CALIFORNIA
Water Boards

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GOVERNOR

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SECRETARY FOR
ENVIRONMENTAL PROTECTION

Santa Ana Regional Water Quality Control Board

September 24, 2015

Dave Kiff, City Manager
City of Newport Beach
100 Civic Center Drive
Newport Beach, CA 92660

Response to City of Newport Beach's July 16, 2015 Letter to Chairman Ruh/Regional Board Members regarding Newport Bay Copper/Metals TMDLs

Dear Mr. Kiff:

This letter provides Regional Board staff's response to your comments/concerns stated in your July 16, 2015 letter to Chairman Ruh and other Regional Board members regarding the Newport Bay Copper/Metals TMDLs. We have listed each comment/concern separately with our responses below. We have also included technical documents related to the maximum allowable leach rate and recommendations set by the Department of Pesticide Regulation (DPR) for copper (Cu)-based antifouling paints (AFPs), and Regional Board staff concerns about those recommendations (Attachments 2 and 3).

1) City comment/concern:
"Over the course of many years, the City of Newport Beach ("City") has been working closely with the Santa Ana Regional Water Quality Control Board (Board) and its staff to proactively address a wide range of water quality related issues...Water quality monitoring studies performed by Board and City show that these efforts have been effective in bringing much of the harbor into compliance with the California Toxic Rule (CTR) standard for copper and lowering copper concentrations in the remainder of the harbor to within 1-3 ppb of CTR." (para. 1 and 2)

Response: The Regional Board and Regional Board staff recognize and commend the City for its significant efforts to improve water quality and protect beneficial uses in Newport Bay. As Board staff discussed at the July 24, 2015 Regional Board meeting, and at the two CEQA scoping meetings held on July 23, 2015, water quality monitoring data demonstrate that copper (Cu) concentrations in the Bay continue to exceed the saltwater Cu CTR criterion; therefore, the finding of Cu impairment of the Bay is still appropriate.

This finding of impairment is based on data from the Cu-Metals Marina Study (2007) and monitoring data from the County of Orange in Upper and Lower Newport Bay (2002-2012). These data show Cu exceedances of the CTR criterion in both marina and open Bay waters. The evaluation of these studies is part of Board staff's Metals Impairment Assessment, and a requisite part of our ongoing work to consider appropriate revisions to the Cu and other Metals TMDLs promulgated by USEPA in 2002.

2) City comment/concern:
"Based on recommendations by the California Department of Pesticide Regulation (DPR) to ban copper-based antifouling paints (AFP) with high leach rates, it is now reasonable for us all to expect that the remaining areas in the harbor will also come into compliance with CTR." (para. 2)

Response: We disagree with this conclusion. First, DPR has determined that the maximum leach rate alone will not achieve compliance with the CTR; BMPs and other DPR recommendations are built into the determined leach rate and must be implemented. Second, DPR has acknowledged that the maximum leach rate and implementation of their BMP recommendations will not achieve compliance in highly impaired waters, including Newport Bay, unless at least 12% of the boats are converted from Cu to non-Cu paints. Finally, the reduction of Cu loading with the implementation of the maximum leach rate is dependent on the leach rates of the Cu AFPs now in use. Data regarding the leach rates of Cu AFPs now in use in Newport Bay must be collected and evaluated to determine the potential Cu load reduction from DPR's maximum leach rate. These points are addressed in greater detail below and in the Attachments.

It is critical to understand that the implementation of DPR's maximum allowable leach rate alone will not achieve water quality compliance for Cu, as BMPs for hull cleaning are an inherent part of DPR's leach rate calculations for all marinas. This means that in smaller marinas (<1270 boats) the maximum leach rate WITH BMPs for hull cleaning is expected to achieve CTR compliance. In larger marinas (>1270 boats), the maximum leach rate WITH BMPs for hull cleaning AND the conversion of boats from Cu to nontoxic paints must be implemented to achieve CTR compliance (See Attachments 1,2,3). (Note also that DPR's analysis speaks to compliance within a marina rather than a harbor. As you know, Newport Bay includes a number of marinas and a very high density of vessels. It is necessary to achieve CTR compliance both within these marinas and throughout the Bay.)

BMPs for hull cleaning include cleaning with soft cloths and/or slip liner hull cleaning methodology. Per DPR's analyses, larger marinas (>1270 boats) must also convert a minimum of 12% of the boats from Cu to non-Cu paints to achieve compliance with the CTR. Board staff's draft implementation recommendations include the same measures that DPR recommends: boat conversions from Cu to nontoxic paints, and the required use of BMPs such as soft cloths or slip liner cleaning methodology.

Whether or not DPR's maximum leach rate will reduce Cu loading also depends on the Cu paints actually in use in a particular water body (i.e., if boaters currently use Cu paints with leach rates higher than DPR's maximum leach rate, there will be some reduction in Cu loading with the use of DPR-compliant Cu paints; however, if boaters are already using Cu paints with leach rates below DPR's maximum leach rate, then no reduction in Cu loading will occur. In addition, implementation of DPR's leach rate and the shelf removal and replacement of Cu paints with higher leach rates will likely take a number of years.

3) City comment/concern:
"Notwithstanding this significant and costly effort undertaken by the City to improve water quality, we acknowledge that Board staff is developing a Basin Plan amendment to incorporate a revised copper Total Maximum Daily Load (TMDL) for Newport Bay. Board staff has confirmed that compliance may likely require the City to restrict or ban the use of *legally-available* copper-based AFP in Newport Harbor."

Response: First, we appreciate the City's recognition that Board staff is developing a revised Cu TMDL. A Cu TMDL for Newport Bay is already in place as part of USEPA's Toxics TMDLs (promulgated in 2002). USEPA's Cu TMDL shows that Cu paints on boat hulls are the largest source of Cu to the Bay, and requires a 90% reduction in Cu loading from boats.

Board staff's proposed revised Cu TMDL (based on data since 2002) shows that Cu discharges from Cu paints on boat hulls are still, by far, the largest source of Cu to Newport Bay (approx. 36,000 lbs/yr), but our revised Cu TMDL requires a lower reduction in Cu loading from boats (83%) compared to USEPA's required reduction (90%).

In the absence of an approved revised Cu TMDL for the Bay, the Regional Board will need to require responsible dischargers, including the City of Newport Beach, to take action to meet USEPA's Cu TMDL, which, as noted, requires a greater reduction of Cu discharges from boat hulls than that identified in Board staff's revised Cu TMDL. Regulatory options available to the Board to compel compliance with the USEPA's Cu TMDL, and the revised Cu TMDL when and if approved, include the issuance of waste discharge requirements and the prohibition of Cu discharges to the Bay. (In addition, dischargers will have to meet reduction requirements for zinc (Zn), lead (Pb) and cadmium (Cd) in the Bay identified in USEPA's Zn, Pb and Cd TMDLs, while Board staff found no impairment for these metals except for Zn in the Lower Bay.)

