OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Evaluation Report

Much Effort and Resources Needed to Help Small Drinking Water Systems Overcome Challenges

Report No. 2006-P-00026

May 30, 2006

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Abbreviations

CDC	Centers for Disease Control and Prevention
DWSRF	Drinking Water State Revolving Fund
EPA	U.S. Environmental Protection Agency
OGWDW	Office of Ground Water and Drinking Water
OIG	Office of Inspector General
RCAP	Rural Community Assistance Partnership
RWA	Rural Water Association
SDWA	Safe Drinking Water Act

Cover photo: A girl drinking glass of water from sink (United States Geological Survey photo)

U.S. Environmental Protection Agency
Office of Inspector General

2006-P-00026
May 30, 2006

At a Glance

Catalyst for Improving the Environment

Why We Did This Review

We conducted this review to examine the challenges faced by small drinking water systems in providing water that is safe to drink and the adequacy of U.S. Environmental Protection Agency (EPA) and State initiatives for addressing those challenges.

Background

EPA classifies public water systems according to the number of people they serve, the source of the water, and whether they serve the same customers year-round or on an occasional basis. There are approximately 54,000 community water systems of which 85 percent are small (501 to 3,300 people) or very small (25 to 500 people), serving 10 percent of this Nation's population.

For further information, contact our Office of Congressional and Public Liaison at (202) 566-2391.

To view the full report, click on the following link:
www.epa.gov/oig/reports/2006/20060530-2006-P-00026.pdf

Much Effort and Resources Needed to Help Small Drinking Water Systems Overcome Challenges

What We Found

The critical issues facing small drinking systems have not changed in recent years. Our preliminary research suggests that they have faced and still face a multitude of challenges that fall into two basic categories: financial/management matters and regulatory/compliance issues.

Government and nongovernment organizations have attempted many different initiatives and approaches to assist small drinking water systems in overcoming their challenges. We noted several State and third party initiatives that could be used for best practices. While it is difficult to measure the effectiveness of individual EPA and State activities to assist small drinking water systems, our preliminary research provided indicators of success as well as limitations of these approaches.

Limited data exist on the health impacts related to small drinking water systems. The Centers for Disease Control and Prevention maintains the data system on drinking water cases, but states that the information is vastly underreported. That is not to say that the potential for health impacts is not something to be taken seriously. Some data show health outbreaks related to small drinking water systems.

What We Recommend

We recommend that EPA work with States to identify successful approaches for working with small systems to obtain financing. We also recommend the Agency work closer with States to identify and compile small system best practices and establish a method for disseminating the information, to maximize limited resources to assist small systems. Our recommendations in this report, while necessary, will not in themselves solve small system problems in their entirety.

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

OFFICE OF
INSPECTOR GENERAL

May 30, 2006

SUBJECT: Much Effort and Resources Needed to Help Small Drinking Water Systems Overcome Challenges
Report No. 2006-P-00026

TO: Benjamin Grumbles
Assistant Administrator for Water

This is our report on the subject evaluation conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA). This report contains findings that describe problems the OIG has identified and corrective actions the OIG recommends. This report represents the opinion of the OIG and does not necessarily represent the final EPA position. Final determinations on matters in this report will be made by EPA managers in accordance with established resolution procedures.

On March 14, 2006, the OIG issued a draft report to EPA for review and comment. A response was submitted on April 20, 2006, and an exit conference was held on May 8, 2006. EPA agreed that many small water systems lack adequate technical, managerial, and financial capacity to operate in a sustainable manner and stated that its efforts have brought about improvements. EPA generally concurred with our recommendations, but suggested some changes to recognize activities that are underway. EPA also requested the deletion of one recommendation on regulatory approach because EPA has attempted to reduce the burden of regulations on small systems by providing flexibility. The OIG has incorporated these comments, as well as technical corrections and supplemental information provided by EPA, into the final report.

Action Required

In accordance with EPA Manual 2750, you are required to provide a written response to this report within 90 calendar days. You should include a corrective actions plan for agreed upon actions, including milestone dates. We have no objections to the further release of this report to the public. This report will be available at http://www.epa.gov/oig. If you or your staff have any questions, please contact me at (202) 566-0847 or Dan Engelberg at (202) 566-0830.

Sincerely,

Bill A. Roderick
Acting Inspector General

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Chapter 1
Introduction

Purpose

The EPA Strategic Plan stated that small community water systems are more likely than others to have difficulty complying with drinking water standards. We conducted preliminary research to examine the challenges faced by small drinking water systems in providing water that is safe to drink and the adequacy of EPA and State initiatives for addressing those challenges. More specifically, we directed our work toward the following questions:

1. What challenges do small drinking systems face to assure that drinking water meets current and future Safe Drinking Water Act (SDWA) requirements?
2. What approaches are EPA, States, and drinking water systems using to overcome these challenges?
3. How effective are EPA and the States in assisting small drinking water systems to meet drinking water requirements?
4. What is the impact of these efforts on the health of consumers of drinking water from small systems?

Background

EPA classifies public water systems according to the number of people they serve, the source of the water, and whether they serve the same customers year-round or occasionally. Public water systems provide water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serve an average of at least 25 people for at least 60 days a year. EPA has defined three types of public water systems:

Table 1.1: Types of Public Water Systems

Type	Description
Community Water System	Supplies water to the same population year-round.
Non-Transient Non-Community Water System	Regularly supplies water to at least 25 of the same people at least 6 months per year, but not year-round. Some examples are schools, factories, office buildings, and hospitals that have their own water systems.
Transient Non-Community Water System	Provides water in a place such as a gas station or campground where people do not remain for long periods.

EPA also classifies water systems according to the number of people they serve:

Table 1.2: Number of People Served by Public Water Systems

Size of System	Number of People Served
Very small	25-500
Small	501-3,300
Medium	3,301-10,000
Large	10,001-100,000
Very large	100,001+

SDWA was passed by Congress to protect public health by regulating the nation's public drinking water supply. SDWA authorized EPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants. EPA, States, and water systems then work together to make sure that these standards are met.

Approximately 54,000 community water systems exist, of which 85 percent are small or very small, serving 10 percent of the population.

Scope and Methodology

We performed our evaluation in accordance with *Government Auditing Standards,* issued by the Comptroller General of the United States. We conducted our preliminary research from June 2005 through December 2005. Preliminary research is a fact-finding process to obtain operational, performance, financial, and other program information. Therefore, a preliminary research report (like this one) is not as complete or thorough as a field work one. To gain a broad perspective of small drinking water issues, we reviewed various agency, trade, industry, and academic journals, reports, and Web sites and attended the Association of State Drinking Water Administrators national conference. We also interviewed staff at EPA's Office of Ground Water and Drinking Water (OGWDW) and Regions 1 and 7; State environmental and health offices in Maine, Massachusetts, and Kansas; 9 third party assistance organizations; and 19 small community drinking water systems (see Appendix A). To obtain additional insight on our health objective, we interviewed a member of the National Drinking Water Advisory Council.

We selected the States based on several factors, including (1) difference of approaches, (2) geographic diversity, (3) number of third party organizations, and (4) number and proportion of small systems. We avoided selecting States that had been recently visited during other Office of Inspector General drinking water assignments. We also avoided selecting States that were in the midst of dealing with hurricane-related concerns. To aid in our decision making, we sought the

advice of OGWDW for State selection, and States and third party organizations for small system selections, because of their greater familiarity with the program. Our study was limited to community water systems; the majority of systems visited were very small ones, since they probably faced the greatest challenges. Although our conclusions are drawn from commonalities among participants, this study did not employ a statistical sampling approach.

The OIG has not performed any previous work specifically on the small drinking water systems. However, the following recent reports have detailed some issues related to small systems:

- *Progress Report on Drinking Water Protection Efforts* (2005-P-00021), August 22, 2005

- *Source Water Assessment and Protection Programs Show Initial Promise, But Obstacles Remain* (2005-P-00013), March 28, 2005

Chapter 2
Small Systems Face Many Challenges

Small drinking water systems have faced and still face a multitude of challenges.[1] Our preliminary research suggests that these challenges basically fall into two categories: financial/management matters and regulatory/compliance issues, though the two categories are interrelated. EPA officials have noted that the critical issues facing small systems have not changed much over the past 20 years. Our preliminary research work through literature reviews and discussions with officials at all the levels corroborated that observation.

Financial/Management Challenges

Small drinking water systems face many challenges that fall under this category including lack of financial resources, insufficient revenue, aging infrastructure, difficulties obtaining financial assistance, cost of scale, management limitations, lack of long-term planning, and system operator issues. These affect the regulatory/compliance challenges to be discussed (see page 10). Almost half (9 of 19, or 47 percent) of the small systems visited mentioned financial issues as a challenge.

Lack of Financial Resources

A 1997 report by the National Academy of Sciences stated, "Small communities face the greatest difficulty in supplying water of adequate quality and quantity because they have small customer bases and therefore often lack the revenues needed to hire experienced managers and to maintain and upgrade their water supply facilities."[2] This limited financial capacity was echoed by groups such as the National Drinking Water Advisory Council, the National Regulatory Research Institute, the National Rural Water Association, and the Universities Council on Water Resources.

The lack of financial resources was brought up at each level of our site visits. For example, OGWDW staff members pointed out parts of the country have

[1] Congress tried to address some of these challenges with the SDWA Amendments of 1996. The Amendments contained provisions to help States and water systems (including small ones) improve public health protection, including (1) assessing water sources, (2) certifying system operators, (3) improving the technical, managerial, and financial capacity of water systems, (4) providing funding for infrastructure improvements, (5) providing funding to States, and (6) keeping the public informed. An August 2005 OIG report (*Progress Report on Drinking Water Protection Efforts*, 2005-P-0021, August 22, 2005) discussed some of the progress made as a result of the Amendments.

[2] National Academy of Sciences, Committee on Small Water Supply Systems, Water Science and Technology Board, Commission on Geosciences, Environment, and Resources, National Resource Council, *Safe Water From Every Tap – Improving Water Services to Small Communities*.

communities that are losing population; this loss reduces the fee or rate base of the utility. The Chief, Drinking Water Management Branch, Region 7, stated that financial capabilities top the list of small drinking water system challenges. She further noted that no revenue base for small systems exists. State of Maine officials cited a lack of money to install treatment systems as an issue facing small systems. The Massachusetts Rural Community Assistance Partnership (RCAP) indicated that many systems lack adequate capacity and do not have the funding. The Massachusetts Water Works Association said it was more difficult for small systems to address issues when more money is needed and financial assistance is unavailable. Eight of the 19 systems we visited mentioned a need for funding to address problems. A Massachusetts water district superintendent stated that his greatest concern was money for plant operations and debt payment. The customer base had diminished with large industry moving away. All five Kansas systems visited were poor communities with very poor financial bases.

Insufficient Revenue

One factor contributing to the strain of financial resources is receiving adequate revenue from users. The need to increase water rates can be affected by political concerns and weak financial bases. In May 2004, a group of international experts meeting on small water systems reported[3] balancing system needs with costs as a challenge faced by system managers. The experts indicated that board members and elected officials may be reluctant to raise rates, or have conflicting priorities when it came to distributing funds. Articles in National Rural Water Association and University of Council of Water Resources publications have highlighted avoidance or infrequent rate increases as difficulties faced by water managers. One author stated that many systems have never analyzed their rates and almost none do it annually. He further stated that elected boards tend to believe their role is to keep rates low.

An article[4] by an Environmental Finance Center official stated that another factor contributing to the problem of sustaining financial capacity is customer perception of the cost of service. Even if water is under-priced, customers will react to any increase in charges or costs regardless of their legitimacy. Customers react with "sticker shock" to rapid or significant price increases necessary to compensate for delays in system improvements or failures to properly reserve resources for future capital improvements.

