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August 2015

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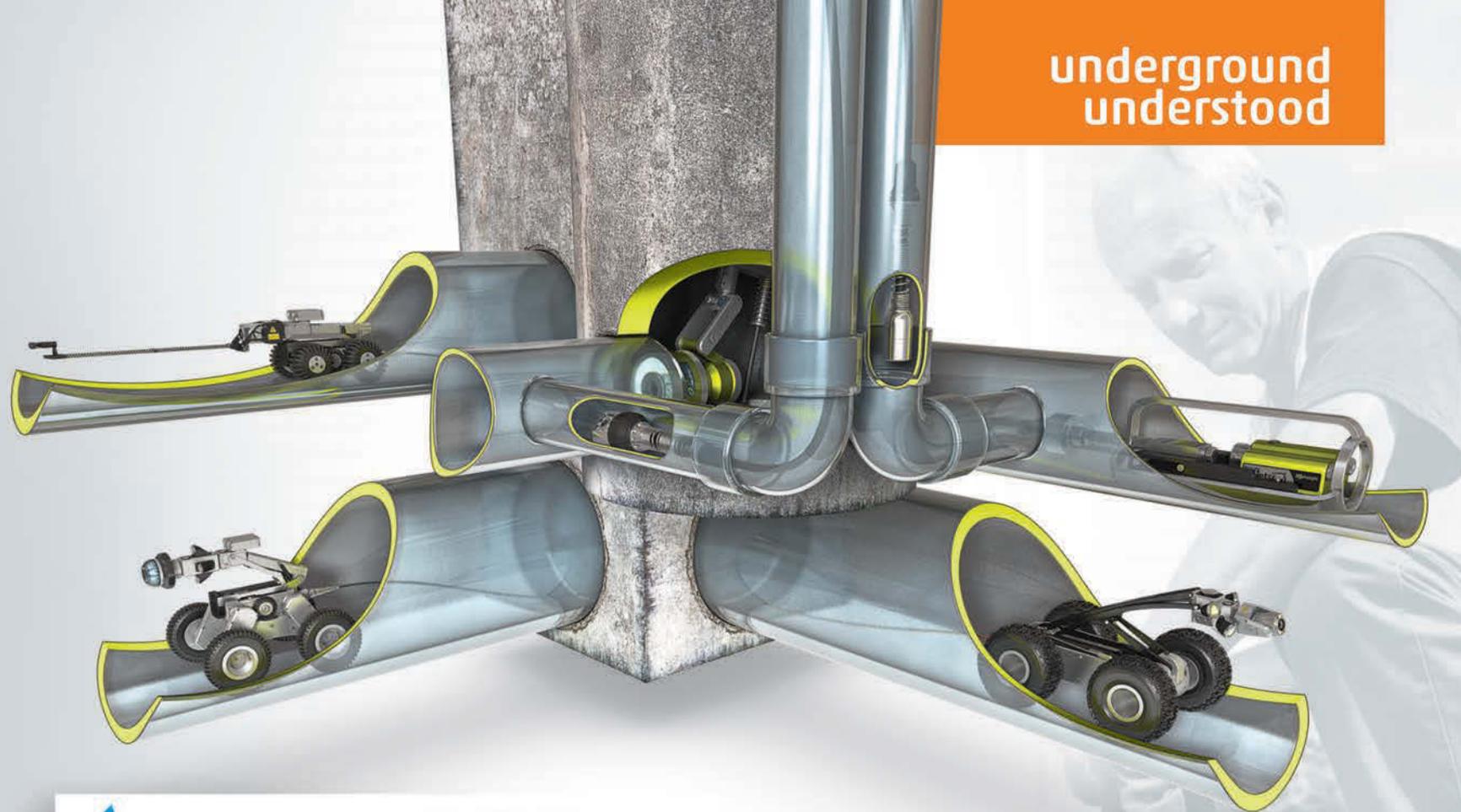
# ELIMINATING WASTE

California's Victor Valley Wastewater  
Reclamation Authority is banking on  
innovative energy-from-waste technology  
to become energy independent

PAGE 20

Logan Olds, general manager of  
the Victor Valley Wastewater  
Reclamation Authority in  
Victorville, California

underground  
understood



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<p><b>NAUGHTY</b>          have big teeth          and camping.          dogs and cats          baboons or          ed monkeys.          ne. #1171</p>	<p><b>NEGLECTED SEWER</b>          seeks hard working professional          for long-term relationship. Must be          well built, reliable and willing to          put up with my frustrating debris,          unmanageable roots and massive          greasy buildups. #3109</p>	<p><b>LONELY ROO</b>          seeking tall          flat assistant          removal. Just          likes biking and          get"</p>
<p><b>BIG SOFTY</b>          and hardcore</p>	<p><b>ROMANTIC PLUMBER</b>          seeking coupling partner to polish          flanges, pipes and other neglected</p>	

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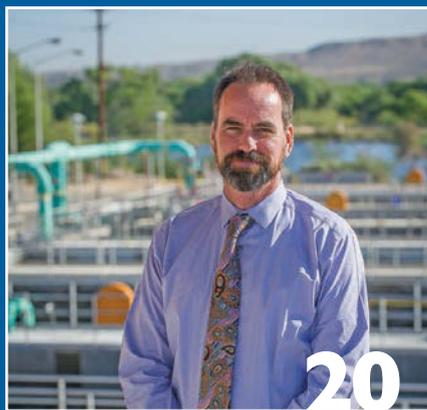
# INSIDE:

PIPELINE INSPECTION,  
SURVEYING AND MAPPING



#### ON THE COVER:

Victor Valley Wastewater Reclamation Authority General Manager Logan Olds in Victorville, California. (Photography by Eric Reed)



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- ◆ HUMAN SIDE: Inspire employees to work harder
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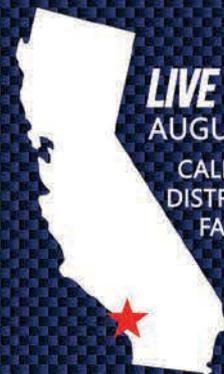
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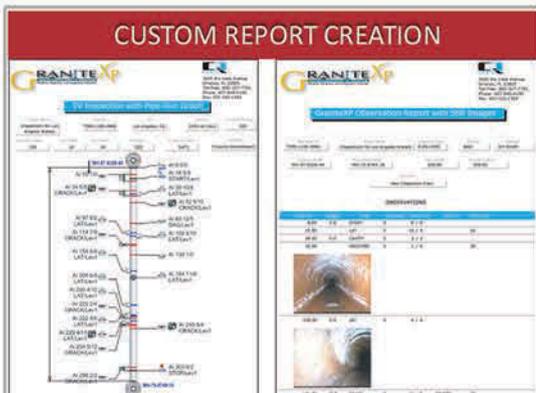
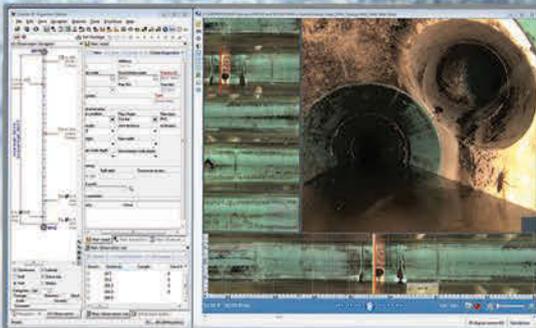
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# WORKING TOWARD THE FUTURE

Preserving and protecting our water resources is an industry-wide mission

**W**e're all looking for better ways to do things. Better ways to do our jobs. Ways to eliminate waste. Everyone wants to run their utilities more efficiently – to replace and rehabilitate more, to lose less and leak less, and everyone's trying to do it without letting it cost more.

I'm writing this month's column from the American Water Works Association's ACE15 in Anaheim, California. There are so many people here looking for new ways to lead their utilities into the future, and so many manufacturers pushing the latest and greatest in everything from manhole rehabilitation to membrane purification systems. I like attending industry trade shows. The Water & Wastewater Equipment, Treatment & Transport Show is my favorite, but ACE and WEFTEC provide great opportunities to meet MSW readers and the people who make all the equipment they use. Everyone has their best on display at these shows and it provides a look into the



## FROM THE EDITOR

*Luke Laggis*

future of water and wastewater.

This month's profile on the Victor Valley Wastewater Reclamation Authority, located right here in Southern California, is a great example of everything mentioned above. The authority is working tirelessly to eliminate waste from every corner of its operation, and it has its collective eyes trained squarely on the future. Things are changing, especially in California, and if you're not looking forward, you're falling behind.

The VVWRA is located at the southwestern edge of the Mojave Desert northeast of Los Angeles. It serves 250,000 residents and treats between 12 and 13 million gallons of wastewater per day at its Victorville wastewater treatment facility. In recent years, the authority has increased efficiency at its wastewater treatment plant, reduced power consumption and inaugurated the Omnivore Biogas Renewable Energy Project, a unique wastewater-to-energy program. The mission to improve efficiency and eliminate waste goes far beyond treatment and has permeated throughout the utility's operations. It also stretches beyond Victor Valley.

Last night I had dinner with the Top Ops team from Palm Coast, Florida. They've done great things with their system. On the treatment side, they've become one of the top utilities in the country. One of their three wastewater plants has a 0 percent net liquid discharge. Every drop is recycled. Another of their plants is at 98.5 percent. They're ahead of the curve, and it was great to hear their story. Of course, this show is in California, which is in the midst of a historic drought and unprecedented new regulations on water use.

I read and write about water every day, but I live in one of the most water-rich areas of the country. My office is on the largest freshwater chain of lakes in the world. Water is not scarce here, but that doesn't mean we take it for granted. Quite the opposite. It drives the local economy, as well as the lifestyle. But people tend to lack perspective on the things that aren't immediately at hand. I write about water, but I can also look out my window and see a lake. The woods are green. Drought is easy to grasp on an intellectual level, but it's not something I've ever lived with.

Now here I am in Southern California, with reminders all over my hotel room about saving water however and wherever possible. I'm actually thinking about the impact of short showers and turning off the water while I brush my teeth. And I'm also talking to the people who have made it their mission to find better ways to do their jobs and preserve our precious water resources. That's one of the fun parts of this job. And it provides some perspective on the work it takes to ensure we'll continue to have an adequate supply of clean, safe water.

