

Summary of Water Infrastructure Forum

from the Closing the Gap: Innovative Solutions for America's Water Infrastructure Forum

January 31, 2003

This document is a summary of discussions during a public meeting and does not necessarily represent EPA's position.

INTRODUCTION

In an effort to facilitate and stimulate a national dialogue on the importance of finding innovative ways of enhancing and sustaining the nation's water infrastructure which is vital for protecting public health and the environment, U.S. EPA Administrator, Governor Christine Todd Whitman, and the Assistant Administrator for Water, G. Tracy Mehan, convened a forum on Closing the Gap: Innovative Solutions for America's Water Infrastructure on January 31, 2003, in Washington, DC.

The emerging theme from the forum was that Federal, State and local governments and the private sector, working with the public should extend their efforts in supporting the necessary water infrastructure. This infrastructure is critical for protecting public health and the environment, and maintaining local and national economies.

Over the past several years, a number of studies have highlighted the need for substantial investment in the nation's drinking water and wastewater infrastructure. (U.S. Environmental Protection Agency 1998, 2001, and 2002; General Accounting Office 2002; Congressional Budget Office 2002; Water Infrastructure Network 2000 and 2001; American Water Works Association 2001.) While the estimates of the cost of this investment vary greatly, each study concludes that a significant increase in spending above current levels will be necessary to meet this investment need. In response, the U.S. Environmental Protection Agency (U.S. EPA) convened a forum of water system experts from industry, government, and academia to discuss options for meeting this investment need. While Federal subsidies for investment in drinking water and wastewater infrastructure would help finance needed investment, Federal support will not address the entire need; therefore, the U.S. EPA wants to consider other innovative responses to ensure the investment need is met in an efficient, timely, and equitable manner. These approaches could include improvements in management systems and water use, a watershed approach to resource management, and efficient pricing of drinking water and wastewater services.

The forum was convened by the U.S. EPA Administrator, Governor Christine Todd Whitman, on January 31, 2003, in Washington, DC. The Assistant Administrator for Water, G. Tracy Mehan, III, opened the forum and introduced Governor Whitman, who welcomed the participants and explained the purpose of the forum: to exchange information and views on innovative management and sustainable financing of the nation's water and wastewater infrastructure. Following the Governor's remarks, the Assistant Administrator summarized the issues to be addressed during the day by two panels comprised of water system operators, regulators, environmentalists, and academics, focusing on four areas: better management, smarter water use, full-cost pricing, and a watershed approach. (The forum's agenda, the introductory remarks,

and the list of panel members are appended at the end of this report.) The first panel focused on management of water and infrastructure assets. The second panel focused on infrastructure financing. In addition to 14 panelists, more than 250 people attended the forum. The forum concluded with an open discussion with the Assistant Administrator for Water and panel members.

The difference between the projected level of spending on drinking water and wastewater infrastructure and the projected level of spending required to meet future investment needs is referred to as the "gap." While the gap is a useful construct, it has limitations. The gap is a static estimate of a dynamic phenomenon; the level of investment required will change over time, depending on a wide range of variables and the actions of water and wastewater systems. The estimates are sensitive to the assumptions made regarding economic growth, population growth, and future spending on operations, maintenance, and investment. Finally, the high end estimates do not take into account how systems will use less water; adopt new, more efficient technologies; or better manage their assets.

On the other hand, the gap analyses focus attention on the additional resources - financial, technical, and managerial - necessary to ensure water remains clean and safe. The issues raised by the forum can be organized into the following themes:

- System management
- Technology
- Finance
- Efficient pricing
- Public education

This report summarizes the discussion and presents the basic conclusions of the forum. It presents the issues raised by the two panels and the public discussion that followed. It does not represent EPA policy; rather, it presents the issues and ideas raised during the forum about approaches for addressing the water and wastewater infrastructure needs.

AN INTEGRATED APPROACH TO SYSTEM MANAGEMENT

Effective management integrates approaches across assets in watersheds and is coordinated with financing, including pricing, and public education to address clean water needs. Drinking water and wastewater systems need good management systems such as asset management and environmental systems management programs. Good watershed management can minimize the cost of future investment. Watershed management also requires regulatory flexibility to deal with a range of conditions that exist in different systems and watersheds.

