



OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Supplemental Report

**Additional Details in Support of
Report No. 2005-P-00021
“Progress Report on Drinking Water
Protection Efforts”**

August 22, 2005

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Note: As a companion to "Progress Report on Drinking Water Protection Efforts," this supplemental report provides additional detail regarding the successes the U.S. Environmental Protection Agency (EPA) and its partners have had ensuring:

- a. Drinking water sources are protected from contamination.
- b. Operators of public water systems are adequately trained.
- c. Water systems have adequate technical, managerial, and financial capacity.
- d. Water systems have adequate infrastructure.
- e. State resource funding levels support adequate oversight of drinking water systems.
- f. The public is well informed about its drinking water quality.

In each area, we used the following general evaluation questions to identify successes:

1. What activities were conducted prior to the 1996 Safe Drinking Water Act (SDWA) Amendments?
2. How successful were these pre-1996 activities?
3. What did the 1996 SDWA Amendments mandate and how did EPA and State activities change as a result?
4. What was the outcome associated with these post-1996 activities?
5. What challenges / opportunities exist for the future?

These questions were then used to organize the information collected from the eight States reviewed (Arkansas, Hawaii, Minnesota, New York, North Dakota, Oklahoma, Pennsylvania, and South Dakota).

* * *

Abbreviations

AWWA	American Water Works Association
CCR	Consumer Confidence Report
CWS	Community Water System
DWSRF	Drinking Water State Revolving Fund
EPA	U.S. Environmental Protection Agency
FY	Fiscal Year
NTNCWS	Non-Transient Non Community Water System
SDWA	Safe Drinking Water Act
T/M/F	Technical, Managerial, and Financial

Section A

Source Water Information

How were source waters protected prior to the 1996 SDWA Amendments?

EPA did not have a source water protection program prior to 1996. However, elements of the source water protection concept have been present since the original SDWA was passed in 1974. The original SDWA included today's Underground Injection Control and Sole Source Aquifer programs. The 1986 SDWA Amendments authorized a wellhead protection program which mandates that States develop programs to protect public water-supply wells from harmful contaminants. Many pre-1996 Federal drinking water regulations (e.g. 1989's surface water treatment rule) also contained elements of the source water protection concept.

What outputs or outcomes resulted from these pre-1996 efforts?

All 50 States now have primacy for the wellhead protection program. The Underground Injection Control and Sole Source Aquifer programs are also part of the SDWA.

Some States also addressed source water issues prior to 1996. In 1991, North Dakota developed a system for identifying those areas in the State where ground water resources are most susceptible to contamination. New York, meanwhile, required that wastewater discharged into surface waters meet ambient standards before it reached intakes; New York has managed surface waters for drinking water use since the 1970s.

Nevertheless, Congress created the source water protection program in 1996 because it found that source protection was still not a major part of the national drinking water program. Source water protection was still largely the domain of the Clean Water Act in 1996, and community water systems were having difficulty accessing Clean Water Act programs. Congress saw source water protection as a cost-effective way to ensure safe water supplies.

How did source water activities change as a result of the 1996 SDWA Amendments?

The 1996 SDWA Amendments required source water assessments. The assessments provided the following information for all public water systems:

- A map (delineation) of the source water assessment area
- An inventory of potential sources of contamination
- A determination of how susceptible the water supply was to contamination from those sources

Source water assessments represented an expansion of the wellhead protection program. Both programs required delineation of protection areas, inventories of potential contamination sources, management controls for these potential sources, and contingency plans. However, source water assessments also required susceptibility determinations and the public release of assessment results. Following the events of September 11, 2001, South Dakota, Oklahoma, and Pennsylvania restricted public access to source water assessment results.

What outputs / outcomes have resulted from the 1996 Amendments?

Source water assessments had been completed for 86 percent of all public water systems by February 2005. Seven of the eight States visited have completed their required source water assessments, and the eighth (Pennsylvania) has completed all but 6 percent of its assessments.

Source water protection activity is occurring in some States. Pennsylvania provides grants to fund local efforts to develop source water protection plans. The State has also funded the Pennsylvania League of Women Voters Water Resource Education Network's administration of a mini-grant program that is designed to increase awareness of source water protection issues at the municipal level. Oklahoma, meanwhile, has worked with its Municipal League on the development of model municipal source water protection (zoning) ordinances.

In other States, source water protection activity is concentrated at the local level. Although the Arkansas Department of Health has not become involved with the implementation of local source water protection plans to date, the Arkansas Rural Water Association has helped some utilities implement source water protection programs. In much the same way, the rural water associations in North and South Dakota, rather than the State primacy agencies, have promoted source water protection at the local level in those States. The State of North Dakota has, for example, contracted source water protection work to the North Dakota Rural Water Systems Association since 1999.

The National Rural Water Association, the State rural water associations' parent organization, noted that its involvement with the protection of source waters and wellheads continues. The National Rural Water Association is presently working with larger communities to complete and implement source water protection plans. This nine-State pilot project has, thus far, resulted in the implementation of some 100 source water protection plans. One hundred thirty-three more source water protection plans are currently in progress. The National Rural Water Association has also assisted in the development of 6,810 wellhead protection plans, with some 1,003 additional wellhead protection plans still in progress. As of March 2005, 19 source water protection specialists were working in 361 project areas across the country. Soon, source water protection specialists will be working in 34 States, increasing the population served by National Rural Water Association specialists to roughly 6.5 million.

What opportunities and challenges exist for progress in the future?

Opportunities

States noted that both the source water assessments themselves and ensuing source water protection efforts have produced many ancillary benefits (see Table A-1):

Table A-1: Benefits of Source Water Assessments / Protection

State	Benefit
Minnesota, South Dakota	Education Both States use source water assessments to educate operators about their respective source waters. Operators learn about potential sources of contamination for their drinking water supplies.
North Dakota, Minnesota	Inter-Agency Cooperation The North Dakota Department of Health uses hydrogeologic information from the State Water Commission and the U.S. Geological Survey to help define source water protection areas. In Minnesota, liaison activity between the Minnesota Pollution Control Agency's leaking underground storage tank program and the Minnesota Department of Health's wellhead protection work has gradually been incorporated into regulations for both the Pollution Control Agency and the Department of Health.
North Dakota	Awareness North Dakota stated that its communities are more aware of source water protection issues today. As communities come to realize the importance of source water protection, they may then be able to develop and implement source water protection plans.
New York, South Dakota	Better Contaminant Data Both New York and South Dakota stated that the source water assessment process has yielded better data on potential sources of contamination.