Enjoy this month's issue. ♦

**Comments on this column or about any article in this publication may be directed to editor Luke Laggis, 800/257-7222; editor@mswmag.com.**

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## HOT TOPIC

### Warning: Heat Can Kill

Municipal work poses many inherent safety risks, but there is one that is easily overlooked. With NFL training camps in full swing, we're reminded of All-Pro lineman Corey Stringer who died from heat stroke in 2001. Football teams now follow procedures to help get players acclimated to the heat. The league has changed from the get-tough attitude of no water breaks to mandatory hydration and rest periods, and it's time for all to embrace a smarter approach to heat safety by following these simple precautions. [mswmag.com/featured](http://mswmag.com/featured)



## SEARCHING FOR SOLUTIONS

### Water Suppliers Wrestle With Decreased Sales

California agencies are forced to find new ways to deal with a decline in revenue as water use throughout the state drops due to unprecedented regulations aimed at conservation. Learn what is currently being done to help balance the budgets. [mswmag.com/featured](http://mswmag.com/featured)



## WATER SYSTEM SYNERGY

### Partnerships Make 50-Mile Pipeline Successful

In a day when many municipalities are squabbling over water resources, the Colorado Southern Delivery System is one example of communities working together to assure adequate water supplies for their citizens in the future. And when the water supply project — one of the largest in the western United States — comes in nearly \$10 million under budget, the story gets even better. [mswmag.com/featured](http://mswmag.com/featured)

## OVERHEARD ONLINE

“The topic of sewers is relevant for today's Brooklynites whose health and sanitation depend on an infrastructure designed with 19th century technology for a 19th century population.”

— *Brooklyn Sewer Exhibit Unveiled*  
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Class 1 operator Beverly Hall gathers raw water samples from taps that are connected to various water streams to and from the Middle Fork Water Treatment Plant to test the pH. (Photography by Earl Neikirk)



# DELIVERING RESULTS

The Washington County Service Authority uses aggressive system upgrades and new technology to improve operating efficiency

By *Jim Force*

The hilly terrain and rural character of Washington County in far southwest Virginia can be deceiving. Beneath the ground runs a 900-mile-long water distribution system, closely monitored with state-of-the-art software and upgraded with new piping. The results are already saving the Washington County Service Authority (WCSA) and its customers both water and money.

Under the direction of General Manager Robbie Cornett, the utility, based in Abingdon, is in Phase 2 of a three-phase project to replace miles of aging 2-inch galvanized pipe. It has also divided its 300-square-mile service area into a series of subdistricts to help monitor water usage

more precisely and identify leaks and inefficiencies. At the same time, the utility has constructed a new raw water intake on the Holston River, nearly doubled the capacity of its water treatment plant and replaced manual meter reading with radio-based reading technology.

“We figure the galvanized pipe was costing us as much as \$1.4 million a year, and we’ve identified four areas that have been accounting for more than half our water losses,” says Cornett. Other benefits of the new programs include a 33 percent reduction in meter reading staff, an 11 percent increase in water and sewer revenue, and the elimination of all but two of the 12 substandard pumping stations the old system used.

## Spread-out system

Washington County lies in the southwest corner of the state, where Virginia, Tennessee and North Carolina come together. “We’re closer to five other state capitals than we are to Richmond (Virginia’s capital),” says Cornett. It’s a rural area, dotted with small population centers like the towns of Abingdon, Glade Spring and Damascus.

“In utility circles, people are amazed that we only have 23 customers per mile of pipe,” Cornett says. Dramatic elevation changes require pressure reduction and pumping stations along the water distribution system. Raw water comes from several sources: the Holston River, two large springs in the Mill

Creek and Taylors Valley communities and, until recently, a small well in Mendota that has been phased out in favor of purchased water.

On the river, the Middle Fork intake structure (rated at 6.6 mgd) and the recently (2014) completed South Fork intake (12 mgd) supply river water to the Middle Fork Water Treatment Plant, which has just undergone a \$26.8 million expansion. “The two intakes give us redundancy, in case we need to take one down for maintenance or for water-quality reasons,” Cornett says.

## Peak performance

The water from WCSA’s springs is naturally pristine and requires little treatment beyond precautionary

*(continued)*



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**Above:** Chief Operator Joe Baldwin actuates a gate on one of three sedimentation basins. **Top:** The Washington County Service Authority's Middle Fork Water Treatment Plant in Abingdon, Virginia, with freshly landscaped grounds. **Middle:** Compliance Manager Gary Vanhuss tests river water for coliforms and *E. coli*. Positive samples glow under ultraviolet light. **Bottom:** General Manager Robbie Cornett checks random turbidity meters in the pipe gallery down under the filter tanks at the Middle Fork Water Treatment Plant. This area houses the backwash drainpipe for the entire plant and other drainlines and turbidity meters.



**PROFILE:**  
**Washington County Service Authority, Abingdon, Virginia**

**FOUNDED:**  
 1976

**SERVICE AREA:**  
 300 square miles

**INFRASTRUCTURE:**  
 900 miles of waterlines, 24 storage tanks, 52 pumps at 26 stations

**SYSTEM STORAGE:**  
 13.6 million gallons

**EMPLOYEES:**  
 70

**ANNUAL BUDGET:**  
 \$12 million (water operations)

**WEBSITE:**  
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disinfection. Reservation Spring produces about 900,000 gpd. Chlorine, stored in 50-pound cylinders, is added at the point where the water enters the distribution system.

"This is one of the few springs in Virginia that is not under the influence of surface water," explains Cornett. "It's very high quality. We use it for entering the various water tasting contests." (WCSA finished fourth among 100 entries in the Berkeley Springs International Water Tasting awards competition in 2004.)

