Final Report

of the

SBREFA Small Business Advocacy Review Panel

on EPA's Planned Proposed Rule:

FILTER BACKWASH RECYCLING

October 19, 1998

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1. INTRODUCTION

This report is presented by the Small Business Advocacy Review Panel (hereafter referred to as SBAR Panel or Panel) convened for the proposed rulemaking on the Filter Backwash Recycle rule (FBR) that the Environmental Protection Agency (EPA or Agency) is currently developing. On August 21, 1998, EPA's Small Business Advocacy Chair convened this Panel in accordance with Section 609(b) of the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA). Section 609(b) requires convening a SBAR Panel prior to the publication of an initial regulatory flexibility analysis (IRFA) that an agency is required to prepare under the RFA. In addition to its chairperson, the Panel consists of the Director of the of the Standards and Risk Management Division in the Office of Ground Water and Drinking Water (OGWDW) within EPA's Office of Water, the Administrator of the Office of Information and Regulatory Affairs in the Office of Management and Budget, and the Chief Counsel for Advocacy of the Small Business Administration.

This report provides the scope and statutory background of the FBR, a brief description of possible rule components, a description of the number and types of entities potentially affected by the rule, a summary of outreach activities, and the comments and recommendations of the small entity representatives (SERs). In addition, Section 609(b) of the RFA directs the SBAR Panel to report on the comments of SERs and make findings regarding the key elements of an IRFA under Section 603 of the RFA. The key elements addressed in an IRFA are:

- The number and types of small entities to which the proposed rule will apply;
- Possible reporting, record keeping, and other compliance provisions of the proposed rule, including the classes of small entities which will be subject to the requirements and the type of professional skills necessary for preparation of the reports or records;
- Other relevant federal rules which may duplicate, overlap, or conflict with the proposed rule; and
- Any significant alternatives to the regulatory components under consideration which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities.

The completed Panel report is provided to the agency issuing the proposed rule and included in the rulemaking record. The agency is to make changes to the draft proposed rule, the IRFA for the proposed rule, or the decision on whether an IRFA is required taking into consideration information in the Panel report.

The Panel's findings and discussion are based on information available at the time this reported was drafted and EPA is continuing to conduct analyses relevant to the proposed FBR. The Agency expects additional information will be developed or obtained as part of the rule development process. Any options the Panel identifies for reducing the regulatory impact on small entities may require further analysis and/or data collection to ensure that the options are practicable, enforceable, environmentally sound and consistent with the statute authorizing the proposed rule.

2. SCOPE AND STATUTORY BACKGROUND AND POSSIBLE RULE COMPONENTS

The purpose of the Safe Drinking Water Act (SDWA) is to protect public health by ensuring that the tap water in the United States is safe for consumption. Section 1412(b)(1)(A) of the SDWA requires EPA to establish National Primary Drinking Water Regulations for contaminants that may have an adverse public health effect, are known to occur in public water systems with a frequency and at levels of public health concern, and that present a meaningful opportunity for health risk reduction. Congress also required under Section 1412(b)(14) that EPA develop a Filter Backwash Recycling Rule governing the recycle of filter backwash within the treatment process of public water systems. Under these provisions, EPA has the responsibility to develop a FBR to assure public health protection. The rule will require all public water systems which utilize filtration, regardless of size, to meet new requirements. In addition, EPA may include in this rule additional requirements, such as regulating certain waste streams (e.g., lab wastes).

EPA's Office of Ground Water and Drinking Water (OGWDW) is responsible for developing the FBR. OGWDW is working with stakeholders to develop the proposed rule by August of 1999 and a final rule by the statutory deadline of August of 2000. The FBR development and implementation may also involve local, tribal, and state governments.

The Agency's goal in developing the FBR is to provide protection from disease-causing microbial pathogens for community and non-community public water systems (PWSs) that recycle filter backwash. Recycling filter backwash and other waste streams may increase the concentration of microbial pathogens and other contaminants in plant influent and these increased concentrations of pathogens to the filters may threaten filter performance and finished water quality. Recycling large volumes of backwash water may also hydraulically overload the sedimentation basin and filters. To achieve EPA's goal of protecting public health, the rule may establish a framework that develops risk control strategies, including best management practices, or govern filter backwash by flow equalization or recycle flow treatment requirements.

OGWDW has identified a number of potential regulatory components that may be included in the proposed rule. These components will be developed in more detail in the course of the Agency's internal regulatory development process and through discussions with stakeholders, including SERs. EPA expects that a number of systems will be required to implement at least some of the components to comply with the final rule. The particular components a system may be required to implement will vary based upon site-specific conditions to a system and existing state requirements. The following sections provide a brief description of potential backwash treatment rule components.

