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March 1, 2004

Attention Docket ID OW-2003-0079  
Water Docket  
Environmental Protection Agency  
Mailcode MC-4101T  
1200 Pennsylvania Ave, NW  
Washington, D.C. 20460  
OW-Docket@epa.gov

VIA ELECTRONIC MAIL

RE: COMMENTS ON THE PROPOSED 304(A) CRITERIA FOR  
COPPER

Dear Sir or Madam:

The Association of Metropolitan Sewerage Agencies<sup>1</sup> (AMSA or the Association) appreciates the opportunity to provide scientific views on the U.S. Environmental Protection Agency's (EPA or the Agency) proposed revision of the aquatic life criteria for copper.

Tasked with meeting National Pollutant Discharge Elimination System (NPDES) permit limits based on water quality criteria, oftentimes with little control over what enters the treatment plant, AMSA members have a vested interest in ensuring that all criteria are based on sound science. AMSA and its members have closely followed efforts by the Water Environment Research Foundation and EPA to develop the biotic ligand model (BLM) and to incorporate the BLM approach into the criteria derivation process. AMSA supports EPA's revision of the freshwater copper criteria to incorporate the BLM, but believes EPA's proposed revision to the existing saltwater criteria is not defensible.

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<sup>1</sup> Founded in 1970, AMSA represents the interests of nearly 300 of the nation's publicly owned treatment works (POTWs). These member POTWs serve the majority of the sewered population in the United States and collectively treat and reclaim over 18 billion gallons of wastewater every day.

Given the significant concerns AMSA has with the proposed saltwater criteria, the compliance issues that would result from the adoption of the criteria, and the potential for using the BLM to derive more realistic saltwater criteria, AMSA believes that EPA should not finalize the proposed saltwater criteria revisions. AMSA believes that EPA should decouple the saltwater criteria revisions from the freshwater, BLM-based criteria, finalize the freshwater criteria as soon as possible, and expeditiously work to complete and promulgate a saltwater, BLM-based copper criterion. AMSA's scientific views and concerns are outlined below.

### **BLM Approach Should Be Applied to Freshwater and Saltwater Criteria**

AMSA strongly supports EPA's proposal to use the BLM to derive the freshwater criteria for copper. The freshwater BLM model and the underlying chemical speciation model have undergone extensive peer review and have proven to represent the latest scientific knowledge on both the speciation of copper ions and complexes and the relative toxicity of those various copper complexes. The incorporation of the BLM approach into the water quality criteria derivation process is a major step forward in addressing one of the most serious technical limitations of the current approach for addressing aquatic metal toxicity – the use of total or dissolved measurements as the indicator of metal toxicity in aquatic ecosystems.

Research on the freshwater BLM, along with several saline water effects ratio (WER) studies around the country (New York Harbor; Elizabeth River, Virginia; San Francisco Bay) have clearly shown that measurements of dissolved copper alone are not adequate to assess copper toxicity in fresh and saline waters. Rather than relying simply on hardness to predict the availability of dissolved copper and therefore determine the final criteria, the BLM makes site-specific predictions of toxicity based on nine model inputs, including pH, dissolved organic carbon (DOC), and alkalinity, resulting in a more realistic final criteria value. Of course, the water effects ratio (WER) process has been available to dischargers willing and able to conduct the studies necessary to develop these site-specific criteria, but the BLM packages the relationships among these nine parameters into a single model that can be run with significantly less effort and resources.

AMSA believes that the Agency may receive adverse comments on its proposal to use the BLM approach that raise the issue of particulate copper and the effects that particulate copper might have on aquatic toxicity. However, studies to date demonstrate that particulate copper is not causing water quality problems and that current control regulations are sufficient to protect freshwater systems from particulate copper.

AMSA believes that use of the BLM is a critical step toward improving the science underlying water quality criteria and urges EPA to finalize its proposed revisions to the freshwater criteria for copper as soon as possible. AMSA understands from communication with participants in the effort to develop the freshwater BLM and EPA personnel that there is no reason to believe that the BLM approach could not work for saltwater or estuarine environments. AMSA understands that the primary roadblock to proposing a saltwater BLM is the lack of adequate toxicity data. Given the concerns AMSA has with the proposed saltwater criteria revisions (see

below) and the potential to apply the BLM to saltwater environments, AMSA encourages EPA to decouple the saltwater criteria revisions from the freshwater, BLM-based criteria, finalize the freshwater criteria as soon as possible, and expeditiously work to complete and promulgate a saltwater, BLM-based copper criterion.