The elevation of the spring eliminates the need for pumping: The water flows by gravity to a number of customers in one of the small communities WCSA serves. The other spring delivers 1.8 mgd and requires treatment, as regulators have declared it to be affected by surface water. A small membrane plant (Koch Membrane Systems),

one of the first in Virginia, has been in operation since 1999. WCSA owns the plant with a neighboring utility and has received excellent water quality, although the facility is due for upgrading and replacement in four to five years.

**Galvanized pipe issues**

Improvements to the water management system have involved more than upgrades to the intake and treatment facilities. When Cornett joined the agency in the early 1990s, he was quick to recognize the harmful impact the 2-inch and smaller galvanized pipe was having on the system. "Forty percent of all our connections were served by the galvanized pipe," he remembers. "We had numerous customer complaints about lack of water pressure or poor-quality water — even colored water that would ruin a load of clothes in a washing machine."

Ultimately, the agency committed to addressing the issue. As a stop-gap, small blow-off valves (Cla-Val) were installed so that operators didn't have to go into the field to turn water on or off. The blow-offs allowed automatic flushing of the system at night so that customers would get the best-quality water when they started their day.

In addition, to deal with pressure drops, WCSA installed 12 booster pump stations along the lines. While these measures eliminated most complaints, WCSA undertook a full-scale study of the galvanized pipe issue, analyzing leaks and breaks and the overall impact on the utility, especially costs. According to the agency's calculations, 86 percent of all system leaks and breaks could be traced to the galvanized piping. That figure was later validated in an independent review of the system by The Lane

*(continued)*

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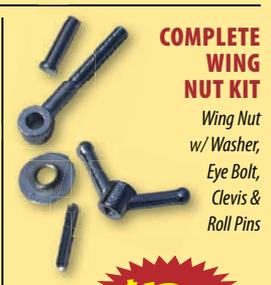
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**Above:** Water Production Manager Don Cole views control room monitors that show polyaluminum chloride (PACl) feed status. **Right:** The WCSA team includes (from left) Chief Operator Joe Baldwin, Class 1 operator Beverly Hall, Water Production Manager Don Cole and Compliance Manager Gary Vanhuss.



**“Our goal is to convey information about water use to our customers – such as the time of day, how much they’re using and why they should consider reconfiguring their plumbing.”**

**- Robbie Cornett**

Group engineering consultants.

“It became obvious that we needed to become more aggressive than we’d been in the past in replacing this pipe,” Cornett says. “Much of it wouldn’t have been capable of providing service to anyone in another 10 to 20 years.”

The project is unfolding in three phases. WCSA tackled the most difficult replacement areas first. Those included the towns of Abingdon and Glade Spring, along with areas near and next to the City of Bristol — populous areas where lines run

under streets and private property. Using open-cut methods for the most part, workers removed the galvanized lines and replaced them, using PVC for smaller diameters and ductile iron for larger.

Phase 1 involved installation of about 30 miles (3 percent) of the system, not including service lines, which added 10 miles. The replaced pipe serves about 8 percent of WCSA customers. “The pipe removed from service wasn’t inventoried but may have been greater than the number of miles installed,” explains Cornett.

“In some cases, it was a matter of jumping taps from the old galvanized line to a new line that had been installed in recent years — the old galvanized line was just never abandoned. It was a major undertaking, but Phase 1 was completed at the end of 2012 and went well. It’s early, but we’re already seeing a decrease in leaks and breaks and improved waterline production.”

WCSA expects to finish up most of Phase 2 by this coming October, with some additional work to be added around that time, and adver-

tise for bids for Phase 3 in 2017, with construction on that phase expected to start later that year.

### **Embracing automation**

WCSA improvements don’t stop at fixing pipes. Cornett and his team launched other programs to make the system more efficient and enhance customer value. Automation is one area. “A few years ago we realized that most of our water meters were 20 to 40 years old,” says Cornett. “We were reading them manually, and over a 300-square-mile area,

## **ENERGY BOOST**

The Washington County Service Authority’s expanded Middle Fork Water Treatment Plant features more capacity and demonstrates innovative energy recovery as well. At the point where raw water enters flocculation, pressure reduction was required. The agency installed a pair of Francis turbines that generate electrical energy from the water passing through the valves, and use a pressure-reducing valve as a backup.

“The turbines operate like a centrifugal pump in reverse,” explains

Robbie Cornett, general manager. “Water hits the impeller, which then turns the motor and generates electricity.”

Francis turbines were invented in the mid-1800s and are common in water projects. A spiral casing surrounds the runner blades and directs the energy of the flowing water onto the blades. The units have a total generating capacity of 150 kW. The electricity powers the utility’s intermediate booster pump station.

As Cornett explains, an adsorption clarifier has been added downstream of the existing sedimentation basins. Water flows by gravity out of the basins and needs to be lifted to the clarifier before it moves on to the filtration and disinfection. “We are powering the pump station entirely from the turbines,” Cornett says.

it took six people two months to completely read the system. Also, many meters were not correctly sized for the application.”

Since then, WCSA has adopted a radio-read system and a meter calibration and validation program. “We were able to reduce our meter reading staff from six people to four, reassigning the other two to a different department,” says Cornett. The agency also regularly checks the larger meters for accuracy, randomly checks residential meters and remains on alert for any meters reading zero usage for several consecutive months.

