



December 12<sup>th</sup>, 2013

Geotechnical  
Environmental  
Water Resources  
Ecological

Denise Ruzicka, Director  
Connecticut Department of Energy and Environmental Protection  
Bureau of Water Protection and Land Reuse  
79 Elm Street  
Hartford, CT 06106-5127

**Re: Proposal to Support the Use of Biotic Ligand Model for Copper Aquatic Life Criteria in Connecticut**

Dear Ms. Ruzicka,

We would like to participate in the Connecticut Department of Energy and Environmental Protection (DEEP) triennial review of surface water quality standards on behalf of our client, the International Copper Association and Copper Development Association (ICA/CDA). ICA/CDA played a significant role in sponsoring scientific research used in development of the freshwater Biotic Ligand Model (BLM) for copper, which was adopted by the United States Environmental Protection Agency (USEPA) in its latest national ambient water quality criteria (USEPA 2007). ICA/CDA is now interested in encouraging efforts by states and tribes to incorporate these latest recommended USEPA national criteria for copper into their water quality standards programs.

It is our understanding that the DEEP is conducting its Triennial Review of water quality standards and is currently accepting stakeholder comments until December 16<sup>th</sup>, 2013. Thus, the purpose of this letter is to urge the DEEP to consider including in its updates the option to use the BLM to calculate aquatic life criteria for copper, as currently recommended by USEPA.

Connecticut's current aquatic life criteria for copper are fixed values based on statewide reference conditions (i.e., acute and chronic = 14.3 and 4.8  $\mu\text{g Cu/L}$ , respectively). In addition, Connecticut has site-specific standards (i.e., acute and chronic = 25.7 and 18.1  $\mu\text{g Cu/L}$ , respectively) for several streams based on the water-effect ratio approach that apply to several streams. While use of statewide reference condition values is a conservative approach that would be expected to protect Connecticut's aquatic life, it excludes a substantial body of peer-reviewed scientific literature demonstrating that modifying factors can and should be incorporated into regulatory benchmarks or standards, while providing the same levels of aquatic life protection required under the Clean Water Act (USEPA 1985, 1994, 2001, 2007). Like most metals, copper toxicity is a function of its bioavailability, which in addition to being controlled by hardness, is also strongly related to other important factors such as dissolved organic carbon (DOC), alkalinity, pH, and temperature. The key strength of the BLM is that it accounts for

multiple factors—in addition to hardness—that mitigate or exacerbate copper's toxic effect on aquatic life. The BLM could be used in Connecticut to develop protective state-wide copper standards as well as update the site-specific standards, which currently only apply to a limited number of effluent-influenced streams. Additionally, the development of site-specific standards using the BLM offer considerable cost savings compared to traditional water-effects ratio studies. While Connecticut acknowledges the mitigating factors of copper toxicity in natural waters (e.g., using the water-effects ratios for site-specific standards), we strongly recommend that the BLM be considered for development of water quality criteria, as it is a more realistic and accurate means of predicting copper bioavailability and toxicity.

Similar to copper, BLMs have been developed, validated, and are available for regulatory use for several other metals, including zinc, lead, nickel, and cadmium. While EPA has yet to develop formal recommended national ambient water quality criteria using BLMs for these other metals, the models are widely available and are being applied in regulatory programs in several European countries and Canada. ICA/CDA fully supports and shares their desire to move towards bioavailability models such as the BLM as being the current state of both scientific and regulatory practice.

There also are practical advantages for using the BLM; it is a cost effective regulatory tool compared to other site-specific toxicity test procedures (e.g., water-effect ratios), and the BLM software is publicly available, sanctioned by USEPA, and requires only brief training to generate rapid and useable output. Therefore, BLM-based criteria provide a practical means of deriving demonstrably more accurate levels of aquatic life protection across a broad range of water quality conditions.

Please let us know how we can assist the DEEP in its consideration of the BLM during this review. GEI or ICA/CDA could help in a variety of ways, including preparation of written or oral testimony supporting the technical basis of the BLM, or providing guidance on application of the BLM to water quality criteria and what type of implementation approach would best fit your available datasets. ICA/CDA has also sponsored BLM training sessions over the past several years, and they have been well-attended by both regulators and the regulated community. If desired, it may be possible to provide this course or related education materials if you would find that helpful as a means of helping inform the public and stakeholders as to the basis and application of the BLM.

We appreciate the opportunity to provide you with this prospective proposal. Please let us know if you have any questions. We look forward to discussing this with you further.

Sincerely,

GEI CONSULTANTS, INC.



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RWG

cc: Joe Gorsuch, CDA  
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Eric Van Genderen, International Zinc Association

## References

- U.S. Environmental Protection Agency (USEPA). 1985. Guidelines for deriving numerical national water quality criteria for the protection of the aquatic organisms and their uses. PB85-227049, U.S. Environmental Protection Agency, Washington, DC.
- U.S. Environmental Protection Agency (USEPA). 1994. Interim guidance on determination and use of water-effect ratios for metals. EPA-823-B-94-001, U.S. Environmental Protection Agency, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2001. Streamlined water-effect ratio procedure for discharges of copper. EPA-822-R001-005, U.S. Environmental Protection Agency, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2007. Aquatic Life Ambient Freshwater Quality Criteria – Copper. EPA-822-R-07-001. U.S. Environmental Protection Agency, Washington, D.C.