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FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS
May 2012
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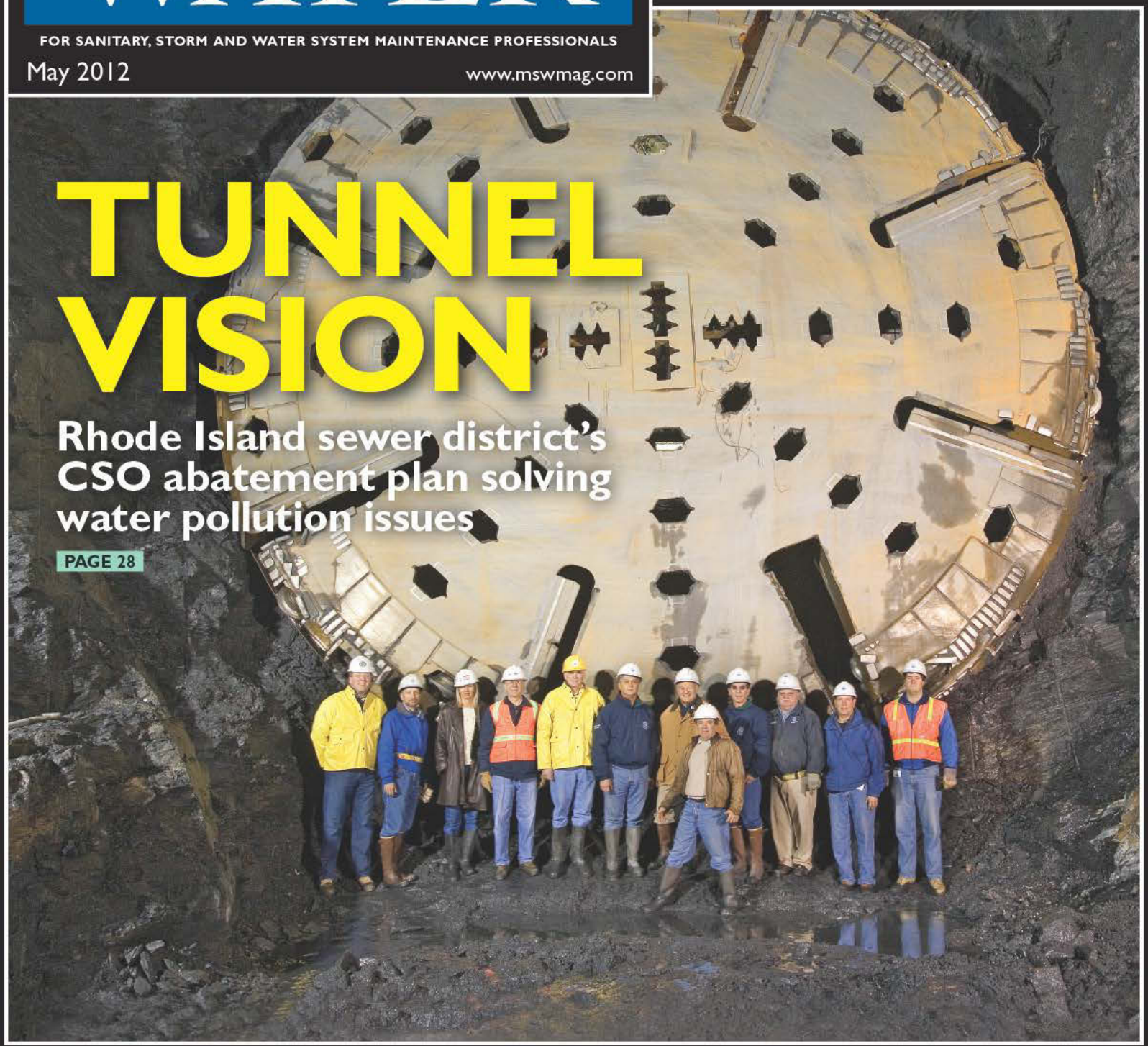

TUNNEL VISION

Rhode Island sewer district's CSO abatement plan solving water pollution issues

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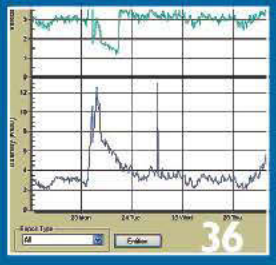
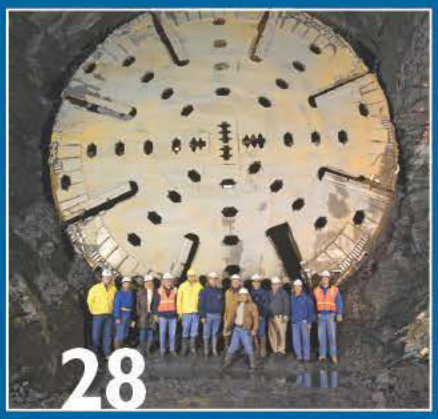


ON THE COVER:
The Narragansett Bay Commission management group stands in front of the 30-foot-diameter cutterhead at the termination point of the Deep Rock Tunnel, completed in 2008. Pictured, from left, are Tom Grala, Rich Bernier, Karen Giebink, Phil Albert, Tom Brueckner, Paul Pinault, Vincent Mesolella, Tom Uva, Ray Marshall, Steve Chmura, Paul Nordstrom and Tony Dalmazzi. (Photo courtesy of Narragansett Bay Commission)



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LOOKING INTO THE FUTURE

Good things are in the pipeline for *MSW* readers

FROM THE EDITOR

Luke Laggis

Welcome to the May issue of *Municipal Sewer & Water*. For you it's May, anyway. Writing these words I found myself thinking about the coming change of seasons and the wave of green that washes over the woods of Northern Wisconsin in spring. Then I looked out the window at several inches of fresh snow and saw the mercury in the outdoor thermometer pinned down at 10 degrees. It was still February.

That's how it is in the magazine publishing world: January could be March, or June, or even the following January. It can be hard to keep straight, and it's not uncommon for an editor to have a very skewed sense of time. But that illustrates my point. It's February, but for you, as you read these pages there aren't piles of snow outside the window and the mercury is being much more liberal in its movements up the scale.

Everything here at COLE Publishing is always a few months ahead. Our deadline for the July issue, for instance, will have passed by the time you read this. We were wrapping up the March issue when I stepped into the editor's chair, and much of the material for the April edition was already in the can, as we say in the business. That's why we're just now getting a formal introduction in May, even though I stepped into my role at *MSW* in January.

As we move forward, I'll do my best to make sure *MSW* continues to deliver information of value to the industry, including profiles of the people and departments that are shaping the future for sewer and water utilities.

I've already visited a CIPP lining project in Madison, Wis. The project was the first of its kind on a potable water main in Wisconsin. You'll be able to read about the project in an upcoming issue of *MSW*. I've also sat down with Rob Molskie, conveyance system manager for the Stevens Point (Wis.) sewer and water utility. The utility has come a long way in the past five years, and you'll also be able to read about how they've made drastic improvements in their system in an upcoming issue.

There are other great stories coming up in *MSW* as well. Bethlehem Township (Pa.) has just begun an ambitious lateral lining project that will likely make a big impact on the municipal sewer system. Nashville, Tenn., will also grace these pages in a story detailing the work the municipality has done to build green stormwater infrastructure. Those efforts have been recognized by the Natural Resources Defense Council, and we'll bring you the full story in August.

Of course, there will also be plenty of stories on new technology, new solutions to common problems and new ways to serve your customers better.

My hope is that you won't notice any significant changes as the balance of the load shifts each issue from work that was done prior to my arrival to the work done under my watch. I assure you the focus and quality of this publication won't waver, because a lot of dedicated people put a great deal of hard work into putting together a product that speaks to your industry and its place among the vital services we all depend on.

As we move forward, I'll do my best to make sure *MSW* continues to deliver information of value to the industry, including profiles of the people and departments that are shaping the future for sewer and water utilities. If you have comments, suggestions or story ideas, please feel free to email me at editor@mswmag.com. I hope to hear from you. ✦

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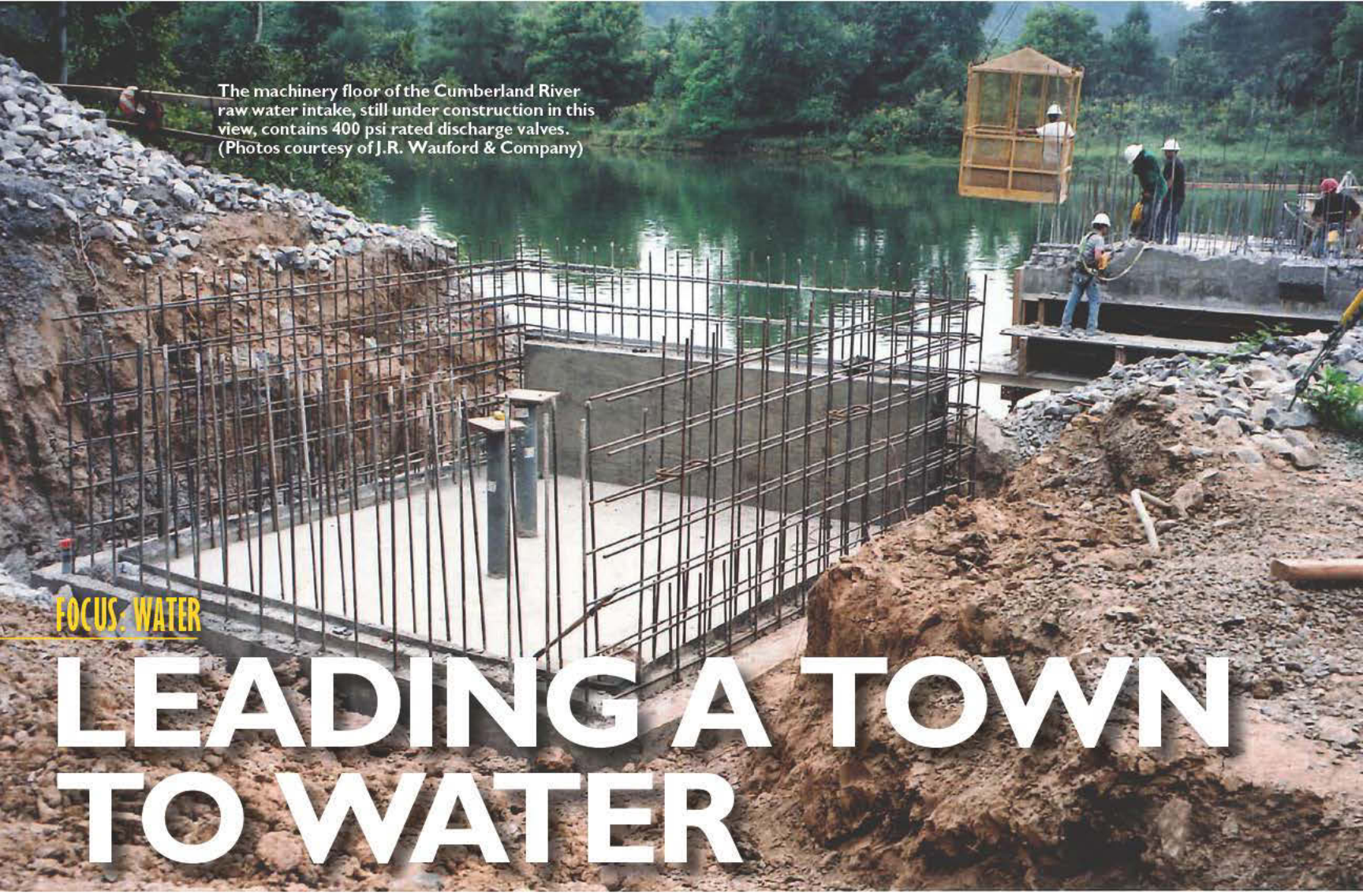

The machinery floor of the Cumberland River raw water intake, still under construction in this view, contains 400 psi rated discharge valves. (Photos courtesy of J.R. Wauford & Company)

FOCUS: WATER

LEADING A TOWN TO WATER

An ambitious pipeline project yields a permanent source of water for Livingston, Tenn.

By Jim Force

A firm handshake and concern for the customer were as important as backhoes and budgets to the success of a $16 million water project in Livingston, Tenn.

A new 19-mile water intake line from the Cumberland River to the town's water treatment plant went through hayfields and across the driveways of dozens of rural residents who weren't very happy with the project at first.

But the sincerity of water systems manager Tim Coffee, and a willingness to make adjustments to the route in response to property owners' concerns, won the day — and without any messy condemnation procedures.

"We were called names, and there were threats, but we looked people in the eye and promised we wouldn't leave them with a bad job," recalls Coffee. "Our contractors did a great job.

"Today," he says of the property owners, "I count these folks as good friends."

The Livingston project, completed in 2009, was necessitated by recurring droughts and water shortages in this hilly community of 20,000 people midway between Nashville and Knoxville.

Previously, Livingston drew its water from a shallow 54-acre impoundment behind a local dam.

"We nearly ran out of water several times," recalls Coffee, who's been with the utility for 27 years. "We had to shut down car washes; people couldn't fill their swimming pools."

He says the leadership of Livingston Mayor Curtis Hayes — then on the city council — pushed the town to develop a more reliable source and build the necessary infrastructure.

> **"We were called names, and there were threats, but we looked people in the eye and promised we wouldn't leave them with a bad job. Our contractors did a great job."**
>
> **Tim Coffee**

"We were tired of the situation," Coffee says. "Mayor Hayes convinced us to seek a better solution."

The project

The Livingston waterline was no ordinary project. At first, the town looked to nearby Dale Hollow Lake as a water source, but withdrawal fees that would have been imposed by the Army Corps of Engineers were out of Livingston's price range.

The next best choice was the Cumberland River, which could be tapped without fees but was nearly 20 miles from the utility's water treatment plant. Plus, the route ran over hilly terrain and would require high-pressure pumping.

The river intake structure itself presented another challenge. Its location is downstream of the Wolf Creek Dam, which is undergoing extensive repairs. To withstand the possibility of dam failure, the structure had to be anchored to the rock bottom of the river by steel rods grouted into 3-inch-diameter, 9-foot-deep borings.

"It was not cost-effective to raise the electrical systems (supplied by Eaton) the 19-20 feet required to

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Photo courtesy of Rebecca Clayton

Mayor Curtis Hayes, left, with the Livingston team: Mike Auberson, B.J. Norrod, Josh Parsons, Michael Hayes, Charlie Woodward, Timmy Coleman, Ronnie England, T.J. Pendergrass, Jerry Kennedy, Tim Coffee, Johnny Harries, Randall Buck, Monroe Helton, Johnny White, David Stainbrook, and Jack Parrott.

protect them against potential flood levels," explains the town's engineer, Roy Wauford of J.R. Wauford & Co., Nashville. "But the structure is designed so it will withstand a dam failure if one ever occurs."

The intake structure also features intake gates at two levels to allow selection of the best water quality.

Transporting water over long distances at higher than normal pressures may be common in the West, but it's unusual in Tennessee. "As far as we know," Wauford says, "there is no system other than Livingston in the Southeastern U.S. transporting water over a like distance with similar pressures."

A pair of high-pressure pumps from Flowserve do the job. The pumps are rated at 500 and 700 psi, respectively, and provide the 310 psi working pressure necessary to move the water from the intake structure some 50,000 feet to a surge tank located on a high ridge halfway to the treatment plant. Slow-closing, oil-actuated ball valves and specially made butterfly relief valves from the Henry Pratt Co. control the flow, minimize surges and prevent water column separation.

Except when the new waterline went under roadways, contractors used open trench construction to lay 20-inch ductile iron pipe varying from special thickness Class 52 (for 500 psi) down to Class 250. Average trench depth was five feet, and at least 42 inches of soil covers all cuts. The line had to run up and down hillsides with grades as much as 40 degrees. From the river to the ridgeline, elevation rises nearly 650 feet. And with the 54-foot side water depth of the surge tank, static head is 700 feet.

Coffee recalls watching contractors loading pipe onto a sled and winching it up the hill. "Some days we'd barely lay 20 feet (of pipe)," he says. "At one point, we had to dynamite a hillside."

The line also had to cross under a creek bed five times on its way up to the surge tank. Under these conditions, bends were lim-

The Livingston raw water intake on the Cumberland River at Butler's Landing in Clay County, Tenn., near completion (left) and at completion.

KUDOS TO THE TEAM

For successfully completing the intake and transmission line project, the Town of Livingston received a 2011 Tennessee Municipal League Achievement Award for Excellence in Public Works.

The award recognizes cities throughout the state for overall excellence, improvement, and specific outstanding accomplishments or departmental achievements.

Recognition goes to the Livingston Board of Aldermen who supported the project through three administrations and to long-time Mayor Hosea Winningham, who initiated the project, Mayor Frank Martin, who continued it and accumulated necessary monies, and to Mayor William Curtis Hayes Jr., who guided a speedy and efficient easement acquisition process and presided over most of the construction activities.