2.1 Ban on Recycle

One way to mitigate the potential risks posed by recycling filter backwash and other waste streams is to ban the practice altogether. In evaluating this approach, EPA is considering and analyzing several factors: 1) whether there are sufficient data on the severity of recycling impacts for a broad range of treatment plant configurations, raw water types, and geographic locations to justify a ban; 2) the implications of such a ban in areas where limited water resources make conservation a significant concern; 3) the alternative disposal options for recycle waters, (e.g., discharge to a surface water or disposal to a sewer); 4) whether recycle water can be treated before it is reintroduced to the plant influent, which may be able to significantly reduce the additional risk created by recycling untreated filter backwash water and other waste streams; and 5) the economic impacts of such an approach. Based on available information regarding existing alternatives (and related costs), EPA is not leaning toward proposing such a ban but is including it for analytical purposes only, to demonstrate one end of the continuum of possible options with the other end of the analytical continuum being no action.

2.2 Installation of Process Control Testing Equipment

To monitor the quality of water being recycled, recycle flow water quality [e.g., turbidity] can be measured and compared to a target value. If that measured value exceeds the target value, a signal is sent to the control system or operator to change operations so that recycle does not cause excessive turbidity to be carried through the treatment processes to the filters. Three types of process control equipment that can be used in this situation are a Zetameter, particle counter, or streaming current monitor.

2.3 Replacement of Recycle Flow Valving and/or Pumps

Some systems may currently have in place recycle systems that have inadequate valving, piping, or pumps. This substandard equipment can lead to an uncontrolled or under-controlled recycle flow being reintroduced at the headworks of the plant that can cause excessive turbidity to be carried through the treatment process to the filters.

Although no major structural improvements are necessary, improvements for pumping, valving, minor piping, some controls for monitoring flows to minimize the impact of recycle flows, and electrical considerations to meter recycle flows back into the water flow at a constant rate are items which would be considered under this option.

2.4 Require that Recycle Flows be Introduced at the Head of the Plant

Recycle waters are introduced to the treatment train at various points, including the head of the plant, the flocculation basin, post-rapid mix, and the sedimentation basin. It may be appropriate to introduce recycle waters only at the head of the plant, prior to any treatment unit process, to ensure that the recycle waters pass through as many contaminant removal processes as possible. This will help to maximize removal of microbial pathogens and ensure the highest possible quality finished water is produced.

2.5 Require Flow Equalization for all Recycle Water

Utilities may reintroduce or recycle filter backwash water to the plant influent as the process occurs. For example, during filter backwash, the backwash water is pumped up gradient and reintroduced at the head of the plant to the plant influent as it exits the filter bed. This operational practice can reintroduce large volumes of contaminant-laden backwash water to the plant influent in a short period of time, thereby increasing the concentration of microbial contaminants in the plant influent.

Under flow equalization, a limit might be set on the percentage volume of recycle water that could be introduced in the plant influent. A 5 percent flow equalization requirement, for example, would require that 95 percent of a plant's influent be source water and 5 percent (as a maximum) of the influent be recycled waters. The equalization percentage would be set to control the concentration of microbial pathogens in the plant influent. During operational upsets or source water quality events, the flow equalization requirement will help ensure that a "spike" of microbial pathogens in the plant influent will not be caused by the recycling and/or that concentrations of microbial pathogens in source water will not be increased by recycling.

2.6 Require Additional Treatment of Filter Backwash and Other Recycle Waters

To evaluate whether treatment of filter backwash and other waste streams is appropriate prior to recycle, a performance measure for treatment efficiency must be established. Performance measures may be based on application of specific technologies to treat recycle waters, or based on attaining a particular level of treatment performance (e.g., log removal of contaminants). The Agency believes the following technologies may be viable treatment candidates:

2.6.1 Sedimentation with Polymer

Sedimentation with polymer addition can achieve significant particulate and microbial pathogen removal at much higher overflow rates than sedimentation alone. However, the overflow rates for filter backwash may still be lower than those used in conventional sedimentation basin operation. There also is a question as to the size of the basin that might be required. As with sedimentation alone, land availability, the cost of constructing large basins, and the amount of backwash water produced are important factors to consider in evaluating this approach.

2.6.2 Conventional Treatment (Coagulation, Flocculation, and Sedimentation)

Utilities could rely on a small conventional filtration treatment train alongside the main treatment plant to treat recycle waters. This treatment would provide very good removal of particulate and microbial pathogens; the quality of the effluent might often be better than that of the source water. The applicability of this treatment scheme may be constrained by land availability and the infrastructure construction costs (flocculation basin, sedimentation basin, and filters). The filter backwash water produced by a conventional or direct filtration treatment scheme would have to be removed and disposed. However, it may be easier to obtain a permit to dispose of this small volume of backwash than it would for the backwash of the full-size plant.

2.6.3 Dissolved Air Flotation

Dissolved air flotation (DAF) has been used extensively in Europe and is being installed at full-scale water treatment plants in this country. The technology has three advantages over traditional treatment schemes: 1) DAF requires little space for a unit with sufficient capacity; 2) the loading rates for DAF units are higher than those of conventional filtration allowing for smaller and less costly infrastructure; and 3) for most waters, DAF can remove at least as much particulate matter as conventional settling. Although the applicability of DAF is limited by the specific gravity of the contaminants, contaminants in filter backwash and other waste water streams have low specific gravities (if the converse were true, these particles and pathogens would have settled out in the primary sedimentation basin). DAF may well be an applicable treatment for most backwash waters and other recycle streams.