Challenges

The States visited often cited the following as barriers to achieving full source water protection:

- States noted that they lack the resources necessary to implement source water protection.
- Both States and rural water districts may lack the authority to require protection because land use remains a local issue.
- South Dakota reported that EPA allowed a hog confinement to be sited on a reservation when this development may adversely impact the South Dakota Department of Environment and Natural Resource's overall source water protection efforts. Some tribes have water quality discharge standards while others do not.
- Arkansas believes that more coordination needs to occur across Federal agencies. Arkansas' Department of Health, for instance, only learned about a Forest Service source water protection pilot project through the newspaper.

Section B

Water System Operator Information

How were water system operators' competencies developed prior to the 1996 SDWA Amendments?

The 1974 SDWA required water systems to monitor the water delivered to consumers so that they could detect whether the water exceeds the drinking water standards. Most States had operator training and certification programs prior to 1996 and these programs varied in testing and certification requirements, as well as the types of systems covered. Some States required very small systems to have trained operators while others did not. All eight States visited reported having some form of an operator certification program prior to the 1996 SDWA Amendments. Table B-1 provides a brief summary of how these States described their pre-1996 programs.

Table B-1: Pre-1996 State Operator Certification Program Summary

State	Summary
Arkansas	Mandatory operator certification program since 1957.
Hawaii	Required certification of water treatment plant operators since 1992. Training for surface water treatment systems began in 1992/1993.
Minnesota	The State reported having an operator certification program prior to the 1996 Amendments. No additional details were provided.
New York	Operator certification requirements have been in existence since the 1930s. They were revised in the 1970s to include renewal training.
North Dakota	Mandatory operator certification for water systems serving more than 500 people since 1971. In 1991, North Dakota extended the operator certification requirement to all community water systems (CWSs) and non-transient non community water systems (NTNCWSs).
Oklahoma	Required certified operators since 1959.
Pennsylvania	Had an operator training and certification program prior to 1996, but the certification exam was difficult; the exam passing range was low and not valid.
South Dakota	Mandatory operator certification since 1970 for water systems serving more than 500 people and non community water systems using a chlorinator or surface water.

What outputs or outcomes resulted from these pre-1996 efforts?

While variations of operator training and certification programs were in place, a 1990 Government Accountability Office report found that drinking water violations were still going undetected or unreported by water systems. The report highlighted two causes of water system sampling errors: (1) the increasingly technical nature of water sample collection; and (2) inadequately trained or inexperienced operators, particularly at small systems. To improve compliance and reduce operator error, the Government Accountability Office recommended that EPA promote more consistent use of State-

sponsored operator certification and training programs. The survey instrument used in this study did not include any questions about the public health outcomes of State operator certification programs prior to the 1996 SDWA Amendments.

What activities changed as a result of the 1996 SDWA Amendments?

Congress directed EPA to establish guidelines specifying minimum standards for the certification and recertification of operators of CWSs and NTNCWSs. Additionally, Congress authorized the Federal Expense Reimbursement Grant Program (Section 1419(d)), which provided funds, through 2003, for States to reimburse systems serving 3,300 persons or fewer for the costs of training and certification.

An EPA Office of Ground Water and Drinking Water staff member reported that the 1996 SDWA Amendments required States to revise their operator certification programs to ensure that all CWSs and NTNCWSs have a certified operator. EPA's Operator Certification guidelines allow the States to tailor their operator certification programs to accommodate varying complexities of water systems. All the States implement operator certification programs, which includes contracting with third party organizations to assist in training and continuing education requirements. For example, Minnesota, Pennsylvania, and Arkansas partnered with community colleges, technical schools, or universities to provide training to water system operators. Table B-2 provides a brief summary of the operator certification activities found among the States interviewed in this evaluation.

Table B-2: Operator Certification and Renewal Activities

State	Summary
Arkansas	The Arkansas Department of Health contracts with training organizations such as the Arkansas Rural Water Association, the Arkansas Environmental Academy, and the Southwest section of the American Water Works Association (AWWA). The State issues a quarterly newsletter, "Arkansas Drinking Water Update," to water systems / operators.
Hawaii	The Hawaii State Department of Health has offered refresher training classes to help operators pass the exams. The State reported that they are just beginning a contract with the University of Hawaii Outreach College to provide operator certification and training with funds from the Expense Reimbursement Grant.
Minnesota	The Minnesota Department of Health works with the Minnesota section of the AWWA, the Minnesota Rural Water Association, and the Minnesota Training Coalition to administer training. The State also awards grants to Vermillion Community College and St. Cloud Technical College to provide instruction for small system operators.
New York	The operator certification provisions in the 1996 SDWA Amendments expanded the classes of operators that needed certification to include NTNCWSs. The Expense Reimbursement Grant enabled the State to provide free training to operators and pay for text books and trainers. Third party organizations, such as the New York Rural Water Association and AWWA, as well as community colleges and independent training consultants, provide training.

State	Summary
North Dakota	Third party organizations such as the North Dakota Rural Water Systems Association and the North Dakota section of the AWWA provide training. The North Dakota Department of Health contracted with technical assistance providers (e.g. North Dakota Rural Water Systems Association) to offer one-on-one training opportunities to uncertified operators.
Oklahoma	The Oklahoma Department of Environmental Quality instituted an on-line training option for operators. Operator training courses are held at three training facilities: Accurate Labs, Rose State College, and the Oklahoma Rural Water Association. The Oklahoma Rural Water Association trains small system operators through on-site, one-on-one assistance. In an effort to increase the number of certified operators in the State, some prisoners are going through the water system operator certification process via on-line testing.
Pennsylvania	The Pennsylvania Department of Environmental Protection created 40 different training modules and exercises that focus on key points of the certification exam. Training is provided by 90 approved vendors that offer, collectively, more than 800 courses. The Department also had plans to provide Web-based training. The Department used the Expense Reimbursement Grant to pay water system operators directly for costs incurred during training, certification, and continuing education. The Expense Reimbursement Grant is also used to pay for some training modules.
South Dakota	The South Dakota Association of Rural Water Systems conducts 90 percent of training. The South Dakota Water and Waste Water Association, AWWA, and the Water Environment Federation provide small amounts of training. Certification exams are administered all across the State throughout the year. Enforcement is pursued when systems are given sufficient time to get a certified operator, but the systems still fail to comply with regulations. Systems are allowed to contract with certified operators if they cannot hire a certified operator themselves.

