UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

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OFFICE OF
THE ADMINISTRATOR
SCIENCE ADVISORY BOARD

EPA-SAB-DWC-COM-92-004

Honorable William K. Reilly
Administrator
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Re: Drinking Water Committee (DWC) Commentary on the Disinfection By-Product Regulatory Analysis Model (DBPRAM)

Dear Mr. Reilly:

At our meeting on February 11-12, 1992, the Drinking Water Committee (DWC) of the Science Advisory Board was briefed by EPA Staff on a computer model they are developing to compare microbial risk with chemical risk as part of the Agency's regulatory process for disinfection and disinfection by-product (D/DBP) regulations. The Committee believes that the development of the Disinfection By-Product Regulatory Analysis Model (DBPRAM) is a worthwhile effort and encourages its development for use in evaluating the economic and drinking water quality impacts of various regulatory strategies. We believe, however, that the model is at such a preliminary stage of development that its use in the regulatory process is not appropriate at this time. We, therefore, recommend that it not be a part of the upcoming draft D/DBP regulation.

The DBPRAM includes many of the issues appropriate to the evaluation process. We note, however, that the model is extremely complex and contains so many data gaps and unvalidated assumptions that its use at this stage of development in regulatory decision making must be seriously questioned. Field studies and laboratory research directed at filling gaps, reducing uncertainties in these estimates, and providing a solid foundation for assumptions upon which a scientifically robust model can be built are critical needs. Some specific concerns are as follows:

a. Critical data such as source water bromide levels and ozonation induced bromate levels are essential model inputs, especially since more and more utilities are turning to this method of disinfection. Data on the formation of non-trihalomethane (THM) by-products, particularly brominated analogs, are required because individual maximum contaminant levels (MCL) are being considered. Without such data, potentially significant hazards could be overlooked.

b. Currently, available data on viability, human infectivity and infectious dose are needed to estimate the microbial risks of *Cryptosporidium* and to present a complete analysis. We recognize that this will be even more difficult than for *Giardia*.

c. The model should consider the seasonality of disinfection requirements (cold temperature requires high levels of disinfection) and disinfection by-product formation (high temperatures and spring/summer organic loadings favor DBP formation). Many utilities currently use alternate seasonal treatment strategies. The decay of chlorine in the distribution system has an important impact on the required disinfection conditions and good data do not seem to be available to adequately model this impact.

d. The available model inputs are heavily weighted against chlorination because by-product formation for this procedure is better understood than it is in the case of alternative disinfectants. Additionally, we are concerned that the Agency's default assumptions on cancer risk assessment for chlorination by-products may greatly overestimate the actual cancer risks associated with chlorination by-products that are being considered for regulation.

We have supported, and continue to support, the need for research necessary to further the development of this model and the regulatory process. Aggressive research is essential to guide regulatory decision making, particularly considering the competing goals of microbial and DBP control. Once sufficient information is developed to provide reliable inputs, the model must be calibrated and validated against field data before it is used in the regulatory process.

Because the DBPRAM is at such a preliminary stage of development, contains so many uncertainties, and is unvalidated at this time, the Committee recommends that it not be

a part of the upcoming draft D/DBP regulation. Instead, we recommend that the draft regulation contain a discussion of the purpose of the DBPRAM, a general discussion of its form and desired outputs, as well as a request for suggestions, data and recommendations from the public concerning the model. The inclusion of a specific list of data gaps or research needs, or both, would also be useful. In addition, we recommend that EPA continue to interact with user groups such as the American Water Works Association (AWWA), and others, to obtain additional input and refine the DBPRAM until it is ready for dissemination to the public.

Concern over the Agency use of models is broad-based. This Commentary is another in a series of recent Science Advisory Board reports that express concern over modeling issues. For example, in 1991, the Environmental Engineering Committee (EEC) reviewed the usage of computer models in hazardous waste and superfund programs (EPA-SAB-EEC-91-016). The Drinking Water Committee reviewed the VIRALT model for simulating transport and fate of viruses in ground water - our report is presently undergoing final review. The Radiation Advisory Committee (RAC) recently issued a Commentary on radionuclide transport models (EPA-SAB-RAC-COM-92-003).

We appreciate the opportunity to participate in meaningful discussion with Agency Staff at an early stage in this process, and look forward to continuing our work with EPA Staff in their efforts to develop appropriate drinking water regulations. Based on the scientific and technical issues raised in our discussion with the Agency Staff, we would consider a formal review of the model at a later date. In the interim, we look forward to your response to this Commentary.

Sincerely,

Raymond C. Loehr

Ray Loehr, Chair
Executive Committee
Science Advisory Board

Verne Ray

Verne Ray, Chair
Drinking Water Committee
Science Advisory Board

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