May 23, 2000

EPA-SAB-DWC-COM-00-004

Honorable Carol M. Browner
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Subject: Commentary on EPA's Draft Proposal for a Long-Term 1 Enhanced Surface Water Treatment and Filter Backwash Rule

Dear Ms. Browner:

The Drinking Water Committee (DWC) of the Environmental Protection Agency's (EPA) Science Advisory Board (SAB) met in Washington, D.C. on March 13, 2000 to review the Agency's Draft Proposal for the Long-Term 1 Enhanced Surface Water Treatment and Filter Backwash Rule (LT1FBR). The rule is intended to increase protection against microbial contamination (especially *Cryptosporidium*) in finished drinking water supplies from systems using surface water or ground water under the direct influence of surface water.

The Committee conducted this review in fulfillment of its responsibilities under Section 1412(e) of the Safe Drinking Water Act (SDWA as amended in August 1996) which states:

> *The Administrator shall request comments from the Science Advisory Board (established under the Environmental Research, Development, and Demonstration Act of 1978) prior to proposal of a maximum contaminant level goal and national primary drinking water regulation. The Board shall respond, as it deems appropriate, within the time period applicable for promulgation of the national primary drinking water standard concerned. This subsection shall, under no circumstances, be used to delay final promulgation of any national primary drinking water standard.*

EPA's draft proposal was evaluated by the Committee while it was still under review by the Office of Management and Budget (OMB) and prior to being released for publication in the Federal Register as a proposed rule. As such, the DWC members recognize that specific elements are subject to change after the OMB review.

The Committee reached closure on the document during the March 13-14, 2000 meeting. The comments that the committee wishes to raise to the Administrator are included in the following sections of this letter. The Committee compliments the Agency on the significant internal efforts of EPA staff, as well as the efforts to include Stakeholders and this Board in reviewing this rule.

A general issue raised by members during the discussion concerned the form of the material provided to the Committee for review. The draft regulatory proposal provided by the Agency refers to, but does not include, detailed technical information on the science that supports the rulemaking. Although the nature of the questions addressed by the Drinking Water Committee in this review did not require access to detailed technical information, the Committee can envision situations where access to such data will be critical to discharging its responsibilities under the Act. Committee members noted that for future reviews, it will be important for the Agency to identify and provide the relevant technical support documents that underpin Agency proposals reviewed under this SDWA requirement. Committee staff and Agency representatives should discuss such issues sufficiently in advance of the actual SAB review so that the appropriate technical documentation to support a thorough review can be identified and obtained for the Committee.

1. BACKGROUND

1.1 Statutory Context

The Safe Drinking Water Act (SDWA, 1996a) requires that EPA publish a maximum contaminant level goal [MCLG] if it determines that a drinking water contaminant may have an adverse effect on the health of persons; that the contaminant is known to occur, or there is a substantial likelihood that the contaminant will occur, in public water systems with a frequency and at levels of public health concern; and that regulation of the contaminant presents a meaningful opportunity for health risk reduction for persons served by public water systems. MCLGs are to be "set at the level at which no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety"(SDWA, 1996b).

EPA must publish a National Primary Drinking Water Regulation (NPDWR) that either specifies a maximum contaminant level (MCL) for such contaminants (the MCL must be set as close to the MCLG as is feasible) (SDWA, 1996c) or specify "the use of a treatment technique in lieu of

establishing an [MCL]," if EPA finds "that it is not economically or technologically feasible to ascertain the level of the contaminant" (SDWA, 1996d) in water. The Act gives special meaning to the term 'feasible' noting that it "means feasible with the use of the best technology, treatment techniques, and other means [found by examination under] field conditions...are available (taking cost into consideration)" (SDWA, 1996e)

In addition, when EPA proposes such a regulation, the Administrator must also "publish a determination as to whether the benefits of the [MCL] justify, or do not justify, the costs..." (SDWA, 1996f). This determination is to be based upon a Health Risk Reduction and Cost Analysis (HRRCA); and it must "use i) the best available, peer-reviewed science and supporting studies conducted in accordance with sound and objective scientific practices; and ii) data collected by accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies use of the data)" (SDWA, 1996g); and "ensure that the presentation of information on public health effects is comprehensive, informative, and understandable" (SDWA, 1996h).

Existing actions and requirements related to the draft proposal reviewed by the Committee include EPA's Interim Enhanced Surface Water Treatment Rule (IESWTR) and a Stage 1 Disinfection Byproducts Rule (DBP1) both of which were promulgated in December, 1998. In addition, the Act requires "EPA to promulgate a Long-Term 1 Enhanced Surface Water Treatment Rule for systems serving less than 10,000 people) by November, 2000 [cited as SDWA 1412(b)(2)(C)](EPA, 2000) and also to promulgate a regulation to govern the recycling of filter backwash water within the treatment process of a public water system by August, 2000 [cited as SDWA 1412(b)(14)]."