SCADA represents another enhancement. “In 1998, we had no SCADA system, so we began implementing one,” says Cornett. “Before, our pumps ran on timers set by the operators, and tank levels were determined by visual observation twice a day. Some tanks ran dry, others overflowed. It was an inefficient and ineffective way to run a system.”

It took six years, but today WCSA is equipped with a fully operational SCADA system (GE Intelligent Platforms, integrated by Innovative Controls) that has eliminated tank level issues and helps identify where breaks have occurred in the system. That has helped reduce water losses, as has refurbishment or installation of 16 new pressure-reducing valves throughout the system to cope with elevation changes.

**Loss control**

WCSA was also invited to take part in a beta study of new AWWA water audit software, a result of Cornett’s participation on the association’s Water Loss Control Committee. “The software was free, and we now use it to track real and apparent water losses and monitor our improvement efforts,” Cornett says. “It has allowed us to test and validate the accuracy of our data.”

In another move to enhance efficiency and improve system data, WCSA subdivided its service area into 30 smaller district-metered areas. Customers in these areas are coded so that the team can monitor water use more closely and compare water use versus sales. “We’re still validating data, but what we’ve found so far is that

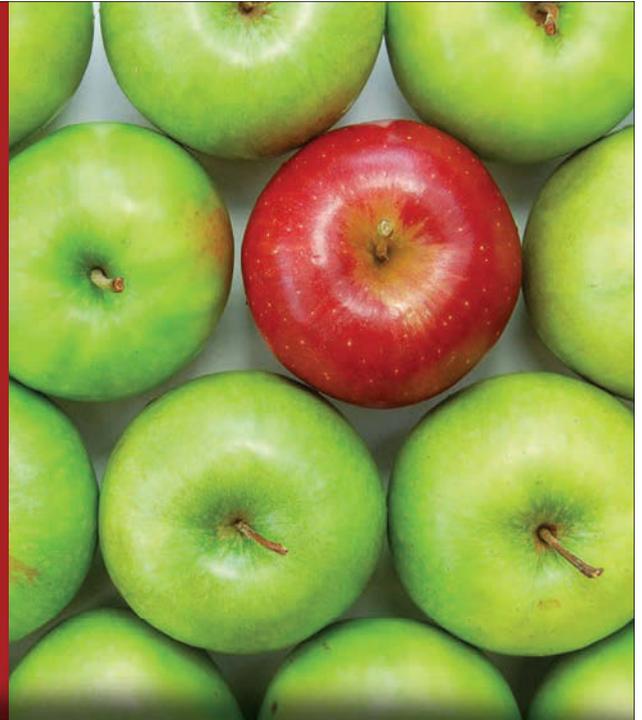
four of these smaller districts account for more than half our water loss,” Cornett says. Two are older parts of the system, and the other two are industrial parks.

When staff members looked more closely at the water usage patterns, they realized that the industrial areas had the biggest concentration of unmetered fire lines, and that as industries expanded, contractors had been inadvertently tying into fire lines for process water, dust control and other uses. That led the agency to use clamp-on meters to try to measure flows. “Our

goal is to convey information about water use to our customers – such as the time of day, how much they’re using and why they should consider reconfiguring their plumbing,” Cornett says.

The water loss program has also led WCSA to monitor its own water usage and optimize where possible. “We installed meters at all 26 of our lift stations and at all our facilities, including the treatment plant,” he says. “We found we use about 3 million gallons a month on average, not including the blow-offs on the galvanized lines. It was an eye-opener.” ♦

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# TIME: IT'S NOT ON YOUR SIDE

Make the most of every precious hour at work, because working smarter and more efficiently is more important than ever

By *Ken Wysocky*

The average American works nearly 47 hours a week, according to a recent Gallup poll — that's the highest level in almost 15 years. For salaried employees, that number ratchets up to 49 hours a week. And an extra-zealous cohort of worker bees — 21 percent in all — report working 50 to 59 hours a week.

To put those numbers in perspective, consider that even just an average employee is working almost a full extra day a week. Which raises two thought-provoking questions: Why do so many workers feel like there's never enough hours in a day to do their jobs? And what can be done to alleviate that seemingly endless run on the workplace hamster wheel, with no end point ever in sight?

Pauline Larkin, a corporate training and development consultant and the owner of Pauline Larkin Consulting, has some answers. For 17 years, she's been coaching up executives and employees in a variety of areas, including time management (or personal management, as she prefers to call it). That work gives her a unique perspective on this issue.

"I definitely see that people are being asked to squeeze more and more work out of the time they spend on their jobs," Larkin says. "There have been many layoffs, but the work doesn't stop ... workers are like deer in the headlights because there's so much coming at them, especially if their roles have been enlarged to do the work of former colleagues.

"I really see the work/life balance getting crunched, too," she adds. "It's hard for people to find time to recharge, and it's difficult to be energized at work if you never have time to refresh or refocus."

## Banish the to-do list

OK, so admitting there's a problem is the first step toward fixing it. So, what's next? Well, unless you suddenly become a master of time, space and dimension, there's no way to create, say, a 32-hour workday. So, clearly, more efficient use of existing time is the key. For starters, Larkin suggests doing away with — or at least drastically reassessing — the time-honored to-do list, that agenda of tasks that so many of us jot down each morning, then ruefully assess before we leave work.