What outputs / outcomes have resulted from the 1996 Amendments?

Table B-3 provides a brief summary of the results of operator certification efforts among the States interviewed in this evaluation.

Table B-3: Operator Certification Outputs

State	Summary
Arkansas	The Arkansas Department of Health has not developed any formal strategic targets. The State has increased the percentage of CWSs with a licensed operator from 98.5 percent to 98.9 percent. The percentage of NTNCWSs with a licensed operator has also risen from 33.3 percent to 85.7 percent. The exam passage rates have increased steadily over time – from 31 percent (1997) to 71 percent (2004).
Hawaii	The Hawaii State Department of Health reported that it wants to have at least one certified operator at each water system. The Department reported that almost 100 percent of the State's water systems have at least one certified operator on staff.
Minnesota	An analysis of documents indicates that 93.3 percent of CWSs and 97.5 percent of NTNCWSs have a certified operator.
New York	The New York State Department of Health has reduced the number of systems without a certified operator. In 2001, there were 1,695 systems without a certified operator, while today that number is only 160. The Department stated that operator training affects water quality compliance rates, water system capacity, and oversight focus.
North Dakota	The North Dakota Department of Health reported that their operator certification program has made significant improvements. Ninety-one percent of all North Dakota public water systems (CWSs and NTNCWSs) have a certified operator.
Oklahoma	Oklahoma reported that from July 2003 to July 2004, 692 water systems participated in the Expense Reimbursement Grant program, and 1,321 operators were trained. Oklahoma has 1,311 public water systems.
Pennsylvania	Pennsylvania reported that of the 2,143 CWSs in the State, 1,769 have a certified operator – a compliance rate of 83 percent. Prior to the Water and Wastewater Systems Operator Certification Act, the Pennsylvania Department of Environmental Protection estimated a 68 percent CWS compliance rate. Also, 11 percent of the NTNCWSs (1,221) have certified operators, which represents a 10-fold increase over State Fiscal Year 2002. The allowance for "grandparenting" in the operator certification provisions should increase the compliance rate during the next 2 years.
South Dakota	South Dakota's reported operator certification compliance rates are currently at 90 percent.

What opportunities and challenges exist for future progress?

States reported several challenges affecting operator training and certification. Table B-4 provides a brief summary of the operator certification challenges that exist:

Table B-4: Operator Certification Impediments

State	Challenge
Arkansas, Hawaii, Oklahoma, and South Dakota	Lack of adequate compensation for water system operators
Hawaii, Minnesota, North Dakota, New York, and Oklahoma	Small system operators' lack of time or desire, or the need for replacement personnel when regular personnel attend training
Arkansas, Hawaii, North Dakota, New York, Oklahoma, and South Dakota	Lack of support from local government, water suppliers and drinking water consumers regarding the importance of operator training and certification.

While States noted a number of challenges that affect their training of water system operators, there are opportunities for improvement. These include using emerging technologies to make it easier for operators to receive testing and training, and expanding the number of courses that can be counted as continuing education credit. Some of the States interviewed reported a need for additional funding, and the Expense Reimbursement Grant was one of the sources mentioned. However, the Expense Reimbursement Grant is not authorized for Congressional funding beyond 2003.

Section C

Capacity Development Information

How was capacity assistance provided prior to 1996?

The 1974 SDWA and 1986 Amendments did not have specific capacity development requirements, though a few States implemented “viability” initiatives. These initiatives were intended to improve small system compliance by developing T/M/F capabilities. Table C-1 describes State efforts to assist utilities in developing T/M/F capacities.

Table C-1: State Capacity Assistance Activities Prior to 1996

State	Activities
Arkansas	Provided “on demand” technical assistance to utilities.
Hawaii	Did not have capacity assistance apart from direct assistance to utilities.
Minnesota	All parts of the program were already in place prior to the Amendments.
New York	None identified
North Dakota	The State had a voluntary capacity development program that overlapped with its operator certification and inspection programs.
Oklahoma	The CD Strategy was simply a consolidation of existing programs. Finance training for water boards started between 1994 and 1996.
Pennsylvania	Since 1988, the Pennsylvania Department of Environmental Protection has been conducting Filter Plant Performance Evaluations.
South Dakota	The State provided operator certification training, technical assistance (both on-site and telephone), a list to systems of what samples will need to be taken in a given year (and an approximate cost), reminder letters and phone calls to water systems for samples needed by a certain deadline but not yet received. The State also promoted the use of water meters, periodic review of rate structures, capital improvement funds, and the availability of a funding source (State Water Plan) to help systems.

What outputs or outcomes resulted from these pre-1996 efforts?

Capacity development activities prior to the 1996 Amendments were not included in the scope of our State survey. We are, therefore, not able to sufficiently discuss the outputs and outcomes of the various States’ capacity development services for the time period prior to 1996.

How did capacity development activities change as a result of the 1996 SDWA Amendments?

States developed capacity development strategies, which were approved by EPA Headquarters and the Regions. The strategies must be reviewed on an annual basis. Table C-2 describes State and third party efforts to assess and improve water system T/M/F capacities.

Table C-2: Selected Capacity Development Assistance Reported by States

State	Activities
Arkansas	<ul style="list-style-type: none"> • Utilities must develop long-range plans, though these plans are not reviewed unless there is a problem at the water system. • The State conducts Comprehensive Performance Evaluations and Performance Based Training sessions. • The Arkansas Rural Water Association conducts technical / operational assessments for existing water systems. • The Community Resource Group conducts managerial / financial assessments of existing water systems. The Group does capacity followup activities with water systems to check and see if they are implementing recommendations. The Group also works with local government (e.g. county boards) on drinking water issues. The Group, finally, does rate studies for local systems.
Hawaii	<ul style="list-style-type: none"> • The revised capacity development strategy calls for continuing education opportunities for operators through the University of Hawaii, and a circuit rider to assist all privately-owned small water systems.
Minnesota	<ul style="list-style-type: none"> • Activities devoted to T/M/F capacity assistance include: operator certification, rural water association circuit rider on-site assistance and classroom training courses, various T/M/F training sessions for operators and municipal employees, water sampling by Minnesota Department of Health engineers, writing Consumer Confidence Reports for utilities, Source Water Protection / Wellhead Protection, water system plan reviews, sanitary surveys every 18 months, newsletters, providing wellhead information to drillers, enforcement, Drinking Water State Revolving Fund (DWSRF) loans, and interacting with the waterworks industry such that utilities have a training network in place. • The Minnesota Department of Health also funds drinking water research projects that are focused on treatment techniques (e.g., Long Term 2 Enhanced Surface Water Treatment Rule, a filtration rule that will affect utilities in the northern part of the State).