At the 2011 Tennessee Municipal League Conference, Hayes also received the prestigious Mayor of the Year Award.

PROFILE: Town of Livingston (Tenn.) Water Department

ESTABLISHED:
Late 1930s

POPULATION SERVED:
5,600 customers; about 16,000 people

AREA SERVED:
795.6 square miles

INFRASTRUCTURE:
Intake structure, 20 miles of raw water intake line, approximately 550 miles of water mains, 7 aboveground storage tanks, 4.0 mgd water treatment plant. About 25 percent of the water produced by the town is sold to three neighboring utility districts.

ANNUAL BUDGET:
$8.3 million

STAFF:
20 on waterline side; 5 at the water plant

WEBSITE:
www.cityoflivingston.net

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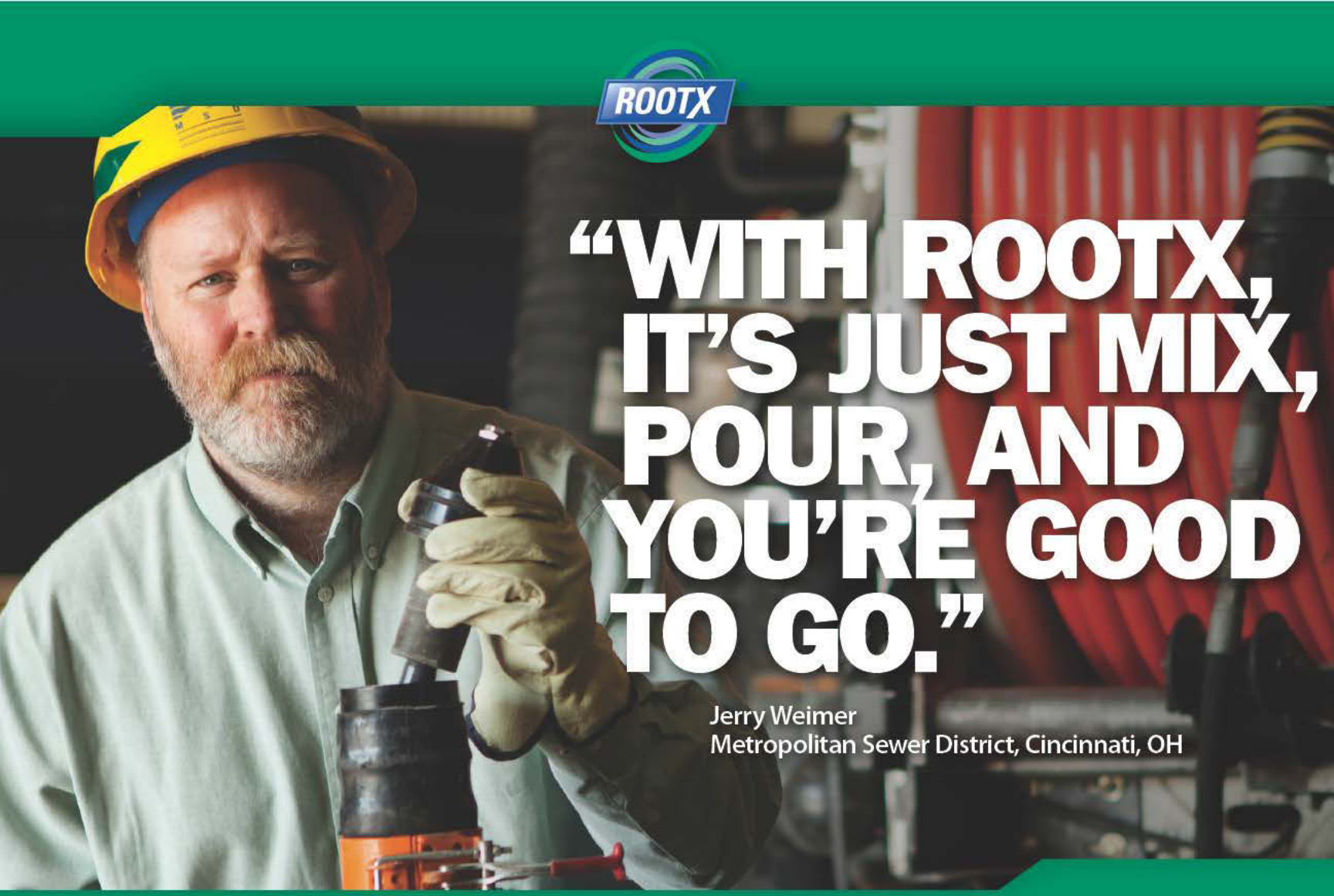

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ited to 45 degrees and required the use of specially designed, reinforced concrete thrust blocks.

The surge tank has a capacity of about 300,000 gallons, and water flows by gravity through C905 PVC pipe — also installed via open trench methods — another 50,000 feet to the Livingston Water Treatment Plant. The arrangement enables operators to regulate the flow through the plant regardless of the raw water being pumped, and also allows the plant to continue to produce water during power outages.

Treatment plant

Last expanded in 2006, the water plant now has a capacity of 4 million gallons a day and features pre- and post-chlorination, conventional flash mixing and flocculation, and high-rate sand and anthracite bed filtration.

Supervisor Johnny White, who has logged 39 years of experience at the facility, explains that activated carbon is used to improve taste and odor, and that a seven-chain phosphate is added to the clearwell to inhibit corrosion and scale. He reports that flow averages about 2.3 mgd in the winter, and 2.5 to 3.0 mgd during the summer. The plant also adds fluoride to the product water. High-pressure pumps push the product water to the distribution system.

In order to monitor and control the new water system, an extensive supervisory control and data acquisition (SCADA) system was designed and installed by Southern Flow of Atlanta, Ga. The system uses solar panels where power is not available, and to solve any line-of-sight problems, a 60-foot-high antenna on the top deck of the raw water intake transmits data to a central data acquisition point at the highest elevation in the system.

The system also controls the treatment plant operation, monitoring the filters and exhibiting tank levels around the system in real time. Coffee says the SCADA system is "the biggest blessing we've ever had."

Dead ends

Treated water is distributed to Livingston's customers through a far-flung network of waterlines and storage tanks. Dead ends are common. Coffee explains that many of the lines go into remote areas and serve only one or two homes.

"You'll be driving out in the country and you wouldn't believe there's a water line out there, but there is," he says.

Some of these outlying lines were established by small, separate utility districts before the town took them over. The system has 105 dead ends, according to Coffee, and that can lead to problems with flushing and maintaining the water supply and chlorine residual.

"It can be a nightmare," he says. "We flush every three months, or as needed."

Yet, none of these issues, including fixing leaks and rebuilding meters (see sidebar) amount to much when compared with the task of getting the 90 or so private property easements required to facilitate the intake line project in the first place.

"A lot of these people had nothing to gain from the new line," says Coffee. "Some of them were getting their water from another system, yet we had to go across their property."

Coffee attributes much of the success to plain old face-to-face honesty.

"My grandfather taught me the importance of your handshake," Coffee says. "We never went onto somebody's land without asking first. We never drove over people's property. We looked them in the eye and didn't lie to them. Now, nobody has come back to us and said we did them wrong. That's a good feeling."

"My grandfather taught me the importance of your handshake. We never went onto somebody's land without asking first. We never drove over people's property. We looked them in the eye and didn't lie to them. Now, nobody has come back to us and said we did them wrong. That's a good feeling."

Tim Coffee

The crew handles the tedious task of running the new pipeline up a steep incline after a creek crossing.

A temporary construction dam in Dry Fork Creek aided in the first of seven creek crossings but didn't keep construction workers dry.

(continued)

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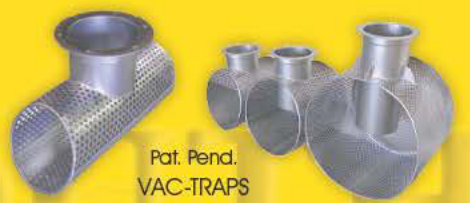
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MAINTAINING THE SYSTEM

With the new system, Tim Coffee and his staff thought they might encounter some new issues, and indeed they have.

"We're getting some small leaks, even on our newer pipes," he says, suggesting that the new intake and waterline is delivering water that's colder than that from the shallow surface impoundment of the previous system. "This is good cool water, averaging around 70 degrees year round," he says. "I think that has something to do with it (the leaks)."

Old cast iron pipes in the distribution system also present problems with rust and deterioration. "This has nothing to do with the treatment plant, which is producing great water," Coffee observes. "The old rusted sections can just break loose."

Livingston has an ongoing program replacing the older pipes with PVC, using open trenching. "We've done two replacement projects totalling about 25,000 feet in town," he says, "and we're surveying for another 12,000 feet. Your water loss goes up if you don't stay with it."

Coffee says his crew randomly checks for system leaks on an annual basis, but relies more on water meter readings and customer reports to spot leaks.

"We have an active meter program," he says. "We can't afford drive-by meter reading technology, but we change out old meters when they hit about 750,000 gallons, or if we see the usage rates falling off dramatically."

Rather than buy new, Livingston sends old meters to Meter Service and Sales, located in Georgia, for rebuilding at about half the cost of new meters.

"We get the same mileage out of the rebuilds," he says. "It pays for itself."

Overall, Coffee reports that water losses have dropped from 44 to 26 percent in recent years.

Photo courtesy of Rebecca Clayton

Tim Coffee, utility manager, Livingston, Tenn.

The new SCADA filter control panel from Southern Flow at the Livingston Water Treatment Plant.

them. Now, nobody has come back to us and said we did them wrong. That's a good feeling."

Working with Melissa Boner from J.R. Wauford and city attorney Kelly Williams, Coffee was able to negotiate all the easements in a year and a half. He credits the project contractors for cementing the relationships with good performance.

"They made the situation possible," he says. "It was just the way they worked with people … they treated the hayfields or driveways like their own … they filled holes quickly and if they had to cut down trees, they piled the logs up neatly for the property owner to use."

Coffee says many times, the easement was carved out along property edges and fence lines rather than going through the middle. "It was more costly," he says, "but it made people happy and created less resistance.

"Any little thing that was necessary to make it happen, we did that."

In a compliment to Coffee and the utility, Wauford says, "We never did a project of this size without having to go to court."

"Our water may be more expensive than that of other utilities, but we've bitten the bullet. There are other towns near us that still don't have a permanent water source. Now, they're looking to buy water from us. We feel we're ahead of the game."

Tim Coffee

Payoff

Bringing a reliable supply of freshwater to the Town of Livingston has required a lot of hard work and persistence over several years, but today, the effort is paying off.

The town won a prestigious award from the Tennessee Municipal League last year (see sidebar) and is earning high marks from state regulators.

"They do a survey every two years," Coffee explains. "They check everything — flushing records, cross connections, tapping, leaks, chlorine residuals, flow rates, computer records. We scored 597 out of 599 possible points — or 99 percent."

And while it's true that the project has forced Livingston's user rates to go higher, Coffee believes the investment is worthwhile.

"Our water may be more expensive than that of other utilities, but we've bitten the bullet," he says. "There are other towns near us that still don't have a permanent water source. Now, they're looking to buy water from us. We feel we're ahead of the game." ✦

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Jennifer Suttles, project manager at Woodard & Curran, uses hydraulic modeling software to examine Americus' water infrastructure. (Photos and graphics courtesy of Hugh Ryan)

FOCUS: WATER

UNDERGROUND MYSTERIES SOLVED

Hydraulic modeling helps a Georgia city make water system improvements and plan for future growth in the aftermath of a tornado

By Bernard Kendrick, Jennifer Suttles and Lorraine Campagne

When a tornado nearly leveled sections of Americus, Ga., the city got down to the business of rebuilding. One major reconstruction project was the replacement of the destroyed Sumter Regional Hospital, the area's major health care facility.

To serve the new facility and provide for more growth and development, the city needed to ensure adequate pressure throughout its water distribution system. Some of the infrastructure is over 100 years old. City officials knew some areas of town had much different pressure than would be expected based on maps of the system.

Addressing these issues required a thorough understanding of the whole system, and the best way to develop that was through a systemwide hydraulic model. An initial data collection phase provided information for the model, which accounted for known water system attributes such as pipe sizes and materials, valve locations, fire hydrants, and elevated water tank levels and sizes.

The model identified areas of low pressure and inadequate fire flow, but that was far from the only benefit. It also helped the city find infrastructure it didn't know it had, and identified closed valves in the system, solving mysteries about low pressure. Finally, the model highlighted areas where opening or closing valves would improve pressure, and where new or upgraded pipes would be needed to accommodate future demand.

Incomplete information

Americus, known as the "Shining City on a Hill," is located in Sumter County in southwest Georgia. It is home to the headquarters of Habitat for Humanity International, the century-old Windsor Hotel and the Rosalynn Carter Institute for Caregiving. It is also a popular tourist destination, being near the birthplace of former president Jimmy Carter and the site of the Civil War's infamous Andersonville prison.

Out of sight from the wandering tourist, beneath the city's roadways and historic buildings, lie old water pipes, some dating back to the early 20th century. As challenging as it is to run an aging water system, it grows much more difficult when information on the infrastructure is outdated, inaccurate or missing. The lack of information is accentuated when water mains break and it is nearly impossible to fully isolate the system for repairs.

Building the model

The Americus water distribution system consists of 134 miles of 2- to 20-inch pipe spread over nearly

PROFILE:
City of Americus (Ga.) Department of Public Works

CHARTERED:
1832

POPULATION:
17,000

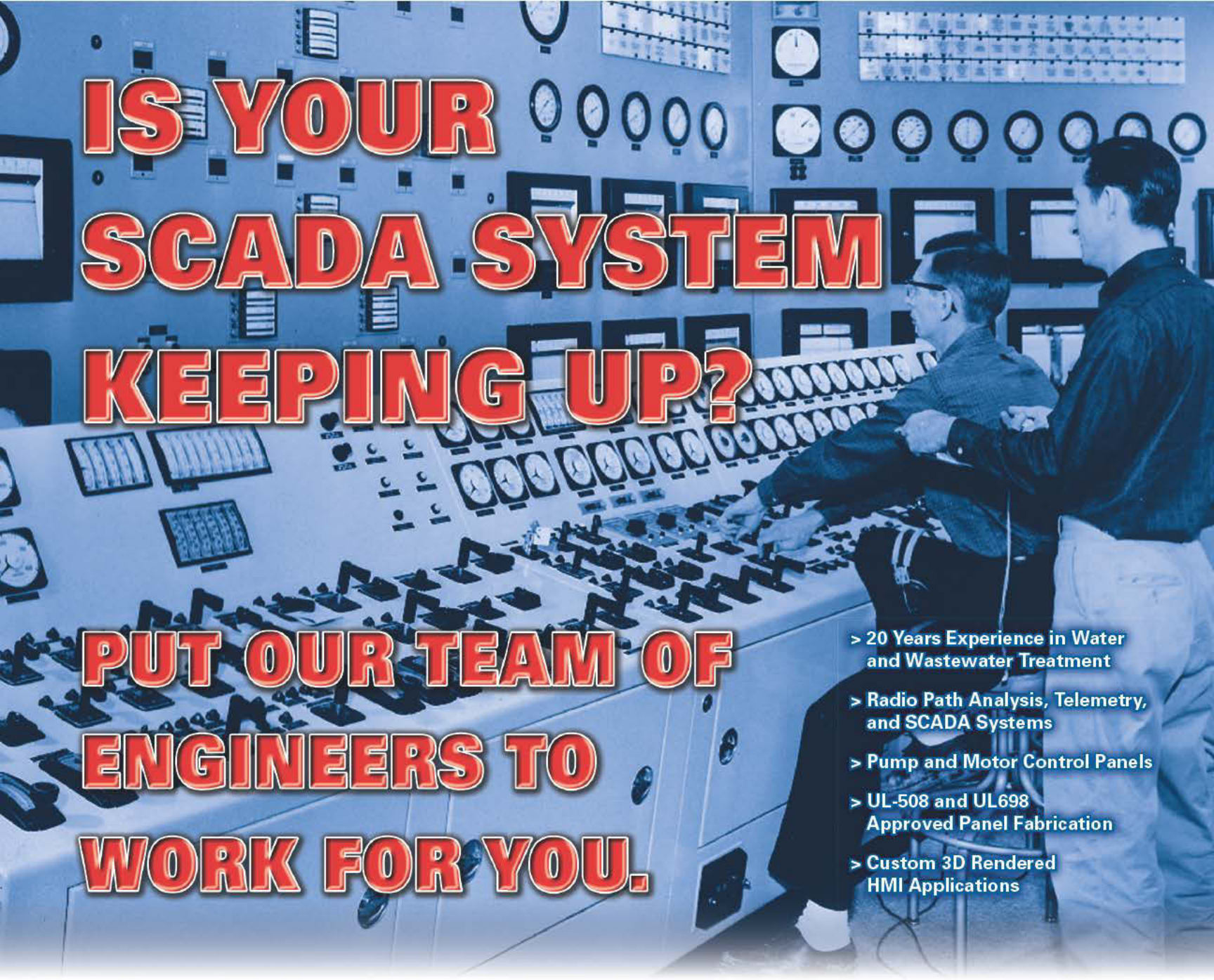
AREA SERVED:
10.5 square miles

INFRASTRUCTURE:
134 miles of water mains

ANNUAL BUDGET:
$4.8 million (water and sewer)

