

September 14, 2005

**COMMENTS OF THE UTILITY WATER ACT GROUP
FOR THE SEPTEMBER 21, 2005 MEETING
OF THE SAB AQUATIC LIFE CRITERIA
GUIDELINES CONSULTATIVE PANEL
70 Fed. Reg. 51,354 (August 30, 2005)**

These comments of the Utility Water Act Group (UWAG)¹ are intended to highlight, in summary fashion, a few key ideas and problems that the SAB Consultative Panel and EPA will have to take into account in revising EPA's guidelines for setting aquatic life water quality criteria.

1. The guidelines for aquatic life criterion need to be revised, and EPA's attempt to account for the current level of scientific understanding is commendable

UWAG is supportive of EPA's interest in incorporating sound science into the setting of aquatic life water quality criteria in a way that takes into account, at least partly, the complexities of aquatic species' response to water pollutants. We are in favor, as a general matter, of setting

¹ UWAG is an association of 203 individual electric utilities and four national trade associations of electric utilities, the Edison Electric Institute, the National Rural Electric Cooperative Association, the American Public Power Association, and the Nuclear Energy Institute. The individual utility companies operate power plants and other facilities that generate, transmit, and distribute electricity to residential, commercial, industrial, and institutional customers. The Edison Electric Institute is the association of U.S. shareholder-owned electric companies, international affiliates, and industry associates. The National Rural Electric Cooperative Association is the association of nonprofit electric cooperatives supplying central station service through generation, transmission, and distribution of electricity to rural areas of the United States. The American Public Power Association is the national trade association that represents publicly owned (municipal and state) electric utilities in 49 states representing 16 percent of the market. The Nuclear Energy Institute establishes industry policy on legislative, regulatory, operational, and technical issues affecting the nuclear energy industry on behalf of its member companies, which include the companies that own and operate commercial nuclear power plants in the United States, as well as nuclear plant designers and other organizations involved in the nuclear energy industry. UWAG's purpose is to participate on behalf of its members in EPA's rulemakings under the CWA and in litigation arising from those rulemakings.

criteria in appropriate cases (like mercury and selenium) on a fish tissue concentration basis. We are also in favor of distinguishing among different taxa in setting criteria.

The documents for the September meeting of the SAB Consultative Panel contain other sound ideas as well. For example, EPA is considering density-dependent modeling, which is preferred over density-independent modeling.

2. Ecological risk assessment, if not used carefully, may merely substitute “default” values for real data

Using a “risk assessment” approach to water quality criteria is a sound idea. However, the agency’s proposed use of the ecological risk assessment principles carries with it a potential problem. Risk assessments typically involve the use of many “default” values where data are lacking. These default values are always conservative, sometimes to an extreme. The compounding of numerous conservatisms can make the resulting risk calculation hopelessly unrealistic.

3. For tissue-based criteria, EPA needs to focus on what form of pollutant is bioavailable

When formulating tissue-based criteria, EPA needs to consider, for example, that many organic chemicals and some metals are sequestered in non-target tissues and thereby rendered biologically inert. If tissue-based criteria rely on measures of *total* pollutant, they may be overconservative. This is a difficult issue to address, because analytical procedures that distinguish between active and inactive pollutant forms in tissues are complex and not always available. Even so, tissue-based criteria are better than water column criteria, because they measure a sort of “body burden” that the animal has actually accumulated. However, there is a need to develop better dose-response relationships for a “body burden” to be meaningful in the context of its ecological significance.

Tissue-based criteria have both advantages and disadvantages. One advantage is that they make it unnecessary to use a conservative bioaccumulation factor or to make assumptions about pollutant solubilities to determine how much a pollutant actually enters an organism. This is important in setting criteria for selenium, for example.

But there are also disadvantages. Analyzing fish tissues for a pollutant does not tell us where that pollutant originated. Fish move around and are exposed to many sources of pollutants. EPA needs to consider how to address this issue. Experience has shown that it is not satisfactory to use “translators” to convert tissue concentrations to water column concentrations.