### **Proposed Saltwater Criteria Are Not Scientifically Defensible**

AMSA and other stakeholders are concerned with the proposed saltwater criteria because much of the additional data underlying them were generated as part of several WER studies using *Mytilus*, which is the most sensitive saltwater species in EPA's database. These data reflect sensitivities found only in the cleanest (low DOC, for example) lab water attainable, as required of a WER study. This is also likely true of the data on the purple sea urchin, which has the 4th most sensitive saltwater genus mean acute value (GMAV) in EPA's database. Further, WER data where the total organic carbon (TOC) or total suspended solids (TSS) of test water is less than 5 ppm was not used as allowed in EPA's 1985 *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses (Guidelines)*. The magnitude of the *Mytilus* and sea urchin GMAVs used in the criteria document, therefore, over-predict toxicity of copper in near shore coastal and estuarine waters due to the absence of complexing ligands in the test dilution water. The saltwater Final Acute Value (FAV), Criteria Maximum Concentration (CMC), and Criteria Continuous Concentration (CCC) are significantly influenced by these data since the GMAVs of the four most sensitive species (as well as the total number of GMAVs) drive the FAV calculation. In this case, the CMC and CCC are a direct function of the FAV.

As noted above, the proposed saltwater criteria do not represent the toxicity of copper in most natural waters, near shore coastal and estuarine waters in particular. These criteria overestimate the potential for copper toxicity in these natural waters due to the lack of organic and inorganic ligands in the water used to conduct the tests driving the criteria. These technical problems with the saltwater copper criteria will needlessly exacerbate current efforts to reduce water impairments. Copper concentrations in many estuarine and near shore coastal areas, particularly those in proximity to urban areas, currently exceed these proposed criteria. However, there is no evidence to suggest that copper toxicity is currently a problem for these waters. The proposed revision will, therefore, result in many more waters being listed for copper impairment unnecessarily.

With the listing of an impaired waterbody comes a total maximum daily load and further pressure on POTWs to meet the criteria, which are inherently impossible to meet due to domestic sources of copper that cannot be controlled by POTWs. Current pretreatment programs are effectively limiting the controllable *industrial* copper contributions, but for many communities the industrial contribution accounts for only a small portion of the total influent copper and the major contributions from domestic sources would prevent POTWs from being able to comply.

#### *Lack of Sufficient Saltwater Chronic Data*

The criteria document uses a single saltwater chronic test (sheepshead minnow) to derive the saltwater CCC. Although this appears to meet the requirements of the *Guidelines*, these *Guidelines* also state that the single saltwater test must be for an acutely sensitive saltwater species. The sheepshead minnow is very acutely insensitive based on its proposed ranking of 31 out of 44 GMAVs in the criteria document. EPA acknowledges in the "Introduction" that it has published copper criteria in several forms over the past 20 years. However, in that 20 year period, EPA has not completed a single chronic saltwater test with copper meeting the requirements of the 1985 *Guidelines* for calculating a saltwater CCC to complement the single value in hand or to fill the data gap existing. Given that the sheepshead minnow provided the lowest acute-chronic-ratio (ACR) of 10 ACRs calculated in Table 2c, one could conclude that the copper ACR for saltwater organisms is different than that of freshwater organisms without more information. EPA has been aware of this possibility for a minimum of 15 years, yet no additional data has been generated. AMSA believes that EPA would need to conduct a chronic saltwater test with another taxonomic group that is acutely sensitive to copper and meets the requirements of the 1985 *Guidelines* for calculating a saltwater CCC before it could finalize the proposed saltwater criteria.

#### *Substitution of Mytilus GMAV for FAV*

The document indicates that the GMAV<sup>2</sup> for *Mytilus edulis* is used as the FAV to protect this commercially important species. The *Guidelines* state that "If for a commercially or recreationally important species the geometric mean of the acute values from flow-through tests in which the concentrations of test material were measured is lower than the calculated Final Acute Value, then that geometric mean should be used as the Final Acute Value instead of the calculated Final Acute Value." The data that were used to calculate the GMAV for *Mytilus* were not based on flow-through tests. EPA clearly made a distinction in the *Guidelines* that the GMAV for FAV substitution should only be made when the data was of the highest quality (from flow-through tests and measured). Therefore, EPA's recommendation to substitute the *Mytilus* GMAV for the calculated FAV is not supported by EPA's 1985 *Guidelines*. The FAV should be calculated using EPA's standard approach given considerations for geography and taxonomic distribution.

