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The pressure is on at water utilities

by Karen D. Schwartz

January 8, 2001 —**WHEN DAVID RAGER TOOK** the helm of the Greater Cincinnati Water Works in 1993, he walked into an operation of 600 employees servicing 1 million consumers -- but functioning, for the most part, without the benefit of modern technology. In the field, workers completed preprinted cards to read customers' water-usage meters, which were then read by a machine. The machine produced a tape that fed information to a 25-year-old mainframe-based billing system using homegrown software. Back in the office, the staff used dumb terminals connected to the aging mainframe to track collections of customers' late payments as well as work-orders for maintenance projects.

CEO Rager quickly assembled a group of nine technologists on staff and an outside consultant who spent three months study-ing every part of the organization's operations, from billing and customer service to water treatment and management. The group concluded that technology -- lots of it -- was the key to succeeding in the long term.

With an IT strategic plan in hand, Rager prioritized project implementations for the next six years based on which efforts would lead to improved operations, reduced costs and better customer service. The result: The agency now has client/server systems that include both Windows NT and Unix servers running on a Windows NT network and using an Oracle database. It also has upgraded its billing, collections and meter-reading functions by installing a customer management system designed for utilities from SCT Corp. in Malvern, Pa. It's a system that the utility can use to anticipate customer call volumes and staff call centers accordingly. It also can help pinpoint customers who take advantage of early payment plans, Rager says. The changes came with costs too. Although the Water Works' executives originally planned on investing \$3 million to \$4 million per year for five years on the upgrade, rapidly escalating IT costs -- largely because of Y2K -- forced the company to spend a total of about \$35 million, Rager says. (The five-year plan's stretching to six years also lifted costs.) In the process, the agency also cut 100 positions; most of those who remained were retrained to use the technology, such as how to run a fiber-optics network. "Maintenance staff who used to do largely just mechanical maintenance work now also performs electronic-circuit troubleshooting and repair," Rager says.

The seven-year metamorphosis of the Greater Cincinnati Water Works from a relative IT backwater to one where technology plays a central role is indicative of the seismic shift occurring in this industry. Water utilities are learning, slowly but surely, that technology is the best way to achieve their ultimate goals: elevating customer service, lowering costs and preparing for a future in which competition and consolidation are expected and the Internet creates both opportunities and challenges to keep up.

Many water utilities today are modernizing back-office systems, installing new customer service systems and customer usage/data collection technologies, and incorporating the Internet into their business models. And it is only by upgrading back-office systems that water utilities can take advantage of other technologies, says Guerry Waters, vice president of energy information strategy services at Meta Group in Stamford, Conn. That's especially true in the case of Internet-based technologies, because many water utilities' legacy systems lack the functionality and technology that would allow them to effectively tie those systems to the Internet.

But modernizing systems to participate in the Internet age is only part of the story. Some water utilities, fearing acquisition by other water utilities, large multinational conglomerates, or even electric and gas utilities, believe up-to-date technology is the best defense.

Watershed Moment

The water industry has operated in a largely manual environment for a century or more, employing only rudimentary automation systems in water-treatment facilities and mainframe-style billing systems in the back office. It is only in the past five or 10 years that technology has entered the industry, and only in the last few that water industry executives have begun to realize that without it, they simply can't keep up, much less deal with the pressures facing them.

Much of the move toward modern technology has to do with the changing landscape of the water industry. While many municipalities and utilities continue to operate as they always have -- through manual processes or with a minimum of modern technology -- others face competition. Greater Cincinnati's Rager, for example, can face as many as 19 smaller rival water agencies in southwest Ohio when he bids to serve a newly built neighborhood. Others are the target of takeovers by companies like Paris-based conglomerate Vivendi and United Water Resources, a subsidiary of Suez Lyonnaise des Eaux, also headquartered in Paris. These multinational companies offer to buy and run the utilities, promising to infuse them with new, cost-cutting technologies.

And many state and local governments are taking them up on their offers. United Water has partnered with a diverse set of water utilities in the United States over the past several years, such as Gary, Ind.'s wastewater treatment facility and New Jersey's Hoboken water services. Similarly, United States Filter Corp., the North American arm of Vivendi, now runs more than 250 municipal and industrial water and wastewater systems across North America, growing in seven years from just \$17 million to \$5 billion in sales.