Our visits and interviews found examples of rate increase resistance. Maine RCAP officials spoke of very small systems being leery of rate increases. Also, 5 of the 19 small systems visited discussed the difficulty of getting a rate increase as a problem. A Massachusetts water system had not had a rate increase in

[3] Tim Ford, Gretchen Rupp, Phillip Butterfield, and Anne Camper, compilers, *Protecting Public Health in Small Water Systems*, Report of International Colloquium, January 2005.
[4] William Jarocki, *Funding the Future: Meeting the Costs of Capital Replacement*, Journal of Contemporary Water, pp. 21-26.

approximately 15 years because town approval was not likely. A Kansas system pointed to a majority of the town's population being elderly or below the poverty level as the reason for low rate increases.

Aging Infrastructure

One of the biggest costs facing drinking water systems is maintaining and replacing infrastructure. The most recent report to Congress on drinking water infrastructure needs[5] (June 2005) shows that small system needs are estimated at $34.2 billion. Aging infrastructure needs to be replaced to assure water quality and compliance with drinking water regulations.

The challenge of aging infrastructure has been addressed by many reports and publications. A 2000 Midwest Technology Assistance Center study on economic and managerial capacity for small systems[6] found that the main topic for most small systems was a need to replace antiquated and inadequate infrastructure. Over a 5- year period of financial capacity reviews, the Environmental Finance Center at Boise State University[7] found that 78 percent of Idaho systems presented no evidence that future infrastructure needs had been identified

Third-party organizations we visited described infrastructure concerns. According to the Executive Director of the Maine Rural Water Association (RWA), water systems are reaching their natural life expectancy of 50 to 80 years and fewer dollars and grant monies are available for infrastructure than in prior years. The Executive Director of the Massachusetts Water Works Association stated that small systems have a continuing larger infrastructure need while operating day-to-day. Small systems, she said, will have to wait until new requirements are in place before they can consider any infrastructure improvements, since they do not want to chance spending money on proposals that may not occur.

Seven of the small systems we visited mentioned aging infrastructure as a challenge. A Massachusetts water district indicated that as water leaks occur, replacement work is done. No money exists for capital improvements. One Maine system described needing $1.5 million to make its water system safe from a potentially dangerous health hazard, as its system infrastructure has water lines directly below septic systems. Several of the Kansas systems have been unable to comply with recently enacted drinking water regulations and cannot afford the necessary system upgrades to bring them into compliance.

[5] U.S. Environmental Protection Agency, *Drinking Water Infrastructure Needs Survey and Assessment, Third Report to Congress*, EPA-816-R-05-001, June 2005.
[6] Jarocki, pp. 21-26.
[7] Ibid.

Difficulties Obtaining Financial Assistance

Small water systems found it more difficult to obtain necessary funding to address financial needs. Both the 2000 National Drinking Water Advisory Council report[8] and an article in the 2004 Universities Council on Water Resources Journal[9] identify the availability and affordability of financing as a small system challenge.

Both regions we interviewed indicated that the ability of small systems to obtain loans, especially from the Drinking Water State Revolving Fund (DWSRF), is an impediment. States and third parties also raised concern. Massachusetts officials stated that there is a lot of paper work for systems to apply for loans. Generally, if an amount is less than $100,000 it is not cost-efficient for a small system to complete a DWSRF loan application. Massachusetts RCAP stated that less DWSRF funding was going to communities and small systems have little capacity to obtain funds. The Massachusetts Water Works Association said that the DWSRF loan application process for small systems is both cumbersome and costly. In some cases, it is cost-prohibitive for the amount of loan money sought.

Only 1 of the 19 small systems we visited received a loan/grant from the DWSRF. Four systems obtained loans from the U.S. Department of Agriculture and one got a commercial loan (EPA is only one of several Federal agencies that provides funding for drinking water needs). Maine mobile home park owners had to sell some of their other properties to cover $50,000 in drinking water related costs. Only a few of the visited systems commented on the DWSRF process. Three systems indicated they did not qualify or were rejected, while one system said it stayed away from government loans and would rather pay cash.

Cost of Scale

It is more difficult for small systems to spread costs among their customers to operate and maintain their systems. The 2001 drinking water needs report to Congress[10] stated that project costs for small systems are modest to larger ones; however, costs per household are significantly higher than those associated with the larger systems. This disparity results in many of the challenges we discuss.

Several 2004 Universities Council of Water Resources articles address this topic. One states[11] that economies of size are significant in water system operation and have a profound effect on system management. These smallest systems are at a

[8] U.S. Environmental Protection Agency, *Report of the National Drinking Water Advisory Council Small Systems Implementation Work Group*, EPA-816-R-00-012, April 2000.
[9] Universities Council on Water Resources, *Journal of Contemporary Water Research & Education*, Issue 128, June 2004.
[10] U.S. Environmental Protection Agency, *Drinking Water Infrastructure Needs Survey and Assessment, Second Report to Congress*, EPA-816-R-01-004, February 2001.
[11] Ben Dziegielewski and Tom Bik, *Technical Assistance Needs and Research Priorities for Small Community Water Systems*, Journal of Contemporary Water, pp. 13-20.

distinct economic disadvantage. A second states[12] that small systems, lacking economies of scale, are frequently poorly funded. They commonly operate at a loss on an operating cost basis. A third states[13] that a distinction is made with very small systems since they are the systems most likely to be lacking technical, financial, and management capacity. An economy of scale exists for the number of users that water systems must have to be sustainable and very small systems typically fall below it. Both the Massachusetts Department of Environmental Protection and Massachusetts RCAP specifically brought up the challenge of economy of scale.

Management Limitations

Managerial capacity has been recognized for some time as a key component to successful operation. Small systems are acutely affected because their management many times is in the hands of a few individuals for whom a drinking water operation is not their sole occupation.

Many reports and articles have addressed this theme. Two University of Illinois authors writing about the importance of water system management stated[14] that many small communities are hard-pressed to evaluate needed improvements, raise funds, and manage the more sophisticated systems required to meet new drinking water standards. Most have part-time officials and few staff members to plan, oversee, and manage infrastructure improvements. The 2000 Midwest Technology Assistance Center study noted that poor water system management often reflected poor community management.

The Region 7 Drinking Water Management Branch Chief said that two of the most difficult challenges facing small systems were the stability of a water system to maintain staff members that have the technical knowledge, and the ability and know-how to manage on a day-to-day basis.

The third-party organizations we visited identified poor management as a concern. For example, according to Massachusetts RCAP, many systems lack adequate capacity and do not have the leadership. Maine RCAP stated that the overall strength or weakness of a system lies in its water boards and the overall strength is lacking. Massachusetts RWA discussed the absence of management at small systems. The Executive Director of the Massachusetts Water Works Association talked about the constant change of small system ownership, which negatively impacts implementing rules.

[12] Carl E. Brown, *Making Small Water Systems Strong*, Journal of Contemporary Water, pp. 27-30.
[13] Jim Maras, Economic and Financial Capacity of Small Water Systems, Journal of Contemporary Water, pp. 31-34.
[14] John B. Braden and Philip C. Mankin, Ecnomic and Financial Management of Small Water Systems: Issue Introduction, Journal of Contemporary Water, pp. 1-5.

Obviously, the systems we visited did not identify poor management as a current concern because it might reflect on them. However, we were told several times that people did not have enough time to understand the regulations or complete necessary paperwork. One Massachusetts system discussed the neglect of the previous water board that had mired the system in noncompliance issues. One operator described the water system's commissioners as "not too smart" and not taking advantage of any provided training. We heard of system managers who were only part-timers (e.g., school bus driver, volunteer) or had until recently performed other professions (e.g., nursing technician).

Lack of Long-Term Planning

One aspect of poor management that carries over to some of the other challenges is planning deficiencies. The challenge of long-term planning was cited in National Drinking Water Advisory Council, International Colloquium, and the Universities Council on Water Resources articles and reports. One third-party organization commented on this topic. Maine RCAP stated that water systems do no planning and do not look to the future.

Most systems visited did not discuss long-term planning, since they were mainly focused on current issues. For example, four of the systems were not even aware of how new pending regulations might affect them. However, one Massachusetts water district indicated that a challenge for the future will be infrastructure needs and no planning has occurred for future work.

System Operator Issues

Water system operators are key players in assuring the safe drinking water is provided to the public. While the challenges discussed so far reflect managerial and financial capacity concerns, operator issues reflect water system technical capacity concerns. Many challenges involve or face operators, which reflect the microcosm of challenges that confront small systems (financial/management, regulatory/compliance).

The January 2005 International Colloquium report[15] listed many of the specific challenges faced by small system operators:

- Multiplicity of regulations, which can be confusing. Not always obvious to operator responsible for compliance why regulations exist or whether they apply to all systems.
- Older operators may have difficulty understanding new technologies (insufficient training opportunities, poor reading skills).
- When older operators retire, there is limited ability or opportunity to pass on historical operation knowledge to new operators.
- Part-time or volunteer operators.

[15] Tim Ford et al.

- Lack of available training, or few incentives to take training.
- Inability to attend training because of lack of backup operators.
- Shortage of new people to replace retiring operators (exacerbated by poor pay and low status of job).
- Operators may not have influence to take protective health measures that are in conflict with other financial demands on system or community.

The entities we visited discussed many of these same issues. Maine officials emphasized the high turnover rate of water system operators; very small system operators do not have the time to keep current with additional training. The New England Interstate Water Pollution Control Commission, Maine RCAP, Maine RWA, and Massachusetts RWA noted that keeping qualified system operators was a problem. Massachusetts RWA officials further stated the technology required of operators was "too large" for them. The New England Interstate Water Pollution Control Commission and Massachusetts RWA said that being an operator is not viewed as a profession by the public and thus these positions are not adequately funded or funded at all. Maine RWA emphasized this point by stating that a trained and licensed operator can go work at Wal-Mart® and get more pay and fringe benefits, with much less responsibility and liability.

Only one small system from Massachusetts specifically discussed overall operator issues. The Director of Public Works for the town said a major problem for systems is low pay, retention of qualified operators, and difficulty in getting people to step up and be responsible. Most other systems visited noted regulations issues (see below) or assistance and training received (see Chapters 3 and 4).

Regulatory/Compliance Challenges

Small drinking water systems face challenges of a regulatory/compliance nature: difficult to understand and burdensome regulations, compliance with current regulations, and compliance with future regulations. Many of these are as a result of the challenges described in the financial/management section. Of the 19 small systems we visited, 13 (68 percent) mentioned regulatory issues as a challenge.

Regulations Burdensome or Difficult to Understand

A July 2001 National Rural Water Association white paper[16] concluded that regulations have steadily increased since 1974 in both number and complexity and small water systems face a compounding effect. That is, compliance with one particular regulation may be much more difficult as result of one or more prior

[16] F. W. Pontius, *Compounding Effect of Drinking Water Regulations on Small Water Systems*, Rural Water Parnership White Paper (Duncan, Oklahoma: National Rural Water Association, July 4, 2001).

regulations. A later June 2004 white paper[17] noted the increasingly stringent regulatory requirements and the associated cost and technical complexity of compliance.

Massachusetts staff indicated that a major problem was that systems do not understand the rules which results in a need for technical assistance. They also stated that small systems have too much paperwork. Maine staff indicated that from a small system's perspective, the existing requirements, the reporting, and the impact of the new regulations will be burdensome.

Small systems we visited also weighed in on these issues. A Maine mobile home park operator stated that his greatest concern was the time to do necessary paperwork. He claimed to understand the regulations, but not why certain tests were needed. Another Maine mobile home owner expressed frustration with burdensome requirements and their impact on his system. He said he did not know what he would do, but "maybe just walk away from the system." A Massachusetts water district operator stated that too much time was required of systems to comply with regulations and the town could not pay someone to do all the work.

Compliance with Current Regulations

Several of the systems we visited in Massachusetts and Maine had been issued or were on enforcement documents and hence current compliance was not a challenge. Kansas staff discussed problems its small systems were having complying with the Stage 1 Disinfectant/Disinfection By-Products Rule. The challenge for systems with surface water as the source is infrastructure changes needed to comply with the maximum contaminant level requirements for Total Trihalomethanes and Five Haloacetic Acids. All five Kansas systems we visited faced this problem.

Compliance with Future Regulations

Many of the EPA regions, States, third parties, and small systems we visited mentioned future regulations as a challenge. These groups were concerned because EPA will be issuing new drinking water regulations soon, and their effect on small systems' operations and finances is uncertain.

