ASSET MANAGEMENT: A New Frontier for Utilities

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It's 2 a.m. on a cold, rainy fall morning. Leo, the public works director for the small rural community of Summerville, is waking up to another emergency phone call. A pump has failed at a local sewage lift station, and if he doesn't get there quickly, raw sewage could back up and pollute a nearby stream. He wonders if he'll have the parts he needs on hand to fix the problem. As he laces up his boots, Leo tries to recall just how many times over the past three years he's been forced to leave his bed for an emergency like this one. It seems to be happening more and more.

"Things have been breaking down right and left at the wastewater and water plants," he thinks to himself. "The equipment is getting old, so you'll have that. Still, it would be nice if we could predict which parts need to be replaced first so we can avoid a violation and so I can get some sleep." But Leo realizes there's only so much he can do with the time and money he has. It seems he only ever has enough of both to put out fires.

Meanwhile, down the road in the neighboring town of Quiet Dell, Judy, the water treatment plant supervisor, is also spending a sleepless night. Judy is worried because she's slated to go before town council later in the day to request money to upgrade the treatment works and distribution system. She's certain the investment is needed now to prevent future problems and save money in the long run, but she's not sure the council will agree. Money is tight right now in Quiet Dell. The treatment plant has been running smoothly for a long time, and the council even increased her budget slightly last year.

Although Judy could go into the meeting and scare everyone with worst-case scenarios of what could go wrong and speak in generalities about how waiting

could cost the town more money, she doubts she'll convince anyone. If only she had the time and the data to prepare a detailed estimate to show council members how much money the town could save by making the upgrades now, she knows they would make the right decision.

Leo and Judy are not alone in their worries. Many small treatment plant supervisors across the country face similar nightmares. Whether they serve 1,000 or 100,000 people, water and wastewater utilities are expected to provide continuous, high-quality service to their customers. Anything less can have dire consequences for public health and the environment. Typically, small system managers are expected to maintain this high level of service with a lot less money than their counterparts in the city. It's no wonder they're losing sleep.

Besides money, what Leo and Judy need most is information. They need to know more about their systems to manage them effectively. Imagine for a moment that Leo had, at his fingertips, data on the age of all his pumps, their expected life cycles, how recently they've been serviced, and what parts to keep in stock. Imagine that he had access to all the information for planning routine maintenance for all those pumps. If Leo were able to access data like that everyday at work—information that could help him plan and use his limited time and resources as efficiently as possible—system failures may be a lot less common in Summerville. Leo could move from putting out fires to preventing them.

Likewise, if Judy had access to detailed information about all of her system's physical assets, their cost, condition, and remaining years of service, she could compare the cost of operating, maintaining, and repairing them with the cost of replacing them with newer, more efficient models. This could give her a more meaningful argument to present to the council and a better chance of receiving the funding she needs. Another possibility, after analyzing all the data and prioritizing her assets, is that Judy may decide that extensive upgrades are not as icritical as she previously thought. This would allow her to budget for the upgrades and give the council advance warning about investments they will need to make in the plant over the next few years.

By gathering information about their systems' assets, and using that information to run the systems as cost-effectively and efficiently as possible, Judy and Leo would be practicing asset management.

What is asset management?

Asset management is a structured, "holistic," approach to system management, which relies on information about the condition, cost, and use of the system's physical assets. An asset is defined as a physical facility or a component of a physical facility that has value and that enables a service to be provided. Assets that communities should be concerned about managing typically have a useful life of more than a year.

Although asset management is not a new concept, its application to water and wastewater treatment facilities was pioneered in Australia and New Zealand and is relatively new in the U.S. All water and wastewater operators currently manage their assets in some way—the key is to do it well. The goal of asset management (also called advanced, strategic, or total asset management) is to minimize the cost of owning and operating assets over time while continuously delivering the required and desired customer service. In layman's terms, asset management is getting the most bang for the infrastructure buck.

Why is asset management important?

