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WATER POLLUTION

**Alternative Strategies
Needed to Reduce
Wastewater Treatment Costs**

Statement for the Record by
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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to discuss (1) the findings of our January 1992 report on the states' ability to meet their wastewater treatment needs through state revolving funds (SRFs)¹ and (2) preliminary observations of our work, being performed for this Subcommittee, concerning the prospects of finding cost-effective alternatives to conventional wastewater treatment.

The Water Quality Act of 1987 dramatically changed how the nation finances billions of dollars in wastewater treatment plant construction. It phased out the Environmental Protection Agency's (EPA's) title II Construction Grants Program, which for years had provided grants directly to local governments to build treatment facilities. The act replaced that program with one authorizing states to develop their own SRF loan programs, with the initial capital provided through federal seed money and state contributions. Under this program, states use the funds to provide a range of loan assistance to local governments, and as the loans are repaid, the fund replenishes. All 50 states and Puerto Rico are presently operating SRF programs.

In summary, Mr. Chairman,

- While SRFs are an efficient alternative to the Construction Grants Program for providing a subsidy to local government, they will not generate nearly enough funds to close the tremendous gap between wastewater treatment plant needs and available resources. Our survey of 50 states and Puerto Rico showed that total reliance on SRFs will pose particular problems for small communities, many of whom cannot repay loans at any interest rate and have difficulty competing with larger communities for loans. Half the states indicated that unmet needs in these communities will have significant health and environmental impacts. While some states and federal agencies have other grant and loan programs that can be used for these purposes, the assistance available through these other sources falls far short of meeting the wastewater treatment needs of these communities.
- The growing difficulty the nation is experiencing in financing wastewater treatment needs, and the implications of this problem for public health, underscore the need to rely more heavily on alternative strategies to lower wastewater treatment costs. While a number of alternative and innovative technologies and management approaches have been tested and appear promising, they have thus far been

¹Water Pollution: State Revolving Funds Insufficient to Meet Wastewater Treatment Needs (GAO/RCED-92-35, Jan. 27, 1992).

used sparingly. Our work thus far suggests that several barriers may be impeding the wider use of promising alternatives, including insufficient information about the alternatives, institutional biases toward conventional treatment technologies, and private-sector financial disincentives for using these alternatives. Among other things, our future work will examine how states, localities, and private firms can overcome these barriers.

BACKGROUND

The Federal Water Pollution Control Act Amendments of 1956 provided the first federal grants for constructing wastewater treatment facilities. While the initial federal commitment was relatively small, the Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act) increased federal grants to an unprecedented level--\$18 billion through 1976.

The Congress reduced federal funding for the Construction Grants Program in the late 1970s and through the 1980s. Then, in the 1987 amendments to the act, the Congress created a funding program at the state level, the State Water Pollution Control Revolving Fund Program, to replace construction grants altogether. The SRFs are capitalized with federal grants and a 20-percent state match through fiscal year 1994, after which the federal contribution ends. The Congress authorized \$8.4 billion for the federal grants between fiscal years 1989 and 1994.

The Congress created a flexible framework for states to develop SRF loan assistance programs that meet their particular needs. States can provide a range of financial assistance to local governments through the SRF, such as direct loans, refinancing, and bond insurance purchases. States are also authorized to leverage the federal grants by issuing bonds guaranteed by resources in the SRFs, and then depositing the proceeds in their SRFs to increase the resources available to assist local governments.

STATE REVOLVING FUNDS INSUFFICIENT TO MEET WASTEWATER TREATMENT NEEDS

Our report observed that SRFs are an efficient alternative to the Construction Grants Program for providing a subsidy to local governments, noting that SRFs increase the flexibility of states to meet priority needs and encourage local governments to reduce costs and improve operations and maintenance. It also made a number of recommendations to EPA and suggested statutory changes to resolve problems impeding the SRF program's usefulness and effectiveness (such as removing statutory restrictions on using the SRFs to purchase land on which a wastewater treatment plant is built).

The report acknowledged, however, that even if these problems were resolved, states will still be able to meet only a small

portion of their wastewater treatment needs through the SRFs. States' responses to our survey indicated that they would meet only about 31 percent of their wastewater treatment needs by 2001, given current levels of SRF capitalization.² Yet we noted in our report that the actual percentage of overall wastewater treatment needs that states will meet is actually much lower--EPA does not include in its needs survey many items that are eligible for SRF assistance, including needs for nonpoint source pollution control and estuary protection.