According to the Chief of the Drinking Water Branch, Region 1, compliance with the Arsenic Rule will have the greatest impact on small systems; those systems without disinfection will be affected by the Ground Water Rule. Those States that have not monitored under Stage 1 will be quite heavily affected in implementing Stage 2 of the Disinfection By-Products Rule. According to Region 7, the

[17] Robert Raucher, Megan Harrod, and Marca Hagenstad, *Consolidation of Small Water Systems: What Are the Pros and Cons*, Rural Water Partnership White Paper (Duncan, Oklahoma, National Rural Water Association, June 29, 2004).

Radionuclides Rule and compliance will be an issue for some States and systems on a case-by-case basis, with many systems being in noncompliance. Region 7 has found that many systems with radionuclide problems also have arsenic ones.

Massachusetts' Chief, Drinking Water Program, said the Ground Water Rule will be a problem for most of the small systems because 90 percent of those that use ground water do not disinfect—maybe an especially costly situation because new equipment may be needed to comply with the rule. A major problem, according to Massachusetts staff, was that systems do not understand the rules, resulting in a need for technical assistance. Maine staff concurred with the impact this rule will have on its small systems.

Third-party organizations described future compliance issues faced by small systems. For example, the New England Interstate Water Pollution Control Commission is concerned with the revised Arsenic Rule and not sure how much EPA consideration was given to the burden placed on small systems – in particular the disposal of what is produced from the waste stream. Massachusetts RWA said the Ground Water, Disinfectant By-Products, and Arsenic Rules will impact the small systems; in particular those with ground water sources. In Massachusetts, the State's proposed maximum contaminant levels for perchlorate is creating concerns among system operators. The Executive Director of the Massachusetts Water Works Association said that the new regulations will be overwhelming to the very small systems. She added that EPA's concept of writing the rules as "one size fits all" does not fit all. Consideration should be given to personalizing or regionalizing a rule. Maine RWA indicated that while some small systems have recently spent money to upgrade their water filtration systems, they will have problems complying with the new regulations. Kansas RWA stated that the monitoring costs to test for C*ryptosporidium* and *Giardia* under the Long Term 2 Enhanced Surface Water Treatment Rule could be additionally imposing to the small systems.

Ten of the 19 small systems we visited also brought up future regulations as items of possible concern. One Maine water department operator stated that if EPA's rules become more stringent, many small systems will not be able to cope. This possible situation is due in part to the lack of experience, finances, technology, and the time to address the additional requirements. Several systems stated that they were not sure what the impact of future regulations would be on their systems.

Conclusion

Small drinking water systems face myriad challenges to assure good water quality and protect public health now and into the future. These challenges, whether they are financial/management or regulatory/compliance, are interrelated, have existed for some time, and will continue.

Recommendation

We recommend that the Assistant Administrator for Water:

2-1 Direct EPA work with States to identify successful approaches for working with small systems in the DWSRF program.

Agency Comment and OIG Evaluation

In its April 20, 2006 response, EPA stated that while it establishes the basic requirements of the DWSRF program, individual States implement them, thus there are actually 51 programs. EPA agreed that States should review their own processes to simplify and streamline them. The response stated that the law requires that 15 percent of DWSRF funds be provided to small systems serving fewer than 10,000, and national figures show that 39 percent of funding went to those entities. Statistics were provided showing that over half of the loans made since the program began were provided to small systems (serving 3,300 people or less). In response to Recommendation 2-1 the Agency stated it "will continue to work with states to identify best practices and share them with other states that are still facing challenges in funding small systems."

The ability to obtain necessary funding is a challenge that small systems face. We recognize that within the DWSRF process, it is the States that have primary responsibility for the program. Some States have been more successful than others in assisting small systems. The identification and sharing of this information can be beneficial to other States and we believe EPA, with its national influence, can facilitate that exchange. We have revised our recommendation to reflect EPA's role in the process.

The response also suggested that draft Recommendation 2-2 be dropped. The recommendation had asked EPA to determine whether a "one size fits all" regulatory approach could be changed to a "regionalized" one. EPA stated that while potential occurrence and related exposure to a contaminant may vary by region, the health effects do not. EPA develops regulations to protect the public from potential health risks due to drinking water, regardless of where they are or the size of the system. In doing so, regulations are established that are risk-based, as opposed to a "one size fits all" approach. Examples were provided relative to Long-Term 2 Enhanced Surface Water Treatment and Arsenic Rules as they relate to small systems. To reduce burden on small systems, EPA varies schedules and monitoring requirements by system size (and relative population served). In addition, to reduce monitoring costs for small filtered systems, more expensive monitoring is only required if specified trigger values are exceeded. With regard to arsenic, small systems were provided an additional two years to comply with the standard. Additionally, where warranted, States have the flexibility to provide eligible systems with exemptions that can provide an additional nine years to meet the standard.

The information provided in EPA's response is consistent with the flexible approach we were advocating in our draft recommendation. We believe small systems sometimes need to be dealt with differently than larger systems because of the specific challenges they face. Therefore, based on the EPA response, we are deleting the draft recommendation.

Chapter 3
Many Approaches Undertaken to Assist Small Systems

Many activities are being utilized to assist small drinking water systems in overcoming their challenges. EPA Headquarters, EPA regions, and States have all attempted different initiatives, several utilizing third-party organizations. Some address specific issues, while others cover a broad spectrum. Headquarters pursued a capacity development strategy and revised variance and exemption regulations. Region 1 used many of the Headquarters tools as part of its initiative; both Regions 1 and 7 had more directed initiatives for small systems concerning arsenic.

We noted during our preliminary research several State and third-party initiatives that could be used for best practices. Massachusetts extensively used a coalition of third-party organizations, while Kansas' initiatives sought to develop tools and programs that help water systems achieve and maintain financial and managerial capacity. Third-party efforts included a Massachusetts Water Works Association mentoring program, Maine RCAP working with several systems to establish a joint rate payer base, and Kansas RWA documents to aid water board/town council members.

This chapter details the approaches taken. The effectiveness of the approaches is discussed in Chapter 4.

EPA Headquarters Pursues Several Approaches

Headquarters' strategy for small systems, Capacity Development, is pursued with all drinking water systems. This strategy continues the approach advocated in the SDWA Amendments to ensure that water systems have adequate technical, management, and financial capacity. Headquarters has been focusing mainly on guidance documents and working through funds given to the Technical Assistance Centers and Environmental Finance Centers. A number of Simple Tools for Effective Performance documents and "targeted" quick reference guides have been issued to assist small systems. Regions have utilized these for their own initiatives (see Region 1 below). The Technical Assistance Centers are working on materials for board member training and security basics (additional details on Technical Assistance Center activities are provided at the end of this chapter). The Environmental Finance Centers are currently working on financial training for board members.

EPA also revised its variances and exemptions regulations on August 14, 1998, to create a new affordability-based small systems variance. Variances under SDWA allow a public water system to deviate from the maximum contaminant level of a national primary drinking water regulation under certain conditions when exceptionally poor source water conditions prevent compliance with that regulation. Exemptions under SDWA allow a public water system extra time to comply with a new national primary drinking water regulation. When operating under variances or exemptions, water systems must still provide drinking water that protects public health.

EPA Regional Initiatives Address System Concerns

Both the EPA regions we visited had their own initiatives to assist small drinking water systems address both categories of challenges presented in Chapter 2. Region 1 indicated that it utilized many of the Headquarters tools to assist small systems. For example, the region utilized the asset management tool developed by OGWDW: "Asset Management - A Handbook for Small Systems – One of the Simple Tools for Effective Performance (STEP) Series." In 2004, the Region provided funds to RCAP to design and conduct asset management training for key regional and State contacts throughout New England. The asset management "Train the Trainers" workshops were developed to train about budgets, capital improvement plans, life cycle costs, operation and maintenance costs, and proper rate structure.

The June 2004 Pocket Sampling Guide for Small Water Systems was developed by the New England Water Works Association, under an Assistance Agreement with Region 1. This sampling tool was modeled after two older versions produced by OGWDW. The region supported the effort to update the pocket guide to address noncompliance issues due to monitoring and reporting violations, advance the knowledge of new and existing regulations, and meet the needs of small systems for user friendly compliance assistance tools.

Other Region 1 initiatives included the following:

- The **"Got Computer**" **Project** was funded on a grant to the New England Rural Water Association. This pilot project was an attempt to meet the needs of some small systems in accessing the Internet, by providing water utilities with used and donated EPA computers.

- The **Technology List Server** was developed to give water system owners and operators an opportunity to ask questions, share experiences, and post information informally.

- The **Technology Advisory Board** was established in 2001 to serve as a regional forum for information exchange, technical discussion, and

priority setting about treatment and emerging technologies relating to water systems.

- An **Arsenic Initiative** was developed to assist small systems address this water quality concern. This initiative included data compilation, GIS (Geographic Information System) mapping, an arsenic costing tool, information transfers, circuit riders, and various meetings.

Region 7 also has an arsenic initiative for small systems. The regional staff's emphasis is on systems' use of EPA's Office of Research and Development grants and finding low cost treatment technologies for the systems to utilize (grants have been given to the University of Nebraska).

The Region's implementation plan (1) emphasizes regulatory flexibility to States and utilities, (2) identifies appropriate and affordable arsenic removal strategies for small systems, (3) identifies and promotes use of affordable funding options, (4) provides appropriate treatment technologies for water systems, and (5) implements an aggressive research to identify new affordable technologies.

States Take Various Approaches

The States we visited took different approaches to assist small systems. Some of these initiatives we believe can serve as best practices and should be shared with other States.

Massachusetts

Massachusetts extensively used a coalition of third-party assistance organizations. It provided its full 2-percent DWSRF set-aside to the Massachusetts Coalition for Small System Assistance, which was made up of the New England Water Works Association, Massachusetts Water Works Association, Massachusetts Rural Water Association, and RCAP.

Free Massachusetts Coalition for Small System Assistance services to public water system personnel were in the following areas: seminar series on diverse topics, one-on-one site visits, regional mentoring cooperatives, operator reimbursement training, and public awareness.

Massachusetts found it helpful to put systems on a compliance schedule. The State uses compliance measures as the method of determining if information is being communicated correctly to the systems or if they understand what they need to do. This allows the assistance organizations to provide the aid systems need to comply. Third-party assistance organizations are considered to wear the "white hats" by water systems because they are not responsible for enforcement, which is the State role. Therefore, these assistance organizations are better accepted and can provide the needed assistance.

Maine

Maine also worked closely with its third party organizations. The State partnered with such groups as Maine RWA and Maine RCAP to fund circuit riders and provide training to small systems.

Kansas

Kansas has taken a number of initiatives to assist small systems. Since 2002, the State has been involved with developing tools and programs that help water systems achieve and maintain financial and managerial capacity. These programs and tools are listed below.

Kancap. Under contract with Kansas RWA, an interactive CD and handbook (available on the disk) were developed that water system and governing board members can use as an educational tool as well as a reference guide, once training is completed. Many topics are on the disk, with an emphasis on managerial and financial responsibilities.

Financial Planning Tools and Assistance (In Process). Kansas contracted with the Environmental Finance Center at Boise State University to develop a Kansas-specific rate-setting and financial planning tool to be made available via the Internet to all water systems. The software was to be ready by the end of 2005.

Kansas contracted with a consulting firm to provide on-site financial planning assistance, including rate setting, budget review, and capital improvement planning. A report is provided to the systems with recommendations to help them achieve and maintain financial capacity.

Regional Public Water Supply Planning Grant Program. This program provides 50-percent matching funds for preliminary engineering studies that evaluate regional solutions to address system needs and challenges. Kansas uses a portion of the drinking water loan fund set-aside to provide up to $12,500 to match funding provided by project sponsors for the studies. It started in fiscal 2004; to date, three studies have been funded. Those studies have the potential to benefit a total of 19 public water supply systems.

Kansas Public Water Supply Loan Fund Program. The revolving fund provides financial assistance in the form of loans to municipalities at below market interest rates, for constructing public water supply system infrastructure. The loan fund is made possible by receiving capitalization grants from EPA. As new regulations are implemented, it is the State's intent that loans help systems meet challenges faced in achieving compliance. The State contracts with the Kansas Rural Water Finance Authority to conduct financial reviews of all systems applying for a loan.

