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Exploring the Best Practices of “Work With Less—Better”

Washington, D.C., has been sending various messages to the US water industry over the past couple of years, but one clear message seems to be “work with less—better.” The message comes at a time when the water and wastewater industry has gathered a significant mountain of evidence about the rising costs and issues that utilities are facing, as evidenced by the recently published report *Buried No Longer: Confronting America’s Water Infrastructure Challenge* (AWWA, 2012).

Although many utilities feel as if their belt-tightening has put them on a course of working with less, it has been the perpetual storyline for a large number of small utilities serving populations of fewer than 10,000 people. In exploring the best practices of these small water systems it is helpful to include a review of the efforts and partnerships of the US Department of Agriculture (USDA) Rural Development (RD) programs and the National Rural Water Association and its state affiliates.

Whether large or small, utilities are dealing with crises in the water industry—namely new and changing regulatory and compliance issues, aging infrastructure, experience and knowledge loss through a retiring workforce, and challenges with project planning and funding.

THE US WATER INDUSTRY CLASSIFICATIONS

The US Environmental Protection Agency’s (USEPA’s) definition of a public water system is one that provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year. Under this definition, there are approximately 155,000 public water systems in the United States. A community water system (CWS) is defined as a public water system that supplies water to the same population year-round. A CWS is further classified by the number of people it serves:

- very small water systems serve a population of 25–500 people,
- small water systems serve a population of 501–3,300 people,
- medium water systems serve a population of 3,301–10,000 people,
- large water systems serve a population of 10,001–100,000 people, and
- very large water systems serve a population of more than 100,001 people.

There are 51,651 community water systems in the United States and the majority of these (94%) serve a population of fewer than 10,000 people. (On the wastewater side, 13,057 of the 16,255 sewer systems serve fewer than 10,000 people.) The USEPA is continually concerned with these small systems and asserts that they

tend to be economically disadvantaged, underserved, and resource-poor, and as such they face significant barriers to building and maintaining effective systems.

SMALL SYSTEMS FACE SPECIAL CHALLENGES

In 2006, the USEPA Office of Inspector General identified numerous obstacles that small systems face. “Many small systems lack financial capacity, because of small customer bases and declining populations, which result in limited revenue. Not only is revenue hindered by a small customer base, but small systems struggle to obtain sufficient revenue because of inadequate rates. Small systems can be challenged by management limitations, because they are often run by part-time staff with limited experience and time. A lack of strong management may also result in poor operating and/or maintenance of the system’s assets that can lead to an increase in operating costs” (USEPA, 2006).

Small and rural communities often have a difficult time when it comes to providing safe water and compliance with federal standards because of their limited customer base. This challenge is compounded by the fact that small and rural communities often have lower median household incomes and higher water rates compared with larger communities (Bagi, 2002). As a result the cost of compliance is often dramatically higher per household even though smaller water utilities raise their rates more often. Costs are not proportionate among utilities of various sizes. A compliance project for a large customer-based utility could cost an additional \$0.30 per customer per month, whereas for a small utility the cost increase could range between \$3.00 and \$5.00 (Ponti, 2012). Systems serving fewer than 10,000 people have been charging higher rates than those serving larger populations because of the smaller customer base over which investment costs and operating and maintenance costs are spread.

CHARACTERISTICS OF RURAL WATER SYSTEMS

In July 2011, the USEPA released a report titled National Characteristics of Drinking Water Systems Serving Populations Under 10,000. This report reviews the trends and issues of ownership, operations, financial stability, infrastructure, compliance, water supply, and capacity issues. Highlights of the characteristics include the following:

Ownership. Seventy-two percent of very small systems are privately owned, and there is a shift to public ownership for systems serving fewer than 500 connections. For systems serving more than 500 connections, public ownership ranges from 75 to 87%.

Water source. A water system’s primary water source and supply change as the number of connections increase. A small system serving fewer than 500 connections relies on groundwater as 84% of its primary source, whereas systems serving more than 3,301 con-

nections are at 53% groundwater as their primary source, and systems serving more than 10,000 connections average 36% groundwater. Conjunctive use of surface water, purchased water, and groundwater increases as a system supplies more water to a greater number of connections.

Demand. Rural systems primarily serve residential customers, and a high percentage of connections are metered. If the system is not metered, then a flat rate structure is used. Smaller systems that are publically owned have a high ratio (double) of designed treatment to peak demand capacity because of a lack of storage and inconsistent demand for water during the day. More than half of the very small systems only disinfect groundwater, whereas 95% of surface water systems serving more than 500 connections provide additional treatment.

Employees. Employees of systems serving fewer than 3,300 people work an average of less than 20 hours a week, which can affect the management of a water system. It is difficult to find skilled operators for these positions because they are not viewed as a career opportunity and the pay is less than half of what would be paid for a comparable full-time position.