State	Activities
New York	<ul style="list-style-type: none"> • Local Health Units conduct viability (T/M/F) reviews for systems in Significant Non-Complier status or when utilities apply for State Revolving Fund loans. • The New York State Department of Health is implementing a process for conducting viability analyses of all systems. T/M/F elements of capacity development were integrated into the sanitary surveys. • The Environmental Finance Center hosts special events, such as capacity workshops, to assist communities. The Center hosts technical assistance fora every few months on various issues, including funding. • The New York State Department of Health works with the Department of State to provide general training for newly elected local government officials.
North Dakota	<ul style="list-style-type: none"> • Developed a quantitative system that prioritizes systems for capacity assistance. • The Midwest Assistance Program provides technical assistance to utilities, and it will undertake managerial / financial assistance for systems receiving DWSRF loans. • The North Dakota Department of Health assists operators with sampling by sending them sample bottles ahead of time. The Department also sends systems reminder letters if they appear to be having problems getting samples submitted to the Department on time.
Oklahoma	<ul style="list-style-type: none"> • The Oklahoma Water Resources Board assesses utilities' managerial and financial capacities as part of the DWSRF loan application process. • The Community Resource Group meets with water boards to discuss managerial and financial capacity issues. • The Department of Environmental Quality also has smaller water systems complete a checklist to assess managerial / financial capacity. Large systems do a managerial / financial self-audit.
Pennsylvania	<p>Pennsylvania's Capability Enhancement program identifies and rates all public drinking water systems in need of assistance. Capability Enhancement Facilitators evaluate and assist drinking water systems, working with water system operators and managers to evaluate the T/M/F aspects of the water system. The Rural Community Assistance Program and the Pennsylvania Rural Water Association help implement components of the Capacity Enhancement program.</p>
South Dakota	<p>The State contracted with the South Dakota Association of Rural Water Systems and South Dakota's six regional planning and development districts to help communities evaluate the T/M/F capacity of water utilities. A State staff person reviews completed capacity assessments and issues recommendations for system improvements. The State produced a <i>New Water System Planning Manual</i> to guide systems through the process of obtaining a certificate of approval.</p>

What outputs / outcomes have resulted from post-1996 capacity development efforts?

The States rely upon outputs (number of utilities assisted or assessments conducted) and drinking water compliance rates to track the impact of capacity assistance activities. EPA is developing a set of measures in response to the 2003 Office of Inspector General report, *Impact of State Drinking Water Capacity Development Efforts Uncertain* (2003-P-00018). Table C-3 illustrates how States track the performance of their capacity development activities.

Table C-3: State Capacity Development Outputs

State	Measure
Arkansas	Approximately 160 capacity development assessments have been completed since 1999.
Hawaii	Approximately 75 percent of operators passed the Association of Boards of Certification standard examinations as a result of the State's initial capacity-related effort to train and certify operators. The State uses compliance as an indicator of water system capacity.
Minnesota	The Minnesota Department of Health tracks compliance with drinking water standards as its indicator of success. The Fiscal Year (FY) 2003 Capacity Development Report noted that 79 percent of benchmark compliance rates (15 of 19) were met or exceeded in 2002.
New York	Since December 2000, 20 percent (18/90) of the utilities with Maximum Contaminant Level violations (or that were Significant Non-Compliers) or that could not respond to an emergency situation have been improved through DWSRF assistance or consolidations.
North Dakota	Approximately 83 percent of CWSs and 86 percent of NTNCWSs came off of the North Dakota Department of Health's capacity priority list after they received capacity assistance from the Midwest Assistance Program. Eighteen of 321 CWSs required capacity assistance between FYs 2001 and 2003.
Oklahoma	There was an increase in compliance to 94.1 percent in 2002 from 86.8 percent in 1994.
Pennsylvania	Pennsylvania tracked water system changes over time using a quantitative and qualitative method. If system scores improve over time, then the system's T/M/F capacity is likely improving as well.
South Dakota	In total, contract organizations completed approximately 68 capacity assessments between 1998 and the close of FY 2003. The assessments were reviewed, and the State issued recommendations for system improvements.

What opportunities and challenges exist for progress in the future?

States described impediments to implementing capacity development strategies (Table C-4), as well as opportunities for improving water system T/M/F capacity (Table C-5).

Table C-4: Capacity Development Impediments

State	Impediments
Arkansas	<ul style="list-style-type: none"> • The Arkansas Department of Health lacks the regulatory authority to force systems to develop their institutional capacity. • There is a lack of guidance on what constitutes “adequate” managerial / financial capacity.
Hawaii	<p>New water system applicants (such as new subdivisions or homeowner associations) are trying to get under the 15-service connection requirement because they perceive that it will be difficult for new water systems to obtain capacity approval. The Hawaii State Department of Health has no regulatory authority over these systems. When systems are in compliance with drinking water regulations, there is no “hammer” to force them to make improvements.</p>
Minnesota	<ul style="list-style-type: none"> • Impediments include cost (to maintain systems and hire personnel); time (operators and elected officials have many non-water-related responsibilities); and priorities (elected officials and employees have many “irons in the fire”). • There is no national guidance for non community water systems. • Non community water systems are not included in EPA’s strategic plan.
New York	<p>The New York State Department of Health does not have the authority to require utilities to increase their water rates.</p>
North Dakota	<p>Impediments include the cost of upgrades for small water systems, recalcitrant water systems, and consolidation. Geographic isolation has prevented some small systems from joining larger rural water systems.</p>
Oklahoma	<ul style="list-style-type: none"> • There is insufficient staff time for meeting capacity development reporting requirements. • Oklahoma is forced into a reactive stance with its drinking water protection activities (enforcement vs. capacity development, for example) because of new drinking water regulations. • Limited Department of Environmental Quality resources and authorities are factors that prevent staff from encouraging more system consolidation. • There is a “disconnect” between the rulemaking process and rule implementation. The complexity of new regulations makes it difficult for State staff to implement existing rules, study new ones, and explain new rules to utilities. The State believes it was better when EPA’s Office of Ground Water and Drinking Water was involved with enforcement.
Pennsylvania	<ul style="list-style-type: none"> • There is a lack of trust among water systems toward regulatory agencies. • Elected officials and staff change. • Water systems are often reluctant to increase water rates.
South Dakota	<ul style="list-style-type: none"> • A relatively limited field presence makes it more challenging to determine water system capacity needs. • Training is often too costly for small systems. • Many systems fail to have any interest in acquiring managerial / financial capacity apart from that which must be demonstrated to secure loans.