Asset Management

Water systems need to conduct a full accounting of the costs to manage their assets, both for current operations and future investment needs. This accounting is also necessary to substantiate pricing water to cover the full cost to treat and deliver to consumers (addressed below). Asset management is an approach for an integrated assessment of future capital and operating needs and ensuring investments are made efficiently. By appropriately managing its assets, a system may be able to reduce its overall investment needs. The key focus of asset management is on improving the quality of information on which decisions are made. Asset management requires an information system that characterizes the risks associated with failure to repair or replace elements of infrastructure and a decision-making approach that uses risk assessment to measure the benefits of alternative approaches to infrastructure rehabilitation and replacement. Asset Management processes and techniques can be adapted to the complexity and scale of the organization's systems. For more complex systems, asset management is

neither inexpensive nor easy to implement, but it can be a cost-effective means of closing the gap.

Asset management is an inventory-based approach to planning. Systems must define the service levels required for end uses, from fire flow to residential water use. They then account for the physical assets in their inventory by assessing the age, condition, and importance of each asset. Age will give a sense of the condition of the asset, but its physical condition also must be evaluated. Condition assessments are focused on parts of the system that are most critical to continuing successful provision of the services. Physical inspections (such as walking through pipe or sending in cameras) may be needed. Other means also may be available. For example, systems can measure iron pick-up in the water in the distribution system over time as is done in England, which would indicate potential corrosion of the iron pipes. Use of operational data and statistical approaches also can be used to identify trends in performance.

Systems also must determine how critical the asset in question is. For example, not all pipe of similar age and condition needs to be replaced at the same time. In some cases, a pipe break would have severe consequences: it could disrupt service for thousands of customers for several days, and it could be very expensive to fix. In other cases, a break can be repaired in several hours, with little impact on customers. By classifying how critical each asset is to service provision, a system can focus its investment where it is needed most.

Based on this assessment, systems can then plan for the replacement of its assets. As with pricing, this may require changes in culture and attitude. In many cases, the approach towards public infrastructure is to build it and operate it, with minimal maintenance, until it wears out. Asset management entails a more proactive approach, looking at the asset over its entire life cycle. In addition to technological needs like fiber optics, cameras, and flow meters, system operators need training to implement asset management. Asset management requires a significant amount of information, and a major commitment on the part of the system to collect the data and manage the system. Seattle with more than 1,000 employees was able to commit four staff to asset management. Smaller systems may require outside assistance.

Watershed Management

A watershed approach that involves both institutional and physical integration of wastewater management, storm water management, water use, and land use could lower costs all around. A watershed approach would entail broad stakeholder involvement, hydrologically defined boundaries, and coordinated management across all aspects of policy that affect water. Through increased efficiency in water use and water reuse, water withdrawals can be lowered, reducing the need for new source development and reducing the amount of wastewater to be processed. By protecting source water, it may be possible to reduce the need for expensive treatment plants. Some regionalization of systems, through actual consolidation; sharing of management resources, computer systems, and information; or interconnection, can help lower costs for small systems and enhance the management of the watershed.

One example of this type of integration happened in 1974 in the United Kingdom. Responsibility for all water and sewer policies was vested in ten new authorities that were defined by hydrological boundaries. The oversight of these regional authorities by national agencies concerned about water quality and the cost of service created the conditions for strong asset management policies. The United States is not the United Kingdom; therefore, there will not be a real opportunity for national watershed planning. But there are opportunities within states, as some states are moving forward in consolidating entities into larger units for decision-making on water beyond political boundaries.

Regulatory Flexibility

The regulatory regime also can have an impact on system planning and watershed management. Inflexible regulations can lead to inefficient management of the watershed. For example, controlling and managing non-point sources of pollution are very important to improve water quality and will require significant attention. But these sources are not the focus of current regulations, which force systems to put most of their resources towards curbing point sources of pollution. Increased regulatory flexibility may let systems meet clean water and drinking water standards at a lower cost. For example, Seattle was able to save a significant amount of money when it was allowed to invest in source water protection rather than install a filtration plant to comply with drinking water standards.

Regulators tend to favor the traditional approaches, even though new approaches can be more cost effective. Seattle has experimented with using swales on both sides of a street and has succeeded in reducing runoff by 97 percent. This kind of "thinking outside the box" may be expensive at the beginning, but can produce significant savings in the long run from reduced maintenance costs.