2.6.4 Membranes

Membranes are a pressure driven thin-film barrier used for the removal of a range of particles from dissolved ions to turbidity. Nano-filtration (NF) systems typically consist of spiral-wound NF membrane elements assembled in a parallel formation on skids. NF is a diffusion controlled process capable of removing divalent salts, as well as turbidity and pathogens (Taylor and Jacobs, 1996). NF systems typically operate at feed pressures between 70 and 150 psi, and reject over 90 percent of hardness forming ions and between 50 to 70 percent of dissolved solids.

NF is often used in combination with other treatment techniques. Physical pretreatment, including microfiltration, and multi-media filters, is often used to reduce influent particulate concentration and to protect the NF membranes. Chemical pretreatment, including anti-scalants and coagulants, is also often employed. Some groundwaters and most surface water systems will require pretreatment to control fouling. In some cases extensive pretreatment (i.e., coagulation and filtration) may be needed prior to NF.

2.7 Flow Equalization Monitoring

If flow equalization is chosen, utilities would need to monitor the plant influent and recycle flows to ensure the recycle percentage is not exceeded. Utilities would also need to keep records to demonstrate compliance with the flow equalization requirement. A continuous flow monitor might be installed in with the influent stream and the recycle stream. A remote recording device could display flow volumes to the operator in the control room. Continuous flow monitoring devices are widely used and available; plant personnel would need to calibrate the device for reliable operation.

2.8 Monitoring Treatment Unit Performance

The influent and effluent water quality to and from recycle treatment units may be monitored. If the treatment standard provides for the removal of a percentage of influent solids, a surrogate parameter, such as turbidity, could be monitored. If the treatment standard is an "exit" standard (e.g., the water quality leaving the treatment unit must meet a minimal turbidity standard), then only the effluent quality would need to be monitored. Use of a surrogate parameter to indicate performance is necessary in either scenario, since continuous monitoring for pathogens is not possible. Turbidity is generally thought to be an indicator of treatment performance.

2.9 Monitoring for Log Removal Credit

This monitoring option would only apply if the final regulation established a specific log removal level (of particulate, turbidity, *Giardia lamblia*, oocysts, etc.) for a particular target. For example, the final rule may require that recycle water achieve 2 log removal (i.e., treatment removes 2 logs of Giardia) before it can be recycled. The regulation would assign a specific log removal credit to each treatment technology. The performance of the processes would be evaluated on a routine basis. The frequency of this evaluation would be a major factor in the burden associated with this as well as other monitoring approaches.

2.10 Infrastructure Construction

Utilities may need to construct infrastructure to meet the requirements of the final rule. EPA developed preliminary cost estimates for potential infrastructure requirements. A description of potential construction needs is provided below.

2.10.1 Piping to the Head of the Plant

If the final rule requires that utilities recycle filter backwash and other recycle waters to the head of the plant, some utilities may need to install additional piping and pumping capacity to convey the recycle flows.

2.10.2 Flow Equalization

A flow equalization requirement may necessitate the construction of additional recycle water storage tanks or holding ponds.

2.10.3 Treatment

If treatment of recycle flows is required, the costs of constructing treatment facilities and maintaining them would generate additional costs for utilities.

2.11 Reporting and Record Keeping Requirements

Reporting and record keeping requirements are dependent on the structure and requirements of the final regulation; at this time, it is difficult to develop a complete list of potential requirements. It is probable, however, that the recycle flow and plant influent flow will have to be recorded and kept on file for compliance determinations. If recycle treatment is required it is also probable that a water quality parameter will have to be monitored, recorded, and kept on file for compliance determinations (turbidity is a likely candidate).

3. APPLICABLE SMALL BUSINESS DEFINITIONS

EPA's authority under SDWA extends to all "public water systems." The law applies the term "public water system" to water utilities and a wide range of businesses (e.g., campgrounds, factories, and schools). As part of the 1996 SDWA amendments, Congress expressly addressed the issue of system size and included several provisions for small system regulatory relief for systems serving 10,000 or fewer people and/or systems serving 3,300 or fewer people. OGWDW believes it is appropriate to define a small system as one that serves 10,000 or fewer people. However, the Small Business Administration (SBA) regulations typically define a small business in terms of either total revenues or total employees. Under SBA's definition, a "small," privately-owned water utility would be one with revenues of less than $5,000,000. Under the RFA, a "small" governmental entity is one with a jurisdiction of 50,000 or fewer people. Data from the Community Water System Survey (CWSS) indicate that the median revenue of a community water system serving between 3,300 and 10,000 people is $605,000. Systems serving less than 10,000 people would actually have annual revenues well below $5 million. The proposed EPA definition of a small water system as one serving 10,000 or fewer people is therefore narrower than the SBA definition for small business and the RFA definition of a small government entity. However, OGWDW believes the proposed definition is appropriate both because of the statutory provisions of the SDWA, and because it believes this definition appropriately distinguishes public water systems that have stronger technical expertise and revenue sources from those that do not.