Even if they remain independent, water utilities are looking to IT investments to cut costs and boost revenues. The District of Columbia Water and Sewer Authority (DC WASA), for example, has embarked on an ambitious replacement of its legacy mainframe-based billing system with the Enterprise Customer Information System from Orcom Solutions of Bend, Ore. When fully implemented, this system will help communication with customers, track problems and provide an electronic interface with the utility's new automated water meters. It's a \$14 million investment over eight years that an internal agency study predicts will provide returns quickly. "We're going to save money internally by upgrading our system, and we'll enhance our employees' job skill sets at the same time," says Grace Beaman, DC WASA's customer service manager for billing operations.

DC WASA's move is typical for a water utility's first big IT step in that it tackles an automated customer information system. But it's unusual for a utility because DC WASA will use Orcom as an application service provider. This gives the utility the option of having Orcom personnel pick up the phones in their customer support centers or simply provide the billing and other services, says Mark Crapeau, an Orcom executive vice president.

DC WASA's AS/400-based system will offer electronic billing, allowing customers to view bills and pay them via the utility's website (www.dcwasa.com). It will also enable call center employees to relay an order status to customers in real-time instead of having to call customers back later with answers to their questions. Orcom's system, which resides in Orcom facilities in Scottsbluff, Neb., and at an IBM Global Services site in Rochester, N.Y., can also process data from DC WASA's new automated meters to help the utility track collections.

Plumbing in Place

Once back-end systems are upgraded, water utilities are poised to take advantage of the Internet age. Memphis Light, Gas and Water (MLGW) chose to enter in the Internet arena with the help of partner Link2Gov Corp., a Nashville, Tenn.-based government-to-consumer e-commerce provider. Link2Gov will provide bill payment services both online and via the organization's telephony-based interactive voice response system. The goal is to provide customers with an alternate way to pay bills and reduce the cost of processing bill payments, says Michael Rogers, MLGW's systems development manager for e-business. The service even has real-time capability, Rogers says. Customers scheduled to have their water cut off for nonpayment in the afternoon can circumvent the problem by paying the bill electronically.

The Greater Cincinnati Water Works also has taken some Internet steps, erecting an informational website, enabling its customers to access information on water quality and how water is treated and delivered. The company expects that by the end of 2001, the system will also let customers access account information, make payments online and report meter readings. Rager says the utility has taken its time on purpose. A 1997 survey revealed that only 30 percent of the utility's customers had Internet access and that only 10 percent would use the Internet to communicate with it. But a recently completed 2000 study revealed seven out of 10 customers have Internet access, and about 40 percent said they would use it to obtain information from the utility. Based on market trends, the Water Works also predicted that by 2004, customers' Internet access would reach 90 percent.

As with any business serving consumers, utilities like these are increasingly seeking to save money by turning to

Web-based ideas that get customers to service themselves. "When you look at the economics of doing it online versus getting a person every time you call, there is at least a 30 percent to 40 percent savings if you can move your customer to an interactive channel," Meta Group's Waters says.

Going, Going, Gone

Once water utilities are comfortable with using the Internet to communicate with customers, it's a minor leap to using it for business-to-business commerce.

One idea taking hold is the concept of a trading exchange for water supplies and chemicals. Exchanges like ChemicalDesk.com and WaterDesk.com have begun offering this type of service by pairing individual buyers with individual sellers. ChemicalDesk.com, for example, bills itself as the e-marketplace for the water treatment industry, allowing utilities to electronically obtain current pricing for chemicals and place orders. Similarly, Azurix Corp.'s WaterDesk.com offers traders the opportunity to buy and sell maintenance, repair and operations products, and services for the water and wastewater industry via its trading exchange.

Twelve major water utilities across the United States, working with PricewaterhouseCoopers, are developing another water electronic marketplace with a twist. The service, called Water eMarket, will aggregate purchases for water-related goods and services from a group of utilities in an effort to garner a better price, much like Pantellos has done with the electric and natural gas industry. "There are about 70,000 different water and wastewater utilities in the United States, and the average utility is very small. They have no economies of scale in terms of procurement," says Roger Patrick, a principal consultant with PricewaterhouseCoopers' energy and utility practice in Philadelphia. "We figure that the Internet cuts through the problem of having lots of small organizations."

United States Filter also is developing its own e-procurement vehicles for use only by units it owns or runs. Because the company owns hundreds of water utilities, President Andy Seidel believes he can generate enough economies of scale by aggregating his own company's purchases to justify a standalone portal.

Seidel's company uses a private Internet portal built by Greenville, S.C.-based Datastream Systems' iProcure division to negotiate discounts and buy everything from Post-It notes to small motors and pumps. For procurement items such as larger water pumps and hydrants, the company conducts reverse auctions for a set of qualified buyers in concert with SupplierMarket.com, an online marketplace based in Burlington, Mass. Seidel says that United States Filter is now conducting \$100 million worth of business annually via reverse auctions. On items like pumps and hydrants, reverse auction prices are coming in between 10 percent and 50 percent lower than in the past, Seidel adds.

