3 Feb-16 10:00	0 Spe	cies:	Mytilis gallopro	ovincialis		Brin	ie: Not	t Applicable		
Duratio	on: 48	3h	Sou	rce:	Carlsbad Aqua	afarms CA		Age	:			
Sample	e ID: 1	5-9110-5695	Cod			MYT020116m				ernal Lab		
Sample	e Date: 0	1 Feb-16 10:00	0 Mate	erial:	Copper chlorid	le		Proj	ect: RE	F TOX		
Receiv	e Date:		Sou	rce:	Reference Tox	kicant						
Sample	e Age: N	A	Stat	ion:	REF TOX							
Linear	Interpolat	ion Options				_						
X Trans	sform	Y Transform	See	d	Resamples	Exp 95%	CL Meth	od				
Linear		Linear	0		280	Yes	Two-	Point Interp	oolation			
Point E	Estimates		_									
Level	μg/L	95% LCL	95% UCL									
EC5	0.05717	0.05314	0.06092									
EC10	0.06548	0.06137	0.07106									
EC15	0.07379	0.06836	0.07992									
EC20	0.07915	0.07637	0.08201									
EC25	0.08264	0.08031	0.08499									
EC40 EC50	0.09313 0.1005	0.09154 0.09822	0.09527 0.1032									
		ortion Normal					ılated Varia		-		r	
C-µg/L		trol Type	Count	Mean		Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Neg	ative Control	5	0.930		0.942	0.004596	0.01028	1.11%	0.0%	1042	1120
0.026			5 5	0.942		0.9732 0.942	0.01332 0.00786	0.02978 0.01758	3.16% 1.9%	-1.25% 0.67%	1055 1035	1120 1120
0.051 0.077			5	0.924		0.8304	0.00766	0.01756	4.32%	16.41%	871	1120
0.077			5	0.496		0.5402	0.01303	0.03502	5.22%	46.64%	556	1120
0.121			5	0.235		0.2946	0.02673	0.05976	25.35%	74.66%	263	1120
Combin	ned Propo	rtion Normal	 Detail									
C-µg/L	-	trol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0 0		ative Control	0.942	0.919		0.9196	0.9375					
0.026	9		0.942	0.964		0.8973	0.9732					
0.051			0.942	0.919		0.942	0.9018					
0.077			0.8304	0.790		0.7634	0.7589					
0.098			0.5402	0.495		0.4911	0.4732					
0.121			0.2768	0.258		0.2946	0.1518					
Combin	ned Propo	ortion Normal	Binomials									
C-µg/L		ntrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0		gative Control		206/2		206/224	210/224					
0.026		-	211/224	216/2		201/224	218/224					

Analyst: VO QA:

CETIS™ v1.8.7.11

211/224

171/224

110/224

66/224

202/224

170/224

106/224

34/224

0.051

0.077

0.098

0.121

211/224

186/224

121/224

62/224

206/224

177/224

111/224

58/224

205/224

167/224

108/224

44/224

Report Date:

03 Mar-16 13:09 (p 2 of 2)

Test Code:

MYT020116 | 03-9971-1783

Mussel Shell Development Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

20-9709-5571 03 Mar-16 8:20

**Endpoint:** Combined Proportion Normal Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7 Official Results: Yes

#### **CETIS Measurement Report**

Report Date:

03 Mar-16 13:09 (p 1 of 2)

Test Code: MYT020116 | 03-9971-1783

Mussel Shell Development Test	Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 15-4694-9349 Test Type: Development-Survival Analyst:

Start Date: 01 Feb-16 10:00 EPA/600/R-95/136 (1995) Diluent: Laboratory Seawater Protocol: Ending Date: 03 Feb-16 10:00 Species: Mytilis galloprovincialis Brine: Not Applicable Duration: Carlsbad Aquafarms CA 48h Source: Age:

Sample ID:15-9110-5695Code:MYT020116mClient:Internal LabSample Date:01 Feb-16 10:00Material:Copper chlorideProject:REF TOX

Receive Date: Source: Reference Toxicant
Sample Age: NA Station: REF TOX

#### Dissolved Oxygen-mg/L

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.5	1.418	11.58	6.1	6.9	0.4	0.5657	8.7%	0
0.026		2	6.5	5.229	7.771	6.4	6.6	0.1	0.1414	2.18%	0
0.051		2	6.4	5.129	7.671	6.3	6.5	0.1	0.1414	2.21%	0
0.077		2	6.2	4.929	7.471	6.1	6.3	0.1	0.1414	2.28%	0
0.098		2	6.25	5.615	6.885	6.2	6.3	0.05001	0.07072	1.13%	0
0.121		2	6.25	5.615	6.885	6.2	6.3	0.05001	0.07072	1.13%	0
Overail		12	6.35			6.1	6.9				0 (0%)

#### Total Ammonia (N)-mg/L

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
0.026		1	1.55			1.55	1.55	0	0	0.0%	0
0.051		1	2.86			2.86	2.86	0	0	0.0%	0
0.077		1	4.33			4.33	4.33	0	0	0.0%	0
0.098		1	5.51			5.51	5.51	0	0	0.0%	0
0.121		1	6.79			6.79	6.79	0	0	0.0%	0
Overall		6	3.507			0	6.79				0 (0%)

#### pH-Units

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.026		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.051		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.077		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.098		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.121		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
Overall		12	7.9		-	7.9	7.9				0 (0%)

#### Salinity-ppt

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
0.026		2	34	34	34	34	34	0	0	0.0%	0
0.051		2	34	34	34	34	34	0	0	0.0%	0
0.077		2	34	34	34	34	34	0	0	0.0%	0
0.098		2	34	34	34	34	34	0	0	0.0%	0
0.121		2	34	34	34	34	34	0	0	0.0%	0
Overall		12	34			34	34				0 (0%)

#### Temperature-°C

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
0.026		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
0.051		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
0.077		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
0.098		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
0.121		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
Overall		12	14.75			14.7	14.8				0 (0%)

### **CETIS Measurement Report**

Report Date: Test Code: 03 Mar-16 13:09 (p 2 of 2) MYT020116 | 03-9971-1783

	<u></u>			Test Code. M11/02/01/0   03-307/1-17/03
Mussel She	II Development Te	est		Aquatic Bioassay & Consulting Labs, Inc.
Dissolved C	)xygen-mg/L			
C-µg/L	Control Type	1	2	
0	Negative Contr	6.9	6.1	
0.026	-	6.6	6.4	
0.051		6.5	6.3	
0.077		6.3	6.1	
0.098		6.2	6.3	
0.121		6.3	6.2	
Total Ammo	onia (N)-mg/L			
C-µg/L	Control Type	1		
0	Negative Contr	0		
0.026		1.55		
0.051		2.86		
0.077		4.33		
0.098		5.51		
0.121		6.79		
pH-Units				·
C-µg/L	Control Type	1	2	
0	Negative Contr	7.9	7.9	
0.026		7.9	7.9	
0.051		7.9	7.9	·
0.077		7.9	7.9	
0.098		7.9	7.9	
0.121		7.9	7.9	
Salinity-ppt				
C-µg/L	Control Type	1	2	
0	Negative Contr	34	34	
0.026		34	34	
0.051		34	34	
0.077		34	34	
0.098		34	34	
0.121		34	34	
Temperatur	e-°C			
C-µg/L	Control Type	1	2	
0	Negative Contr	14.8	14.7	
0.026		14.8	14.7	
0.051		14.8	14.7	
0.077		14.8	14.7	
0.098		14.8	14.7	
0.121		14.8	14.7	



March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu.

SAMPLE I.D.:

24-BB-03Z

DATE RECEIVED:

01/31/2016

ABC LAB. NO.:

COM0116.224

#### CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 %

EC50 = >100.00%

Yours very truly,

Scott Johnson

Laboratory Director

### **CETIS Summary Report**

Report Date:

03 Mar-16 10:26 (p 1 of 1)

Test Code:

COM0116.224urc | 06-2062-7839

								000 0000		71110110	/ 0.10   0	0 2002 . 0
Purple Sea Ur	chin Sperm Cell	Fertilizat	ion Test	:		_		Aqua	tic Bioas	say & 0	Consulting	Labs, Ind
Batch ID: Start Date: Ending Date: Duration:	06-9724-3860 01 Feb-16 13:00 01 Feb-16 13:40 40m	Pro Sp	st Type: otocol: ecies: urce:	Fertilization EPA/600/R-95/ Strongylocentro David Gutoff		tus	[ E	Analyst: Diluent: Brine: Age:	Laborato Not App		water	
Sample ID:	19-8486-0480	Co	de:	COM0116.224	u		(	Client:	City of N	1alibu		
Sample Date:	31 Jan-16 10:32	2 Ma	terial:	Sample Water			F	Project:	ASBS			
Receive Date:	31 Jan-16 12:40	) So	urce:	Bioassay Repo	ort							
Sample Age:	26h	Sta	ation:	24-BB-03Z								
Comparison S	Summary											
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Meth	od			
14-0221-3411	Fertilization Rate	е	100	>100	NA	NA	1	Wilco	xon Ran	k Sum 1	Two-Sampl	e Test
Point Estimate	e Summary					_		_			_	
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	od			
01-2697-4760	Fertilization Rate	e	EC5	>100	N/A	N/A	<1	Linea	r Interpo	lation (I	CPIN)	
			EC10	>100	N/A	N/A	<1					
			EC15		N/A	N/A	<1					
			EC20		N/A	N/A	<1					
			EC25		N/A	N/A	<1					
			EC40		N/A	N/A	<1					
	_		EC50	>100	N/A	N/A	<1					
Test Acceptab	oility											
Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Limi	its	Over		cision		
01-2697-4760	Fertilization Rate	е	Contr	ol Resp	1	0.7 - NL		Yes			cceptability	
14-0221-3411	Fertilization Rate	e 	Contr	ol Resp	1	0.7 - NL		Yes	Pa	asses A	cceptability	Criteria
Fertilization R	ate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	rr St	d Dev	CV%	%Effec
0	Negative Control		1	1	1	1	1	0	0		0.0%	0.0%
100		8	1	11	1	1 	1	0	0		0.0%	0.0%
Fertilization R	ate Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	7 Re	ep 8		
0	Negative Control	1	1	1	1	1	1	1	1			
100		1	1	1	1	1	1	1	1			
Fertilization R	ate Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep	7 Re	ep 8		
0	Negative Control	100/100	100/1	00 100/100	100/100	100/100	100/1	00 100/1	00 10	0/100		
100				00 100/100	100/100	100/100	100/1	00 100/1		0/100		

000-055-186-4

Report Date:

03 Mar-16 10:26 (p 1 of 1)

Test Code:

COM0116.224urc | 06-2062-7839

Purple Sea U	rchin Sperm Cel	l Fertiliz	ation Test			<del>-</del>		Aquatic E	Bioassay &	Consultin	g Labs, Inc.
Analysis ID: Analyzed:	14-0221-3411 03 Mar-16 8:21		indpoint: analysis:	Fertilization Nonparamet	Rate ric-Two Sam	ple		IS Version:		.8.7	
Batch ID: Start Date: Ending Date: Duration:	06-9724-3860 01 Feb-16 13:0 01 Feb-16 13:4 40m	0 F	est Type: Protocol: Species: Source:		95/136 (1995 ntrotus purpu	,	Ana Dilu Brin Age	e: Not	ooratory Sea Applicable	water	
Sample ID:	19-8486-0480		ode:	COM0116.2			Clie	,	of Malibu		
•	: 31 Jan-16 10:3 : 31 Jan-16 12:4 26h	0 S	Material: source: station:	Sample Wat Bioassay Re 24-BB-03Z			Proj	ect: ASI	BS		
Data Transfo		Zeta	Alt H		Seed			Test Res	ult		
Angular (Corre		NA	C > T		NA				ertilization ra	te	
Wilcoxon Ra	nk Sum Two-Sar	nple Tes	t								
Control	vs C-%		Test S	Stat Critical	Ties [	F P-Value	P-Type	Decision	(a:5%)		
Negative Conf	trol 100		68	NA	1 1	4 1.0000	Exact	Non-Sign	ificant Effec	t	
Test Accepta	bility Criteria										
Attribute	Test Stat	TAC Li	mits	Overla	p Decisio	n					
Control Resp	1	0.7 - NI	L	Yes	Passes	Acceptability	Criteria				
ANOVA Table	)										
Source	Sum Squa	ares		Square	DF	F Stat	P-Value	Decision	· <u>-</u>		
Between	0		0		1	65540	<0.0001	Significar	it Effect		
Error Total	0		0		14 15	-					
Distributiona	I Toete										
Attribute	Test			Test St	at Critical	P-Value	Decision	(a.19/)			
Distribution	D'Agostin	o Skewn	ess	1.937	2.576	0.0527		istribution			
	Rate Summary										
C-%	Control Type	Count	Mean	95% LC	CL 95% UC	L Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contro	l 8	1	1	1	1	1	1	0	0.0%	0.0%
100		8	1	1	1	1	1	1	0	0.0%	0.0%
Angular (Cori	rected) Transfor	ned Sun	nmary		_						
C-%	Control Type	Count	Mean	95% LC	L 95% UC	L Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	8	1.521	1.521	1.521	1.521	1.521	1.521	0	0.0%	0.0%
100		8	1.521	1.521 ———————	1.521	1.521	1.521	1.521 —————	0	0.0%	0.0%
Fertilization F	Rate Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Negative Contro		1	1	1	1	1	1	1		
100		1	1 	1	1	1	1 ————	1	1 ————————————————————————————————————		
Angular (Corr	rected) Transfori	ned Deta	ail								
C-%	Control Type	Rep 1	Rep 2		Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0 100	Negative Contro	1.521 1.521	1.521 1.521	1.521 1.521	1.521 1.521	1.521 1.521	1.521 1.521	1.521 1.521	1.521 1.521		
	Rate Binomials	1.021	1.021	1.321		1.521	1.041	1.521	1.521		
		Da = 4	Dem 1	D- · · · ^	Day 4	Da	Dan 1	Den 7	Dom 0		
<u>C-%</u>	Control Type Negative Contro	Rep 1	Rep 2		Rep 4	Rep 5 100/100	Rep 6 100/100	Rep 7	Rep 8 100/100	_	
100	110gative Contilo	100/100				100/100	100/100	100/100	100/100		

CETIS™ v1.8.7.11 Analys

Analyst: QA

Report Date:

03 Mar-16 10:26 (p 1 of 2)

Test Code:

COM0116.224urc | 06-2062-7839

									lest Code:	COMOTTE	5.224urc	06-2062-7839
Purple	Sea Ur	chin Sperm Cel	l Fertilizati	on Test	t	_	_		Aquat	ic Bioassay &	Consulti	ng Labs, Inc.
Analys	is ID:	01-2697-4760	End	point:	Fertilization Ra	te			CETIS Versi	ion: CETISv1	1.8.7	
Analyz	ed:	03 Mar-16 8:21	Ana	lysis:	Linear Interpola	ation (ICPIN	۷)	(	Official Res	ults: Yes		
Batch	ID:	06-9724-3860	Test	Type:	Fertilization				Analyst:			
Start D	ate:	01 Feb-16 13:00	0 Prot	ocol:	EPA/600/R-95/	136 (1995)		I	Diluent:	Laboratory Sea	water	
Ending	Date:	01 Feb-16 13:40	0 Spe	cies:	Strongylocentro	otus purpur	atus		Brine:	Not Applicable		
Duratio	on:	40m	Sou	rce:	David Gutoff			,	Age:			
Sample	D:	19-8486-0480	Cod	e:	COM0116.224	ı 		(	Client:	City of Malibu		
•		31 Jan-16 10:32		erial:	Sample Water			F	Project:	ASBS		
		31 Jan-16 12:40	) Sou	rce:	Bioassay Repo	rt						
Sample	e Age:	26h	Stat	ion:	24-BB-03Z							
Linear	Interpo	lation Options										_
X Trans	sform	Y Transform	See	d	Resamples	Exp 95%	6CL Me	ethod				
Linear		Linear	0		280	Yes	Tw	vo-Point In	terpolation			_
Test Ad	ceptab	ility Criteria			_							
Attribu	te	Test Stat	TAC Limit	s	Overlap	Decision	1					
Control	Resp	1	0.7 - NL		Yes	Passes A	cceptabili	ty Criteria				
Point E	stimate	es ·							_			
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL	<u> </u>					
EC5	>100	N/A	N/A	<1	NA .	NA						
EC10	>100	N/A	N/A	<1	NA	NA						
EC15	>100	N/A	N/A	<1	NA	NA						
EC20 EC25	>100	N/A	N/A	<1	NA	NA						
EC40	>100 >100	N/A N/A	N/A N/A	<1 <1	NA NA	NA NA						
EC50	>100	N/A	N/A	<1	NA NA	NA						
	-	ate Summary	-				ulated Var	rioto/A/D)				
C-%		ontrol Type	Count	Mean	Min	Max	Std Err		ev CV%	%Effect	Α	В
0		egative Control	8	1	1	1	0	0	0.0%	0.0%	800	800
100			8	1	1	1	0	0	0.0%	0.0%	800	800
Fertiliza	ation Ra	ate Detail										
C-%	C	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	N	egative Control	1	1	1	1	1	1	1	1	_	
100			1	1	1	1	1	1	1	1		
Fertiliza	ation Ra	ate Binomials										
C-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0		Negative Control	100/100	100/10	00 100/100	100/100	100/100	100/10	00 100/10	00 100/100		
100			100/100	100/10	00 100/100	100/100	100/100	100/10	00 100/10	00 100/100		

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:26 (p 2 of 2)

Test Code:

COM0116.224urc | 06-2062-7839

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

01-2697-4760 03 Mar-16 8:21

Endpoint: Fertilization Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

### **CETIS Measurement Report**

Report Date:

03 Mar-16 10:26 (p 1 of 1)

Test Code:

COM0116.224urc | 06-2062-7839

Purple Sea U	Irchin Sperm Ce	II Fertil	ization Tes	t					Aqua	tic Bioassay &	Consultin	g Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	06-9724-3860 01 Feb-16 13:4 01 Feb-16 13:4		Test Type: Protocol: Species: Source:	EPA/6	600/R-95	/136 (1995) rotus purpur	atus	Dil	alyst: uent: ne: e:	Laboratory Sea		
	19-8486-0480 : 31 Jan-16 10:3 e: 31 Jan-16 12:4 26h		Code: Material: Source: Station:	Samp	0116.224 le Water say Rep 3-03Z				ent: oject:	City of Malibu ASBS		
Parameter A	cceptability Crite	 eria										
Parameter			Min	Max	Acc	ceptability	Limits	Overlap	Decisio	on	_	
Salinity-ppt			34	34		- 36		Yes		Within Limits		
Temperature-	·°C —————		14.7 ————	14.8	11	- 13 ————		Yes	Results	Above Limit		
Dissolved Ox	xygen-mg/L											
C-%	Control Type	Coun			5% LCL	95% UCL	Min	Max	Std E		CV%	QA Count
0 100	Negative Contr		6.45		003	10.9	6.1	6.8	0.35	0.495	7.67% 2.28%	0
Overall		<u>2</u>	6.2	4.	929	7.471	6.1	6.8	0.1	0.1414	2.2070	0 (0%)
pH-Units												
C-%	Control Type	Coun	t Mean	Q	5% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
0	Negative Contr		7.9		884	7.916	7.9	7.9	0	0	0.0%	0
100		2	8.05		415	8.685	8	8.1	0.0500		0.88%	0
Overall		4	7.975				7.9	8.1				0 (0%)
Salinity-ppt												
C-%	Control Type	Coun	t Mean	9	5% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	4	34	34	34	0	0	0.0%	0
100		2	34	34	4	34	34	34	0	0	0.0%	0 (00()
Overall		4	34				34	34				0 (0%)
Temperature												
C-%	Control Type	Count			5% LCL	95% UCL		Max	Std E		CV%	QA Count
0 100	Negative Contr		14.75		4.11	15.39	14.7	14.8	0.0500		0.48%	0 0
Overall		4	14.75 14.75		4.11	15.39	14.7	14.8	0.0500	0.07075	0.48%	0 (0%)
Dissolved Ox	vygen-mg/l											
C-%	Control Type	1	2									
0	Negative Contr	<del>1</del> 6.8	<u>2</u> 6.1									
100	regulive conti	6.1	6.3									
pH-Units												
C-%	Control Type	1	2									
0	Negative Contr		7.9									
100		8.1	8									
Salinity-ppt												
C-%	Control Type	1	2									
0	Negative Contr	34	34	_								
100		34	34									
Temperature	-°C											
C-%	Control Type	_1	2									
0	Negative Contr	14.8	14.7									
100		14.8	14.7									

Analyst: QA:



March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03R

DATE RECEIVED:

01/31/2016

ABC LAB. NO.:

COM0116.225

#### CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 %

EC50 = >100.00 %

Yours very truly,

Scott Johnson

Laboratory Director

### **CETIS Summary Report**

Report Date:

03 Mar-16 10:27 (p 1 of 1)

Test Code: COM0116.225urc | 14-1010-1755

								rest Code	;	COMOTIO	.225urc	14-1010-175
Purple Sea Ur	rchin Sperm Cel	l Fertiliza	tion Tes	t		_		Aqua	atic B	ioassay & 0	Consultin	g Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	12-1551-4559 01 Feb-16 13:0 01 Feb-16 13:4 40m	1 Pr 1 Sp	st Type: otocol: pecies: purce:	Fertilization EPA/600/R-95/ Strongylocentro David Gutoff	, ,	tus	i	Analyst: Diluent: Brine: Age:		oratory Seav	water	
	13-6295-5562 31 Jan-16 10:50 31 Jan-16 12:40 26h	) Ma	ode: aterial: ource: ation:	COM0116.2256 Sample Water Bioassay Repo 24-BB-03R				Client: Project:	City ASB	of Malibu		
Comparison S	Summary	_										
Analysis ID	Endpoint		NOEL	L LOEL	TOEL	PMSD	TU	Meti	hod			
09-0461-9744	Fertilization Rat	e	100	>100	NA	NA	1			Rank Sum	Гwo-Samp	le Test
Point Estimat	e Summary											
Analysis ID	Endpoint		Level	I %	95% LCL	95% UCL	TU	Meth	hod			
08-8749-7689	Fertilization Rat	e	EC5	>100	N/A	N/A	<1	Line	ar Inte	erpolation (I	CPIN)	
			EC10	>100	N/A	N/A	<1					
			EC15	>100	N/A	N/A	<1					
			EC20	>100	N/A	N/A	<1					
			EC25	>100	N/A	N/A	<1					
			EC40	>100	N/A	N/A	<1					
			EC50	>100	N/A	N/A	<1					
Test Acceptab	oility											
Analysis ID	Endpoint		Attrib	oute	Test Stat	TAC Limi	its	Ove	rlap	Decision		
08-8749-7689	Fertilization Rat	е	Contr	ol Resp	1	0.7 - NL		Yes		Passes A	cceptabilit	y Criteria
09-0461-9744	Fertilization Rat	e	Contr	ol Resp	1	0.7 - NL		Yes		Passes A	cceptabilit	y Criteria
Fertilization R	Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std	Err	Std Dev	CV%	%Effect
0	Negative Control	8	1	1	1	1	1	0		0	0.0%	0.0%
100		88	1	11	1	1	1	0		0	0.0%	0.0%
Fertilization R	late Detail											
C-%	Control Type	Rep 1	Rep 2		Rep 4	Rep 5	Rep 6		7	Rep 8		
0	Negative Control	1	1	1	1	1	1	1		1		
100		1	1	1	1	1	1	11		1		
Fertilization R	tate Binomials											
		_			D 4	Dan 5	Rep 6	6 Rep	7	Dan 0		
C-%	Control Type	Rep 1	Rep 2	2 Rep 3	Rep 4	Rep 5	veh (	, veb	1	Rep 8		
0 C-%	Control Type Negative Control		100/1		100/100	100/100	100/1	<u>-</u>		100/100		

CETIS™ v1.8.7.11

000-055-186-6

Report Date:

03 Mar-16 10:26 (p 1 of 1)

Test Code:

COM0116.225urc | 14-1010-1755

								I es	t Code:	COMUTTE	.225urc	14-1010-175
Purple Sea Ur	rchin Sperm Cel	l Fertili:	zation Test	t		_	_		Aquatic	Bioassay &	Consultir	g Labs, Ind
Analysis ID: Analyzed:	09-0461-9744 03 Mar-16 8:21		Endpoint: Analysis:	Fertilizat Nonpara		te -Two Samp	le		ΓIS Versior cial Result		1.8.7	
Batch ID:	12-1551-4559		Test Type:	Fertilizati	ion			Ana	ılyst:			
Start Date:	01 Feb-16 13:0	1 I	Protocol:	EPA/600	/R-95/	136 (1995)		Dilu	ient: La	boratory Sea	water	
Ending Date:	01 Feb-16 13:4	1 5	Species:	Strongylo	ocentro	otus purpur	atus	Brit	ne: No	ot Applicable		
Duration:	40m		Source:	David Gu	ıtoff			Age	<b>:</b> :			
Sample ID:	13-6295-5562	- (	Code:	COM011	6.225ı	1		Clie	nt: Ci	ty of Malibu		_
•	31 Jan-16 10:50		Material:	Sample \	Nater			Pro	ject: AS	SBS		
	31 Jan-16 12:40		Source:	Bioassay		rt						
Sample Age:	26h		Station:	24-BB-03	3R							
Data Transfor		Zeta	Alt H		ls	Seed			Test Re		_	
Angular (Corre	cted) 	NA	C > T	NA		NA			Passes	fertilization ra	ite	_
Wilcoxon Ran	k Sum Two-San	nple Te	st									
Control	vs C-%		Test		ical		F_P-Value	P-Type	Decisio	<u> </u>		
Negative Contr	rol 100		68	NA		1 14	1.0000	Exact	Non-Sig	nificant Effec	t	
Test Acceptab	oility Criteria											
Attribute	Test Stat	TAC L	imits	Ove	erlap	Decision						
Control Resp	1	0.7 - N	L	Yes		Passes A	cceptability	Criteria				
ANOVA Table												
Source	Sum Squa	ires	Mean	Square		DF	F Stat	P-Value	Decisio	n(α:5%)		
Between	0		0			1	65540	<0.0001	Significa	nt Effect		
Error	0		0			14	_					
Total	0					15			_			
Distributional	Tests											
Attribute	Test			Tes	t Stat	Critical	P-Value	Decision	(α:1%)			
Distribution	D'Agostin	o Skewr	ness	1.93	37	2.576	0.0527	Normal D	istribution		_	
Fertilization R	ate Summary					_						
C-%	Control Type	Count	Mean	95%	LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	1	1		1	1	1	1	0	0.0%	0.0%
100		8	1	1		1	1	1	1	0	0.0%	0.0%
Angular (Corre	ected) Transforn	ned Sur	nmary									_
C-%	Control Type	Count	Mean	95%	LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	8	1.521	1.52	<u>'</u> 1	1.521	1.521	1.521	1.521	0	0.0%	0.0%
100		8	1.521	1.52	:1	1.521	1.521	1.521	1.521	0	0.0%	0.0%
Fertilization R	ate Detail			_								
C-%	Control Type	Rep 1	Rep 2	Rep	3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Negative Control	1	1	1		1	1	1	1	1		
100		1	1	1		1	1	1	1	1		_
Angular (Corre	ected) Transforn	ned Det	ail									
C-%	Control Type	Rep 1	Rep 2	Rep	3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	Negative Control	1.521	1.521	1.52		1.521	1.521	1.521	1.521	1.521		
100		1.521	1.521	1.52	1	1.521	1.521	1.521	1.521	1.521		
Fertilization Ra	ate Binomials				_			_				_
	Control Type	Rep 1	Rep 2	Rep	3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
	Negative Control					100/100	100/100	100/100	100/100	100/100		
100	_	100/10				100/100	100/100	100/100	100/100	100/100		
		100/10	0 100/10	,5 100/	,00	100/100	100/100	100/100	100/100	100/100		

Analyst:\_\_\_\_\_QA:\_\_\_

Report Date:

03 Mar-16 10:27 (p 1 of 2)

Test Code:

COM0116.225urc | 14-1010-1755

									est Code:	COMUTTE	5.225urc	14-1010-17
Purple	Sea Ur	chin Sperm Cell	l Fertilizati	on Tes	t			_	Aquat	ic Bioassay &	Consulti	ng Labs, Ind
Analys	is ID:	08-8749-7689	End	lpoint:	Fertilization Ra	ate			ETIS Versi	on: CETISv1	1.8.7	
Analyz	ed:	03 Mar-16 8:21	Ana	lysis:	Linear Interpol	ation (ICPIN	1)	C	Official Res	ults: Yes		
Batch	ID:	12-1551-4559	Tes	t Type:	Fertilization			Α	nalyst:			
Start D	ate:	01 Feb-16 13:01	1 Pro	tocol:	EPA/600/R-95	/136 (1995)			Diluent:	Laboratory Sea	water	
Ending	Date:	01 Feb-16 13:4	1 Spe	cies:	Strongylocentr	otus purpur	atus	Е	Brine:	Not Applicable		
Duratio	on:	40m	Sou	rce:	David Gutoff			A	\ge:			
Sample	e ID:	13-6295-5562	Coc	le:	COM0116.225	u	_	C	lient:	City of Malibu		
Sample	e Date:	31 Jan-16 10:50	) Mat	erial:	Sample Water			P	Project:	ASBS		
Receiv	e Date:	31 Jan-16 12:40	) Sou	rce:	Bioassay Repo	ort						
Sample	e Age:	26h	Stat	ion:	24-BB-03R							
Linear	Interpo	lation Options										
X Trans	sform	Y Transform	See	d	Resamples	Exp 95%	CL Me	ethod				
Linear		Linear	0		280	Yes	Tw	o-Point Int	terpolation			
Test Ad	ceptab	oility Criteria										_
Attribu	te	Test Stat	TAC Limi	ts	Overlap	Decision						
Control	Resp	1	0.7 - NL		Yes	Passes A	cceptabilit	ty Criteria				_
Point E	stimate	es -	_				_					
Level	%	95% LCL	95% UCL	TU_	95% LCL	95% UCL						
EC5	>100	N/A	N/A	<1	NA	NA						
EC10	>100	N/A	N/A	<1	NA	NA						
EC15	>100	N/A	N/A	<1	NA	NA						
EC20	>100	N/A	N/A	<1	NA	NA						
EC25	>100	N/A	N/A	<1	NA	NA						
EC40	>100	N/A	N/A	<1	NA	NA						
EC50	>100	N/A	N/A	<1	NA 	NA						
Fertiliz	ation R	ate Summary				Calcu	ılated Var	riate(A/B)			-	
C-%		ontrol Type	Count	Mean	Min	Max	Std Err	Std De	ev CV%	%Effect	Α	В
0	N	egative Control	8	1	1	1	0	0	0.0%	0.0%	800	800
100			8	1	1	1	0	0	0.0%	0.0%	800	800
Fertiliz	ation R	ate Detail										
C-%	С	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0	N	egative Control	1	1	1	1	1	1	1	1		
100			1	1	1	1	1	1	1	1		
Fertiliza	ation R	ate Binomials										
C-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
0		Negative Control	100/100	100/1	00 100/100	100/100	100/100	100/10	00 100/10	00 100/100		
100			100/100	100/1	00 100/100	100/100	100/100	100/10	00 100/10	00 100/100		
										_		

Analyst: QA:

Report Date:

03 Mar-16 10:27 (p 2 of 2)

Test Code:

COM0116.225urc | 14-1010-1755

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

08-8749-7689 03 Mar-16 8:21

Endpoint: Fertilization Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

### **CETIS Measurement Report**

Report Date:

03 Mar-16 10:27 (p 1 of 1)

Test Code:

COM0116.225urc | 14-1010-1755

									or ocac.	001110111	J.LLOUIO	11 1010 1700
Purple Sea U	rchin Sperm Ce	II Ferti	ization Tes	t					Aqua	tic Bioassay &	Consultin	g Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	12-1551-4559 01 Feb-16 13:0 01 Feb-16 13:4 40m		Test Type: Protocol: Species: Source:	EPA/6	600/R-95	5/136 (1995) rotus purpur		Dil	alyst: uent: ne: e:	Laboratory Sea Not Applicable	ıwater	
Receive Date:	13-6295-5562 31 Jan-16 10:5 31 Jan-16 12:4		Code: Material: Source:	Samp Bioas	0116.225 le Water say Rep	r			ent: oject:	City of Malibu ASBS		
Sample Age:			Station:	24-BE	3-03R							
	ceptability Crite	eria										
Parameter			Min	Max		ceptability	Limits	Overlap	Decision			
Salinity-ppt Temperature-°	rc.		34 14.7	34 14.8		- 36 - 13		Yes Yes		Within Limits Above Limit		
				14.0								
Dissolved Ox		•			<b>5</b> 07 1 <b>0</b> 1	050/ 1101			0.15	04.15	0.404	04.0
C-% 0	Control Type Negative Contr	Coun 2	6.45		5% LCL .003	95% UCL 10.9	Min 6.1	Max 6.8	0.35	7 Std Dev 0.495	7.67%	QA Count
100	rvegative Conti	2	6.25		.003	9.427	6	6.5	0.35	0.493	5.66%	0
Overall		4	6.35				6	6.8				0 (0%)
pH-Units												
C-%	Control Type	Coun	t Mean	9:	5% LCL	95% UCL	Min	Max	Std E	r Std Dev	CV%	QA Count
0	Negative Contr		7.9	_	.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	8.15	6.	.244	10.06	8	8.3	0.15	0.2121	2.6%	0
Overall		4	8.025				7.9	8.3				0 (0%)
Salinity-ppt									_			
C-%	Control Type	Coun	t Mean	9	5% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	4	34	34	34	0	0	0.0%	0
100		2	34	34	4	34	34	34	0	0	0.0%	0
Overall			34				34	34				0 (0%)
Temperature-	°C											
C-%	Control Type	Coun		9	5% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
0	Negative Contr		14.75		4.11	15.39	14.7	14.8	0.0500		0.48%	0
Overell		2	14.75	1	4.11	15.39	14.7	14.8	0.0500	0.07075	0.48%	0 (00()
Overall		4	14.75				14.7	14.8				0 (0%)
Dissolved Ox												
C-%	Control Type	1	2									
0	Negative Contr	6.8	6.1									
100		6.5	6									
pH-Units												
C-%	Control Type	_1	2						_			
0	Negative Contr	7.9	7.9									
100		8.3	8		_							
Salinity-ppt	_											
C-%	Control Type	1	2									
0	Negative Contr	34	34				_					
	•••	34	34									
Temperature-												
C-%	Control Type	1	2								-	
0	Negative Contr	14.8	14.7									
100		14.8	14.7									



#### CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

DATE:

February 1, 2016

STANDARD TOXICANT:

Copper Chloride

NOEC =

18.00 ug/l

EC25 =

35.03 ug/l

EC50 =

45.21 ug/l

Yours very truly,

Scott Johnson

Laboratory Director

# **CETIS Summary Report**

Report Date:

03 Mar-16 13:09 (p 1 of 1) URC020116 | 18-6344-9599

Test Code:

Purple Sea U	Irchin Sperm Cell	Fertiliz	zation Test					A	Aquatic E	ioassay &	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	05-0550-0141 01 Feb-16 13:4 01 Feb-16 14:25 40m	5 F	Fest Type: Protocol: Species: Source:	Fertilization EPA/600/R-95 Strongylocente David Gutoff		itus		Analys Diluen Brine: Age:	t: Lab	oratory Sea Applicable	water	
Sample ID:	16-4985-3189		Code:	URC020116u	la.			Client:		rnal Lab		
Receive Date	: 01 Feb-16 13:45		Material:	Copper chloric				Project	τ:			
Sample Age:			Source: Station:	REF TOX	dicant							
Comparison	Summary											
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU		Method			
	Pertilization Rate	e	18	32	24	2.8%				Multiple Com	nparison Tes	st
Point Estima	te Summary											
Analysis ID	Endpoint		Level	μg/L	95% LCL	95% UCL	TU	ı	Method			
14-5036-8769	Fertilization Rat	e	EC5	21.98	20.5	22.45			_inear Int	erpolation (I	CPIN)	
			EC10	25.97	24.58	26.9				,	•	
			EC15		28.46	31.34						
			EC20	32.99	32.15	33.76						
			EC25		34.22	35.78						
			EC40		40.35	41.96						
			EC50	45.21	44.38	46.2						
Test Accepta	bility											
Analysis ID	Endpoint		Attrib		Test Stat		its		Overlap	Decision		
13-3320-3622				ol Resp	0.945	0.7 - NL		`	Yes .		cceptability	
14-5036-8769				ol Resp	0.945	0.7 - NL			Yes .		cceptability	
13-3320-3622	Pertilization Rate	e 	PMSI	) 	0.02797	NL - 0.25			No ———	Passes A	cceptability	Criteria ————
	Rate Summary											
C-µg/L	Control Type	Count				Min	Max		Std Err	Std Dev	CV%	%Effect
	Negative Control		0.945		0.9726	0.92	0.96		0.00866	0.01732	1.83%	0.0%
18 32		4	0.947 0.78	5 0.9275 0.7616	0.9675 0.7984	0.93 0.77	0.96		0.006292 0.005774	0.01258 0.01155	1.33% 1.48%	-0.26% 17.46%
56		4	0.78		0.7964	0.77	0.78		0.003774	0.01155	11.24%	76.46%
100		4	0.222		0.2023	0.21	0.20		0.0123	0.023	35.85%	93.92%
180		4	0.037	0.0247	0.0903	0.03	0.00		)	0.02002	33.03 /0	100.0%
Fertilization I	Rate Detail											
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4							
0	Negative Control		0.95	0.95	0.96							
18	<b>3</b>	0.95	0.93	0.96	0.95							
32		0.77	0.79	0.79	0.77							
56		0.21	0.26	0.21	0.21							
100		0.06	0.03	0.08	0.06							
180		0	0	0	0							
Fertilization I	Rate Binomials											
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4							
C-μg/L	Control Type Negative Control	$-\dot{-}$			96/100							
	<del></del> _	$-\dot{-}$	95/10	0 95/100	<del></del>							
0	<del></del> _	92/100	95/10 93/10	0 95/100 0 96/100	96/100							
0 18	<del></del> _	92/100 95/100	95/10 93/10 79/10	95/100 96/100 0 79/100	96/100 95/100							
0 18 32	<del></del> _	92/100 95/100 77/100	95/10 93/10 79/10	95/100 96/100 0 79/100	96/100 95/100 77/100							

Report Date: Test Code: 03 Mar-16 13:09 (p 1 of 2) URC020116 | 18-6344-9599

								Test	Code:	URC	020116   18	3-6344-959
Purple Sea Urchin Sperm Cell Fertilization Test								Aquatic Bioassay & Consulting Labs, Inc.				
Analysis ID:	13-3	320-3622		Endpoint: F	ertilization Ra	te		CET	S Version:	CETISv1.	8.7	_
Analyzed:	1 80	/lar-16 8:20		Analysis: F	arametric-Cor	ntrol vs Trea	tments	Offic	cial Results	: Yes		
Batch ID:	05-0	550-0141		Test Type: F	ertilization			Ana	lvst:			
Start Date:	01 Feb-16 13:45			Protocol: EPA/600/R-95/		136 (1995)				oratory Seav	vater	
Ending Date:	e: 01 Feb-16 14:25			Species: Strongylocentre		tus purpuratus		Brin		Applicable		
Duration:	40m			Source: David Gutoff				Age				
Sample ID:	16-4	985-3189		Code: L	JRC020116u			Clie	nt: Inte	rnal Lab		
Sample Date:	01 Feb-16 13:45		5	Material: 0	Copper chloride	oper chloride		Proj	ect:			
Receive Date	:			Source: F	Reference Toxi	cant						
Sample Age:	NA			Station: F	REF TOX			_				
Data Transfo			Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre	ected)		NA	C > T	NA	NA		2.8%	18	32	24	
Dunnett Mult	ple C	omparison	Test									
Control	vs	C-µg/L		Test St	at Critical	MSD DF	P-Value	P-Type	Decision	(a:5%)		
Negative Cont	rol	18		-0.2049	2.356	0.055 6	0.8594	CDF	Non-Sign	ificant Effect		
		32*		10.93	2.356	0.055 6	<0.0001	CDF	Significar	nt Effect		
		56*		36.47	2.356	0.055 6	< 0.0001	CDF	Significar	nt Effect		
		100*		47.34	2.356	0.055 6	<0.0001	CDF	Significar	nt Effect		
Test Acceptal	oil <b>ity</b> (	Criteria										
Attribute		Test Stat	TAC	Limits	Overlap	Decision						
Control Resp	0.945 0.7 -		NL Yes		Passes A	Passes Acceptability Criteria						
PMSD	0.02797 NL - 0.25			No	Passes Acceptability Criteria							
ANOVA Table												
Source		Sum Squa	ires	Mean S	quare	DF	F Stat	P-Value	Decision	(a:5%)		
Between	_	4.08869		1.02217	3	4	951.6	<0.0001	Significar	t Effect		
Error		0.0161123	4	0.00107	4156	15	_					
Total		4.104803				19						
Distributional	Test	3						•				
Attribute		Test			Test Stat		P-Value	Decision				
Variances	Bartlett Equality				3.509	13.28	0.4765	Equal Variances				
Variances			-	uality of Varian		4.893	0.9129	Equal Var				
Variances	Levene Equality Shapiro-Wilk W				0.6662	4.893	0.6252	Equal Variances Normal Distribution				
Distribution		•		•	0.9476 0.1617	0.866 0.2235	0.3324 0.1853	Normal D				
Distribution Distribution		Kolmogor D'Agostine			1.042	2.576	0.1853	Normal D				
Distribution		D'Agostin			0.5439	2.576	0.5865	Normal D				
		•	o man		0.0 100	2.070						
		D'Agostine	o-Pear		us 1.381	9.21	0.5014	Normal D	istribution			
Distribution Distribution		•		son K2 Omnib g A2 Normality		9.21 3.878	0.5014 0.1605	Normal D Normal D				
Distribution Distribution	Rate S	Anderson		rson K2 Omnib								
Distribution Distribution Fertilization		Anderson		rson K2 Omnib g A2 Normality						Std Err	CV%	%Effect
Distribution Distribution Fertilization F	Cont	Anderson- ummary	-Darlin Cour	rson K2 Omnib g A2 Normality	0.5498	3.878	0.1605	Normal D	istribution	Std Err 0.00866	CV% 1.83%	%Effect
Distribution Distribution Fertilization F C-µg/L 0	Cont	Anderson- ummary rol Type	-Darlin Cour	rson K2 Omnib g A2 Normality nt Mean	95% LCL	3.878 95% UCL	0.1605 Median	Normal D	istribution Max			
Distribution Distribution Fertilization F C-µg/L 0 18	Cont	Anderson- ummary rol Type	Cour	nt Mean	95% LCL 0.9174	3.878 95% UCL 0.9726	0.1605 Median 0.95	Min 0.92	Max 0.96	0.00866	1.83%	0.0%
Distribution Distribution	Cont	Anderson- ummary rol Type	Cour	nt Mean  0.945 0.9475	95% LCL 0.9174 0.9275	3.878 95% UCL 0.9726 0.9675	0.1605 Median 0.95 0.95	Min 0.92 0.93	Max 0.96 0.96	0.00866 0.006292	1.83% 1.33%	0.0% -0.26%
Distribution Distribution Fertilization F C-µg/L 0 18 32	Cont	Anderson- ummary rol Type	Cour 4 4	nt Mean  0.945 0.78	95% LCL 0.9174 0.9275 0.7616	3.878 95% UCL 0.9726 0.9675 0.7984	0.1605 Median 0.95 0.95 0.78	Min 0.92 0.93 0.77	Max 0.96 0.96 0.79	0.00866 0.006292 0.005774	1.83% 1.33% 1.48%	0.0% -0.26% 17.46%

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 13:09 (p 2 of 2)

Test Code:

URC020116 | 18-6344-9599

							Test	Code:	URC	020116   18	3-6344-9599
Purple Sea L	Jrchin Sperm Cel	l Fertilizat	ion Test					Aquatic Bi	ioassay &	Consulting	Labs, Inc.
Analysis ID:	13-3320-3622	End	dpoint: Fe	rtilization Ra	te	_	CET	IS Version:	CETISv1	.8.7	
Analyzed:	03 Mar-16 8:20	Ana	alysis: Pa	rametric-Cor	ntrol vs Trea	tments	Offic	ial Results:	Yes		
Angular (Cor	rrected) Transforr	ned Sumn	nary		_						
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	4	1.336	1.278	1.394	1.345	1.284	1.369	0.01824	2.73%	0.0%
18		4	1.341	1.297	1.385	1.345	1.303	1.369	0.0138	2.06%	-0.36%
32		4	1.083	1.061	1.105	1.083	1.071	1.095	0.00697	1.29%	18.96%
56		4	0.4908	0.4438	0.5378	0.476	0.476	0.5351	0.01476	6.01%	63.26%
100		4	0.2389	0.1641	0.3138	0.2475	0.1741	0.2868	0.02352	19.69%	82.12%
180		4	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.26%
Fertilization	Rate Detail										
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Negative Control	0.92	0.95	0.95	0.96						
18		0.95	0.93	0.96	0.95						
32		0.77	0.79	0.79	0.77						
56		0.21	0.26	0.21	0.21						
100		0.06	0.03	0.08	0.06						
180		0	0	0	0						
Angular (Cor	rected) Transforn	ned Detail									
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Negative Control		1.345	1.345	1.369						
18		1.345	1.303	1.369	1.345						
32		1.071	1.095	1.095	1.071						
56		0.476	0.5351	0.476	0.476						
100		0.2475	0.1741	0.2868	0.2475						
180		0.05002	0.05002	0.05002	0.05002						
Fertilization I	Rate Binomials										
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Negative Control		95/100	95/100	96/100						
18	<b>J</b>	95/100	93/100	96/100	95/100						
32		77/100	79/100	79/100	77/100						
56		21/100	26/100	21/100	21/100						
		21/100	20/100	21/100	21/100						

Analyst:\_\_\_\_\_QA:\_\_\_\_

100

180

6/100

0/100

3/100

0/100

8/100

0/100

6/100

0/100

Report Date: Test Code:

03 Mar-16 13:09 (p 1 of 2)

URC020116 | 18-6344-9599

								est Co	ode:	URC	020116   1	8-6344-9599
Purple	Sea Urchin Sperm Cel	l Fertilizatio	n Test				_		quatic B	ioassay &	Consultin	g Labs, Inc.
Analysi Analyze			ooint: ysis:	Fertilization Ra Linear Interpol		1)			Version: Results	CETISv1 : Yes	.8.7	
Batch I Start D Ending Duratio	ate: 01 Feb-16 13:4  Date: 01 Feb-16 14:2	5 Prot	ocol: cies:	Fertilization EPA/600/R-95 Strongylocentr David Gutoff	, ,		[ E	Analys Diluent Brine: Age:	: Lab	oratory Sea Applicable	water	
Receive	e Date: 01 Feb-16 13:4	Code 5 Mate Sour Stati	erial: rce:	URC020116u Copper chlorid Reference Tox REF TOX				Client: Project		rnal Lab		
Linear	Interpolation Options											
X Trans	sform Y Transform	Seed	ł	Resamples	Exp 95%	6 CL Meth	nod					
Linear	Linear	0		280	Yes	Two-	Point In	terpola	tion			
Test Ac	ceptability Criteria										_	
Attribut	te Test Stat	TAC Limit	s	Overlap	Decision	1						
Control	Resp 0.945	0.7 - NL		Yes	Passes A	Acceptability	Criteria					
Point E	stimates											
Level	μg/L 95% LCL	95% UCL										
EC5	21.98 20.5	22.45						_				
EC10	25.97 24.58	26.9										
EC15	29.95 28.46	31.34										
EC20 EC25	32.99 32.15 35.03 34.22	33.76 35.78										
EC40	41.14 40.35	41.96										
EC50	45.21 44.38	46.2										
Fertiliz	ation Rate Summary				Calc	ulated Varia	te(A/B)					_
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std D	ev (	CV%	%Effect	_A	В
0	Negative Control	4	0.945		0.96	0.00866	0.017		.83%	0.0%	378	400
18		4	0.947		0.96	0.006292	0.012		1.33%	-0.26%	379	400
32		4	0.78 0.222	0.77 5 0.21	0.79 0.26	0.005774 0.0125	0.011		l.48% l1.24%	17.46% 76.46%	312 89	400 400
56 100		4	0.222		0.28	0.0123	0.020		35.85%	93.92%	23	400
180		4	0	0	0	0	0			100.0%	0	400
Fertiliza	ation Rate Detail											
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4							
0	Negative Control	0.92	0.95	0.95	0.96							
18	-	0.95	0.93	0.96	0.95							
32		0.77	0.79	0.79	0.77							
56		0.21	0.26	0.21	0.21							
100		0.06	0.03	0.08	0.06							
180		0	0	. 0	0							
	ation Rate Binomials											
C-µg/L	Control Type	Rep 1	Rep 2		Rep 4							
0	Negative Contro		95/10		96/100							
18		95/100 77/100	93/10		95/100 77/100							
32 56		21/100	26/10		21/100							
100		6/100	3/100		6/100							
180		0/100	0/100		0/100							
-		-	_	_								

CETIS™ v1.8.7.11

Report Date:

03 Mar-16 13:09 (p 2 of 2)

Test Code:

URC020116 | 18-6344-9599

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

14-5036-8769 03 Mar-16 8:20

Endpoint: Fertilization Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

## **CETIS Measurement Report**

Report Date:

03 Mar-16 13:09 (p 1 of 2)

Test Code: URC020116 | 18-6344-9599

		_					700	n oouo.		3020110	10 0011 0000
Purple Sea U	Jrchin Sperm Ce	II Fertili	zation Tes	t				Aquat	ic Bioassay &	Consultin	g Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	05-0550-0141 01 Feb-16 13: : 01 Feb-16 14: 40m	45   25	Test Type: Protocol: Species: Source:		95/136 (1995) ntrotus purpui f		Dil	ne:	Laboratory Sea		
Sample ID: Sample Date: Receive Date Sample Age:		45 I	Code: Material: Source: Station:	URC020116 Copper chlo Reference T REF TOX	ride			ent: oject:	Internal Lab		
Parameter Ac	cceptability Crite	eria									
Parameter		1	Min	Max A	cceptability	Limits	Overlap	Decisio	n		
Salinity-ppt		- ;	34	34 3	2 - 36		Yes	Results	Within Limits		
Temperature-	·°C		14.7	14.8 1	1 - 13		Yes	Results	Above Limit		
Dissolved Ox	xygen-mg/L										
C-µg/L	Control Type	Count	Mean	95% LC	L 95% UCL	Min	Max	Std En	r Std Dev	CV%	QA Count
0	Negative Contr	2	6.45	2.003	10.9	6.1	6.8	0.35	0.495	7.67%	0
18		2	6.45	4.544	8.356	6.3	6.6	0.15	0.2121	3.29%	0
32		2	6.3	3.759	8.841	6.1	6.5	0.2	0.2828	4.49%	0
56		2	6.3	6.298	6.302	6.3	6.3	0	0	0.0%	0
100		2	6.15	5.515	6.785	6.1	6.2	0.0500		1.15%	0
180		2	6.15	5.515	6.785	6.1	6.2	0.0500	1 0.07072	1.15%	0
Overall		12	6.3			6.1	6.8				0 (0%)
pH-Units											
C-µg/L	Control Type	Count	Mean	95% LC	L 95% UCL	Min	Max	Std Eri	r Std Dev	CV%	QA Count
0	Negative Contr		7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
18		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
32		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
56		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
180		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0 (00()
Overall		12	7.9			7.9	7.9				0 (0%)
Salinity-ppt	_										
C-µg/L	Control Type	Count	Mean	95% LC			Max	Std Err		CV%	QA Count
0	Negative Contr		34	34	34	34	34	0	0	0.0%	0
18		2	34	34	34	34	34	0	0	0.0%	0
32 56		2	34	34	34	34	34	0	0	0.0%	0
100		2	34 34	34	34	34	34	0	0	0.0%	0
180		2	34 34	34 34	34 34	34 34	34 34	0 0	0	0.0% 0.0%	0 0
Overall		12	34			34	34	U	U	0.070	0 (0%)
Temperature-											- (- / -/
C-µg/L	Control Type	Count	Mean	95% LC	L 95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr		14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
18		2	14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
32		2	14.75	14.11	15.39	14.7	14.8	0.0500		0.48%	0
56		2	14.75	14.11	15.39	14.7	14.8	0.05002		0.48%	0
100		2	14.75	14.11	15.39	14.7	14.8	0.05002	2 0.07075	0.48%	0
100 180		2	14.75 14.75	14.11 14.11	15.39 15.39	14. <i>7</i> 14.7	14.8 14.8	0.05002		0.48% 0.48%	0

## **CETIS Measurement Report**

Report Date: Test Code: 03 Mar-16 13:09 (p 2 of 2) URC020116 | 18-6344-9599

Purple Sea	Urchin Sperm Cel	I Fertiliza	tion Test	Aquatic Bioassay & Consulting Labs, Inc.
Dissolved C	)xygen-mg/L			
C-μg/L	Control Type	1	2	
0	Negative Contr	6.8	6.1	
18		6.6	6.3	
32		6.5	6.1	
56		6.3	6.3	
100		6.2	6.1	
180		6.1	6.2	
pH-Units				
C-µg/L	Control Type	1	2	
0	Negative Contr	7.9	7.9	
18		7.9	7.9	
32		7.9	7.9	
56		7.9	7.9	
100		7.9	7.9	
180		7.9	7.9	
Salinity-ppt				
C-µg/L	Control Type	1	2	
0	Negative Contr	34	34	
18		34	34	
32		34	34	
56		34	34	
100		34	34	
180		34	34	
Temperatur	e-°C			
C-µg/L	Control Type	1	2	
0	Negative Contr	14.8	14.7	
18		14.8	14.7	
32		14.8	14.7	
56		14.8	14.7	
100		14.8	14.7	•
180		14.8	14.7	



March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03Z

DATE RECEIVED:

1/31/2016

ABC LAB. NO.:

COM0116.224

#### CHRONIC KELP GERMINATION & GROWTH BIOASSAY

GERMINATION NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 % EC50 = >100.00 %

GROWTH NOEC = 100.00 %

TUc = 1.00

IC25 = >100.00 % IC50 = >100.00 %

Yours very truly,

Scott Johnson Laboratory Director

## **CETIS Summary Report**

Report Date:

03 Mar-16 10:26 (p 1 of 2)

Test Code:

COM0116.224klp | 01-7835-9845

Macrocystis (	Germination and	Germ Tub	e Grow	th Test			_	Aqua	itic Bi	oassay &	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	11-1062-0494 01 Feb-16 13:30 03 Feb-16 13:30 48h	Pro Spe	t Type: tocol: cies: irce:	Growth-Germin EPA/600/R-95/ Macrocystis py Aquatic Bioass	136 (1995) rifera	lection		Analyst: Diluent: Brine: Age:		oratory Sea Applicable	water	
•	19-8289-9156 31 Jan-16 10:32 : 31 Jan-16 12:40 27h	) Sou	le: erial: irce: tion:	COM0116.224l Sample Water Bioassay Repo 24-BB-03Z				Client: Project:	City ASB	of Malibu S		
Comparison	Summary				<del>-</del>							
Analysis ID	Endpoint		NOEL	. LOEL	TOEL	PMSD	TU	Meth	od			
04-1839-6747	Germination Ra	te	100	>100	NA	1.79%	1			ance t Two	-Sample Te	est
16-1432-4135	Mean Length		100	>100	NA	1.8%	1	-			Two-Sampl	
Point Estimat	e Summary											
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	od			
12-0716-6617	Germination Ra	te	EC5	>100	N/A	N/A	<1	Linea	ar Inte	rpolation (I	CPIN)	
			EC10	>100	N/A	N/A	<1					
			EC15	>100	N/A	N/A	<1					
			EC20	>100	N/A	N/A	<1					
			EC25	>100	N/A	N/A	<1					
		•	EC40	>100	N/A	N/A	<1					
			EC50	>100	N/A	N/A	<1					
10-7022-2653	Mean Length		IC5	>100	N/A	N/A	<1	Linea	ar Inte	rpolation (I	CPIN)	
			IC10	>100	N/A	N/A	<1					
			IC15	>100	N/A	N/A	<1					
			IC20	>100	N/A	N/A	<1					
			IC25	>100	N/A	N/A	<1					
			IC40	>100	N/A	N/A	<1					
			IC50	>100	N/A 	N/A	<1_					
Test Acceptat	oility											
Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Limi	ts	Over	lap _	Decision		
04-1839-6747	Germination Rat	te	Contro	ol Resp	0.935	0.7 - NL		Yes		Passes A	cceptability	Criteria
`12-0716-6617	Germination Rat	te	Contro	ol Resp	0.935	0.7 - NL		Yes		Passes A	cceptability	Criteria
10-7022-2653	Mean Length		Contro	ol Resp	14.78	10 - NL		Yes		Passes A	cceptability	Criteria
16-1432-4135	Mean Length			ol Resp	14.78	10 - NL		Yes			cceptability	
	Germination Rat	te	PMSD		0.01795	NL - 0.2		No		Passes A	cceptability	Criteria
16-1432-4135	Mean Length		PMSD		0.01799	NL - 0.2 		No		Passes A	cceptability	Criteria
Germination F	Rate Summary											
		Count	Mean	95% LCL	95% UCL	Min	Max			Std Dev	CV%	%Effect
	Negative Control		0.935	0.9202	0.9498	0.9	0.96			0.02068	2.21%	0.0%
100		10	0.943	0.9279 —————	0.9581	0.91	0.98	0.006	675	0.02111	2.24%	-0.86% 
Mean Length												
		Count	Mean	95% LCL	95% UCL		Max	Std E	rr	Std Dev	CV%	%Effect
	Negative Control		14.78	14.45	15.11	14.3	15.7			0.4614	3.12%	0.0%
100		10	14.5	14.39	14.61	14.3	14.8	0.047	14	0.1491	1.03%	1.89%

Analyst:\_\_\_\_\_\_QA:\_\_\_\_

000-055-186-6

CETIS™ v1.8.7.11

## **CETIS Summary Report**

Report Date:

03 Mar-16 10:26 (p 2 of 2)

Test Code:

COM0116.224klp | 01-7835-9845

Macrocys	stis Germination and	Germ Tu	be Growth	Test				Aquatic l	Bioassay &	Consulting	Labs, Inc
Germina	tion Rate Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0.92	0.93	0.96	0.95	0.94	0.93	0.96	0.91	0.9	0.95
100		0.91	0.96	0.98	0.95	0.93	0.92	0.96	0.93	0.95	0.94
Mean Lei	ngth Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	15.5	14.9	15.7	14.3	14.5	14.6	14.7	14.6	14.5	14.5
100		14.4	14.4	14.4	14.6	14.4	14.5	14.3	14.8	14.6	14.6
Germinat	tion Rate Binomials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	92/100	93/100	96/100	95/100	94/100	93/100	96/100	91/100	90/100	95/100
100		91/100	96/100	98/100	95/100	93/100	92/100	96/100	93/100	95/100	94/100

000-055-186-6 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:26 (p 1 of 3)

Test Code:

COM0116.224klp | 01-7835-9845

	· .			_		_	Tes	t Code:	COM0116.	224klp   0	1-7835-984
Macrocystis G	Sermination and	Germ	Tube Growtl	n Test			_	Aquatic	Bioassay & C	onsulting	g Labs, Inc.
Analysis ID: Analyzed:	04-1839-6747 03 Mar-16 8:21		•	Germination Ra			_	TIS Version		8.7	
Batch ID:	11-1062-0494		Test Type:	Growth-Germin	ation		Ana	ılyst:			
Start Date:	01 Feb-16 13:30			EPA/600/R-95/				-	boratory Seav	vater	
Ending Date:	03 Feb-16 13:30	)	Species: I	Macrocystis pyi	rifera		Brit	ne: No	t Applicable		
Duration:	48h		Source:	Aquatic Bioass	ay Labs Coll	ection	Age	<b>:</b> :			
Sample ID:	19-8289-9156		Code:	COM0116.224k	(		Clie	ent: Cit	ty of Malibu	_	
	31 Jan-16 10:32			Sample Water			Pro	ject: AS	SBS		
	31 Jan-16 12:40			Bioassay Repo	rt						
Sample Age:	27h 		Station:	24-BB-03Z 							
Data Transfori		Zeta	Alt Hy	p Trials	Seed		PMSD	Test Res			
Angular (Corre	cted)	NA	C > T	NA	NA		1.79%	Passes (	germination ra	ite	
Equal Varianc	e t Two-Sample	Test									
Control	vs C- <u>%</u>	_	Test St	at Critical_		P-Value	P-Type	Decision	<u> </u>		
Negative Contr	rol 100	_	-0.8904	1.734	0.035 18	0.8075	CDF	Non-Sig	nificant Effect		
Test Acceptab	oility Criteria										
Attribute	Test Stat	TAC L	imits	Overlap	Decision						_
Control Resp	0.935	0.7 - 1		Yes		cceptability					
PMSD	0.01795	NL - 0	0.2	No	Passes Ad	ceptability	Criteria ——				
ANOVA Table											
Source	Sum Squa	res	Mean S	Square	DF	F Stat	P-Value	Decisio			
Between	0.0016173		0.0016		1	0.7928	0.3850	Non-Sig	nificant Effect		
Error	0.0367193		0.0020	39966	18 19	-					
Total	0.0383367									_	
Distributional				Took Stat	Cuition	D Value	Daninin	-/~·49/\			
Attribute Variances	TestVariance I	Patio F		Test Stat 1.323	Critical 6.541	P-Value 0.6838	Decision Equal Va	<del></del>			
Variances Variances			ality of Variar		8.285	0.7740	Equal Va				
Variances		-	of Variance	0.08558	8.285	0.7732	Equal Va				
Distribution	Shapiro-W			0.9681	0.866	0.7148	Normal [	Distribution			
Distribution	Kolmogor	ov-Smi	rnov D	0.1079	0.2235	0.8716	Normal I	Distribution			
Distribution	D'Agostine			0.5192	2.576	0.6037		Distribution			
Distribution	D'Agostine			0.3414	2.576	0.7328		Distribution			
Distribution Distribution			son K2 Omnil 3 A2 Normalit		9.21 3.878	0.8245 0.7165		Distribution Distribution			
						-	-	-			
	Rate Summary Control Type	Coun	t Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
	Negative Control		0.935	0.9202	0.9498	0.935	0.9	0.96	0.00654	2.21%	0.0%
100		10	0.943	0.9279	0.9581	0.945	0.91	0.98	0.006675	2.24%	-0.86%
Angular (Corre	ected) Transforn	ned Su	ımmary							_	
	Control Type	Coun	-	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
	Negative Contr	10	1.316	1.286	1.346	1.313	1.249	1.369	0.01325	3.19%	0.0%
		10	1.334	1.299	1.368	1.334	1.266	1.429	0.01524	3.61%	-1.37%
100											
	Rate Detail										
Germination R C-%	Control Type	Rep 1		Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
			Rep 2 0.93 0.96	Rep 3 0.96 0.98	Rep 4 0.95 0.95	Rep 5 0.94 0.93	Rep 6 0.93 0.92	Rep 7 0.96 0.96	Rep 8 0.91 0.93	Rep 9 0.9 0.95	Rep 10 0.95 0.94

Analyst: QA:

Report Date:

03 Mar-16 10:26 (p 2 of 3)

Test Code:

COM0116.224klp | 01-7835-9845

							100	t oode.	COMOT	O.ZZ-HNIP   O	1 1000 50-10
Macrocystis	Germination and	Germ	Tube Grow	th Test				Aquatic Bi	oassay &	Consulting	J Labs, Inc.
Analysis ID: Analyzed:	04-1839-6747 03 Mar-16 8:21		Endpoint: Analvsis:	Germination F				ΠS Version: icial Results:	CETISv Yes	1.8.7	
	rected) Transform										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1.284	1.303	1.369	1.345	1.323	1.303	1.369 -	1.266	1.249	1.345
100		1.266	1.369	1.429	1.345	1.303	1.284	1.369	1.303	1.3 <b>4</b> 5	1.323
Germination	Rate Binomials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	92/100	0 93/100	0 96/100	95/100	94/100	93/100	96/100	91/100	90/100	95/100
100		91/100	0 96/100	98/100	95/100	93/100	92/100	96/100	93/100	95/100	94/100

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:26 (p 3 of 3)

Test Code:

COM0116.224klp | 01-7835-9845

Analysis ID: Analyzed: Batch ID:	Germination and	l Germ Tu	ha Growth								
Analyzed: Batch ID:			be Glowill	Test				Aquatic E	Bioassay & 0	Consulting	g Labs, Inc
	16-1432-4135 03 Mar-16 8:21		•	ean Length onparametric	Two Sampl	e		IS Version: cial Results		.8.7	
Start Date: Ending Date: Duration:	11-1062-0494 01 Feb-16 13:3 03 Feb-16 13:3 48h	0 Pr 0 Sp	otocol: E ecies: M	rowth-Germin PA/600/R-95/ acrocystis py quatic Bioass	136 (1995) rifera	lection	Anal Dilud Brin Age:	ent: Lab e: Not	ooratory Sea Applicable	water	
•	19-8289-9156 31 Jan-16 10:3: 31 Jan-16 12:40 27h	2 <b>M</b> a	aterial: Source: B	OM0116.224i ample Water oassay Repo I-BB-03Z			Clier Proj	•	of Malibu BS	-	
Data Transfor	rm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Untransformed		NA	C > T	NA	NA NA		1.8%		nean length		_
Wilcoxon Rai	nk Sum Two-Sar	mple Test									
Control	vs C-%		Test Sta	t Critical	Ties DF	P-Value	P-Type	Decision	(a:5%)		
Negative Cont			84	NA		0.0578	Exact		ificant Effect		
Test Acceptal	bility Criteria										
Attribute	Test Stat	TAC Lim	nits	Overlap	Decision						
Control Resp	14.78	10 - NL		Yes		cceptability	Criteria				
PMSD	0.01799	NL - 0.2		No		cceptability					
ANOVA Table	·						`		_		
Source	Sum Squa	ares	Mean So	uare	DF	F Stat	P-Value	Decision	(a:5%)		
Between	0.392		0.392		1	3.335	0.0845	Non-Sign	ificant Effect		
Error	2.116		0.11755	55	18	_					
Total	2.508				19						
Distributional	Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance	Ratio F		、 9.58	6.541	0.0025	Unequal \	/ariances			
Variances	Mod Leve	ene Equali	y of Variand	e 2.052	8.285	0.1691	Equal Var				
Variances		quality of '		6.609	8.285	0.0192	Equal Var	riances			
Distribution	,	Vilk W No	•	0.8491	0.866	0.0052		ıal Distributi	on		
Distribution	•	ov-Smirno		0.2096	0.2235	0.0215	Normal Di				
Distribution	_	o Skewne		2.768	2.576	0.0056		ial Distributi	on		
Distribution	_	o Kurtosis		2.05	2.576	0.0404	Normal Di				
Distribution	-		ι Κ2 Omnibι 2 Normality	1.296	9.21 3.878	0.0027 0.0019		nal Distributi nal Distributi			
					-						
Distribution	Summary				050/ 1101	Median	Min	Max	Std Err		0/ = 65
Distribution  Mean Length	-	Count	Mean	050/ 1 (2)				141 24 1		C1/9/-	
Distribution  Mean Length  C-%	Control Type	Count	Mean	95% LCL	95% UCL					CV%	%Effect
Distribution  Mean Length  C-%  0	-		14.78	14.45	15.11	14.6 14.45	14.3 14.3	15.7 14.8	0.1459 0.04714	3.12%	0.0% 1.89%
Distribution  Mean Length  C-%  0  100	Control Type  Negative Contro	l 10				14.6	14.3	15.7	0.1459		0.0%
Distribution  Mean Length C-% 0 100  Mean Length	Control Type Negative Contro	l 10 10	14.78 14.5	14.45 14.39	15.11 14.61	14.6 14.45	14.3 14.3	15.7 14.8	0.1459 0.04714	3.12% 1.03%	0.0% 1.89%
Distribution  Mean Length  C-%  0  100	Control Type  Negative Contro	I 10 10 Rep 1	14.78	14.45	15.11	14.6	14.3	15.7	0.1459	3.12%	0.0%

Analyst: QA:

<b>CETIS</b>	Analy	/tical	Ren	ort
	/ WIIMI	LIVUI	IVV	~

Report Date:

03 Mar-16 10:26 (p 1 of 3)

Test Code:

COM0116.224klp | 01-7835-9845

								1.6	est Code:	U	CIVIOTIO	.224NIP   U	1-7033-904
Macrocy	ystis G	ermination and	Germ Tub	e Grow	vth Test				Aqua	itic Bioa	ssay & (	Consulting	Labs, Inc.
Analysis	s ID:	12-0716-6617	End	point:	Germination Ra	ate		С	ETIS Vers	sion: (	CETISv1	.8.7	
Analyze	d:	03 Mar-16 8:21	Ana	lysis:	Linear Interpola	tion (ICPIN)	)	0	fficial Res	sults: `	Yes .		
Batch II	D:	11-1062-0494	Tes	t Type:	Growth-Germin	ation		A	nalyst:				
Start Da	ite:	01 Feb-16 13:30	) Pro	tocol:	EPA/600/R-95/	136 (1995)		Di	iluent:	Laborat	tory Sea	water	
Ending	Date:	03 Feb-16 13:30	Spe	cies:	Macrocystis pyr	rifera		В	rine:	Not App	olicable		
Duration	n:	48h	Sou	rce:	Aquatic Bioassa	ay Labs Col	lection	A	ge:				
Sample		19-8289-9156	Cod	le:	COM0116.224k	ζ		С	lient:	City of I	Malibu		
Sample	Date:	31 Jan-16 10:32	2 Mat	erial:	Sample Water			Pi	roject:	ASBS			
Receive	Date:	31 Jan-16 12:40	) Sou	rce:	Bioassay Repo	rt							
Sample	Age:	27h	Stat	ion:	24-BB-03Z								
Linear I	nterpo	lation Options											
X Trans	form	Y Transform	See	d	Resamples	Exp 95%	CL Met	hod					
Linear		Linear	0		280	Yes	Two	-Point Inte	erpolation				
Test Ac	ceptab	ility Criteria											
Attribute	е	Test Stat	TAC Limi	ts	Overlap	Decision							
Control F	Resp	0.935	0.7 - NL		Yes	Passes A	cceptability	Criteria					
Point Es	stimate	es											
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL							
EC5	>100	N/A	N/A	<1	NA	NA							
EC10	>100	N/A	N/A	<1	NA	NA							
EC15	>100	N/A	N/A	<1	NA	NA							
EC20	>100	N/A	N/A	<1	NA	NA							
EC25	>100	N/A	N/A	<1	NA	NA							
EC40	>100	N/A	N/A	<1	NA	NA							
EC50	>100	N/A	N/A	<1	NA	NA							
Germina	ation F	tate Summary				Calcu	lated Varia	ate(A/B)					
C-%	С	ontrol Type	Count	Mean	Min	Max	Std Err	Std De	v CV%	%	Effect	Α	В
)	N	egative Control	10	0.935	0.9	0.96	0.00654	0.0206	8 2.219	% 0.	.0%	935	1000
100			10	0.943	0.91	0.98	0.006675	0.0211	1 2.249	% -0	0.86%	943	1000
Germina	ation F	tate Detail											
C-%	С	ontrol Type	Rep 1	Rep 2	2 Rep 3	Rep 4	Rep 5	Rep 6	Rep	7 R	ер 8	Rep 9	Rep 10
0	N	egative Control	0.92	0.93	0.96	0.95	0.94	0.93	0.96	0.	.91	0.9	0.95
100			0.91	0.96	0.98	0.95	0.93	0.92	0.96	0.	.93	0.95	0.94
Germina	ation R	ate Binomials											
C-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep	7 R	ер 8	Rep 9	Rep 10
0		Negative Control		93/10		95/100	94/100	93/100	96/10		1/100	90/100	95/100
100			91/100	96/10	0 98/100	95/100	93/100	92/100	96/10	nn a	3/100	95/100	94/100

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:26 (p 2 of 3)

Test Code:

COM0116.224klp | 01-7835-9845

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

12-0716-6617 03 Mar-16 8:21

Endpoint: Germination Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

Report Date:

03 Mar-16 10:26 (p 3 of 3)

Test Code: COM0116.224klp | 01-7835-9845

									Test Co	de:	COM0116	i.224klp   0	1-7835-984
Macro	cystis G	ermination and	I Germ Tub	e Grow	th Test	_			Α	quatic	Bioassay &	Consulting	Labs, Inc
Analys	is ID:	10-7022-2653	End	point:	Mean Length				CETIS	/ersion	n: CETISv1	.8.7	
Analyz		03 Mar-16 8:21	Ana	lysis:	Linear Interpola	tion (ICPIN	l)		Official	Result	s: Yes		
Batch	ID:	11-1062-0494	Tes	Туре:	Growth-Germin	ation	_		Analys	:			
Start D	ate:	01 Feb-16 13:3	0 Pro	ocol:	EPA/600/R-95/	136 (1995)			Diluent	: La	boratory Sea	water	
Ending	g Date:	03 Feb-16 13:3	0 Spe	cies:	Macrocystis pyr	rifera			Brine:	No	t Applicable		
Durati	on:	48h	Sou	rce:	Aquatic Bioassa	ay Labs Co	llection		Age:				
Sampl	e ID:	19-8289-9156	Cod	e:	COM0116.224k				Client:	Cit	y of Malibu		
Sampl	e Date:	31 Jan-16 10:3	2 Mat	erial:	Sample Water				Project	: AS	SBS		
Receiv	e Date:	31 Jan-16 12:4	0 <b>So</b> u	rce:	Bioassay Repo	rt							
Sampl	e Age:	27h	Stat	ion:	24-BB-03Z								
Linear	Interpo	lation Options											
X Tran	sform	Y Transform	See	d	Resamples	Exp 95%	CL	Method					
Linear		Linear	207	2320	280	Yes		Two-Point	Interpola	tion			
Test A	cceptab	ility Criteria			-				_			_	
Attribu	ite	Test Stat	TAC Limit	s	Overlap	Decision							
Contro	Resp	14.78	10 - NL		Yes	Passes A	cceptal	bility Criter	ia				
Point I	Estimate	es											
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL							
IC5	>100	N/A	N/A	<1	NA	NA							
IC10	>100	N/A	N/A	<1	NA	NA							
IC15	>100	N/A	N/A	<1	NA	NA							
IC20	>100	N/A	N/A	<1	NA	NA							
IC25	>100	N/A	N/A	<1	NA	NA							
IC40	>100	N/A	N/A	<1	NA	NA							
IC50	>100	N/A	N/A	<1	NA	NA	_				_		
Mean I	_ength \$	Summary				Ca	Iculate	d Variate					
C-%	С	ontrol Type	Count	Mean	Min	Max	Std E	rr Std	Dev C	:V%	%Effect		
0	N	egative Control	10	14.78	14.3	15.7	0.145	0.46	614 3	.12%	0.0%		
100			10	14.5	14.3	14.8	0.047	714 0.14	191 1	.03%	1.89%		
Mean I	_ength l	Detail											
C-%	c	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep	5 Rep	6 F	Rep 7	Rep 8	Rep 9	Rep 10
0	N	egative Control	15.5	14.9	15.7	14.3	14.5	14.6	5 1	4.7	14.6	14.5	14.5
100			14.4	14.4	14.4	14.6	14.4	14.5	5 1	4.3	14.8	14.6	14.6

000-055-186-4

CETIS™ v1.8.7.11

#### **CETIS Measurement Report**

Report Date:

03 Mar-16 10:26 (p 1 of 1)

Test Code:

COM0116.224klp | 01-7835-9845

Macrocystis Germination and Germ Tube Growth Test						Aquatic Bioassay & Consulting Labs, Inc.						
Batch ID: Start Date: Ending Date: Duration:	11-1062-0494 01 Feb-16 13: 03 Feb-16 13: 48h		Test Type: Protocol: Species: Source:	Growth-Germi EPA/600/R-95 Macrocystis py Aquatic Bioass	/136 (1995) rifera	llection	[ E		boratory Sea t Applicable	awater		
•	19-8289-9156 : 31 Jan-16 10:3 e: 31 Jan-16 12:4 27h		Code: Material: Source: Station:	COM0116.224 Sample Water Bioassay Repo 24-BB-03Z					y of Malibu BS			
Dissolved Ox	kygen-mg/L											
C-%	Control Type	Coun		95% LCL	95% UCL	Min	<u>Max</u>	Std Err	Std Dev	CV%	QA Count	
0	Negative Contr		6.45	2.003	10.9	6.1	6.8	0.35	0.495	7.67%	0	
100 Overall		2	6.2 6.325	4.929	7.471	6.1	6.8	0.1	0.1414	2.28%	0 (0%)	
pH-Units			0.323									
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count	
0	Negative Contr		7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0	
100	9	2	8.05	7.415	8.685	8	8.1	0.05001	0.07073	0.88%	0	
Overall		4	7.975			7.9	8.1				0 (0%)	
Salinity-ppt										_		
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count	
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0	
100		2	34	34	34	34	34	0	0	0.0%	0	
Overall		4	34			34	34				0 (0%)	
Temperature	-°C											
C-%	Control Type	Coun		95% LCL	95% UCL		Max	Std Err	Std Dev	CV%	QA Count	
0	Negative Contr		14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0	
100 Overall		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0 (0%)	
Overall			14.75			14.7	14.8					
Dissolved Ox	xygen-mg/L											
C-%	Control Type	_1	2									
0	Negative Contr	6.8	6.1									
100		6.1	6.3									
pH-Units												
C-%	Control Type	_1	2		<u>_</u>							
0	Negative Contr		7.9									
100		8.1	8									
Salinity-ppt												
C-%	Control Type	_1	2									
0	Negative Contr		34									
100		34	34									
Temperature												
C-%	Control Type	_1	2									
0	Negative Contr		14.7									
100		14.8	14.7									



March 3<sup>rd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03R

DATE RECEIVED:

01/31/2016

ABC LAB. NO.:

COM0116.225

#### CHRONIC KELP GERMINATION & GROWTH BIOASSAY

GERMINATION NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 % EC50 = >100.00 %

GROWTH NOEC = <100.00%

TUc = >1.00

IC25 = >100.00 %

IC50 = >100.00 %

Yours very truly,

Scott Johnson

Laboratory Director

## **CETIS Summary Report**

Report Date:

03 Mar-16 10:26 (p 1 of 2)

Test Code: COM0116.225klp | 21-3758-2869

Macrocystis Germination and Germ Tube Growth Test  Aquatic Bioassay & Consulting La						Labs, Inc.						
Batch ID: Start Date: Ending Date: Duration:	09-6814-6080 01 Feb-16 13:31 03 Feb-16 13:31 48h	Prot	ocol: cies:	Growth-Germin EPA/600/R-95/ Macrocystis pyr Aquatic Bioass	136 (1995) rifera	lection			Laboratory Not Applic		water	
	17-1967-2320 31 Jan-16 10:50 31 Jan-16 12:40 27h		erial: rce:	COM0116.225k Sample Water Bioassay Repo 24-BB-03R					City of Ma ASBS	libu		
Comparison S	Summary											
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Metho	od			
02-7408-6006	Germination Rat	e	100	>100	NA	1.61%	1	Equal	Variance	t Two	-Sample <b>T</b> e	est
03-2103-8363	Mean Length		<100	100	NA	1.97%	>1	Equal	Variance	t Two	-Sample Te	est
Point Estimat	e Summary										<u> </u>	
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Metho	od			
15-3139-2950	Germination Rate	е	EC5	>100	N/A	N/A	<1	Linea	r Interpolat	ion (I	CPIN)	
			EC10	>100	N/A	N/A	<1					
			EC15	>100	N/A	N/A	<1					
			EC20	>100	N/A	N/A	<1					
			EC25	>100	N/A	N/A	<1					
			EC40		N/A	N/A	<1					
			EC50	>100	N/A	N/A	<1					
00-4078-8832	Mean Length		IC5	>100	N/A	N/A	<1	Linea	r Interpolat	ion (I	CPIN)	
			IC10	>100	N/A	N/A	<1					
			IC15	>100	N/A	N/A	<1					
			IC20	>100	N/A	N/A	<1					
			IC25	>100	N/A	N/A	<1					
			IC40	>100	N/A	N/A	<1					
			IC50	>100 	N/A	N/A	<1 					
Test Acceptab	oility											
Analysis ID	Endpoint		Attrib		Test Stat	TAC Limi	its	Overl	<del></del>	ision		
02-7408-6006	Germination Rate			ol Resp	0.935	0.7 - NL		Yes			cceptability	
15-3139-2950	Germination Rate	е		ol Resp	0.935	0.7 - NL		Yes			cceptability	
00-4078-8832	Mean Length			ol Resp	14.78	10 - NL		Yes			cceptability	
03-2103-8363	Mean Length			ol Resp	14.78	10 - NL		Yes			cceptability	
02-7408-6006		е	PMSE		0.01615	NL - 0.2		No			cceptability	
03-2103-8363	Mean Length		PMSE		0.0197	NL - 0.2		No	Pass	ses A	cceptability	Criteria
Germination F	Rate Summary											
		Count	Mean		95% UCL	Min	Max				CV%	%Effect
0	Negative Control	10	0.935	0.9202	0.9498	0.9	0.96	0.006			2.21%	0.0%
100		10	0.934	0.92	0.948	0.91	0.96	0.006	182 0.01	955	2.09%	0.11%
Mean Length	Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	std E	rr Std	Dev	CV%	%Effect
	Negative Control		14.78		15.11	14.3	15.7				3.12%	0.0%
100	-	10	14.37		14.56	13.7	14.6		07 0.26	27	1.83%	2.77%

000-055-186-6 CETIS™ v1.8.7.11

## **CETIS Summary Report**

Report Date:

03 Mar-16 10:26 (p 2 of 2)

Test Code:

COM0116.225klp | 21-3758-2869

Macrocy	stis Germination and	Germ Tul		Aquatic Bioassay & Consulting Labs, Inc.							
Germina	tion Rate Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0.92	0.93	0.96	0.95	0.94	0.93	0.96	0.91	0.9	0.95
1 <b>0</b> 0		0.91	0.93	0.96	0.95	0.92	0.91	0.93	0.96	0.95	0.92
Mean Lei	ngth Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	15.5	14.9	15.7	14.3	14.5	14.6	14.7	14.6	14.5	14.5
100		14.4	14.2	14.5	14.5	14.5	13.7	14.5	14.6	14.3	14.5
Germinat	tion Rate Binomials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	92/100	93/100	96/100	95/100	94/100	93/100	96/100	91/100	90/100	95/100
100		91/100	93/100	96/100	95/100	92/100	91/100	93/100	96/100	95/100	92/100

Report Date:

03 Mar-16 10:26 (p 1 of 3)

Test Code:

COM0116.225klp | 21-3758-2869

	-						Te	st Code:	COM0116	.225klp   2	21-3758-2869
Macrocystis	Germination and	Germ	Tube Growth	Test				Aquati	c Bioassay & 0	Consultin	g Labs, Inc.
Analysis ID: Analyzed:	02-7408-6006 03 Mar-16 8:21		•	ermination Ra arametric-Two				TIS Version		.8.7	
Batch ID:	09-6814-6080		Test Type: G	rowth-Germin	ation		An	alyst:	_		
Start Date:	01 Feb-16 13:3	1	Protocol: E	P <b>A</b> /600/R-95/	136 (1995)		Dil	luent: L	_aborat <mark>o</mark> ry Seav	water	
Ending Date:	03 Feb-16 13:3	1	Species: N	lacrocystis py	rifera		Br	ine: 1	Not Applicable		
Duration:	48h		Source: A	quatic Bioass	ay Labs Co	llection	Ag	je:			
Sample ID:	17-1967-2320		Code: C	OM0116.225k	<		Cli	ient: (	City of Malibu		
	: 31 Jan-16 10:50			ample Water			Pr	oject: A	ASBS		
	: 31 Jan-16 12:40	)		ioassay Repo	rt						
Sample Age:	27h	_	Station: 2	4-BB-03R 							
Data Transfor	rm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test R	esult		
Angular (Corre	ected)	NA	C > T	NA	NA		1.61%	Passe:	s germination ra	ate	
Equal Variand	ce t Two-Sample	Test									
Control	vs C-%		Test Sta	t Critical	MSD DF	P-Value	P-Type	Decisi	on(α:5%)		
Negative Cont	trol 100		0.1207	1.734	0.032 18	0.4526	CDF	Non-S	ignificant Effect		
Test Acceptal	bility Criteria										
Attribute	Test Stat	TAC I		Overlap	Decision						
Control Resp	0.935	0.7 - 1	_	Yes		cceptability					
PMSD	0.01615	NL - 0	).2	No	Passes A	cceptability	Criteria				
ANOVA Table	•										
Source	Sum Squa		Mean So		DF _	F Stat	P-Value		on(α:5%)		
Between	2.471218E		2.47121		1	0.01457	0.9053	Non-Si	ignificant Effect		
Total	0.0305360 0.0305608	9	0.00169	545	18 19	_					
Distributional											
Attribute	Test			Test Stat	Critical	P-Value	Decisio	n(α:1%)			
Variances	Variance I	Ratio F		1.074	6.541	0.9175		'ariances			
Variances	Mod Leve	ne Equ	ality of Variand	ce 0.03446	8.285	0.8548	Equal V	ariances			
Variances			of Variance	0.001085	8.285	0.9741	Equal V	ariances			
Distribution	Shapiro-W		,	0.9206	0.866	0.1016		Distribution			
Distribution	Kolmogor			0.1689	0.2235	0.1403		Distribution			
Distribution Distribution	D'Agostino D'Agostino			0.09078 2.098	2.576 2.576	0.9277 0.0359		Distribution Distribution			
Distribution	_		son K2 Omnibu		9.21	0.0333		Distribution			
Distribution	_		g A2 Normality	0.6503	3.878	0.0901		Distribution			
Germination I	Rate Summary									_	
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	10	0.935	0.9202	0.9498	0.935	0.9	0.96	0.00654	2.21%	0.0%
100		10	0.934	0.92	0.948	0.93	0.91	0.96	0.006182	2.09%	0.11%
Angular (Corr	rected) Transforn	ned Su	ımmary								
C-%	Control Type	Coun		95% LCL	95% UCL		Min	Max	Std Err	CV%_	%Effect
0	Negative Contr	10	1.316	1.286	1.346	1.313	1.249	1.369	0.01325	3.19%	0.0%
100		10	1.314	1.285	1.343	1.303	1.266	1.369	0.01279	3.08%	0.17%
Germination F		_					_	_	_	_	_
C-%	Control Type	Rep 1		Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0 100	Negative Control	0.92	0.93 0.93	0.96 0.96	0.95 0.95	0.94 0.92	0.93 0.91	0.96 0.93	0.91 0.96	0.9 0.95	0.95 0.92
100		0.01	0.33	0.50	0.00	0.02	0.01	0.33	0.30	0.00	0.02

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:26 (p 2 of 3)

Test Code:

COM0116.225klp | 21-3758-2869

							103	t oode.	COMICT	O.EEO.Ap   E	0,00 200
Macrocystis	Germination and	Germ Tu	be Growth	Test				Aquatic Bi	oassay &	Consulting	Labs, Inc.
Analysis ID: Analyzed:	02-7408-6006 03 Mar-16 8:21		•	ermination R arametric-Tw				TS Version: cial Results:	CETISv Yes	1.8.7	
Angular (Cor	rected) Transforn	ned Detai	ī								
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1.284	1.303	1.369	1.345	1.323	1.303	1.369	1.266	1.249	1.345
100		1.266	1.303	1.369	1.345	1.284	1.266	1.303	1.369	1.345	1.284
Germination	Rate Binomials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	92/100	93/100	96/100	95/100	94/100	93/100	96/100	91/100	90/100	95/100
100		91/100	93/100	96/100	95/100	92/100	91/100	93/100	96/100	95/100	92/100

Analyst: QA:

000-055-186-4 CETIS™ v1.8.7.11

000-055-186-4

Report Date:

03 Mar-16 10:26 (p 3 of 3)

Test Code:

COM0116.225klp | 21-3758-2869

									0011101110	3.220mp   2	. 1 0100 200
Macrocystis	Germination and	Germ '	Tube Growth T	est				Aquatic	Bioassay &	Consultin	g Labs, Inc
Analysis ID: Analyzed:	03-2103-8363 03 Mar-16 8:21		•	an Length rametric-Two	o Sample			IS Version		1.8.7	
Batch ID: Start Date:	09-6814-6080 01 Feb-16 13:3		Test Type: Gro	owth-Germin				lyst: ent: La	boratory Sea	water	
Ending Date:				crocystis py			Brin		t Applicable	iwatei	
Duration:	48h		•	uatic Bioass		lection	Age		t Applicable		
			<u> </u>							· -	
Sample ID:	17-1967-2320			M0116.225	<		Clie		y of Malibu		
•	31 Jan-16 10:50			mple Water			Proj	ect: AS	BS		
	: 31 Jan-16 12:40			assay Repo	ort						
Sample Age:	27h 		Station: 24-	BB-03R							
Data Transfor	rm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	sult		
Untransformed	i 	NA	C > T	NA 	NA		1.97%	Fails me	an length		
Equal Variand	ce t Two-Sample	Test									
Control	vs C-%		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	η(α:5%)		
Negative Cont	rol 100*		2.442	1.734	0.291 18	0.0126	CDF	Significa	nt Effect		
Test Acceptal	bility Criteria			_							
Attribute	Test Stat	TAC L	imits	Overlap	Decision						
Control Resp	14.78	10 - N		Yes	Passes A	cceptability	Criteria				
PMSD	0.0197	NL - 0	2	No	Passes A	cceptability	Criteria				
ANOVA Table											
Source	Sum Squa	ares	Mean Squ	uare	DF	F Stat	P-Value	Decision	η(α:5%)		
Between	0.8405002		0.8405002	2	1	5.963	0.0252	Significa	nt Effect	_	
Error	2.536999		0.1409444	1	18						
Total	3.3775				19						
Distributional	Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance			3.085	6.541	0.1086	Equal Va				
Variances			ality of Variance		8.285	0.3162	Equal Va				
Variances			of Variance	2.691	8.285	0.1183	Equal Va				
Distribution	Shapiro-V		-	0.9201	0.866	0.0993	Normal D				
Distribution	Kolmogor			0.211	0.2235	0.0199		istribution			
Distribution Distribution	D'Agostin D'Agostin			1.612 1.497	2.576 2.576	0.1069 0.1343	Normal D	istribution			
Distribution	_		on K2 Omnibus		9.21	0.1343	Normal D				
Distribution	-		A2 Normality	0.7796	3.878	0.0427	Normal D				
Mean Length	Summary				_						
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control		14.78	14.45	15.11	14.6	14.3	15.7	0.1459	3.12%	0.0%
100	-	10	14.37	14.18	14.56	14.5	13.7	14.6	0.08307	1.83%	2.77%
Mean Length	Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	15.5	14.9	15.7	14.3	14.5	14.6	14.7	14.6	14.5	14.5
100		14.4	14.2	14.5	14.5	14.5	13.7	14.5	14.6	14.3	14.5

CETIS™ v1.8.7.11

Analyst: QA:

			_
CFTIS	Anah	<i>ı</i> tical	Report
	Allai	LIGUI	IVOPOIL

Report Date:

03 Mar-16 10:26 (p 1 of 3)

Test Code:

COM0116.225klp | 21-3758-2869

Analyzed: 03 Mar-16 8:21 Analysis: Linear Interpolation (ICPIN) O		ic Bioassay &	Consulting	ı Labs, Inc.		
Analyzed: 03 Mar-16 8:21 Analysis: Linear Interpolation (ICPIN) O	ETIS Versi					
Potch ID: 00 6914 6090 Test Tune: Crowth Comingtion	CETIS Version: CETISv1.8.7 Official Results: Yes					
Batch ID: 09-6814-6080 Test Type: Growth-Germination A	Analyst:					
	Diluent:	Laboratory Sea	water			
Ending Date: 03 Feb-16 13:31 Species: Macrocystis pyrifera B	Brine:	Not Applicable				
	Age:					
Sample ID: 17-1967-2320 Code: COM0116.225k C	Client:	City of Malibu				
Sample Date: 31 Jan-16 10:50 Material: Sample Water P	Project:	ASBS				
Receive Date: 31 Jan-16 12:40 Source: Bioassay Report						
Sample Age: 27h Station: 24-BB-03R						
Linear Interpolation Options						
X Transform Y Transform Seed Resamples Exp 95% CL Method						
Linear Linear 0 280 Yes Two-Point Int	terpolation					
Test Acceptability Criteria						
Attribute Test Stat TAC Limits Overlap Decision						
Control Resp 0.935 0.7 - NL Yes Passes Acceptability Criteria						
Point Estimates	_					
Level % 95% LCL 95% UCL TU 95% LCL 95% UCL						
EC5 >100 N/A N/A <1 NA NA						
EC10 >100 N/A N/A <1 NA NA						
EC15 >100 N/A N/A <1 NA NA						
EC20 >100 N/A N/A <1 NA NA						
EC25 >100 N/A N/A <1 NA NA						
EC40 >100 N/A N/A <1 NA NA						
EC50 >100 N/A N/A <1 NA NA						
Germination Rate Summary Calculated Variate(A/B)			-			
C-% Control Type Count Mean Min Max Std Err Std De	ev CV%	%Effect	Α	В		
0 Negative Control 10 0.935 0.9 0.96 0.00654 0.0206			935	1000		
100 10 0.934 0.91 0.96 0.006182 0.0195	55 2.09%	6 0.11% ————	934	1000		
Germination Rate Detail						
C-% Control Type Rep 1 Rep 2 Rep 3 Rep 4 Rep 5 Rep 6			Rep 9	Rep 10		
0 Negative Control 0.92 0.93 0.96 0.95 0.94 0.93	0.96	0.91	0.9	0.95		
100 0.91 0.93 <b>0</b> .96 0.95 0.92 0.91	0.93	0.96	0.95	0.92		
Germination Rate Binomials						
C-% Control Type Rep 1 Rep 2 Rep 3 Rep 4 Rep 5 Rep 6	Rep 7	Rep 8	Rep 9	Rep 10		
0 Negative Control 92/100 93/100 96/100 95/100 94/100 93/100	0 96/10	0 91/100	90/100	95/100		
5 Negative Control 32/100 33/100 33/100 34/100 33/100	0 93/10	0 96/100	95/100	92/100		

Analyst: QA:

Report Date:

03 Mar-16 10:26 (p 2 of 3)

Test Code:

COM0116.225klp | 21-3758-2869

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

15-3139-2950 03 Mar-16 8:21

Endpoint: Germination Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7 Official Results: Yes

CETIS™ v1.8.7.11

Report Date:

03 Mar-16 10:26 (p 3 of 3)

Test Code: COM0116.225klp | 21-3758-2869

								Т	est Code:	COM011	6.225klp   2	1-3758-2869
Macro	cystis C	Sermination and	Germ Tub	e Grow	th Test	_			Aquati	c Bioassay &	Consulting	g Labs, Inc.
Analys	is ID:	00-4078-8832	Enc	lpoint:	Mean Length				ETIS Version	on: CETISv	1.8.7	
Analyz	ed:	03 Mar-16 8:21	Ana	lysis:	Linear Interpola	ition (ICPIN	l)	C	official Resu	ılts: Yes		
Batch	ID:	09-6814-6080	Tes	t Type:	Growth-Germin	ation		Α	nalyst:			
Start D	ate:	01 Feb-16 13:3	1 Pro	tocol:	EPA/600/R-95/	136 (1995)			iluent: L	aboratory Sea	awater	
Ending	g Date:	03 Feb-16 13:3	1 Spe	cies:	Macrocystis pyr	rifera		В	rine: N	Not Applicable		
Duratio	on:	48h	Sou	rce:	Aquatic Bioass	ay Labs Co	llection	A	ge:			
Sample	e ID:	17-1967-2320	Cod	le:	COM0116.225k			C	lient: C	City of Malibu		
Sample	e Date:	31 Jan-16 10:5	0 <b>M</b> at	erial:	Sample Water			P	roject: A	ASBS		
Receiv	e Date:	31 Jan-16 12:4	0 Sou	rce:	Bioassay Repo	rt						
Sample	e Age:	27h	Stat	ion:	24-BB-03R	_						
Linear	Interpo	lation Options										
X Tran	sform	Y Transform	n See	d	Resamples	Exp 95%	CL M	ethod				
Linear		Linear	140	740	280	Yes	Tv	vo-Point Int	erpolation			
Test A	cceptab	ility Criteria										
Attribu	te	Test Stat	TAC Limi	ts	Overlap	Decision						
Control	Resp	14.78	10 - NL		Yes	Passes A	cceptabili	ity Criteria				
Point E	Estimate	es	_		_			_				
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
IC5	>100	N/A	N/A	<1	NA	NA						
IC10	>100	N/A	N/A	<1	NA	NA			*			
IC15	>100	N/A	N/A	<1	NA	NA						
IC20	>100	N/A	N/A	<1	NA	NA						
IC25	>100	N/A	N/A	<1	NA	NA						
IC40	>100	N/A	N/A	<1	NA	NA						
IC50	>100	N/A	N/A	<1	NA	NA						
Mean L	ength	Summary				Са	lculated \	Variate				
C-%	c	ontrol Type	Count	Mean	Min	Max	Std Err	Std De	ev CV%	%Effect		
0	N	egative Control	10	14.78	14.3	15.7	0.1459	0.4614	3.12%	0.0%		
100			10	14.37	13.7	14.6	0.08307	7 0.2627	1.83%	2.77%		
Mean L	_ength [	Detail										
C-%	c	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	egative Control	15.5	14.9	15.7	14.3	14.5	14.6	14.7	14.6	14.5	14.5
100			14.4	14.2	14.5	14.5	14.5	13.7	14.5	14.6	14.3	14.5

000-055-186-4

CETIS™ v1.8.7.11

## **CETIS Measurement Report**

Report Date:

03 Mar-16 10:26 (p 1 of 1)

Test Code:

COM0116.225klp | 21-3758-2869

O         Negative Control         2         6.45         2.003         10.9         6.1         6.8         0.35         0.495         7.67%         0           100         2         6.25         3.073         9.427         6         6.5         0.25         0.3536         5.66%         0           Overall         4         6.35         -         6         6.8         -         -         0         0%)           pH-Units           C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Contr         2         7.9         7.884         7.916         7.9         7.9         0         0         0.0%         0           Overall         4         8.025         -         7.9         8.3         -         -         0         0%)           Salinity-ppt           C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0	Macrocystis Germination and Germ Tube Growth Test						Aquatic Bioassay & Consulting Labs, Inc.						
Sample Date   31 Jan-16 10 12 14	Start Date: Ending Date:	01 Feb-16 13:3 03 Feb-16 13:3		Protocol: Species:	EPA/600/R-95 Macrocystis py	/136 (1995) yrifera			Diluent: Brine:		-		
C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Control         2         6.45         2.003         10.9         6.1         6.8         0.35         0.495         7.67%         0           Overall         4         6.35         3.73         9.427         6         6.8         0.35         5.66%         0         0           PH-Units         4         6.35         8.73         9.427         6         6.8         5         3.536         5.66%         0	Sample Date: Receive Date	: 31 Jan-16 10:5 : 31 Jan-16 12:4		Material: Source:	Sample Water Bioassay Repo						Malibu		
Negative Control Type	Dissolved Ox	kygen-mg/L											
100         −         2         6.25         3.073         9.427         6         6.5         0.25         0.3536         5.66%         0           Cycrafil         4         6.35         -         6         6.8         -         -         0				t Mean	95% LCL	95% UCL	Min	<u>Max</u>	Std E	rr St	d Dev	CV%	QA Count
Overall         4         6.35         6         6.8         6.8         Combol Type         0 (0%)         PH-Units           C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QAC out of the count	-	Negative Contr											
PH-Units					3.073	9.427			0.25	0.5	3536	5.66%	
C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Countrol Type           100         Negative Control Type         2         7.9         7.884         7.916         7.9         7.9         0<				0.35			ь						
One of the control of the c		0	0 -		050/ 1 01	05% 1101			04.15	- 0.		01/0/	0.1.0
100         2         8.15         6.244         10.06         8         8.3         0.15         0.2121         2.6%         0           Overall         4         8.025											d Dev		
Salinity-ppt		Negative Conti									2121		
C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Contr         2         34         34         34         34         0         0         0.0%         0           100         2         34         34         34         34         34         0         0         0.0%         0           Overall         4         34         34         34         34         0         0         0.0%         0           Temperature**C         C         0					0,244	10.00			0.10			2.070	
0 Negative Control 100         2 34 34 34 34 34 34 34 34 0 0 0.0% 0.0% 0.0% 0.0% 0.00 0.0% 0.0%	Salinity-ppt									_			
0 Negative Control 100         2 34 34 34 34 34 34 34 34 0 0 0.0% 0.0% 0.0% 0.0% 0.00 0.0% 0.0%		Control Type	Coun	t Mean	95% L CI	95% UCL	Min	Max	Std F	rr St	d Dev	CV%	QA Count
100         2         34         34         34         34         34         34         0         0         0.0%         0           Overall         4         34         34         34         34         34         34         0 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>													
Overall         4         34         34         34         34         34         34         34         34         34         34         36         36         36         36         34 <td>100</td> <td></td>	100												
C-%         Control Type         Count         Mean         95% LCL         95% UCL         Min         Max         Std Err         Std Dev         CV%         QA Count           0         Negative Contr         2         14.75         14.11         15.39         14.7         14.8         0.05002         0.07075         0.48%         0           100         2         14.75         14.11         15.39         14.7         14.8         0.05002         0.07075         0.48%         0           Overall         4         14.75         14.11         15.39         14.7         14.8         0.05002         0.07075         0.48%         0           Dissolved Oxygen-mg/L         4         14.75         4.11         15.39         14.7         14.8         0.05002         0.07075         0.48%         0           0         Negative Contr         6.8         6.1         6.5         6         14.7         14.8         14.7         14.8         14.7         14.8         14.7         14.8         14.7         14.8         14.7         14.8         14.7         14.8         14.7         14.8         14.7         14.8         14.7         14.8         14.7         14.7	Overall		4	34				34					0 (0%)
Negative Control   14.75	Temperature	-°C											
100	C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std E	rr St	d Dev	CV%	QA Count
Overail         4         14.75         14.7         14.8         0 (0%)           Dissolved Organization         C-%         Control Type         1         2           DH-Units           C-%         Control Type         1         2	0	Negative Contr	2	14.75	14.11	15.39	14.7	14.8	0.050	0.0	07075	0.48%	0
Dissolved Oxygen-mg/L           C-%         Control Type         1         2           0         Negative Control Type         6.8         6.1           100         -         6.5         6           pH-Units           C-%         Control Type         1         2           0         Negative Control Type         7.9         7.9           100         -         8.3         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Control Type         34         34           100         34         34           Temperature->         Control Type         1         2           0         Negative Contr         14.8         14.7					14.11	15.39		14.8	0.050	0.0	07075	0.48%	
C-%         Control Type         1         2           0         Negative Contr         6.8         6.1           100         6.5         6           pH-Units           C-%         Control Type         1         2           0         Negative Contr         7.9         7.9           100         8.3         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Contr         34         34           100         34         34           Temperature-°C         Control Type         1         2           0         Negative Contr         14.8         14.7	Overall		4	14.75			14.7	14.8					0 (0%)
0         Negative Contr         6.8         6.1           100         6.5         6           pH-Units           C-%         Control Type         1         2           0         Negative Contr         7.9         7.9           100         8.3         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Contr         34         34           100         34         34           Temperature-°C         Control Type         1         2           0         Negative Contr         14.8         14.7	Dissolved Ox	ygen-mg/L											
100	C-%	Control Type	1	2									
pH-Units           C-%         Control Type         1         2           0         Negative Contr         7.9         7.9           100         8.3         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Contr         34         34           100         34         34           100         34         34           Temperature-°C         Control Type         1         2           0         Negative Contr         14.8         14.7	0	Negative Contr	6.8	6.1									
C-%         Control Type         1         2           0         Negative Control Type         7.9         7.9           100         8.3         8           Salinity-ppt           C-%         Control Type         1         2           0         Negative Control Type         34         34           100         34         34           Temperature-°C           C-%         Control Type         1         2           0         Negative Contr         14.8         14.7	100		6.5	6									
0       Negative Contr       7.9       7.9         100       8.3       8         Salinity-ppt         C-%       Control Type       1       2         0       Negative Contr       34       34         100       34       34         Temperature-°C         C-%       Control Type       1       2         0       Negative Contr       14.8       14.7	pH-Units												
100       8.3       8         Salinity-ppt         C-%       Control Type       1       2         0       Negative Control 34       34         100       34       34         Temperature-°C         C-%       Control Type       1       2         0       Negative Control 14.8       14.7	C-%	Control Type	1	2									
Salinity-ppt           C-%         Control Type         1         2           0         Negative Contr         34         34           100         34         34           Temperature-°C           C-%         Control Type         1         2           0         Negative Contr         14.8         14.7	-	Negative Contr		7.9									
C-%         Control Type         1         2           0         Negative Contr         34         34           100         34         34           Temperature-°C           C-%         Control Type         1         2           0         Negative Contr         14.8         14.7	100		8.3	8									
0       Negative Contr       34       34         100       34       34         Temperature-°C         C-%       Control Type       1       2         0       Negative Contr       14.8       14.7	Salinity-ppt												
100     34     34       Temperature-°C       C-%     Control Type     1     2       0     Negative Contr     14.8     14.7	C-%	Control Type	1	2									
Temperature-°C           C-%         Control Type         1         2           0         Negative Contr         14.8         14.7	0	Negative Contr	34	34									
C-%         Control Type         1         2           0         Negative Contr         14.8         14.7	100		34	34									
0 Negative Contr 14.8 14.7	Temperature-	-°C											
0 Negative Contr 14.8 14.7	C-%	Control Type	1	2									
100 14.8 14.7			14.8										
	100		14.8	14.7									

Analyst: QA:



#### CHRONIC KELP GERMINATION & GROWTH BIOASSAY

DATE:

February 1, 2016

STANDARD TOXICANT: Copper Chloride

ENDPOINT:

**GERMINATION** 

NOEC =

32.0 ug/l

EC25 =

108.0 ug/l

EC50 =

138.5 ug/l

ENDPOINT:

**GROWTH-LENGTH** 

NOEC =

32.0 ug/l

IC25 =

81.32 ug/l

IC50 =

202.4 ug/l

Yours very truly,

Scott Johnson

Laboratory Director

## **CETIS Summary Report**

Report Date:

03 Mar-16 13:09 (p 1 of 2)

Test Code:

KLP020116 | 00-8926-1908

							Test Code:	KLP020116   00-8926-190
Macrocystis G	Germination and Ger	m Tube Grow	th Test				Aquatic Bi	oassay & Consulting Labs, Inc
Batch ID:	14-1595-5110	Test Type:	Growth-Germ	ination			Analyst:	
Start Date:	01 Feb-16	Protocol:	EPA/600/R-95	5/136 (1995)			Diluent: Labo	ratory Seawater
Ending Date:	03 Feb-16	Species:	Macrocystis p	yrifera			Brine: Not A	Applicable
Duration:	48h	Source:	David Gutoff				Age:	
Sample ID:	04-7914-7466	Code:	KLP020116k				Client: Inter	nal Lab
Sample Date:	01 Feb-16	Material:	Copper chloric	de			Project:	
Receive Date:		Source:	Reference To	xicant				
Sample Age:	NA	Station:	REF TOX					
Comparison S	Summary				_			
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method	
18-4383-8954	Germination Rate	32	100	56.57	4.12%			ultiple Comparison Test
16-8410-8911	Mean Length	32	100	56.57	3.27%		Steel Many	y-One Rank Sum Test
Point Estimate	e Summary							
Analysis ID	Endpoint	Level		95% LCL	95% UCL	ΤU	Method	
4-0334-7001	Germination Rate	EC5	46.56	33.43	54.81		Linear Inte	rpolation (ICPIN)
		EC10		51.89	79.55			
		EC15		68.34	104.6			
		EC20		86.25	107.6			
		EC25		100.8	113.6			
		EC40		120.4	130.8			
		EC50		133.1	143.3		<del></del>	
0-8495-5840	Mean Length	IC5	40.52	35.55	42.96		Linear Inte	rpolation (ICPIN)
		IC10	50.72	46.04	53.17			
		IC15	60.92	56.64	63.46			
		IC20	71.12	67.44	73.98			
		IC25	81.32	77.24	84.54			
		IC40 IC50	174.1 202.4	131.4 190.4	189.1 208.9			
Test Acceptab	sility							
Analysis ID	Endpoint	Attrib	ute	Test Stat	TAC Limi	its	Overlap	Decision
4-0334-7001	Germination Rate		ol Resp	0.926	0.7 - NL		Yes	Passes Acceptability Criteria
8-4383-8954	Germination Rate		ol Resp	0.926	0.7 - NL		Yes	Passes Acceptability Criteria
0-8495-5840	Mean Length		ol Resp	14.44	10 - NL		Yes	Passes Acceptability Criteria
6-8410-8911	Mean Length		ol Resp	14.44	10 - NL		Yes	Passes Acceptability Criteria
	Mean Length	NOEL	•	32	NL - 35		No	Passes Acceptability Criteria
6-8410-8911	Mean Length	NOLL		02				
6-8410-8911 8-4383-8954	Germination Rate	PMSE		0.04117	NL - 0.2		No	Passes Acceptability Criteria

Analyst: QA:

Report Date:

03 Mar-16 13:09 (p 2 of 2)

KLP020116 | 00-8926-1908 Test Code: Macrocystis Germination and Germ Tube Growth Test Aquatic Bioassay & Consulting Labs, Inc. Germination Rate Summary CV% C-µg/L Control Type Count Mean 95% LCL 95% UCL Min Max Std Err Std Dev %Effect 0 Negative Control 5 0.926 0.8925 0.9595 0.9 0.96 0.01208 0.02702 2.92% 0.0% 5.6 5 0.924 0.9032 0.9448 0.91 0.95 0.007483 0.01673 1.81% 0.22% 10 5 0.928 0.9058 0.9502 0.9 0.95 0.008 0.01789 1.93% -0.22% 18 5 0.928 0.8997 0.9563 0.9 0.96 0.0102 0.0228 2.46% -0.22% 32 5 0.914 0.8952 0.9328 0.9 0.93 0.006782 0.01517 1.66% 1.3% 100 5 0.756 0.7001 0.8119 0.7 0.81 0.02015 0.04506 5.96% 18.36% 180 5 0.148 0.09289 0.2031 0.1 0.21 0.01985 0.04438 29.99% 84.02% 5 320 0 0 0 0 0 100.0% 0 0 Mean Length Summary CV% C-µg/L **Control Type** Count Mean 95% LCL 95% UCL Min Max Std Err Std Dev %Effect 0 Negative Control 5 14.44 14.27 14.2 14.5 0.06 0.1342 0.93% 0.0% 14.61 -1.52% 0.78% 5.6 5 14.66 14.52 14.8 14.5 14.8 0.05099 0.114 10 5 14.64 14.57 14.71 14.6 14.7 0.02449 0.05477 0.37% -1.39% 18 5 14.56 14.15 14.97 14.3 15.1 0.147 0.3286 2.26% -0.83% 32 5 14.46 14.11 14.81 14.2 14.8 0.1249 0.2793 1.93% -0.14% 100 5 9.6 9.26 9.94 9.2 9.9 0.1225 0.2739 2.85% 33.52% 180 5 8.68 7.918 9.442 7.6 9.1 0.2746 0.614 7.07% 39.89% 320 5 0 0 0 0 0 Ω 0 100.0% Germination Rate Detail C-µg/L **Control Type** Rep 1 Rep 2 Rep 3 Rep 4 Rep 5 0 Negative Control 0.96 0.91 0.91 0.95 0.9 5.6 0.91 0.91 0.93 0.95 0.92 10 0.93 0.95 0.9 0.93 0.93 18 0.92 0.94 0.92 0.9 0.96 32 0.9 0.93 0.9 0.93 0.91 0.78 100 0.7 0.72 0.81 0.77 0.11 0.21 180 0.16 0.1 0.16 320 0 0 0 0 0 Mean Length Detail C-µg/L **Control Type** Rep 2 Rep 3 Rep 4 Rep 1 Rep 5 0 Negative Control 14.5 14.5 14.5 14.2 14.5 5.6 14.5 14.6 14.7 14.8 14.7 10 14.6 14.6 14.7 14.6 14.7 18 15.1 14.3 14.5 14.6 14.3 32 14.2 14.7 14.8 14.4 14.2 100 9.9 9.5 9.8 9.6 9.2 180 8.9 9.1 7.6 9 8.8 320 0 0 0 0 Germination Rate Binomials **Control Type** C-µg/L Rep 1 Rep 2 Rep 3 Rep 4 Rep 5 0 Negative Control 96/100 91/100 95/100 90/100 91/100 5.6 91/100 91/100 93/100 95/100 92/100

000-055-186-6 CETIS™ v1.8.7.11

93/100

92/100

90/100

70/100

16/100

0/100

95/100

94/100

93/100

72/100

11/100

0/100

90/100

92/100

90/100

81/100

21/100

0/100

93/100

90/100

93/100

78/100

10/100

0/100

93/100

96/100

91/100

77/100

16/100

0/100

10

18

32

100

180

Report Date:

03 Mar-16 13:08 (p 1 of 4)

OL 110 And	nytical itepe		Test Code: KLP020116   00-8926-1908								
Macrocystis (	Germination and	Germ	Tube Growt	h Test				Aquatic I	Bioassay & C	Consulting	g Labs, Inc.
Analysis ID:	18-4383-8954		Endpoint:	Germination R	Rate		CET	IS Version	: CETISv1.	.8.7	
Analyzed:	03 Mar-16 8:20		Analysis:	Parametric-Co	ontrol vs Trea	itments	Offic	cial Results	s: Yes		
Batch ID:	14-1595-5110		Test Type:	Growth-Germi	nation		Ana	lyst:			
Start Date:	01 Feb-16		٠.	EPA/600/R-95			Dilu	-	boratory Seav	water	
Ending Date:	03 Feb-16			Macrocystis py	` '		Brin		t Applicable		
Duration:	48h		•	David Gutoff	•		Age				
Sample ID:	04-7914-7466		Code:	KLP020116k		-	Clie	nt: Inte	ernal Lab	_	
Sample Date:	te: 01 Feb-16 Material: C			Copper chloric	le		Proj	ect:			
Receive Date:	:		Source:	Reference Tox	kicant						
Sample Age:	NA		Station:	REF TOX							
Data Transfor	m	Zeta	Alt Hy	p Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre	ected)	NA	C > T	NA	NA		4.12%	32	100	56.57	
Dunnett Multi	ple Comparison	Test									
Control	vs_C-μg/L		Test S	tat Critical	MSD DF	P-Value	P-Type	Decision	η(α:5%)		
Negative Cont	rol 5.6		0.2165	2.407	0.07 8	0.7904	CDF	Non-Sigr	nificant Effect		
	10		-0.0513		0.07 8	0.8706	CDF	-	nificant Effect		
	18		-0.0959		0.07 8	0.8815	CDF	_	nificant Effect		
	32		0.8665		0.07 8	0.5142	CDF	_	nificant Effect		
	100*		8.4	2.407	0.07 8	< 0.0001	CDF	Significa			
	180*		31.27	2.407	0.07 8	<0.0001	CDF	Significa	nt Effect		
Test Acceptab	oility Criteria										
Attribute	Test Stat	TAC	Limits	Overlap	Decision						
Control Resp	0.926	0.7 -	NL	Yes	Passes A	cceptability	Criteria				
PMSD	0.04117	NL - (	).2 	No 	Passes A	cceptability	Criteria				
ANOVA Table											
Source	Sum Squa	res	Mean	Square	DF	F Stat	P-Value	Decision	<del></del>		
Between	3.425762		0.5709		6	271.3	<0.0001	Significar	nt Effect		
Error	0.0589321	4	0.0021	04719	28	_					
Total ——————	3.484694				34						
Distributional	Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision				
Variances			of Variance	3.841	16.81	0.6982	Equal Var				
Variances			ality of Varia		3.812	0.6953	Equal Var				
Variances			of Variance	1.578	3.528	0.1904	Equal Var				
Distribution	Shapiro-W		_	0.9698	0.9146	0.4390	Normal D				
Distribution	Kolmogor			0.09739	0.1723	0.5332	Normal D				
Distribution	D'Agostino			0.6161	2.576	0.5378	Normal D				
Distribution	D'Agostino			1.389	2.576	0.1647 0.3151	Normal D				
Distribution	•						Normal D				
Distribution		-Darling	g A2 Normalii	y 0.325	3.878	0.5410 ————	Normal D	istribution			
	Rate Summary	•		0=0/ : 5:	050/110	84			04 : =	0) (0)	0/====
	Control Type  Negative Control	Coun	t Mean 0.926	95% LCL 0.8925	95% UCL 0.9595	Median 0.91	0.9	Max 	0.01208	2.92%	%Effect 0.0%
5.6	INEGALIVE COLLIO	5	0.926	0.8925	0.9393	0.92	0.91	0.95	0.01208	1.81%	0.0%
10		5	0.924	0.9052	0.9446	0.92	0.91	0.95	0.007463	1.93%	-0.22%
18		5	0.928	0.8997	0.9563	0.93	0.9	0.95	0.008	2.46%	-0.22% -0.22%
33		5	0.926	0.0997	0.9303	0.92	0.9	0.90	0.0102	1.66%	1 20/

Analyst: QA:

29.99%

1.3%

18.36%

84.02%

100.0%

0.006782 1.66%

0.02015 5.96%

0.01985

000-055-186-4 CETIS™ v1.8.7.11

0.914

0.756

0.148

0.8952

0.7001

0.09289 0.2031

0

0.9328

0.8119

0.91

0.77

0.16

0.9

0.7

0.1

0

0.93

0.81

0.21

0

5

5

5

5

32

100

180

Report Date:

03 Mar-16 13:08 (p 2 of 4) KLP020116 I 00-8926-1908

	,		Test Code: KLP020116   00-8926-19										
Macrocystis	Germination and	Germ Tub	e Growth T	est				Aquatic Bi	oassay &	Consulting	Labs, Inc.		
Analysis ID:	18-4383-8954	End	lpoint: Ge	rmination Ra	ate		CET	S Version:	CETISv1	.8.7			
Analyzed:	03 Mar-16 8:20	Ana	lysis: Pa	rametric-Cor	ntrol vs Trea	tments	Offic	ial Results:	Yes	y & Consulting Labs ISv1.8.7  Err CV% %E 125 4.17% 0.06 177 2.55% 0.48 128 2.63% -0.1 156 3.53% -0.2 123 2.15% 1.94 148 4.97% 18.7 199 15.97% 69.8			
Angular (Cor	rrected) Transforr	ned Summ	ary										
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	Negative Contr	5	1.299	1.232	1.367	1.266	1.249	1.369	0.02425	4.17%	0.0%		
5.6		5	1.293	1.252	1.334	1.284	1.266	1.345	0.01477	2.55%	0.48%		
10		5	1.301	1.258	1.343	1.303	1.249	1.345	0.01528	2.63%	-0.11%		
18		5	1.302	1.245	1.359	1.284	1.249	1.369	0.02056	3.53%	-0.21%		
32		5	1.274	1.24	1.308	1.266	1.249	1.303	0.01223	2.15%	1.94%		
100		5	1.055	0.9903	1.121	1.071	0.9912	1.12	0.02348	4.97%	18.76%		
180		5	0.3918	0.3141	0.4695	0.4115	0.3218	0.476	0.02799	15.97%	69.84%		
320		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.15%		
Germination	Rate Detail					_							
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5							
0	Negative Control	0.96	0.91	0.91	0.95	0.9							
5.6		0.91	0.91	0.93	0.95	0.92							
10		0.93	0.95	0.9	0.93	0.93							
18		0.92	0.94	0.92	0.9	0.96							
32		0.9	0.93	0.9	0.93	0.91							
100		0.7	0.72	0.81	0.78	0.77							
180		0.16	0.11	0.21	0.1	0.16							
320		0	0	0	0	0							
Angular (Cor	rected) Transforr	med Detail											
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5							
0	Negative Control	1.369	1.266	1.266	1.345	1.249							
5.6		1.266	1.266	1.303	1.345	1.284							
10		1.303	1.345	1.249	1.303	1.303							
18		1.284	1.323	1.284	1.249	1.369							
32		1.249	1.303	1.249	1.303	1.266							
100		0.9912	1.013	1.12	1.083	1.071							
180		0.4115	0.3381	0.476	0.3218	0.4115							
320		0.05002	0.05002	0.05002	0.05002	0.05002							
Germination	Rate Binomials												
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5							
0	Negative Control		91/100	91/100	95/100	90/100							
5.6		91/100	91/100	93/100	95/100	92/100							
10		93/100	95/100	90/100	93/100	93/100							
18		92/100	94/100	92/100	90/100	96/100							
				90/100	93/100	91/100							
32		90/100	93/100			77/100							
100		70/100	72/100	81/100	78/100								
180		16/100	11/100	21/100	10/100	16/100							

Analyst: M QA:

CETIS™ v1.8.7.11

0/100

0/100

0/100

0/100

0/100

Report Date:

03 Mar-16 13:08 (p 3 of 4)

Test Code:

de: KLP020116 | 00-8926-1908

Macrocystis	Germ	ination and	Germ	Tube Grow	th T	est					Aquatic	Bioassay &	Consulting	g Labs, In
Analysis ID:	_			Endpoint:		an Length				CETIS Version: CETISv1.8.7				
Analyzed:	03	Mar-16 8:20		Analysis:	Nor	parametric-	-Control	vs 1	reatments	Offic	cial Result	s: Yes		
Batch ID:	14-	14-1595-5110		Test Type:	t Type: Growth-Germination					Ana	lyst:			
Start Date:	01	Feb-16		Protocol:	EPA/600/R-95/136 (1995)					Dilu	ent: La	boratory Sea	water	
Ending Date:	03	Feb-16		Species:	Macrocystis pyrifera Brine: Not Applicable									
Duration:	tion: 48h Source:					id Gutoff				Age	:			
Sample ID:						P020116k				Clie	nt: Int	ernal Lab		
Sample Date	: 01	Feb-16		Material:	Copper chloride Project:									
Receive Date				Source:	Ref	erence Toxi	cant							
Sample Age:	NA			Station:	REF	TOX		_						
Data Transfo			Zeta	Alt H	ур	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransforme	d		NA	C > T		NA	NA _			3.27%	32	100	56.57	
Steel Many-C	ne R	ank Sum Te	st											
Control	vs	C-μg/L		Test S	Stat	Critical	Ties	DF	P-Value	P-Type	Decisio	n(α:5%)		
Negative Con	trol	5.6		38		16	1	8	0.9999	Asymp	Non-Sig	nificant Effec	t	
		10		40		16	0	8	1.0000	Asymp	Non-Sigi	nificant Effect	t	
		18		30		16	1	8	0.9557	Asymp	_	nificant Effec		
		32		27		16	1	8	0.8267	Asymp	_	nificant Effect	t	
		100*		15		16	0	8	0.0222	Asymp	Significa			
		180*		15 		16 	0	8	0.0222	Asymp	Significa	nt Effect		
est Accepta	bility	Criteria												
\ttribute		Test Stat	TAC	Limits		Overlap	Decis							
Control Resp	•					Yes			ceptability (					
NOEL	32 NL - 35					No	Passe	s Ac	cceptability (	Criteria				
PMSD 		0.03267	NL - 0	0.2		No	Passe	s Ac	ceptability	Criteria ————				
ANOVA Table	)													
Source		Sum Squa	res	Mean	Squ	are	DF_		F Stat	P-Value	Decision	η(α:5%)		
Between		211.5309		35.25	35.25514		6 367.2			< 0.0001	Significa	nt Effect		
rror		2.688001		0.0960000		3	28	-						
「otal ————————————————————————————————————		214.2189					34							
Distributiona	I Test	s												
ttribute		Test				Test Stat		al	P-Value	Decision				
ariances				of Variance		22.31	16.81		0.0011		Variances			
/ariances				uality of Varia	nce	1.163	3.812		0.3626	Equal Va				
/ariances			,	of Variance		2.576	3.528		0.0410	Equal Va				
istribution		Shapiro-W				0.8868	0.9146		0.0018		nal Distribut	ion		
Distribution		Kolmogoro				0.1584	0.1723	3	0.0263		istribution			
Distribution		D'Agostino				3.234	2.576		0.0012		nal Distribut			
Distribution		D'Agostino				3.31	2.576		0.0009		nal Distribut			
Distribution Distribution	D'Agostino-Pearson K2 Omnibus Anderson-Darling A2 Normality					21.41 1.02	9.21 3.878		<0.0001 0.0112		nal Distribul istribution	ion		
				y Az Nollilai		1.02	3.076		0.0112	- Normal D				
Mean Length		-	0.			050/ 1.02	0.507 :	١٥.	B#12		B.4	044.5	0.101	0/ =
C-μg/L		trol Type	Coun			95% LCL	95% L	ICL	Median	Min	Max	Std Err	CV%	%Effec
	Nega	ative Control		14.44		14.27	14.61		14.5	14.2	14.5	0.06	0.93%	0.0%
6.6			5	14.66		14.52	14.8		14.7	14.5	14.8	0.05099	0.78%	-1.52%
0			5	14.64		14.57	14.71		14.6	14.6	14.7	0.02448	0.37%	-1.39%
8			5	14.56		14.15	14.97		14.5	14.3	15.1	0.147	2.26%	-0.83%
2			5	14.46		14.11	14.81		14.4	14.2	14.8	0.1249	1.93%	-0.14%
00			5	9.6		9.26	9.94		9.6	9.2	9.9	0.1225	2.85%	33.52%

Analyst: QA:

7.07%

39.89%

100.0%

0.2746

000-055-186-4

5

5

8.68

7.918

0

180

320

CETIS™ v1.8.7.11

8.9

0

7.6

9.1

0

9.442

Report Date:

03 Mar-16 13:08 (p 4 of 4)

Test Code:

KLP020116 | 00-8926-1908

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed: 16-8410-8911 03 Mar-16 8:20

Analysis

Endpoint: Mean Length

Analysis: Nonparametric-Control vs Treatments

CETIS Version:

: CETISv1.8.7

Official Results: Yes

Mean	Length	Detail
------	--------	--------

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	14.5	14.5	14.5	14.5	14.2
5.6		14.8	14.5	14.6	14.7	14.7
10		14.6	14.6	14.7	14.6	14.7
18		15.1	14.3	14.5	14.6	14.3
32		14.2	14.7	14.8	14.4	14.2
100		9.6	9.9	9.2	9.5	9.8
180		8.9	9.1	7.6	9	8.8
320		0	0	0	0	0

000-055-186-4

CETIS™ v1.8.7.11

Report Date:

03 Mar-16 13:09 (p 1 of 4)

Test Code:

KLP020116 | 00-8926-1908

									rest	Code:	KLP	0201161	00-8926-1908
Macro	ystis C	Sermination and	Germ Tub	e Grow	th Test					Aquatic B	ioassay &	Consulti	ng Labs, Inc.
Analys Analyz		14-0334-7001 03 Mar-16 8:20		point: lysis:	Germination R		)			S Version: ial Results		.8.7	
Batch I Start D Ending Duratio	ate: Date:	14-1595-5110 01 Feb-16 03 Feb-16 48h	Pro Spe	Type: tocol: cies: rce:	Growth-Germi EPA/600/R-95 Macrocystis py David Gutoff	/136 (1995)			Anal Dilue Brine Age:	nt: Lab	oratory Sea Applicable	water	
Sample Sample Receive Sample	Date: Date:			erial: rce:	KLP020116k Copper chloric Reference Tox REF TOX				Clier Proje		rnal Lab		
Linear	Interpo	lation Options				,	·						
X Trans	sform	Y Transform	See	d	Resamples	Exp 95%	CL M	ethod					
Linear		Linear	0		280	Yes		wo-Point	Interp	olation			
Test Ac	ceptab	oility Criteria											
Attribu	•	•	TAC Limi	e	Overlap	Decision							
Control		0.926	0.7 - NL		Yes	Passes A		ity Criteri	<u></u>				
Point E	stimate	es					<u> </u>						
Level	μg/L	95% LCL	95% UCL										
EC5	46.56	33.43	54.81						•				
EC10	66.49		79.55										
EC15	86.43		104.6										
EC20	101.9		107.6										
EC25	108	100.8	113.6										
EC40	126.3		130.8										
EC50	138.5	133.1	143.3										
Germin	ation F	Rate Summary				Calcu	ılated Va	riate(A/E	3)				
C-µg/L		ontrol Type	Count	Mean		Max	Std Er		Dev	CV%	%Effect	Α	В
0	N	legative Control	5	0.926		0.96	0.0120			2.92%	0.0%	463	500
5.6			5	0.924		0.95	0.0074			1.81%	0.22%	462	500
10			5	0.928		0.95	0.008	0.01		1.93%	-0.22%	464	500
18			5 5	0.928		0.96	0.0102			2.46%	-0.22%	464	500
32 100			Ü	0.914		0.93	0.0067			1.66%	1.3% 18.36%	457 378	500 500
180			5 5	0.756 0.148		0.81 0.21	0.0201 0.0198			5.96% 29.99%	84.02%	74	500
320			5	0.140	0.1	0.21	0.0130	0.04	430	29.9970	100.0%	0	500
	ation F	Rate Detail											
C-µg/L	С	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
0	Ν	egative Control	0.96	0.91	0.91	0.95	0.9						
5.6			0.91	0.91	0.93	0.95	0.92						
10			0.93	0.95	0.9	0.93	0.93						
18			0.92	0.94	0.92	0.9	0.96						
32			0.9	0.93	0.9	0.93	0.91						
100			0.7	0.72	0.81	0.78	0.77						
180			0.16	0.11	0.21	0.1	0.16						
320			0	0	0	0	0						

Report Date:

03 Mar-16 13:09 (p 2 of 4)

Test Code:

KLP020116 | 00-8926-1908

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

14-0334-7001 03 Mar-16 8:20

Endpoint: Germination Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

Germination	Rate	Binomials
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C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	ol 96/100	91/100	91/100	95/100	90/100
5.6		91/100	91/100	93/100	95/100	92/100
10		93/100	95/100	90/100	93/100	93/100
18		92/100	94/100	92/100	90/100	96/100
32		90/100	93/100	90/100	93/100	91/100
100		70/100	72/100	81/100	78/100	77/100
180		16/100	11/100	21/100	10/100	16/100
320		0/100	0/100	0/100	0/100	0/100

Report Date:

03 Mar-16 13:09 (p 3 of 4)

Test Code:

KLP020116 | 00-8926-1908

								1651	i Code.		KLF020110   00-0920-190		
Macroo	cystis Germination and	d Germ Tube 0	Grow	th Test					Aquati	c Bio	passay & Consulting Labs, Inc		
Analysis ID:         10-8495-5840         End           Analyzed:         03 Mar-16 8:20         Ana				•					CETIS Version: CETISv1.8.7 Official Results: Yes				
Batch I	D: 14-1595-5110	Test Ty	ype:	Growth-Germin	nation			Ana	lyst:				
Start D	ate: 01 Feb-16	Protoc		EPA/600/R-95/				Dilu		abor	atory Seawater		
Ending	Date: 03 Feb-16	Specie		Macrocystis py				Brin			pplicable		
Duratio	on: 48h	Source	e:	David Gutoff				Age					
Sample	e ID: 04-7914-7466	Code:		KLP020116k				Clie	nt: !	ntern	al Lab		
Sample	e Date: 01 Feb-16	Materia	al:	Copper chloride	e			Proj	ect:				
Receive		Source	e:	Reference Tox	icant								
Sample ———	e Age: NA	Statior ———	n:	REF TOX									
_inear	Interpolation Options												
( Trans				Resamples	Exp 95%	6 CL	Method						
_inear	Linear ————	185696 	86	280	Yes		Two-Poir	nt Interp	olation				
Test Ac	ceptability Criteria												
Attribut		TAC Limits		Overlap	Decision								
Control	Resp 14.44	10 - NL -		Yes	Passes A	Accepta	ability Crite	eria					
oint E	stimates												
_evel	μg/L 95% LCL												
C5	40.52 35.55	42.96											
C10	50.72 46.04	53.17											
C15 C20	60.92 56.64 71.12 67.44	63.46 73.98											
C25	81.32 77.24	84.54											
C40	174.1 131.4	189.1											
C50	202.4 190.4	208.9											
Mean L	ength Summary				Ca	lculat	ed Variate	9					
C-µg/L	Control Type	Count N	/lean	Min	Max	Std		d Dev	CV%		%Effect		
)	Negative Control		4.44	14.2	14.5	0.06		1342	0.93%		0.0%		
5.6	•		4.66	14.5	14.8	0.05		114	0.78%		-1.52%		
0		5 1	4.64	14.6	14.7	0.02		05473	0.37%		-1.39%		
8		5 1	4.56	14.3	15.1	0.14	7 0.3	3286	2.26%		-0.83%		
32		5 1	4.46	14.2	14.8	0.12	.49 0.2	2793	1.93%		-0.14%		
00		5 9	0.6	9.2	9.9	0.12	25 0.2	2739	2.85%		33.52%		
80		5 8	3.68	7.6	9.1	0.27	'46 0.6	614	7.07%		39.89%		
320		5 0	)	0	0	0	0				100.0%		
/lean L	ength Detail												
C-μg/L	Control Type	<del></del>	Rep 2		Rep 4	Rep							
)	Negative Control		4.5	14.5	14.5	14.2							
5.6			4.5	14.6	14.7	14.7							
0			4.6	14.7	14.6	14.7							
8			4.3	14.5	14.6	14.3							
32			4.7	14.8	14.4	14.2							
00			.9	9.2	9.5	9.8							
80			.1	7.6	9	8.8							
320		0 0		0	0	0							

Report Date: Test Code:

03 Mar-16 13:09 (p 4 of 4) KLP020116 | 00-8926-1908

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

10-8495-5840 03 Mar-16 8:20 Endpoint: Mean Length

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7

Official Results: Yes

CETIS™ v1.8.7.11

#### **CETIS Measurement Report**

Report Date:

03 Mar-16 13:09 (p 1 of 2)

Test Code:

KLP020116 | 00-8926-1908

Macrocystis Germination and Germ Tube Growth Test	Macrocystis	Germination	and Germ	Tube	Growth Test
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Aquatic Bioassay & Consulting Labs, Inc.

Batch ID:
Start Date:

Duration:

14-1595-5110 01 Feb-16 Ending Date: 03 Feb-16

Species:

Source:

Test Type: Growth-Germination Protocol: EPA/600/R-95/136 (1995) Macrocystis pyrifera

Analyst: Diluent: Brine:

Laboratory Seawater

Not Applicable

Age:

Sample ID:

04-7914-7466 Sample Date: 01 Feb-16

Code: Material: KLP020116k Copper chloride

David Gutoff

Client: Project:

Internal Lab

Receive Date: Sample Age: NA

48h

Source:

Reference Toxicant REF TOX Station:

Dissolved Oxygen-mg/L

C-μg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.45	2.003	10.9	6.1	6.8	0.35	0.495	7.67%	0
5.6		2	6.4	1.318	11.48	6	6.8	0.4	0.5657	8.84%	0
10		2	6.55	5.915	7.185	6.5	6.6	0.04999	0.0707	1.08%	0
18		2	6.45	4.544	8.356	6.3	6.6	0.15	0.2121	3.29%	0
32		2	6.3	3.759	8.841	6.1	6.5	0.2	0.2828	4.49%	0
100		2	6.15	5.515	6.785	6.1	6.2	0.05001	0.07072	1.15%	0
180		2	6.15	5.515	6.785	6.1	6.2	0.05001	0.07072	1.15%	0
320		2	6.1	6.094	6.106	6.1	6.1	0	0	0.0%	0
Overall		16	6.319			6	6.8				0 (0%)

#### pH-Units

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
5.6		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
10		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
18		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
32		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
180		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
320		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
Overall		16	7.9			7.9	7.9				0 (0%)

#### Salinity-ppt

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
5.6		2	34	34	34	34	34	0	0	0.0%	0
10		2	34	34	34	34	34	0	0	0.0%	0
18		2	34	34	34	34	34	0	0	0.0%	0
32		2	34	34	34	34	34	0	0	0.0%	0
100		2	34	34	34	34	34	0	0	0.0%	0
180		2	34	34	34	34	34	0	0	0.0%	0
320		2	34	34	34	34	34	0	0	0.0%	0
Overall	_	16	34			34	34				0 (0%)

#### Temperature-°C

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
5.6		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
10		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
18		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
32		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
100		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
180		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
320		2	14.75	14.11	15.39	14.7	14.8	0.05002	0.07075	0.48%	0
Overall		16	14.75			14.7	14.8				0 (0%)

## **CETIS Measurement Report**

 Report Date:
 03 Mar-16 13:09 (p 2 of 2)

 Test Code:
 KLP020116 | 00-8926-1908

 Aquatic Bioassay & Consulting Labs, Inc.

Macrocystis	Germination and	Germ Tu	be Growth Test	Aquatic Bioassay & Consulting Labs, Inc.
Dissolved C	Dxygen-mg/L			
C-μg/L	Control Type	1	2	
0	Negative Contr	6.8	6.1	·
5.6		6.8	6	
10		6.6	6.5	
18		6.6	6.3	
32		6.5	6.1	
100		6.2	6.1	
180		6.1	6.2	
320		6.1	6.1	
pH-Units				
C-μg/L	Control Type	1	2	
0	Negative Contr	7.9	7.9	
5.6		7.9	7.9	
10		7.9	7.9	
18		7.9	7.9	
32		7.9	7.9	
100		7.9	7.9	
180		7.9	7.9	
320		7.9	7.9	
Salinity-ppt				
C-μg/L	Control Type	1	2	
0	Negative Contr	34	34	
5.6		34	34	
10		34	34	
18		34	34	
32		34	34	
100		34	34	
180		34	34	
320		34	34	
Temperatur	e-°C			
C-μg/L	Control Type	1	2	
0	Negative Contr	14.8	14.7	
5.6		14.8	14.7	
10		14.8	14.7	
18		14.8	14.7	
32		14.8	14.7	
100		14.8	14.7	
180		14.8	14.7	
		14.8	14.7	



March 22<sup>nd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03R

DATE RECEIVED:

03/11/2016

ABC LAB. NO .:

COM0316.081

## CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

100.00 % NOEC =

TUc 1.00

EC25 >100.00 % EC50 >100.00 %

Yours very truly,

Scott Johnson

Laboratory Director

## **CETIS Summary Report**

Report Date:

22 Mar-16 10:17 (p 1 of 1)

Test Code:

COM0316.081urc | 01-2546-5707

											CONTRACTOR OF THE		
Purple Sea Ur	chin Sperm Cel	l Fertil	ization Tes					Aquat	ic Bic	bassay &	Consulting	Labs, Inc	
Batch ID; Start Date; Ending Date; Duration;	15-8621-4110 12 Mar-16 13:0 12 Mar-16 13:4 40m	1	Test Type: Protocol: Species: Source:	Fertilization EPA/600/R-95/ Strongylocentro David Gutoff		atus				aboratory Seawater Not Applicable			
Sample ID:	12-6234-7441		Code:	COM0316.081	u			Client:	City o	f Malibu			
Sample Date:	11 Mar-16 14:3	1	Material:	Sample Water					ASBS				
Receive Date:	11 Mar-16 17:00	0	Source:	Bioassay Repo	ort								
Sample Age:	22h		Station:	24-BB-03R									
Comparison S	Summary												
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Metho	od				
15-9257-8106	Fertilization Rat	е	100	>100	NA	3.58%	1	Equal	Varia	nce t Two	-Sample To	est	
Point Estimate	e Summary				LII	100							
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Metho	od				
20-5401-3847	Fertilization Rat	e	EC5	>100	N/A	N/A	<1	Linear	Inter	polation (I	CPIN)		
			EC10	>100	N/A	N/A	<1						
			EC15	>100	N/A	N/A	<1						
			EC20	>100	N/A	N/A	<1						
			EC25		N/A	N/A	<1						
			EC40		N/A	N/A	<1						
			EC50	>100	N/A	N/A	<1						
Test Acceptab	oility												
Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Lim	its	Overla		Decision		2.7.	
15-9257-8106	Fertilization Rat	е	Contr	ol Resp	0.94	0.7 - NL		Yes		Passes A	cceptability	Criteria	
20-5401-3847	Fertilization Rat	е	Contr	ol Resp	0.94	0.7 - NL		Yes		Passes A	cceptability	Criteria	
15-9257-8106	Fertilization Rat	е	PMSI	)	0.03581	NL - 0.25		No		Passes A	cceptability	Criteria	
Fertilization R	ate Summary												
C-%	Control Type	Coun	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	95% LCL	95% UCL	Min	Max		rr	Std Dev	CV%	%Effec	
	Negative Control	14	0.94	0.9109	0.9691	0.92	0.96		V (2012)	0.01826	1.94%	0.0%	
100	A-10 -1 -100	4	0.95	0.9156	0.9844	0.93	0.98	0.0108	В	0.0216	2.27%	-1.06%	
Fertilization R	ate Detail												
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4								
0	Negative Control	0.92	0.96	0.95	0.93								
100		0.98	0.95	0.93	0.94								
Fertilization R	ate Binomials	71-71		4.	Jan.								
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4								
0	Negative Control	92/10	0 96/10	0 95/100	93/100								
400		00/4-		0 001405	044400								

100

95/100

98/100

93/100

94/100

Report Date:

22 Mar-16 10:17 (p 1 of 2)

Test Code:

COM0316.081urc | 01-2546-5707

							Test	Code:	COM0316.	081 urc   0	1-2546-570
Purple Sea Urc	hin Sperm Cell	Fertiliz	zation Test					Aquatic Bi	oassay & C	onsulting	g Labs, Inc
Analysis ID:	15-9257-8106	1	Endpoint: F	ertilization Rat	ie		CET	IS Version:	CETISv1.	8.7	
Analyzed:	22 Mar-16 9:18			arametric-Two			Offic	ial Results:	Yes		
	15-8621-4110		10.10.10.10.10	ertilization			Anal	yst:	3		
	12 Mar-16 13:01			PA/600/R-95/	136 (1995)		Dilu	70 and 100 miles	ratory Seaw	vater	
Ending Date:	12 Mar-16 13:41			trongylocentro	and the second	tus	Brin	e: Not A	Applicable		
	40m			avid Gutoff			Age				
Sample ID:	12-6234-7441	-	Code: C	OM0316.081u			Clie	nt: City	of Malibu		
CONTRACTOR OF THE PROPERTY OF	11 Mar-16 14:31			ample Water			Proj				
그 시간에 가는 것 같은 것이 없었다.	11 Mar-16 17:00			ioassay Repor	rt		3.162	1410 11123			
	22h			4-BB-03R							
Data Transform		Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resu	lt .		
Angular (Correc		NA	C>T	NA	NA		3.58%		tilization rat	e	
		1-1			102						
	t Two-Sample	rest	Tool Ct.	et Cultion!	Men De	P-Value	D Tuno	Desirient	v.E9/.)		
Control	vs C-%		Test Sta				P-Type CDF	Decision(	icant Effect		
Negative Contro			-0.7304	1.943	0.066 6	0.7537	CDF	Non-Signif	cant Effect		
Test Acceptabi	lity Criteria										
Attribute	Test Stat	TAC L	imits	Overlap	Decision						
Control Resp	0.94	0.7 - N	IL	Yes		cceptability					
PMSD	0.03581	NL - 0	.25	No	Passes A	cceptability	Criteria				
ANOVA Table						777	777	, Jan 14 44			
Source	Sum Squa	res	Mean S	quare	DF	F Stat	P-Value	Decision(	a:5%)		
Between	0.0012189		0.00121		1	0.5335	0.4927	Non-Signif	icant Effect		
Error	0.0137101		0.00228	5026	6						
Total	0.0149291				7						
Distributional 1	Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a:1%)			
Variances	Variance F	Ratio F		2.016	47.47	0.5793	Equal Va				
Variances	1,000,000,000		ality of Varian		13.75	0.8164	Equal Va	riances			
Variances			of Variance	0.195	13.75	0.6742	Equal Va	riances			
Distribution	Shapiro-W	ilk W N	Normality	0.9203	0.6451	0.4324		istribution			
Distribution	Kolmogoro	ov-Smir	nov D	0.1937	0.3313 0.6068 Normal Distribution						
Distribution	Anderson-	Darling	A2 Normality	0.3415	3.878	0.4978	Normal D	istribution			
Fertilization Ra	ate Summary				1116	and the			7.1.7		
C-% (	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	cv%	%Effect
	Negative Control	4	0.94	0.9109	0.9691	0.94	0.92	0.96	0.009129	1.94%	0.0%
100	3777	4	0.95	0.9156	0.9844	0.945	0.93	0.98	0.0108	2.27%	-1.06%
Angular (Corre	cted) Transforn	ned Su	mmary				7			71	
C-% (	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
		4	1.325	1.264	1.387	1.324	1.284	1.369	0.01946	2.94%	0.0%
100	<u> </u>	4	1.35	1.262	1.438	1.334	1.303	1.429	0.02764	4.09%	-1.86%
Fertilization Ra	ate Detail			7							
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
	Negative Control	-	0.96	0.95	0.93						
100	A SAME TAKEN	0.98	0.95	0.93	0.94						
Angular (Corre	cted) Transforn	ned De	tail	11 60							
	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
	Negative Control		1.369	1.345	1.303						
100	Togative Control	1.429	1.345	1.303	1.323						
100		1.429	1.345	1,303	1.323						

Analyst: QA:

Report Date:

22 Mar-16 10:17 (p 2 of 2)

Test Code:

COM0316.081urc | 01-2546-5707

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

15-9257-8106 22 Mar-16 9:18

Endpoint: Fertilization Rate Analysis: Parametric-Two Sample **CETIS Version:** Official Results: Yes

CETISv1.8.7

Fertilization Rate Binomials

Rep 4 C-% **Control Type** Rep 1 Rep 2 Rep 3 Negative Control 92/100 96/100 95/100 93/100 0 94/100 100 98/100 95/100 93/100

CETIS .	Analytical	Report
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Report Date:

22 Mar-16 10:17 (p 1 of 2)

Test Code:

COM0316.081urc | 01-2546-5707

									or outer.			1000 10010	A
Purple	Sea Ur	chin Sperm Cell	Fertilizatio	n Test					Aquat	ic Bio	assay & (	Consulti	ng Labs, In
Analys Analyz		20-5401-3847 22 Mar-16 9:18	9,77.77	point: lysis:	Fertilization Rat Linear Interpola				TIS Versi ficial Resu		CETISv1 Yes	8.7	7
Batch I	D:	15-8621-4110	Test	Type:	Fertilization			An	alyst:				
Start D		12 Mar-16 13:01		ocol:	EPA/600/R-95/	136 (1995)				Labora	atory Sea	water	
Ending		12 Mar-16 13:41			Strongylocentro		us				plicable		
Duratio		40m	Sou		David Gutoff	res barbara		Ag		112714	Enson		
Sample	e ID:	12-6234-7441	Cod	e:	COM0316.081u	1		CI	ent:	City of	Malibu		
The second	e Date:	11 Mar-16 14:31			Sample Water					ASBS			
	e Date:				Bioassay Repo	rt			3,500				
	e Age:	22h	Stati		24-BB-03R	'`							
		lation Options	100		4-11-24-11-11								
X Trans	62 O. Ye	Y Transform	Seed	d	Resamples	Exp 95%	CL Me	thod					
Linear		Linear	0		280	Yes	Tw	o-Point Inte	rpolation				
Test A	cceptab	ility Criteria											
Attribu	te	Test Stat	TAC Limit	s	Overlap	Decision							
Control	Resp	0.94	0.7 - NL		Yes	Passes Ad	ceptabilit	y Criteria					
Point E	stimate	es	- 47			1.0							
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL							
EC5	>100	N/A	N/A	<1	NA	NA							
EC10	>100	N/A	N/A	<1	NA	NA							
EC15	>100	N/A	N/A	<1	NA	NA							
EC20	>100	N/A	N/A	<1	NA	NA							
EC25	>100	N/A	N/A	<1	NA	NA							
EC40	>100	N/A	N/A	<1	NA	NA							
EC50	>100	N/A	N/A	<1	NA	NA							
Fertiliz	ation R	ate Summary		C		Calcul	ated Var	iate(A/B)					
C-%	C	ontrol Type	Count	Mean	Min	Max	Std Err	Std De	v CV%		%Effect	Α	В
)	N	egative Control	4	0,94	0.92	0.96	0.00912	9 0.01826	1.94%	6 (	0.0%	376	400
100		OT WOMEN AND AND AND AND AND AND AND AND AND AN	4	0.95	0.93	0.98	0.0108	0.0216	2.27%	-	-1.06%	380	400
Fertiliz	ation R	ate Detail				91.77.=							
C-%	С	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4							
)	N	egative Control	0.92	0.96	0.95	0.93							
100		D. continued.	0.98	0.95	0.93	0.94							
Fertiliz	ation R	ate Binomials											
C-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4							
		Negative Control		96/10		93/100							
0		negative Control	92/100	30110	55/100	00/100							

Report Date:

22 Mar-16 10:17 (p 2 of 2)

Test Code:

COM0316.081urc | 01-2546-5707

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

20-5401-3847 22 Mar-16 9:18

Endpoint: Fertilization Rate

Analysis: Linear Interpolation (ICPIN) CETIS Version:

CETISv1.8.7

Official Results: Yes

## **CETIS Measurement Report**

Report Date:

22 Mar-16 10:17 (p 1 of 1)

Test Code:

COM0316.081urc | 01-2546-5707

Purple Sea Ur	chin Sperm Ce	II Fertil	ization Tes	t					Aqua	tic Bioassay &	Consultin	ng Labs, Inc.
Batch ID; Start Date: Ending Date; Duration:		12 Mar-16 13:01 12 Mar-16 13;41			0/R-95 locenti	i/136 (1995) rotus purpur			ne:	Laboratory Sea Not Applicable	awater	
Control of the contro	12-6234-7441 11 Mar-16 14:3 11 Mar-16 17:0 22h		Code: Material: Source: Station:	COM03 Sample Bioassa 24-BB-	Water ay Rep					City of Malibu ASBS		
Parameter Acc	ceptability Crite	eria	a.A.					7377	13.71			
Parameter			Min	Max	Acc	ceptability	Limits	Overlap	Decisio	on		
Salinity-ppt			34	34	15.7	- 36		Yes	Results	Within Limits		
Temperature-°	С		14.7	14.9	11	- 13		Yes	Results	Above Limit		
Dissolved Oxy	/gen-mg/L											
C-%	Control Type	Count	Mean	959	6 LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
	Negative Contr	2	6.4	1.3		11.48	6	6.8	0.4	0.5657	8.84%	0
100	4.5	2	6,35	3.1	73	9.527	6.1	6.6	0.25	0.3536	5.57%	0
Overall		4	6.375	-1	1		6	6.8	17717	7		0 (0%)
pH-Units												
C-%	Control Type	Count	Mean	95%	6 LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
	Negative Contr	2	7,9	7.8	84	7.916	7.9	7.9	0	0	0.0%	0
100		2	8.05	7.4	15	8.685	8	8.1	0.0500	0.07073	0.88%	0
Overall		4	7.975				7.9	8.1				0 (0%)
Salinity-ppt												
C-%	Control Type	Count	Mean	95%	6 LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
0	Negative Contr	2	34	34		34	34	34	0	0	0.0%	0
100	A1 34 CO ATE	2	34	34		34	34	34	0	0	0.0%	0
Overall		4	34				34	34				0 (0%)
Temperature-°	C											
C-%	Control Type	Count	Mean	95%	6 LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
0	Negative Contr	2	14.8	13.	53	16.07	14.7	14.9	0.1	0.1414	0.96%	0
100	1. 10. 10. 10. 10. 10.	2	14.8	13.	53	16.07	14.7	14.9	0.1	0.1414	0.96%	0
Overall		4	14.8				14.7	14.9				0 (0%)
Dissolved Oxy	gen-mg/L											
C-%	Control Type	1	2									
	Negative Contr	6.8	6									
100	man and the	6.6	6.1									
pH-Units												
C-%	Control Type	1	2									
	Negative Contr	7.9	7.9		_							
100	T. \$1100 A. M.	8.1	8									
Salinity-ppt												
	Control Type	1	2									
	Negative Contr	34	34									
100	A PARTY TO THE PAR	34	34									
Temperature-°	C											
The state of the s	Control Type	4	2									
	Negative Contr	14.7	14.9				-					
100	rogative Conti	14.7	14.9									
		14.7	14.8									