Kansas Public Water Supply Loan Fund: Small System Technical Assistance 2 Percent Set-Aside. Technical assistance is provided to systems serving less than 10,000 through a contract with Kansas RWA. Kansas RWA will provide technical help to small systems to help comply with rules, develop and maintain proper operation and maintenance procedures, and develop appropriate management procedures and provide technical assistance to systems using surface water as their source of supply. Kansas RWA provides a minimum of 420 hours of onsite technical assistance.

Kansas is also focused on regionalizing (or consolidating) systems. This is not a forced program but can be mandated depending on case-by-case issues. Nonetheless, it is encouraged as small systems get into difficulty. Regionalizing systems is more common in the central and western parts of the State. (Consolidation is detailed more fully in Chapter 4.)

Third-Party Organization Assistance a Key Piece

Third-party organizations are active in assisting small systems, both as partners with EPA and States and on their own. They are a key player in the small system assistance process. Besides the approaches already described above (including the coordinated Massachusetts Coalition for Small System Assistance activity), some additional ones include the following.

Maine RCAP

RCAP's role is to aid systems in finding funding for improvements. Major problems for very small systems, especially with populations with low incomes, are they cannot keep up with plant improvements or they have an insufficient rate structure or user rate. An example of its efforts is its activity in Addison, Maine. The town has 65 households (200 people) with a ground water system and zero capacity development. A Maine RCAP official said many systems are like this in the State. RCAP is attempting to establish five systems on the same rate payer base with one operator. The overall benefit for the systems is that they would have an operator available to them for reporting, compliance, testing results, and any other pertinent issues. They also would share in the economy of scale for infrastructure issues. Both the State of Maine and Rural Development (at the U.S. Department of Agriculture) are supporting this initiative. Maine RCAP was able to get a local accounting firm to review the books *pro bono* and make corrections for the Addison water system. Massachusetts RCAP provided assistance to solve the technical problems. To date no operator has been hired.

Massachusetts Water Works Association

The Massachusetts Water Works Association independently provides 12 training sessions annually, in addition to the 20 to 25 training sessions that it does through

the Massachusetts Coalition for Small System Assistance contract. The Massachusetts Water Works Association provides very low cost training to water system operators while training provided under the coalition contract is free. The organization also does training sessions at vocational schools to identify job opportunities in the drinking water field. It addresses boards of health, day care centers, etc., to identify that, given the specifics, certain entities are in fact public water systems and are required to abide by the SDWA regulations. Some problems have occurred with local public health officials who are not fully aware of all water requirements.

The Massachusetts Water Works Association also performs mentoring. The mentoring sessions were designed to provide pertinent information to assist small water systems maintain regulatory compliance. An additional benefit was that the sessions provided an opportunity for small water system owners and operators to meet experienced water works professionals and develop a network of resources and contacts for obtaining additional information. A key component of the mentoring program is the corps of volunteers who serve as "mentors" at the mentoring sessions. The corps of volunteers consists of experienced water works professionals, including consultants, engineers, and specialized staff from larger water systems. The volunteers serve as presenters and facilitators at the mentoring sessions. As "mentors," they share their knowledge and skills with the attendees. The mentoring program was promoted through the regional water works associations, boards of health associations, and other organizations.

Kansas RWA

Kansas RWA has five circuit riders; three are funded by Kansas/EPA monies and the remaining two are funded by the National Rural Water Association. The organization provides training to water system operators and board members. To aid water board/council members and utility employees in the running of their water systems, Kansas RWA produced between 1993 and 2000 the seven-volume *Water Board Bible* series.

EPA Technical Assistance Centers

We visited the EPA Technical Assistance Center at the University of New Hampshire. This Center has worked with the New England Interstate Water Pollution Control Commission and the New England Water Works Association with respect to small systems treatment needs. For example, a pilot study is in place in Newbury, Vermont; the Center will be coordinating similar small system sand filtration systems with Maine RWA and the State of Maine.

Typically, a $4 million appropriation for the eight Technical Assistance Centers is divided equally amongst them. However, there can be separate riders or other appropriations. Each of the centers has specialties. For example:

- **Montana State University**. Maintains the national Web site and is nationally focused. It provides basic training material for operators in the form of CDs, on-line training, and books: 13 hours of training material. It has distributed thousands of CDs. The center has a $40,000 grant for research.
- **University of Missouri, Columbia.** This center focuses more on technology than training.
- **Mississippi State University**. This center works with Rural Water Associations and addresses small drinking water systems' existing and emerging needs.
- **Pennsylvania State, Harrisburg.** This Center provide training for persons involved with instruction and training of small public water system operators.
- **University of Alaska, Sitka.** This Center provides training and technical assistance. It trains operators to use a laboratory testing kit.

Conclusion

EPA, States, and third-party organizations are using many different approaches to assist small systems to overcome the various challenges they face. Some of these are in partnership and others are self-initiated. We found several of these to be better practices and worthy of sharing with other States and organizations.

Recommendation

We recommend that the Assistant Administrator for Water:

3-1 Direct OGWDW to work closer with States to identify and compile small system best practices and establish a method for disseminating the information so that limited resources to assist small systems can be maximized.

Agency Comment and OIG Evaluation

EPA concurred with our recommendation and agreed that it is important that successful tactics be shared to ensure the maximization of resources. The Office of Water has had many efforts underway and cited successes such as regional and national capacity development workshops, meetings with Technical Assistance Center grant recipients and providers, and the Capacity Development Program Tool. The Office of Water is also assessing approaches to get feedback directly from small systems on both the usefulness of the tools developed and the additional tools needed. Finally, one of the Office of Water's goals is to develop an improved Internet site to provide information it has developed to support small systems and links to other third-party providers.

We encourage Office of Water to continue to find ways to compile and disseminate best practice information to assist small systems to maximize their limited resources.

Chapter 4
Small System Approaches Have Shown Mixed Results

The effectiveness of efforts to overcome small drinking water challenges has been mixed. Statistics over the last 13 years show that system size correlates with noncompliance with drinking water regulations.[18] The smaller the system, the greater the possibility of noncompliance. The approaches that EPA, States, and third parties have tried to use to assist small systems (see Chapter 3) have run the spectrum of success. We list the effectiveness of several of these approaches in this chapter.

Smaller Systems Have Greater Noncompliance

EPA statistics have shown over the years that noncompliance with drinking water regulations has increased as the size of the system decreases. For example, the 1997 Report by the National Academy of Sciences, *Safe Water From Every Tap--Improving Water Services to Small Communities*, reviewed EPA data and found the following:

> *. . . [the] number of community water systems that violated the maximum contaminant level (MCL) for total coliforms by size of community and water source (ground or surface) for the 27-month period October 1, 1992, through December 31, 1994. Most of the systems in violation were in ground water systems serving 500 or fewer people, presumably because many of these systems do not disinfect their water. The violation rate for systems with fewer than 500 customers is more than twice the rate for systems serving larger populations: a violation of the MCL for total coliforms was reported by 29.5 percent of the systems serving fewer than 500 people as compared to less than 14.5 percent of the systems serving larger communities.*

The report also provided some other data for that time from the Federal Reporting Data System, as shown in Table 4.1.

[18] Meeting drinking water standards is most difficult for water systems in small communities. Small communities often cannot afford the equipment and qualified operators necessary to ensure compliance with safe drinking water standards. Increases in both the number of drinking water regulations and the number of small community water systems over the past three decades have compounded the problem of providing safe drinking water to small communities.

Table 4.1: Violations of Drinking Water Standards for Chemical Contamination by Size of Water System

	Size of Population Served			
	500 and under	501-3,300	3,301-10,000	>10,000
Total number of systems with violations	531	162	25	15
Percentage of systems with violations	1.5	1.1	0.61	0.44

A June 2004 Journal of Contemporary Water Research & Education article[19] cited statistics on 2002 SDWA violations in the United States. The proportion of total violations for the very small size category was much larger than the proportion of systems in this category (73 percent vs. 57 percent). Monitoring and Reporting violations dominated all size categories (nearly 60 percent of all violations) and more than 80 percent of Monitoring and Reporting violations are accounted for by very small systems. EPA considers maximum contaminant levels and treatment technique violations to be the most serious and classifies these as health-based violations. Very small systems had almost 60 percent of all the health-based violations; small systems accounted for another 24 percent.

Data[20] from 2 years later also support the system size difference:

Table 4.2: Number of Community Water Systems in Violation

System Size	Maximum Contaminant Level Violations	Maximum Residual Disinfectant Level and Other Violations	Treatment Technique Violations
Very small	2,032	6,218	808
Small	806	2,003	365
Medium	324	438	107

EPA data also show that small system noncompliance rates have remained relatively unchanged in recent years. For example, maximum contaminant level small system violation rates have ranged between 5.48 and 6.98 percent for the years 1998 to 2004. For the same period, treatment technique violation rates have ranged from 1.78 to 3.01 percent. These and other types of violations have varied up or down depending on the year.

[19] Dziegielewski and Bik, *Technical Assistance Needs.*

[20] U.S. Environmental Protection Agency, *FACTOIDS: Drinking Water and Ground Water Statistics for 2004*, EPA 816-K-05-001, May 2005.

Systems Report EPA Guidance Is Difficult to Understand

One way EPA communicates drinking water requirements is through guidance documents. We found that many small systems thought this guidance difficult, complicated, and too technically written. Small systems had to depend on third party organizations to help them understand the documents. Since considerable time was spent on this endeavor, other worthwhile activities to assist small systems had to be sacrificed.

For example, the Massachusetts Drinking Water Program Chief said that guidance documents, which are to explain and identify implementation of a rule, are too technical. A "plain English" version is needed.

Four of the third-party organizations we visited also provided comments. On whether communicating material or guidance is reaching the small systems, Massachusetts RCAP believed it was achieved in an indirect manner--not directly from the regulatory agencies. It stated communication is generally a result of a system having a problem which results in their awareness of something--"a reaction thing." Massachusetts RWA staff indicated that communication to water systems was okay, but the material sent to systems is too overwhelming. Systems feel guidance or any material is too complex (written by engineers for engineers), too overwhelming, and too burdensome. Maine RWA advised that the EPA regulations are burdensome to small systems. Its field staff spent a majority of their time explaining regulations to systems or reacting and explaining problems that occurred. Maine RWA stated that part of the problem is the amount of regulations and part is how EPA and States communicate to the water systems. Massachusetts RWA stated that guidance is complicated and presented in a confusing manner as opposed to hard technical jargon.

Variances and Exemptions Appear Rarely Used

None of the entities we visited brought up the use of variances or exemptions. EPA had established these tools to assist small systems who cannot afford to comply with drinking water regulations. Since we identified compliance with future regulations as a small system challenge, we had expected more active use of this approach.

Regional Initiatives Have Had Mixed Results

Several of the Region 1 initiatives described in Chapter 3 have had mixed results. Implementing the "Got Computer" Project pilot identified barriers to success due to the nature and age of the donated computers. The New England Regional Water Association distributed used computers (5 years old) to nine small water systems. As for the Technology List Server, about 60 representatives of water utilities, technical assistance providers, State drinking water programs, and EPA signed up for the list server. Region 1 utilized this mechanism to post information

on upcoming training and provide announcements of the availability of fact sheets and other guidance. However, over the long term the overall success of this project was spotty with respect to engaging water utilities to ask questions and share experiences. The Technology Advisory Board has proved more successful and continues today on an informal and as-needed basis.

Consolidation Has Pros and Cons

Consolidation (sometimes referred to as regionalization) is one approach that has been proposed as a way for many small systems to address some of the challenges they face. Some States are strong proponents of this method (Alabama, Connecticut, Kansas, Kentucky, and North Carolina), while others (Maine and Massachusetts) are not. This approach is not a cure-all and has many advantages and challenges. Consolidation was brought up in several of the articles we reviewed and was an active approach in one of the States we visited (Kansas).