Second, we do not dispute that Cu AFPs are legally available, and that the City cannot ban the use of such Cu paints. Neither can the Regional Board. DPR controls the sale and use of Cu AFPs; however, the Regional Board can and must restrict the discharge of Cu from Cu AFPs to waters of the state to ensure that the saltwater Cu CTR criterion is achieved. Recognizing differences in the legally specified roles and responsibilities of DPR and the Water Boards, the State Water Resources Control Board and Regional Boards have endeavored to work with DPR to coordinate our respective obligations so as to ensure that any restrictions imposed by DPR are sufficient to meet the Water Board's legal requirements under the California Water Code and federal Clean Water Act. We have identified our concerns regarding DPR's recent determination of a maximum leach rate and their BMP recommendations in a letter to DPR dated August 15, 2014 (Attachment 3). We will continue to work with DPR, and USEPA, which also has pesticide regulatory authority, to identify appropriate measures that will ensure that water quality objectives will be achieved. We encourage the City to join in those efforts.

The California Water Code precludes the Regional Board from dictating the method or manner of compliance with its regulations, including TMDLs. The draft implementation plan for the Cu TMDLs, which we have shared with City staff for early review and comment, envisions that the responsible dischargers, including the City, will develop proposed strategies whereby the necessary reduction in Cu discharges from Cu AFPs would be achieved. We recommend that these strategies include requirements for 1) the conversion of boats from Cu to nontoxic paints, 2) the use of BMPs for hull cleaning (i.e., the use of soft cloths by all divers and/or hull cleaning in slip liners/containers), and 3) boater education programs to educate boaters and boatyards on the need to reduce Cu discharges from Cu AFPs and the use of alternative paints and hull cleaning BMPs.

We agree with DPR that the implementation strategies must include conversions from Cu-based paints to nontoxic paints. If the proposed revised Cu TMDL and implementation plan are approved, the City and other responsible dischargers will need to find ways to accomplish those paint conversions, such as increased slip fees for boaters using Cu paints, and/or incentive program(s) for boaters who convert from Cu to nontoxic paints. While the Regional Board

cannot specify the method of compliance, we will review the strategies proposed by the City and require their implementation upon Board approval.

We note that the City has already passed a resolution encouraging boaters to use copper –free boat paints (Resolution 2010-53). We commend that action.

4) City comment/concern:
"Additionally, as more fully set forth in the attached document entitled "History of Copper Paint Regulation", and as we have previously advised staff, we believe that the staff's recommendation is precluded by doctrine of preemption as DPR is the exclusive regulator of pesticides, including copper-based AFPs." ....

"Quite simply, we believe that the local regulation proposed by the implementation plan is both unenforceable and an end run around DPR notwithstanding the fact that the State of California, DPR, has already established standards under which copper-based AFP may be lawfully used and DPR is the exclusive authority to regulate pesticides "to the exclusion of all local regulation." (Cal. Food & Agric. Code, §11501.1.)"

Response: We recognize that DPR (and USEPA) regulate the sale and use of pesticides, including Cu AFPs; however, the Regional Board has the duty and authority to regulate the discharge of waste, including Cu discharges from Cu AFPs, to waters of the state. These are distinct responsibilities. As described above, the State and Regional Board staff have attempted to work with DPR to coordinate these responsibilities, but where DPR's restrictions and recommendations are not sufficient to protect water quality, the State and Regional Boards must take or require appropriate action. The proposed implementation plan for the revised Cu TMDL identifies those actions.

5) City comment/concern:
"We respectfully request that you reject this proposal. We say this again acknowledging the fine work of your staff, whom we respect very much."

Response: The Regional Board and Board staff sincerely appreciate the productive and respectful relationship that the Board and its staff have enjoyed in joint efforts with the City to improve and protect water quality. We hope that this relationship will continue. The draft TMDL and implementation plan will be widely distributed for public and agency comment, and revisions will be considered on the basis of those comments before this matter is brought to the Regional Board for adoption consideration at a public hearing.

6) City comment/concern:
"We suggest that the Board recognize DPR's prohibition on very high leach rate copper-based AFPs that exceed the leach rate thresholds set by DPR in 2014 in lieu of requiring our one community and harbor to be more restrictive than the DPR mandate. Complying with DPR's maximum leach rates will serve the intent of any Basis [Basin] Plan Amendment and, as confirmed by DPR, should dramatically reduce the use of copper in anti-fouling paints. (*Determination of Maximum Allowable Leach Rate and Mitigation Recommendations for Copper Antifouling Paints Per AB 425* ("Determination", p.3). In addition to respecting DPR's preemptive role, our suggested alternative provides the benefit of allowing the industry to react to the newly-established leach-rate thresholds so that the success of product reformulation can be adequately assessed."

"It allows the boating community – especially the local boating community – to more thoughtfully react to these important changes to time-tested ways of doing things."

Response: Please see the responses above concerning the respective responsibilities and authorities of DPR and the Regional Board, and the potential effects of DPR's maximum leach rate. It should be noted that the proposed Cu TMDL/implementation plan calls for an extended compliance schedule (a maximum of 15 years), which is expected to allow boats to be repainted with nontoxic or non-Cu based AFPs over time, consistent with current maintenance/repainting schedules. This compliance schedule provides time to assess whether and to what extent DPR's leach rate and recommendations result in any appreciable Cu load reductions, and whether changes to the Cu TMDL and/or implementation plan should be considered on the basis of those findings.

7) City comment/concern:
"Additionally, the City of Newport Beach strongly believes any such monitoring, enforcement, testing, etc. for compliance with DPR regulation associated with AFP's must be applied on a Statewide basis, by the State. The monitoring of vessels for compliance to State or Federal regulations should be looked at in the same way the States and Federal governments monitor and regulate land based vehicles through the control of the various products used in their assembly and upkeep (such as tires, brake pads, oils and fuel). The compliance monitoring for such items like DPR's AFP standards should be done through a required testing program prior to obtaining vessel registration, similar to the SMOG check compliance program for vehicles."

Response: While a statewide registration for boats might be a helpful option, this would likely take years to put in place and implement, and it's not clear that it would succeed in meeting this Cu TMDL. Furthermore, not all marinas in the state are impaired for Cu. The most impaired marinas for Cu from Cu AFPs on boat hulls, are found in southern California (Newport Bay, Shelter Island, Marina del Rey). We have discussed with DPR the possibility of a regional (southern California) ban on the sale and use of Cu-based AFPs; however, to date, DPR has declined to pursue this approach. We would welcome the City's efforts to work jointly with us and other southern California Regional Boards to encourage DPR (and USEPA) to pursue further restrictions (lower allowable leach rates or possibly a regional ban) on Cu AFPs in southern California.

8) City comment/concern:
"We do not believe such responsibilities should be delegated to the local or county government, nor should it be applied to one, or a few, particular harbors. We are ill-equipped to do this work. Further, a piecemeal approach to regulation creates a ready
market to move vessels around to other locations for AFP. Expecting a municipality to track the ins and out of vessels and their AFP work is unreasonable."

Response: Please see the preceding response. We would be pleased to work with the City to encourage DPR to pursue further restrictions (lower allowable leach rates or possibly a regional ban) on Cu AFPs in southern California; however, without a ban on Cu AFPs in southern California (which is unlikely), DPR itself states that to achieve compliance with the saltwater Cu CTR criterion, BMPs and conversions to non-Cu AFPs must be implemented in addition to the implementation of the maximum leach rate. (City-instituted public education and requirements imposed by the City that hull cleaners must employ BMPs are reasonable steps, under any circumstances, to reduce the discharge of Cu from Cu AFPs to surface waters. Given its tidelands grant by the State, it is reasonable to expect that the City will employ its authorities

and execute its responsibilities to address activities that take place on lands under the control of the City to prevent the discharge of pollutants, including Cu from Cu AFPs.)