The Role of Technology

Water infrastructure ranges from relatively simple pipe to complex treatment facilities. The need to replace infrastructure is the source of the funding need; technological innovations may provide a means for reducing the cost of the future investment. The use of fiber optics can help assess the condition of buried infrastructure, as has been done in the United Kingdom. Cleaning out and lining old pipes provide low-cost alternatives to replacement of distribution mains and sewer lines. New pipe material that reduces leaks will reduce water demand. Computers can free operators from monitoring dials to managing assets and other tasks. New membrane technologies will be useful, at least on a small scale. A host of decentralized wastewater technologies are very cost-effective for small communities compared to conventional sewers. Some of these technologies can be blended with conventional systems for urban and suburban areas.

Not all promising innovations are complex technologies. Coca-Cola reduced water consumption by 25 percent in a matter of days by capturing wastewater onsite and using it to wash the company's trucks and crates. Other small technology changes, like replacing an old chlorinator with a state-of-the-art model, can yield significant cost savings as the Narragansett Bay Commission discovered.

However, regulators, engineers, and drinking water and wastewater system operators tend to be conservative when it comes to adopting new technologies. The technology must be in use for it to even be considered. Laboratory testing likely will not be adequate to encourage operators to adopt new technologies; rather, full-scale demonstrations may be necessary. The Federal government plays an essential role in promoting research, development, testing, and evaluation of new technologies and then in disseminating information about proven technologies. This role will remain important in the future.

FINANCING INFRASTRUCTURE INVESTMENT

EPA's gap analysis (U.S. EPA, September 2002), like other studies, focuses on projected estimates of the cost of future investment in water infrastructure without identifying the source of funds to pay for this investment. While not the focus of the forum, funding was an underlying theme. Clean and safe water is a public good; therefore, the central question is to what extent taxpayers or rate payers will pay for the needed investment. The forum raised several issues with regard to the means of financing infrastructure investment.

First, the drinking water and wastewater systems themselves - and by extension, their customers - will pay for the vast majority of the investment. Some argue that systems should move towards full-cost pricing that accounts for needed future investment to generate the necessary funds and to impart a clear signal of the cost of water to their customers. As mentioned earlier, many systems do not adequately account for their investment needs and charge rates below cost; therefore, they generate insufficient revenue to finance investment, and will need to increase their rates. Because water consumes a relatively small share of household income, most households may be able to afford a rate increase. To minimize rate payer backlash, systems must back-up rate increases with solid information on costs of service. Programs also will need to address affordability issues through mechanisms such as lifeline rates for low-income customers. It was also mentioned that accounting/financial reporting is needed to regulate the industry economically to press the case for proper rates.

Second, the Federal government will continue to play an important role. Appropriate incentives can promote improved management practices. The Federal government can provide incentives to encourage systems to implement asset management, full-cost pricing, technological innovation, and water saving programs. The Federal government also remains an important source of funds for water and wastewater infrastructure improvements. Some panelists called for additional resources by the Federal government, including an increase in the Federal contribution to the Drinking Water State Revolving Fund and the Clean Water State Revolving Fund. Several panelists recommended that states should leverage these funds to generate additional resources. Some states leverage these funds, others do not. One controversial suggestion was the establishment of a federal water trust fund, with dedicated funds tied to a water-related fee. Other panelists believed that increased Federal funding should not be the answer.

To encourage sustainable financing, some argued that steps should be taken to level the playing field so that anyone interested in investing in public infrastructure for the public good has access to tax-exempt financing, which often is limited even for public utilities. This access can be provided by lifting the restrictions on tax-exempt financing for many communities and allowing private activity bonds. Municipal bond reform could generate additional funds by providing preferential tax treatment for water-related bonds issued by both publicly or privately owned systems. "Green" bonds - below market interest rate bonds to support water infrastructure and other environmental programs - also could be created to finance water projects. Also, many systems cannot float bonds for political or rating reasons, limiting access to capital markets. Creative measures are available for systems' rate structures as well. Connecticut and Pennsylvania allow water utilities to recover infrastructure investment through monthly bills for a particular period of time. The Elizabethtown Water Company can segment their market by charging for specialized services (e.g., insurance for line breaks between the curb and the house); these funds can then be used to finance infrastructure investment.