Water system consolidation is defined as one community water system being absorbed into, combined with, or served by other utilities to gain the resources they otherwise lack. There are numerous forms of consolidation; some entail actual physical interconnection or other structural approaches, and some forms involve nonstructural approaches such as shared management arrangements. Utilities can enter into mergers or other cooperative agreements with other (usually larger) systems, or transfer management and/or ownership to another entity.

The benefits to consolidation include economies of scale, increased financial opportunities, elimination of duplicative services, increased reliability, increased flexibility, enhanced protection of public health, skill improvements, and service efficiency. Conversely, a number of barriers exist, including loss of power and community independence, differing management goals, conflicting regulations, cost and benefit inequities, workforce reduction, equipment reduction, public confusion, and debt. Appendix B provides more details on benefits and barriers.

Of the three States visited, only Kansas was actively pursuing consolidation. Kansas officials noted the challenges small systems faced and said the State proposes to systems that "regionalization" of systems may be an alternative. Massachusetts officials said they cannot have a "Consolidation Policy," while Maine officials noted that there were not any options for consolidation of small systems. All five small systems we visited in Kansas had dealt with regionalization; two have gone through with it, while the other three are still trying to decide what to do. Four of the five faced noncompliance with the Stage 1 Disinfectant/Disinfection By-Products Rule that became effective in January 2004. The other system had water supply problems. Challenges that these systems face or still face include poor economic bases (including many low income and elderly residents), fear of increased costs, loss of autonomy, and loss of revenue.

State Resource Shortages Hamper Assistance

State resource shortages are affecting the State agency's ability to serve the needs of small systems. We found shortages in two of the three States we visited. The shortages have caused States to cut back on their activities and depend more on third-party organizations to fill the void.

- Maine does not have enough staff to do all the work it needs. Staffing (32 people) has been the same since 2000. In fact, one person oversees over 1,000 systems in one part of the State. In 2001, the State completed a self-assessment tool and identified that 62 State staff were needed for its drinking water program. The future of the whole program has been in jeopardy because the needed matching State funds have been an annual issue. In 2005, a $3.5 million bond was drafted through a special legislative session and was approved by the voters in November 2005. In 2004, the State had no matching funds nor was a bond provided. In 2003, the State match was cut from $1.8 million to $1.2 million. At least one of the small systems visited stated that due to cutbacks the State had not been helpful.

- Massachusetts had a "budget meltdown" 4 years ago which resulted in a 25-percent staff reduction. The drinking water program was supported through funding that was approximately 25 percent EPA, 25 percent from the State budget, and the balance from an assessment to water systems (enacted through State legislation) that is .085 cents per thousand gallons of water used by systems. The State bills the water systems and this amount annually is approximately $2.2 million. At least one small system commented that it had to rely on third-party assistance because of the staff reductions.

Kansas Loan Program Is Productive

Kansas' Public Water Supply Loan Fund Program has been able to address water system needs. As noted in Chapter 3, the loan fund is made possible by receipt of capitalization grants from EPA. Between fiscal years 1997 and 2004, Kansas received a total of $84,376,600 from EPA in grants. Since inception in 1997, 127 loans have been closed for a total of $290,457,701. One of the program goals is to provide loans to small systems. SDWA requires that 15 percent of the loan assistance must be to systems serving less than 10,000 people. Kansas takes this one step further and requires that 20 percent of loan funds go to systems with a population less than 5,000. Small systems have received 88 of the 127 loans made since the program began amounting to $103,174,812, or approximately 35 percent of the total dollar of loans closed.

Third-Party Organizations Seen as Beneficial to Small Systems

Third parties have been a bright spot, providing the hands-on attention that small systems need. In a climate of limited governmental resources, third-party assistance organizations fill a void. In partnership with States, they provide necessary training, technical assistance, guidance, and financial and management tools to small systems. Fourteen of the 19 systems we visited spoke positively (none were negative) of these organizations.

States are making use of these organizations to the benefit of small systems. For example, as noted in Chapter 3, Massachusetts made extensive use of the four-organization Massachusetts Coalition for Small System Assistance. This coalition was able contribute much needed assistance. For the period July 1, 2002, through June 30, 2004, the coalition reported the following milestones:

- All 41 group training sessions have been completed.
- All 276 one-on-one site visits have been completed.
- All 30 mentoring sessions have been completed.
- The Drinking Water Fair in the Western Region was conducted on November 20, 2002, and November 18, 2003, both with a good turnout.
- The National Theatre for Children performed at various schools in the State during "Drinking Water Week," May 5-9, 2003, and May 3-7, 2004.
- The Small Systems Outreach Web Site continues to operate and is updated on a regular basis.

Massachusetts officials said they were pleased with the work done and assistance by each of the organizations. They said there is no overlap of services provided by each. In fact, they are put in the same room to identify projects and coordination.

While the other two States visited did not make as extensive use of its third-party organizations as did Massachusetts, small systems did benefit from the State/third-party partnerships.

Maine identified a very good working relationship with the Maine RWA and Maine Utilities. Cooperation includes matching funds and sharing work. The State also identified its successful contact with third-party organizations such as RCAP and quarterly meetings with the New England Interstate Water Pollution Control Commission. The face-to-face meetings are successful. The State has used the Technical Assistance Center and has handed out Technical Assistance Center training CDs to water systems.

Concerning its operator certification requirements, Maine contracted with Maine RWA to put on pre-exam training at 30 different sessions throughout the State. Maine specifically targeted systems that did not have certified operators and provided training at four strategic locations with 20 to 25 candidates each.

Training brochures were mailed out over a 4-year period through five to six mailings from Maine RWA. Maine states that it has 98-percent operator certification compliance. However, it emphasized that it has a high turnover of water system operators and that very small system operators do not have the time to keep abreast with additional training. Nonetheless, Maine continues to maintain its outreach for educational training.

The measure of an approach is the perception of its user--in this case, the small systems themselves. We found the small systems we visited appreciated very much the assistance provided by third-party organizations. Here is just a sampling of their comments:

- A Massachusetts director of public works said that without the assistance from assistance organizations, the water system would have great difficulties.
- A Massachusetts water district treasurer said that if they did not have these resources (third parties) available to him, he would not know what to do.
- A Maine system operator relied on a third-party organization to help define and translate the regulations. With hands-on assistance, the system is now in compliance.
- A Maine water system operator stated, "I would stagger under the regulations without Maine Rural Water."
- Kansas town officials advised that a third-party organization was a great help to their community.

One Small System Overcomes Challenges Through Own Efforts

Small systems are able to right their own ship in some cases. East Chelmsford, Massachusetts, was able to get out of noncompliance and improve its operation by its own actions. A town commissioner said the best thing for the system was the State Consent Order issued in 1999 because it forced change. This Order cited 42 infractions since 1990 with no action taken to resolve and 19 additional new violations. The system was fined $5,000 and shut down from February to July 1999. During this time, the State told the town to consider consolidation with another system. The commissioner said the townspeople rejected this recommendation. The Board of Commissioners had resigned.

The big problem in 1999 was that the system had very little money. During the first 4 months under the new staff, the system was unable to pay bills and could only meet payroll. With a complete change in staff and board, the system doubled water rates in 1999, which Massachusetts had advised in prior years but not done. These rates were increased 5 percent per year for the next 3 years. Only in the last 3 years have rates not increased. Rate increases enabled the system to begin much needed improvements neglected under the prior administration. The system is now solvent and operates on $2 million per year with rates that have allowed improvements with excess of $1 million spent on upgrades over the past 6 years.

Today the system is a success story--but it is due to the diligent efforts of the current Board and the water system staff, in response to State enforcement action. EPA and Massachusetts have held sanitary survey classes using the town's success as an example.

Conclusion

While it is difficult to measure the effectiveness of individual EPA and State activities to assist small drinking water systems, our preliminary research provided indicators of both successes and limitations in the approaches. An important aspect of the EPA drinking water program is its regulations and the guidance provided to assure compliance with them. We heard many times that they were difficult for small systems to understand. Regions and States tried many approaches; some worked better than others. Consolidation was one the approaches on the forefront, but because it has advantages and disadvantages, it is not a panacea. States are also facing resource shortages affecting their ability to assist small systems. Yet, States like Kansas have been able to provide loans funds to these systems. Because of limited resources, States have had to depend more on their partnerships with third-party organizations, and these have been able to fill the need. Several highly successful activities have taken place and small systems have acknowledged the benefits they receive.

Recommendation

We recommend that the Assistant Administrator for Water:

4-1 Develop and implement approaches to improve communication with small systems so that targeted guidance is received and understood.

Agency Comment and OIG Evaluation

EPA indicated that it was difficult to respond to this recommendation without a better understanding of the specific documents to which the interviewees were referring. EPA has been making a greater effort in the past several years to develop guidance that is targeted to small systems. As an example, a six-page summary of recent and upcoming products for small systems was attached as part of the April 20, 2006 response. The Agency response stated that while EPA will continue to work to develop guidance geared to small systems, it knows it needs to do a better job of ensuring the delivery of these products. It is clear that some small systems are unaware of specific products and tools and EPA believes the improved Web site and interactions with States and technical assistance providers will help get the word out, identify needs, and refine existing information to make it more useful.

We found the difficulty of understanding the complicated and technically written drinking water guidance was a concern that was prominently voiced by officials of small systems and the States and third-party organizations that assisted them. This was raised to us as a general complaint and hence we cannot provide the specificity EPA requests. We note that the Office of Water has recently been putting more effort in addressing this problem. We have revised the recommendation to more accurately reflect our concern that EPA guidance is not reaching the small systems for which it is intended. We encourage the Office of Water to continue to try to better communicate technical and regulatory information to small systems.

Chapter 5
Minimal Data on Health-Related Impacts

Limited data exists on the health impacts related to small drinking water systems. The Centers for Disease Control and Prevention (CDC) maintains a data system of drinking water cases, but the information received is voluntary; CDC officials state that the information is vastly underreported. Examples of drinking water cases have occurred, as well as State boil orders, but they are not numerous; only some can be attributed to small community water systems.

The potential for health impacts needs to be taken seriously. Health effects may be related to small systems: experts have stated that health problems are more likely to arise from exposure to "disinfectable pathogens" in smaller systems with limited resources than in larger ones.

Drinking Water Outbreak Data Underreported

Most of the data on drinking water health issues come from the CDC. The CDC maintains a Waterborne Outbreak Surveillance System, which is voluntary, passive, paper-based, and unfunded. Because of these conditions, according to the Chief of CDC's Environmental Health Services Branch, outbreaks are vastly underreported. She gave the example of the Milwaukee outbreak that involved approximately 400,000 cases, yet only 20 were reported. Some data are available from the CDC, but no specific breakdown exists of health-related cases relative to small community drinking water systems.

For example, the above CDC official stated that from 1971 to 2002, 758 outbreaks were reported, most caused by individual or non-community systems. Of that, CDC data for 1991 to 2000 indicated 155 outbreaks:

Table 5.1: Waterborne Outbreaks (1991-2000)

	Outbreaks	Cases
Community Water Systems	57	422,364
Non-community Water Systems	64	8,934
Individual Water Systems	34	548
All Systems	155	431,846

Of all the cases in Table 5.1 above, 403,000 of them related to the one outbreak in Milwaukee involving *Cryptosporidium* in 1993. The etiological agents that caused these other outbreaks included: G*iardia, Cryptosporidium, Campylobacter, Salmonella, Escherichia coli (E. coli), Shigella, Plasiomonas shigelloides,* non-O1 Vibrio *cholerae,* hepatitis A virus, Norwalk-like viruses, small, round-structured virus, chemical, and undetermined.

Health Effects May Be Small-System Related

Other examples of health effects may be related to small systems, but these are either specific outbreaks or evidence of problems in relatively small numbers and, as can be seen, they are not only caused by small community systems.

- During the summer of 1998, an outbreak of *E. coli* occurred in Alpine, Wyoming, sickening 157 people from 15 States. The investigators concluded that surface water containing deer and elk feces seeped into the aquifer that provided the town's water. The outbreak surfaced when physicians noted an increase in bloody diarrhea among town residents.

