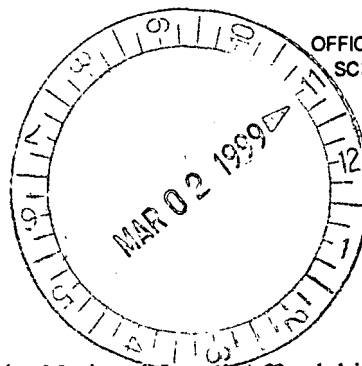


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

December 21, 1998

EPA-SAB-DWC-ADV-98-001

The Honorable Carol Browner  
Administrator  
United States Environmental Protection Agency  
401 M Street, SW  
Washington, DC 20460



OFFICE OF THE ADMINISTRATOR  
SCIENCE ADVISORY BOARD

Subject: An SAB Advisory on the National-Level Affordability Criteria and Technologies for Small Systems Under the 1996 Amendments to the Safe Drinking Water Act

Dear Ms. Browner:

This Advisory was developed by the Drinking Water Committee (DWC) of the Science Advisory Board (SAB) in response to an interaction with Agency representatives at a meeting on June 19, 1998. The Agency's substantial efforts and progress in developing these criteria are apparent in the draft report that was provided to the Committee, entitled, *National-Level Affordability Criteria Under the 1996 Amendments to the Safe Drinking Water Act (Revised Draft Report dated April 30, 1998)*. This Advisory provides a series of comments that the SAB feels are important to the success of the Agency's efforts to select and explain its affordability criteria.

## 1. BACKGROUND

The Safe Drinking Water Act (SDWA) requires EPA to set maximum contaminant levels (MCL) to protect the public health from certain pollutants in drinking water. MCLs are to be set as close to health-based goals (MCLG) as feasible and employ the best technology available. When setting an MCL the Agency must consider the cost and the efficacy of technologies and other possible treatment means (i.e., determine if an MCL is feasible).

Drinking water systems must implement measures to keep contaminants from exceeding specific MCLs. However, the technical demands and costs associated with implementing corrective techniques that are feasible for large drinking water systems often make such techniques inappropriate for small systems. Therefore, SDWA requires the agency to conduct small system technology assessments for contaminants that are already covered by existing regulations, or for which regulations may be developed in the future, for three categories of small systems depending upon the number of people they serve (25 - 500 people, 501 - 3,300, and 3,301 - 10,000). SDWA mentions two classes of technologies for small systems, compliance and variance technologies.



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A compliance technology is a technology that is affordable and achieves compliance with an MCL or satisfies a treatment requirement. Affordability and technical complexity are considered when evaluating compliance technologies for small systems; however, affordability is considered to be a key criterion. Variance technologies are technologies that achieve the maximum reduction or inactivation efficiency affordable -- and that are protective of public health--for specific system size/source water quality combinations. Variance technologies are to be specified for system size/source water quality combinations for which a compliance technology cannot be identified.

The Agency published a list of compliance technologies that meet surface water treatment rule (SWTR) requirements for small systems on August 11, 1997. On August 6, 1998 (subsequent to the DWC meeting in which affordability criteria were discussed), the Agency published a list of technologies to achieve compliance for other existing National Primary Drinking Water Regulations (NPDWR). Affordability criteria, the subject of this Advisory, were applied during the analysis that supported the publication of the August 6, 1998 list. In that action, the Agency determined that compliance technologies existed for all 80 of the currently regulated drinking water contaminants; therefore, no variance technologies are identified. The Agency intends to apply the affordability criteria as it develops future NPDWRs.

In the August 6, 1998 announcement of the list of compliance technologies, the Agency noted that due to the short time available to develop and apply the affordability criteria, it considered the application of the current methodology to be an initial screen and not a final determination. EPA noted in the announcement that it was interested in receiving comments on how to improve its method for future updates to these lists.