WEBSITE:
www.cityofamericus.net

(continued)



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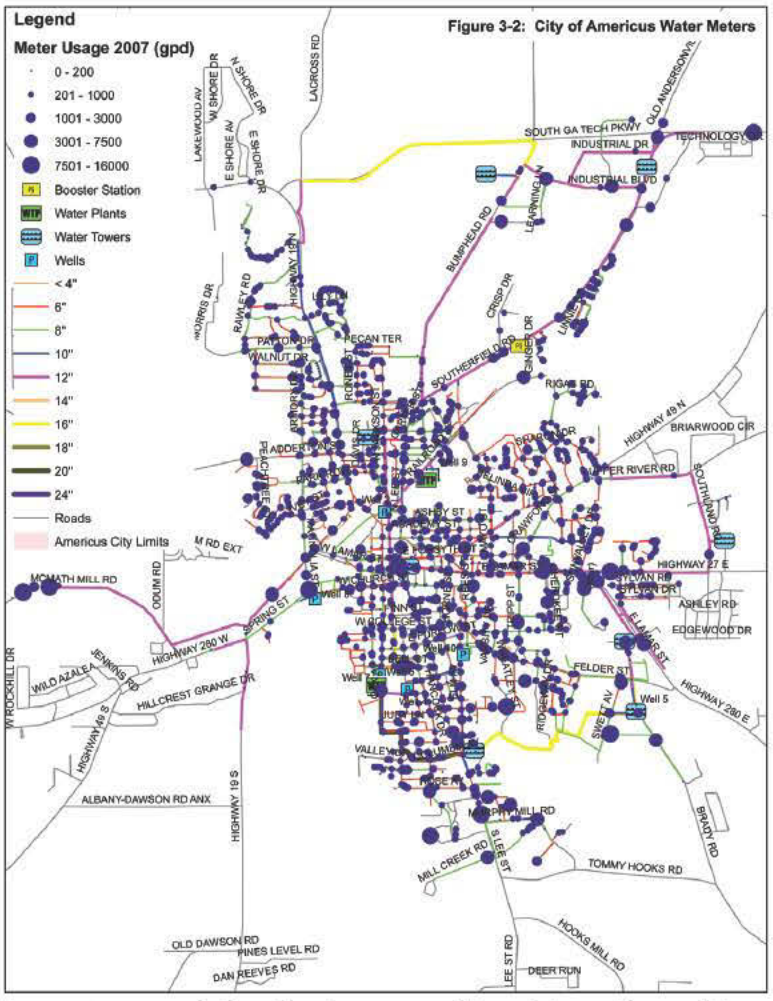

Every water meter in Americus is represented by a circle on this map. The size of the circle corresponds to the volume of water used by that customer.

11 square miles. To serve its 17,000 people, the city has two water treatment plants fed by groundwater and eight elevated storage tanks. The city now supplies an average water demand of 2.85 mgd, but future demand has been estimated at 3.34 mgd by 2030, a 17 percent increase.

To develop the hydraulic model, Americus hired consultants Woodard & Curran to examine infrastructure maps and information, including Geographical Information System (GIS), record drawings and water maps.

Engineers entered the data into the Bentley WaterGEMS hydraulic modeling software to create an initial infrastructure schematic for the entire city. They extracted residential, commercial, industrial and institutional water consumption data from the city's utility billing system, and then accurately located the data within the model to represent varying daily and seasonal demands on the waterlines at any given location.

As a better picture of the system emerged, officials chose nine strategic locations for fire hydrant tests that calibrate the model and replicate how the system worked in reality. During a fire flow test, flows from an open hydrant are recorded, along with initial (static) and final (residual) pressures on neighboring hydrants, to document the system's reactions to high flows.

These tests aid in refining pipe roughness values, a factor that contributes to pressure. Well-calibrated roughness values result in a model that accurately represents field conditions. In addition to fire flow testing, engineers installed five pressure data loggers throughout the system to record pressure over a 24-hour period.

The pressure loggers captured the behavior of the system at specific points before, during and after the fire flow tests. The data gave the team a better idea how the system reacted to the fire flow tests and provided information on how the system performed over time, from daytime high demands to nighttime low demands.

Once preliminary data was entered into the hydraulic modeling software, along with elevated

(continued)

Beverly Butcher, GIS coordinator, left, and Bernard Kendrick, DPW director, view the Americus water and wastewater systems on a department computer. Beverly is responsible for maintaining the Americus GIS.

REBUILDING AND GROWTH

The Americus City Hall

On top of the basic challenges of maintaining old infrastructure, Americus suffered a setback when a tornado devastated the city in March 2007, destroying many businesses and homes, claiming two lives and nearly ruining Sumter Regional Hospital.

Since then, the city has focused on revitalization and growth, including the construction of a new hospital, Phoebe Sumter Medical Center, on the edge of town. A major driver behind the city's water distribution model was providing assurance that the hospital would receive adequate water pressure and meet fire flow requirements.

Another driver was a proposed warehouse development southeast of the city, the result of a planned inland port in neighboring Crisp County. The city also planned for growth at Georgia Southwestern State University, a 250-acre campus with more than 3,000 students. With so much growth potential, it was essential to create a water distribution model to make sure the city could provide a high level of service to existing and future customers.

One immediate benefit of the modeling was a better understanding of how to isolate specific areas of the system without affecting other customers throughout the city. In addition, identifying potentially closed valves allowed the city to locate and open them to increase pressure and fire flows to homes and businesses experiencing lower pressures.

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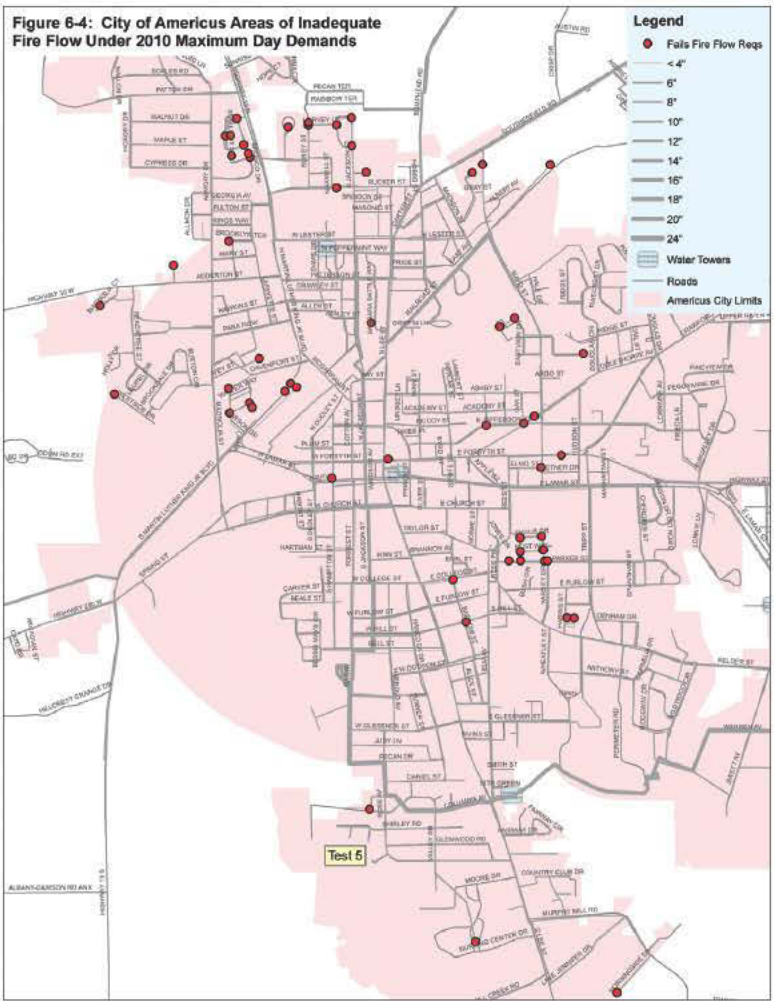
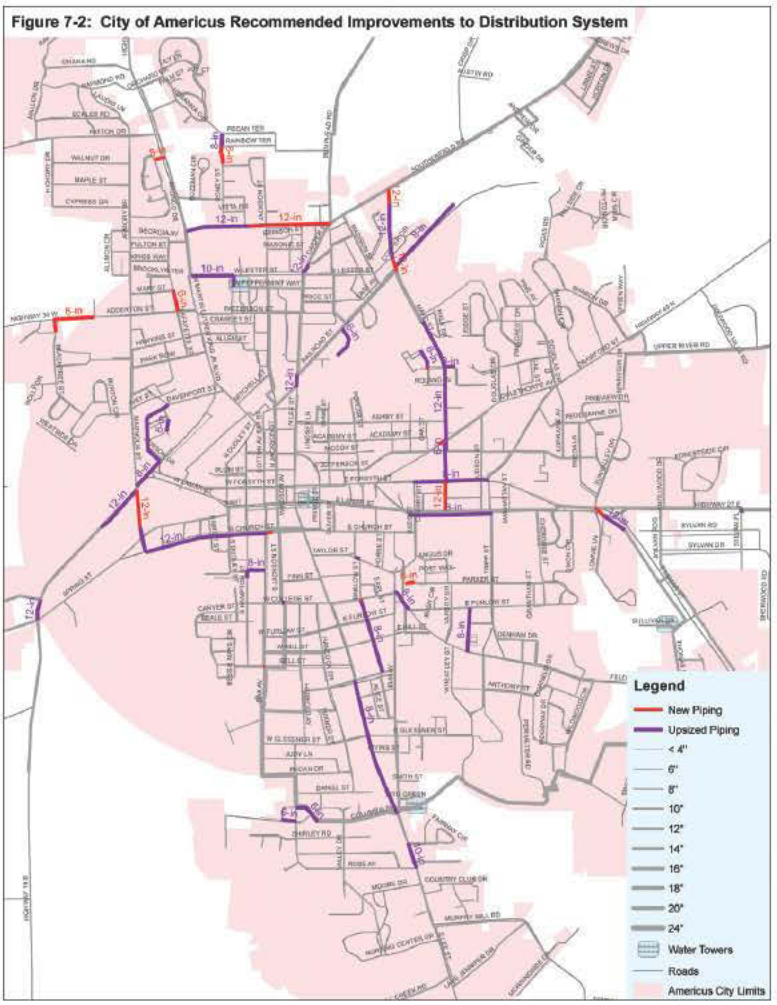


The hydraulic model indicated issues with Americus' water system, including a number of fire hydrants that lacked adequate water pressure. This map indicates the location of all hydrants that do not meet flow requirements.



The project resulted in several recommendations for improvements to Americus' water infrastructure, including adding piping in some locations (recommendations shown in red) and upsizing it in others (shown in purple).

storage tank data from the city's SCADA system, the initial typical values assumed for pipe roughness (originally based on material) were refined based on the results of the fire hydrant tests.

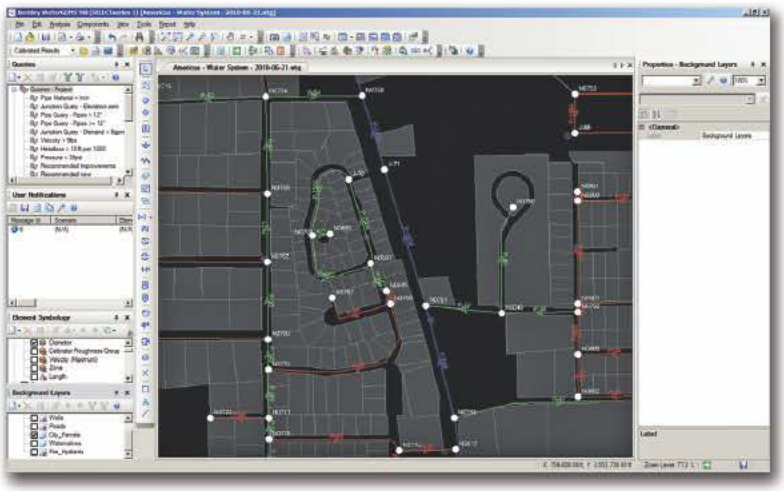
In many cases, because of the age of the system, the roughness coefficients were lower than typical for the pipe material. (The lower the coefficient, the rougher the pipes, and the more potential pressure loss.) Newer pipes, such as large transmission lines installed more recently, had higher roughness coefficients.

Discovering the system

During calibration, the team discovered several anomalies. First, the modeled elevated storage tanks did not accurately represent the filling/emptying cycling seen in reality. In addition, field measurements showed extremely low pressures in some sections of the distribution system where the model indicated pressures should be much higher.

Finally, parts of the system thought to be closed off were still under pressure, and vice versa. Behaviors that did not represent how the system should act based on known attributes of the infrastructure indicated the presence of pipes and valves that were not in the city's water map or GIS.

To find the "missing" infrastructure, team members changed the model to try to explain why the system was behaving differently than expected. In some cases, the modification required inserting a partially or even fully closed valve in areas where real pressures were lower than modeled.



A small section of the hydraulic model of the Americus water distribution system, with 8-inch piping shown in green, 6-inch piping in red, and 10-inch piping in blue. The model includes additional information such as water pressure and infrastructure features such as valves.

Insertion of these valves made the model more accurately represent the physical system, and when technicians performed field checks of those areas, they indeed found valves. In one case, simply opening a closed valve provided adequate pressures to an area that had experienced zero pressure during fire flow testing.

To resolve another anomaly, the team added a pipe to the model where the city thought an old abandoned line was located, based on a 1911 map. The model showed that the pipe was, in fact, still in service, and that explained why the city had difficulty isolating parts of the system.

Benefits of knowing

One immediate benefit of the modeling was a better understanding of how to isolate specific areas of the system without affecting other customers throughout the city. In addition, identifying potentially closed valves allowed the city to locate and open them to increase pressure and fire flows to homes and businesses experiencing lower pressures.

In areas where inadequately sized infrastructure was responsible for chronic low pressures and flows, the model supported recommendations for new pipes or pipe upsizing to improve water availability.

For example, the model showed that additional piping would be needed to ensure that developments like the new hospital would receive adequate daily pressures and fire flows during emergencies. The new line would also provide redundancy in the system in case the existing line went out of service.

Team members scrutinized the recommendations for impacts to the city's historical areas and worked to minimize them wherever possible.

Another benefit of the model was the determination that one of the city's eight elevated storage tanks could be taken out of service, saving on maintenance costs. The tank was temporarily out of service for maintenance during the fire hydrant testing, and the model showed that the system could meet both existing and projected demands with the remaining seven tanks.

A learning process

Since the final hydraulic model report was issued, the city has continued to collect data and update the model. Tank elevations have been surveyed where estimates had been used previously. The city hired a company to exercise valves, giving a much better idea of their working condition and whether they were open or closed. The city continues to incorporate this information into the model to maintain as accurate a system as possible for emergencies and future growth.

The hydraulic model, with collected field data, helped the city conclusively identify unknown or forgotten infrastructure, from missing pipes to closed valves. It helped the city plan for growth and provided greater certainty in day-to-day operations, leading to better service to customers without unnecessary capital expense.

The city showed foresight in developing the hydraulic model and making a small investment to improve it continuously for the future. ✦

The hydraulic model, with collected field data, helped the city conclusively identify unknown or forgotten infrastructure, from missing pipes to closed valves.

About the Authors

Bernard Kendrick (bernard.kendrick@cityofamericus.net) is public works director in Americus, Ga. Jennifer Suttles (jsuttles@woodardcurran.com) is a project manager and water resources expert with Woodard & Curran. Lorraine Campagne (lcampagne@woodardcurran.com) is a water resources engineer with Woodard & Curran.

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The OHxyPhogg V250 system from Parkson Corp. has eliminated hydrogen sulfide odors that used to prompt angry calls to Baltimore County officials and negative publicity in the local news media. (Photos courtesy of Tim McComas)

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FOGGING AWAY ODORS

No news is good news for a Baltimore County wastewater pumping station that once drew the wrong kind of publicity

By Jim Force

"The pilot test station is out away from populated areas, and odors can be very bad. I thought if the fogging system worked there, it would be a good solution to the Gray Manor situation."

John Guido

Odors from the Gray Manor pumping station in Baltimore County, Md., were so bad that one neighbor complained to the newspaper, saying she couldn't run the circulating fans in her windows in the summertime.