- A University of Minnesota article[21] noted that 5 of the 18 waterborne outbreaks of *E. coli* reported to the CDC between 1982 and 1998 stemmed from contaminated drinking water, and all 5 involved small water systems or wells supplying rural townships or camps.

- A 2002 CDC article[22] states in its summary paragraph that "Contamination of small unprotected water systems may be an increasing public health risk." This article cites other statistics on *E. coli* outbreaks. It states that the first reported drinking water outbreak of *E. coli* occurred in 1989 in rural Missouri and subsequently six more had been associated with drinking water. Three were small and occurred in a camp, a recreational vehicle park, and a well. The three more highly publicized recent ones occurred in Wyoming (see above), New York, and Canada. The New York one occurred in September 1999 at the Washington County Fair. In that outbreak, the drinking water was likely contaminated when cow manure seeped into a shallow, unchlorinated well after a large rainstorm. There were 921 cases of diarrhea and possibly 2 deaths. The authors of the article state that because of underreporting and underdiagnosis, reported outbreaks probably represent a small fraction of the true number of *E. coli* outbreaks associated with drinking water in the United States. The article concludes:

  > *Small drinking water systems may be less likely to be adequately chlorinated and to routinely monitor for contaminants. The outbreak reported here confirms the potential of these small, unprotected and unchlorinated water systems to be an important source of infection with E. coli O157:H7 and other pathogens. Stronger enforcement of existing regulations and perhaps*

[21] *Wyoming E. coli O 157:H7 outbreak showed hazards in small water system* (University of Minnesota: Center for Infection Disease Research and Policy), April 3, 2002.

[22] Sonja J. Olsen, Gayle Miller, Thomas Breuer, Melinda Kennedy, Charles Higgins, Jim Walford, Gary McKee, Kim Fox, Wililam Bibb, and Paul Mead, *A waterborne outbreak of Escherichia coli O157:H7 infections and hemolytic uremic syndrome: implications for rural water systems*, **Emerging Infectious Diseases**, April 2002.

broadening of current regulations, such as the proposed ground water rule designed to prevent illness from drinking water from ground water sources through disinfection, are needed to protect rural drinking water systems in the United States.

- From July 23 to September 12, 2004, an outbreak occurred on Bass Island, Ohio, that involved 1,450 cases (mainly *Giardia*). Though the specific cause of the outbreak was not determined, the problems occurred basically relative to transient public water systems.

- As of September 26, 2005, 13 active boil water orders occurred in the State of Maine for the following reasons:

Table 5.2: Reasons for Maine Boil Water Order

Reason	Number	Percent
E. coli positive	9	69%
Non-functioning disinfection system	2	15%
Chronic total coliform	1	8%
System without water	1	8%

The longest boil water order was in effect for 25 months, while four systems had orders in effect less than a month. The average age of these orders was 4.5 months. Of the 13 small water systems, 3 are small community water systems, 5 systems are Non-Transient Non-Communities, and 5 systems are Transients.

- During calendar year 2004, 16 boil water orders were issued in Kansas--15 of these were for systems serving less than 3,300 people (5 of these were for systems less than 500).

Public Health More at Risk in Small Systems

A group of 46 international experts from the United States and other countries met in May 2004 to discuss small water systems. They agreed on four principal problems affecting small systems, including the incomplete understanding of public health risks. In the report on the international colloquium (issued January 2005), the Executive Summary stated:

Public health risks associated with small water systems can be incurred at any point in the water treatment and transmission process, encompassing both acute and chronic diseases due to microbial or chemical contamination ... Colloquium participants concurred that system stakeholders must become far more aware of these potential health risks.

The report also noted that relative to public health risks, small systems can be more at risk:

- As distribution systems age and deteriorate, the burden of replacement is far
  greater for small systems and the per-household costs are very high.
- Financial limitations and relative lack of access to laboratories and technical
  expertise may lead to inadequate monitoring and poorly trained personnel.
- Cumulative risks may be greater for customers of small systems.
- Small systems are more susceptible to acts of terrorism.
- An alarming rise of *E. coli* contamination has occurred over the past 30 years.
- Increasing links exist between heavy rainfall and waterborne disease outbreaks.

Similar comments were provided by a professor from Tufts University we met with, who is a member of the public health subcommittee of the National Drinking Water Advisory Council and on the water panel of EPA's Science Advisory Committee. He noted the following:

- Small drinking water systems frequently do not have the expertise to do testing, the economics to maintain the systems, nor the population base to successfully support the system.

- With regard to small community drinking water systems issues, there were challenges associated with flooding at various times of the year on a case-by-case basis. He stated that these challenges were true to the risks (e.g., bacteria, C*rypto, E. coli, Giardia,* turbidity, and water quality in general) and that basically people were not protected from the risks under these conditions.

- Although larger water systems were, in general, better, small drinking water systems were more at risk because of depopulation and the decrease in the tax base and thus not able to cope economically and address risk.

Conclusion

Not much data exists on the health impacts relative to small drinking water systems. The CDC, which maintains the data system, has stated that information is vastly underreported. This data system relies on voluntary reports. Outbreaks can be directly related to small systems, but they are not of any great magnitude. Experts say, however, that small systems can be more at risk for public health incidents.

Recommendation

We recommend that the Assistant Administrator for Water:

5-1 Continue the collaborative effort with the CDC to improve the system of identifying drinking water related health outbreaks.

Agency Comment and OIG Evaluation

EPA did not believe that it is possible to draw sound conclusions regarding the magnitude of outbreaks based on data from the current outbreak surveillance system. The response noted that CDC statistics only represent a portion of the burden of illness associated with drinking water exposure, the system only pertains to outbreaks of waterborne illness, and our report noted that studies have not been performed to assess the sensitivity of the reporting system.

However, EPA appreciated the recommendation. The Office of Water has been working with the Office of Research and Development and CDC counterparts on efforts to improve the surveillance system and other activities to improve the investigation and reporting of outbreaks.

We were pleased that EPA is working collaboratively with the CDC to improve the surveillance system so that there are better data on the effects of drinking water on the public health. We have slightly revised our recommendation to recognize the current EPA activity.

Appendix A

Organizations Visited During Preliminary Research

EPA

Office of Ground Water and Drinking Water
Region 1
Region 7

States

Kansas Department of Health and Environment
Maine Department of Health and Human Services
Massachusetts Department of Environmental Protection

Third Party Organizations

Kansas Rural Water Association
Maine Rural Community Assistance Partnership
Maine Rural Water Association
Massachusetts Rural Community Assistance Partnership
Massachusetts Rural Water Association
Massachusetts Water Works Association
New England Interstate Water Pollution Control Commission
New England Water Works Association
Technical Assistance Center at the University of New Hampshire

Drinking Water Systems

Kansas	**Maine**	**Massachusetts**
Altoona	Begin Trailer Park	East Chelmsford Water District
Elk City	Buckfield Water Department	Elm Hill Water District
Harveyville	Hebron Water Company	Leino Park Water District
Toronto	Northern Springs Mobile Home Park	Nanatomqua Mobile Home Park
Williamsburg	Port Clyde Water District	Palmer Water District
	Topsham Mobile Home Park	Wagon Wheel Mobile Home Park
		West Brookfield Water District
		Westminister Water District

Appendix B

Benefits and Barriers to Consolidation

Benefits to Consolidation

Economies of Scale: Spreading fixed capital, operation, and maintenance costs over a larger population could lead to lower per unit costs and subsequent lower customer rates, and additional efficiencies by having lower total costs from combined financial, administrative, personnel, and equipment resources.

Increased Financial Opportunities: More revenues and assets, larger tax base, and access to regional programs (States give priority to regional efforts when disbursing grants/financial support).

Elimination of Duplicative Services: Greater efficiencies can be experienced by eliminating any services at one facility if another facility has a greater capability.

Increased Reliability: Meeting water supply needs with one large source instead of numerous small ones.

Increased Flexibility: New management possibilities - with more opportunities available, communities can develop strategies tailored to their specific needs and concerns.

Enhanced Protection of Public Health: With benefits of economies of scale and potential greater access to state-of-the-art technologies, public health and environmental protection can be enhanced.

Skill Improvements: Being able to offer higher salaries could attract better, more qualified employees.

Service Efficiency: While data show that consolidation improves efficiency in other services, it is not known what efficiencies might be experienced in the water utility service.

Barriers to Consolidation

Loss of Power and Community Independence: This is a primary concern of communities considering consolidation. Some smaller jurisdictions might have less influence on or supervision of a consolidated agency than their larger neighbors.

Differing Management Goals: While neighboring communities share many common needs and concerns, disparities in population, geography, or other characteristics may make it difficult for communities to agree on specific regional projects.

Conflicting Regulations: Multistate or multicounty regional programs can face varying regulations.

Cost and Benefit Inequities: Some communities may bear a disproportionate share of costs relative to the benefits derived when compared to communities with whom they might consolidate services.

Workforce Reduction: Consolidation often entails employee layoffs, and it may be difficult to get support from officials or citizens. Also, difficulties may arise when personnel from one utility are tasked with increasing service to a larger population.

Equipment Reduction: Consolidation might entail disposal of facilities and equipment, which often creates resistance from officials, especially where resources might be shared across local service agencies (e.g., periodical use of water utility backhoe by town road department).

Public Confusion: Short-term confusion that may arise over service delivery areas or service providers.

Debt: It may take many years before a consolidation is able to pay off all pre-existing debts, or at least slow their increase. Communities may not support consolidation if it does not immediately bring about tax savings or fee reductions.

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

Appendix C

APR 20 2006

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Much Effort and Resources Needed to Help Small Drinking Water Systems Overcome Challenges, Assignment No. 2005-0001358, Draft Report

FROM: Benjamin H. Grumbles
Assistant Administrator

TO: Dan Engelberg
Director of Program Evaluation
Office of Inspector General

Thank you for the opportunity to comment on your Office's draft report, *Much Effort and Resources Needed to Help Small Drinking Water Systems Overcome Challenges*. I will respond briefly to the overall findings, with more detailed responses to your recommendations and technical comments attached.

The report reconfirms the finding that many small drinking water systems lack adequate technical, managerial, and financial capacity to operate in a sustainable manner. Over the past several years, the Environmental Protection Agency (EPA) has been working to implement programs from the 1996 Amendments to the Safe Drinking Water Act that were intended to help strengthen the ability of these systems to reliably supply safe drinking water. We believe that improvements have occurred as a result of efforts at the national, state and local levels.

EPA has attempted to reduce the burden of regulations on small systems by providing flexibility that is available through the law. However, for some systems, challenges will always be there because they lack an adequate rate base across which to spread costs. Given that one of EPA's primary missions is to protect public health, restructuring the industry to address these systems is preferable to changing our public health protection framework in such a way as to increase the public's exposure to risk.

Additionally, many of the financial stresses that water systems have faced and will face in the future are unrelated to regulatory requirements. EPA's assessments of drinking water infrastructure needs have demonstrated that most of the identified needs are those that a system would have to address irrespective of drinking water regulations. As water infrastructure ages, systems will need to address the basic infrastructure which allows them to deliver water to

customers. EPA is emphasizing the importance of addressing our nation's water infrastructure through the Sustainable Infrastructure Initiative (www.epa.gov/ow. As part of its Better Management pillar to the initiative, we will continue to promote restructuring, whether physical or managerial, as a strategy to reduce costs and the commensurate burden on ratepayers.

Thank you again for the opportunity to comment on the draft report. If you have questions regarding our comments, please contact Cynthia C. Dougherty, Director, Office of Ground Water and Drinking Water, at (202) 564-3750.

Attachments

EPA Response to Recommendations

Recommendation 2-1: Review the DWSRF process and determine if there are ways to simplify it so that small systems have a better opportunity to obtain financing from the Fund.

Response: When discussing the DWSRF program, it is important to understand that, while the national program establishes basic requirements, state programs are in charge of implementing their own programs. Therefore, when looking at processes, there are actually 51 distinct programs. EPA agrees that states should review their own processes to simplify and streamline them, to the extent possible (given overriding federal requirements). The law requires that a minimum of 15% of DWSRF funds be provided to small systems serving fewer than 10,000. At a national level, the program has far exceeded this level, with 39% of funding going to small systems. Because the costs of projects for small systems tend to be smaller, it is also useful to look at the percentage of loans going to small systems, since it better reflects the impact of the program. Through June 30, 2005, 73% of 4,200 loans made since the program began have been provided to small systems. Breaking it down further, 19% of loans have gone to systems serving fewer than 500, 34% to systems serving 501-3,300 and 18% to systems serving 3,301 to 10,000.