4. A number of important concepts are difficult to quantify

EPA refers to the “quality and health of aquatic organisms” as well as other intangible properties. The sustainability, resiliency, diversity, structure, function, productivity, stability, and composition of aquatic communities and ecosystems are also mentioned.

These are difficult concepts to quantify. It is also difficult to distinguish between normal variability within a population and variability caused by anthropogenic chemicals. Evidently EPA plans to use models to address these issues, but the ecological relevance of the models to be used should be carefully reviewed.

5. Extrapolating from biological measures to population effects is difficult

EPA notes the uncertainty in extrapolating across levels of biological organization, and everyone can agree that this is an important issue. In particular, extrapolating from biochemical measurements to population effects is a giant leap fraught with potential problems. For example, just because a pollutant reduces the liver enzyme function of a fish does not mean it will affect the fish’s reproductive capacity or the overall dynamics of the fish population. Research with Ohio River fish populations has demonstrated that natural variability caused by weather and

temperature extremes (for example, flooding) has often had a more dramatic effect on the fish populations than pollutants.

6. The emphasis should be on protecting populations, not individual organisms

There is mention of biochemical markers in the EPA “overview” document, as well as other references to effects on individual organisms. UWAG is concerned that EPA may focus too much on individual organism effects without adequately linking them to population, community, and ecosystem-level effects. The criteria should be designed to protect populations, not individuals.

EPA makes reference to an “unacceptable reduction in population.” But how exactly is an “unacceptable” reduction to be defined? Fortunately, EPA indicates that it prefers a relative measure of toxic impairment of a species, meaning that it favors comparing toxicant-exposed populations to reference populations rather than relying on absolute measures like positive or negative population growth. The problem with this approach is that there can be statistical differences between two populations that are not ecologically relevant. As long as two populations are growing, it may not matter that the growth in one population is slower than in the other. For example, Figure 4 on page 19 of the paper on water-based criteria compares the exponential growth of two populations. EPA notes that the two populations diverge from each other by tenfold every six to seven years, yet it can be seen that both populations are still increasing over time. Here the statistical difference between the two populations does not suggest a problem. EPA will need to explain how it will define “unacceptable” declines in organism populations before its methodology can be supported.

7. Independent applicability needs to be addressed

In the overview document and the paper on water-based criteria we find no mention of “independent applicability.” EPA should give some attention to how decisions will be made

when one type of criterion suggests there may be a water quality problem while other measures show the contrary.

Tissue-based criteria are a good example of how a water-column criteria might be failed, and yet fish might not have accumulated a toxic dose of the pollutant, as shown by the tissue criterion. As another example, what if chemical-specific and whole effluent toxicity (WET) testing criteria are failed, but population-level studies indicate no problem? Although the guidelines for setting criteria may not be the place to deal with this issue, eventually EPA should provide for a weight-of-the-evidence approach that would allow judgments to be made when different measures of water quality give disparate results for the same waterbody.

8. Kinetic-based toxicity modeling needs to be used with discrimination

In the water-based criteria proposal, kinetic-based toxicity modeling and life-stage population modeling are proposed. Both are good concepts. But it is probably not possible to do such modeling for every species and every chemical of concern.

UWAG members have done such modeling of the Ohio River fish populations. For example, one company did an age and growth study on several common species in the Ohio River, such as freshwater drum, gizzard shad, white bass, and bluegill. The company also did population modeling of these species using a Leslie Matrix model. Such a model requires the population to be divided into age classes based on the length of the fish. In addition, the study required estimates of survival and fecundity for each age class. The researchers found that much of the needed information was not available for these common species, let alone for individual age classes. The problems will be much greater if EPA conducts modeling on a variety of lesser known species.

9. Relying on surrogate populations is a concern

EPA makes references to using surrogate populations to establish revised criteria. Fish can respond differently to different toxicants, and these responses can differ between fish species. EPA cannot view “fish” as a generic population but needs to recognize that there are differences among species. For this reason, reliance on surrogate populations is a source of concern. It is important that any new or revised criteria not be based *solely* on surrogate populations.