The issue of financing sustainable infrastructure can be viewed in the framework of capacity development. While some systems may be able to meet their needs through a combination of increased rates, improved water use, and asset management, other systems - especially low-income small systems - may not be able to implement improved management techniques or raise sufficient funds. Many low-income small systems may not have the managerial, technical, or financial capacity to meet the investment challenge or national environmental and drinking water standards. Often these systems may not know what their needs are; in some cases, the state or other regional authority assesses the needs of the system and makes recommendations. Regionalization provides a means of upgrading assets at lower costs. For regionalization to succeed, a third party may be needed to provide an unbiased analysis of the situation. Regionalization will not always be the answer, however. Small, isolated systems should be screened to determine whether a structural solution is warranted, or if technical or financial support would address the system's needs.

The Role of Pricing

Pricing water appropriately is important for water providers and consumers to get the right market signals. Like other utilities, drinking water and wastewater systems are typically either regulated monopolies or publicly owned. One of the key challenges facing systems under these circumstances is to provide their services in an economically efficient manner. Prices play an important role, but the price signal often is muted in publicly owned systems or regulated monopolies. The price of drinking water and wastewater services is rarely equal to marginal cost (i.e., the cost to the system of producing an additional unit of water), and is often below the average cost per unit of water service (implying some form of subsidy).

It was discussed that switching to a pricing approach that recovers the full cost of water and wastewater services could address the infrastructure funding gap in two ways. First, full-cost pricing would tend to increase system revenue. Moving to full-cost pricing may require changes in accounting and management to ensure the rate covers the cost of future investment needs as well as current operations (see the discussion of asset management, above). With these changes in place, the revenue generated through full-cost pricing can provide systems with much of the funding necessary to finance infrastructure investment. Second, full-cost pricing can reduce future investment needs. The elimination of rate subsidies (explicit or otherwise) will send a clear signal of the value of water to consumers. The clear price signal can play an important role in demand-side management, encouraging conservation. Reduced demand, in turn, can reduce or delay planned investments.

This dual effect of raising funds for investment and reducing the level of investment required is a theme that was present throughout the forum. The gap is analogous to the open jaw of an alligator. The top of the jaw represents the projected investment need over the next twenty years, which, if not addressed, threatens to imperil the service level of existing water infrastructure. The bottom jaw represents the projected level of funding available to finance this investment which, if not sufficient, will not mobilize the necessary resources. The challenge for systems (and for public policy) is to close this jaw. It was argued by some that full-cost pricing works on both the top and bottom of the jaw, generating funds for investment, and reducing the amount of investment required.

Appropriate economic incentives can encourage efficient allocation of resources for both publicly and privately owned water systems. Because of the requirements of the market, privately owned systems are more likely to use full-cost pricing. Privately owned systems tend to charge higher rates than publicly owned systems, because they must provide a return for investors and pay taxes. (Privately owned systems also are regulated by state public utility commissions, which approve their rates and hence provide political support not necessarily available to publicly owned systems.) Full-cost pricing helps make privately owned systems self-sustaining by providing them with the means for necessary infrastructure investment.

It often is assumed that private companies are very good at project delivery and management. But privatization is not a panacea; it is not appropriate in all circumstances and must be evaluated on a case-by-case basis, considering service received for the price paid. Private firms can produce good results, but a bad contract can leave a community worse off. Whether publicly or privately owned, drinking water and wastewater utilities must recognize both the public service and business aspects of their systems. Some argue that publicly owned systems can benefit by using private sector management approaches, including full cost-pricing and asset management. The public has demanded input into decisions of privately owned systems regarding traditional public-sector issues like land use. A privately owned or operated system must provide service that is at least as good as a publicly owned and operated system. If service is not as good, it will be penalized; if it performs better than the public system, it may benefit.

The issue raised by pricing is not simply one of ownership, but the incentives facing the system. Many publicly owned systems recover their costs through full-cost pricing. On the other hand, some privately owned systems do not face the incentive needed to adequately plan for investment. For example, a smaller privately owned system did not adequately plan for investment until it was acquired by a larger company and changes were made that affected how management made investment decisions. Both publicly and privately owned systems will need to address issues raised by more efficient operations, including operators' fear of job loss, changes in relationships with unions and other institutions, and the cost impact for households.