1.2 Provisions of the Proposal Reviewed by the Drinking Water Committee

The draft proposal applies to public water systems that use surface water, or ground water under the direct influence of surface water (EPA, 2000a). The Long Term 1 portion of the rule applies to systems having less than 10,000 persons served. Provisions of the rule address:

a) Turbidity: Individual filter turbidity and combined filter effluent turbidity requirements for conventional and direct filtration systems;

b) Disinfection Benchmarking: Public water systems must develop a disinfection profile unless they conduct applicability monitoring to demonstrate that their disinfection byproduct (DBP) levels are less than 80 percent of the maximum contaminant levels. Also, whenever systems consider making significant changes to disinfection practices, they will be required to develop a disinfection benchmark; and

c) Other Requirements: Covers will be required for finished water reservoirs completed after the rule becomes effective as will additional watershed control requirements for unfiltered systems.

The Filter Backwash portion of the rule applies to all systems which recycle irrespective of the population served (EPA, 2000). Provisions of the rule address:

a) Point of Backwash Return: Requires the return of spent filter backwash water, thickener supernatant, and liquids from dewatering processes prior to the point of primary coagulant addition unless the State specifies an alternative location;

b) Recycle Treatment Information: Detailed recycle information must be provided to the State by direct filtration systems recycling to the treatment process. The State may require modification of the process;

c) Recycle Self-Assessment: Conventional systems practicing direct recycle that use 20 or fewer filters to meet production requirements during a month and recycle filter backwash water and/or gravity thickener supernatant within the treatment process must conduct a one-month, one-time recycle self assessment (hydraulic flow monitoring and data reporting to the State).

2. SPECIFIC COMMENTS

Key points raised by the Committee are presented below. Section 2.1 applies to the Long Term 1 Enhanced Surface Water Treatment portion of the proposal and Section 2.2 applies to the Filter Backwash portion of the proposal.

2.1 Long Term 1 Enhanced Surface Water Treatment Proposal

2.1.1 Turbidity Requirements - Combined Filter Effluent in Small Plants

Recommendation: *The Science Advisory Board recommends that EPA outline further measures that it will take to ensure that the desired level of performance can be successfully achieved.*

The Committee noted that it can be demonstrated that a well-designed package plant, operating within its design range and with close operator supervision, is able to meet the proposed 0.3 NTU (nephelometric turbidity units) criterion 95 per cent of the time. Experience also indicates that good operator training is important in ensuring that such goals are successfully achieved. However, it is important to recognize that operators develop advanced skills through effective training have opportunities to locate more lucrative employment with larger utilities. Given current conditions, it is difficult to imagine that small systems will be able to provide the amount of quality operator attention required to meet these regulations over the long term without some attention being given to developing an approach to provide long term training support.

2.1.2 Turbidity Requirements - Collection of Data by Small Systems

Recommendation: *The SAB sees no technical problem with small utilities maintaining continuous monitoring equipment that stores and reports on turbidity data at 15 minute intervals.*

Continuous monitoring is conducted so that operators can maintain an awareness of each individual filter's performance. The proposed rule states that it is "appropriate and necessary to extend individual filter monitoring requirements to systems serving populations under 10,000. The agency noted that data collection carried out at 15-minute intervals generates approximately 2,800 data points per filter per month. EPA is hopes to reduce the burden that such a number of data points implies for small facilities. The Drinking Water Committee notes that the requirement is not merely an exercise in the capture, cataloging and reporting of additional quantities of data and that the number of data points is not really the issue. With current programmable logic controller (PLC) technology, data storage, data analysis and data display can be accomplished easily and inexpensively. If continuous monitoring does fail, sampling every four hours is sufficient to maintain good operation until a malfunctioning recorder can be replaced.

2.2 Filter Backwash Proposal

2.2.1 Issues of where to return the backwash flow in conventional plants

Recommendation 1: *The SAB recommends that EPA conduct studies to determine if gravity settling of washwater return flows is sufficient or if additional treatment is required. If studies reveal problems, then more specific requirements for treatment of backwash water should be considered. Based on the evidence now available, the SAB recommends against requiring that washwaters be recycled ahead of the point of coagulant addition.*

Many older plants with separate coagulation, sedimentation, and filtration steps return all backwash flows to a single settling basin. Experience has shown that flow equalization or better flow distribution can improve particulate removal in these situations. Here, caution should be used in considering a requirement that washwater be recycled to a point ahead of the coagulant addition point. Washwater flows are intermittent and flow pacing alone will not resolve the matter because the coagulant demand of recycled washwater flows is often very high. This higher demand must be taken into account or breakthrough could result. Many washwaters respond well to gravity sedimentation, however, no systematic cataloging is available and in some cases, such as sludge from plants involved in color removal, they may not respond so well.

Recommendation 2: *Based on the information currently available, the SAB recommends against requirements which would alter the design of these direct recycle processes.*

In lime softening, experience shows that recirculating sludge ahead of lime addition improves operation. In addition, in a solids contact unit, solids recirculation is often integral to the process. In either of these two cases, changes could be detrimental to these processes, which are often quite efficient in their current form.