Compliance and variance technology pathways are mutually exclusive under the SDWA. The primary role of national-level affordability criteria is to identify whether pollutants covered by specific NPDWRs have available a variance technology pathway or only a compliance technology pathway. However, the national-level criteria do not lead directly to a decision on technology affordability and the selection of a specific treatment technologies for individual drinking water systems. If national-level affordability criteria are set very high, then the variance technology pathway will be limited or eliminated and systems will need to install compliance technologies. If national-level criteria are set very low, the compliance technology pathway will be limited or eliminated and more systems will operate under small system variances. It is important to note that a "no-cost" alternative is not an option since some action will be necessary for systems that exceed an MCL.

Key Agency considerations in setting national level affordability criteria included: a) user burden (e.g., drinking water cost increase per household); b) existence of financial assistance from other than water users; c) knowledge that user burden alone as a criterion could act as a barrier against technology; and d) difficulty for a system to install a technology that did not meet the affordability criteria. In developing its income-based measures of affordability, the agency looked at baseline annual water bills for single residential and non-residential customers, water

consumption levels, expenses and revenue for systems of various sizes and water sources, annual household water costs, median household income (MHI), and comparative household expenditures as a percent of MHI.

To settle on appropriate criteria the Agency attempted to determine: a) if the link between household cost increases and median household income is the best measure of affordability; b) if EPA should use a 'bump' to account for financial assistance since the method can't directly measure it; c) whether EPA should use separate baselines for groundwater and surface water systems and public versus private systems; d) if there exist additional methods to estimate current annual household water bills; e) what household consumption level to use to evaluate treatment cost; f) if there are other mechanisms to estimate MHI; g) if the mean or the median is the appropriate measure for water sales revenues/MHI/consumption; h) if other utilities should be part of the comparisons; and i) if residential users are the most vulnerable?

The Agency asked the DWC its opinion on: a) the components included in the national-level affordability criteria; b) the EPA measure of national-level affordability; and c) whether there might be better alternatives.

## **2. COMMENTS AND RECOMMENDATIONS**

The Committee was pleased with the analysis contained in the background report provided by the Agency. The Committee noted that no statutory definition exists for the concept of affordability and that the deadline for developing criteria for affordability did not provide ample time for the Agency to conduct original studies that would lead to an empirically derived meaning of affordability. The Committee thought that some of the comparisons between incremental costs for treatment technologies and other expenditures made in the Agency's background document had a raw intuitive appeal while a few did not. For example, many members of the Committee felt that attempting to support an affordability threshold by referring to alcohol and tobacco costs was wholly inappropriate. Further, the Committee thought that the focus on defining affordability by reference to median household income was not well explained by the report. Further, the members questioned why the economic circumstances of less fortunate families was unimportant. More generally, it would seem that without a clear conceptual framework, efforts to determine affordability become highly arbitrary.

An element in the Agency analysis which has more theoretical appeal is the effort to consider evidence on willingness to pay (WTP) for other risk reduction activities. The reference to willingness to pay for point of use treatment devices and bottled water appears to be relevant, but the report did not make it clear whether the underlying data were adequate to support estimates of willingness to pay for risk reduction. Specifically, it was not clear how much of the willingness to pay for bottled water (or point of use treatment devices) should be attributed to willingness to pay for risk reduction (i.e., "perceived safety of drinking water") as opposed to other attributes of bottled water. A critical test of this assumption would be to determine whether bottled water users return to drinking tap water when improvements in treatment systems (such as those envisioned under the SDWA amendments) occur. Several members of the Committee

doubted that substantial changes in tap water consumption would be likely. Without such information it may be hard to defend these estimates of willingness to pay as being directly applicable to the assessment of affordability. Although there may be little data directly relevant to assessment of willingness to pay for reduction of drinking water risks, a number of estimates are available for valuing risk reduction in other settings.

In addition, since total residential water usage is not equivalent to drinking water consumption, the amount that consumers are willing to pay for drinkable water may differ among consumers in different geographical locations, and in the context of their other uses of water. Some additional complexities can be illustrated by an example. Consumers may be willing to pay more for drinking water, but not for watering their lawns. Therefore, costs of point of use devices or bottled water may reflect the possibility that a consumer places a premium on safe drinking water, but not on the multitude of other uses of water in a household. Perhaps the consumer simply prefers beverages other than tap water for drinking. In these cases, the willingness to pay might apply only to that volume of tap water that is consumed by humans.