Table C-5: Capacity Development Opportunities

State	Opportunities
Arkansas	Water system “buy-in” is central to developing Arkansas’ water system capacities. This “buy-in,” however, is often hard to procure from the State’s worst offenders. Consequently, the Arkansas Department of Health is trying to focus its capacity development efforts on those utilities that are not yet Significant Non-Compliers.
Hawaii	None identified
Minnesota	None identified
New York	<ul style="list-style-type: none"> • Providing better materials and opportunities for drinking water staff and operators, as well as clear guidance materials on rules, and the technical knowledge needed to design, operate, and manage water systems. • Assistance with how to sell drinking water protection programs to State legislatures. • The next reauthorization of the SDWA should be based on better health knowledge rather than lowering contaminant levels in drinking water.
North Dakota	None identified
Oklahoma	The national capacity development meeting in Denver was very useful because it offered attendees an opportunity to learn about what other State capacity development programs are doing.
Pennsylvania	Including bond issues for infrastructure improvements. Developing a program integrating infrastructure improvements with economic development, although this would require legislative changes.
South Dakota	More involvement of technical assistance providers, more training, and information sharing.

Section D

Infrastructure Information

How was drinking water infrastructure promoted prior to the 1996 SDWA Amendments?

All Federal funding (exclusive of EPA-administered earmarked funds) for drinking water infrastructure came from non-EPA sources prior to 1996. Both the Bureau of Reclamation and the U.S. Departments of Agriculture, Commerce, and Housing and Urban Development provided drinking water infrastructure funding prior to 1996. The Department of Agriculture provided funding through its Rural Utilities Service while the Department of Commerce's funding activity was housed in its Economic Development Administration. Bureau of Reclamation funding came from the Bureau's Rural Water Program, while the Department of Housing and Urban Development funded projects through its Community Development Block Grant Program.

States supplemented Federal infrastructure funds with their own monies. Table D-1 lists some examples of the financing programs present in the States visited prior to 1996:

Table D-1: State Infrastructure Funding Programs (pre-1996)

Program	Description	Creation
Arkansas [Arkansas Soil and Water Conservation Commission] - <i>Water Development Fund</i>	Provides loans, grants and deferred loans to water systems. The Water Development Fund may also be used to finance joint ventures between utilities and the Commission.	1969
[Arkansas Soil and Water Conservation Commission] - <i>Water Resources Cost Share Revolving Fund</i>	Provides up to 25 percent of project costs to the State of Arkansas and localities to help meet Federal match requirements.	1989
[Arkansas Soil and Water Conservation Commission] - <i>Water, Sewer & Solid Waste Fund</i>	Funds up to 50 percent of system project costs via loans, grants, or deferred loans.	1975
New York [New York Environmental Facilities Corporation] - <i>Industrial Finance Program</i>	Provides tax-exempt loans to water systems for such items as mains, piping, wells, treatment works, finished water reservoirs, and sludge facilities.	1970
[State Energy Research and Development Authority]	Helps water systems increase energy efficiency.	Parent agency created - 1975

Program	Description	Creation
Oklahoma [Oklahoma Water Resources Board] - <i>Emergency Grants</i>	Grants (15 percent match) to address emergencies at water systems. A project cannot receive more than \$100,000 in any fiscal year.	1983
[Oklahoma Water Resources Board] - <i>Financial Assistance Program (Bond) Loans</i>	Long-term, low-interest loan program for sewers and public water systems. This program provided \$66 million to systems in FY 2003.	1984
Pennsylvania [Pennsylvania Department of Community and Economic Development / Economic Development Financing Authority] - <i>Bond Financing Program</i>	The Bond Financing Program provides both tax-exempt and taxable bonds to finance land, building, equipment, working capital and refinancing costs for water systems. Up to 100 percent of project costs may be covered.	1989
<i>Small Water Systems Regionalization Grant Program</i>	Provides funds to help water systems evaluate whether consolidation is appropriate.	1992
<i>State Revolving Loan Fund</i>	Provides loans for water infrastructure improvements.	1988
South Dakota <i>Consolidated Water Facilities Construction Program</i>	Provides grants and loans for water-related projects.	1986 - 1993

What outputs or outcomes resulted from these pre-1996 efforts?

In a 1993 report, EPA noted that State drinking water programs still required additional financial assistance. EPA asserted that President Clinton's February 1993 proposal for a DWSRF would help systems meet rising compliance costs.

How did drinking water infrastructure activities change as a result of the 1996 SDWA Amendments?

The Senate expressed concern about compliance costs when it drafted the SDWA Amendments. EPA, it said, had estimated that approximately \$8.6 billion in capital expenditures were needed to comply with the requirements of the SDWA at that time. Some 40 percent of these investments would need to come from small systems. While Congress had provided \$65 billion to help utilities meet the secondary treatment requirements imposed under the 1972 amendments to the Clean Water Act, similar assistance had not been provided under the SDWA.

Congress authorized a DWSRF in the 1996 SDWA Amendments because it found that communities needed additional Federal resources if they were to meet Federal drinking water requirements. The DWSRF was to help States fund projects that both protect public health and ensure compliance with the SDWA. The DWSRF helped boost Federal infrastructure investments after FY 1997. Annual DWSRF appropriations ranged from \$743 million to \$1.38 billion between FYs 1998 and 2004 (2003 constant dollars).

What outputs / outcomes have resulted from the 1996 Amendments?