9) City comment/concern:
"As we have noted, if the City of Newport Beach prohibits or restricts the application of DPR approved copper-based paint in Newport Beach alone, someone a short distance away in Long Beach, Huntington Beach or Dana Point would not be restricted. As a store in any of these communities could sell paint banned in Newport Beach, such a pervasive conflict requires that state law predominate. Otherwise, the result will be an unnecessary confusion and uncertainty as different localities attempt to enforce different rules. A patchwork of varying restriction on paint would be extremely costly and nearly impossible to enforce, especially in Orange County with our multiple harbors and marine paint vendors."

Response: Please see preceding responses. We agree that a regional ban on the use of Cu-based AFPs would simplify the regulatory response necessary to achieve Cu discharge reductions from Cu AFPs. We have thus far been unable to persuade DPR of the merits of this approach and would welcome the City's supporting voice in this conversation; however, as stated above, DPR is not amenable to a regional ban on Cu AFPs at this time. Absent such a regional ban on the sale and use of Cu-based AFPs, the Regional Board must ensure that suitable and effective actions are taken by responsible parties, including the City of Newport Beach, to achieve the requisite Cu loading reductions from Cu AFPs. This is true whether USEPA's Cu TMDL remains in effect or is superceded by the revised Cu TMDL developed by Regional Board staff. In addition, it would be useful to work with USEPA to add leach rate designations to Cu AFP labels so that boaters and boatyards can choose Cu AFPs with lower leach rates.

10) City comment/concern:
"If the State of California (and any of its departments or agencies as each are considered the State in our eyes) approves the use of a particular product(s) for sale and use, in this case AFPs, that include a known and expected discharge rate of a particular substance, in this case copper, then there is an implied and expected understanding that that product is acceptable although it causes an associated exceedance of another rule, in this case CTR. If the Regional Quality Control Board disagrees with DPR (its sister State agency) on the use of this product, then we respectfully suggest that the onus is on the Regional Water Quality Control Board and DPR as the appropriate parties to come to a joint agreement so that California speaks with one voice, and its individual departments do not to look to local government to decipher conflicting messages."

Response: While Regional Board staff would have liked DPR to issue a lower maximum leach rate, we do not disagree with DPR's conclusions that achieving compliance with the Cu CTR criterion will take the maximum leach rate WITH BMPs for hull cleaning in the smaller marinas (<1270 boats), and the maximum leach rate WITH BMPs for hull cleaning AND boat conversions from Cu to nontoxic paints in larger marinas (>1270 boats). There is no disagreement with DPR. Again, we would welcome the City's support in encouraging DPR (and USEPA) to pursue further restrictions (lower allowable leach rates or possibly a regional ban) on Cu AFPs in southern California and in working with USEPA to add leach rate designations to Cu AFP labels.

11) City comment/concern:
"For all of these reasons, and based on the provisions of the Business and Professions Code, the Food and Agriculture code, case law, and recent legislative action outlined in this

attachment, we just don't think this is wise or will work. It is clear that DPR is the preemptive regulating and enforcement agency with regard to the use of anti-fouling paints. Requiring the City of Newport Beach to restrict the use of legally-available paint likely interferes with state law and the intent of the California Legislature. A requirement imposed in Newport Harbor would directly interfere with the power vested in DPR to regulate the use of pesticides. We respectfully suggest that you not adopt these new requirements on our community and harbor, instead working with DPR to implement, measure and test the success of DPR's new obligations.

Response: As stated in the preceding responses, and as reflected in more detail in the Attachments to this letter, Regional Board staff do not dispute DPR's authority to regulate the sale and use of pesticides such as Cu-based AFPs; however, we disagree that DPR's adoption of a maximum Cu leach rate for Cu-based AFPs somehow pre-empts the Regional Board from exercising its state and federal authority to regulate discharges of copper to Newport Bay and to adopt and implement a revised Cu TMDL that addresses Cu impairment in the Bay.

In setting a maximum Cu leach rate and making other recommendations, DPR has considered what is necessary to achieve the CTR criterion, recognizing the Regional Board's obligation to ensure that water quality and beneficial uses are not adversely affected as the result of Cu discharges from the use of Cu AFPs sanctioned by DPR. As stated above, DPR has acknowledged that in the larger, most impaired marinas, the maximum leach rate must be coupled with the implementation of hull cleaning BMPs AND the conversion of some percentage of vessels from Cu-based AFPs to nontoxic (or non-Cu) AFPs. As reflected in this letter and in Attachments 1, 2 and 3, we agree with this conclusion.

The proposed TMDL and implementation plan provide an extended compliance schedule that will allow the City, and other responsible parties, to identify proposed strategies to achieve the requisite paint conversions and reductions in Cu discharges. Regional Board staff's expectation is that the proposed strategies will include identification of the leach rates of Cu AFPs now in use in the Bay to determine whether and to what extent DPR's maximum leach rate will reduce Cu loading to the Bay. The implementation strategies should also include requirements for the use of BMPs by hull cleaners and public education. Finally, we again strongly encourage the City to work with us to encourage DPR (and USEPA) to pursue further restrictions (lower allowable leach rates or possibly a regional ban) on Cu AFPs in southern California and to work with USEPA to add leach rate designations to Cu AFP labels. We respectfully remind the City of the need to reduce Cu discharges to meet both the already established USEPA TMDL and Regional Board staff's revised Cu TMDL now being drafted.

Summary:
The water quality monitoring data demonstrate that Cu concentrations in the Bay continue to exceed the saltwater Cu CTR criterion and the finding of continued impairment of the Bay is justified.

USEPA's Metals TMDLs for Newport Bay, including Cu, are already in place, and if the proposed revised Cu TMDL is not adopted, USEPA's Metals TMDL will be implemented. There are several issues, however, with USEPA's Metals TMDLs: 1) The data on which those TMDLs rely are pre-2002, and methods of determining compliance developed prior to the adoption of California's State Listing Policy (2004) are outdated; 2) USEPA's Cu TMDL requires a 90% reduction in Cu loading from boats, which is larger than the revised Cu TMDL requirement of 83% reduction in Cu loading from boats; and, 3) USEPA's TMDLs include requirements for zinc (Zn), lead (Pb) and cadmium (Cd). If Board staff's revised Cu TMDLs and

recommendations for other metals are not adopted, then USEPA's Metals TMDLs will remain in place and all metals requirements must be implemented. Note that in addition to USEPA's Cu TMDL for Newport Bay, Cu TMDLs have been adopted in Shelter Island (San Diego) and Marina del Rey (Los Angeles) with boats shown to be the main contributor of Cu to those water bodies.

We thank the City for its work in Newport Bay, and we look forward to our continued work together to achieve water quality compliance in the Bay, especially with respect to Cu. We strongly encourage the City to begin development of an implementation plan with strategies to reduce Cu in Newport Bay. These strategies should include recommendations for converting boats from Cu to non-Cu AFPs, using BMPs for hull cleaning, such as soft cloths or slip liner cleaning methodology, and conducting education programs for boaters and boatyards regarding Cu issues.