Making Waves

Another Internet-based model catching the eye of some water suppliers is the idea of buying and selling water itself online. Some of these exchanges, such as The Water Rights Market of Littleton, Colo., and WaterBank of Albuquerque, N.M., aim to be trading exchanges for water much like HoustonStreet.com and Enermetrix are for the electric power industry.

Houston-based Water2Water Corp., an arm of Azurix, is another exchange that wants to help water sellers and buyers do business, but plans to do so via online auction. Launched in February, Water2Water is developing a network of locally based trading exchanges with the goal of being a U.S.-wide trading exchange with different segments for different localities.

Water2Water is focusing its efforts heavily on the western portion of the United States, where water is scarce, droughts are common, and arcane and sometimes nonsensical methods of water allocation are still in place. In the western United States "you've got the old Spanish legal system of allocation, which is first in line, first in right; and the English riparian system, which gives you access to water if you own land alongside a river or a lake," says Patrick Meyers, a Water2Water product manager. Those laws, combined with complex environmental, municipal, industrial and agricultural issues, have created a system of water allocation in the western United States that just doesn't work very well, he says.

One of the first projects the company is developing is a microexchange for water users on the Lower Rio Grande Valley in Texas. The Lower Rio Grande system contains 27 independent irrigation districts, to which it distributes an average of about 1.2 million acre-feet of water per year, though in a drought year like this one that figure dips to about half (an acre-foot equals 43,560 cubic feet of water). The area's activity makes it one of the top five markets in the United States for water that is moved and traded.

Having an exchange like this "gives people in Del Rio, Texas, which is seven hours away from here, the ability to know that somebody in the lower valley has excess water in his account," says Carlos Rubinstein, Rio Grande Watermaster with the Texas Natural Resource Conservation Commission, which oversees all water activity on the entire Rio Grande River. And because the price of water for irrigation fluctuates so much in the region from

\$20 to \$40 per acre-foot, an exchange like this is ideal, he says.

Internet technologies like Water2Water can help lower the cost of finding buyers and sellers and facilitating trades, says Terry Anderson, executive director of the Political Economy Research Center, a Bozeman, Mont., nonprofit organization that helps develop marketing strategies for resolving environmental problems. "If I'm using water in a way that's worth \$5 and you have a use where it's worth \$200, we ought to be able to engage in a trade," he says.

But for other parts of the country where water is not a scarce resource, the appeal for this type of exchange seems to be low. MLGW's Rogers, for example, notes that Memphis sits on top of several of the largest aquifers in the country and wouldn't need a service like this, at least on the buying end of the equation.

Another sticking point may be the infrastructure itself. "It's unclear whether the model will be a success. You can move gas around because of well-developed pipes, but water was never designed to operate that way. Where is the pipeline to do that? It has to be built. It's just too early to tell whether it will be a success," Meta Group's Waters says of Water2Water's model.

Now that technology has found the water industry -- and vice versa -- many more things are possible. The water industry is taking advantage of technology as never before, and the trend shows no signs of slowing down.

DC WASA, for example, plans to build on its customer information system's framework by adding additional computer telephony, interactive voice response and real-time customer service interactivity online. The organization also has embarked on a project to install new automated meters at all houses and businesses. Eventually, the automated meters will be able to send data electronically back to DC WASA headquarters wirelessly, Beaman says (although the technology to do so has not yet been chosen). A companion project will involve mounting small computers in technicians' service trucks to transmit customer service status in real-time to both customer service reps and customers. "Eventually, we'll be able to tell customers that the technician is about to knock on their door," Beaman says, another way to boost customer service.

The Greater Cincinnati Water Works, meanwhile, is installing an imaging system to cut down on the hundreds of thousands of paper documents it has accumulated over 160 years. The utility also has installed a suite of geographic information system applications using software from ESRI. The goal, Rager says, is to track service requests and actions throughout the organization's 400-square-mile reach. The GIS application now allows the staff to pull up a map that shows all water mains, valves and hydrants along with building descriptions, service outage locations and customer account data.

Although technologies like these can go a long way in helping water utilities save money and increase customer satisfaction, the bottom line remains the same.

"In five years, I fully expect that we'll be heavily Internet-based in terms of gathering information, purchasing and interfacing with our customers, and technology will be an increasing part of every process we have," predicts Rager. "But the basic operation of the industry won't change much. You still have to get it, treat it and pump it through pipes to people's homes."

CIO