The Federal Government plays a larger role in financing infrastructure projects today than it did in 1996. The combined infrastructure expenditures of EPA, the Department of Agriculture, the Economic Development Administration, and Bureau of Reclamation were higher between FYs 1997 and 2004 than they were prior to FY 1997. Total Federal expenditures likely exhibit the same pattern. Although funding from the Department of Housing and Urban Development for water and wastewater projects decreased from an average of \$529,499,981 in FYs 1991-1996 to \$437,582,667 in FYs 1997-2004, this decrease does not offset the increase in EPA funding after FY 1996. Even if the entire decrease in funding from the Department of Housing and Urban Development is due to cuts in drinking water, the Federal Government is still playing a larger financing role than in FY 1996.

What opportunities and challenges exist for progress in the future?

Opportunities

Most States have attempted to coordinate infrastructure funding sources. An October 2003 EPA report found that 45 States were coordinating water / wastewater infrastructure funding. Such coordination can produce efficiency gains. For example, Arkansas has a Water and Wastewater Advisory Committee that meets monthly to review preliminary engineering reports from systems seeking State or Federal assistance; coordination of funding requests has reduced delays associated with preliminary project approvals in Arkansas from 2-3 years to 60-90 days. Oklahoma's Funding Agency Coordinating Team, meanwhile, helped streamline the funding application process by creating common environmental/engineering report checklists that all Team partners now employ. Seven of the eight States included in this study were coordinating drinking water infrastructure funding in some way (see Table D-2).

Table D-2: Infrastructure Funding - State Coordination Mechanisms

State	Activity
Arkansas	Water and Wastewater Advisory Committee
Minnesota	Informal communication between funding organizations
New York	Water and Sewer Infrastructure Co-Funding Initiative
North Dakota	Informal communication between funding organizations
Oklahoma	Funding Agency Coordinating Team (FACT)
Pennsylvania	<i>Ad hoc</i> committees - informal meetings with the U.S Departments of Agriculture and Housing and Urban Development
South Dakota	Informal coordination between funding organizations
Hawaii	Does not currently coordinate with other funding agencies

Some States and third parties educated systems about the infrastructure funding sources available to them as well. States also exercised some authority over infrastructure via the plan review / approval process.

Challenges

Federal Funding

Federal funding alone cannot meet the nation's drinking water infrastructure needs. In its 2002 Gap Analysis, EPA estimated annualized infrastructure needs at \$7.7 - 22.3 billion. This range encompasses previous needs estimates (see Table D-3).

Table D-3: Needs Estimates

Organization	Annual Need (estimate)
EPA (Needs Survey - 2005)	\$13.8 billion (2003 dollars)
EPA (Needs Survey - 2001)	\$8.4 billion (2003 dollars)
EPA (Needs Survey - 1997)	\$8.5 billion (2003 dollars)
EPA (Gap Analysis - 2002)	\$7.7 billion - 22.3 billion; point estimate at \$13.7 billion (nominal dollars)
Association of General Contractors	\$12.1 billion (2003 dollars)
Joint Economic Committee	\$9.3 billion (2003 dollars)
Congressional Budget Office (1988)	\$13.5 billion (2003 dollars)
Congressional Budget Office (2002)	\$12.2 billion - 21.2 billion (2003 dollars)
Water Infrastructure Network	\$12.6 billion (2003 dollars)
American Society of Civil Engineers	\$11 billion (nominal dollars)
American Water Works Association	\$17.2 billion (2003 dollars)

EPA, the U.S. Department of Agriculture, the Economic Development Administration and the Bureau of Reclamation have not been able, collectively, to meet this need. In FY 2004, the four agencies met, at most, 21.7 percent of the need (see Table D-4). DWSRF appropriations met no more than 9.7 percent of estimated annual infrastructure

needs that year. However, DWSRF funding does play a somewhat larger role in the financing of small system (population 501-3,300) infrastructure investments. EPA's most recent *Community Water System Survey* reported that some 19.3 percent of these systems' infrastructure needs were met through DWSRF loans.

Table D-4: Federal Funds' Role in Promoting Adequate Infrastructure (FYs 2001 - 2004)

Source	FY 2001	FY 2002	FY 2003	FY 2004
EPA *	4.2 - 12.2%	4.1 - 12.0%	3.9 - 11.3%	3.5 - 10.3%
U.S. Department of Agriculture*	4.0 - 11.6%	5.5 - 16.0%	3.4% -10.0%	3.6 - 10.3%
Economic Development Administration*	0.2 - 0.5%	0.2 - 0.5%	0.1 - 0.4%	0.1 - 0.4%
Bureau of Reclamation*	0.3 - 0.8%	0.4 - 1.1%	0.4 -1.2%	0.3 - 0.9%
Subtotal **	8.7 - 25.2%	10.3 - 29.7%	7.9 - 22.9%	7.4 - 21.7%
* The percentage ranges for the four organizations above are derived from annual drinking water infrastructure needs of \$7.7 - 22.3 billion inferred from the 2002 EPA Gap Analysis. ** Data from the four organizations listed may not sum due to rounding.				

Rate Structures

Utilities do not often have adequate rate structures in place. A 2002 Government Accountability Office report estimated that 29 percent of utilities serving populations greater than 10,000 deferred maintenance because of insufficient funding. More than half of these utilities had raised their rates two or less times between 1992 and 2001. Smaller utilities are even more likely to be in financial difficulty. Thirty-nine percent of private utilities serving fewer than 500 persons were operating at a loss in 2000 while just 3.4 percent of private systems serving more than 100,000 persons had deficits that year. Twenty percent of large (serving populations of more than 100,000) public systems operated at a loss in 2000.

Statutory Authority

Several States had little direct statutory authority over drinking water infrastructure unless a particular system was in violation. North Dakota, for example, needs an Administrative Order before it can compel systems to make infrastructure improvements. Neither Hawaii nor South Dakota can force a system to make improvements unless that system has a Maximum Contaminant Level violation or other significant system deficiencies.

Limitations on the Use of DWSRF Funds

Some State staff were frustrated over limitations placed on the use of DWSRF funds. Staff in New York, Oklahoma and Hawaii all noted that the 4 percent set-aside for administrative costs is inadequate. The statutory prohibition on the use of State Revolving Funds for growth was, meanwhile, a concern in South Dakota and Arkansas. Staff in both South Dakota and Pennsylvania, finally, were concerned about their inability to use DWSRF funds for dam or reservoir construction.