Looking at those states visited by the IG, 77% of loans in Kansas (45% of funds) and 92% of loans in Maine (80% of funds) went to small systems. Massachusetts, however, provided only 28% of its loans to small systems (14% of funds). While the DWSRF may not be "broken" at the national level, it may be appropriate for Massachusetts to reassess its program to determine whether it can increase participation of small systems in the program. The Agency will continue to work with states to identify best practices and share them with other states that are still facing challenges in funding small systems.

If maintained, we suggest that the recommendation be redrafted to ask EPA to work with states to identify successful approaches for working with small systems in the DWSRF program.

Recommendation 2-2: Determine whether a "one size fits all" approach could be changed to a "regionalized" one.

Response: While potential occurrence and related exposure to a contaminant may vary by region (e.g., arsenic), the health effects from a contaminant do not. EPA develops regulations to protect the public from potential public health risks due to drinking water, regardless of where they are in the country or the size of the system from which they receive service. In doing so, we establish regulations that are risk-targeted (as compared to a "one size fits all" approach). For example, the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2) establishes risk-targeted treatment techniques requirements to control *Cryptosporidium* in public water systems using surface water or ground water under the direct influence of surface water. Rather than require all systems to meet more stringent treatment requirements, the LT2 regulation targets additional treatment requirements to those systems that are identified as being at a greater risk of having *Cryptosporidium.*

To reduce burden on small systems, EPA varies schedules and monitoring requirements by the system size (and relative population served). For example, the date for public water systems to begin LT2 monitoring is staggered by size, with small systems starting at a later time than larger systems. In addition, to reduce monitoring costs, small filtered systems initially monitor for *E. coli* for one year as a screening analysis and are only required to carry out more costly *Cyptosporidium* monitoring if their *E. Coli* levels exceed specified trigger values.

For the revised arsenic standard, which affects smaller systems to a greater degree than larger systems, the Agency provided all systems with an additional two years to comply with the standard (the 2001 rule became effective on January 23, 2006). Additionally, where warranted, states have the flexibility to provide eligible systems with exemptions that can provide an additional nine years to meet the standard so that they have time to obtain funding to address capital needs.

We suggest that the IG drop this recommendation.

Recommendation 3-1: Direct OGWDW to work closer with states to identify and compile small system best practices and establish a method for disseminating the information so that limited resources to assist small systems can be maximized.

Response: EPA agrees that states and technical assistance providers are using a variety of approaches to reach small systems and that it is important to share successful tactics to ensure that we all maximize our resources. Over the past few years, EPA has convened regional and national capacity development workshops which bring together EPA staff, state personnel and technical assistance providers to share their experiences in working with small systems. We have found these to be successful and well-regarded by attendees as a mechanism for sharing information. We have also found success in convening annual meetings of recipients of EPA's Small System Technical Assistance Center (TAC) grants and other technical assistance providers to share information about EPA's priorities and the activities carried out at each TAC.

Looking forward, we are incorporating a section on innovations and best management practices into our Capacity Development Program Evaluation Tool. We are also assessing approaches by which we could get feedback directly from small systems on both the usefulness of the tools we have developed and what additional tools they need. Finally, one of our goals is to develop an improved Internet site that will provide information developed by EPA to support small systems and links to other third party providers who also assist small systems.

We can concur with this recommendation because it reflects efforts the program already has underway.

Recommendation 4-1: Develop guidance documents directed at small systems in easier to understand language.

Response: It is difficult to respond to this recommendation without a better understanding of the specific documents to which interviewees were referring. EPA has been making a greater effort in the past several years to develop guidance that is targeted to small systems. We have developed Quick Reference Guides which provide overviews of each rule and a number of documents for our *Simple Tools for Effective Performance* series. While we will continue to work to develop guidance that is geared to small systems, we know that we need to do a better job of ensuring the delivery of these products to small systems. In discussions with states, systems, and technical assistance providers, it is clear that some are unaware of specific products and tools that have been developed by EPA and its grantees. We believe our improved web site and interactions with states and technical assistance providers will help us to get the word out on existing tools, identify needs, and refine existing information to make it more useful to the regulated community. For your reference, we have attached a summary of recent and upcoming products for small systems that was provided to state drinking water administrators at a March 2006 meeting in Alexandria, Virginia.

If maintained, this recommendation would be more useful if it was more specific. For example, it would be helpful if the IG could provide examples of specific guidance that EPA has developed for small systems that is not easy to understand. Alternatively, it would be helpful if the IG could provide examples of guidance developed by third parties that small systems have identified as easy to understand.

Recommendation 5-1: Seek ways to work jointly with the CDC to improve the system of identifying drinking water related health outbreaks.

Response: The IG's conclusion notes that "outbreaks can be directly related to small systems, but they are not of any great magnitude". We do not believe it is possible to draw sound conclusions regarding the magnitude of outbreaks based on data from the current outbreak surveillance system. The CDC's outbreak surveillance summary for 2001-2002 noted that their statistics represent only a portion of the burden of illness associated with drinking water exposure. As discussed in the IG report and interviews with experts, not all outbreaks are recognized, investigated, or reported to CDC or EPA, and studies have not been performed to assess the sensitivity of the reporting system. Additionally, the current surveillance system pertains only to outbreaks of waterborne illness and therefore might not reflect or correspond with trends associated with endemic waterborne illness.

However, we appreciate the recommendation that EPA work with CDC to improve reporting of drinking water related outbreaks. EPA's Office of Water has been working with our EPA Office of Research and Development and CDC counterparts on efforts to improve the Waterborne Disease Surveillance Systems and other activities to improve the investigation and reporting of outbreaks. Specific activities being planned by CDC that EPA has been involved with include: transitioning from a paper-based to electronic outbreak reporting system, providing training on outbreak investigations, and implementing an Environmental Health Specialist Network pilot for drinking water.

If maintained, we suggest that this recommendation be redrafted to recognize that EPA is already working with CDC and encourage that those collaborative efforts continue.

Specific Comments on Draft Report

Abbreviations

- The text for "MCL" should read "Maximum Contaminant Level".

Chapter 2

- Page 5, under Aging Infrastructure, 3rd paragraph, 2nd sentence. The text notes that "fewer and fewer grant dollars are available for infrastructure than in prior years". It is unclear to what grant dollars the speaker is referring. EPA had no formal funding mechanism for drinking water infrastructure prior to the 1996 SDWA Amendments. If the speaker is referring the funds made available through the U.S. Department of Agriculture's Rural Development or other state and federal programs, it would be appropriate to clarify and verify that fact.

- Page 6. 3rd paragraph under Difficulties in Obtaining Financial Assistance. In considering the availability of funding, it is important to remember that there are close to 50,000 community water systems in the country that serve fewer than 10,000 people. No one federal funding program can or should address the needs of all of these systems. Each federal program must focus its limited resources on the highest priorities of that program. For the DWSRF program, these are projects needed to protect public health and ensure compliance with the Safe Drinking Water Act. If the IG did not consider the priorities of the funding programs in selecting small systems to interview, then it is not surprising the systems visited had not applied for or received assistance.

- Page 9.1st paragraph and heading under Regulatory/Compliance Challenges. The heading "understanding and burdensome regulations" is somewhat confusing because it appears there are either missing words or an extra "and" in the clause. We recommend changing it to read "Concerns about Burdensome Regulations" since this seems to capture the issues raised in the section. With respect to these concerns, the focus on burden implies that there is no underlying public health benefit to drinking water regulations. EPA issues regulations to address public health concerns, not for the sole purpose of creating more burden for systems.

- Page 10, 1st paragraph under Compliance with Current Regulations. The 1st sentence does not make sense. For the 3rd sentence, the text should read "maximum contaminant levels", not "maximum combined loadings".

- Page 10, 3rd paragraph under Compliance with Future Regulations. This paragraph is unclear. If a ground water system does not disinfect, the Stage 2 Disinfection Byproducts rule would <u>not</u> be a problem. Should the reference instead be to the "Ground Water Rule", which could result in some systems having to disinfect and thus install equipment?

- Page 11, 2nd paragraph beginning "Third-party organizations described...". The second sentence indicates that NEIWPCC is concerned with the new Ground Water Rule because

of disposal issues associated with the resulting effluent. Is the reference supposed to be to the "revised Arsenic Rule"? The only "waste stream" that would be associated with the Ground Water Rule would be disinfected water, whereas treatment to meet the Arsenic Rule could result in a residual that systems would have to manage.

- Same paragraph. With respect to the comment about "EPA's concept of writing the rules as one size fits all", as noted in the response to recommendation 2-2, EPA is working to develop regulations that target risks and tailor requirements according to the identified risk. It would appear that the speaker is comparing the requirements that small systems must meet to "doing nothing at all" instead of comparing the requirements to those that larger systems must meet.

- Same paragraph. In the last sentence, the reference should be to "monitoring", not "capital" costs, and to the "Long Term 2 Enhanced Surface Water Treatment Rule (LT2 Rule)", not the "Stage 2 Rule". Further, the statement fails to recognize the flexibility provided in the LT2 rule which allows small systems to conduct an initial screen of monitoring for *E. coli*. Systems would only have to carry out more expensive testing for *Cryptosporidium* if they exceed a trigger value for *E. coli*.

Chapter 4

- Page 19. We are not sure of the usefulness of including compliance data from 1992-1994 in the report unless it is for the purpose of showing trends between that time period (pre-1996 SDWA amendments) and the present.

- Page 20. Tables 4-1 and 4-2 should indicate the years covered by the data.

- Page 20. 1st paragraph under Table 4-1. Text refers to "maximum levels of contaminants (MCL)". It should refer to "maximum contaminant levels".

- Same paragraph, last sentence. Given the fact that small systems make up a greater percentage of all systems, it is not surprising that they account for more violations. It is more useful to look at the systems in violation as a percentage of total systems in a specific size class. For example, Table 4-2 shows the number of systems with violations of health-based standards by size class. The table below shows the percent of CWS in 2004 with violations of any health based standard (e.g., MCL, MRDL, TT, other) by size, after correcting for double counting systems that may have a violation of more than one contaminant (e.g., one system may have a violation of the MCL for the Total Coliform Rule and a violation of the TT for the Surface Water Treatment Rule). While individual small systems may have a violation of more than one rule, a review of this table would seem to indicate that the overall percentage of systems with violations is not so different from medium or large systems.

FY	CWS Size	Violations	CWS with a Violation	Population Served by CWS with Violation	Total CWS	Total Population Served by CWS	% CWS with Violation	% Population Served by CWS with violation
2004	1_Very_Small	4,249	2,757	445,449	30,006	4,957,131	9.2%	9.0%
	2_Small	1,820	1,123	1,601,133	14,212	20,137,604	7.9%	8.0%
	3_Medium	676	410	2,407,717	4,707	27,346,264	8.7%	8.8%
	4_Large	709	359	8,745,641	3,541	99,808,668	10.1%	8.8%
	5_Very_Large	60	28	14,113,921	372	120,246,010	7.5%	11.7%

- Page 20-21. With respect to text under the section EPA Guidance Hard to Understand, it would have been useful to have a better understanding as to whether the speakers were referring to products that have been specifically developed for small systems.

- Page 22. Last paragraph under Consolidation has Pros and Cons. The first sentence should clarify that it is referring to the "Stage 1" Disinfectant/Disinfection Byproducts Rule.

- Page 25. Last paragraph under Small Systems Overcome Challenges Themselves. In the first paragraph, the text indicates that the town commissioner said "the best thing for the system was the State Consent Order issued in 1999 because it forced change". Given this, it would seem that the last paragraph should also speak to the diligent efforts of the State drinking water program (in addition to the Board and water system staff). While unfortunate, it seems that, in some cases, state oversight and enforcement actions must serve as the driver for change. Had the state backed down, it is unlikely the system would have been able to gain support for rate increases that are allowing them to upgrade services for the community.