SRFs Will Have Particular Difficulty Meeting Needs of Small Communities

SRFs are particularly limited in the assistance they provide for small communities. Thirty-four of the states responding to our survey said that their SRFs will not meet the needs of small communities, and 24 of these states indicated that unmet needs in small communities will have significant health and environmental impacts. For example, Utah said that the health department may have to condemn entire towns that cannot afford to improve their wastewater treatment systems. West Virginia has identified more than 40 small communities discharging raw sewage directly into the state's waterways.

Nevertheless, data from EPA and from the U.S. Bureau of the Census show that small communities are receiving less than a proportional share of financial assistance from the SRFs, given the percentage of U.S. population in these communities. For example, we reported that communities with populations under 10,000 received 24 percent of the money loaned from the SRFs between 1987 and 1990, but represented 38 percent of the national population. To some extent, this funding imbalance merely continues a trend from the Construction Grants Program, although to a somewhat lesser extent.³

²For this analysis, total wastewater needs are the \$83.5 billion estimated by EPA in its 1988 Needs Survey Report to Congress for 1988 to 2008. In our survey, we asked states what percentage of the needs that EPA estimated for 1988 to 2008 they would meet through the SRFs by the year 2001.

³In a 1981 evaluation of the Construction Grants Program, EPA determined that small communities did not receive a fair portion of the construction grants. While local governments with fewer than 10,000 people had 38 percent of the national population, they received only 19 percent of the grant money between 1972 and 1980. Communities with populations over 100,000 represented 31 percent of the total population, yet received 47 percent of the grant money awarded during the same time period. See 1990 Preliminary Draft Strategy for Municipal Wastewater Treatment-

(continued...)

Other reasons, however, also account for the difficulty small communities have had in acquiring SRF assistance:

- Many states consider the ability to repay the loan to be almost as important in making loan decisions as meeting communities' health and environmental needs. However, some small communities cannot support the necessary user charges to repay an SRF loan. In such cases, states concerned about the long-term viability of their SRFs are often reluctant to make the loan.⁴
- If a state determines that a community on its priority list is not ready to begin construction on a project, the community is passed over for a community that is ready. However, without the certainty of a loan to fund the project, small communities are often unable or unwilling to undertake the large up-front costs needed to plan and design a treatment facility.

In part because the SRF has been unable to provide sufficient financing for small communities, some states have other grant and loan assistance programs. In addition, other federal agencies, including the Department of Housing and Urban Development, the Department of Agriculture, and the Department of Commerce, have programs to provide grant and loan assistance for small community wastewater treatment projects. However, the assistance available from these other sources is relatively limited: the \$2.2 billion that EPA estimates will be spent through federal programs from 1988 through 1999, together with the estimated \$6.7 billion in state expenditures during this period, will make about \$742 million a year available outside of the SRF during this period.

Complicating matters further, the burden of higher wastewater treatment costs is superimposed on a growing list of environmental mandates that will increase compliance costs for small and large communities alike. As a recent EPA study demonstrated, smaller communities will have the highest per household compliance costs.⁵

³(...continued)

Funding, Office of Water and Waste Management, EPA (Jan. 1981).

⁴One notable exception is the state of Wisconsin, which processes SRF loans based on environmental need rather than a community's ability to repay the loan. Wisconsin provides grants for a portion of the total project cost so that charges to the local users are reduced.

⁵A Preliminary Analysis of the Public Costs of Environmental Protection: 1981-2000, EPA (Washington, D.C.: May 1990).

The study showed that the smallest communities in particular (fewer than 500 residents) will see their environmental compliance costs per household rise from \$670 in 1987 to \$1,580 by the year 2000 (1988 dollars). Overall, the cost of environmental protection for these small communities is projected to rise from 2.8 percent of average household income in 1987 to 5.6 percent in 2000. According to officials in several states we visited, these financial burdens may result in a number of projects being delayed or not undertaken, resulting in continued noncompliance that could seriously threaten local public health.

FINDING ALTERNATIVE STRATEGIES TO REDUCE WASTEWATER TREATMENT COSTS

Given the wide gap between wastewater treatment needs and available funding, many communities are searching for ways to meet their treatment needs at lower costs. Possibilities include alternative or innovative treatment technologies as well as alternative arrangements for the construction, operation, and maintenance of treatment facilities.