But you don't find newspaper articles about the smell anymore. That's because the pump division of Baltimore County Utilities has installed an odor control system based on hydroxyl radical fogging technology. Operational since last August, the OHxyPhogg V250 system from Parkson Corp. has eliminated hydrogen sulfide odors that used to prompt calls to county council members from neighbors and negative publicity in the local news media.

"We don't hear anything now," says John Guido, operations supervisor for the pumping and treatment division. "And that's a good thing."

Close to neighborhoods

The Baltimore County sewage system handles 40 billion gallons of wastewater a year and includes 3,000 miles of sewer pipe and 60,000 manholes. Guido's division operates and maintains 224 pumps at 117 pumping stations, one community treatment plant, three treatment and water distribution systems, and 2,500 grinder systems at individual homes.

The Gray Manor location is surrounded by homes and commercial establishments and is one of the largest pumping stations in the system. On average, it handles 6 to 8 mgd, and the flow can run higher during storms. The wet well pumps are driven by 700 hp motors.

"Hydrogen sulfide odors had been persistent at the site," says

Guido. For the past few years, his team of mechanic III Mike Cooper, mechanic II Jay Tawes, and mechanic I Justin Yokubinas had used a masking agent with little impact.

"We had tried using a misting system that sprayed an orange blossom scent around the pump station," says Guido. "It had a marginal effect, and the misting system was costly and maintenance-intensive. When the orange blossom agent ran out, we'd have to go out and install a fresh 55-gallon drum of it. If the system ran dry on a holiday or weekend, the odors went unmasked until our crew came back on the job. It knocked down some of the odors, but not all."

The odors were even worse during an upgrade of the pumping station, prompting the calls from neighbors.

"At first, we considered replacing the orange blossom scent mister with ozone, but then Parkson introduced us to the OHxyPhogg system," says Guido. The company gave a 30-day pilot test at another pumping station in November 2010.

Fast response

OHxyPhogg systems use an air atomizing three-fluid nozzle developed by Vapex Environmental Technology that combines ozone with a rapid application of micron-sized water droplets. The result is a hydroxyl radical fog that can be dispersed throughout the odorous air space, generating a large reaction surface area and oxidizing the odors.

The technology is being used successfully in lift stations, wet wells, covered sludge thickeners and holding tanks, and other odorous spaces. The systems require only a potable water source and a 110 VAC or 220 VAC electrical connection.

The pilot study was designed to determine the ability of the technology to reduce or eliminate hydrogen sulfide odors inside the wet well structure. A second aim was to test the effectiveness of the fogging system in reducing or preventing grease buildup and corrosion on the structure walls.

The results were excellent. Monitors recorded average hydrogen sulfide levels of 22 ppm in the wet well, and even higher levels in the diverter box, before operation of the fogging system. Once the system went online, the hydrogen sulfide dropped to 0 to 3 ppm at various points in the wet well. The test showed a reduction in grease and corrosive gases, as well.

"The pilot test station is out away from populated areas, and odors can be very bad," says Guido. "I thought if the fogging system worked there, it would be a good solution to the Gray Manor situation."

Easy installation

Under direction of superintendent Mark Thiess, the utility bought an OHxyPhogg V250 unit and worked with Parkson to install it. A utility crew handled the piping. The unit was positioned in a separate small room in the pumping station and connected to electrical service and water. Then Guido's team ran the fogging pipes into an adjacent room, drilled holes in the floor, and routed the pipes into the wet well below, positioning the fogging heads so they would completely cover the wet well area.

"We made one change by using schedule 80 PVC pipe instead of the schedule 40 that was specified," says Guido. "It stands up better and is harder to break if something hits it."

The piping installation took about 12 hours. "We actually did such a good job that Parkson tells us they want to use us as a model," Guido says.

The system was activated the next day, and the results were evident immediately.

"We could not detect any hydrogen sulfide odors around the pumping station," Guido says. "The nose is one of the best odor monitors we have. Our operators didn't smell anything."

The Baltimore County Utilities staff includes, from left, Jay Tawes, mechanic II; John Guido, supervisor II; Mike Cooper, mechanic III; Mark Theiss, superintendent; and Justic Yokubinas, mechanic I.

Maintenance has been minimal, and the negative media coverage has ended. "You never hear about a job well done," Guido says. "As long as the neighbors don't smell the pump station, we don't hear anything." ✦

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Sierra Instruments, Inc. 5 Harris Ct., Bldg. L, Monterey, CA 93940 800-866-0200 831-373-0200 Fax: 831-373-4402 info@sierrainstruments.com www.sierrainstruments.com		YES			YES	YES				
Spire Metering Technology LLC 14-B Craig Rd., Acton, MA 01720 888-738-0188 978-263-7100 Fax: 978-418-9170 sales@spiremt.com www.spiremt.com See ad page 55	YES	YES		YES	YES	YES	YES			

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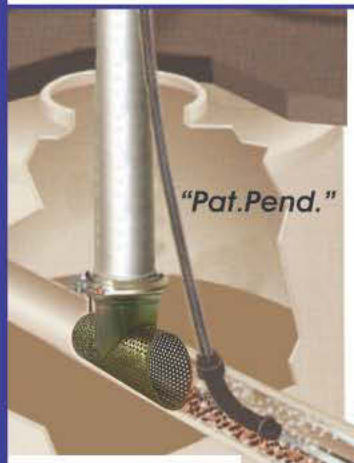

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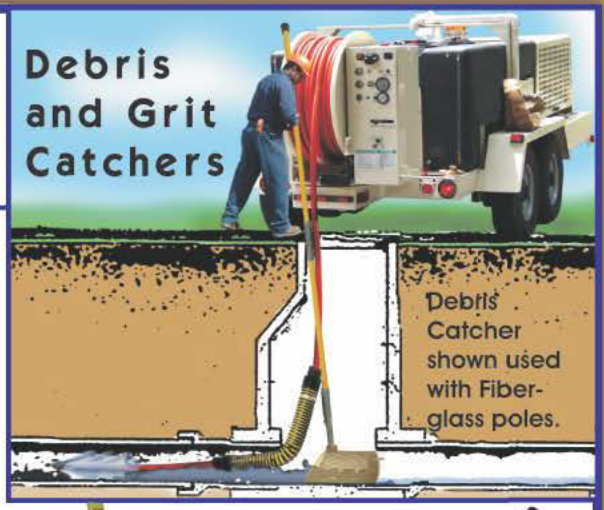

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Grit Catcher for use with Poles

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MDS Debris Scoopers. Heavy duty construction. For 4", 6", 8", and 10"

MCG Grit Basket. For use with poles or rope. In sizes from 6"-24".

CH-1 Great for cameras or gaffing downstream tools.

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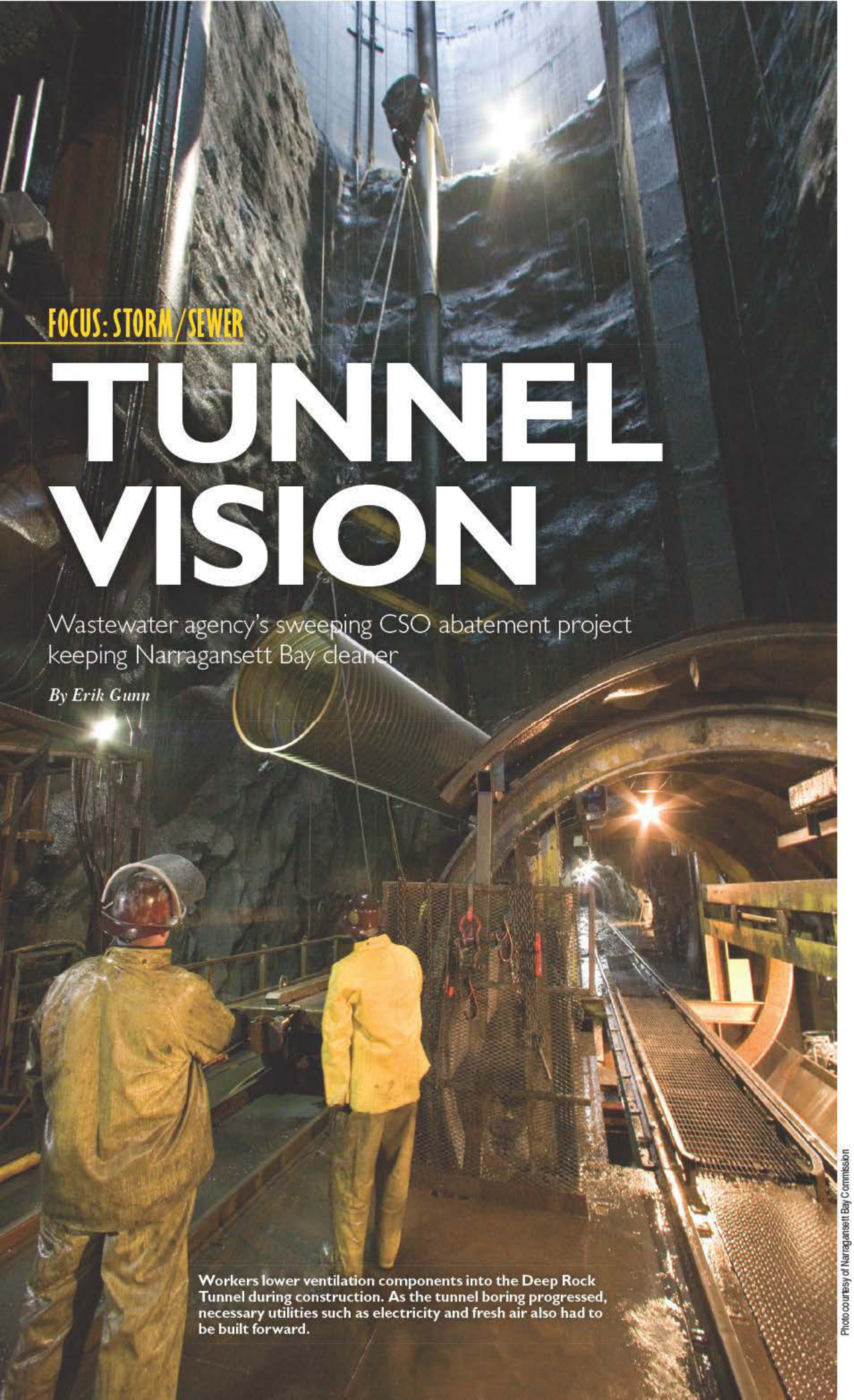
FOCUS: STORM/SEWER

TUNNEL VISION

Wastewater agency's sweeping CSO abatement project keeping Narragansett Bay cleaner

By Erik Gunn

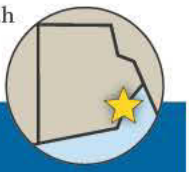


Workers lower ventilation components into the Deep Rock Tunnel during construction. As the tunnel boring progressed, necessary utilities such as electricity and fresh air also had to be built forward.

Photo courtesy of Narragansett Bay Commission

Combined sewer overflows were once a regular headache for the wastewater treatment operators and the residents living around Narragansett Bay in Rhode Island, but thanks to an aggressive program that combined capital investment and changes in procedure, they are becoming a thing of the past.

CSOs haven't been eliminated entirely, but they've diminished considerably, says Ray Marshall, executive director of the Narragansett Bay Commission. There's room for even more improvement, but the benefits have been readily apparent — fewer beach closings on the bay and fewer disruptions in the busy shellfishing industry in the waters to the south. Not to mention reduced threats to health and safety.



PROFILE: Narragansett Bay Commission, R.I.

POPULATION:
360,000

AREA SERVED:
Northeastern Rhode Island, encompassing Providence, North Providence, Johnston, Pawtucket, Central Falls, Cumberland, Lincoln, and nearby communities

TREATMENT CAPACITY/ WATER VOLUME:
77 mgd capacity;
45 mgd average

INFRASTRUCTURE:
110 miles of sewer interceptors*

ANNUAL OPERATING BUDGET:
$84.7 million

WEBSITE:
www.narrabay.com

* Narragansett Bay Commission collects and treats flow from constituent communities, which maintain their own sewer line infrastructure.

Marshall gives the credit to the commission's Combined Sewer Overflow Abatement Plan that was begun in 2001 after a decade of planning. An ongoing monitoring program helps keep the effort sharp. And thanks to extensive communication going all the way back to the project's planning stages, it's enjoyed support from the people who count most — the ratepayers whose sewer bills bear the program's cost.

"We enjoy a very positive reputation," Marshall says. "Quite a few of the political figures in the state have made it a point to come down and see our facility."

Urban utility

The Narragansett Bay Commission is a regional authority divided into two separate service districts, each served by its own treatment plant. The Field's Point service district includes the City of Providence and the communities of Johnston and North Providence to the northwest of the bay as well as a small segment of the Town of Lincoln. The Bucklin Point district ranges north along the eastern shore of the bay, from East Providence up through Pawtucket and Central Falls and on to the rest of Lincoln and Cumberland.

Controller Art Sheridan configures and tests graphics and objects in Wonderware (Invensys Operations Management), in preparation for roll-out at a new area of the facility. (Photography by Kimberly Iemma)

"We enjoy a very positive reputation. Quite a few of the political figures in the state have made it a point to come down and see our facility."

Ray Marshall

Altogether the commission serves some 360,000 people, about one third of the state's population of 1.1 million, and covers about a fifth of the state's acreage — the urban and industrial portion, says Marshall. It controls about 110 miles of interceptor pipes and the associated control regulators. Some 1,200 or more miles of laterals owned by the communities the commission serves send sewage through the commission's pipes and to its treatment plants.

But about 40 percent of the area the commission serves uses combined sanitary/storm sewer systems, Marshall says. Historically, heavy storms brought significant sewage overflows as the pipes normally conveying effluent filled with rainwater.

Ray Marshall, executive director, Narragansett Bay Commission.

HOW THE TUNNEL WORKS

The Narragansett Bay Commission's 3.1-mile Deep Rock Tunnel slopes from 230 feet underground at the upstream end down to 280 feet at the downstream end. In dry weather, the tunnel sits empty. Control gates atop drop shafts that feed into the tunnel are set to open.

When it rains, the first half-inch or so of precipitation can mix with the effluent in the combined sewers without taxing the system. There it continues to the Field's Point Treatment Plant, where the average 45 mgd capacity can grow to as much as 77 mgd and still get full secondary treatment.

Phil Albert, the chief environmental engineer, explains that once the rain rises above half an inch, the water-laden sewage spills over weirs and flows into one of seven drop shafts — five are located on combined sewer lines, two on interceptors that connect to the treatment plant.

Now, the mixed sewage and stormwater flows into the Deep Rock Tunnel where it's held. Of course, the harder and faster it rains, the sooner that happens.

Those first gallons that go in are "far uglier, more polluted," notes commission executive director Ray Marshall. "What we're capturing in the tunnel is all the real nasty stuff."

When the tunnel reaches its 65-million-gallon capacity, says Albert, crews can measure its volume and use a wireless control to close all the entry gates. "The smallest ones close in about a minute, and the largest ones take about 10 minutes to close," says Albert.

If stormwater is still entering the collection system at that point, an overflow of stormwater mixed with sewage is inevitable. Even so, Marshall explains, because the proportion of rainwater in the effluent is much greater, the water that is allowed to overflow and discharge directly into waterways is far more diluted than those first gallons that entered the tunnel.

When the rain stops and the flow to the treatment plant drops below 65 mgd, crews turn on one set of pumps stationed 300 feet underground. The units pump out the stored stormwater and sewage from the tunnel at a rate of 12 mgd, sending it to the treatment plant for complete treatment. It takes a couple of days to fully empty the tunnel with one set of pumps. If the regular flow is low enough — 40 mgd or so — to allow a second set of pumps to be used, the tunnel can be emptied more quickly.

"Everything is computer monitored, even the remote locations where the gates are located for the tunnel," Marshall says. Treatment plant operators are able to control everything from their location.

Emptying the tunnel can be tricky when there is a succession of heavy rains that make it difficult to get out all the backlogged liquid, Marshall says. Fortunately, he adds, "there haven't been too many of those."

Laborer Francisco Arruda uses the Wacker Neuson vibratory trench roller to compact soil.

When the rain stops and the flow to the treatment plant drops below 65 mgd, crews turn on one set of pumps stationed 300 feet underground to pump out the stored stormwater and sewage from the tunnel at a rate of 12 mgd, sending it to the treatment plant for complete treatment (US Motors pumps, Siemens Water Technologies).

Laborer Francisco Arruda, foreman Antonio Duarte and equipment operator Richard Molis Jr. dig a trench to install storm sewers as a part of Phase 2 of the CSO project.

Those overflows regularly put the commission in violation of the federal Clean Water Act, and in recent years, Marshall notes, "the bar keeps getting raised higher and higher" as regulations become more stringent.

Shellfishing impact

Sewer overflows hold a special hazard for Narragansett Bay. The bay is a prime site for shellfishermen targeting hard-shell quahog and soft-shell steamer clams. Shellfishing is both a commercial industry and a pastime for local residents and tourists. After every overflow, however, fishing must be shut down until sampling tests establish that the water in the bay is clean again. That's been as long as seven days at a stretch, says Marshall.