"It's not the right tool for today's workplace," Larkin asserts. "The to-do list is usually just a safe place to do a brain dump so you don't forget anything. But there's a big difference between vomiting from your brain a list

of everything you need to do and actually compiling a prioritized, strategic task list."

To strategically determine what's most important, consider the essential items you need to deliver that day or week. That, in turn, will help you hone in on the tasks that will truly add value to your organization. Too often, workers pluck off the low-hanging fruit on their to-do lists because getting things done makes them feel productive.

"But you need to shake out that to-do list," Larkin says, pointing to the so-called 80/20 rule as a valuable tool for prioritizing. (Also known as the Pareto Principle, the theory essentially contends that 20 percent of your efforts produce 80 percent of your results.) "Pull out those 20 percent of the tasks that give you leverage (on providing value)."

Too often, people perform the easiest tasks first, thinking that perfect moment will arrive later in the day when they feel best equipped to tackle the tougher items on their lists. Reality check: That moment may never come. So suck it up and do the tough stuff first; break those tasks into 10-minute chunks to make them seem less daunting, she advises.

Email stands as another mammoth time suck. Typically, the first email you see becomes the most important thing to do at that moment. "But it probably has very little to do with your key priorities for that day or week," Larkin notes. "People want that gratification piece ... it's almost a form of procrastination. Emails make us feel important. Plus fear and politics dictate how to manage email ... you want to keep your boss happy (with quick responses)." Instead, strategically prioritize emails using that same aforementioned value-added criteria, she says.

## Carving out time

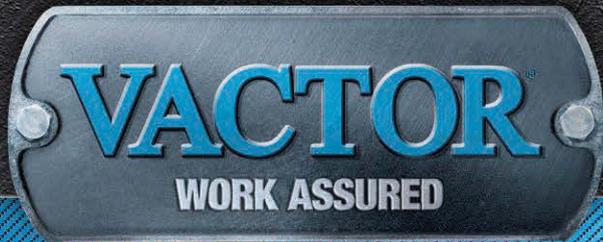
Another time-saving strategy centers on effective use of electronic calendars commonly used by companies and organizations. Too often, people use the calendars to show only meeting appointments. But it's a potential game-changer if you also block off time on your calendar to perform specific tasks, such as writing that report that's due at the end of the week; doing so shows co-workers and managers that you're not available for impromptu meetings or other interruptions.

"Use your calendar to make it visible to your team that you're busy working on that 20 percent of the really important things," Larkin explains.

**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](mailto:editor@mswmag.com).

**"Lack of clarity is where a lot of time gets wasted. And the funny thing is that no matter how busy we are, there's always enough time to do something over — correct what was done wrong — even if it requires pulling an all-nighter."**

— **Pauline Larkin**



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“Otherwise you’re a fair target (for more work assignments or meetings) if your calendar is empty and no one knows what you’re doing. It also gives you a valid reason to not drop what you’re doing to take on something else.”

On a broader level, it also pays huge dividends if you work with what Larkin calls “clarity of purpose.” Look at it this way: How many times have you spent a considerable amount of time doing one thing, only to find your manager/supervisor wanted you to do something else? No need to feel embarrassed; you’re certainly not alone.

Larkin’s advice on this point is simple: Go slow to go fast. It may sound counterintuitive, until she expounds on the concept. “We work in very fast-paced workplaces and can’t manufacture more hours,” she explains. “So it’s important to get clarity and plan carefully ... instead of working on assumptions. Before you embark on particular tasks and projects, you need to get concrete clarity on exactly what needs to be done, so that in the limited time you have to work, you know you’re executing to the best of your abilities and there’s a match between your expectations and your manager’s expectations.

“Lack of clarity is where a lot of time gets wasted,” she continues. “And the funny thing is that no matter how busy we are, there’s always enough time to do something over — correct what was done wrong — even if it requires pulling an all-nighter. There’s just too much emphasis on doing things quickly and not enough on clarity. We all talk quickly and act quickly, but the language we use is full of ambiguity. So don’t be afraid to ask for specifics.”

The message is clear: It’s high time you retooled your to-do list, relied more on your electronic calendar and sought more clarity on assignments. Once you do that, you’ll find that working more efficiently and effectively is just, well, a matter of time. ♦

### About the Author

To contact Pauline Larkin, email her at [pauline@paulinelarkinconsulting.com](mailto:pauline@paulinelarkinconsulting.com).

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# ELIMINATING WASTE

California's Victor Valley Wastewater Reclamation Authority is banking on innovative energy-from-waste technology to become energy independent

By Peter Kenter

If California's Victor Valley Wastewater Reclamation Authority (VWVRA) could wrap up its mission in a single sentence, it might be "to take the waste out of wastewater." In recent years, the authority has increased efficiency at the plant, reduced power consumption and inaugurated the Anaergia's Omnivore Biogas Renewable Energy Project, a unique wastewater-to-energy program.

The VWVRA is located at the southwestern edge of the Mojave Desert, about 80 miles northeast of Los Angeles. It was formed in 1976 and serves the wastewater needs of 250,000 residents in Victorville, Apple Valley, Hesperia and small parts of San Bernardino County, including Oro Grande and Spring Valley Lake. The authority treats between 12 and 13 million gallons of wastewater per day at its Victor-

ville wastewater treatment facility.

The authority manages 41 miles of trunk sewer while member communities manage their own sewage collections systems.