Section E

Resources Information

The States reported that they currently have sufficient or stable resources with which to implement the SDWA provisions. However, future drinking water requirements (new regulations) or budget cuts may force States to reduce proactive outreach activities or shift resources to compliance efforts.

Prior to the 1996 SDWA Amendments, States had difficulty meeting core program requirements. In 1993, EPA estimated that the gap between State SDWA funding needs and the available State and Federal resources was \$162 million. Through the SDWA Amendments, Congress increased the authorization level of the Public Water System Supervision national grant to \$100 million. In 1976, States had received approximately \$43.5 million (constant 2003 dollars). The Amendments also established DWSRF set-asides to support State drinking water protection activities. In the original Act, Congress authorized Federal Public Water System Supervision grants to cover no more than 75 percent of a State program's cost.

State drinking water programs rely upon general revenues and fees to supplement Federal funding. Table E-1 lists the States in this study which rely upon fees to support program activities.

Table E-1: State Fee Structures

State	Fees
Arkansas	The current monthly fee is 25 cents. The Arkansas Department of Health is asking the State Legislature for the authority to increase its fees from 25 to 35 cents per service connection (although the Department plans only to increase the fee to 30 cents initially). Arkansas estimated that an increase in fees from 25 to 30 cents per service connection should generate \$600,000 in additional revenue, providing the Arkansas Department of Health with money for the new positions that will be required for the implementation of new Federal rules.
Minnesota	The current fee is \$5.21 per connection per year. The Minnesota Department of Health is proposing to raise the fee to \$6.36 effective July 1, 2006. After this increase, it will probably rise at 2-to-3 year intervals in the future. Minnesota creates cost estimates for each new Federal rule that is implemented. These estimates are then used to make budget projections.
Oklahoma	The fee is approximately 30 cents per connection per month.
South Dakota	The South Dakota Department of Environment and Natural Resources has a population-based fee system. Non community water systems pay a flat \$10 fee. Community water system fees are capped at \$40,000. These fees generate roughly \$244,000 a year.

All States rely upon DWSRF set-aside funding to implement their drinking water protection activities. Through June 2004, the eight States visited spent some \$107.6 million in DWSRF set-asides, or 60.7 percent of the set-aside dollars that they were awarded. Table E-2 lists, for each of the eight States, the percentage of set-aside awards that were actually expended. State staff and third parties can be funded through set-asides, and those dollars were described in some States as playing a significant role in the implementation of drinking water programs.

**Table E-2:
Cumulative Amount of Set
Asides Expended as
Percentage of Set-Asides
Awarded, 1996-2004**

State	Total %
Arkansas	53.9
Hawaii	27.8
Minnesota	59.7
New York	74.8
North Dakota	80.3
Pennsylvania	51.5
Oklahoma	73.2
South Dakota	64.4
Nationally	64.4

States also reported other sources of fee revenue that support drinking water protection programs. These fees include lab accreditation fees and construction permit fees, Public Water System annual renewal fees, and fees for operator training.

The States described two sources of impediments to having adequate resources: (1) EPA, and (2) State legislatures. The States asserted that while they are currently able to implement all of the SDWA provisions with their resources, the additional work caused by EPA's new drinking water regulations will force them to align resource allocations away from the SDWA's more proactive provisions to meet compliance requirements. Seven States cited EPA's quantity and/or complexity of new regulations as an impediment to maintaining current assistance activity levels. For example, Oklahoma stated that there are 19 ways to comply with just one drinking water regulation.

State legislatures set staffing caps, curtail the use of contracts, and have elaborate processes for adopting new drinking water regulations. In Hawaii, it can take 12 to 18 months to develop and approve new rules. New regulations require Indiana to move staff from other areas, thereby reducing oversight for existing activities.

Section F

Informed Consumer Information

How was the public informed about drinking water quality prior to the 1996 SDWA Amendments?

The public notification provision was part of the original SDWA in 1974. It was revised in the 1986 SDWA Amendments. The public notification provisions required water systems to notify customers of any failures to sample water or meet drinking water standards. A 1973 House Committee report wrote that these requirements were intended to inform the public of drinking water hazards and to educate the public in order to increase public support for the funding necessary to correct drinking water violations.

What outputs or outcomes resulted from these pre-1996 efforts?

In 1992, a Government Accountability Office report (*Drinking Water: Consumers Often Not Well-informed of Potentially Serious Violations*, June 1992; GAO/RCED-92-135) concluded that the public notice provisions were not working effectively because of: (1) limited State enforcement, (2) limited EPA oversight, (3) the provisions being too complex to understand, and (4) the notices not clearly conveying the health risks and subsequent preventative action that the public should undertake.

How did public information activities change as a result of the 1996 SDWA Amendments?

Congress wanted consumers to have information about water sources, quality, and safety, and to have prompt notification of any violation of drinking water regulations. Congress amended the public notification requirements to improve the effectiveness of public notices. Congress also required CWSs to start providing customers with annual Consumer Confidence Reports (CCRs).

EPA's Office of Ground Water and Drinking Water published guidance materials for Public Notices and CCRs to assist States and utilities with the implementation of these requirements. It also assisted States and utilities by developing the CCRiWriter software, which can help water systems develop CCRs.

We observed that the type of water system assistance and public information provided varies among the States. Table F-1 briefly summarizes the consumer education activities found in the States interviewed for this evaluation.