In the early 1990s, the commission agreed with the Rhode Island Department of Environmental Management to develop a comprehensive abatement plan for overflows. Separating all of the combined sewers — "the deepest pipe in any street" — would have created huge disruptions, especially in commercial districts, and so was ruled out. Instead, the agency planned to build a series of underground storage tanks and tunnels.

That plan evolved over subsequent years in response to changing federal rules, and in 1997, the commission narrowed a list of more than 16 options to three, presenting them to a stakeholders advisory group representing utility ratepayers, business owners, environmentalists, shellfishermen and the general public.

Besides the original plan, the advisors also considered a plan to build 19 smaller satellite treatment plants at overflow sites to intercept and immediately treat effluent that would otherwise be dumped in the lake. "That never won widespread support," Marshall says; the additional plants would have required additional personnel — and no one wanted them built in their neighborhoods.

Three-phase project

The advisors favored a different alternative: constructing six miles of underground storage tunnels to serve as holding tanks for water that rapidly accumulates during storms, along with several other related projects.

"The Deep Rock Tunnel is the centerpiece of an entire three-phase program," Marshall says.

Phase 1 of the Combined Sewer Overflow Abatement Plan includes the first tunnel, which serves the Field's Point district, and related projects. Begun in 2001, the $350 million initial phase was completed and its components put into use in 2008. Phase 2, priced at $245 million, is now beginning. According to Bay Commission chief environmental engineer Phil Albert, this phase consists of another dozen contractors building long interceptor lines to connect overflow points with the tunnel. It also includes creation of a wetlands treatment system to treat overflow after screening and settling of effluent in one area, Marshall says, along with 12 sewer-separation projects in the City of Providence.

Phase 3 will be to build a second deep rock tunnel in the Bucklin Point district about the same size as the Field Point district tunnel.

"The whole thing should be done by 2021," says Marshall.

The cost of the project is being financed through the Rhode Island Clean Water Finance Agency, which allows for a 33 percent discount on interest rates. Debt service costs are applied to ratepayers' bills.

Concrete results

Since they came online in 2008, the first tunnel and other abatement measures have captured 3.5 billion gallons of sewer overflow. Of that, 90 percent has received full secondary treatment, and 10 percent has been

treated in the commission's wet-weather facilities — a treatment plant within the treatment plant — where it gets primary treatment plus chlorination.

"We've treated an extra 100 million gallons of flow per month since that tunnel has been online," Marshall says.

Once the entire project is completed in the next decade, the commission expects the number of overflows to drop to four per year from about 30 per year before any of the work began. But already results are showing.

Before the abatement project, Marshall says, those 30 "rain events" per year led authorities to shut down shellfishing beds in the southern portion of the bay for as many as 200 days — more than half the year.

Now, closures of the shellfish beds have dropped to fewer than 10 over the two-year period of 2009-2010. And instead of lasting seven days at a time, the commission's sampling has found the water to be clean enough after as few as four or five days. That has allowed the beds to be reopened sooner. In fact, the findings have led the state environmental and health departments to revise the criteria for halting shellfishing.

"Historically, once half an inch of rain falls they assume there have been overflows," Marshall explains. The state would automatically order a 5,500-acre shellfish bed area closed. After another half-inch of rain — meaning an inch total — the state would shut down a second 4,500-acre area. Now the standard for when to shut down the beds has risen: the first area isn't shut until there have been eight-tenths of an inch, and the second not until there's been a total of 1.5 inches.

In the upper part of Narragansett Bay, the number of pollution-related beach closings was down 36 percent in 2010 (the most recent year available) compared with four years earlier, and the number of days lost to closures was down by 73 percent. The beach closest to a commission treatment plant — Conimicut Beach — was closed just eight days in 2010, compared with 45 days in 2006.

"The tunnel and the combined sewer overflow facilities overall are doing their job, and we're able to document that by the water-quality monitoring that's being done and by the results that we're seeing," Marshall says.

Monitoring and maintenance

Additional elements of the commission's effort include monitoring and preventive maintenance, with commission employees handling general maintenance and outside contractors filling in on specialty tasks such as video inspections and cleanings. Meg Goulet, who manages the maintenance program for the agency, notes that some of the lines are a century old.

Working from a comprehensive set of inspection and maintenance data, Goulet and her staff are ranking the conditions of the entire network, scheduling maintenance and other projects, including lining sewers, reconfiguring manholes, and dig-and-replace repairs where necessary.

A regular program of monitoring water quality is overseen by Tom Uva, director of Planning, Policy, and Regulation for the Bay Commission. That includes sampling rivers upstream and downstream of combined sewer overflow points to see if blockages are creating overflows in dry weather. It also includes weekly trips around the bay itself in a 23-foot boat that samples water and conducts surface mapping. A pair of stationary water-quality sensors continually check for temperature, salinity, dissolved oxygen, pH, chlorophyll and water clarity as well. And when extreme weather hits, "we're out there monitoring it," Uva says.

> **"The monitoring program like this really protects your ratepayers."**
>
> **Tom Uva**

Good business and goodwill

Besides simply being the right and necessary thing to ensure that treatment and collection systems are operating at peak efficiency, there's self-interest in monitoring, Uva notes. With federal and state regulators requiring treatment operators to reduce nitrogen loadings

Phil Albert, tunnel operation expert and chief environmental engineer, inspects rock core boring samples of sandstone, siltstone, shale, conglomerate and graphite from the next phase of the project. Samples come from the CSO Phase 2 interceptor route along the Woonasquatucket River in Providence.

in discharge, it's important to get data that shows whether the treatment operation is actually the nitrogen source — or if it's coming from elsewhere.

"The monitoring program like this really protects your ratepayers," Uva says.

Altogether, the commission's laboratory analyzes 110,000 samples per year, including 26,000 directly collected by the monitoring program. Urban rivers are sampled twice weekly for bacteria, for example.

Efforts like these have drawn industry recognition. Phase 1 of the CSO abatement project was awarded Project of the Year by the Underground Construction Association for 2009. Both the CSO abatement project and the water monitoring program were cited when the National Association of Clean Water Agencies gave the Bay Commission its Excellence in Management Recognition award in 2011 — the third time in 10 years the agency has received the designation.

Support remains strong close to home as well, Marshall says. "I think the stakeholders group that we had back in the mid- to late-90s is the reason why," he says. "We let people take part — it wasn't run by a bunch of engineers. People felt like they had some say."

Well on its way to its goal of sharply reducing overflows, the Narragansett Bay Commission seems likely to maintain that goodwill — and keep earning kudos as well. ✦

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www.wonderware.com

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SmartCover monitoring and alarm systems detect potential spills in locations such as known trouble spots on the collection system and pipes in difficult-to-access easement areas. (Photos and graphics courtesy of Leucadia Wastewater District)

BETTER MOUSETRAPS

PRODUCT:
SmartCover monitoring and alarm system

APPLICATION:
Web-based remote sensing with alarm function

USER:
Leucadia Wastewater District, Carlsbad, Calif.

SUPPLIER:
Hadronex, Inc.
760/291-1980
www.mysmartcover.com

BENEFITS:
Spill prevention in sewer trouble spots, fewer easement inspections, capacity assurance

EYES ON FLOW

SmartCover monitors provide real-time alerts to potential overflows for Leucadia Wastewater District

By Leo Schempp and Jeff Stecker

The devices, attached below manhole covers, continuously monitor water levels in the sewers and provide user-defined alarm notifications to impending overflow events and to intrusions by unauthorized parties.

The general public and regulatory agencies have grown more sensitive to sanitary sewer spills. In states like California, where sewer system management plans (SSMPs) have become the rule and third-party lawsuits have become more common, spill frequency and volume have been measurably reduced.

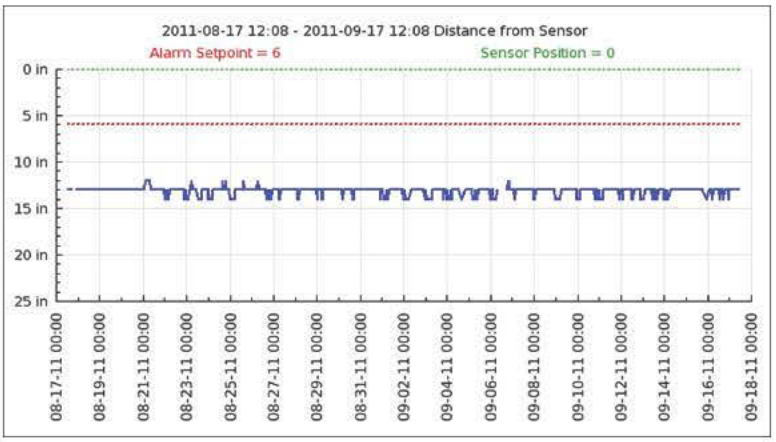
The reasons include enhanced maintenance, spill-response training, and greater general awareness of the problem among wastewater agencies. Some agencies, including the Leucadia Wastewater District in Carlsbad, Calif., have gone further, adopting formal operation and maintenance programs, publishing design and performance provisions, updating overflow response plans, and developing capacity assurance plans that include monitoring and measurements — elements specified by the U.S. EPA's proposed Capacity, Management, Operations, and Maintenance (CMOM) program.

Leucadia's efforts also include use of technology, including SmartCover monitoring and alarm systems that detect potential spills in locations such as known trouble spots on the collection system and pipes in difficult-to-access easement areas. The devices are helping the district prevent spills, reduce easement inspection frequency and document sewer performance history.

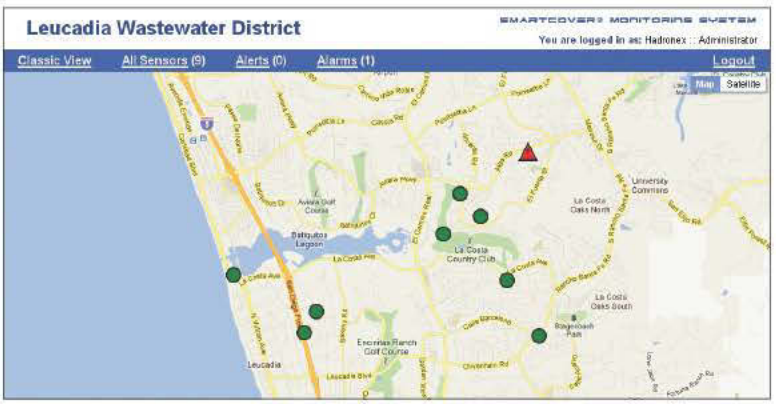
Easy problems first

Like most agencies implementing new SSMPs, Leucadia addressed the easiest sewer problems first, leaving more challenging and costly work ahead. To sustain its Internet-accessible compliance record, the district also conducted an external audit of its performance and adherence to the SSMP to identify areas for improvement.

That effort revealed two areas of concern: Trouble spots (especially where overflows had occurred) and off-road easement areas difficult to access because of canyon



This chart shows the sewage level in the manhole that is monitored by a SmartCover unit for a 30-day period. The graphical pattern (in blue) shows the normal diurnal flow pattern while the dotted red line above is the alarm setpoint that the Leucadia Wastewater District established to alert its standby duty operator. A "high level" alarm would indicate a sewer stoppage and allow the operator to respond and correct this "abnormally high sewage level" before it resulted in a sewer spill or flooded residence.



A map shows where 10 SmartCover sensors are located. One sensor shows an alarm, which could mean a potential spill in a trouble spot.

topography, protected biological resources and floodplains. Furthermore, large-diameter pipes, surcharge flows and long distances between access points affect the district's ability to clean and inspect parts of the collection system.

The district deploys easement inspectors to monitor assets in remote areas.

The inspections mean sending an employee (or a team of employees using the buddy system) into canyons and other unpaved areas to locate manholes, inspect the manholes for deterioration or vandalism, and observe the flow for short periods.

However, these inspections involve hazards that include encounters with snakes, poison ivy and wild animals, along with the chance of injury during foot travel on rough terrain. Thus there were risks to offset the benefits of putting eyes on a given manhole for five minutes per year or per quarter.

Automating inspections

In seeking an alternative to labor-intensive inspections and a way to monitor trouble spots more closely, the district installed SmartCover monitoring and alarm systems from Hadronex. The devices, attached below manhole covers, continuously monitor water levels in the sewers and provide user-defined alarm notifications to impending overflow events and to intrusions by unauthorized parties.

The battery-operated units

Field service technician Maurico Avalos, left, and field service supervisor Marvin Gonzalez install a SmartCover monitor from Hadronex.

install in a few minutes. Batteries typically last one year. The devices provide two-way wireless communication, allowing the district to interrogate them from anywhere. Data is downloadable for insertion into spreadsheets. Alarms are sent directly to specified district personnel for timely response.

The devices can be easily maintained or traded out by inspection personnel. Thus they provide continuous real-time information for the same level of effort as periodic inspections. Additionally, data from the monitors has given the district an improved picture of sewer lines' capacity and dynamic performance over longer periods than previously available.

Analysis of the data has allowed the district to target capital improvements more effectively and gain the benefit of each asset's full useful life. Managers and regulators also appreciate the more detailed data available during spill investigations.

Finally, the alarm function demonstrates the district's commitment to proactive spill prevention and limits risk exposure in less-traveled and more environmentally sensitive service areas. By installing several SmartCover units and adding more each year, the district has achieved efficiencies in easement inspection. ✦

About the Authors

Leo Schempp is former field services manager and Jeff Stecker is field services superintendent with Leucadia Wastewater District, based in Carlsbad, Calif. Both hold California Water Environment Association Collection System Operator IV certification.

A QUICK QSTART

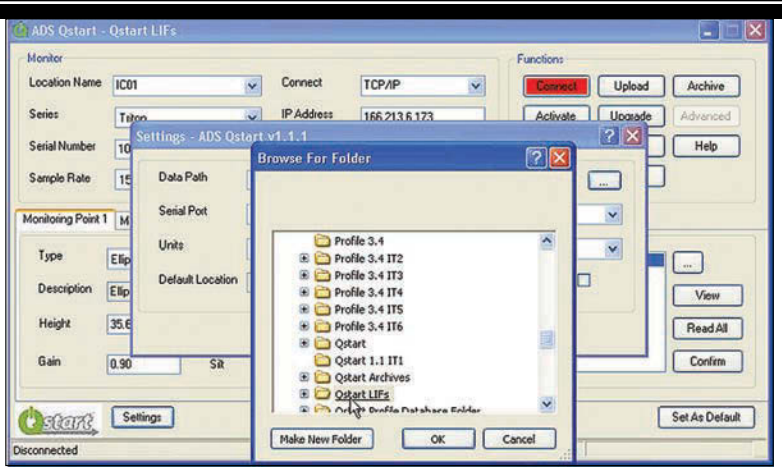


FIGURE 1. When first starting Qstart, the application must be associated with data about the individual monitors with which it will be used. That information will be in appropriate folders on the computer. (Graphics courtesy of ADS)

ADS Environmental Services offers new software to simplify the setup and activation of its flow monitors

By Erik Gunn

Flow monitors are critical tools for overseeing both sewer collection and water distribution systems, and successful interaction requires software that is reliable and easy to use. ADS Environmental Services in Huntsville, Ala., an IDEX water and wastewater business, is offering Qstart, a new software package for setting up and activating the company's FlowShark Triton, FlowAlert, and RainAlert II flow monitoring systems.

Lynne Reynolds, quality control and technical documentation manager for ADS Environmental, says Qstart was designed to be easily accessible to new users and thereby add value to the company's flow monitor product line. Qstart is downloadable for free from the ADS Environmental Services website. Reynolds hosted a demonstration of the system over the Web.

Walk-around

Qstart has a standard Windows-style interface with various screens, buttons and drop-down menus to make its features work. It includes screens for setting up and configuring a utility's flow monitors as well as for viewing data returned from monitors in both graph and table form. An extensive help file included in the installation provides answers to a wide range of user questions.

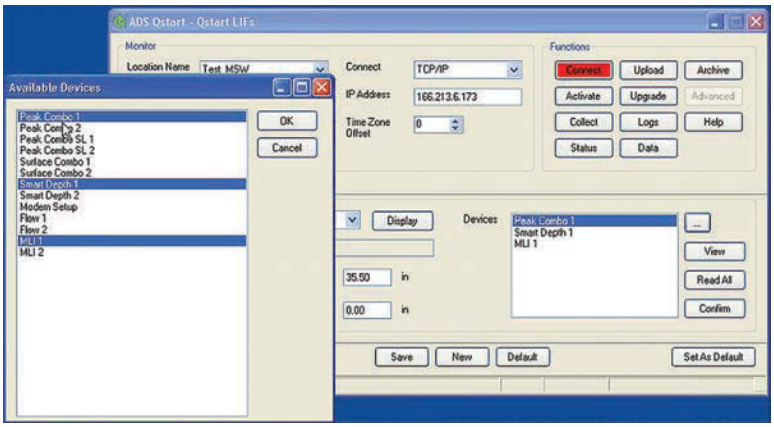


FIGURE 2. When configuring a monitor, the user must select the device that will be attached to the flow monitor.