## Pipe capacity biggest issue

"The oldest parts of the trunk line date back to 1982, so it's a fairly young system," says Logan Olds, general manager of the VWVRA. "The smallest lines are 8 inches in diam-

eter and the largest are the 42-inch force mains. However, the region is experiencing enormous growth. Housing prices are more affordable here, and the biggest issue we're facing is the capacity of the pipe to serve the growing population."

Driven by the twin engines of drought and operational efficiency, member communities are investing in recycled water. The City of Victorville produces 2 million gallons of



Crews work on percolation pond renovations for the Victor Valley Wastewater Reclamation Authority in Victorville, California. (Photography by Eric Reed)



Senior mechanic Marcos Avila changes the spark plugs on a 450 hp Waukesha VGF natural gas engine.



The Victor Valley Wastewater Reclamation Authority is using 2G Biogas CHP Cogeneration Modules to burn biogas for more energy at its plant.

recycled water per day at its main plant, and two new water-scalping plants have recently broken ground in Apple Valley and Hesperia. On completion, they'll each provide up to 1 million gallons of recycled water per day to local parks and golf courses.

"However, between population growth and having to convey the remain-



## PROFILE:

Victor Valley  
Wastewater  
Reclamation Authority,  
Victorville, California

**YEAR AUTHORITY  
ESTABLISHED:**  
1976

**POPULATION SERVED:**  
250,000

**AREA SERVED:**  
160 square miles

**DEPARTMENT STAFF:**  
43

**INFRASTRUCTURE:**  
41 miles

**ANNUAL DEPARTMENT  
OPERATING BUDGET:**  
\$10 million

**ASSOCIATIONS:**  
California Association of  
Sanitation Agencies,  
California Sanitation Risk  
Management Authority,  
California Rural Water Asso-  
ciation, California Water  
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ing highly viscous wastewater after recycled water is removed, capacity is still an issue," Olds says.

The trunk line pipes are made of a variety of material from fused HDPE to fused PVC and vitrified clay. Force mains are made of steel.

"The overall condition of the pipes is quite good," says Olds. "In some areas where the pipe runs really flat we have a problem with hydrogen sulfide, so that might lead to the premature replacement of some manhole frames and covers."

The system is completely inspected every five years by third-party contractors, employing CCTV inspection, sonar scanning for pipe defects and bucket cleaning.

### A drive for efficiency

Operational efficiencies continue to drive decisions made by the

authority. Southern California Edison recently presented the VVWRA Board with an incentive refund check for almost \$50,000 for an energy efficiency program developed by VVWRA Director of Operations Gilbert Perez and his staff. Under the program, the authority established a new protocol for operating the wastewater treatment plant's UV disinfection lights, resulting in significant energy savings.

The authority's signature energy efficiency achievement has been the development of the Omnivore Biogas Renewable Energy Project, a partnership between VVWRA and Anaergia, a global resource recovery and renewable energy company. The first program of its kind in North America, it uses Anaergia's Omnivore technology, a process that thickens sludge and increases the capacity of

co-digestion inside a retrofitted anaerobic digester. The result is a dramatic increase in the production of biogas, which is used to generate electricity for wastewater plant operations.

"Gilbert and I are believers in operational efficiency," says Olds. "In the summer of 2008, we had built two new digesters and were planning to decommission three smaller digesters. We reasoned that when you buy a new car, you don't just drive the old one off a cliff. Based on our anaerobic digestion capacity using conventional active sludge, if we planned carefully, we could retrofit those digesters to generate enough power to become energy neutral."

The authority already used a portion of the gas generated through anaerobic digestion to power some of the blowers used at the plant. However, much of the gas was being flared



## THE POWER OF FOUR: VICTOR VALLEY SEWER PROJECT EMPLOYS MULTIPLE CONSTRUCTION TECHNIQUES

Five years ago, a massive flood through the Mojave River took out a wastewater pipeline operated by the Victor Valley Wastewater Reclamation Authority (VWVRA). It took four construction techniques — open cut, pipe ramming, micro tunneling and directional drilling — to put it back.

What was classified as an “unprecedented storm event” struck the region from late Dec. 19, 2010, to Jan. 4, 2011.

“It was actually four or five storms that ran end to end over several days,” says Logan Olds, general manager of the VWVRA. “The massive rainfall caused liquefaction of the soil in the Upper Narrows area where one of our sewer pipelines was located, in the bed of the Mojave River.”

The 36-inch vitrified clay sewer pipe typically conveys wastewater from the Town of Apple Valley to VWVRA’s West Side Water Reclamation Facility. While the pipe was surrounded by cement, it broke in several locations, resulting in massive sand infiltration and a large release of wastewater to the Mojave River.

In the eight days following the discovery of the pipe rupture, the authority mobilized a team to build an emergency sewer bypass almost a mile long, including a pipe bridge across the Mojave River and installation of two emergency booster pumping stations. The incident was declared a federal natural disaster and the authority applied for funds to rebuild the sewer pipe through the California Emergency Management Agency to the U.S. Department of Homeland Security’s Federal Emergency Management Agency.

The approved \$40 million Upper Narrows Pipeline Replacement Project contract was awarded to general contractor James W. Fowler Co. in January 2014.

“Including all segments, we are installing 4,800 feet of HDPE for the new sewer line,” Olds says. “We had to use directional drilling to go deep underneath the river bed and pipe ramming to extend the pipe underneath the Burlington Northern Santa Fe Railway line, one of the busiest railways in the area.”