Attachment referenced in response to Recommendation 4-1

Drinking Water Utilities Team Products to Assist States and Small Systems
March 2006 Update

I. STEP Guides (Simple Tools for Effective Performance)

Setting Small Drinking Water System Rates for a Sustainable Future (December 2005): As part of its on-going efforts to promote sustainable water infrastructure, EPA has released a new document to help water utilities consider whether their rate structures sufficiently address the costs of ensuring safe and clean water. This document is for owners and operators of small community drinking water systems. It is designed to help these owners and operators understand the full costs of providing a safe and adequate supply of drinking water to their customers, and to guide them in setting water rates that will support these costs. Systems that will find this guide useful are small publicly or privately owned entities whose primary business is providing drinking water, as well as homeowner associations and manufactured housing communities. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 800-426-4791. Please reference EPA Document # 816-R-05-006. Copies of this document can also be obtained from the EPA website at:
http://www.epa.gov/safewater/smallsys/pdfs/guide_smallsystems_final_ratesetting_guide.pdf.

Taking Stock of Your Water System: A Simple Asset Inventory Guide for Very Small Drinking Water Systems (October 2004): EPA has developed a STEP Guide to assist very small systems in conducting a simple inventory of infrastructure for capital planning purposes. This STEP Guide is essential in keeping these types of water systems running properly and making sure that the drinking water produced by these systems is reliable, safe and affordable. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 800-426-4791. Please reference EPA Document # 816-K-03-002. Copies of this document can also be obtained from the EPA website at:
http://www.epa.gov/safewater/smallsys/pdfs/final_asset_inventory_for_small_systems.pdf

Small Systems Guide to Safe Drinking Water Act (SDWA) Regulations (September 2003): EPA has developed a STEP Guide that explains how current and future SDWA regulations relate to each other to achieve public health protection. This workbook focuses on why compliance is important, what knowledge is needed in order to comply, and when compliance is required. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA Document # 816-R-03-017. Copies of this document can also be obtained from the EPA website at:
http://www.epa.gov/safewater/smallsys/pdfs/guide_smallsystems_sdwa.pdf

Asset Management: A Handbook for Small Water Systems (September 2003): EPA has developed a STEP Guide that emphasizes how effective asset management is a key element of small system sustainability. Various sample worksheets are provided to help small systems organize data

and determine the best approach to maintenance and replacement of major physical assets. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA Document # 816-R-03-016. Copies of this document can also be obtained from the EPA website at:
http://www.epa.gov/safewater/smallsys/pdfs/guide_smallsystems_asset_mgmnt.pdf

Strategic Planning: A Handbook for Small Water Systems (September 2003): EPA has developed a STEP Guide to assist small systems in strategic planning. The STEP Guide provides worksheets and related tools to help systems organize data and systematically assess their strengths, weaknesses, challenges, and opportunities. This Guide is based on the strategic planning workshops held around the country in 2000. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 800-426-4791. Please reference EPA Document # 816-R-03-015. Copies of this document can also be obtained from the EPA website at:
http://www.epa.gov/safewater/smallsys/pdfs/guide_smallsystems_stratplan.pdf.

Complying With the Revised Drinking Water Standard for Arsenic: Small Entity Compliance Guide (One of the Simple Tools for Effective Performance (STEP) Guide Series) (December 2002): EPA has developed a guide that is designed to help small drinking water systems understand and achieve compliance with the revised Arsenic Rule. The STEP Guide provides information for small drinking water systems to help in their selection of appropriate arsenic compliance options. Worksheets are also provided along with step-by-step instructions on how to complete them and interpret monitoring results. Additional blank worksheets can be requested separately. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA Document # 816-R-02-008A for the STEP Guide and EPA Document # 816-R-02-008B for additional blank worksheets. Copies of this document can also be obtained from the EPA website at: http://www.epa.gov/safewater/ars/pdfs/regguide/ars_final_app_f.pdf

Sources of Financial and Technical Assistance for Small Systems (July 2002): EPA has developed a guide that identifies major sources of technical and financial assistance specifically targeted at small drinking water systems. Each source listed in this document contains a description about the source's mission, types of assistance that can be provided, and contact information. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA document # 816-K-02-005. Copies of this document can also be obtained from the EPA website at: http://www.epa.gov/safewater/smallsys/pdfs/tfa_sdws.pdf

A Small System Guide to the Total Coliform Rule: Monitoring Drinking Water Systems to Protect Public Health (June 2001): EPA has developed a guide that describes the need for coliform monitoring and how the Total Coliform Rule (TCR) applies to small community drinking water systems serving 3,300 people or less. Worksheets are provided along with step-by-step instructions on how to complete them and interpret the results of TCR monitoring. Additional blank monitoring worksheets can be requested separately. Copies of these products can be obtained by calling the Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA Document # 816-R-01-017A for the STEP guide and EPA Document # 816-R-01-017B for

additional blank monitoring worksheets. Copies of this document can also be obtained from the EPA website at: http://www.epa.gov/safewater/smallsys/small-tcr.pdf

Coming Soon!

Stage 1 Disinfection Byproducts (DBP) STEP Guide: EPA is currently developing a STEP Guide to guide small systems in achieving compliance with the Stage 1 Disinfectants and Disinfection By-Products rule. The STEP Guide will include worksheets and other tabular and graphical tools to help systems organize their data and think through compliance options. EPA is expecting to have this workbook completed in Spring 2006.

Restructuring Workbook for Small Water Systems: EPA is currently developing a simple workbook to help small drinking water systems with restructuring. The workbook shall include worksheets and related tools to assist small systems in their restructuring efforts. Emphasis should be place on management and physical consolidation options. Restructuring opportunities in the public and private sectors will also be explored. EPA is expecting to have this product completed by Spring 2006.

Total Coliform Rule STEP Guide for Non-Community Water Systems: EPA is developing a workbook to help small non-community drinking water systems comply with the Total Coliform Rule. EPA is expecting to have this document completed by Spring 2006.

II. Reports and Manuals

Arsenic Treatment Technology Evaluation Handbook for Small Systems (July 2003): This manual addresses state-of-the-art arsenic treatment for small systems and includes discussion of process theory, design parameters, cost estimation, compatibility with existing treatment processes, necessary pre- and post-treatment, residual disposal, and process operation and maintenance. Detailed example design calculations will be provided. The manual is intended for use by consulting engineers, state engineers, and technical assistance providers. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA Document # 816-R-03-014. Copies of this document can also be obtained from the EPA website at: http://www.epa.gov/safewater/smallsys/arsenic_treatment_handbook_lo.pdf

Coming Soon!

Summary of State Operator Certification Programs: EPA is currently developing a comprehensive summary document of state Operator Certification programs. The summary will be organized to address the key components of EPA's Operator Certification Guidelines. EPA is expecting to have this document completed by Summer 2006.

Compendium of Restructuring Statutes, Regulations, and Policies Report: EPA is currently developing a compendium of statutes, regulations, and policies on restructuring. EPA is expecting to have this compendium completed by Summer 2006.

III. Drinking Water Academy Courses

Drinking Water Academy Courses on Capacity Development: EPA has developed four courses in conjunction with the Drinking Water Academy: Introduction to Capacity Development (February 2003); Developing Technical Capacity (February 2003); Developing Managerial Capacity (July 2002), and Developing Financial Capacity (July 2002). Copies of these courses are available at: http://www.epa.gov/safewater/dwa/electronic/ematerials.html#PWS

Coming Soon!

"Introduction to Restructuring for Small Systems" Drinking Water Academy Course: EPA is developing a one-day course to help small drinking water systems with restructuring. Emphasis will be placed on management and physical consolidation options. Restructuring opportunities in the public and private sectors will also be explored in the course. The course will discuss available tools to assist small systems in their restructuring efforts. EPA is expecting to have this course completed by Spring 2006.

"Introduction to the Multiple Barrier Approach" Drinking Water Academy Course: EPA is developing a one-day course to help all water system personnel understand the barriers to contamination: source water protection; treatment; distribution system integrity; and public awareness. The course will discuss available tools to systems in their important efforts to protect public health through safe drinking water. EPA is expecting to have this course completed by Spring 2006.

IV. Quick Reference Guides and Brochures

Quick Reference Guide for Variances and Exemptions: EPA has developed a Quick Reference Guides for Variances and Exemptions Rule. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA Document # 816-F-04-005. Copies of this document can also be obtained from the EPA website at: http://www.epa.gov/safewater/smallsys/pdfs/qrguide_smallsystems_variance-exemptions.pdf

Coming Soon!

Promotional Materials for Best Management Practices: EPA is developing a brochure (4 pages) highlighting the capacity building benefits of system performance and optimization initiatives through Environmental Management Systems. EPA is expecting to have this document completed by Summer 2006.

"Targeted" Quick Reference Guides: EPA is developing a series of 2-4 page Quick Reference Guides for small water systems, including: Distribution Systems and Cross Connections; Roles and Responsibilities of Operators; Roles and Responsibilities of Owners; Timing Basics; Reporting and Recordkeeping. EPA is expecting to have these documents completed by Summer 2006.

V. Tools

Preventive Maintenance Tool for Small Ground Water Systems (Card File): EPA has developed a simple preventive maintenance tool for small ground water systems. The tool consists of index cards that give preventive maintenance tasks to be accomplished on a daily, weekly, and monthly basis. The tool also incorporates security-related tasks that could be accomplished in conjunction with the maintenance tasks. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA Document # 816-B-04-002. Copies of this document can also be obtained from the EPA website at: http://www.epa.gov/safewater/smallsys/pdfs/logcards_smallsystems_preventivemaintainance.pdf (log cards) and http://www.epa.gov/safewater/smallsys/pdfs/booket_smallsystems_preventivemaintainance.pdf (guide booklet)

Coming Soon!

Interactive Sampling CD for Small Systems: This Interactive CD-Rom tool is being developed to provide small system operators with video instruction for sample collection, storage, and shipment of contaminants such as: VOC's, IOC's, SOC's, Coliform bacteria, Radiological, TTHM/HAA5, and Lead/Copper. PowerPoint slides will also be available for trainers. The CD will contain **Case Studies** (7 short video clips highlighting small systems that have had detections of some of these contaminants and their story on how they dealt with each situation); the **Rule Wizard** (allows the user to input system size, source, and treatment type to generate the Federal SDWA sampling requirements); and a **Contaminant List.** EPA is expecting to have these documents completed by Summer 2006.

VI. Case Studies

Case Studies of Sustainable Water and Wastewater Pricing (December 2005): As part of its on-going efforts to promote sustainable water infrastructure, EPA has released a new document to help water utilities consider whether their rate structures sufficiently address the costs of ensuring safe and clean water. This document provides case studies describing how eight drinking water systems across the U.S. have approached water pricing. Each case study provides background on the system and describes how they are allocating costs and what rates should be charged to their customers. EPA collected this information to respond to the increasing challenges systems face with maintaining our nation's water infrastructure. This document will be made available to water and wastewater utility staff, state regulators, and technical and financial assistance providers in order to give new perspectives, and possibly valuable insight, on ways to develop and implement sustainable pricing practices. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA document # 816-R-05-007. Copies of this document can also be obtained from the EPA website at: http://www.epa.gov/safewater/smallsys/pdfs/guide_smallsystems_fullcost_pricing_case_studies.pdf.

Small System Partnership Solutions (September 2002): EPA has developed a product that provides an overview of steps that promote partnerships between systems. The product provides

examples of successful case studies of systems that have partnered with each other as a solution to achieving capacity. Copies of this document can be obtained from the EPA Safe Drinking Water Hotline at 1-800-426-4791. Please reference EPA document # 816-R-02-022. Copies of this document can also be obtained from the EPA website at:
http://www.epa.gov/safewater/smallsys/pdfs/capacitydevelopstudyv15.pdf

Appendix D

Distribution

Office of the Administrator
Assistant Administrator, Office of Water
Director, Office of Ground Water and Drinking Water
Agency Followup Official (the CFO)
Agency Followup Coordinator
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