Operation

Using information from an actual sewer flow monitoring site in Huntsville, where she was speaking from and where ADS is based, Reynolds began by showing how a monitor would typically be activated with the Qstart software. She double-clicked a Qstart icon in the lower left-hand corner of her computer screen, launching the program. Qstart's first screen includes two panels in the upper half and a single panel in the lower half. To the left, below the lower panel, is a Settings button.

Reynolds clicked on the Settings button to show how the software can be configured for a monitor. For a user setting up the software, the first action is creating a data-path for the information on each flow monitor. The data is stored in Location Folders containing Location Information Files (LIFs). Reynolds clicked on Settings, which opened a Windows Explorer window showing a number of folders related to Qstart and other flow monitor software applications.

In many instances, Reynolds said, users might install Qstart after already having installed and operated ADS flow monitors with the company's earlier and more complex software, called Profile. Data created in a Profile installation can be used directly by Qstart, she said.

Reynolds browsed to a folder

TECHNOLOGY TEST DRIVE

EQUIPMENT:
Qstart flow monitor activation software

MANUFACTURER:
ADS Environmental Services
800/633-7246
www.adsenv.com

LOCATION OF DEMO:
Via the Web, from ADS offices in Huntsville, Ala.

DEMONSTRATED BY:
Lynne Reynolds, ADS Environmental Services, Quality Control and Technical Documentation Manager

LIST PRICE AS DEMONSTRATED:
Downloadable for free from www.adsenv.com/qstart

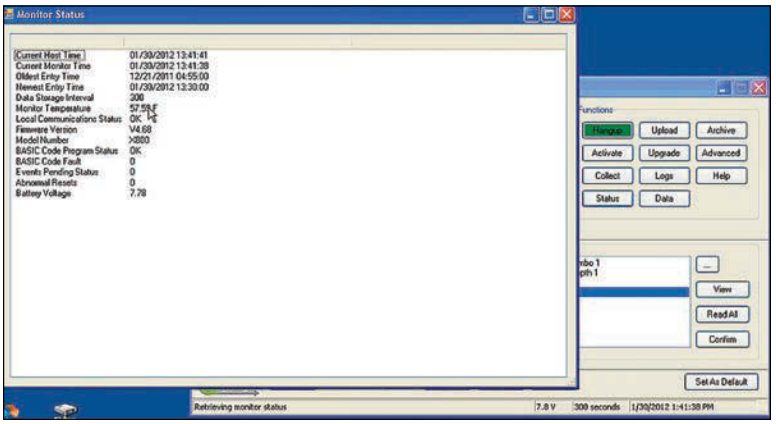


FIGURE 3. Clicking on the Status button in Qstart allows the user to see how much data, and from when, is already in the monitor's memory.

called "Qstart LIFs" and clicked on it, thereby associating the program with the individual monitors whose information was contained in that folder (FIGURE 1).

She then proceeded through the rest of the Qstart activation. The required steps include defining communication ports on the machine hosting the program. This facilitates both serial and landline communications with the flow monitors.

The system allows users to choose if they want data delivered in U.S. units or metric units. It also allows users to choose whether to save data in an ADS proprietary format, in comma-separated value (CSV) files that can be imported to a spreadsheet, or both. Reynolds chose "both," but users who don't plan to acquire the Profile software can opt for data to be saved just in CSV files, she said.

For a new monitor to associate with the software, the user selects the model name and details of the ADS flow monitor to be used from a drop-down menu. Additional selections are made for the frequency with which the monitor takes readings, such as every 2, 5, or 15 minutes, and information is logged on the shape and size of the pipe where the monitor is installed.

Reynolds selected FlowShark Triton and entered the unit's serial number in a designated field. She selected a 5-minute frequency for the monitor to test, and because it was going to have a wireless Internet connection to the monitor, entered an IP address for the unit.

When selecting the pipe size, the application defaults to 24-inch pipe. Reynolds selected 36-inch pipe for the monitor being associated. In addition, because the pipe has been in use for a long time, she made adjustments in the software to reflect the pipe's slight change in diameter: 35.625 inches high and 35.5 inches wide. That information is normally taken by a field crew when the monitor is installed or inspected at the site.

"We recommend that you take both a height and a width measurement of your pipe," she said.

After setting other parameters for the pipe where the flow monitor was installed, Reynolds further configured the software for the specific monitor's multiple sensors (FIGURE 2). For this monitor, Reynolds selected a Peak Combo sensor, which includes ultrasonic, velocity, pressure and temperature sensors.

She also selected an appropriate flow device as part of the configuration. The flow device enables the monitor to calculate the quantity of flow, which Qstart cannot do on its own. Because she was selecting multiple devices at this stage, Reynolds held down the computer's Control key and used the mouse to click on each device she was choosing.

Clicking on the View button for each sensor, Reynolds confirmed that each was set to the appropriate parameters. As she selected a device and clicked on View, a new screen opened showing that device's various parameters.

Because the sensor in question was offset from the bottom of the pipe by one inch when it was installed, Reynolds entered that information in an appropriate field in the application. She made no other changes to the sensors' parameters. She typically recommends retaining the default settings at first, changing them only if abnormalities in the data indicate the need for doing so.

Reynolds proceeded in the same way to configure additional sensors that were part of the monitor being activated.

Once configured, Reynolds clicked on an Activate button on the software to activate the flow monitor, and the software connected wirelessly to the monitor.

When Reynolds had originally entered the unit's serial number in the software, she made a typographical error. Now as the software connected to the actual monitor, it detected the discrepancy and gave her an opportunity to choose which number — the one reported by the monitor or the one she had entered — was correct. Realizing her error, Reynolds instructed the software to change the number she had entered to the one that was already associated with the actual monitor.

The software then uploaded its configuration information to the monitor itself. Since the monitor had already been in service, Reynolds was able to click one button and see the volume and age of data already in the monitor's memory (FIGURE 3).

She then clicked on the View button, which allowed a check of the data from each of the sensor devices in sequence. For the Peak Combo sensor array, it showed a schematic of the pipe where the monitor was located (FIGURE 4).

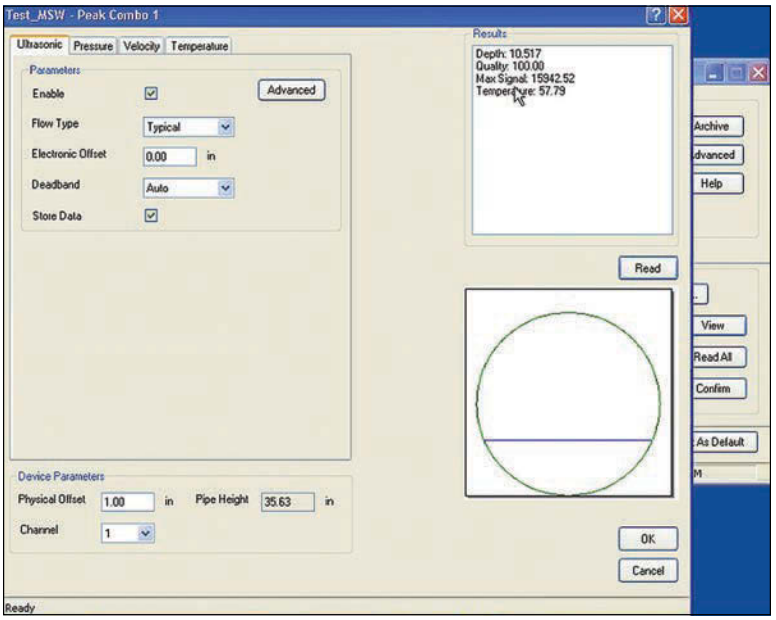


FIGURE 4. Clicking on the View button allows the user to check data from each of a flow monitor's sensor devices in sequence. Here, the check includes a schematic image of the pipe where the monitor is located, including the depth of liquid in the pipe.

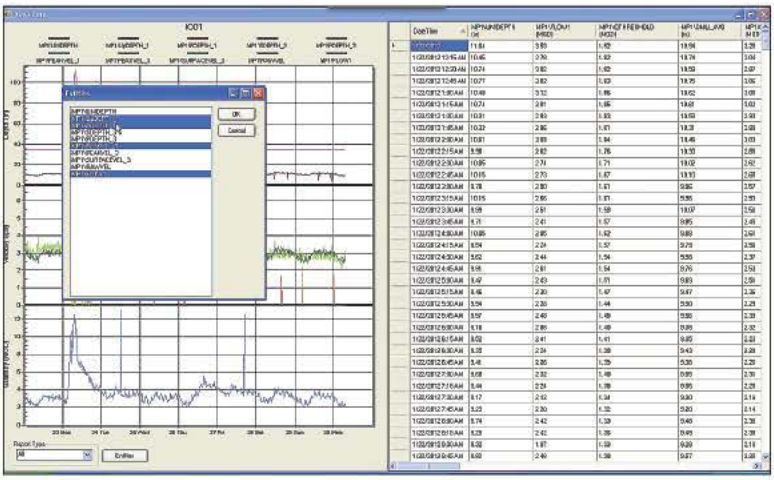


FIGURE 5. Selecting the Data button shows in graphical form data on several different variables from the flow being monitored. The information is also visible in tabular form.

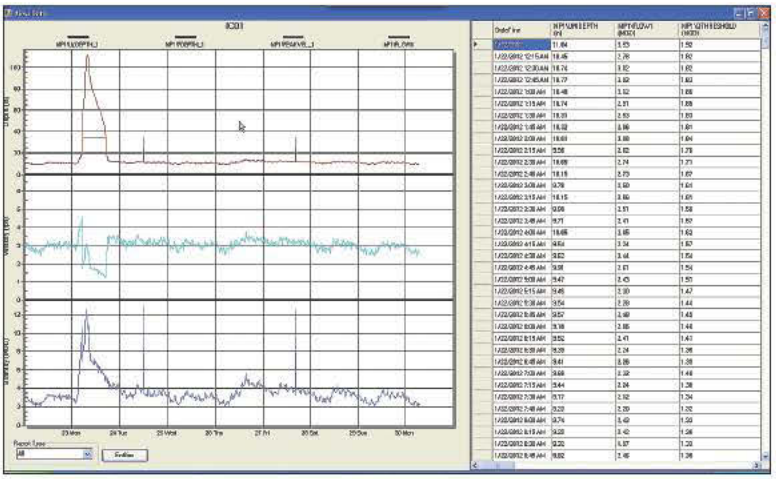


FIGURE 6. The user can select a limited number of variables and limit the graphs to showing those only, making them easier to interpret.

For a history in graphical form of the flow monitor's readings, Reynolds clicked on a button labeled Data. The first view (FIGURE 5) showed several different variables from the flow being monitored. The information was also visible in tabular as well as graph form.

Reynolds selected a limited number of monitor variables to show so that it was easier to interpret the graph results (FIGURE 6); the change had no effect on the tabular view, however, which continued to make all the data visible.

In the graphs, the effects of a major rain on Jan. 23, eight days before the demonstration, was immediately visible.

Manufacturer's comments

Typically, software makers develop new versions and products that are more complex than their predecessor applications: loaded with more features and taking up a bigger and bigger footprint on the computer. In that way, Qstart represents a refreshing change of pace — trimming down the product so that it is easier to use rather than more complex.

> **"This was developed in response to the voice of the customer surveys that we did to come up with a program that enables a user to configure and activate a monitor in less than five minutes."**
>
> **Lynne Reynolds**

"This particular pipe was a 36-inch pipe, but you can see the flow depth got all the way over 100 inches," she said.

The tabular data also can be sorted in a variety of ways.

Observer's comments

The software interface is clean and easy to understand. Its labels and menus are intuitive and appear quick to learn. Various built-in features that correct errors (such as the serial number error Reynolds encountered) are likely to be very helpful.

As demonstrated, Qstart responded quickly to commands and did not appear to put a significant drain on computer memory.

"In the past, we've had a very full-featured software product that activated and configured and collected and then analyzed the data," Reynolds noted. "But for a new user who's not really familiar with our flow monitors, it had a steeper learning curve.

"So this was developed in response to the voice of the customer surveys that we did to come up with a program that enables a user to configure and activate a monitor in less than five minutes. And once you know what you're doing, it's about a two-minute process." ✦

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We invite readers to offer ideas for this regular column, designed to help municipal and utility managers deal with day-to-day people issues like motivation, team building, recognition and interpersonal relationships. Feel free to share your secrets for building and maintaining a cohesive, productive team. Or ask a question about a specific issue on which you would like advice. Call editor Luke Laggis at 800/257-7222, or email editor@mswmag.com.

WHAT'S WRONG WITH SELLING?

People in water-related professions should feel free to stand up in public and advocate for projects and programs they believe in

By Ted J. Rulseh

My first clean-water-related job was with a metro agency looking to win public acceptance for its biosolids land application program, which had run into opposition in some outlying communities where farmers were using the material.

When the agency embarked on a public participation program to get citizen's feedback and suggestions on the program, the local newspaper responded with an editorial cartoon showing a sewer pipe labeled as the agency's "public relations campaign," dumping black goo on a hapless man labeled "taxpayers." The caption read: "The sweet smell of boondoggle."

The accompanying editorial went on about how the agency shouldn't be spending tax money to "polish its image." First of all, that's not what the public participation program did. And second, what's inherently wrong with a public agency going out to the public it serves and telling its story?

I often hear the argument that it's wrong for public entities to engage in "public relations" and "marketing" — that when discussing their projects and initiatives, it should be "just the facts." Don't be an advocate. Just lay out the data and let the public decide. To that I somewhat impolitely say, "Baloney."

Need to believe

Consider a school district putting forth a referendum to build a new school. To hear certain radio talk show hosts tell it, the only "fact" that matters is that the school board is trying to raise people's taxes. What about the benefits of the new building? Like replacing an antiquated school with one that is wired for technology, more energy efficient, cleaner, better lit, more comfortable, and more conducive to learning?

What is wrong with the school board, administration and staff advocating what they believe is best for the institution they are sworn to serve? Doing so is in fact part of their jobs, or ought to be.

Now, should they hide information? Sugar-coat inconvenient facts? Mislead? Of course not. But they should be free to make the case that the building project is needed, based on the information at hand. The public then has the right to disagree, and say no — that's democracy. But the public officials should feel no obligation to be passive, or neutral, about what they propose. How is it any different for water, wastewater and stormwater agencies?

True advocates

And that brings us to a couple of recent *MSW* articles about municipal leaders who did not shy away from marketing. A story in the March issue told how Brant Keller, Public Works and Utilities director in Griffin, Ga., built partnerships in the community to win approval for a stormwater utility with authority to raise funds and correct rampant stormwater problems.

At first, residents and businesses opposed the utility, mainly because it was another municipal agency that would levy a fee. Keller and his allies got the utility implemented by methodically and boldly making the case.

Keller even hired (horror of horrors!) a media relations firm to help market the stormwater utility concept. He also went door-to-door in his community of 23,500 to explain the need for the utility and urge residents and businesses to support it. Should he hang his head in guilt and shame for his deeds? No, no, a thousand times no.

Then there was the City of Guelph, Ont., also profiled in a March article. The city had a limited time to complete a vast array of infrastructure projects under a deadline for federal government stimulus funding. An aggressive communications campaign helped explain to residents why it would be worthwhile to endure the many traffic and other disruptions that would result from doing so much work in such a short span.

Time to speak up

Now is exactly the wrong time to be timid about supporting clean-water projects and infrastructure. Public investment is on the chopping block like never before. If the people in the water professions don't speak up for the facilities that keep our rivers and lakes clean and our properties free from flooding, then exactly who will?

Now is exactly the wrong time to be timid about supporting clean-water projects and infrastructure. Public investment is on the chopping block like never before. If the people in the water professions don't speak up for the facilities that keep our rivers and lakes clean and our properties free from flooding, then exactly who will?

As another public agency spokesperson explained about her outreach program: "Wastewater is not exciting, except maybe to us. But it's critical to our community, and we're our only cheerleaders." So must everyone in the industry be.

With megaphone and pompoms? Likely not. But with conviction, energy, and unrestrained enthusiasm? Yes, yes, a thousand times yes. ✦

SETTING A STANDARD

Local influence promotes global benefits for sewer professionals

By Ted DeBoda, P.E.

As the president of the Chesapeake Water Environment Association (CWEA) and a former chair of the Collection System Committee, I have seen these organizations take on the responsibility of providing necessary training to local collection system operators and engineers. For several years, the National Association of Sewer Service Companies (NASSCO) has been providing training programs for the Pipeline Assessment and Certification Program (PACP) that these member associations — part of the Water Environment Federation (WEF) — can use to introduce professionals to pipeline assessment. My goal is to help provide even more training and coordination with these important associations throughout the U.S. and Canada.