Finally, in the text of the report, numerous statements are made that reflect judgments which are important to the outcome of the study. Each of these judgments should be identified and should be subjected to review by persons with appropriate qualifications. One key example of such a judgment is "...technology costs are presumed affordable to the average household if they are within a certain percentage of median household income and comparable to other household expenditures." Several other such judgments are listed in Appendix A to this Commentary.

Viewed in light of these issues, the report's final assertion that household water costs between 1.5 and 3.5 percent of median (or mean) household income may seem to be both arbitrary and difficult to defend. In a recent action, the Agency finally settled on 2.5% of MHI as the criterion; see the August 6, 1998 Federal Register announcement (page 4203; FR, Vol. 63, No. 151).

The SAB recognizes that in directing EPA to consider "national affordability" the statute provides EPA with a difficult task. The SAB appreciates that this report represents a substantial effort. Nevertheless, there are several aspects of the analysis and report that could be improved if given further attention. The DWC recommends that:

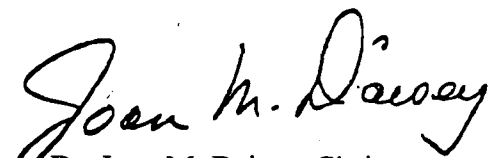
- a) EPA search the literature for -- (1) a definition of national affordability; (2) estimates of willingness to pay for risk reduction; (3) studies of the price-elasticity of water consumption; and (4) a comparison to water costs in other countries, especially Canada and Western Europe.
- b) EPA consider arranging short-term consultations with one or two experienced economists who have worked extensively in health or environmental benefits assessment or regulatory economics, to ensure that any theoretical basis or historical regulatory precedents for evaluation of affordability have been

considered, and where appropriate, drawn upon in the analysis of affordability.

- c) In the report, EPA should (1) reflect the conceptual and practical difficulties with the definition of affordability; (2) deal with these issues openly and early; and (3) make it clear to readers that EPA has carefully thought through these problems and their alternative interpretations in arriving at its solution to the problem.
- d) Where strong assumptions, which are critical to the report's conclusions, are necessary, that EPA clearly identify each such critical assumption, and discuss alternative interpretations that were considered and discarded.

While the analysis provided is certainly adequate given the lack of guidance and short deadline provided in the legislation, the Committee believes that the report would benefit from additional input by economists and policy analysts even in the short term. Because of the critical impact that affordability has on community compliance, the Committee urges the Agency to take the time to obtain a better set of criteria for the longer term with more measured input and review by experts in economics and public policy. We look forward to the response from the Assistant Administrator for the Office of Water.

Sincerely,



Dr. Joan M. Daisey, Chair  
Science Advisory Board



Dr. Richard J. Bull, Chair  
Drinking Water Committee  
Science Advisory Board

## APPENDIX A - Illustrative List of Judgments

“Non-community water system...their water treatment costs to be passed on to customers in the form of increased prices for other goods and services to customers.”

“...at least half of the very smallest systems are attaining their revenues from sources other than water sales.”

“...water systems in the smallest size category are not meeting their expenses.”

“...affordability determinations should include consideration of the inefficient pricing of water.”

“...the average rating of perceived safety among respondents nationally was 75.9. However, the desired safety level was rated at 93.6, suggesting that people wanted to be provided with drinking water of higher quality than actually received. Those customers who used bottled water had a mean perceived safety of local water of only 57.5.”

“Based on these considerations, establishing an affordability threshold in the range of 1.5 to 3 percent of income appears to be consistent with EPA’s joint objectives of maintaining low household costs, while providing sufficient additional revenues to support further public health improvements.”

## **APPENDIX B - Acronyms and Abbreviations**

<b>CDW</b>	Centrally Distributed Water
<b>DWC</b>	Drinking Water Committee
<b>MCL</b>	Maximum Contaminant Level
<b>MHI</b>	Median Household Income
<b>SAB</b>	U.S. EPA Science Advisory Board
<b>SDWA</b>	Safe Drinking Water Act Amendments of 1996
<b>WTP</b>	Willingness to Pay

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**MS. DOROTHY M. CLARK**, Management Assistant, US EPA, Science Advisory Board, 401 M Street,  
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