4. PROFILE OF THE AFFECTED INDUSTRY

As noted above, EPA's authority under the SDWA extends to all public water systems. A public water system provides piped water for human consumption. Based on information identified in the Regulatory Impact Analysis (RIA) for the Stage 1 Disinfectant and Disinfection Byproduct (Stage 1 DBP) rule, there are 5,165 public water supply systems that use surface water and ground water under the direct influence of surface water. In addition, analysis for the Stage 1 DBP rule identified 7,628 ground water systems that filter. The term "public water systems" applies not only to water utilities, but also to a wide range of privately or publicly owned businesses and entities that provide drinking water (e.g., campgrounds, factories, restaurants, and schools).

Public water systems are classified as community (C), non-transient non-community (NTNC), or transient non-community (TNC) systems. Descriptions of the types of systems are given below.

Community Water Systems
Community systems provide drinking water to at least 15 service connections used by year-round residents or that regularly serve at least 25 year-round residents.

Non-Transient Non-Community Water Systems
NTNC systems serve at least 25 of the same people at least six months of the year and include entities such as schools, factories, and hospitals.

Transient Non-Community Water Systems
TNC systems, such as campgrounds and motels, serve transient populations.

5. SUMMARY OF OUTREACH ACTIVITIES

To facilitate regulation development, EPA has actively involved stakeholders in the rule development through various outreach activities.

To develop a list of small entity representatives (SERs) who could provide input into a series of drinking water regulations that are currently under development, OGWDW consulted with trade associations, EPA regional offices, state drinking water programs, individuals who have attended stakeholder meetings, foundations, and the Small Business Administration. This effort produced a list of representatives of small water utilities and other entities that provide drinking water ancillary to their primary business. EPA invited 24 SERs representing systems that use surface water or ground water under the influence of surface water that would be directly affected by the Long Term 1 Enhanced Surface Water Treatment (LT1) and Filter Backwash Recycle rules to participate in the consultation process. These SERs were drawn from several sources, including the previously mentioned list of SERs, and additional references from trade associations and EPA regional offices. OGWDW also included one "Drinking Water System Circuit Rider" (i.e., an individual who does not directly own a system, but provides technical and compliance assistance to small systems). Table 1 lists the names of the 16 SERs who agreed to participate and the organizations they represent. The table also lists the dates of the tele-conference calls in which each SER participated.

TABLE 1. SMALL ENTITY REPRESENTATIVES & MEETING PARTICIPATION			
NAME	**ORGANIZATION**	**4/28/98**	**9/25/98**
Dan Boyce	Water and Light Department, East Grand Fork, MN	X	
Doug Evans	Salt Lake County Service Area #3, UT	X	
Danny Flemming	Blanding City Water Treatment Plant, UT	X	
Charlie Holbrook	Water Treatment Plant, Allum Creek, WV	X	
Chris Kramer	Bayfield, CO	X	
Al Lamm	Thief River Falls Municipal Utilities, MN	X	
Tom McFeron	Nashville Water Treatment Plant, IL	X	
Albert Ricksecker	Brooklyn Tapline Co., Inc., UT	X	
Tom Sakry	International Falls Water Utility, MN	X	X
Jim Sheldon	Cedar-Knox Rural Water Project, NE	X	
Paul Torok	Seeley Lake, Missoula County Water District, MT	X	X
J.D. Hightower	City of Escalon, CA		X
Michael Knox	Cherrydale Valley & Rockdale Water District, MA		
Gary Fluckey	Green River WTP, UT		
Gary Walter	Tuolumne Utilities District, CA	X	
Tom Weathers	Glencoe Water Department, IL	X	X

EPA convened a teleconference with SERs on April 28, 1998, in Washington, D.C. The purpose of the meeting was to discuss SDWA and RFA/SBREFA, as well as to introduce upcoming rules that are relevant to disinfection and microbial protection at surface water systems. While the meeting focused on the FBR and LT1 rules, the SERs also received a brief overview of the planned Long Term 2 Enhanced Surface Water Treatment Rule and Stage 2 Disinfection Byproduct Rule. The teleconference served specifically to provide SERs with summaries of the data that support rule development; engage SERs in analysis and discussion of the implications of the data; solicit additional data, especially actual experience with costs and how the cost burdens estimated by EPA compare to the SERs experience; discuss EPA's next steps for rule development, data analysis, and SER involvement; and identify additional parties who may be interested in future meetings. EPA encouraged the SERs to ask questions and provide feedback and comments throughout the teleconference and to provide written comments after the meeting. A summary of that meeting is included as Attachment A.

On September 17, 1998, the Small Business Advocacy Review Panel for the FBR distributed additional information to the FBR SERs for their review and on September 25, the Panel held a teleconference with the SERs to discuss the FBR. The additional materials described the regulatory approaches being considered by EPA and preliminary unit cost estimates associated with the regulatory approaches. A summary of the September 25 SBAR Panel teleconference is found in Attachment B. The SERs were asked to review the materials and provide any additional comments to the Panel in writing by October 2, 1998. The SERs were asked to comment specifically on the aspects of the possible regulatory approaches which they believed were "most helpful" and "least helpful".