This past year, the Infiltration Control Grouting Association (ICGA), a division of NASSCO, developed a standard specification for the use of chemical grout in sanitary sewers, laterals and manholes. The specification, originally drafted by environmental consulting firm Malcolm Pirnie, was reviewed and revised by many dedicated ICGA members. It was also peer reviewed by professionals from the Water Environment Associations of New England, Florida, Kentucky-Tennessee, Virginia, Chesapeake and California. The peer reviews were critical to the development of a quality chemical grouting specification.

The ICGA also developed a white paper to educate utility operators on the appropriate use of chemical grouting in sanitary sewers. This document, titled *The Role of Chemical Grouting in Wastewater Systems,* will be translated into a training program that can be used by chemical grouting professionals to train operators and engineers throughout the country. The white paper can be found on the ICGA website: www.sewergrouting.com.

The International Pipe Bursting Association (IPBA), another division of NASSCO, recently published the *Guideline for Pipe Bursting.* This guideline is designed to assist owners, designers and contractors involved in pipeline replacement and/or rehabilitation projects to evaluate the capabilities of pipe bursting as an existing trenchless pipe replacement method.

Another training initiative is the development of *NASSCO's Introduction to Sewer Cleaning with Jetting Equipment,* a newly released 55-minute video that provides fundamental information about the safe and efficient use of sewer cleaning equipment. It also provides a basic overview of sewer jetting for beginners and can serve as a reminder of proper and effective practices for more experienced workers.

We are also developing documents and training materials that provide overviews of other rehabilitation and assessment technologies, including CIPP liner installation and inspection and lateral and manhole rehabilitation.

NASSCO would like to work more closely with local WEF member associations and other organizations such as local Rural Water Associations. Our goal is not only to assist with training, but to provide a two-way line of communication between NASSCO and local sewer professionals for feedback concerning programs like PACP and the Inspector Training Certification Program (ITCP), and also to learn how we can better serve the industry.

NASSCO has served the sewer industry for 36 years and continues to move forward with new and exciting initiatives. Over the past year, more than 100 organizations have joined NASSCO to help set industry standards for the assessment and rehabilitation of underground pipelines and assure the continued acceptance and growth of trenchless technologies. If you would like to get involved in the myriad of opportunities that NASSCO offers, please feel free to contact us and discuss how you can participate. ✦

Ted DeBoda is executive director of NASSCO. He can be reached at director@nassco.org. NASSCO is located at 11521 Cronridge Drive, Suite J, Owings Mills, MD 21117.

FLOW CONTROL/MONITORING, STORMWATER TREATMENT AND PRETREATMENT

By Briana Jones

Catch basin risers

Catch basin risers from **American Highway Products** eliminate debris falling into collection systems causing backups, reduce costs, and streamline the adjusting of utilities to the new grade when paving roads. Heights start at 3/4-inch rise and increase in 1/4-inch increments. Inclined risers are available. The type 1 and type 2 risers are easy to install, and will not break from installation forces or uneven manhole frames. Custom designs are available. **888/272-2397; www.ahp1.com.**

I&I barrier

The **I&I barrier** from **AP/M PERMAFORM** is designed to stop water from leaking into manholes through grade rings. The weather- and puncture-resistant unit is made of polyethylene, and forms an interior wall that stops water from infiltrating. Once installation is complete, there is no need for further adjustments. No adjustable bands are used to hold the unit in place. **800/662-6465; www.permaform.net.**

Battery-operated meter

The **M5000** mag meter from **Badger Meter** delivers flow measurement information for general-purpose detection. The battery-operated unit comes in a low-maintenance stand-alone package and is suitable for a wide range of utility and industrial applications. It can be used to measure well water, wastewater, reclaimed water and bidirectional flow applications that have minimal electrical conductivity. Built for field verification testing with the use of a simple handheld device, the meter can achieve an accuracy of ±0.5 percent and a flow range better than 300:1.

The meter combines a detector and an amplifier. The flow detector has no moving parts in the flow stream, which prevents pressure loss and keeps maintenance to a minimum. The amplifier can be integrally mounted to the detector, or it can be mounted remotely. Housed in a NEMA 4X (IP66) enclosure, the amplifier targets a variety of applications. **800/876-3837; www.badgermeter.com.**

Multiple-path flowmeter

The **Model 7720 Transit-Time** flowmeter from **Accusonic Technologies** addresses difficult installation requirements common to large UV disinfection systems. The maximum 10-path capability allows the unit to measure with accuracy and repeatability, even in the presence of distorted flow profiles. The pipe section length required for installation is less than for other flow measurement technologies, according to the manufacturer. Measurable pipe and channel sizes range from 8 inches to 600 feet. Using multiple-path, chordal, transit-time technology, accuracy is ±0.5 percent in full pipes and ±2.0 percent in partially full pipes and channels. **508/273-9600; www.accusonic.com.**

Leak correlator

LeakFinderRT from **Echologics** is a Windows-based acoustic leak noise correlator that pinpoints quiet narrow-band leaks on water and wastewater mains of all materials including ductile iron, pre-stressed concrete cylinder pipe (PCCP), plastic (PVC) and asbestos cement (AC). Its advanced hydrophones and enhanced correlation function improve municipalities' ability to accurately identify and locate narrow-band leak noise. The system is well designed for plastic pipes, multiple leak situations, and scenarios where there is a large amount of background noise or where leak sensors have to be closely spaced. **866/324-6564; www.echologics.com.**

Multiple velocity flowmeter

The **FlowShark Triton** flowmeter from **ADS Environmental Services** offers multiple velocity and depth measurements for accuracy in standard and challenging hydraulics. It is a fit-for-purpose monitoring device, with intrinsic safety as the standard. The unit offers simplified software with Qstart, which can be downloaded from the company website. It allows setup, activation and collection in a few minutes, and has viewing options that enhance data accessibility. The flowmeter sensors offer versatility, redundancy and multiple technologies for continuous running of comparisons and tolerances.

Options include the peak combo sensor with peak Doppler velocity, an uplooking ultrasonic depth, and pressure depth all-in-one housing for versatile, economical measurement across a wide range of hydraulics. The surface combo sensor includes surface velocity, downlooking quadredundant ultrasonic depth, pressure depth, and surcharge continuous wave velocity. An all-in-one housing stores the four technologies, allowing all measurements of depth and velocity to take place without the need to install a separate sensor. The quadredundant ultrasonic sensor is also available as an option. **800/633-7246; www.adsenv.com/triton.**

Chlorine dioxide analyzer

The **CDA-22** chlorine dioxide (ClO_2) analyzer from **Electro-Chemical Devices** includes a panel mounted plumb-and-play design and automatic flow control in a low-maintenance complete measurement system. The unit measures ClO_2 concentrations from 0.05 to 20 ppm. Easy to install and maintain, the analyzer incorporates a ClO_2 sensor, automated flow control device and analyzer/controller mounted on a PVC panel.

Installation is complete after connecting the sample and drain lines, power and outputs. It can run for up to one year between electrolyte/membrane changes. The unit features a polarographic gold/silver PTFE membrane amperometric ClO_2 sensor, which is flow-sensitive. Output is almost flow-independent at values greater than 0.5 ft/s. **800/729-1333; www.ecdi.com.**

Level measurement

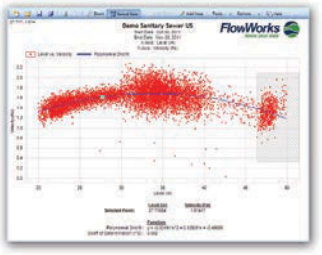
The **Prosonic S FDU90** ultrasonic level sensor from **Endress+Hauser** is designed for small measurement ranges up to 100 feet of liquid depth, and is used for measurements in open ponds, flumes, and sewer system weirs. The low profile and reduced blocking distance allows use in confined spaces. An optional submergence shield protects the sensor membrane from contamination and provides a reliable evaluation of flood events in conjunction with the unit's evaluation. A separate transmitter makes the sensor suitable for harsh environmental conditions. Setup can include an active flooding alarm. It is designed for level measurement at rain overflow basins. **888/363-7377; www.us.endress.com/level.**

Electromagnetic meter

The **WATERFLUX 3070** electromagnetic water meter from **KROHNE** offers a flow sensor construction with a rectangular, reduced cross section and efficient coil construction. The coils provide a strong homogeneous magnetic field, leading to an improved signal to noise ratio. The measurement is independent of the flow profile and measurements are very stable.

The mean flow velocity and flow profile are optimized within the rectangular and reduced cross section, reducing uncertainty for upstream disturbances. The meter can be installed directly after an elbow or reducer in the pipe without straight inlet or outlet lengths. A reduction of inlet and outlet sections means smaller measurement pits. The unit also offers low power consumption of the signal converter. **800/356-9464; www.krohne.com.**

Data management



FACE (FlowWorks Advanced Calculation Engine) from **FlowWorks** is a one-stop data management platform. The system offers real-time data analysis across multiple hardware platforms, and a complete suite of graphical editing QA/QC tools. FlowWorks collects data from all SCADA systems and from USGS and NOAA environmental stations.

FACE is a set of real-time data calculation tools, allowing users to create new data channels from incoming channels using advanced algebra, statistics and logic equations. The editing tools combine real-time data manipulation with an easy-to-use graphical interface. Analysts can highlight data directly on time-series or scatter graphs, or in tables, and then flip to a simple editing screen to make short work of common editing functions. **206/859-6999; www.flowworks.com.**

Velocity flowmeter

The **FH950** portable velocity flowmeter with electromagnetic sensor from **Hach** simplifies the velocity measurement process for stream discharge measurements, primary device calibration and sewer spot-check measurements. Step-by-step instructions guide the user through the flow profiling process, and field time is shortened with the ability to log velocity and entered depth information within the meter. Real-time discharge calculations are available, and collected flow data is downloaded to a computer via USB connection, eliminating post-site visit manual data transfer and calculations.

The electromagnetic sensor can be disconnected from the meter, has no moving parts and never requires mechanical maintenance or calibration. The meter is a direct replacement for USGS type mechanical meters. **800/368-2723; www.hachflow.com.**

Double clarification

The **BIOACTIFLO** system from **Kruger USA** combines contact stabilization and microsand ballasted clarification to produce high-quality treatment of wet-weather flows. Return activated sludge (RAS) from the existing clarifiers is combined with the excess flows into a solids contact tank. A targeted mixed liquor suspended solids (MLSS) concentration is maintained in

the contact tank to facilitate rapid uptake of soluble biological oxygen demand (BOD) via contact stabilization followed by ACTIFLO clarification.

The combination of the two results in total BOD removals in excess of 85 percent, 95 percent TSS removal and total phosphorus levels of less than 0.15 mg/L. Existing ACTIFLO installation for wet-weather flows can be converted to BIOACTIFLO and the ACTIFLO train can also be used for tertiary treatment during dry-weather flows. **919/677-8310; www.krugerusa.com.**

Submersible level transducers

TruBlue submersible level transducers from **Measurement Specialties** measure water level and quality. The transducer has an 8 MB internal memory and can store up to 55,000 level and temperature measurements. Its internal 3.6-volt lithium battery with onboard surge protection has a 5-year lifespan, based on four readings an hour. Sampling modes include linear, linear averaging and event, with programmable sampling rates of up to five per second. The transducer is available in full scale water level ranges from 0-11.5 to 0-658 feet (5-300 psi) and has an operating range of 32 to 122 degrees F. **800/328-3665; www.trubluemonitor.com.**

Full-profile flowmeter

The **FPI Mag** (full-profile insertion) flowmeter from **McCrometer** with hot tap installation is a scalable solution to measuring and monitoring variable runoff flows. The flowmeter installs without interrupting service, dewatering lines, cutting pipe or welding flanges. The unit is an economical flow metering solution for medium and large line sizes.

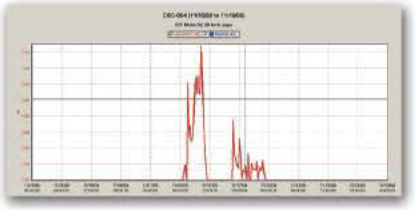
The meter is available for line sizes from 4 to 138 inches, and features accuracy of ±1 percent of reading ±0.03 ft/s zero stability from 0.3 to 20 ft/s velocity range. The flow sensor is pre-calibrated in the company's NIST traceable calibration lab and requires no field recalibration. Applications include wells, booster stations, filter balancing and backwash, pumping stations, UV dosing and potable water distribution. **800/220-2279; www.mccrometer.com.**

Portable sludge detector

The **Sludge Gun** from **Markland Specialty Engineering** is a portable sludge level detector used to find the sludge/sand interface in stormwater pretreatment systems. It can also be used in primary and secondary clarifiers, DAFs, settlement tanks and lagoons. Power intensity is adjustable for sludge densities ranging from light flocs to thick blankets. No calibration is required.

A spring-loaded trigger turns on the gun, and a thumb-adjustable sensitivity control compensates for thin or thick sludge. A tone is emitted as the optical probe enters the bed, varying in volume and pitch depending on concentration of solids. By observing the depth markers on the cable, the operator establishes the location of the sludge blanket and the overlying unsettled cloudy layer. After use, the cable is wound at the self-storing spool at the front of the gun. **905/873-7791; www.sludgecontrols.com.**

Monitoring software



Telogers Enterprise software and **Ru-33** remote telemetry unit from **Telog Instruments** offer a complete monitoring, data collection and reporting solution. The telemetry unit provides real-time monitoring and alarming of instruments and sensors, even in the harsh environments of sewers and underground water vaults. It forwards data wirelessly to a host computer over 1xRTT or GPRS networks, so no telephone lines are required. The Ru-33 can operate for six months to a year on a 6-volt lantern battery, eliminating hard-wired power sources.

Once the data reaches the host computer, Enterprise provides users with immediate access to the information for analysis and reporting. Real-time information and easy-to-use templates help users create reports. The software also aids in the use of modeling programs, helping municipalities predict CSO events and their potential hazards to adjacent waterways, beaches, and public or private lands. **585/742-3000; www.telog.com.** ✦

Sioux Corp. redesigns website

Sioux Corp., manufacturer of pressure washers, steam cleaners and steam generators, redesigned its website, www.sioux.com, adding videos, slide shows and related content.

East Jordan Iron Works consolidates under EJ brand

East Jordan Iron Works Inc., East Jordan, Mich., and its affiliated companies Norinco in France, Cavanagh in Ireland, McCoy Construction Castings in Canada and HaveStock in Australia have consolidated under the EJ brand. Products include cast manhole frames and covers, hinged assemblies, adjustment risers, drainage castings, grates and gate valves.

ISCO Industries founder dies

Jim Kirchdorfer Sr.

Jim Kirchdorfer Sr., founder and chairman of ISCO Industries, passed away Feb. 3. Kirchdorfer started the Louisville-based pipe supply and custom manufacturer of HDPE pipe company 50 years ago in his father's hardware store. The company now has 25 locations with 300 employees worldwide.

Goddard named TRB emeritus member

James Goddard, who retired as chief engineer from Advanced Drainage Systems, was named member emeritus of the Transportation Research Board committee on subsurface soil-structure interaction. ✦

Product Spotlight

Piercing tools offer trenchless option for small line repair

By Ed Wodalski

Big Shot pneumatic piercing tools from Footage Tools Inc.

Big Shot pneumatic piercing tools from Footage Tools Inc. are made for water, gas and cable installations. Available in 2-, 2.5-, 3- and 4-inch diameters (models U215, U262, U300 and U400) with a full complement of accessories, the tools are CNC machined to exact dimensional tolerances from a solid billet of nickel chromoly steel and fully heat treated for superior strength and durability. Weighing from 23 to 108 pounds, the tools range from 35 to 59 inches in length.

"The Big Shot typically runs off an air compressor," says Dan Ferguson, Footage Tools president. "There's a piston that runs inside the barrel of the tools; it's the inertia of the piston striking the nose of the tool that moves it forward in the ground. What you're doing is displacing the earth as you move along. In an ideal situation, you have a nicely formed, compact hole left behind where you can pull your cable, water service or gas line through."

The tools can be run by a portable compressor. The 2-inch model requires 25 cfm at 80-100 psi, while the 4-inch model requires 75 cfm at 90-110 psi. Ferguson says the pneumatic tools offer an economical alternative to pipe bursting and other trenchless methods when replacing 30- to 60-foot-long service lines, two inches in diameter and smaller.

The tools' pistons are designed to withstand high-impact conditions and are treated with an anti-corrosive coating. Features include an easily replaceable cartridge-style shock absorber and a flexible air tube assembly to minimize internal deflection.

"They're lightweight and require a fairly small entrance and exit pit (4 to 6 feet, depending on tool length)," Ferguson says. Expander heads (4.5-inch diameter for the 3-inch U300 model and 5.5-inch diameter for the 4-inch U400) are available for bursting clay tile pipe and pulling in new lines. Other accessories include a cutting head for the U300 model, pipe puller extension, tailpipe pulling cable and tailpiece wrench.