Costs. The treatment costs per thousand gallons is higher for surface water systems than for groundwater systems, in part reflecting the need for more skilled personnel; however, there is no clear relationship between system size and expenses per thousand gallons delivered. Because larger systems spend a higher percentage on debt service and capital projects, they have a higher capacity to plan for and obtain financing for improvement projects than small systems. Although both size categories spend a large proportion of their budgets on routine operating expenses, small systems spend 68% and large systems spend 43%.

THE FEDERAL MEMORANDUM

In 2002 the USDA’s Rural Utilities Service (RUS) and USEPA signed Memorandum of Agreement to work together to assist rural water and wastewater systems in implementing strategies and tools to achieve short- and long-term sustainability. The memorandum focuses on four distinct areas:

Sustainability of rural systems. This area emphasizes promoting asset management planning and water and energy efficiency practices.

System partnerships. This effort is intended to educate communities and utilities on the array of tools that are available through partnerships and to encourage struggling water systems to explore all options that may be available to increase sustainability.

Water sector workforce. The USEPA and USDA will work together to promote careers in the water sector to attract a new generation of water professionals to rural systems.

Compliance. USEPA and USDA will partner to ensure compliance by small rural public water and wastewater systems with drinking water and clean water regulations by providing training to public water and wastewater systems in rural areas (USDA, 2012).

An additional “better” practice and financial win for rural utilities through the federal funding programs is the requirement of open and fair competition. The RUS Instruction 1780.70(b) states, “All procurement transactions, regardless of whether by sealed bids or negotiation and without regard to dollar value, shall be conducted in a manner that provides maximum open and free competition.” Competition during the procurement process is good for the owner and the government. RUS expects the owner and design engineer to be open to reasonable alternatives during the facility planning and design process. Contractors, manufacturers, and suppliers with acceptable equipment and materials should have a chance to participate in the project. Once the facility requirements that assure good quality have been established, the goal is to construct the project at the best price for the system customers and the taxpayer (USDA, 2002).

PARTNERING WITH RURAL WATER ASSOCIATIONS

In 1976, the National Rural Water Association (NRWA) was formed to focus on the utility concerns for small and rural systems. Through its state associations, the NRWA has more than 28,353 utility members. Additionally, in conjunction with its state associations, the NRWA trains more than 100,000 people annually and has a formal online Water University to meet the constantly changing demands of small-operator training needs (NRWA, 2012). The grassroots approach and advocacy of NRWA and its state affiliates continually seek access to increased funds through RUS, State Revolving Loan Funds, and other private entities.

In 2002, Kansas Rural Water Association General Manager Elmer Ronnebaum sat in front of a Senate Committee while Senator Graham of Florida questioned him about a request for a \$7 billion state revolving fund appropriation. Senator Graham asked, “If we passed it and you received this money, tell me that you won’t be back asking for more.” Ronnebaum replied “Well, it’s all about maintaining compliance, so tell me how many more rules will be passed” (Ronnebaum, 2012).

REGULATORY COMPLIANCE VIOLATIONS

CWSs of all sizes are subject to regulation. Drinking water regulations set maximum contaminant levels and maximum residual disinfectant levels, require certain monitoring and reporting and treatment techniques. Drinking water regulations also include public notification and recordkeeping requirements. The water systems serving 10,000 or fewer people have a higher number of violations than larger systems (USEPA, 2011). Although drinking water regulations are more

complex for surface water systems than for groundwater systems, surface water systems have better compliance rates because they tend to be larger and generally have the technical staff and resources needed to achieve compliance. Groundwater often requires less complex treatment than surface water, but groundwater systems often serve small populations, and many lack the technical, managerial, or financial capacity to fully comply with regulations, including basic monitoring and reporting requirements.

Ownership's stake in the game. Ownership type can play a large role in determining the level of managerial and financial capacity of a water system. For instance, a small system may be owned by a large, investor-owned company that has strong financial standings and the ability to borrow money more easily. Conversely, a small independently owned system may have a much harder time receiving loans because it does not have the ability to obtain the necessary financial backing. Small publicly owned systems may also have limited resources because they sometimes compete for funding with other departments in the same town or municipality.

NRWA Deputy Director Sam Wade confirmed that many systems are consolidating, "We have lost 1,100 systems since the last census in the year 2000. Most of these consolidations have been driven by the cost of regulatory compliance issues. Many times for small water systems they are able to make compliance, but it may take more time to do so. There is the difference of economies of scale" (Wade, 2012).