In addition to SER outreach, the Agency held a general stakeholder meeting (i.e. open to the public) on the FBR on July 23, 1998, in Denver, Colorado, where EPA presented potential regulatory approaches for discussion. Small entity representatives participated in this meeting and small system concerns were among the issues discussed. OGWDW is planning one additional stakeholder meeting to solicit additional input regarding possible regulatory structure and potential impacts the FBR may have on regulated systems. The meeting will be held in Washington, DC, prior to proposal of the FBR.

EPA has also organized a Small System Data Needs Working Group. The group comprises representatives from the American Water Works Association, Association of State Drinking Water Administrators, National League of Cities, National Resources Defense Council, and National Rural Water Association. Established in the spring of 1997, the group held six meetings, from March through December, to discuss the availability of water quality and financial data for small systems that are needed to support the FBR and other drinking water regulations.

6. SUMMARY OF SER COMMENTS

Written and oral comments received from the SERs were organized by topic and are summarized below with each topic appearing in bold text. OGWDW and the Panel received a total of eleven sets of written comments from SERs. Table 2 provides a record of the commenters, the dates comments were received, and the number of pages in each set of comments. Written comments received from the SERs were based on information provided to SERs by OGWDW and the Panel. Detailed summaries of the oral comments made by the SERs in the April 28, 1998, and September 25, 1998, teleconferences are included as Attachments A and B. In addition, copies of all written SER comments are included as Attachment C.

TABLE 2. WRITTEN COMMENTS RECEIVED ON THE DEVELOPMENT OF THE FBR

COMMENT LETTER	NAME	DATE OF COMMENT	NUMBER OF PAGES
1	Tom Weathers	5/11/98	4

TABLE 2. WRITTEN COMMENTS RECEIVED ON THE DEVELOPMENT OF THE FBR			
COMMENT LETTER	NAME	DATE OF COMMENT	NUMBER OF PAGES
2	Doug Evans	5/18/98	2
3	Al Ricksecker	5/19/98	1
4	Dan Boyce	5/19/98	3
5	Jim Sheldon	5/19/98	4
6	Thomas McFeron	5/19/98	4
7	Gary Walter	5/20/98	4
8	Thomas Sakry	5/28/98	2
9	Thomas Sakry	9/28/98	3
10	Tom Weathers	10/1/98	3
11	Danny Fleming	10/5/98	2

6.1 Summary of Written Comments

The following is a summary of comments received from the SERs, organized by the topic.

Need for Regulation

A SER raised concerns about the need for a filter backwash rule because of the inconclusive results of research into the effects of recycling backwash water. The SER cited a 1993 AWWARF report, which found that while both study plants showed a raw water particle increase during recycle, filtered water was not impacted. [*Note: The report also found that filter backwash water and sedimentation basin sludge can have very high concentrations of Giardia and Cryptosporidium cysts, and recommended sedimentation with low overflow rates to reduce these concentrations prior to recycle.*] This SER recommended that a greater regulatory emphasis not be placed on this area. He further stated that, especially for small systems, some simple steps such as flow equalization and/or sedimentation may be all that are necessary.

Another SER commented that the people in his community do not see the costs and benefits of this type of regulation the way that EPA does. He cited the example of a community with an antiquated system (dating back to 1912) where the community has nonetheless "had no visible health problems." He believes that epidemiological studies of environmental health risk are especially susceptible to exaggerated reporting and that the financial and emotional consequences of such stories can be "staggering." The SER suggested that people in communities like his might be more supportive of public health strategies that emphasize individual responsibility rather than expensive government regulation.

Ban on Recycle

Three of the SERs indicated that their plants do recycle filter backwash, three indicated that theirs do not. Generally, those who currently recycle were opposed to a ban, with some indicating that it would create serious financial hardship, while those who do not currently recycle supported a ban either because of the potential health risks or because of the potential cost and technical difficulty, especially for small systems, of avoiding these risks.

One of the SERs who doesn't recycle stated his doubts that recycling backwash water is as important to small systems as for larger ones. The SER commented that disposal is less likely to present a major problem for smaller systems which tend to be located in more sparsely populated areas. In addition, this SER stated that there may be less of an objection to returning once-used backwash water to the surface source than there might be to water with highly concentrated contamination.

Another SER commented that his plant does not recycle filter backwash, but pumps it to the municipal sewage lagoon. This SER's operation discharges clarifier and softener blowdown directly to sludge detention ponds, with excess water from the ponds being pumped to the city wastewater system. The SER went on to list a number of technical problems that he had encountered with recycling backwash while working at another plant. He noted that it takes a lot of operator attention to maintain anything approaching consistent influent water quality, even with on-line turbidimeters on the recycle, constant flow monitoring, a variety of recycle pump capacities, and a fully staffed and equipped lab. He concluded that the best method is to avoid recycle whenever possible in high TOC, variable turbidity surface water sources.

A third SER indicated that it generally would not be economically feasible for a small plant to recycle backwash while still maintaining suitable water quality. He indicated strong opposition to recycling backwash because of high levels of aluminum, DBPs, Giardia, and other parasites and bacteria. At the same time he suggested that each case should be handled and evaluated individually in recognition of the importance of water conservation in some areas.

