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## Santa Ana Regional Water Quality Control Board

August 15, 2014

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 75<sup>th</sup> 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  $\mu\text{g}/\text{cm}^2/\text{day}$ , 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.

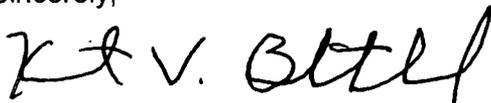
In addition to the mitigation measures proposed by DPR, the Regional Water Boards request DPR's continued support and encouragement of efforts to pursue the development and sale of nontoxic antifouling paints and the support of incentive programs to convert Cu AFPs on boat hulls to alternative paints.

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](mailto:linda.candelaria@waterboards.ca.gov) or Shana Rapoport at 213-576-6763 or [shana.rapoport@waterboards.ca.gov](mailto:shana.rapoport@waterboards.ca.gov).

Sincerely,



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



Chief Deputy E.O.  
for  
Samuel Unger, P.E.  
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<sup>2</sup> 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<sup>2</sup>/d

Shelter Island -R9 (using 35.258m<sup>2</sup> hull area)

Cu input

Allocation

2100kg/yr ----> 79% reduction ----> 447kg/yr/ 2363 slips ----> 0.19kg/boat/yr

LEACH RATE NEEDED approx 1.47ug/cm<sup>2</sup>/d

Marina del Rey -R4 (using 30.056m<sup>2</sup> 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<sup>2</sup>/d

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

LR =  $\frac{\text{allowable Cu load (kg/yr)}}{\text{boat size}(\#\text{boatslips})}$

$(10^{-5} \text{cm}^2/\text{m}^2 \text{kg/ug})(365\text{d/yr})$

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<sub>0</sub>. The LR<sub>0</sub>s were then adjusted upwards to account for 1) the use of BMPs by all (LR<sub>1</sub>) and 2) the use of BMPs plus lower cleaning frequencies (LR<sub>2</sub>) using the adjustment factors applied by DPR to their LR<sub>0</sub> 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<sup>2</sup>/d determined by DPR *will NOT meet the TMDLs even when BMPs and lower cleaning frequencies are factored into the LRs.*

Waterbodies	LR <sub>0</sub> to meet allocations	LR <sub>1</sub> assuming BMPs (max'm 28% reduction in Cu loading over non-BMPs frm DPR model-Table6) (LR <sub>0</sub> + 0.28LR <sub>0</sub> )	LR <sub>2</sub> assuming BMPs + lower cleaning freq. (LR <sub>1</sub> + 0.20LR <sub>1</sub> )
Newport Bay	1.83ug/cm <sup>2</sup> /d	2.35 ug/cm <sup>2</sup> /d	2.82 ug/cm <sup>2</sup> /d
Shelter Island	1.47ug/cm <sup>2</sup> /d	1.88 ug/cm <sup>2</sup> /d	2.26 ug/cm <sup>2</sup> /d
MdRey	1.07ug/cm <sup>2</sup> /d	1.37 ug/cm <sup>2</sup> /d	1.64 ug/cm <sup>2</sup> /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) =  $P \cdot S \cdot N$ , and  $S = L \cdot B \cdot 0.85$

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  $\mu\text{g}/\text{cm}^2/\text{day}$

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  $\text{m}^2$  (EPA used 35.3  $\text{m}^2$ )

(Note that EPA's TMDL had beam "height" –this should be beam "width")

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

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

$$12,869.17 \text{ kg/year} \times 2.20462 \text{ lbs/kg} = 28371.6 \text{ lbs/year}$$

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.