If you have any questions/comments or would like to set up a conference call, please do not hesitate to contact Linda Candelaria, PhD (lcandelaria@waterboards.ca.gov) or Joanne Schneider (jschneider@waterboards.ca.gov).

Sincerely,

Kurt V. Berchtold
Executive Officer
Santa Ana Regional Water Quality Control Board

cc: Regional Board
David Rice, OCC
Rik Rasmussen, SWRCB
Attachment 1: Detailed Response to City comment/concerns 2 and 3
Attachment 2: DPR letter from Duncan to Leahy (January 30, 2014)
Attachment 3: Santa Ana and Los Angeles Regional Boards' letter to DPR (August 15, 2014)

Attachment 1: Detailed Response to City comment/concerns 2 and 3.
1) DPR's determination of a maximum allowable leach rate and BMP recommendations (See Attachment 2-Duncan letter to Leahy, and Attachment 3-Santa Ana and Los Angeles Regional Boards' letter to DPR), and
2) Comments on Board staff's recommended implementation tasks

City comment/concern #2
"Based on recommendations by the California Department of Pesticide Regulation (DPR) to ban copper-based antifouling paints (AFP) with high leach rates, it is now reasonable for us all to expect that the remaining areas in the harbor will also come into compliance with CTR." (para 2)

Response – It is critical to understand that the implementation of DPR's maximum allowable leach rate alone will not achieve water quality compliance for Cu, as BMPs for hull cleaning are an inherent part of DPR's leach rate calculations for all marinas. This means that in smaller marinas (<1270 boats) the maximum leach rate WITH BMPs for hull cleaning must be used to achieve compliance, and in larger marinas (>1270 boats) the maximum leach rate WITH BMPs for hull cleaning AND the conversion of boats from Cu to nontoxic paints must be implemented to achieve compliance (DPR letter, Att.2).

DPR's letter from D. Duncan to B. Leahy (a more detailed explanation of the leach rate and expected results –Att.2) states that the 9.5 ug/cm^2/d leach rate WITH BMPs for hull cleaning is protective of scenario 2 (see explanation of modeling p2), but that scenarios 3-5 will require the leach rate WITH BMPs for hull cleaning AND conversion to non-copper paints to achieve the Cu CTR criterion of 3.1ug/L. (This requires a 12% conversion rate for scenario 3 marinas (1833 boats) and a higher conversion rate for marinas with more boats (scenarios 4 and 5).)

> "The selection of these two leach rates is protective of marinas in scenario 2 where EMB expects waters in marinas that contain as many as 1,270 boats to be in complete compliance with the chronic CTR criterion of 3.1 ppb. Nearly all California salt water marinas are addressed in scenario 2. EMB expects to also observe a significant reduction in dissolved copper concentrations in the larger marinas of scenarios 3, 4, and 5. Although dissolved copper concentrations in these marinas may still at times exceed the CTR criterion, the eventual reduction in copper loading will increase protection of aquatic organisms in all of California's marinas." (p5, para 4) [RB staff inserted the underlining].
>
> "Using our model, we estimated that a 12% adoption rate of non-copper alternatives will bring the marinas belonging in scenario 3 (those with 1,833 boats or less) into compliance with the CTR criterion. A larger adoption rate will bring even larger marinas into compliance. EMB will continue to work with stakeholders groups to facilitate greater adoption of AFP alternatives, including biocide-free products that are a growing presence in the marketplace." (p5, para 5) [RB staff inserted the underlining].

Board staff's implementation recommendations include these same measures that DPR recommends: boat conversions from Cu to nontoxic paints, and the required use of BMPs such as soft cloths or slip liner cleaning methodology.

DPR's finding that their maximum leach rate will reduce Cu loading also depends on the Cu paints in use in a particular water body (i.e., if boaters currently use Cu paints with leach rates higher than the maximum leach rate, there will be some reduction in Cu loading from Cu paints; however, if boaters are using Cu paints below DPR's maximum rate then no reduction in Cu

loading will occur. In addition, implementation of this leach rate and the shelf removal of Cu paints with higher leach rates may take a number of years.

(A more thorough explanation of the process by which DPR selected a maximum allowable leach rate is given in the Leahy letter in the section "Modeling Approach and Rationale for Decision Making" (p2) which explains that initially "This modeling procedure produced the maximum allowable leach rates for each of the five [marina] scenarios that range from 1.12 to 24.60 µg/cm2/day" (p2, para 4) and that "If monthly, soft-pile carpet BMP becomes the accepted industry norm for a cleaning regime, this will allow DPR to work with scenarios with maximum allowable leach rates that range from 0.79 to 17.47 µg/cm2/day" (p4, para 4).)

City comment/concern #3
"Notwithstanding this significant and costly effort undertaken by the City to improve water quality, we acknowledge that Board staff is developing a Basin Plan amendment to incorporate a revised copper Total Maximum Daily Load (TMDL) for Newport Bay. Board staff has confirmed that compliance may likely require the City to restrict or ban the use of *legally-available* copper-based AFP in Newport Harbor."

Response – We note that the City has already passed a resolution encouraging boaters to use copper –free boat paints. Neither the Regional Board nor the City has the authority to restrict or ban the sale and use of pesticides, including Cu-based AFPs; however, as reflected in the draft implementation plan for the revised TMDL, Board staff believes that the City can provide incentives for the use of non-toxic AFPs and/or place restrictions in lease agreements/permits issued for boat-related activities on tidelands and submerged lands under the control of the City. The draft implementation plan for the Copper (Cu)TMDL includes recommended implementation tasks including:

> 1.2.2 Implementation Tasks to reduce Cu discharges from Cu AFPs
> The proposed implementation plan(s) and schedule(s), not to exceed 15 years, shall include strategies to (1) transition from Cu to nontoxic AFPs on recreational and commercial boats moored in Newport Bay, and to require new boats to use nontoxic AFPs; (2) require the use of BMPs by underwater hull cleaners; (3) conduct monitoring of marinas and channels; and (4) develop and conduct education programs (Section 5.6.3.1.2.2). These plan(s) may include controls/incentives for marina owner/operators and individual boat owners such as restricting the use of Cu AFPs through marina leases, permits or other mechanisms.

The preliminary draft implementation plan was given to City staff for review and respond to, and in particular, we requested a response to our recommended implementation tasks, and/or a proposed implementation plan from the City. To date, we have not received any detailed response to this recommended plan or to any of the tasks.

As shown above, the language states that

> "These plan(s) may include controls/incentives for marina owner/operators and individual boat owners such as restricting the use of Cu AFPs through marina leases, permits or other mechanisms."

And in section 1.2 Reduce Cu discharges from Cu AFPs

> "1.2.1 (1) The dischargers shall submit one or more implementation plan(s) and schedule(s) to achieve reductions of Cu discharges from Cu AFPs in accordance with the requirements identified in Task 1 above (see also section 5.6.3.1.2.2)."