The SERs that do currently recycle had a different perspective. One stated that the only practical alternative (if recycling is banned) would be to send the backwash to the local sewage treatment plant, and that would be very expensive based on experience with costs for sludge discharge.

Another indicated that there would be a significant increase in chemical usage to make up for the recirculation effect and estimated the additional cost at $18,000/year. He further indicated his relief that a complete ban on recycling was apparently not likely.

Another SER indicated that while a backwash rule might be a big problem for large systems which would have high capital costs to comply, small package plants like his usually deal with backwash in a better way to minimize the health effects of recycling. He noted that most small package plants recycle to the head of the plant.

Finally, a SER representing a water district with many small systems commented that in California and other western states where water use is periodically restricted for conservation purposes, increased quantities of disposal water (that may result from process changes to meet the new turbidity requirements) create a conflicting message for the public and may lead to pressure for increased use of recycling. This SER further stated that recycling of the water to mitigate this impact adds a significant expense to the small system. He did not indicate how many of his systems practice recycling.

Require That Recycle Flows Be Introduced at the Head of the Plant

A SER stated that recycling to the head of the plant should be mandatory for any recycling. Another SER stated that most small systems recycle to the beginning of the process. There was no disagreement that this was good engineering practice if recycling was to be done at all.

Require Flow Equalization for all Recycle Water

Sedimentation

A SER stated that some sedimentation occurs in his recycling basin because of detention time (about six hours) caused by flow equalization, despite the fact that overflow through the fixed orifice begins as a backwash starts.

Another SER stated that as a result of changing from alum to Ultrion 8155 and optimizing filter performance and sludge removal practices, the average turbidity of finished water has been reduced from .25 to .06 NTU. Based on settleability tests, they have determined that a 10-minute settling period after each backwash is appropriate.

Finally, as noted previously, a SER who questioned the need for greater regulatory emphasis on backwash recycle at all nonetheless agreed that simple steps such as flow equalization and/or sedimentation might be appropriate for small systems.

Sedimentation with Polymer

A SER stated that polymer addition could be accomplished with little problem.

Coagulation/Flocculation/Sedimentation

A SER remarked the addition of a separate treatment plant for recycling seems cost prohibitive. Another SER agreed that this is not a practical alternative. A third SER commented that the costs to monitor, pipe, equalize, coagulate, flocculate, and settle recycle water would be very difficult for small plants with limited staff. This SER thought that recycling of backwash would only be worthwhile in arid regions.

Dissolved Air Flotation

A SER stated that Dissolved Air Flotation (DAF) seems practical for new plants, but was not sure of its feasibility in retrofitting existing facilities.

Membranes

A SER stated that membranes are impractical for treating backwash water and other recycle streams because of fouling. Another SER commented that package plants include more and more permutations of membrane technologies. The SER asked how membrane systems that produce a constant concentrate, sometimes at high ratios to effluent would be effected by the FBR.

Flow Equalization Monitoring

A SER recommended that if a small system is capable of demonstrating proper equalization with its recycle system, that it should not have to do any more monitoring. The SER felt that installing automatic monitoring would be difficult and costly. The SER recommended keeping the process simple; the SERs system consists of a simple hole two inches in diameter cored in the wall of the backwash retention basin. The SER further stated it takes about six hours for a filter wash to drain through this hole, allowing some settling to occur. The SER explained that overflow rates can easily be determined from backwash volume, holding basin volume, and the time it takes to empty the basin. This flow can then be compared to plant minimum influent flows to determine maximum recycled flow. The SER recommended that as long as this calculates to a rate not exceeding 5 percent of plant influent, then the system should be deemed compliant.

Other Comments:

- A SER commented that, in general, there will be some economic impacts to small systems in additional staff times and responsibilities, but to small systems, every additional man hour has a significant impact on the finances of the entity and its customers.
- One SER commented that EPA's estimate of backwash water volume as 3 to 6 percent of total production is low. In this SER's experience, backwash flow, including a rinse cycle, amounts to 9 to 11 percent of production. This SER also noted that California limits recycle flows to 10% of production.
- One SER stated that recycle streams such as lab sinks and floor drains should be banned. Another indicated that some of the 19 waste streams listed by EPA, "seemed like good candidates for control," but preferred to see these addressed through an individual system approach, with assistance from state and federal health authorities.

- One SER noted that his cost for a recycle basin 70' L by 25' W by 12' D was approximately $135,000 in 1975. *[The Panel notes that this is considerably higher than EPA's estimates for recycle basin costs.]*

6.2 Summary of Oral Comments (9/25 Teleconference)

A SER voiced his concerns that a general rule governing all systems would be proposed, but added his approval of EPA's attempts to identify specific problem areas.

Ban on Recycle

A SER commented that his plant considered the cost of "wasting" all of its filter backwash water. Wasting the filter backwash water means that none of it will be recycled or reused in the plant. The SER's system has a design flow of 1.7 mgd and an average flow of 0.16 to 0.17 mgd. However, in the summertime, the flow is very close to the design flow. To waste the backwash water, the system would have to build a piping system that sends the backwash water to a lagoon three miles up the road; a lift station of a wastewater treatment plant. This method would cost the system $1.052 per thousand gallons. The system would waste an average of 100,000 to 120,000 gallons per day.