#### *Table 2c, Acute-Chronic Ratios*

The contents of this table raise questions as to the reliability of the final acute-chronic ratio (FACR) used in this document. Examples include:

- The *C. dubia* acute values cannot be reproduced from Table 1, and for footnote "b" the document does not define which five values from Belanger et al. 1989 were used;
- The *O. mykiss* acute value is not in Table 1;
- The *O. tshawytscha* acute value does not represent a geometric mean of values in Table 1 and cannot be found in Table 1.

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<sup>2</sup> The GMAV for *Mytilus edulis* was reported inaccurately. The value is actually 6.386 ppb. The resulting CMC and CCC would need to be adjusted accordingly before finalizing the criteria.

It is not known whether these observations are errors in the table or simply insufficient information was provided in the document for reviewers to determine the reliability of all information in the table. AMSA believes that EPA would need to revisit this table and provide text outlining more specifically the origin and derivation of all information presented in the table before the Agency could finalize the proposed saltwater criterion.

#### *Saltwater CCC Calculation*

AMSA believes that:

- The *Mytilus* GMAV cannot be substituted for the FAV;
- There is no provision in the 1985 *Guidelines* to divide the GMAV for a commercially or recreationally important species by the FACR to derive the CCC;
- Saltwater organism ACRs may be different from that of freshwater organisms;
- The acute test used to develop the sheepshead minnow ACR was not a flow through test and therefore can not be used to develop an ACR according to the *Guidelines*;
- A chronic saltwater test that meets the *Guidelines* is not available; and
- A CCC derived from a FAV based on 30-40 GMAVs is likely much more sound, defensible, and representative of species sensitivities than that based on a single GMAV.

The proposed saltwater CCC is not defensible and should not be finalized. Too much uncertainty has been introduced in the proposed CCC calculation for the resulting CCC to be used as the basis for legally enforceable water quality standards.

Given these significant concerns with the proposed saltwater criteria, the compliance issues that would result from the adoption of the criteria, and the potential for using the BLM to derive more realistic saltwater criteria, AMSA believes that EPA should not finalize the proposed saltwater criteria revisions. As mentioned earlier, AMSA believes that EPA should decouple the saltwater criteria revisions from the freshwater, BLM-based criteria, finalize the freshwater criteria as soon as possible, and expeditiously work to complete and promulgate a saltwater, BLM-based copper criterion.

#### **Other Significant Comments**

##### *Retain WER Procedure*

Although EPA has developed a freshwater BLM for copper, EPA should continue to make the WER procedure available to states and the regulated community in case variables not addressed in the current BLM are found to influence copper toxicity on a site-specific basis. The BLM represents the latest scientific knowledge available, but more may be learned in the coming years about other factors driving copper toxicity – much in the same way that the BLM theory came to be accepted over the theory that copper toxicity was predominantly mediated by hardness. Retention of the WER approach will best serve all interests.

#### *Nominal corrections*

Although EPA has developed guidance on the topic, and, their impact on the current criteria document (as written) is marginal, the use of dissolved-to-nominal ratios derived from a single lab does not seem appropriate for transforming the results of tests from other labs where test concentrations were not measured. Nominal concentrations are a function of who prepares the dilutions, stock solution accuracy, equipment used to prepare dilutions, tools used to measure dissolved concentrations, etc. Many tests in the copper WQC document were conducted by labs other than those used in the New York/New Jersey Harbor Study (where the nominal correction factor was derived) and some were conducted as many as 25 years ago. This is a poor attempt at validating nominal test data for use in developing WQC. EPA recognizes that the quality of test data based on nominal test concentrations is significantly less than that of tests in which the concentrations were measured. This approach makes use of inappropriate assumptions and results in conclusions of unacceptable uncertainty. For example, it is difficult to explain why the dissolved-to-nominal ratio is less than 1.0. Random variability would produce an average ratio of approximately 1.0. EPA's ratio infers that the methods used to prepare dilutions in the New York/New Jersey Harbor Study (and all other labs) were biased low, but one can not conclude the same of all labs at all times without significantly more information.