In a June 1992 letter, you asked that we examine the range of alternative strategies available to assist communities in meeting their wastewater treatment needs and the barriers that may be impeding their wider use. Although we have only recently begun this review, we can make the following preliminary observations about the use of alternative strategies to reduce wastewater treatment costs:

- There is a wide range of technological and managerial alternatives that can help many communities lower their wastewater treatment costs.
- Although some of these alternatives have already been tested and used by a limited number of communities, institutional, financial, and other barriers have impeded their wider use.

Alternative Strategies Available to Help Communities Lower Treatment Costs

The alternative wastewater strategies identified by EPA and others are generally technological or managerial in nature. The technological strategies can, in turn, be classified as either (1) innovative technologies--cutting-edge technologies that offer potential benefits but have yet to be proven in practice or (2) alternative technologies--technologies that are currently being used and have been demonstrated to perform in the field. Innovative and alternative technologies can be used either on-site to enhance or replace individual septic systems or off-site to collect, transport, and/or treat the wastewater from a number of residents and commercial facilities. Alternative management

strategies involve changes in the way treatment facilities are financed, operated, and/or maintained and can be applied at facilities employing either traditional or alternative/innovative treatment technologies.

Innovative and Alternative Technologies

In recognition of the potential cost-savings offered by innovative and alternative technologies, in the 1977 amendments to the Clean Water Act, the Congress established an incentive program within the Construction Grants Program to promote the development and use of these technologies. These incentives included an increased federal grant share for wastewater treatment projects using innovative or alternative technologies⁶ and, in certain circumstances, grants for up to 100 percent of the cost to modify or replace projects that failed to perform to design standards. This incentive program was terminated, for the most part, along with the Construction Grants Program in fiscal year 1991.

In a 1989 report to the Congress,⁷ EPA asserted that the program had helped to promote the development and use of more cost-effective, environmentally sound wastewater treatment technologies, especially in small communities. EPA reported that the program had funded about 2,100 alternative technology projects in a variety of categories including land treatment of wastewater (e.g., constructed ponds or wetlands), composting of sewage sludge, and alternative collection systems. The program also funded about 600 innovative technology projects in areas such as disinfection, filtration, energy conservation and recovery, and nutrient removal. The federal investment in these projects was nearly \$4.4 billion, while states and localities contributed an additional \$1 billion.

Although EPA's report did not quantify the cost-savings of these projects, others have reported that alternative technology projects yield substantial cost-savings. For example, a community in Kentucky constructed a wetland treatment facility at a cost of \$300,000 as an alternative to a traditional wastewater treatment plant that would have reportedly cost the community between \$3 million and \$4 million. Similarly, an official with Maryland's Anne Arundel County claimed that a constructed wetlands saved about

⁶From fiscal years 1977 through 1984, the federal grant share for eligible innovative/alternative projects was 85 percent while the share for conventional wastewater treatment projects was 75 percent. From fiscal years 1985 through 1990, the federal share for innovative/alternative projects was 75 percent while the share for conventional projects was 55 percent.

⁷Effectiveness of the Innovative and Alternative Wastewater Treatment Technology Program, EPA (Sept. 1989).

\$12 million in construction costs by eliminating the need for a deep-water outfall in the Chesapeake Bay.

Alternative Management Strategies

Alternative management strategies are also cited as ways for communities to realize cost-savings in the design, financing, operation, and maintenance of wastewater facilities. One such strategy is the public-private partnership. These partnerships range from contracts for certain services (such as design, construction, or operation and maintenance of facilities) to full ownership and operation of the facility by a private party. According to EPA, public-private partnerships can sometimes provide essential environmental services to the public at lower cost and reduced construction time. One example cited by the agency is a fully privatized wastewater plant in Auburn, Alabama. According to EPA, the plant saved the city \$25 million in costs over the life of the project and enabled the facility to go on line in one-quarter of the time of similar, nonprivatized facilities.

Another alternative management strategy is the so-called "self-help" program. Under self-help programs, savings can be realized by using local residents to perform many functions the community would otherwise pay others to do. These functions could include surveying potential sites; performing general contractor services; and providing labor for the installation or repair of wastewater treatment systems. According to state officials with New York's Self-Help Program, seven self-help projects have saved communities an average of \$231,000 each, or 44 percent of the initially estimated project costs.