USEPA's Cu TMDL for Newport Bay is already in place as part of USEPA's Toxics TMDLs (issued in 2002). USEPA's Cu TMDL shows that Cu paints on boat hulls are the largest source of Cu to the Bay, and requires a 90% reduction in Cu loading from boats.

Our proposed revised Cu TMDL (based on newer data) shows that Cu discharges from Cu paints on boat hulls are still the number one source of Cu to Newport Bay (approx. 36,000 lbs/yr), but our revised Cu TMDL requires a lower reduction in Cu loading from boats (83%) compared to USEPA's required reduction (90%).

Note that USEPA's metals TMDLs are still in place and if the revised Cu TMDL is not adopted, the Regional Board will need to implement USEPA's metals TMDLs, which require a higher reduction for Cu loading from boats (90%), as well as reductions of other metals. This implementation would include regulatory actions such as Waste Discharge Requirements for Cu discharges from boats, or even a Prohibition on Cu discharges from boats.

Since 2002, Board staff have conducted a number of studies to address data gaps in USEPA's metals TMDLs, including a Copper-Metals Marina Study (in Lower Newport Bay and lower Upper Newport Bay), a Storm Drain Metals Study in Lower Newport Bay, and a post-dredge Metals Sediment Study in Lower Newport Bay (which included resampling of some marinas). From these studies, we collected and analyzed more recent data, which was included in the Metals Impairment Assessment that was sent to City staff.

In addition, Regional Board staff worked with O.C. Coastkeeper on a Newport Bay Copper Reduction Study (319(h) grant). This project achieved some of its objectives in that a City Resolution was passed to encourage the use of Cu-free paints (Resolution #2010-53, and Coastkeeper conducted an education program to educate boaters on Cu problems in the Bay and the availability of alternative nontoxic paints. The project objective to convert boats to nontoxic paints, however, was less successful since ten out of one hundred sixty boats were converted to nontoxic coatings (largely due to non-cooperation from the boatyards).

Department of Pesticide Regulation

Brian R. Leahy
Director

Edmund G. Brown Jr.
Governor

MEMORANDUM

Attachment 2

TO: Brian R. Leahy
Director
Department of Pesticide Regulation

VIA: Charles M. Andrews
Associate Director
Pesticide Programs Division

FROM: David Duncan
Environmental Program Manager II
Environmental Monitoring Branch
916-445-3870

Original Signed By

DATE: January 30, 2014

SUBJECT: DETERMINATION OF MAXIMUM ALLOWABLE LEACH RATE AND MITIGATION RECOMMENDATIONS FOR COPPER ANTIFOULING PAINTS PER AB 425

The Department of Pesticide Regulation (DPR) placed copper-based antifouling paint (AFP) products into reevaluation in June 2010 to address elevated copper concentrations in salt water marinas that are primarily a result of extensive use of copper AFPs on recreational boat hulls.

To date, affected pesticide registrants have complied with the reevaluation data requirements, including disclosure of product copper leach rate, paint types, and potential mitigation strategies that have been valuable to the Environmental Monitoring Branch (EMB) as our staff evaluate mitigation approaches to address the issue. The registrants also funded a passive leaching and hull cleaning study (Earley *et al.*, 2013) to provide DPR with data on copper loading and the water quality impacts of in-water hull cleaning. Reevaluation continues as DPR works toward implementing solutions that will reduce copper concentrations in California marinas.

In October 2013, the Governor signed Assembly Bill (AB) 425 (Atkins) into law. AB 425 states, "No later than February 1, 2014, the Department of Pesticide Regulation shall determine a leach rate for copper-based antifouling paint used on recreational vessels and make recommendations for appropriate mitigation measures that may be implemented to address the protection of aquatic environments from the effects of exposure to that paint if it is registered as a pesticide."

The purpose of this memorandum is to present: 1) DPR's modeling approach and rationale for decision making; 2) DPR's recommendations for mitigation; and 3) the selected maximum allowable leach rate.

Modeling Approach and Rationale for Decision Making

EMB utilized the Marine Antifoulant Model to Predict Environmental Concentrations (MAM-PEC) as a reliable modeling tool to simulate the fate of copper in typical California marinas. Scientists and regulators worldwide (including the U.S. Environmental Protection Agency and the European Union) commonly utilize MAM-PEC to predict environmental concentrations of AFP biocides in a variety of marine environments. In our case, we used MAM-PEC in a manner that ultimately generated a maximum allowable copper leach rate for boats painted with copper AFPs.

DPR selected the California Toxics Rule (CTR) chronic criterion of 3.1 µg/l or parts per billion (ppb) dissolved copper as the statewide target for the reduction of copper loading from AFPs in California marinas. The CTR acute and chronic criteria are currently being enforced by the State Water Resources Control Board and the nine Regional Water Quality Control Boards (collectively referred to as the Water Boards).

With the CTR reduction target in mind, EMB relied on data for 20 California salt water marinas to accurately construct marina scenarios that reflected various levels of copper loading (for detailed modeling analysis see Appendix 1). Five scenarios were subsequently established to define distinct risk management levels. The lowest marina scenario (i.e., #1) represents marinas with 733 boats, which is the median size among the 20 sampled marinas. Scenario 2 represents marinas with 1,270 boats (75^{th} percentile in size); scenario 3 represents marinas with 1,833 boats (90^{th} percentile in size); scenario 4 represents marinas with 2,263 boats (95^{th} percentile in size). Scenario 5 represents marinas with 4,754 boats (largest in size among the sampled marinas), which is comparable to Marina del Rey in Los Angeles County.

As an initial step in determining the maximum allowable leach rate for the five scenarios, EMB modeled the leach rates produced under the condition that the average predicted concentration of dissolved copper within a marina is below the CTR of 3.1 µg/l. This modeling procedure produced the maximum allowable leach rates for each of the five scenarios that range from 1.12 to 24.60 $\mu g/cm^2/day$ (Appendix 1, Table 6, "LR_0" column).

Since in-water hull cleaning commonly occurs in California marina waters, we must adjust these leach rates appropriately to account for the impacts of this activity on passive leaching. Note that cleaning produces particulate copper as well as dissolved copper; however, for the purpose of our analysis, we focused only on dissolved copper.

Although Earley *et al.* (2013) showed that the in-water hull cleaning event itself represents only about 1–3% of dissolved copper loading to the 3-year life span of the AFP, their data also showed that the refreshment of the painted hull surface ultimately causes a spike in passive leaching that gradually declines to the baseline or steady state leach rate within about four weeks.

Therefore, as a direct result of this activity, the regular refreshment of the painted hull can contribute to 59% (average for epoxy and ablative AFPs) of the dissolved copper loading over the 3-year life span of the paint if a relatively abrasive 3M™ pad is used for scrubbing. Note that the use of this material is not considered to be a best management practice (BMP) and therefore we consider this to be a worst case cleaning scenario. For the purpose of determining a maximum allowable leach rate, EMB conservatively assumed that this non-BMP practice is used by all in-water hull cleaners on all boats in every marina. Adjustments for non-BMP in-water hull cleaning lower the initial leach rates to a range of 0.46 to 10.09 $\mu g/cm^2/day$ (Appendix 1, Table 6, "LR_2" column).