#### *East Versus West Coast Saltwater Criteria*

The data used to calculate the saltwater FAV clearly show significant differences in *Mytilus* sensitivity between east and west coast species of the United States. Further, other species driving the FAV calculation (four most sensitive species) are only found on either the east or west coasts (*S. purpuratus*, *C. gigas*). The FAV for an East Coast criterion would approach 15 ug/l; the current calculated FAV is 6.2 ug/l. If EPA decides not to decouple the saltwater and freshwater criteria, AMSA recommends that EPA, prior to finalizing the criteria, either calculate separate criteria for each coast or recognize these issues in the text of the criteria document and recommend that states consider such factors prior to promulgation.

#### *Estuarine Versus Oceanic Criteria*

The data used to calculate the saltwater criteria are partially driven by data for the summer flounder, *P. dentatus*. *P. dentatus* eggs are released and develop in offshore environments where salinities are high and juveniles develop in lower salinity estuarine waters. Therefore, data representing the sensitivity of *P. dentatus* embryos should not be used to derive criteria for estuarine waters when data for juveniles is available. A FAV for eastern estuarine waters would approach 20 ug/l if these adjustments (as well as those discussed above) were made; the current calculated national FAV is 6.2 ug/l. Given significant differences in sensitivity between early embryonic and juvenile life stages and that the vast majority of wastewater discharges required to comply with the criteria occur in estuarine waters, AMSA recommends that EPA, if it decides not to decouple the saltwater criterion, either calculate separate criteria for estuarine and marine waters or recognize this issue in the text of the criteria document and recommend that states consider this fact prior to promulgation.

#### *Use of IC20 in Chronic Tests*

Although AMSA supports the use of point estimates when interpreting toxicity test data, there is no information provided in this document justifying selection of the IC20 as the equivalent of the chronic value. The chronic value has historically been calculated as the geometric mean of the no-observed-effect concentration (NOEC) and the lowest-observed-effect concentration (LOEC). In fact, EPA's own *Technical Support Document for Water Quality-Based Toxics Control* (March 1991) concludes that the NOEC is equivalent to the IC25. If this is true, and the chronic value is greater than the NOEC, the chronic value cannot be equal to the IC20. States use both numeric water quality standards and whole effluent toxicity (WET) tests to regulate discharges under their respective National Pollutant Discharge Elimination System (NPDES) programs. Potential for disagreement in conclusions regarding surface water impact is increased by using different effect levels with each regulatory tool. Additionally, EPA's Guidance, *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program* (June 2000), shows that the difference between controls and a treatment must be greater than 30% on average for 90% of the lab tests to measure a statistical difference. Since EPA uses the ability to detect differences from controls as its criterion for selecting an IC value in this document, there is little justification for using the IC20 to define chronic test results. Selection of an IC value for this effort must address lab and test capability as well as biological significance. EPA's adoption of the IC20 in this document should be reconsidered and better justified.

#### *Availability of 40 CFR Part 136 Procedures*

Currently there are only three EPA procedures approved for use in the NPDES program for measuring copper in water samples. The most sensitive of these three procedures, EPA 220.2 has a published method detection level (MDL) of 1 ppb and is recommended for use in the 5-100 ppb range. The saltwater criteria, as proposed, range from 1.9-3.1 ppb. Permittees are, therefore, without a promulgated method to determine compliance with these criteria once adopted as water quality standards even though the NPDES regulation requires those permittees to only use a promulgated method if available. Promulgated procedures are available but are clearly incapable of providing quantifiable results appropriate for reporting on a discharge monitoring report (DMR) or for conducting reasonable potential determinations or limit development. EPA must provide promulgated procedures that are capable of producing reliable data at the concentration of criteria before those criteria can be finalized.

Again, AMSA supports EPA's revision of the freshwater copper criterion to incorporate the BLM, but questions the defensibility of the proposed revision to the existing saltwater criteria. AMSA recommends that EPA decouple the saltwater criteria revisions from the freshwater, BLM-based criteria, finalize the freshwater criteria as soon as possible, and expeditiously work to complete and promulgate a saltwater, BLM-based copper criterion.

AMSA appreciates the opportunity to provide these scientific views and is available to meet with EPA representatives to discuss resolution of these issues. If you would like to discuss these comments further, please contact me at 202/833-9106.

AMSA Comments on Copper Criteria

March 1, 2004

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Sincerely,

A handwritten signature in black ink, appearing to read "Chris Hornback". The signature is written in a cursive style with a large initial "C".

Chris Hornback

Director, Regulatory Affairs