Alabama used regulatory changes to reduce the number of small systems. For 25 years the state has worked to halve 1,300 water systems to a more reasonable number and has restricted new systems with 500 or fewer connections from forming (USEPA, 2011). In South Dakota the state has spent nearly \$2 billion on rural water systems by directives. North and South Dakota have pursued regional system strategies to provide drinking water to their states. Iowa took a different approach: when developers or municipalities submitted applications to develop their water systems with 38,000 miles of pipe, the state required them to consider a countywide or multicounty solution before creating an independent system. Iowa may have an advantage with many of its small and rural water systems because they are already networked into much larger systems. For many independent small systems, consolidation or regionalization may provide a way to survive (Ronnebaum, 2012).

PIPE INFRASTRUCTURE PRACTICES OF RURAL COMMUNITIES

Deputy Director Wade explained that when dealing with its infrastructure, a small utility may be struggling with replacement of its 6-in. pipes, whereas a large utility is challenged by replacing 48-in. pipe. Still, infrastructure planning for small utilities can be difficult

when many times they do not have full-time management staff, operators, or engineers. "They are continually trying to develop their capacity and make environmentally friendly and sustainable investment decisions. Infrastructure costs are a big issue," Wade said.

Many rural systems may serve a relatively small population but have thousands of miles of pipe and experience a low level of water main breaks. WEBWater Development Association serves 8,200 rural connections in South Dakota and has more than 6,600 miles of pipe. Similarly, North Dakota's Southwest Water Authority system comprises 3,800 miles of pipe.

The length of distribution and transmission pipes per connection generally increases as system size decreases. The median pipe length per connection for the smallest water systems (25–100 people) is more than double that for the largest systems (serving more than 10,000 people), which have the lowest median pipe length per connection. The median number of people served per mile of pipe directly increases with (publicly owned) water system size.

FINANCIAL CONSIDERATIONS

In the state of Kansas, small water systems do have access to capital funding at low interest rates—well below what the financial markets can provide. Recently, a water revenue tax-exempt bond for \$1.1 million that was not rated by the credit agencies had an interest rate of 2.012%. The state funding program is set at 60% of the market bond-interest rate, and in February 2012 the cost of capital was as low as 2.34%. Many utilities are even paying off state revolving fund loans with new revenue bonds. However, doing so requires these systems to continue getting the rate increases necessary to pay for these bonds and maintain their financial stability.

One of the major challenges that small and rural utilities are being faced with in the Midwest includes the outmigration of population. As the revenue base continues to decrease at the same time infrastructure costs increase, many systems may not have the funds necessary to even hire a local operator. Before this circumstance occurs, water system administrators need to think and act regionally with an attitude of better cooperation while reviewing opportunities to share or defray costs (Ronnebaum, 2012). To foster this spirit of cooperation, the Kansas State Rural Water Association has begun providing training programs for boards and councils that helps increase their technical, managerial, and financial capacity while developing the knowledge base required for understanding how to best manage a water or wastewater system.

KEEPING ALL OF YOUR PLATES SPINNING

USDA Rural Development has focused on small and rural utilities and has been very successful. Jacqueline

Ponti-Lazaruk, assistant administrator of the USDA RUS's Water and Environmental Programs explains,

Many people have the perception that small utilities have not made investments to improve their systems. This is not so. Rural water and waste utilities have sought funding to upgrade infrastructure, improve service, and create economic opportunities. USDA Rural Development's Water and Waste Disposal Loan and Grant Program is uniquely focused on assisting these communities—with populations of 10,000 or fewer—in their efforts. In FY 2011, 82% of the funding provided was awarded to projects serving communities with a population of 5,000 or fewer, and of that 42% went for projects serving populations of 1,000 or fewer. Since 2009, the program has invested \$7.5 billion in new or improved rural water and waste infrastructure, at a 70/30% loan/grant split. The overall portfolio is \$11.5 billion and has a less than 1% delinquency rate. Rural communities are taking on debt and repaying it through careful planning. They have learned to do more with less and be more conservative in their approach because they do not have the safety net of a large user base. But bottom line, they want to provide good, quality water and waste services to their customers. The USDA RUD has partnered with the National Rural Water Association and its state affiliates to help them

maintain all of the critical duties, then add additional important 'plates' to the obligations of small utilities. The USDA is also focusing on training the elected officials. Through good governance, small rural utilities have learned to be self-reliant, and good planning will be found at the core of any successful story. This takes a great deal of resources that small and rural utilities may not have internally, considering that local leaders wear multiple hats. The partnerships formed on behalf of small and rural utilities are helping them to be aware of the tools available and to upgrade their skills through free technical assistance from the rural water associations. The 'better' practices in times of less resources and funding can only be developed through partnerships, which are the key and make a big difference with lots of little efforts (Ponti, 2012).

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