Barriers Impeding the Wider Use of Alternative Strategies

Although some promising alternative strategies have been promoted by EPA and others for years and appear to be gaining wider acceptance, our contacts with members of the wastewater community suggest that a wide gap remains between these alternatives' potential application and their actual use. Although we have only recently started our review, our work to date suggests that several barriers may be impeding the wider use of promising alternatives. These barriers include (1) lack of familiarity/knowledge about the alternatives, (2) institutional biases toward conventional treatment technologies, and (3) private-sector financial disincentives for using these alternatives.

Insufficient Information About Alternatives

Before a community can employ an alternative wastewater strategy, it must know what alternatives are available; which ones are appropriate for its particular circumstances and needs; and who can assist the community in implementing the right one. EPA and

several other organizations have undertaken a number of activities to inform the public about alternatives and to promote their wider use. For example, EPA provides financial assistance to the National Small Flows Clearinghouse, a nonprofit organization established to help small communities address their wastewater needs. Among other things, the Clearinghouse issues publications, operates a toll-free service, and maintains an automated data base to assist communities in selecting, designing, financing, and operating alternative technological and managerial strategies.

Other federal agencies, some states, and several water pollution and community-assistance organizations have also played a role in informing the public about alternative wastewater strategies. The Tennessee Valley Authority, for example, has issued guidelines for the design, construction, and operation of small flow wastewater treatment systems using constructed wetlands.

Nevertheless, officials from EPA and the wastewater treatment community told us that while some progress has been made in informing small communities about alternative and innovative technologies, the need among small communities for assistance far outweighs the amount of assistance being provided. The officials suggest that additional and/or better coordinated outreach efforts may be needed to better inform the public about alternative strategies and help narrow the gap between the strategies' potential and actual use.

Institutional Biases Favoring Conventional Technology

Another barrier cited by many in the wastewater community is a bias among many consulting engineers and state and local officials toward conventional treatment technologies. This bias is attributed to the greater familiarity and "comfort level" many engineers, health and environmental officials, and community leaders have with proven, standardized, conventional technology. As we noted in our 1984 report on EPA's innovative technology program,⁸ many consulting engineers, state health and environment agencies, and communities shy away from relatively new technologies because of concerns about potential performance problems and the risk of costly and politically embarrassing failures.

According to EPA and the Water Environment Federation, there is a growing acceptance within the wastewater community for greater use of alternative technologies. EPA's 1989 report to the Congress, for example, noted that whereas treatment plant design manuals published in the 1960s and 1970s devoted scant attention to alternative technologies, more recent manuals go into greater

⁸EPA's Innovative Technology Program for Waste Water Treatment Needs Better Controls (GAO/RCED-84-79, Aug. 1984).

detail on these technologies and some are entirely devoted to them. Despite this apparent growing acceptance, however, EPA and others acknowledge that there still remains a strong bias among the wastewater community toward conventional technologies.

Financial Disincentives Against Using Alternative Technologies

Other barriers include the financial disincentives that discourage consulting engineers from designing systems that employ alternative technologies. Specifically, EPA and others in the wastewater community told us that engineers are deterred from choosing less expensive, alternative systems because design fees are typically based on total project costs. This financial disincentive can be amplified if a project employing an alternative technology requires greater design time than one using traditional technology. Further, an engineering firm may be disinclined to select an alternative or innovative technology if it believes these technologies carry higher risks and could entail financial liability if the systems do not perform to design specifications.

Despite these disincentives, some industry representatives maintain that a growing number of firms are willing to design projects that employ alternative and innovative technologies. Nevertheless, officials from EPA and the wastewater treatment community told us that financial disincentives continue to restrict the number of firms willing to do so.

OBSERVATIONS

Although SRFs are an efficient alternative to the Construction Grants Program, they will not be sufficient to meet the nation's wastewater treatment needs and may fall far short of meeting small communities' needs. Accordingly, less costly alternatives are needed to help narrow this multibillion dollar gap. Although we have only recently begun our review, preliminary indications suggest that a number of alternative technologies and management arrangements have been tested and used in recent years, some of which appear to offer significant cost-savings. However, it appears that the use of these alternatives falls far short of their potential value.

Based on the work we have completed thus far, a number of barriers may be unnecessarily restricting the use of promising alternative strategies. In coming months, we will further explore which alternatives appear to hold the most promise for reducing wastewater treatment costs; how states, localities, and private firms have been able to overcome barriers impeding their use; and how other communities can benefit from these experiences.

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That concludes my statement. I appreciate the opportunity to present our observations to the Subcommittee.

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