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U.S. Environmental Protection Agency
Ecological Risk Assessment Branch | Health and Ecological Criteria Division
Office of Science and Technology | Office of Water
Attn: Mike Elias | Biologist
1200 Pennsylvania Avenue, NW, Washington, DC 20460

Mr. Elias,

The City of Newport Beach respectfully submits the following comments on the Revised Federal Standards Proposed for Copper in Marine Waters.

Thank you,

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CC: Shelly Anghera, Anchor QEA

Revised Federal Standard Proposed for Copper in Marine Waters Technical Comments

Comment 1: Uncertainty resulting from a single abalone test used to derive the Draft Criteria results in an overly conservative criteria for copper.

The proposed Draft Criteria are ultimately driven¹ by results from a single red abalone toxicity test published in 1989², although data from numerous other saltwater toxicity tests (including 171 saltwater mussel toxicity tests) were compiled and summarized. Using one value to derive criteria does not account for the variability in this abalone species' sensitivity to copper and the influence of water chemistry variability known to affect toxicity test results. Further, this species is only present in cool West Coast waters in or near kelp forest habitats and is not relevant to enclosed-shallow water bays and harbors of California or the Gulf and East Coasts of the United States.

Recommendations:

- Additional abalone data should be collected prior to adoption of the Draft Criteria to provide a more robust and defensible data set, which is needed to provide the scientific basis for the Draft Criteria development. This is a reasonable request as the red abalone is a species approved by EPA for use in marine/estuarine toxicity tests and is commonly used for such purposes³.
- The saltwater BLM should include flexibility for considering different habitat types and regions (e.g., the Gulf, enclosed bays, harbors, saltmarshes, etc.).

Comment 2: Uncertainty associated with normalizing the laboratory-derived toxicity test results to an assumed and un-validated DOC value results in an overly conservative criteria for waters with naturally low DOC.

EPA assumed a DOC concentration of 2 mg/L for all unknown natural seawater test conditions. More than 33% of the mussel toxicity test data were assumed to be tested in water with 2 mg/L DOC, and the single abalone test findings (reported EC₅₀ of 8.8 µg/L) were also assumed to be tested in water with 2 mg/L DOC, even though there were no DOC measurements recorded. The result of the normalization procedure on the toxicity test results is that the actual effects concentrations (i.e., EC₅₀ and LC₅₀ values) are reduced by approximately one half (on average).

For example, the single abalone effects concentration (EC₅₀ = 8.8 µg/L) was reduced to a normalized EC₅₀ of 3.94 µg/L, from which the Draft Criteria were derived. This normalization

¹ Because the criteria seek to protect a representation of the entire population of marine organisms, they can be affected by one or more very sensitive species. In this case, a single test conducted with red abalone resulted in the criteria being "driven" downward.

² Hunt, J.W., B.S. Anderson, S.L. Turpen, A.R. Coulon, M. Martin, F.H. Palmer, and J.J. Janik, 1989. *Experimental evaluation of effluent toxicity testing protocols with giant kelp, mysids, red abalone, and topsmelt*. Division of Water Quality Report No. 89-5WQ.

³ Chapman, G., D. Denton, and J. Lazorchak, 1995. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. U.S. Environmental Protection Agency, Washington, D.C., EPA/600/R-95/136 (NTIS PB96261665). Available from: https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=46584.

procedure is not scientifically justified due to lack of supporting DOC data for many saltwater toxicity tests used in the derivation, and is particularly not appropriate for the single abalone test on which the Draft Criteria are most affected. In California, where the mussels and abalone are native, it is common to have DOC values below 1 mg/L in natural seawater rather than over 2 mg/L. The low DOC is typically measured in dry, summer conditions in temperate regions like Southern California. Consequently, it is likely that toxicity tests with actual, and likely lower, DOC than that assumed by EPA would result in higher normalized effects concentrations and consequently higher Draft Criteria. The effects of this normalization on the resulting adjusted effects concentration is most obvious in the 50 most sensitive species tests.