A SER inquired which waste streams were being considered by EPA with regards to a ban. The SER stated that his facility only recycles filter to waste and no other waste streams.

A SER concurred that labs should be prohibited from recycling water from floor and lab drains and roof drains. He recommended that solids should be considered in the ban as well.

Require That Recycle Flows Be Introduced at the Head of the Plant

A SER commented that backwash water should be recycled to the head of the plant to obtain full treatment.

Require Flow Equalization for all Recycle Water

A SER inquired about the flow equalization methods used by other SERs. A SER responded that in the past his system was slugging whole backwash, however the system recently installed a bigger basin and bleeds in backwash flow at a rate of 3% of raw water influent flow.

Another SER commented that flow equalization is the best method for dealing with filter backwash water because it is easy to accomplish and the best alternative in terms of costs.

One SER stated that their backwash recovery system includes three compartmental parts on a 6" slope. Each compartment is lower than the previous compartment, allowing for gravity flow, thereby reducing energy costs. The water flows through each compartment by a 4" x 4" hole. This creates a baffling effect slowing the flow of the filter backwash water and allowing sedimentation to occur. The SER noted that recycling from this 3 compartment basin was not performed during backwash operations. The final compartment in this treatment train provides access to a recycling pump 6 feet above the compartment floor. This provides room between the filter backwash water and the sludge blanket on the bottom of the compartment. The filter backwash water is recycled to the head of the plant. The SER noted that the average source water turbidity is 1.4 NTU and the recycle water turbidity is 0.9 NTU.

Another SER stated that to equalize filter backwash flow, he made modifications to an existing basin. Although a basin was in place, a plug flow to the headworks still existed to recycle backwash because of insufficient capacity in the basin. Originally, backwash water was pumped from the basin overflow weir to the head of the plant. To increase capacity and reduce the percent of filter backwash being recycled, a two inch core was drilled in the wall of the basin. The hole regulates the flow out of the basin that is pumped to the headworks. The position of the hole reduces the standing volume retained in the basin. By lowering the standing volume, the filter of backwash water does not overflow from the basin. Additionally, the two inch hole equalizes the recycle backwash by restricting flow from the basin, allowing some settling.

Issues Affecting Cost and Burden

One SER responded that his system uses three filters at 500 gpm and one pump which pumps 1100 gpm. The optimum performance of the plant is 1250 gpm and the system runs one pump at a time. They shut the resurge off, thus no backwash is recirculated into the system. The backwash flows back into a basin, for flow equalization.

A SER commented that it was not cost effective for his system to backwash water. His plant put in a drainfield at a cost of $60,000, which included the decant tank and electronic pump. The drainfield is at a depth of 6 ft; 2 ft below the frost level. His system has a design flow of 1.2 mgd with a yearly average flow of 400,000 gallons per day.

A SER commented that his plant was built in 1927 and they obviously don't have any plans of building a basin and thus would have a difficult time evaluating costs.

Other Comments

- A SER commented that his greatest concern is in regards to the lack of viability in testing for *Cryptosporidium*. He stated that he has seen nothing in print that demonstrates the viability of *Cryptosporidium* and other protozoan testing. He stated that in order to "sell this rule" to the community, he must first identify a clear problem.
- A second SER reiterated that there was little research to substantiate the need for the testing and quoted an article from the May, 1998, issue of AWWARF which presented a view that testing was not viable.

- A SER commented on an issue of Water Week, that discusses a Maryland based contractor for the CDC exploring alternative options to testing, such as a flow cytometer method.

7. PANEL FINDINGS AND DISCUSSION

The Panel's findings and discussions are based on the information available at the time this report was drafted. EPA is continuing to conduct analyses relevant to developing the rule, and additional information may be obtained via this process and from public comment on the rule. Any options the Panel has identified for reducing the rule's regulatory impact on small entities may require further analysis and/or data collection to ensure the options are practical, enforceable, environmentally sound, and consistent with the Safe Drinking Water Act.

When EPA originally convened this Panel on August 21, SBA stated its belief that the Panel had been convened prematurely. At that time, EPA had not yet prepared for the SERs cost estimates for the various regulatory options. However, this data was provided to the SERs on September 17. Based on this data, the Panel had a particularly useful conversation with the SERs on September 25 regarding the accuracy of the costs. SBA and OMB encourage the Agency to convene future Panels when more technical and cost information about the rule has been developed. This would permit significant and timely comments from the SERs during the sixty day Panel deliberations.

7.1 Number of Small Entities

No commenters questioned the information provided by EPA on the number and types of small entities which may be impacted by the FBR. Because EPA maintains the national Safe Drinking Water Information System (SDWIS) database, with information about all public water systems in the country, the Panel believes EPA has good information on the covered number of surface water systems, most of which use filtration and thus will be covered by this rule. EPA's estimate of the number of ground water systems that filter (7,628) is also based on information contained within SDWIS and the 1995 Community Water Survey. Most of these systems are small (i.e., serve <10,000 people).