EMB compiled a list of leach rates for 169 copper AFP products that were actively registered as of December 2013, using data submitted by registrants. Leach rates ranged from 1.0 to 29.6 $\mu g/cm^2/day$ with a mean of 11.1 $\mu g/cm^2/day$. With this list, EMB determined that for scenarios 1, 2, 3, 4 and 5, the percentage of currently registered copper AFP products that exceed each scenario's associated leach rate were 50, 85, 91, 97 and 100, respectively. Note that the calculated maximum allowable leach rates could change if other actions that impact copper leaching from boat hulls are taken.

Recommendations for Mitigation

EMB assumes that the AB 425 requirement for the "determination of a leach rate" means a maximum allowable leach rate that will serve as a limit for California registered copper AFP products. As noted above, this would mean some percentage of currently registered products would be required to reformulate. EMB has determined that reformulation to AFP products to reduce copper leach rates will dramatically decrease copper loading in marinas. This impact will be pronounced in any of the five scenarios we have defined. However, if product reformulation is to play a key part in the mitigation of copper in marinas, other critical activities need to also be implemented to ensure the overall success of this endeavor. Appendix 2 contains a list of mitigation recommendations from EMB and includes the identification of the parties likely to be involved and a short rationale for the recommendation. Besides reformulation of copper AFP products, these recommendations also include:

- Require in-water hull cleaners to implement BMPs for in-water hull cleaning.
- Reduce in-water hull cleaning frequency to no more than once per month.
- Include painted-hull maintenance information as part of product labels.
- Develop for distribution hull maintenance brochures to be provided to boaters via boatyards at the time of painting.
- Increase boater awareness and acceptance of copper AFP alternatives.
- Foster new incentive programs and continue support for existing programs to convert copper-painted boat hulls to those painted with alternatives.

- Consider site-specific objectives (SSOs) for copper for certain marinas or harbors.

In Appendix 1, EMB further quantitatively explored the impacts that the implementation of many of these recommendations could have on bringing California salt water marinas to compliance with the CTR chronic criterion. Two of these quantitative evaluations that relate to in-water hull cleaning are summarized below.

Earley *et al.* (2013) tested an in-water hull cleaning BMP that employed soft pile carpet as the scrubbing material. This BMP came directly out of the California Professional Divers Association's (CPDA's) hull cleaning BMP certification manual (CPDA, 2008). The BMP material was tested against a more abrasive non-BMP 3M™ pad. Data showed that the BMP cleaning only contributed to 43% (average for epoxy and ablative AFPs) of the copper loading over the 3-year lifespan of the paint compared to 59% from the non-BMP cleaning.

EMB staff also observed that by limiting the frequency of cleaning to monthly during the entire year, up to five less passive leaching spikes are eliminated over the 3-year lifespan of the paint. The cleaning schedule used by Earley *et al.* (2013) was once every three weeks in the summer (June, July, August) and once every four weeks the rest of the year. Loading comparisons showed that a monthly frequency of cleaning lowers copper loading from 43% to 29% over the 3-year lifespan of the paint. Implementation of an even lower frequency of cleaning (e.g., every five weeks, bimonthly) could further reduce copper loading; however, reduction in frequency should be carefully weighted with the benefits of cleaning.

Implementation of these two proposed actions to decrease the magnitude of passive leaching of copper allows DPR to work with a higher range of leach rates that provides greater flexibility in maintaining sufficient product efficacy in reformulated products. Efficacy is critical for the effective control of native fouling species as well as non-native aquatic invasive species. If monthly, soft-pile carpet BMP becomes the accepted industry norm for a cleaning regime, this will allow DPR to work with scenarios with maximum allowable leach rates that range from 0.79 to 17.47 $\mu g/cm^2/day$ (Appendix 1, Table 6, "LR_3" column).

Selected Maximum Allowable Copper Leach Rate

Based on our modeling analysis, DPR recommends the establishment of the maximum allowable copper leach rate for AFP products at 9.5 $\mu g/cm^2/day$ under the condition that in-water hull cleaners follow CPDA's BMP method with soft-pile carpet and that cleaning cannot be performed more frequently than once per month.

For copper AFP products that do not require in-water cleaning, DPR recommends the establishment of the maximum allowable copper leach rate at 13.4 $\mu g/cm^2/day$ under the condition that in-water hull cleaning of any type is prohibited. Registrants will need to prove this

specific product claim to DPR via studies that are conducted in appropriate California marine settings.

In order to reinforce product-specific requirements for in-water hull maintenance for both categories of AFPs to boat owners, brochures or other forms of outreach materials need to also be provided to them. The most logical strategy for product-specific outreach is probably to have boatyards provide brochures to boat owners at the time of painting. More general outreach is important as well in the overall mitigation effort. Other points of distribution (e.g., marinas, AFP retailers, and boating events) will need to be explored.

Setting a maximum allowable leach rate at 9.5 $\mu g/cm^2$/day should result in about 58% of the currently registered copper AFP products or approximately 100 products having to be reformulated. The highest leaching product currently available has the leach rate of 29.6 $\mu g/cm^2$/day. This is equivalent to a maximum of 68% reduction in leaching rate.

The selection of these two leach rates is protective of marinas in scenario 2 where EMB expects waters in marinas that contain as many as 1,270 boats to be in complete compliance with the chronic CTR criterion of 3.1 ppb. Nearly all California salt water marinas are addressed in scenario 2. EMB expects to also observe a significant reduction in dissolved copper concentrations in the larger marinas of scenarios 3, 4, and 5. Although dissolved copper concentrations in these marinas may still at times exceed the CTR criterion, the eventual reduction in copper loading will increase protection of aquatic organisms in all of California's marinas.

EMB expects to see increased adoption of non-copper alternatives (i.e., coatings or technologies) in the future considering the amount of research, development, testing, and demonstration of alternatives that has taken place in recent years. Using our model, we estimated that a 12% adoption rate of non-copper alternatives will bring the marinas belonging in scenario 3 (those with 1,833 boats or less) into compliance with the CTR criterion. A larger adoption rate will bring even larger marinas into compliance. EMB will continue to work with stakeholders groups to facilitate greater adoption of AFP alternatives, including biocide-free products that are a growing presence in the marketplace.

Interested parties may also pursue development of SSOs for consideration by the Water Boards. Before undertaking this effort, parties should discuss the various approaches available to them with a representative of the Water Boards. The Water Effects Ratio approach already exists as option. The Biotic Ligand Model (BLM), which represents a reliable and economical way to calculate site-specific standards in fresh water, is being evaluated by U.S. EPA for use in the salt water environment. Note that in a letter from its Executive Director to the San Diego Port Tenants Association dated September 13, 2013, the State Water Resources Control Board (State Water Board) stated its support of the U.S. EPA in pursuing and making it a priority to complete

development of salt water copper criteria using the BLM. In that letter, the State Water Board also stated that if a BLM for salt water copper criteria was completed, then it would provide another tool that could be used by the Water Boards in developing SSOs for copper.

It is important to stress that reformulation alone based on the selection of any of the five scenarios we developed represents a significant reduction of copper loading to all salt water marinas in California. Reductions should also benefit brackish and fresh water marinas that harbor boats with copper AFPs. The full water quality impact of the this mitigation effort may not be realized for many years due to the timeframes involved with reformulation, relabeling, registration approval, and market distribution. Moreover, the rate at which boatyards can convert boat hulls (i.e., strip existing AFP and apply a new one) is limited. Therefore, the eventual transition to reformulated AFP products will also be dependent on this factor. We would, however, expect to see more immediate improvements in water quality from changes to in-water hull cleaning practices.