Asset management helps utilities save money both in the long and the short term. Saving money has always been especially important for small communities, but the need to manage assets wisely will be critical for all utilities in the future. Operating costs in the industry are increasing, as are costs of infrastructure improvements. EPA anticipates that the gap between drinking water and wastewater infrastructure needs and infrastructure spending and funding will widen significantly in the future.

In addition, the federal government recognizes the importance of asset management and is beginning to encourage utilities to implement programs. A bill approved in June 2004 by the Senate Committee on Environment and Public Works ties state revolving fund (SRF) eligibility to asset management

EPA Defines Asset Management

In the publication, *Asset Management: A Handbook for Small Water Systems*, the U.S. Environmental Protection Agency (EPA) outlines a simple asset management program. Although asset management programs vary in complexity, EPA suggests the following five steps for implementing asset management in a small utility:

1. Taking Inventory

Completing an inventory of system assets includes evaluating and reporting each asset's condition, its age, its service history, and its "adjusted useful life." Inventory is often the most labor-intensive part of the asset management process for utilities. Identifying, locating, and evaluating all of a system's assets can be time-consuming, although many systems have begun or completed this process to comply with GASB 34. The expected useful life of various system components can be found by using industry lists and cost indexes. Using this information, utilities can estimate an adjusted useful life for each asset by taking into account its service history and current condition. For example, the expected useful life of a given pipe may be 40 years, but if the pipe is in poor condition due to lack of maintenance or other conditions, a manager may decide to adjust the useful life by 10 years. Managers then subtract the age of the pipe (10 years) to determine its remaining useful life (20 years).

2. Prioritizing Assets

After taking inventory, utility managers need to devise a system for prioritizing their assets. The simplest way is to base priority on the remaining useful life, assigning the highest priority to assets with the shortest remaining useful life. Other, perhaps better, factors to take into account when prioritizing include the asset's importance to delivering a high-level of service (i.e., safe drinking water). The asset's necessity to the rest of the system and whether other assets in the system can do the same job (redundancy) are also considerations. Assets that are more important to the system's ability to protect public health should be given a higher priority, as should assets for which there is less redundancy.

3. Developing an Asset Management Plan

Now that the assets have been prioritized, utility managers need to plan for and schedule the future rehabilitation and/or replacement of each asset. In other words, they must formulate a capital improvement plan for the system. EPA suggests that utilities calculate the amount of money they will need to set aside each year in an annual reserve fund to pay for each asset.

4. Implementing the Plan

This step requires the utility manager to work out a detailed system budget. The manager will prepare a financial forecast by estimating the revenue the treatment plant expects for the next five years. Next, the manager compares the forecast with the scheduled upgrades in the plan to determine if the utility will need to put aside additional funds in reserve, find ways to save money (such as sharing assets with a neighboring community), find additional funding, or increase customer rates. This exercise is not meant to replace traditional accounting methods.

5. Reviewing and Revising the Plan

The plan can be updated if priorities change and as new information becomes available. EPA suggests reviewing the plan on at least an annual basis.

Source: *Asset Management: A Handbook for Small Water Systems*, U.S. Environmental Protection Agency Office of Water.

through a "priority system." The bill asks states to give more weight to applications for assistance from water and wastewater treatment works that include (1) an inventory of assets, including a description of the condition of those assets; (2) a schedule for asset replacement; and (3) a financing plan, indicating sources of revenue from rate payers, grants, bonds, and other loans and sources. Although the bill is not expected to become law this year, communities should take note. As with the Government Accounting Standards Board Statement (GASB 34) guidelines that came before it, asset management is not mandatory. However, in the future, communities may find it difficult to obtain funding or a good credit rating without good asset management practices.

Another incentive for utilities to embrace asset management is that it helps with GASB 34 compliance. GASB 34 is a method of accrual accounting and financial reporting that publicly owned utilities are encouraged to use to report historical costs and depreciation on all infrastructure assets. Although GASB 34 financial statements also include discussion and analysis of assets and future spending, the goal of asset management is broader. Operators and facility managers can use asset management to generate schedules for routine and preventative maintenance, for example. GASB 34 compliance can be seen as an important component of a utility's asset management program.