Ferguson says the tools require minimal maintenance.

"The biggest nemesis of piercing tools is corrosion," he says. "Because of the water molecules in the compressed air that enters the tool, it's important that the tool is well lubricated. We treat our pistons with a phosphate coating to help minimize corrosion that can happen inside the barrel. If you keep the tool well lubricated and stored properly there generally isn't a problem." **888/737-3668; www.footagetools.com.**

Fluid Metering valveless pump

The low volume, valveless metering pump from Fluid Metering Inc. is made for the precise dispensing of air sensitive, crystal forming fluids. The H Series pump heads are available with an isolation gland to provide a fluid barrier between the pumped process fluid and atmosphere. **800/223-3388; www.fmipump.com.**

Omega event data logger

The OM-CP-Event101A event data logger from Omega interfaces to tipping bucket rain gauges and other devices with TTL pulse or contact closure output. Features include 10-year battery, 4 Hz reading rate, multiple start/stop function, high-speed download, 406,323 reading storage capacity, optional memory wrap, battery life indicator and optional password protection. **800/826-6342; www.omega.com.**

Scantek clamp-on ultrasonic flowmeters

Keiki UFP-20 clamp-on ultrasonic flowmeters from Scantek Inc. feature two pairs of transducers on the outside of pipes. The meter can measure heat energy at two different systems or two different circuits in a system at the same time. By using three different types of transducers (small, medium, large), the meter can measure pipe diameters from 13 mm to 5,000 mm. The main unit's inner memory can provide long-term storage of instantaneous flow rates and totalized data in digital form, which can be transferred to a PC through USM memory under CSV format and modified for statistical analysis. **410/290-7726; www.scantekinc.com.**

Universal Flow Monitors vortex shedding flowmeters

Coolpoint vortex shedding flowmeters from Universal Flow Monitors Inc. have no

moving parts, eliminating the potential for clogging and feature Intrinsic Safety on 1/4-, 3/8-, 1/2-, 3/4-, 1-, 1 1/2- and 2-inch meters. The 4-20 mA three-wire transmitter features brass body with Viton seals and PVDF sensors. Available in pipe sizes from 1/4 to 4 inches, the meters have a 10:1 turndown ratio and three-digit LED readout, selectable alarm state (N.O. or N.C.) set point or pulse output and choice of gpm or lpm. **248/542-9635; www.flowmeters.com.**

RIDGID manual hydraulic benders

Manual hydraulic benders from RIDGID are designed for precise cold bending of standard gas pipe (DIN 2440), black steel Schedule 40 (ASTM A53) and stainless steel Schedule 40 pipe. Bending shows in real time the angle the pipe is bent, reducing the number of starts, stops and pipe removals to take measurements. Durable piston seals prevent premature leaks and maximize uptime. User fatigue is minimized due to handle design, which minimizes the number of strokes to advance the piston. Benders are available in two models: 3/8- to 2-inch capacity (Model HB382) and 3/8- to 3-inch capacity (Model HB383). **800/769-7743; www.ridgid.com.**

General Speedrooter 92 drain cleaner

The Speedrooter 92 drain cleaning machine from General Pipe Cleaners features the Flexitube spring distributor tube that allows cable to feed and retract more smoothly for enhanced machine durability, even if the frame has been damaged. A cord and foot pedal wrap on the handle makes it easier to store. Made to feed and retract 3/4-, 5/8- and 1/2-inch cable, both large and small drums have a see-through inner cage to determine how much cable remains. Other features include a braced frame, heavy-duty 1/2 hp motor and Flexicore cable. **800/245-6200; www.drainbrain.com.**

Subsurface Supply industrial vacuum system

The IVAC PV500 sand, sump, rock, slurry and water handling industrial vacuum system from Subsurface Supply Inc. is capable of moving materials in industrial and environmental cleanups. The skid-mounted unit weighs 1,800 pounds, is 72 inches long, 36 inches wide and 74 inches high. The system delivers up to 100 psi, 500 cfm and 25 inches Hg. Discharge pressure is fully adjustable (1-100 psi). It has a vertical vacuum lift up to 150 feet, vertical discharge up to 500 feet and horizontal vacuum of 500 feet, horizontal discharge up to 10,000 feet. The control panel can be powered by a 12-volt DC or an intrinsically SAFE option is available for hazardous environments. **605/838-8384; www.subsurfacesupply.com.**

Honda industrial series generator

The EB1000 industrial series generator from Honda has a maximum output of 10,000 watts, narrow-shaped design and centralized exhaust. The generator operates at 72 decibels at 23 feet. The digital auto voltage regulator (DAVR) holds voltage stable within 1 percent during standard operation. The i-Monitor digital operation system offers at a glance total used hours, generating voltage (when error detected), battery condition, Oil Alert and AVR (auto voltage regulator) error code. **678/339-2600; www.powerequipment.honda.com.**

McLaughlin truck-mounted Mega Vac

Mega Vac truck-mounted vacuum excavation systems from the McLaughlin Group feature tank capacities from 1,600 to 3,000 gallons. Power options include a 67 hp Kubota diesel engine with 1,025 cfm blower or 99 hp Kubota engine with 1,200 cfm. Both options produce 15 inches of mercury. A deep vacuum power plant with 99 hp engine, 1,200 cfm and 24 inches of mercury is available. The three-stage filtration system allows for both wet and dry excavation. **800/435-9340; www.mightymole.com.**

JWC Environmental vertical screening system

Auger Monster model AGV from JWC Environmental is a vertical screening system that fits inside pump stations to provide protection against rags and debris. The system mounts to the wall of the pump station next to the inlet pipeline, capturing rags, wipes, plastics and trash. The custom built system can screen up to 1 million gpd. It also can be installed as a headworks screen for a package treatment plant or lagoon system. **800/331-2277; www.jwce.com.** ✦

WORTH NOTING

PEOPLE/AWARDS

The **Hopkinsville Surface and Stormwater Utility** received the Kentucky League of Cities Enterprise City Award for the construction of the Woodmont Basin System.

The **Southeast Metro Stormwater Authority** (Centennial, Colo.) received four awards from the Colorado Chapter of the American Public Works Association for Public Works Administration, Building Code Administration/Permitting/Enforcement, Sustainable Design/Construction Management, and Water/Wastewater Design/Maintenance/Operations.

The **Village of Montgomery** received the Stormwater Management of the Year Award from the Illinois Association for Floodplain and Stormwater Management.

The following received **Clean Water New Jersey Awards** for stormwater at the New Jersey League of Municipalities Conference:

- Stafford Township, Post-Construction in New Development and Redevelopment
- Clinton Town – Local Public Education
- Chatham Borough – Maintenance Yard/Public Works Operations
- Hamilton Township – Illicit Connection and Outfall Pipe Mapping Program
- Burlington County – Illicit Connection and Outfall Pipe Mapping Program
- Morris County – Maintenance Yard/Public Works Operations
- Rutgers University – Local Public Education

LEARNING OPPORTUNITIES

American Public Works Association

The APWA has these courses:

- May 9 – Stormwater Manager Certification Study Guide Part 1, Audio/Web
- May 16 – Stormwater Manager Certification Study Guide Part 2, Audio/Web
- May 23 – Stormwater Manager Certification Study Guide Part 3, Audio/Web
- June 12 – Low Cost Safety Improvements, Audio/Web

Visit www.apwa.net.

American Society of Civil Engineers

The ASCE has these courses:

- May 10-11 – Pumping Systems Design for Civil Engineers, Denver, Colo.
- May 10-11 – Structural Condition Assessment of Existing Structures, Madison, Wis.
- July 26 – Northwood Collection System Seminar, Marshfield, Wis.
- July 26 – Regional Utility Management Training, Plover, Wis.

Visit www.asce.org.

Wisconsin

The Wisconsin Department of Natural Resources has these courses:

- June 6 – Customer Service, Richfield
- June 7 – Collection Systems, Watertown

Visit www.dnr.state.wi.us.

The University of Wisconsin Department of Engineering-Professional Development has these courses:

- May 2-4 – Using HEC-RAS to Model Bridges, Culverts and Floodplains, Madison
- May 7-9 – Using HEC-HMS to Model Watersheds, Madison

Visit www.epdweb.engr.wisc.edu. ✦

CALENDAR

April 29-May 2
American Public Works Association 2012 North American Snow Conference, Frontier Airlines Center, Milwaukee, Wis. Visit www.apwa.net.

May 2-3
Vermont Rural Water Association Annual Conference, Fairlee, Vt. Visit www.vtruralwater.org.

May 8
Georgia Association of Water Professionals Stormwater and Watershed Specialty Conference, College Park, Ga. View www.gawponline.org.

May 15-17
North Carolina Rural Water Association Annual Conference, Greensboro, N.C. Visit www.ncrwa.com.

May 19-21
Georgia Rural Water Association Annual Conference, Jeykell Island, Ga. Visit www.grwa.org.

May 21-23
Ohio Rural Water Association Annual Conference, Huron, Ohio. Visit www.ohioruralwater.org.

May 21-24
New York Rural Water Association Annual Conference, Verona, N.Y. Visit www.nyruralwater.org.

June 3-6
Water Environment Federation Collection Systems 2012: Show Me The Green – Confluence of Planning, Implementation and Regulations, St. Louis Convention Center, St. Louis, Mo. Call 703/684-2441 or visit www.wef.org.

June 10-14
ACE12: American Water Works Association Annual Conference and Exposition, Dallas, Texas. Visit www.awwa.org.

June 25-27
American Public Works Association Sustainability in Public Works Conference, Omni William Penn Hotel, Pittsburgh. Visit www.apwa.net.

July 18-20
Water Environment Federation Stormwater Symposium 2012, Sheraton Baltimore City Center, Baltimore, Md. Visit www.wef.org.

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HYDROEXCAVATING EQUIPMENT

WACHS Valve Exerciser and Hydro-Vac trailer: Includes Vitals Valve Maintenance software, hydro-excavator, pressure washer with 70 gallons of water, 500 CFM PD blower, 200-gallon spoils tank with hydraulic dump. Demo unit has 13 hours. Sales price $37,999 (discounted $14,000). Contact Val Teeples 602-677-4750, AZ. (M05)

JET VACS

2008 Vacmasters 4000 w/ 725 hours: 1,000 cfm, Vacpump, 300 cfm air compressor @ 220 psi, 3,000 psi water system, 500-gallon debris tank on a 2004 Freightliner, non CDL, Eaton Fuller 6-speed trans., C-7 CAT, 190 hp, 177,000 miles. Will separate units. .....$65,000/$55,000
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PIPELINE REHABILITATION

4" Percussion Milling Cutter Enz Golden Jet for 3/4" - 1" hose version 14.100. LIKE NEW, used on one job! $3,500. Plumbing Anytime, Inc. 307-733-3534, WY. (CMBM)

PUMPS-HIGH PRESSURE

Myers DP-80-20, 80 gpm/ 2,000 psi, fully refurbished jet pump for sale. $8,750. Also have Vaccon parts for sale. Contact Ralph at 866-599-7378, NY. (M05)

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Dynamic Repairs - Inspection Camera Repairs: 48 hour turn-around time. General Wire, Ratech, Ridgid, Electric Eel, Gator Cams, Insight Vision, Vision Intruders. Quality service on all brands. Rental equipment available. For more info. call Jack at 973-478-0893. Lodi, New Jersey. (CMPBM)

SEPTIC TRUCKS

1978 Mack Vac Truck: Mack diesel, M/T, 10,500/19,040 axles, camelback susp., spoke wheels, 22.5 tires. $24,500
715-546-2680 WI MBM

SEPTIC TRUCKS

2003 Sterling L7500 Vac Truck: CAT 3125 @ 315 hp, A/T, 55k miles, spring susp., 2003 Vac-Con V390LHAD, 3 compressor fans, 10' telescopic boom, HS drive, articulating hose reel, hi-dump debris tank.. .....$99,500
715-546-2680 WI MBM

2006 Sterling LT9500 Vac Truck: Acert C-13, Fuller 8LL, lockers, 18/40 axles, 4x6 drive, air ride, 24k miles, 208" WB, 227" frame behind cab, 22.5 tires, engine brake, disc wheels, 2006 Presvac tank, s/n: APV-4000-0705-7052, 4,000 gal. tank, Masport pump.....$89,500
715-546-2680 WI MBM

SEPTIC TRUCKS

1988 Ford L8000 Vac: Ford @ 210 hp, A/T, 81k miles, 6k hours, spring susp., spoke wheels, Vac-Con body, Cummins showing 1,292 hours, s/n: V290T-0488186. .....$22,500
715-546-2680 WI MBM

WANTED

WATERWORKS MANAGER: N.Y. construction supply company/manufacturer looking for an energetic, experienced Waterworks Manager. Job entails, estimating, customer service, phone sales, and learning new product lines. Excellent salary, benefits, 401K, profit sharing, health insurance, life/disability insurance. Excellent opportunity! Please e-mail resume to gregf@precastconcretesales.com. Thank you for your interest! (M07)

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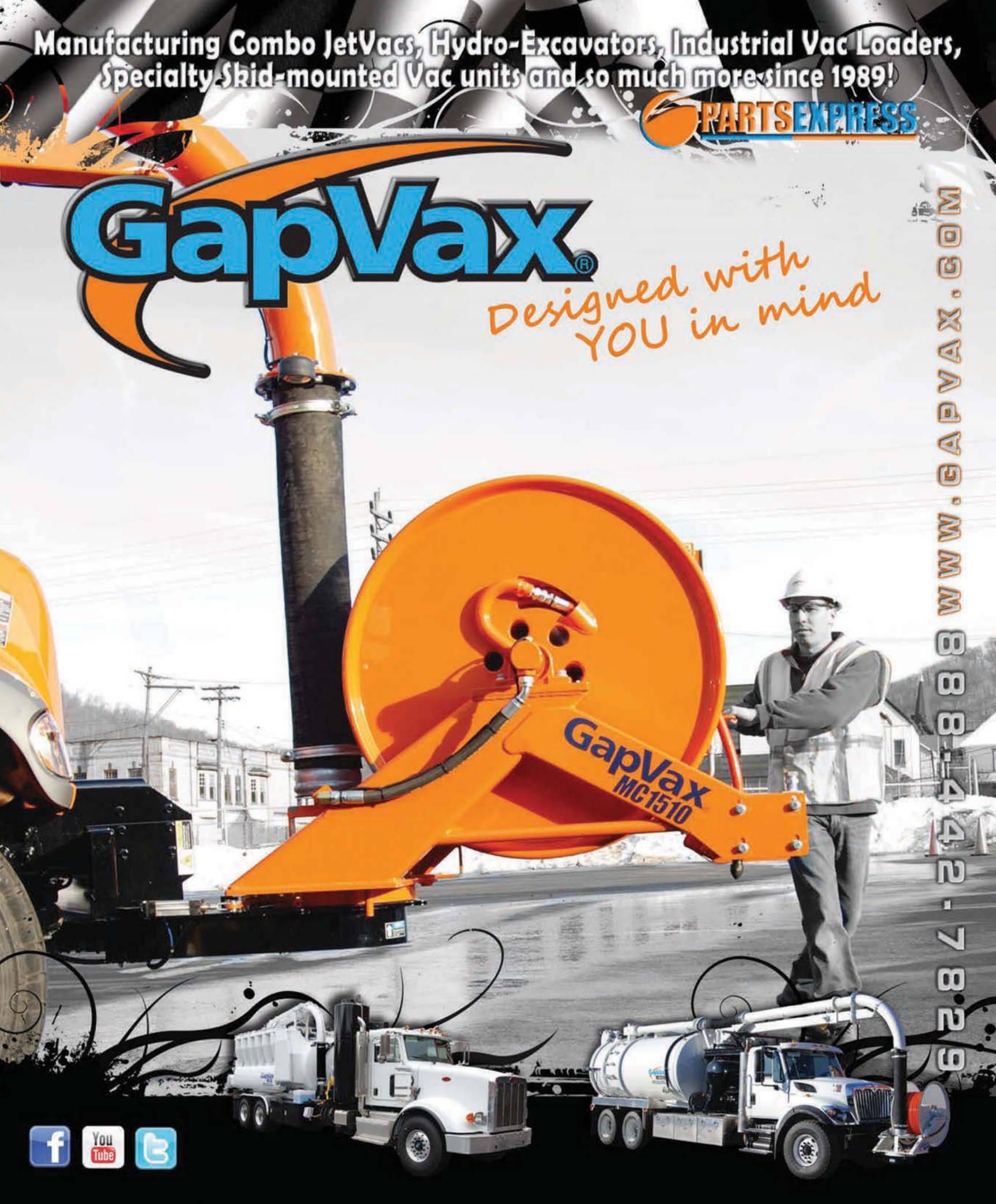
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