As a part of the copper AFP reevaluation, DPR will begin immediate discussions with copper AFP registrants and U.S. EPA regarding reformulation, data requirements (e.g., efficacy), label restrictions and outreach for boaters, boatyards, and marinas. DPR will additionally engage with the Water Boards, registrants and key stakeholder groups to further refine and implement the overall mitigation effort.

We request your approval of this determination. If you or your staff have any questions or require additional information, please contact Nan Singhasemanon, of my staff, at 916-324-4122 or <nsinghasemanon@cdpr.ca.gov>.

APPROVED: *Original Approved By* DATE: 01/30/14
Brain R. Leahy, Director

Attachments

cc: Victoria Whitney, SWRCB, Deputy Director (w/Attachments)
Chris Reardon, DPR, Chief Deputy Director (w/Attachments)
Nan Singhasemanon, DPR, Sr. Environmental Scientist (w/Attachments)

References

Patrick J. Earley, Brandon L. Swope, Katherine Barbeau, Randelle Bundy, Janessa A. McDonald & Ignacio Rivera-Duarte, Biofouling (2013): Life cycle contributions of copper from vessel painting and maintenance activities, *Biofouling: The Journal of Bioadhesion and Biofilm Research*, DOI: 10.1080/08927014.2013.841891

California Professional Divers Association (CPDA). 2008. Divers hull cleaning best management practices certification manual. San Diego (CA): California Professional Divers Association.

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Santa Ana Regional Water Quality Control Board

August 15, 2014

Attachment 3

David Duncan, Chief
Environmental Monitoring Branch
Department of Pesticide Regulation
P. O. Box 4015
Sacramento, CA 95812

RE: DETERMINATION OF MAXIMUM ALLOWABLE LEACH RATE AND MITIGATION RECOMMENDATIONS FOR COPPER ANTIFOULING PAINTS PER AB 425

Dear Mr. Duncan,

The Santa Ana and Los Angeles Regional Water Quality Control Boards (Regional Water Boards) appreciate the ongoing dialogue with the Department of Pesticide Regulation (DPR) regarding copper-based antifouling paints (Cu AFPs). The Regional Water Boards and DPR share the same goals to reduce environmental impacts of Cu AFPs and to bring impaired water bodies into compliance with water quality standards. Recently, we have been in discussions regarding the DPR memorandum entitled "Determination of Maximum Allowable Leach Rate and Mitigation Recommendations for Copper Antifouling Paints Per AB 425." The Regional Water Boards understand that DPR has completed its tasks arising from AB 425 and has submitted its determinations.

However, we are receiving feedback from stakeholders that indicates widespread misunderstanding surrounding DPR's maximum allowable leach rate. Specifically, there appears to be a misunderstanding that the maximum allowable leach rate will meet the water quality objectives in large impaired marinas in the Santa Ana and Los Angeles regions. Two of the most impaired marinas in the State, Newport Bay and Marina del Rey Harbor, lie within our regions. We are concerned that stakeholders may misinterpret DPR's maximum allowable leach rate and mitigation recommendations as sufficient to address the Cu AFP-related impairments in these marinas without any additional requirements.

In this letter, the Regional Water Boards seek to clarify our need to bring impaired marinas into compliance with TMDLs and to convey our interest in working with DPR to develop tools that will clearly communicate what DPR's memorandum addresses and does not address, and what additional efforts will be needed to restore water quality in the most impaired marinas in the State. In the following comments, the Regional Water Boards discuss the implementation of DPR's statewide recommendations in our regions, and areas where further assistance from DPR would enhance our efforts.

Implementation of Maximum Allowable Leach Rate

The Regional Water Boards understand that DPR's maximum allowable leach rate is not designed to achieve the dissolved copper TMDL allocations determined to be necessary to meet water quality objectives in the most impaired marinas in southern California. The calculations attached to this letter (Appendix 1) show that the leach rates required to attain the copper allocations assigned by TMDLs for these marinas are similar to those calculated by DPR for scenarios 4 and 5 in DPR's modeling study. DPR has set as a maximum allowable leach rate at the higher leach rate calculated for scenario 2, which is representative of marinas in the 75th percentile in terms of number of boats. Although DPR is fulfilling its statutory mandate to mitigate significant adverse effects in saltwater marinas, this will not be sufficient to achieve water quality standards in the largest marinas in California and additional efforts will be required of local stakeholders, in collaboration with Regional Water Boards and DPR, to achieve dissolved copper TMDLs.

DPR has recommended a second potential maximum leach rate of 13.4 $\mu g/cm^2/day$, which is applicable only under the condition that in-water hull cleaning of these paints is prohibited. The Regional Water Boards are concerned, based on observed boater behavior, that boaters will not refrain from cleaning their boats' hulls, even if this is the recommendation of paint manufacturers. We believe that this recommendation will be difficult to implement and enforce in our regions; therefore, we do not support a higher leach rate for paints that do not require cleaning in the most impaired marinas. We request that DPR, through outreach and other implementing authorities, work with the Regional Water Boards to encourage the use of lower leach rate products and alternative hull coatings.

Communicating Mitigation Recommendations

In conjunction with the maximum allowable leach rate determination, DPR has also provided mitigation recommendations for Cu AFPs. The Regional Water Boards are supportive of mitigation measures and believe such strategies can be effective in reducing discharge from Cu AFPs. The following comments discuss the anticipated improvements in water quality potentially attainable through implementation of mitigation measures.

Hull-Cleaning BMPs

The Regional Water Boards support the use of the California Professional Divers Association's (CPDA) in-water hull cleaning BMPs as a reasonable method to reduce dissolved copper concentrations. However, we also wish to acknowledge that the reduction of copper loading achievable by implementing BMPs may be limited and additional efforts beyond hull cleaning BMPs will be required to achieve TMDLs in the marinas in the Santa Ana and Los Angeles Regions. The Regional Water Boards want to ensure that communications from all State Agencies, including DPR and the Water Boards, are clear when informing stakeholders that such actions may improve water quality but by themselves will not be sufficient to achieve water quality standards without additional measures.

Hull Cleaning Frequency

DPR has recommended the reduction of in-water hull cleaning frequency to no more than once per month. In addition, DPR has employed the assumption of monthly cleaning as an adjustment factor in calculating the maximum allowable leach rate. The Regional Water Boards are supportive of considering all efforts that may reduce copper loading. However, there is uncertainty surrounding the magnitude of reduction in copper loading attainable through reducing hull cleaning frequency and the practicality of implementing such reductions.

Reformulation of existing products

DPR has recommended reformulation of existing products that have leach rates above the maximum allowable leach rate set by DPR per AB 425. The Regional Water Boards are supportive of these reformulations. The Regional Water Boards are also supportive of any efforts by DPR to require the removal of Cu AFPs with leach rates greater than the maximum allowable leach rate from the market. The Regional Water Boards request that DPR develop the shortest possible time schedule for the reformulations.