2.2.2 Determining if a Water Treatment Plant is Exceeding Its Capacity

Recommendation: *The SAB recommends that the Agency require monitoring of performance parameters, like settled water turbidity and filtered water turbidity instead of trying to determine capacity.*

Capacity Parameters like filter rate and basin overflow rate can be defined with precision, but all states do not define these capacities in the same way – particularly where recycled flows are concerned. This practice has probably survived because the effect of these capacity parameters on plant performance is not so as precise as this requirement suggests. For example, although filter performance declines as the filter rate increases, the decline is gradual. A filter operating at 5.5 gpm/sf (gallons/minute/square foot) performs nearly as well as the same filter operating at 5 gpm/sf. Likewise, a horizontal settling basin operating at 1.1 gpm/sf performs nearly as well as the same basin operating at 1.0 gpm/sf. Although turbidity removal does not directly predict the removal of microorganisms, it is the only standard method the industry has today for monitoring the removal of particulates.

2.2.3 When is it Most Appropriate to Monitor?

Recommendation: *The Science Advisory Board recommends that EPA require monitoring during periods of the year when unit processes are known to perform poorly instead of focusing on high periods of demand alone.*

Although the month with the highest demand is the month when the plant's official capacity is most likely to be exceeded it is not necessarily the month when the plant's treatment performance will suffer the most. Usually poor treatment performance has more to do with influent water quality than any other parameter. In fact, many water treatment plants operate below their design capacity all year. Experience shows that poor quality generally occurs when algae bloom in the spring and fall, during spring runoff, or during cold temperatures in the winter. Maximum recycling occurs when poor influent water quality occurs at or near the period of maximum demand. Monitoring treatment performance is the best way to understand the impact of recycled streams on water quality.

2.2.4 Is Limiting the Self-assessment to Plants with Less Than 20 Filters Appropriate?

Recommendation: *The Science Advisory Board recommends that EPA require all plants to do a self-assessment, no matter how many filters they have.*

Recycled streams are more important in plants with fewer filters. Depending on design and operating conditions, this effect diminishes once the plant is large enough so that the backwash from more than one filter is being returned at the same time. On the other hand, it is difficult to justify a particular number of filters and most large plants should have no difficulty in conducting this study.

2.2.5 Requirements for Direct Filtration Plants

Recommendation: *The Science Advisory Board recommends that EPA study the treatment of recycled flows in direct filtration plants in order to determine the level of treatment that is appropriate in light of requirements for Cryptosporidium removal.*

It is not necessary to require treatment of recycled flows in direct filtration plants. This is because all direct filtration plants must treat their recycle stream to prevent recycling of particulates in order to meet conventional standards. Surveys which do not report a treatment step reflect a poor understanding of the process on the part of the person responding to the survey. On the other hand, treatment of recycled washwater in direct filtration plants is normally limited to some form of gravity sedimentation and the performance of a direct filtration plant is particularly sensitive to recycled flows. EPA should conduct studies to determine if that level of treatment is appropriate.

2.3 Economic Assessment

2.3.1 Estimating Illness Avoided.

Recommendation: *The Science Advisory Board recommends that EPA give special attention to the control of outbreaks as well as endemic disease.*

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A number of illnesses will be avoided with appropriate criteria implemented on systems below 10,000 and appropriate recycle flow controls. On the other hand, unit process upset or failure has also caused major disease outbreaks. EPA should continue to promote the multiple barrier concept in the control of diseases and not rely on improving the performance of individual unit processes alone. The public record on waterborne disease is dominated by these outbreaks and it will not improve if only endemic disease in reduced.

We look forward to the response of the Assistant Administrator of the Office of Water to the advice in this letter.

Sincerely,

Dr. Mort Lippmann,

Interim Chair
Science Advisory Board

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

U.S. Environmental Protection Agency
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March 13-14, 2000 Meeting

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REFERENCES

EPA 2000. *Long Term 1 Enhanced Surface Water Treatment and Filter Backwash Rule - Fact Sheet*. Fact Sheet developed by US EPA Office of Water for the Science Advisory Board Briefing. February 14, 2000.

SDWA 1996. Safe Drinking Water Act as Amended. August 6, 1996. National Drinking Water Regulations. Code of Federal Regulations. Title XIV. Sections 1400 *et seq.* Congress of the United States. Sections as noted below:

(1996a): Section 1412(b)(1)(A) General Authority.
(1996b): Section 1412(b)(4)(A) MCLGs
(1996c): Section 1412(b)(4)(B) MCLs
(1996d): Section 1412(b)(7)(A) Treatment Technology
(1996e): Section 1412(b)(4)(D) Feasible
(1996f): Section 1412(b)(4)(C) B-C Justification
(1996g): Section 1412(b)(3)(A) Best Science
(1996h): Section 1412(b)(3)(B) Public Information
(1996i): Section 1412(b)(3)(C) Health Risk Reduction and Cost Analysis