7.2 Record Keeping, Reporting and Other Compliance Requirements

EPA provided cost and burden estimates concerning the regulatory components, where appropriate. Necessarily these costs are in the early stages of development and require refinement. In response to the costs and burdens presented, SERs had several concerns in meetings which were elaborated on in written comments. These are summarized in the preceding section. The Panel suggests that EPA carefully consider all of these comments as it refines its cost and burden estimates.

The Panel notes that two of the regulatory components developed by EPA were deemed by SERs to be too costly for small systems to implement (ban on recycle, installation of additional treatment trains). These are discussed further below under regulatory alternatives.

The Panel also notes a common concern raised by most of the SERs. Small systems often do not have operators on duty full time and/or their operators often have other duties besides operating the treatment plant. The Panel urges EPA to keep this limitation in mind as it develops options, and to try to minimize the burden placed on systems whose operators are already tasked with other time-consuming requirements.

7.3 Interaction with Other Federal Rules

No comments were received regarding interaction, overlap or conflict with other federal rules. The Panel notes, however, that the FBR, LT1, and Stage 1 DBP rules will affect small systems simultaneously. EPA should analyze the net impact of all of these rules and consider regulatory options that would minimize impacts on small systems.

7.4 Regulatory Alternatives

EPA presented several regulatory alternatives for this rule to SERs and SERs commented on each of these. A description of each alternative, along with Panel recommendations, is provided below.

<u>Ban on Recycle</u> - The Panel notes the concerns of those SERs that currently recycle regarding a ban on recycle of filter backwash water. These concerns included the expense of filter backwash disposal and the economic and operational concerns of western and southwestern drinking water systems which depend on recycled flow to maintain adequate supply. The Panel strongly recommends that EPA explore alternatives to an outright ban on the recycle of filter backwash and other recycle flows. Discussions during the September 25, 1998, conference call focused on a possible ban on other, generally lower volume flows such as lab floor drains, roof drains or sediment basin solids. Some SERs agreed that a ban on recycle of some of these flows would be appropriate. The Panel recommends that EPA further investigate the extent to which such waste streams are currently being recycled, their potential for public health risk, and the impacts to small systems of banning their reuse.

<u>Recycle to the Head of the Plant</u> - The Panel notes that SERs supported a requirement that all recycled water be reintroduced at the headworks of the plant; this was considered an element of sound engineering practice. The Panel recommends that EPA consider including such a requirement in the proposed rule. EPA should also investigate whether there are small systems for which such a requirement would present a significant financial or operational burden.

<u>Flow Equalization</u> - The Panel also notes that SERs generally agreed with the appropriateness of flow equalization for filter backwash that is being recycled. Several SERs noted this was standard practice. Commenters supported the concept of flow equalization as a means to minimize backwash water hydraulic surges and the “slugged” reintroduction of contaminants to the plant. Several SERs indicated that they had discontinued their previous practice of introducing slugged loads of recycled backwash. The Panel notes that there are various ways of achieving flow equalization and suggests that specific requirements remain flexible. The experience of one SER who implemented equalization

merely by drilling a hole in the backwash retention basin wall provides an example of how systems can achieve results by using simple and cost-effective means.

Installation of Treatment - The Panel notes the concerns of SERs regarding the installation of additional treatment, solely for the purpose of treating filter backwash water and/or recycle streams. While SERs believed the installation of a separate treatment train to treat recycled backwash water would not be financially viable for small systems, they did support consideration of some form of settling or sedimentation of recycled water before sending it back to the head of the plant. EPA presented preliminary costs of various treatment scenarios in an effort to gauge capital improvement costs for small systems under such a possible component. For the most part, SERs felt that costs were accurate, but noted that these costs may not be affordable for small systems.

Finally, the Panel discussed an alternative approach under which, rather than specifying a uniform set of requirements that applied to all systems, the rule would establish a procedure for identifying high priority or high risk systems, assessing the elements of these systems' operational practices that may be creating a risk, and incrementally modifying their operations to address the risk on a system-specific basis. This approach would be consistent with the perspective of several SERs who noted the complexity and variability of treatment practices across systems and the difficulty of specifying a uniform set of treatment requirements that would be appropriate for every system. The Panel strongly supports this approach and recommends that EPA give it serious consideration.

7.5 Other Comments

One SER suggested that a phased or multi-tiered approach be considered allowing different phase-in periods for smaller systems to comply with the rule. The Panel encourages EPA to consider such a phased implementation or tiering approach in the development of this rule.

The Panel also recommends that EPA specifically examine whether these regulatory alternatives affect package water systems differently than other water systems, and consider any such differences when developing the FBR.

Finally, the Panel notes the concerns of SERs regarding the limited evidence of public health problems resulting from current backwash practices. At the same time, the Panel notes that EPA's general approach is to be precautionary and address potential problems as well as fully documented ones. SERs did not disagree that improper recycle of backwash could jeopardize system performance and generally supported simple measures, such as recycle to the head of the plant and some degree of sedimentation, as good engineering practice. The Panel agrees that such measures are appropriate to address the potential public health threat from improper recycle of filter backwash.