Table F-1: Consumer Education Activities

State	Summary
Arkansas	<ul style="list-style-type: none"> (1) Publishes quarterly newsletter on drinking water issues. (2) Promotes Drinking Water Week – Some public water systems actively promote public education during Drinking Water Week. Drinking water topics are occasionally chosen for the weekly State Health Officer comment column as well. These columns are distributed to weekly newspapers in Arkansas. (3) Works with all CWSs regarding their individual CCRs, including preparing the majority of CCRs and conducting followup to ensure that the CCRs are properly distributed. (4) Drinking water is included as part of the Agency’s Home Town Health Initiative, which allows communities to identify health issues of primary concern. (5) Some water systems conduct public service announcements on water conservation and quality issues.
Hawaii	<ul style="list-style-type: none"> (1) Initially involved in reviewing water system CCR formats, but technical assistance was dropped because of growing familiarity with format and mandatory language. (2) Issues “The Water Spot” newsletter for water system and operators. (3) Issues a source water newsletter that is available to the public upon request. (4) Assists the University of Hawaii in developing educational materials on rainwater catchment systems.
Minnesota	<ul style="list-style-type: none"> (1) Partnered with the Science Museum of Minnesota to develop the Drinking Water Institute, a workshop for science teachers that is designed to help them incorporate drinking water topics into grade school curricula. (2) Provides each water system with a ready-to-go CCR that can be sent to customers “as is” or incorporated into a larger CCR. (3) Produces and distributes their own information about drinking water through fact sheets and other methods, such as lead information on grocery bags and refrigerator magnets.
New York	<ul style="list-style-type: none"> (1) Local health units provide CCR assistance to water systems. (2) Partnered with the New York Rural Water Association and the American Water Works Association to develop a CCR template for utilities. (3) The New York State Department of Health publishes templates and guidance on its Web site and issues pamphlets on drinking water contaminants such as lead.
North Dakota	<ul style="list-style-type: none"> (1) Sends each water system a packet detailing the CCR requirements. (2) Creates press releases to warn drinking water consumers about violations in the event that a system does not provide a public notification.
Oklahoma	<ul style="list-style-type: none"> (1) The Oklahoma Department of Environmental Quality provides access to CCR templates on its Web site. (2) Water systems have the opportunity to come to Oklahoma Department of Environmental Quality headquarters 8-10 times per year to receive CCR assistance.
Pennsylvania	<ul style="list-style-type: none"> (1) The Pennsylvania Department of Environmental Protection carries out compliance and enforcement activities if utilities do not follow CCR & public notification requirements. (2) Provides guidance, training, and consultation to water systems to make sure water systems have this information. Training is also available on-line.
South Dakota	<ul style="list-style-type: none"> (1) Generates a CCR for all of South Dakota’s CWSs. The CCRs are sent to CWSs each February so that CWSs have the opportunity to add additional information to the CCR before sending them on to customers. (2) CCR templates are available from the South Dakota Association of Rural Water Systems, the Midwest Assistance Program, and the Awwa Research Foundation.

What outputs / outcomes have resulted from the 1996 Amendments?

Hawaii, New York, Oklahoma, and South Dakota reported that most utilities are complying with CCR requirements. However, these four States, as well as North Dakota, are uncertain whether customers are reading the reports because there is little feedback from drinking water consumers. On a national level, a 2003 Gallup survey concluded that 29 percent of the respondents (which equates to 81 million people nationally) are reading their CCRs. Additionally, over 80 percent of survey respondents reported that the information in the CCR was educational, adequate, and useful.

Consumers do have access to additional information. The CCR provisions require water systems to provide a telephone number and contact person who can provide additional information.

During 2002 and 2003, CCR-related e-mails and phone calls to EPA’s Safe Drinking Water Hotline represented 2,553 (7 percent) and 2,606 (8 percent), respectively, of all Hotline contacts. Table F-2 lists common questions and comments from callers:

Table F-2: July 2002 Monthly Safe Drinking Water Hotline Report Common Questions / Comments and Suggestions

Common Questions / Comments	Analysis	Suggestion
<ul style="list-style-type: none"> • "Is my water safe?" 	Over 50% of callers ask if the water is safe. Callers frequently mistake it for a health advisory or notification warning them of unsafe water conditions.	Provide clearly stated language at beginning of report detailing the purpose of the report
<ul style="list-style-type: none"> • "I have a PhD and I cannot decipher this thing!" • "Can't they just tell us in plain English?" 	Callers seem confused when reading the report. They complain about the complexity of the report or the lack of explanation needed to understand the report.	<ul style="list-style-type: none"> • Provide overview paragraph of general water quality that callers can review before reading the table of detected contaminants • Water system personnel should be prepared to explain the report including the contaminant table
<ul style="list-style-type: none"> • "Why is your number in the report if you can't tell me about the quality of my water?" 	Callers often frustrated that the Hotline number is the only number on the report or that the water system number is not prominently displayed.	Provide prominently displayed contact numbers with a detailed descriptions of services provided by each
<ul style="list-style-type: none"> • "Why are we wasting the taxpayers money on this?" • "They wasted thousands of dollars on this slick report and my water still smells and looks awful!" 	Many callers express frustration and anger believing they incur the cost of producing a document that they consider to be undecipherable.	Provide general language on the usefulness of the report and increase readability
<ul style="list-style-type: none"> • "I live in an apartment. How can I obtain a CCR?" 	Citizens living in apartments or condominiums feel they are kept in the dark about water quality because they are not directly receiving the CCR	Provide more explicit instruction to building managers or associations for posting the CCR report

In responding to these inquiries, Hotline Information Specialists provide clarification by detailing the purpose of the report, explaining the elements in the report, and offering fact sheets and local contact recommendations. Most often, however, callers just want someone to be empathetic and to listen to their concerns.

Other organizations are researching the value of CCRs. In an April 2004 presentation to EPA's Office of Water, the Awwa Research Foundation shared the results of research on water system operator and customer perceptions of CCRs. The Foundation reported that water systems believe that CCRs are a good way for customers to learn about drinking water quality. The research team's results showed that most of the CCRs reviewed

contained technical information above the level of the average reader. The team also concluded that CCRs have a positive effect on customers' satisfaction with and trust in their water system.

What opportunities and challenges exist for progress in the future?

Table F-3 lists some challenges to ensuring that consumers are informed about their drinking water:

Table F-3: Consumer Education Challenges

State/Organization	Challenge
Arkansas	Water system personnel do not understand Federal drinking water standards because the regulations are complex and difficult to understand.
New York, Pennsylvania, South Dakota, Office of Ground Water and Drinking Water, and Awwa Research Foundation	CCRs contain too much information for the general reader. They are also difficult to understand.
Arkansas, Hawaii, Minnesota, and North Dakota	Apathy among consumers or water system operators.

Both the States and EPA suggested the following opportunities for progress in the future:

- Improve marketing of EPA tools such as CCRiWriter.
- Have water systems use CCRs as a marketing tool for their customers.
- Conduct a followup Gallup survey to determine if the CCRs are read, and if the public has confidence in its drinking water.
- Remove language in the CCRs that is not necessary for consumers.