Another initiative closely related to asset management is capacity, management, operation, and maintenance or "CMOM." EPA has proposed that wastewater systems be required to submit CMOM plans to obtain National Pollutant Discharge Elimination System (NPDES) permits. CMOM is similar in many respects to asset management. Implementing asset management programs can only simplify CMOM compliance for wastewater facilities.

One clear advantage of asset management for utilities is its usefulness as a planning tool. Small communities around the country will find it indispensable

as they face population growth or decline or other changes, such as the need to increase security spending or comply with increasingly stringent environmental regulations. Asset management allows communities to be proactive, not reactive, to changing needs and helps them make better financial decisions.

Need more information about asset management?

The National Environmental Services Center (NESC) offers a 25-page Guide to Asset Management for Small Water Systems. *To obtain a printed copy of the guide, call NESC at (800) 624-8301 or e-mail* info@mail.nesc.wvu.edu. *Request item #TRBLMG06. The guide costs $5.00 plus shipping and handling. It may also be downloaded free from NESC's Web site located at* www.nesc.wvu.edu/netcsc/netcsc_index.htm.

The Water Environment Research Foundation (WERF) has a Web-based asset management program—SIMPLE [Sustainable Infrastructure Management Program Learning Environment]—designed for systems with a broad range of needs and requiring little asset management experience. It provides users the basic tools they need to begin an asset management program. Learn more about SIMPLE on the WERF Web site at www.werf.org. *Select "interactive tools" from the menu options.*

The U.S. Environmental Protection Agency (EPA) has developed Asset Management: A Handbook for Small Water Systems, *which is available on their Web site at* www.epa.gov/safewater/smallsys/pdfs/guide_smallsystems_asset_mgmnt.pdf *or by calling (800) 490-9198. For information about EPA-sponsored asset management training, visit* www.epa.gov/owm/asses_management.htm. *EPA's Environmental Finance Center (EFC) network also helps systems incorporate asset management principles; visit their site at* www.epa.gov/efinpage/efc.htm.

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Estimated Equipment Life

The various components of a water system have different life expectancies. Here is the useful equipment life, according to EPA:

Asset	Expected Life (in years)
Intake Structures	35–45
Wells and Springs	25–35
Galleries and Tunnels	30–40
Chlorination Equipment	10–15
Storage Tanks	30–60
Pumps	10–15
Buildings	30–60
Electrical Systems	7–10
Transmission Mains	35–40
Distribution Pipes	35–40
Valves	35–40
Meters	10–15
Service Lines	30–50
Hydrants	40–60
Lab/Monitoring Equipment	5–7
Computers	5
Transportation Equipment	10

Source: U.S. Environmental Protection Agency, *Asset Management Guide for Small Water Systems.*

Free Asset Management Software Is Available

The Maryland Center for Environmental Training (MCET) at the College of Southern Maryland has created a free asset management software program for small communities. "Total Electronic Asset Management System" (TEAMS) was developed in partnership with Delaware Technical Community College under a grant from the U.S. Environmental Protection Agency. TEAMS works with Microsoft Office Suite version '97 and later.

According to Karen Brandt, MCET director, the software was developed and tested with help from four small communities in Maryland and Delaware. TEAMS helps systems to address five issues at the heart of an effective asset management program:

1) What is the current state of the assets?
2) What is the required level of service?
3) Which assets are critical to sustained performance?
4) What are the best minimum life cycle cost, capital improvement plan, and operation and maintenance strategies?
5) What is the best long-term funding strategy?

With TEAMS, communities can create an inventory of all system assets and input useful information about each asset, such as the name, date placed into service, manufacturer, supplier, part number, and costs. The program allows users to input an asset's condition using a scale of one to 10, and it helps operators to evaluate asset criticality, taking into account any redundancies in the system and the possible adverse impacts resulting from an asset's failure.

TEAMS also can help operators determine the historical and book value of assets, prepare maintenance schedules based on priority of repairs, and generate work order forms. In addition, systems can use the software to generate financial analyses and reports, and TEAMS meets GASB 34 requirements when using a modified approach for accounting.

The TEAMS software is free and can be requested from the MCET's Web site located at *www.mcet.org*.