Some systems have moved to full-cost pricing, and many systems have dramatically increased rates. For most households, water remains relatively inexpensive, comprising less than one percent of household income. However, many households will not be able to afford higher water rates. Furthermore, some households may be able to reduce water expenses through conservation, but others will not. For example, some systems have found that successful conservation programs can create revenue shortfalls, necessitating rate increases. As consumers had already implemented conservation measures, they could not further reduce their water use in response to the rate increase, and they saw their monthly water bill increase. The increased expenses can have a substantial impact, especially on low-income households which may have an inelastic demand for water and may not be able to reduce consumption further. Rate reduction programs are needed to cushion the impact of rate increases on low income households. These programs may include direct assistance for low-income households, similar to the U.S. Department of Health and Human Services' Low-Income Home Energy Assistance Program (LIHEAP). They also may include the use of lifeline rates or other rate structures that can reduce the cost of water to low-income households.

PUBLIC EDUCATION

While full-cost pricing may be a necessary component of addressing the funding gap, public education is needed to explain to rate payers the need for rate increases. In fact, the move to full-cost pricing is itself part of public education, as it provides information to rate payers about the cost of the provision of drinking water and wastewater services. But other educational efforts also are needed. The need for rate increases may be promoted for water systems and accepted by consensus because they systems provide a high quality, reliable product at a relatively low price. Household spending on water is a fraction of what is spent on cable television, telecommunication services, or even bottled water. With public education and outreach, customers may be willing to pay higher rates for maintaining and improving their water infrastructure. Unfortunately, many of these improvements, such as replacement or repair of pipes, are installed below ground and cannot be seen or appreciated by the public. There are ways that utilities can create positive value as part of their infrastructure projects by making people aware of the importance of the projects.

On the other hand, marketing water can be difficult. Regulated systems may not be allowed to expend funds to market because they are monopolies. Publicly-owned systems may find it politically difficult to launch an advertising campaign as well. And while households spend a larger share of their income on other goods and services, the comparison of water costs to other services is not simple. Furthermore, systems will ask customers to pay higher rates to maintain what may be perceived to be the same level of service (reliable, safe water), rather than to receive a new improved service in the form of higher quality water or more reliable but less (conserved) water supply. Finally, the public usually pays attention only when things go wrong. Utilities need to find opportunities to promote themselves when things go right.

CONCLUSION

Drinking water and wastewater systems, local regulators, the states, and the Federal government will face many challenges over the next 20 years as they try to meet the nation's water infrastructure investment need. Innovative responses are needed by both water systems, government authorities and consumers to close the gap. These may include the use of changes in system management, the adoption of new technologies, increases in external funding and full-cost pricing by systems. Public education also can play an important role as systems, the states, and the Federal government all address the nation's water infrastructure need. These responses can be divided into managerial, financial and technical approaches for closing the gap.

SUGGESTIONS DISCUSSED BY FORUM PARTICIPANTS FOR MANAGERIAL RESPONSES

- **Promote asset management through incentives and assistance** - Integrated approach to management of water systems can help reduce the need for future investment in infrastructure. Asset management can help systems plan for needed investment and ensure the investment is timely and cost-effective. While asset management involves a substantial commitment by systems to develop and maintain information about the age, condition, and criticality of their systems, it presents an important source of potential savings. The government may play an important role by facilitating the adoption of asset management and by providing technical assistance to help systems implement an asset management program.
- **Integrate watershed management with asset management** - An integrated approach to the management of an entire watershed also can help reduce the cost of future investments. A watershed approach that coordinates management across all aspects of policy that affect water can help ensure systems provide water that is clean and safe at the lowest possible cost. This may require additional regulatory flexibility by both the federal government and state regulators.
- **Support public education on water value and costs** - An important component of effective system management will be public education. To close the infrastructure gap, customers may be asked to pay higher rates and to take steps to use water more efficiently. Water systems need to inform their customers about the overall value of water as well as the systems' investment needs to garner their support for the steps needed to meet the nation's water infrastructure needs.

SUGGESTIONS DISCUSSED BY FORUM PARTICIPANTS FOR FINANCIAL RESPONSES

- **Provide incentives from government** - Some argued that the government can play an important role in helping systems adopt full-cost pricing by providing incentives to encourage its adoption, technical assistance with rate design, and financial assistance to help cushion its impact on low-income households.
- **Continue low-interest government loans** - The public sector will continue to play an important role in funding water infrastructure investment. The Drinking Water and Clean Water State Revolving Funds will continue to be an important source of funds for systems, providing loans at below-market rates.