In addition to the mitigation measures proposed by DPR, the Regional Water Boards request DPR's continued support and encouragement of efforts to pursue the development and sale of nontoxic antifouling paints and the support of incentive programs to convert Cu AFPs on boat hulls to alternative paints.

In summary, the Regional Water Boards request that DPR work in close collaboration with the Water Boards on messaging regarding DPR's maximum allowable leach rate for Cu AFPs to ensure that boaters and other dischargers understand that additional efforts, beyond DPR's maximum allowable leach rate and the use of BMPs, will likely be required to meet TMDLs in water bodies impaired by Cu AFPs.

The Santa Ana and Los Angeles Water Boards appreciate the efforts of the Department of Pesticide Regulation in its Cu AFP reevaluation process. The calculations attached to this letter demonstrate the need to implement low leaching Cu AFPs, hull cleaning BMPs, and further measures to achieve water quality objectives in the Santa Ana and Los Angeles Regions. We look forward to continuing to work together with DPR to identify and implement actions to improve water quality by eliminating copper impairments caused by Cu AFPs.
If you have any questions regarding these comments, please contact Dr. Linda Candelaria at 951-782-4991 or linda.candelaria@waterboards.ca.gov or Shana Rapoport at 213-576-6763 or shana.rapoport@waterboards.ca.gov.

Sincerely,

Kurt V. Berchtold
Executive Officer, Santa Ana Regional Water Quality Control Board

Chief Deputy E.O.
Samuel Unger, P.E. for
Executive Officer, Los Angeles Regional Water Quality Control Board

Attachment: Appendix 1, TMDL Copper Allocations and Leach Rate Calculations

Appendix 1: TMDL ALLOCATIONS and LEACH RATES NEEDED TO MEET COPPER (Cu)TMDLs in Newport Bay, Shelter Island Yacht Basin, and Marina del Rey Harbor (expanded)

The leach rates calculated below are those needed to meet the copper TMDLs in southern California. Leach rate calculations were based on copper allocations for boats in the southern California TMDLs (LR0). In the table below, the LR0s were adjusted for the use of BMPs (LR1) and the use of BMPs plus a reduced cleaning frequency (LR2).

Newport ESTIMATES (using 41.062m^2 hull area)
Cu Allocation for boats
approx 6060lbs/yr ----> approx 2748.8kg/yr ----> 2748.8kg/yr/ 10,000slips ----> 0.275kg/boat/yr
LEACH RATE NEEDED approx 1.83ug/cm^2/d

Shelter Island -R9 (using 35.258m^2 hull area)
Cu input Allocation
2100kg/yr ----> 79% reduction ----> 447kg/yr/ 2363 slips ----> 0.19kg/boat/yr
LEACH RATE NEEDED approx 1.47ug/cm^2/d

Marina del Rey -R4 (using 30.056m^2 hull area)
Cu input
3608.6kg/yr ---->84.6% reduction ----> 557 kg/yr/ 4754slips ----> 0.117 kg/boat/yr
LEACH RATE NEEDED approx 1.07 ug/cm^2/d

**Leach rates based on equations from Newport Bay Toxics TMDL –Appendix1*

$$LR = \frac{\text{allowable Cu load (kg/yr)}}{(\text{boat size})(\#\text{boatslips})(10^{-5}cm^2/m^2 kg/ug)(365d/yr)}$$

The leach rates (LR) determined above were calculated directly from the Cu allocations for boats in the corresponding Cu TMDLs (Newport Bay, Shelter Island, Marina del Rey). These LRs are set as LR_0. The LR_0s were then adjusted upwards to account for 1) the use of BMPs by all (LR_1) and 2) the use of BMPs plus lower cleaning frequencies (LR_2) using the adjustment factors applied by DPR to their LR_0 in Table 6 of DPR's MAMPEC modeling study (table below).

The Regional Boards' LR calculations are based on the allocations needed to meet the TMDLs for each water body, then adjusted upwards to account for BMPs and lower cleaning frequency. (The Cu allocations for boats in the TMDLs are determined from the *loading capacity of the water body.*) In addition, the Cu loading for Newport Bay's Cu TMDL is based on a Cu allocation for the entire Bay, which contains 10,000 boats, rather than specific marinas. The LRs below demonstrate that the maximum allowable LR of 9.5 ug/cm^2/d determined by DPR *will NOT meet the TMDLs even when BMPs and lower cleaning frequencies are factored into the LRs.*

Waterbodies	**LR_0 to meet allocations**	**LR_1 assuming BMPs (max'm 28% reduction in Cu loading over non-BMPs frm DPR model-Table6) ($LR_0 + 0.28LR_0$)**	**LR_2 assuming BMPs + lower cleaning freq. ($LR_1 + 0.20LR_1$)**
Newport Bay	1.83ug/cm^2/d	2.35 ug/cm^2/d	2.82 ug/cm^2/d
Shelter Island	1.47ug/cm^2/d	1.88 ug/cm^2/d	2.26 ug/cm^2/d
MdRey	1.07ug/cm^2/d	1.37 ug/cm^2/d	1.64 ug/cm^2/d

Leach Rates based on calculations in Newport Bay Toxics TMDL
Equations from the Toxics TMDL (USEPA 2002). Additions or revisions to the original calculations are highlighted.

Annual copper load (kg/yr) = P*S*N, and S = L*B*0.85
Where:
P = Passive leaching rate
N = Number of boats
S = Wetted hull surface area = Overall length*Beam*0.85
L = Average length
B = Average beam height

Given:
P = 10 $\mu g/cm^2/day$
N = 10,000 (number of boat slips in Newport Bay)
L = 12.2 m (= 40 ft)
B = 3.4 m
Wetted hull surface area = (Overall length)*(Beam width)*(0.85)
Wetted hull surface area = (12.2 m)*(3.4 m)*(0.85) = 35.258 m^2 (EPA used 35.3 m^2)
(Note that EPA's TMDL had beam "height" –this should be beam "width")

Annual Copper load = (10 $\mu g/cm^2/day$)*(35.258 m^2)*(*10,000* boat slips)*(10,000 cm^2/m^2)*(kg/10^9 μg)(365 day/yr)

Estimates of Copper load from passive leaching in Newport Bay= 12,869.17 kg/year (35,258 g/day)

12,869.17 kg/year x 2.20462lbs/kg = 28371.6 lbs/year

References:
Patrick J. Earley, Brandon L. Swope, Katherine Barbeau, Randelle Bundy, Janessa A. McDonald & Ignacio Rivera-Duarte, Biofouling (2013): Life cycle contributions of copper from vessel painting and maintenance activities, *Biofouling: The Journal of Bioadhesion and Biofilm Research*, DOI: 10.1080/08927014.2013.841891

X. Zhang and N. Singhasemanon. January 31, 2014. *Modeling to determine the maximum allowable leach rate for copper-based antifouling products in California marinas.* Appendix 1 to January 30, 2014 Department of Pesticide Regulation Memorandum: Determination of Maximum Allowable Leach Rate and Mitigation Recommendations for Copper Antifouling Paints Per AB 425.

USEPA. 2002. Total Maximum Daily Loads for Toxic Pollutants, San Diego Creek and Newport Bay, California. U.S. Environmental Protection Agency, Region 9.