Recommendations:

- All Granite Canyon and Scripps Pier water quality data inputs should be modified to represent accurate conditions for all tests conducted with these natural seawater sources.
- However, it is preferable that only toxicity tests paired with the actual water quality measurements (including DOC) should be included in the data set that is normalized to DOC to define the acute and chronic criteria using the saltwater BLM.
- The toxicity test data set that is modified by the BLM should only include species and test conditions known to occur in U.S. waters. Currently, the data set includes seawater samples from all over the world, many of which have very high DOC levels; these data are not relevant and further skew the normalization of the effects concentrations.

Comment 3: Uncertainty in calculation of the ACR value results in an overly conservative chronic criterion for copper.

The ACR of 3.022 was calculated as the geometric mean of the genus mean ACRs for five sensitive freshwater genera, *Ceriodaphnia* (3.268), *Daphnia* (4.057), *Oncorhynchus* (3.630), *Acipenser* (5.757), and *Cottus* (2.075), along with the two estuarine/marine genus mean ACRs for *Cyprinodon* (1.475) and *Brachionus* (1.229). Eliminating the freshwater species and using the two marine species to calculate the mean ACR changes the ACR from 3.02 to 1.35. When applied to the current abalone-based FAV of 3.94, it results in a final chronic criterion of 2.92 µg/L. This is a significant difference from the 1.3 µg/L that is currently proposed. This alternate chronic criterion (CCC) is predicted to be higher than the acute criterion (CMC) from the model, further illustrating the overly conservative model-predicted criteria.

Recommendations:

- Chronic criterion derivation should exclude freshwater species ACR data and only the actual values for the two estuarine/marine species should be used.
- Additional paired acute and chronic marine/estuarine toxicity tests should be conducted to support the development of a new, scientifically-based saltwater FACR.

Comment 4: Confirmation that site specific objectives for copper derived through approved USEPA guidance will still be upheld.

It is recognized by USEPA that the national criteria for dissolved metals including those for copper, lead, and zinc may be more or less protective than anticipated, depending on the site specific characteristics including diversity of aquatic life and water quality measurements (i.e., hardness, pH, dissolved organic matter, total suspended particulates, and concentrations of contaminants of concern) (USEPA, 1994). As a consequence, USEPA has developed the Water Effects Ratio (WER) as one of several procedures for deriving a site specific objectives.

Recommendations:

- Please confirm that studies conducted using EPA guidance⁴ will still be supported by the EPA even if the results are not consistent with the revised national copper criteria.

Summary:

If all uncertainties indicated above are removed (i.e., remove single abalone test currently driving the Draft Criteria, normalizing based on more accurate DOC data—or not normalizing at all, and revising the saltwater FACR to a number based only on saltwater species), this would likely result in a lowered FAV similar to that used in 2003 of approximately 6.2 µg/L to protect the commercial Blue Mussel (*Mytilus edulis*), and an acute criterion of 3.1 µg/L (no change from 2003). Additional data would be needed to set and estimate an accurate saltwater FACR and a chronic criterion. Further support that the resulting criteria are overly conservative can be found in that the proposed standard is less than what the State of California considers to be background seawater concentrations for copper (California Ocean Plan⁵), where many of the species being protected thrive. In particular, we believe the Draft Criteria will be most difficult for enclosed bays and harbors, where circulation with ocean water is limited, and in arid regions where naturally low DOC occurs, like Southern California.

⁴ United States Environmental Protection Agency (USEPA). 1994. Interim Guidance on Determination and Use of Water-Effect Ratios for Metals. EPA-823-B-94-001. February.

⁵ State Water Resources Control Board, 2012. *California Ocean Plan. Water Quality Control Plan. Ocean Waters of California*. Effective August 19, 2013. Adopted October 16, 2012. Resolution No. 2012-0056. Available from: http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/cop2012.pdf.