- **Increase leveraging funds by states** - States may leverage the funds more aggressively to increase the funding available for investment in infrastructure; it was argued by some that the Federal government should consider an increase in the level of capitalization of these funds.
- **Establish a water infrastructure trust fund** - The idea was brought up that the Federal government also may want to consider the establishment of a water trust fund, funded through water-related fees.
- **Change tax laws to increase access to capital** - Some participants brought up that other changes, including changes in tax laws, should be considered to level the playing field and increase systems' access to capital markets.
- **Price water at full cost** - Discussion included the idea that full-cost pricing could be one of the main tools available to systems to help address future investment needs. Full-cost pricing can help raise the revenue needed to finance infrastructure investment; it also may reduce the amount of investment required by encouraging efficient use of water.
- **Incorporate equity considerations for low-income households**- Some form of assistance may be needed to cushion the impact of rate increases on low-income households, through either innovative rate design or direct financial assistance.

SUGGESTIONS DISCUSSED BY FORUM PARTICIPANTS FOR TECHNOLOGICAL RESPONSES

- **Research and develop innovative technologies** - New technologies may help reduce the cost of replacing existing infrastructure. Systems may need to explore innovative technologies when upgrading their infrastructure and managing their assets. Additional research and development, including full-scale demonstration of new technologies, can help reduce future investment needs. The public sector can play an important role in promoting this research and in disseminating its results to systems.

SUMMARY

The integrity of the nation's water infrastructure is critical to public health, environmental quality, and economic vitality across the country. The forum focused on the challenges faced by water suppliers, wastewater managers, state and local officials, the Federal government, and consumers in addressing the growing needs to maintain, replace, and improve water infrastructure. In addition to identifying some of the myriad of challenges facing water systems, it fostered a discussion of innovative approaches for meeting these challenges. New management practices, consolidation, asset management, water conservation, public-private partnerships, environmental watershed management, full-cost pricing, and consumer education are some of the promising tools available to help meet future investment needs.

FORUM AGENDA

- 9:00 am **Welcome by the Administrator of the U.S. EPA, Christine Todd Whitman**
- 9:15 am **Introduction and Perspective on Sustaining Our Water Infrastructure by EPA's Assistant Administrator for Water, G. Tracy Mehan, III**
- 9:45 am **Managing Water and Infrastructure Assets Panel**
Facilitator: Bill Ross, Ross & Associates Environmental Consulting
Panelists:

Andrew Chapman, Elizabethtown Water Company
Chuck Clarke, Seattle Public Utilities
Harry Ott, The Coca Cola Company
Paul Pinault, Narragansett Bay Commission
Richard Pinkham, Rocky Mountain Institute
Michael Rouse, International Water Association

A facilitated discussion focused on approaches for efficient, effective management of water and infrastructure assets. A panel of experts will represent a broad array of interests including large corporate water users, public utilities, investor-owned utilities, asset management specialists, environmental and academic institutions, the European water industry, and U.S. EPA. Discussion topics may range from how water industries are currently responding to changing patterns of water use to holistic water resource and infrastructure management. **Open discussion** - The audience will be invited to raise issues and questions for the panel.

12:00 **Lunch**

1:15 **Sustainable Infrastructure Financing Panel**

pm **Facilitator:** Bill Ross, Ross & Associates Environmental Consulting
Panelists:

Janice Beecher, Michigan State University Institute of Public Utilities
John Betkoski, Connecticut Department of Public Utility Control
Michael Chesser, United Water
Paul Halberstadt, ConAgra Foods
Erik Olson, Natural Resources Defense Council
Billy Turner, Columbus Water Works
Kevin Ward, Texas Water Development Board

A facilitated discussion addressing strategies to ensure sustainable infrastructure financing. A panel of experts will represent a range of perspectives including large corporate water users, state public utility commissions, private investment banks, public utilities, state infrastructure financing authorities, investor-owned utilities, and U.S. EPA. Topics for analysis will include the implications of full cost water pricing, new and innovative funding sources and processes, and barriers to innovation. **Open discussion** - The audience will be invited to raise issues and questions for the panel.

3:45 **Reflection on Panel Discussions with the Assistant Administrator for Water**
pm

4:00 **Public comment/discussion**
pm

4:50 **Closing remarks**
pm

5:00 **Adjourn**
pm

REFERENCES

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