Analyst: QA:



March 22nd, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03R

DATE RECEIVED:

03/11/2016

ABC LAB. NO .:

COM0316.081

## CHRONIC MYTILUS 48 HOUR DEVELOPMENT BIOASSAY

NOEC = 100.00 %

TUc = 1.00

EC25 = >100.00 %

EC50 = >100.00 %

Yours very truly,

Scott Johnson

Laboratory Director

CETIS	Summary	Report
-------	---------	--------

Report Date:

22 Mar-16 10:18 (p 1 of 1)

est Code:

40346 084 mut | 13 2222 7728

								Test Code:	COM0316	.081myt   1	3-2223-772
Mussel Shell	Development Te	st						Aquatic	Bioassay &	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	15-7549-9189 12 Mar-16 13:01 14 Mar-16 13:01 48h	l Prote	ocol: cies:	Development-S EPA/600/R-95/ Mytilis gallopro Carlsbad Aqua	136 (1995) vincialis			Analyst: Diluent: La Brine: Age:	aboratory Wa	ler	
Sample ID: Sample Date: Receive Date: Sample Age:		1,11,141	rial: ce:	COM0316.081r Sample Water Bioassay Repo 24-BB-03R					ity of Malibu SBS		
Comparison S	Summary										
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Method			
11-8894-8197	Combined Prop	ortion Norm	the Contract of the Contract	>100	NA	2.37%	1		ariance t Two	-Sample To	est
Point Estimat	e Summary										
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Method			
17-7507-3827	Combined Prop	ortion Norm		>100	N/A	N/A	<1	Linear I	nterpolation (	ICPIN)	
AM SERVICES		Contract State of Con-	EC10	>100	N/A	N/A	<1		12.	0.10	
			EC15	>100	N/A	N/A	<1				
			EC20	>100	N/A	N/A	<1				
			EC25	>100	N/A	N/A	<1				
			EC40	>100	N/A	N/A	<1				
			EC50	>100	N/A	N/A	<1				
Test Acceptat	oility		400		74-0 Y	1000	1		1.000		
Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Limi	its	Overlag	Decision	Carre	100
11-8894-8197	Combined Prop	ortion Norm	PMSD		0,02373	NL - 0.25		No	Passes A	cceptability	Criteria
Combined Pro	oportion Normal	Summary		7.4.6				1. 1.		T. C.	1101
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.9638	3 0.9424	0.9852	0.9457	0,986	64 0.00770	6 0.01723	1.79%	0.0%
100		5	0.9774	0.9587	0.996	0.9548	0.99	0.00671	1 0.01501	1.54%	-1.41%
Combined Pro	oportion Normal	Detail									
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Negative Control	0.9548	0.9864	0.9774	0.9548	0.9457					
100	1.00	0.991	0.9774	0.9729	0.991	0.9548					
Combined Pro	oportion Normal	Binomials									
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Negative Control	211/221	218/22		211/221	209/221					
						20000					

100

219/221

216/221 215/221

219/221 211/221

Report Date:

22 Mar-16 10:18 (p 1 of 2)

Test Code:

COM0316.081myt | 13-2223-7728

							Test	Code;	COM0316.0	81myt   1.	3-2223-112
Mussel Shell	Development Tes	st						Aquatic Bi	oassay & C	onsulting	Labs, Inc.
Analysis ID:	11-8894-8197		46.4000.0000.000	Combined Pro		al	UTIE AL	S Version:	CETISv1.	3.7	
Analyzed:	22 Mar-16 9:19	A	nalysis:	Parametric-Tw	o Sample			ial Results:	Yes		
Batch ID:	15-7549-9189	T		Development-			Anal		Selection		
Start Date:	12 Mar-16 13:01			EPA/600/R-95			Dilue		ratory Wate	r	
Ending Date:	14 Mar-16 13:01	S	Man 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Mytilis gallopro			Brine				
Duration:	48h	S	ource:	Carlsbad Aqua	afarms CA		Age:				
Sample ID:	10-6503-5043		77,776,7	COM0316.081			Clier		of Malibu		
Sample Date:				Sample Water			Proje	ect: ASB	5		
Receive Date:		) 13		Bioassay Rep	ort						
Sample Age:	22h	S	tation:	24-BB-03R			-0.000	33 2000 000			
Data Transfor		Zeta	Alt Hy		Seed		PMSD 2.37%	Test Resu		ortion not	mal
Angular (Corre	ected)	NA	C>T	NA	NA		2.31%	Passes co	mbined prop	ortion noi	mai
Equal Varianc	e t Two-Sample	Test									
Control	vs C-%		Test S	3112 - 310H ANG		P-Value	P-Type	Decision(			
Negative Contr	rol 100		-1.321	1.86	0.059 8	0.8885	CDF	Non-Signif	icant Effect		
Test Acceptat	oility Criteria										
Attribute	Test Stat	TAC LI	mits	Overlap	Decision						
PMSD	0.02373	NL - 0.2		No	Passes A	cceptability	Criteria				
ANOVA Table				Ti i i				ALL WAS	-10-		
Source	Sum Squa	res	Mean	Square	DF	F Stat	P-Value	Decision(			
Between	0.0044200	78	0.0044	20078	1	1.746	0.2229	Non-Signif	icant Effect		
Error	0.02025443	3	0.0025	31804	8	31112					
Total	0.0246745	1			9						
Distributional	Tests			1000	1 77 /1	F . F . F	7				
Attribute	Test			Test Sta	t Critical	P-Value	Decision	(α:1%)			
Variances	Variance F	Ratio F	T. Cvor	1.016	23.15	0.9877	Equal Var	iances			
Variances	Mod Lever	ne Equa	lity of Varia	nce 0.005962	13.75	0.9410	Equal Var				
Variances	Levene Ed	quality o	f Variance	0.04025	11.26	0.8460	Equal Var				
Distribution	Shapiro-W		The second second second	0.929	0.7411	0.4385	Normal D				
Distribution	Kolmogoro			0.1728	0.3025	0.6237	Normal D				
Distribution	D'Agostino			0.1993	2.576	0.8420	Normal D				
Distribution	Anderson-	-Darling	A2 Normali	ty 0.4289	3.878	0,3145	Normal D	stribution			
Combined Pro	oportion Normal	Summa	ary								
C-%	Control Type	Count	Mean	95% LCI		Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.9638	0.9424	0.9852	0.9548	0.9457	0.9864	0.007706	1.79%	0.0%
100	and the state of	5	0.9774	0.9587	0,996	0.9774	0.9548	0.991	0.006712	1.54%	-1.41%
Angular (Corr	rected) Transforn	ned Sur	nmary								
C-%	Control Type	Count	Mean	95% LCI	_ 95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.384	1.322	1.447	1.356	1.336	1.454	0.02241	3.62%	0.0%
100	ALL ALL A	5	1.427	1.364	1.489	1.42	1.356	1.476	0.02259	3.54%	-3.04%
	oportion Normal	Detail									
Combined Pr	"그램 회사님, 나마님의 6, "^^			Rep 3	Rep 4	Rep 5					
	Control Type	Rep 1	Rep 2								
C-%	"그램 회사님, 나마님의 6, "^^	0.9548	0.9864	0.9774	0.9548	0.9457					
C-% 0	Control Type		-	0.9774	0.9548 0.991	0.9457 0.9548					
C-% 0 100	Control Type	0.9548 0.991	0.9864 0.9774	0.9774							
C-% 0 100 Angular (Corr	Control Type Negative Control rected) Transform	0.9548 0.991	0.9864 0.9774	0.9774 0.9729							
C-% 0 100	Control Type Negative Control	0.9548 0.991 ned Det Rep 1	0.9864 0.9774 ail	0.9774 0.9729	0.991	0.9548					

Analyst: QA:

Report Date:

22 Mar-16 10:18 (p 2 of 2)

Test Code:

COM0316.081myt | 13-2223-7728

Mussel Shell Development Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

11-8894-8197 22 Mar-16 9:19

Analysis:

Endpoint: Combined Proportion Normal Parametric-Two Sample

**CETIS Version:** Official Results: CETISv1.8.7

Yes

**Combined Proportion Normal Binomials** 

C-%	Control Type Re	p1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control 21	1/221	218/221	216/221	211/221	209/221
100	219	9/221	216/221	215/221	219/221	211/221

CETIS	S Ana	lytical Repo	ort						Report Da Test Code				18 (p 1 of 3-2223-77
Musse	I Shell I	Development Te	st							atic Bioassa			
Analys Analyz		17-7507-3827 22 Mar-16 9:19		lpoint: lysis:	Combined Prop Linear Interpola				CETIS Vei		ISv1.8.	7	
Batch	ID:	15-7549-9189	Tes	t Type:	Development-S	Survival			Analyst:				
Start D	ate:	12 Mar-16 13:0	1 Pro	tocol:	EPA/600/R-95/	136 (1995)		1)	Diluent:	Laboratory	Water		
Ending	Date:	14 Mar-16 13:0	1 Spe	cies:	Mytilis gallopro	vincialis		, i	Brine:				
Duratio	on:	48h	Sou	rce;	Carlsbad Aqua	farms CA			Age:				
Sample	e ID:	10-6503-5043	Coc	le:	COM0316.081	m			Client:	City of Mali	bu		
Sample	e Date:	11 Mar-16 14:31	1 Mat	erial:	Sample Water				Project:	ASBS			
Receiv	e Date:	11 Mar-16 17:00	) Sou	rce:	Bioassay Repo	rt			77.707	W. 4. 4.			
Sample	e Age:	22h	Stat	ion:	24-BB-03R								
Linear	Interpo	lation Options											
X Tran	sform	Y Transform	See	d	Resamples	Exp 95%	CL Me	thod					
Linear		Linear	0		280	Yes			terpolation	n			
Point F	Estimate	as .											
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL							
EC5	>100	N/A	N/A	<1	NA	NA			_		-		
EC10	>100	N/A	N/A	<1	NA	NA							
EC15	>100	N/A	N/A	<1	NA	NA							
EC20	>100	N/A	N/A	<1	NA	NA							
EC25	>100	N/A	N/A	<1	NA	NA							
EC40	>100	N/A	N/A	<1	NA	NA							
EC50	>100	N/A	N/A	<1	NA	NA							
Combi	ned Pro	portion Normal	Summary			Calcu	lated Vari	iate(A/B)					
C-%	C	ontrol Type	Count	Mean	Min	Max	Std Err	Std D	ev CV	% %Effe	ect A	1	В
)		egative Control	5	0.963		0.9864	0.007706					065	1105
100			5	0.977		0.991	0.006712					080	1105
Combi	ned Pro	portion Normal	Detail										-
C-%	C	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
)	N	egative Control	0.9548	0.986		0.9548	0.9457						
100		· · · · · · · · · · · · · · · · · · ·	0.991	0.977		0.991	0.9548						
Combi	ned Pro	portion Normal	Binomials	1 1									
C-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
)		Negative Control		218/2		211/221	209/221						
		-	27/2027	15/2/3		70,700,00	97.7199						

Analyst: PQA:

100

219/221 216/221

215/221

219/221

211/221

## **CETIS Measurement Report**

Report Date:

22 Mar-16 10:18 (p 1 of 2)

Test Code:

COM0316.081myt | 13-2223-7728

Mussel Shell I	Development T	est						Aquati	c Bioassay &	Consultin	g Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	15-7549-9189 12 Mar-16 13:0 14 Mar-16 13:0 48h		Test Type: Protocol: Species: Source:	Development- EPA/600/R-95 Mytilis gallopro Carlsbad Aqua	/136 (1995) ovincialis			Analyst: Diluent: L Brine: Age:	aboratory Wa	ter	
TANKY DO.	10-6503-5043							7	Str		
Sample ID:	11 Mar-16 14:3	21	Code: Material:	COM0316.081 Sample Water					City of Malibu		
	11 Mar-16 17:0		Source:	Bioassay Repo				Project. A	1303		
Sample Age:	22h	,0	Station:	24-BB-03R	ort.						
Sample Age.	2211		Station.	24-DD-U3R							
Dissolved Oxy	/gen-mg/L										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
	Negative Contr	2	6.4	1.318	11.48	6	6.8	0.4	0.5657	8.84%	0
100	TROTT MAY	2	6.35	3.173	9.527	6.1	6.6	0.25	0.3536	5.57%	0
Overall		4	6.375			6	6.8				0 (0%)
Total Ammoni	a (N)-mg/L				7				-170		
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)
pH-Units										200	
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	8.05	7.415	8.685	8	8.1	0.05001	0.07073	0.88%	0
Overall		4	7.975			7.9	8.1				0 (0%)
Salinity-ppt	With the										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Win	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
100	The Park	2	34	34	34	34	34	0	0	0.0%	0
Overall		4	34			34	34				0 (0%)
Temperature-°	С										
	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
	Negative Contr	2	14.8	13.53	16.07	14.7	14.9	0.1	0.1414	0.96%	0
100		2	14.8	13.53	16.07	14.7	14.9	0.1	0.1414	0.96%	0
Overall		4	14.8			14.7	14.9				0 (0%)

Analyst: QA:

CETIS	Measurement	Report
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Report Date: Test Code:

22 Mar-16 10:18 (p 2 of 2) COM0316.081myt | 13-2223-7728

A LONG TO THE REAL PROPERTY AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON AN	THE LANGE TO	THE CASE OF STREET		Test Code:	COM0316.081myt   13-2223-7728
Mussel She	II Development To	est		Aquatio	Bioassay & Consulting Labs, Inc.
Dissolved O	xygen-mg/L		11		
C-%	Control Type	1	2		
0	Negative Contr	6.8	6		
100	The Market Control	6.6	6.1		
Total Ammo	nia (N)-mg/L				
C-%	Control Type	1			
0	Negative Contr	0			
100	Control of the Control	0			
pH-Units					
C-%	Control Type	1	2		
0	Negative Contr	7.9	7.9		
100		8.1	8		
Salinity-ppt	recva.				
C-%	Control Type	1	2		
0	Negative Contr	34	34		
100	7,7	34	34		
Temperature	e-°C				
C-%	Control Type	1	2		
0	Negative Contr	14.7	14.9		
100		14.7	14.9		



March 22<sup>nd</sup>, 2016

Ms. Jennifer Brown City of Malibu 23815 Stuart Ranch Rd. Malibu, CA 90265

Dear Ms. Brown:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136*. Results were as follows:

CLIENT:

City of Malibu

SAMPLE I.D.:

24-BB-03R

DATE RECEIVED:

03/11/2016

ABC LAB. NO.:

COM0316.081

#### CHRONIC KELP GERMINATION & GROWTH BIOASSAY

GERMINATION NOEC = 100.00%

TUc = 1.00

EC25 = >100.00 % EC50 = >100.00 %

**GROWTH** 

NOEC = 100.00 %

TUc = 1.00

IC25 = >100.00 % IC50 = >100.00 %

Yours very truly,

Scott Johnson Laboratory Director

Report Date:

22 Mar-16 10:18 (p 1 of 2)

Test Code:

COM0316.081klp | 04-8699-5959

Macrocystis G	Bermination and	Germ T	ube Grow	th Test				Aquatic	Bioassay & (	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	06-3694-3055 12 Mar-16 13:01 14 Mar-16 13:01 48h	l F	est Type: Protocol: Species: Source:	Growth-Germin EPA/600/R-95/ Macrocystis pyr Aquatic Bioass	136 (1995) rifera	lection			aboratory Sea ot Applicable	water	
Sample ID: Sample Date: Receive Date: Sample Age:		1 1	Code: //aterial: Source: Station:	COM0316.081k Sample Water Bioassay Repo 24-BB-03R					ty of Malibu SBS		
Comparison S	Summary					7.01		7.70			
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Method			
11-0233-2432	Germination Ra	te	100	>100	NA	2.63%	1	Equal V	ariance t Two	-Sample Te	est
04-0598-1269	Mean Length		100	>100	NA	0.9%	1	Equal V	ariance t Two	-Sample Te	est
Point Estimate	e Summary				7	777					
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Method			
05-2264-8405	Germination Ra	te	EC5	>100	N/A	N/A	<1	Linear	nterpolation (I	CPIN)	
			EC10	>100	N/A	N/A	<1				
			EC15	>100	N/A	N/A	<1				
			EC20	>100	N/A	N/A	<1				
			EC25	>100	N/A	N/A	<1				
			EC40	>100	N/A	N/A	<1				
			EC50	>100	N/A	N/A	<1				
18-1679-3204	Mean Length		IC5	>100	N/A	N/A	<1	Linear I	nterpolation (I	CPIN)	
	2102 -00 2 - 1100		IC10	>100	N/A	N/A	<1		The same		
			IC15	>100	N/A	N/A	<1				
			IC20	>100	N/A	N/A	<1				
			IC25	>100	N/A	N/A	<1				
			IC40	>100	N/A	N/A	<1				
			IC50	>100	N/A	N/A	<1				
Test Acceptab	nility					111111					
Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Limi	its	Overlag	Decision		
05-2264-8405	Germination Ra	te	Contr	ol Resp	0.91	0.7 - NL		Yes	Passes A	cceptability	Criteria
11-0233-2432	Germination Ra			ol Resp	0.91	0.7 - NL		Yes	Passes A	cceptability	Criteria
04-0598-1269	Mean Length			ol Resp	14.38	10 - NL		Yes	Passes A	cceptability	Criteria
18-1679-3204	Mean Length			ol Resp	14.38	10 - NL		Yes		cceptability	
	Germination Ra	te	PMS	A	0.02626	NL - 0.2		No		cceptability	
04-0598-1269	Mean Length		PMS		0.008959	NL - 0.2		No		cceptability	
Germination F	Rate Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	cv%	%Effect
0	Negative Control		0.91	0.8948	0.9252	0.9	0.93		7 0.01225	1.35%	0.0%
100	N. S.	5	0.934		0.9597	0.91	0.96			2.22%	-2.64%
Mean Length	Summary				77 1 8 1						
	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
											0.001
0	Negative Control	5	14.38	14.32	14.44	14.3	14.4	0.02	0.04472	0.31%	0.0%

# **CETIS Summary Report**

Report Date:

22 Mar-16 10:18 (p 2 of 2)

Test Code:

COM0316.081klp | 04-8699-5959

Macrocys	stis Germination and	Germ Tul	be Growth	Test			Aquatic Bioassay & Consulting Labs, Inc.
Germinat	tion Rate Detail						
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	Negative Control	0.91	0.9	0.93	0.91	0.9	***
100		0.93	0.95	0.92	0.96	0.91	11
Mean Lei	ngth Detail						
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	Negative Control	14.4	14.4	14.4	14.4	14.3	
100		14.3	14.5	14.4	14.5	14.7	
Germinat	tion Rate Binomials	400			1.7.7	7.7	
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	Negative Control	91/100	90/100	93/100	91/100	90/100	
100		93/100	95/100	92/100	96/100	91/100	

Report Date:

22 Mar-16 10:18 (p 1 of 3)

Test Code:

COM0316.081klp | 04-8699-5959

							Test	Code:	COM0316.	081klp   0	4-8699-595
Macrocystis G	Sermination and	Germ	Tube Growth	Test				Aquatic Bi	oassay & C	onsulting	Labs, Inc
Analysis ID: Analyzed:	11-0233-2432 22 Mar-16 9:19		Contraction of the contraction of	Germination Ra			C. C.	IS Version: ial Results:	CETISv1. Yes	8.7	
Batch ID:	06-3694-3055		Test Type: 0	Growth-Germin	ation		Anal	yst:			
Start Date:	12 Mar-16 13:01			EPA/600/R-95/	136 (1995)		Dilu		ratory Seav	vater	
Ending Date:	14 Mar-16 13:01		AT A STATE OF THE STATE OF	Macrocystis pyr			Brin		Applicable		
Duration:	48h			Aquatic Bioass		lection	Age:				
Cample ID.	47 7407 5954		Code: 0	COM0316.081k			Clie	at: City	of Malibu		
Sample ID:	17-7427-5851 11 Mar-16 14:31						Proje				
the transfer of the street and				Sample Water	et.		Fioj	ect. Aob	9		
	11 Mar-16 17:00 22h	,		Bioassay Repo 24-BB-03R	rt.						
Sample Age:		-	AV COLU		404	_		4014			_
Data Transfori Angular (Corre		Zeta	C > T	D Trials NA	Seed		PMSD 2.63%	Test Resu	rmination ra	ite	
	The state of the s		0-1	INA.	11/7		2.0070	1 dooco go	innation to		
	e t Two-Sample	Test	-21.02	All Loads		20000	- 24.6	23.4	441		
Control	vs C-%		Test St	12.25.10.17.17.1	111777	P-Value	P-Type	Decision(			_
Negative Contr	rol 100		-2.175	1.86	0.040 8	0.9693	CDF	Non-Signif	icant Effect		
Test Acceptab	oility Criteria										
Attribute	Test Stat	TAC	Limits	Overlap	Decision						
Control Resp	0.91	0.7 -	NL	Yes	Passes A	cceptability	Criteria				
PMSD	0.02626	NL -	0.2	No	Passes A	cceptability	Criteria				
ANOVA Table											
Source	Sum Squa	res	Mean S	Square	DF	F Stat	P-Value	Decision(	a:5%)		
Between	0.0055021	_	0.00550		1	4.729	0.0614		icant Effect		
Error	0.0093072	38	0.00116	33405	8			200			
Total	0.0148093	5			9	_					
Distributional	Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a:1%)			
Variances	Variance I	Ratio I		3.787	23.15	0.2253	Equal Var				
Variances			uality of Variar		13.75	0.1073	Equal Var	riances			
Variances			of Variance	3.965	11.26	0.0816	Equal Val	riances			
Distribution	Shapiro-W	A 10 CHE 10 A		0.95	0.7411	0.6690	Normal D	istribution			
Distribution	Kolmogor			0.207	0.3025	0.2812	Normal D	istribution			
Distribution	D'Agostine			0.6854	2.576	0.4931	Normal D	istribution			
Distribution			g A2 Normalit		3.878	0.4648	Normal D	istribution			
Germination F	Rate Summary										771
	Control Type	Cour	nt Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
	Negative Control		0.91	0.8948	0.9252	0.91	0.9	0.93	0.005477	1.35%	0.0%
100		5	0.934	0.9083	0.9597	0.93	0.91	0.96	0.009274	2.22%	-2.64%
11 1 277 1 3 1	ected) Transform	ned S	ummary								
	Control Type	Cour		95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
	Negative Contr	5	1.267	1.239	1.294	1.266	1.249	1.303	0.009859	1.74%	0.0%
100		5	1.314	1.26	1.367	1.303	1.266	1.369	0.01919	3.27%	-3.7%
Germination F	Rate Detail										
	Control Type	Rep	1 Rep 2	Rep 3	Rep 4	Rep 5					
	Negative Control		0.9	0.93	0.91	0.9					
100	negative Control	0.93	0.95	0.92	0.96	0.91					
1 T. T. T. T. U.S.	Company of the second			077	10.00	266.0					
	ected) Transform			20.00	<b>2540</b>	H					
	Control Type	Rep		Rep 3	Rep 4	Rep 5					
	Negative Control			1.303	1.266	1.249					
100		1.303	3 1.345	1.284	1.369	1.266					

Analyst: M QA:

Report Date:

22 Mar-16 10:18 (p 2 of 3)

Test Code:

COM0316.081klp | 04-8699-5959

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

11-0233-2432 22 Mar-16 9:19

Analysis:

Endpoint: Germination Rate Parametric-Two Sample **CETIS Version:** Official Results: **CETISv1.8.7** 

Yes

Germination Rate Binomials

C-% **Control Type** Rep 5 Rep 1 Rep 2 Rep 3 Rep 4 0 90/100 Negative Control 91/100 90/100 93/100 91/100 100 93/100 95/100 96/100 91/100 92/100

Report Date:

22 Mar-16 10:18 (p 3 of 3)

Test Code:

COM0316.081klp | 04-8699-5959

Managariatic C	and the same of the same of the first										Labs Inc
Macrocystis G	ermination and	Germ 1	Fube Growth	Test				Aquatic Bio	oassay & C	onsulting	Edito, III
Analysis ID: Analyzed:	04-0598-1269 22 Mar-16 9:18			ean Length arametric-Two	Sample			S Version: ial Results:	CETISv1. Yes	8.7	
Batch ID: Start Date; Ending Date: Duration:	06-3694-3055 12 Mar-16 13:01 14 Mar-16 13:01 48h		Protocol: El Species: M	owth-Germin PA/600/R-95/ acrocystis pyr quatic Bioass	136 (1995) ifera	ection	Anal Dilue Brine Age:	ent: Labo	ratory Seav	vater	
Sample ID:	17-7427-5851	(	Code: Co	OM0316.081k			Clier	nt: City o	of Malibu		
Sample Date:	11 Mar-16 14:31 11 Mar-16 17:00 22h	1	Material: Sa Source: Bi	ample Water oassay Repo -BB-03R			Proje	The second second			
Data Transforr	11111	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resul	lt		
Untransformed		NA	C > T	NA	NA		0.9%	Passes me			
Equal Variance	e t Two-Sample	Test									
Control	vs C-%		Test Sta	t Critical	MSD DF	P-Value	P-Type	Decision(c	x:5%)		
Negative Contr			-1.443	1.86	0.129 8	0.9065	CDF	Non-Signifi			
Test Acceptab	ility Criteria										
Attribute	Test Stat	TAC L	imits	Overlap	Decision						
Control Resp	14.38	10 - NI	The state of the s	Yes	141, 200, 3 *10 C 7	ceptability	Criteria				
PMSD	0.008959	NL - 0.		No		ceptability					
ANOVA Table											
Source	Sum Squa	res	Mean So	juare	DF	F Stat	P-Value	Decision(c			
								A 1	water Fifther at		
Between	0.0250001		0.025000	01	1	2.083	0.1869	Non-Signifi	icant Effect		
	0.0250001 0.0959998	1	0.025000 0.011999		1 8	2.083	0.1869	Non-Signifi	cant Effect		
Error		1				2.083	0.1869	Non-Signifi	Cant Effect		
Error Total	0.0959998 0.1209999	1			8	2.083	0.1869	Non-Signin	cant Effect		
Error Total Distributional	0.0959998 0.1209999	1			9	2.083 P-Value	0.1869 Decision		Cant Effect		
Error Total Distributional Attribute	0.0959998 0.1209999 Tests			998	9	Roy	Decision Equal Var	(α:1%) iances	Cant Effect		
Error Total Distributional Attribute Variances	0.0959998 0.1209999 Tests Test Variance I	Ratio F		Test Stat	8 9 Critical	P-Value	Decision Equal Var Equal Var	(α:1%) iances iances	Cant Effect		
Error Total Distributional Attribute Variances Variances	0.0959998 0.1209999 Tests Test Variance I Mod Leve	Ratio F	0.011999	Test Stat	8 9 Critical 23.15	P-Value 0.0394	Decision Equal Var	(α:1%) iances iances	Cant Effect		
Error Total  Distributional Attribute Variances Variances Variances	0.0959998 0.1209999 Tests Test Variance I Mod Leve	Ratio F ne Equa	0.011999 ality of Variance of Variance	Test Stat 11 :e 3.429	8 9 Critical 23.15 13.75	P-Value 0.0394 0.1135	Decision Equal Var Equal Var Equal Var Normal D	(α:1%) iances iances iances iances istribution			
Error Total  Distributional Attribute Variances Variances Variances Distribution	0.0959998 0.1209999 Tests Test Variance I Mod Level	Ratio F ne Equality of Juality of	0.011999 ality of Variance of Variance Normality	Test Stat 11 :e 3.429 2.817	8 9 Critical 23.15 13.75 11.26	P-Value 0.0394 0.1135 0.1318	Decision Equal Var Equal Var Equal Var Normal D	(α:1%) lances lances lances			
Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution	0.0959998 0.1209999  Tests  Test  Variance I  Mod Leve  Levene Ec  Shapiro-W	Ratio F ne Equa quality c /ilk W N ov-Smir	0.011999 ality of Variance of Variance Normality	Test Stat 11 2.817 0.8391	8 9 Critical 23.15 13.75 11.26 0.7411	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039 0.4678	Decision Equal Var Equal Var Equal Var Normal D	(α:1%) iances iances iances istribution al Distributio			
Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution	0.0959998 0.1209999  Tests  Test  Variance I  Mod Leve  Levene Ec  Shapiro-W  Kolmogoro D'Agostino	Ratio F ne Equi quality c /ilk W N ov-Smir o Skewi	0.011999 ality of Variance of Variance Normality	Test Stat 11 12 13 14 19 15 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18	8 9 Critical 23.15 13.75 11.26 0.7411 0.3025	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039	Decision Equal Var Equal Var Equal Var Normal D Non-norm	(α:1%) iances iances iances istribution al Distributio	n		
Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution	0.0959998 0.1209999  Tests  Test  Variance I  Mod Leve  Levene Ec  Shapiro-W  Kolmogore  D'Agostine  Anderson-	Ratio F ne Equi quality c /ilk W N ov-Smir o Skewi	0.011999 ality of Variance of Variance Normality rnov D ness	Test Stat 11 12 2.817 0.8391 0.3232 0.7261	8 9 Critical 23.15 13.75 11.26 0.7411 0.3025 2.576	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039 0.4678	Decision Equal Var Equal Var Equal Var Normal D Non-norm	(α:1%) iances iances iances istribution ial Distribution istribution	n		775
Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Distribution	0.0959998 0.1209999  Tests  Test  Variance I  Mod Leve  Levene Ec  Shapiro-W  Kolmogore  D'Agostine  Anderson-	Ratio F ne Equi quality c /ilk W N ov-Smir o Skewi	0.011999  ality of Variance  Normality  nov D  ness  A Normality	Test Stat 11 12 2.817 0.8391 0.3232 0.7261	8 9 Critical 23.15 13.75 11.26 0.7411 0.3025 2.576	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039 0.4678	Decision Equal Var Equal Var Equal Var Normal D Non-norm	(α:1%) iances iances iances istribution ial Distribution istribution	n	CV%	%Effect
Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Mean Length \$ C-%	0.0959998 0.1209999  Tests  Test  Variance I  Mod Leve  Levene Ec  Shapiro-W  Kolmogore  D'Agostine  Anderson-	Ratio F ne Equi quality o /ilk W N ov-Smir o Skewi Darling	0.011999  ality of Variance  Normality  nov D  ness  A Normality	Test Stat 11 28 3.429 2.817 0.8391 0.3232 0.7261 1.077	8 9 Critical 23.15 13.75 11.26 0.7411 0.3025 2.576 3.878	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039 0.4678 0.0081	Decision Equal Var Equal Var Equal Var Normal D Non-norm Normal D Non-norm	(α:1%) iances iances iances istribution ial Distribution ial Distribution	n n		%Effect
Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Mean Length \$ C-% 0	0.0959998 0.1209999  Tests  Test  Variance I  Mod Leven Levene Ec Shapiro-W  Kolmogore D'Agostine Anderson-  Summary  Control Type	Ratio F ne Equi quality o /ilk W N ov-Smir o Skewi Darling	0.011999 ality of Variance Normality rnov D ness J A2 Normality	Test Stat 11 3.429 2.817 0.8391 0.3232 0.7261 1.077	8 9 Critical 23.15 13.75 11.26 0.7411 0.3025 2.576 3.878	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039 0.4678 0.0081	Decision Equal Var Equal Var Equal Var Normal D Non-norm Normal D Non-norm	(α:1%) riances riances riances istribution rial Distribution rial Distribution rial Distribution rial Distribution rial Distribution	n n Std Err	CV%	
Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Mean Length \$ C-% 0 100	0.0959998 0.1209999 Tests Test Variance I Mod Leven Levene Ec Shapiro-W Kolmogore D'Agostine Anderson- Summary Control Type Negative Control	Ratio F ne Equi quality o /ilk W N ov-Smir o Skewi Darling Count 5	0.011999 ality of Variance Normality nov D ness J A2 Normality Mean 14.38	Test Stat 11 3.429 2.817 0.8391 0.3232 0.7261 1.077  95% LCL 14.32	8 9 Critical 23.15 13.75 11.26 0.7411 0.3025 2.576 3.878	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039 0.4678 0.0081 Median 14.4	Decision Equal Var Equal Var Equal Var Normal D Non-norm Normal D Non-norm	(α:1%) iances iances iances istribution ial Distribution ial Distribution Max 14.4	n n Std Err 0.01998	CV% 0.31%	0.0%
Error Total  Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Distribution Mean Length \$ C-% 0 100  Mean Length I	0.0959998 0.1209999  Tests  Test  Variance I Mod Leven Levene Ec Shapiro-W Kolmogore D'Agostine Anderson-  Summary  Control Type  Negative Control	Ratio F ne Equi quality o /ilk W N ov-Smir o Skewi Darling Count 5	0.011999 ality of Variance Normality nov D ness J A2 Normality Mean 14.38	Test Stat 11 3.429 2.817 0.8391 0.3232 0.7261 1.077  95% LCL 14.32	8 9 Critical 23.15 13.75 11.26 0.7411 0.3025 2.576 3.878	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039 0.4678 0.0081 Median 14.4	Decision Equal Var Equal Var Equal Var Normal D Non-norm Normal D Non-norm	(α:1%) iances iances iances istribution ial Distribution ial Distribution Max 14.4	n n Std Err 0.01998	CV% 0.31%	
Distributional Attribute Variances Variances Variances Distribution Distribution Distribution Mean Length 5 C-% 0 100 Mean Length 1 C-%	0.0959998 0.1209999 Tests Test Variance I Mod Leven Levene Ec Shapiro-W Kolmogore D'Agostine Anderson- Summary Control Type Negative Control	Ratio F ne Equi quality of filk W N ov-Smir o Skewn Darling Count 5 5	0.011999 ality of Variance Normality nov D ness A2 Normality 14.38 14.48	Test Stat 11 3.429 2.817 0.8391 0.3232 0.7261 1.077  95% LCL 14.32 14.3	8 9 9 Critical 23.15 13.75 11.26 0.7411 0.3025 2.576 3.878 95% UCL 14.44 14.66	P-Value 0.0394 0.1135 0.1318 0.0430 0.0039 0.4678 0.0081 Median 14.4 14.5	Decision Equal Var Equal Var Equal Var Normal D Non-norm Normal D Non-norm	(α:1%) iances iances iances istribution ial Distribution ial Distribution Max 14.4	n n Std Err 0.01998	CV% 0.31%	0.0%

<b>CETIS Analytica</b>	I Report
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Report Date:

22 Mar-16 10:18 (p 1 of 3)

Test Code:

COM0316.081klp | 04-8699-5959

								103	Code.	COMOSTO	divib I	04-0000-000
Macro	cystis G	ermination and	Germ Tube	Grow	th Test				Aquatic I	Bioassay &	Consultir	ng Labs, Inc
Analysis ID: 05-2264-8405 Analyzed: 22 Mar-16 9:19 Batch ID: 06-3694-3055			111111	point: ysis:	Germination Ra Linear Interpola	N. I. Santa and A. Santa			S Version		.8.7	
			Test	Type:	Growth-Germina	ation		Ana	yst:			
Start D		12 Mar-16 13:01		ocol:	EPA/600/R-95/			Dilu		oratory Sea	water	
Ending		14 Mar-16 13:01			Macrocystis pyr	Tribution for the first first		Brin	100	t Applicable		
Duratio		48h	Sou		Aquatic Bioassa		ection	Age		. C. de la construcción		
	774		(3,517)	MA	COM0316.081k	2 X 1 W 1 V 1 V V	***************************************	Clie		y of Malibu		
Sample		17-7427-5851	Code					Proj		AND DESCRIPTION OF THE PROPERTY OF THE PROPERT		
		11 Mar-16 14:31			Sample Water			Proj	ect. As	БЗ		
	40 b 30 ca	11 Mar-16 17:00			Bioassay Repor	Ţ						
Sample	e Age:	22h	Stati	on:	24-BB-03R							
Linear	Interpo	lation Options										
X Tran	sform	Y Transform	Seed	ı	Resamples	Exp 95%						
inear		Linear	0		280	Yes	Two-	Point Interp	olation			
Test A	cceptab	ility Criteria										
Attribu	te	Test Stat	TAC Limit	S	Overlap	Decision						
Control	Resp	0.91	0.7 - NL		Yes	Passes Ac	ceptability	Criteria				
Point E	Stimate	es										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
EC5	>100	N/A	N/A	<1	NA	NA						
EC10	>100	N/A	N/A	<1	NA	NA						
EC15	>100	N/A	N/A	<1	NA	NA						
EC20	>100	N/A	N/A	<1	NA	NA						
EC25	>100	N/A	N/A	<1	NA	NA						
EC40	>100	N/A	N/A	<1	NA	NA						
EC50	>100	N/A	N/A	<1	NA	NA						
		Rate Summary	1000 Y			Calcul	ated Varia	te(A/B)				
C-%		ontrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
)		egative Control	5	0.91	0.9	0.93	0.005477	0.01225	1.35%	0.0%	455	500
100		eganve common	5	0.934		0.96	0.009274	0.02074	2.22%	-2.64%	467	500
Z. Tr.	nation F	Rate Detail	_						_			
C-%		ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0-76		egative Control	0.91	0.9	0.93	0.91	0.9					
100	IV	eganve control	0.93	0.95	0.92	0.96	0.91					
			0.00	0.33	0.52	3,30	0,01					
Germin	nation F	Rate Binomials										
		Control Type	Rep 1	Rep 2		Rep 4	Rep 5					
C-% 0		Negative Control	91/100	90/10	0 93/100	91/100	90/100					

Report Date:

22 Mar-16 10:18 (p 2 of 3)

Test Code:

COM0316.081klp | 04-8699-5959

Macrocystis Germination and Germ Tube Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: Analyzed:

05-2264-8405

Endpoint: Germination Rate

**CETIS Version:** Official Results: Yes

**CETISv1.8.7** 

Analysis: Linear Interpolation (ICPIN) 22 Mar-16 9:19

CETIS	Analy	tical	Report
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Report Date: Test Code:

22 Mar-16 10:18 (p 3 of 3)

COM0316 081kln L04-8699-5959

	-L X 174	ALBERT LAND						T	est Code:		COM0316.081klp   04-8699-5959
Macro	cystis G	ermination and	Germ Tub	e Grow	th Test				Aquat	ic Bi	oassay & Consulting Labs, Inc.
Analysis ID: 18-1679-3204 Analyzed: 22 Mar-16 9:19			End	ndpoint: Mean Length					ETIS Versi	on:	CETISv1.8.7
			Ana	lysis:	Linear Interpola	ation (ICPIN)		C	Official Res	ults:	Yes
Batch	ID:	06-3694-3055	Test	Type:	Growth-Germin	ation	-	4	nalyst:		
Start D	ate:	12 Mar-16 13:0	1 Prot	ocol:	EPA/600/R-95/	136 (1995)		C	iluent:	Labo	ratory Seawater
Ending	Date:	14 Mar-16 13:0	1 Spe	cies:	Macrocystis py	rifera		E	Brine:	Not A	pplicable
Duratio	on:	48h	Sou	rce:	Aquatic Bioass	ay Labs Coll	ection	-	ige:		
Sampl	e ID:	17-7427-5851	Cod	е:	COM0316,081	c			lient:	City o	of Malibu
Sampl	e Date:	11 Mar-16 14:3	1 Mate	erial:	Sample Water			F	roject:	ASB	5
		11 Mar-16 17:00			Bioassay Repo	rt.					
Sampl	e Age:	22h	Station:		24-BB-03R						
Linear	Interpo	lation Options									
X Tran	sform	Y Transform	See	d	Resamples	Exp 95% CL Me		lethod			
Linear		Linear	1925	5769	280	Yes Two-Poin		wo-Point In	terpolation		
Test A	cceptab	ility Criteria									
Attribu	te	Test Stat	TAC Limit	s	Overlap	Decision					
Control	Resp	14.38	10 - NL		Yes Passes Acceptability Crite						
Point E	Stimate	s				This		-			
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
IC5	>100	N/A	N/A	<1	NA	NA					
IC10	>100	N/A	N/A	<1	NA	NA					
IC15	>100	N/A	N/A	<1	NA	NA					
IC20	>100	N/A	N/A	<1	NA	NA					
IC25	>100	N/A	N/A	<1	NA	NA					
IC40	>100	N/A	N/A	<1	NA	NA					
IC50	>100	N/A	N/A	<1	NA	NA					
Mean L	ength S	Summary				Calc	culated	Variate			
C-%	C	ontrol Type	Count	Mean	Min	Max	Std Er	r Std D	ev CV%		%Effect
		egative Control	5	14.38	14.3	14,4	0.0199	8 0.0446	68 0.31%	,	0.0%
100		The state of the s	5	14.48	14.3	14.7	0.0663	3 0.1483	1.02%	,	-0.7%
Mean L	ength C	Detail									
C-%		ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	1			
0	N	egative Control	14.4	14.4	14.4	14.4	14.3				
11.61.6											

100

14.3

14.5

14.4

14.5

14.7

CETIS	Measurement	Report
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Report Date:

22 Mar-16 10:18 (p 1 of 1)

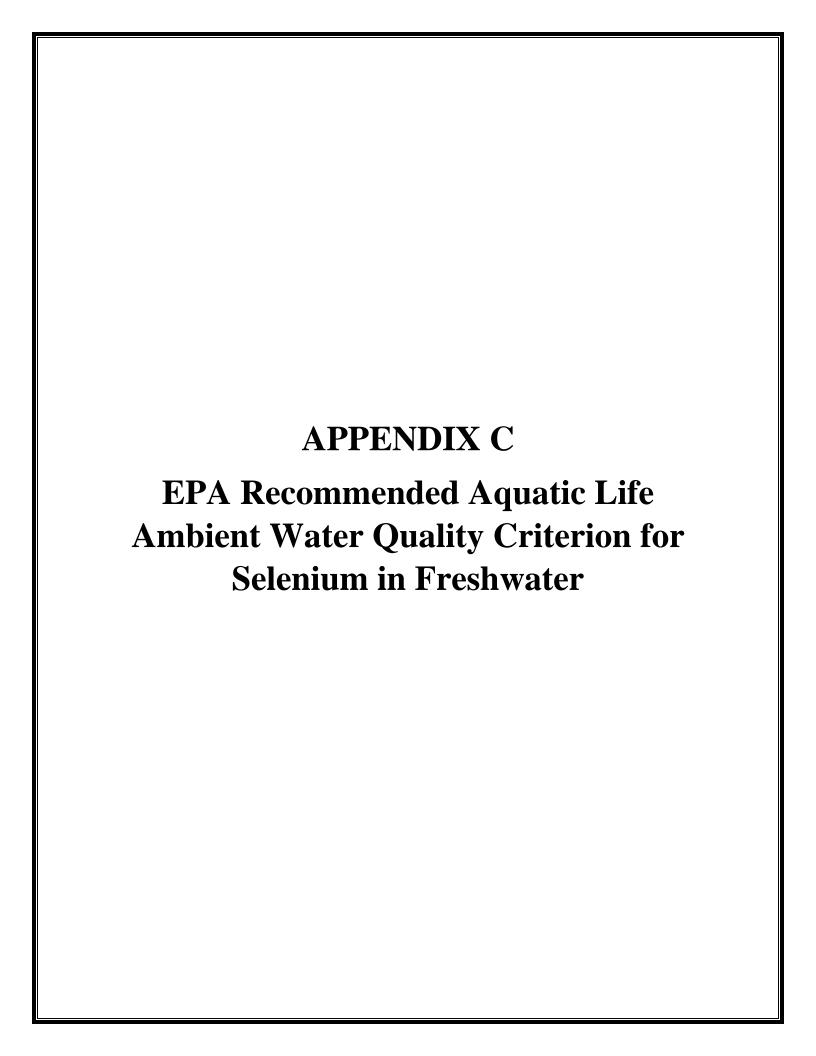
Test Code:

COM0316.081klp | 04-8699-5959

Macrocystis G	Sermination and	d Germ	Tube Grow	th Test				Aqua	atic Bioassay 8	Consultin	g Labs, Inc.
Batch ID: Start Date: Ending Date: Duration:	12 Mar-16 13:01 14 Mar-16 13:01 48h 17-7427-5851 11 Mar-16 14:31 11 Mar-16 17:00		Test Type: Protocol: Species: Source:	Growth-Germi EPA/600/R-95 Macrocystis py Aquatic Bioass	/136 (1995) yrifera			Analyst: Diluent: Brine: Age:	Laboratory Se Not Applicable		
			Code: Material: Source: Station:	COM0316.081k Sample Water Bioassay Report 24-BB-03R				Client: Project:	City of Malibu ASBS		
Dissolved Oxy	ygen-mg/L										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	cv%	QA Count
0	Negative Contr	2	6.4	1.318	11.48	6	6.8	0.4	0.5657	8.84%	0
100	A REAL STATE OF	2	6.35	3.173	9.527	6.1	6.6	0.25	0.3536	5.57%	0
Overall		4	6.375			6	6.8				0 (0%)
pH-Units											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	8.05	7.415	8.685	8	8.1	0.050	01 0.07073	0.88%	0
Overall		4	7.975			7.9	8.1				0 (0%)
Salinity-ppt									7177	777	
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
100	A STATE OF THE STA	2	34	34	34	34	34	0	0	0.0%	0
Overall		4	34			34	34				0 (0%)
Temperature-	°C										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	QA Count
	Negative Contr	2	14.8	13.53	16.07	14.7	14.9	0.1	0.1414	0.96%	0
100	10,000,000	2	14.8	13.53	16.07	14.7	14.9	0.1	0.1414	0.96%	0
Overall		4	14.8			14.7	14.9				0 (0%)
Dissolved Oxy	/gen-mg/L										
C-%	Control Type	1	2								
The second second	Negative Contr	6.8	6								
100	C-Pastering III.	6.6	6.1								
pH-Units											
5 CA	Control Type	1	2								
	Negative Contr	7.9	7.9								
100	, togative conti	8.1	8								
Salinity-ppt		0,1									
	0	50									
	Control Type	1	2								
100	Negative Contr	34	34								
V		34	34								
Temperature-°											
	Control Type	1	2								
	Negative Contr	14.7	14.9								
100		14.7	14.9								

# CHAIN OF CUSTODY RECORD

Client: City of Malibu		Project Name/Number: ASBS			Analysis											
									රේ ග							
Address					Project Mgr. Karin Patrick			phate				horus				
					P.O.#		soyd				nospł			*		
Phone Number: (805) 405-9388				Sampled By (signature)			Ortho	Grease		etals	rganopl id Pesti	oxicity*	cicity*	Foxicity		
Date	Time	Comp.	Grab	Matrix	Sample ID	Volume/ Number	Ammonia	Nitrate & Orthophosphate	Oil & Gr	TSS	Total Metals	PAHs, Organophosphorus Pyrethroid Pesticides	Urchin Toxicity*	Kelp Toxicity*	Bivalve Toxicity*	Comments
03.11.16	1426		X	FW	24-BB-03Z	7	Х	Х	Х	Х	Х	Х				
03-11-16	1431			SW	24-BB-03R	12	Х	Х	X	Х	Х	Х	X	Х	Х	
*				FW	24-BB-02Z	7			Х	Х			X	X	Х	
*				FW-	24-BB-01Z	7			X	- X			X	Х	X	
Special Inst	ructions	*	627	+012	not flowing											
Relinquised By:(signature)			03-11-14 1700									Date: Time:				
Received By: (signature)				Sample Temp	te: Time:	Rece	ivea i	oy.(sign	nature)						Date: Time:	



### **Appendix C**

# EPA Recommended Aquatic Life Ambient Water Quality Criterion for Selenium in Freshwater<sup>1</sup>

		Short-term				
Criterion version	Egg-Ovary <sup>1</sup> (mg/kg dw)	Whole Body <sup>1</sup> (mg/kg dw)	Muscle <sup>1</sup> (mg/kg dw)	Water, <sup>1</sup> Lentic <sup>2</sup> (µg/L)	Water,¹Lotic (µg/L)	Water (µg/L)
2016 Final Update	15.1	8.5	11.3	1.5 (30 d)	3.1 (30 d)	Intermittent exposure equation.
1999 Selenium Criteria	N/A	N/A	N/A	5 (4 d)	5 (4 d)	Acute Equation based on water column concentration.

1. A note on hierarchy of table: when fish egg/ovary concentrations are measured, the values supersede any whole-body, muscle, or water column elements except in certain situations. Whole body or muscle measurements supersede any water column element when both fish tissue and water concentrations are measured, except in certain situations (see examples in text above). Water column values are derived from fish tissue concentrations.

The criterion document does not include an acute criterion (based on water-only exposure) because selenium is bioaccumulative and toxicity primarily occurs through dietary exposure. EPA derived an intermittent exposure criterion element from the 30-day average water column criterion element for situations where elevated inputs of selenium could result in bioaccumulation in the ecosystem and potential chronic effects in fish (*e.g.*, new discharges).

- 2. Lentic, pertaining to organisms or habitats, means inhabiting or situated in still, fresh water.
- 3. Lotic, pertaining to organisms or habitats, means inhabiting or situated in rapidly moving fresh water.

<sup>&</sup>lt;sup>1</sup> EPA, "Recommended Aquatic Life Ambient Water Quality for Selenium in Freshwater," Document No. 2016-16585. July 13, 2016. *Office of the Federal Register* website, Accessed December 7, 2016. <a href="https://www.federalregister.gov/d/2016-16585/p-12">https://www.federalregister.gov/d/2016-16585/p-12</a>