A tunnel boring machine was used to excavate a tunnel for about half the distance, underneath a privately owned ranch. Cut and cover was used to install more than 1,000 feet of sewer pipe in trenches 30 to 40 feet deep along Victorville streets.

Engineers expecting to encounter solid rock instead found a mix of rock and sand that created maintenance challenges for the boring machine and led to some delays in construction.

“We also had to be aware of prehistoric sites potentially containing human remains, built along Historic Route 66 in Victorville, and use a private school property as a staging area for storing and joining lengths of HDPE pipe,” says Olds. “It’s been a real challenge to manage all of the competing interests to their satisfaction.”

The Upper Narrows Pipeline Replacement Project is scheduled for completion in late summer 2015.



**Muck rail cars move supplies in and rock out of a tunnel bored through hills on a private ranch.**

off while the wastewater plant consumed about \$40,000 in natural gas each month. VWVRA’s electricity bill approached \$1 million annually.

### Leveraging partnerships

Anaergia had been looking for a place to demonstrate its Omnivore technology and had already secured a \$2 million grant from the California Energy Commission. As part of a public-private partnership, Anaergia would contribute \$600,000 in funding and equipment, while entering into a 20-year power purchase agreement with the authority. The VWVRA would use as much electricity as required to achieve energy independence, and excess electricity would be sold to the grid.

Using proprietary thickening and mixing solutions, Omnivore can increase the total solids content in a typical digester from 2 percent to

6 percent while significantly increasing biogas production.

Creating a successful value proposition was key to gaining support for the project.

“We went straight to our customers to harness their interest and guessed correctly that their enthusiasm for the project would convince elected officials and the chamber of commerce that they should also support the project,” Olds says.

Once the project was approved, the Environmental Protection Agency provided technical assistance and helped conduct a plant energy audit with the cooperation of the U.S. Department of Energy.

“A fraction of a penny in the price of electricity can make or break a project, so we had to calculate this correctly,” says Olds. “We calculated that over 20 years we could save the authority about \$9 million in energy



**Workers unhook materials outside the entrance of the Victor Valley Wastewater Reclamation Authority's new sewer tunnel. The tunnel is part of the larger Upper Narrows Pipeline Replacement Project.**

costs. We retrofitted the three smaller digesters to operate with Omnivore. By decoupling the hydraulic retention time from the solids retention time, we're also moving water from the system more quickly, increasing our plant capacity."

An added potential bonus — Omnivore can consume fats, oils, greases and food processing waste that can be added to the digester to produce more biogas.

### Easy to adapt

Little work was required on the wastewater treatment plant side to accommodate the project.

"We had to add a gas conditioning system, using ferric to reduce hydrogen sulfide content," says Perez. "Anaergia has a person who comes on site, but it hasn't required us to devote any significant time to the project. We already have a solids team and they're able to handle it in the course of their regular duties."

VVWRA purchased two 800 kW co-generators from 2G – CENERGY Power Systems Technologies to convert the biogas to electricity.

A double membrane gas holder with a capacity of about 500 cubic feet of gas collects biogas from all the digesters, including the Omnivore-enabled units. The membrane ensures that gas pressure from the digesters is equalized to provide a steady flow of fuel to the co-generators.

The project was commissioned in spring 2014 for a 13-month demonstration period to ensure that all the metrics for the project could

be realized.

"So far, we're exceeding my expectations," Olds says. "We are meeting 100 percent of our energy demand, and including the energy used at our two water reclamation plants, our entire system is 90 percent energy independent. We still have part of our footprint set aside for a third generator that may allow us to go completely off grid." ♦



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## INCREASED COMPATIBILITY

New video nozzle from EnviroSight is a good fit for smaller municipal sewer lines

By Craig Mandli



**Jake Wells, right, director of marketing with EnviroSight, points out the features of his company's new 6-inch JetScan Mini video inspection nozzle with a WWETT 2015 attendee. The nozzle can be deployed to inspect sewer lines 6 to 10 inches in diameter. (Photo by Craig Mandli)**

Sometimes smaller is better. At least that is the idea EnviroSight ran with when debuting the new JetScan Mini to the wastewater market at the 2015 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show.

The JetScan Mini video nozzle gives sewer cleaning crews the visual feedback they need to select the proper tools, troubleshoot backups, identify buried safety hazards and document successful cleaning in 6- to 10-inch-diameter pipes. This simple, rugged nozzle captures valuable HD video footage from underground pipes for offline tablet viewing.

"We launched the 8-inch JetScan last year, and it received an extremely favorable response from the sewer cleaning and inspection industry," says Jake Wells, director of marketing at EnviroSight. "It was innovative because it provides rapid, cost-effective HD video without the need for a CCTV truck. But it wasn't a fit for regions where sub 8-inch sewer lines are prevalent. The Mini provides the same productivity, safety and efficiency."

As with the standard JetScan, the JetScan Mini records up to eight hours of 720p HD MPEG video to an onboard 32 GB SDHC memory card. The card is easily removed to view video on an iPad or other SDHC-compatible device. Twin high-output LED lamps ensure bright, vivid footage, and rechargeable lithium-ion batteries provide up to four hours of continuous operation.

"There's no learning curve with the JetScan Mini," says Wells. "You just power it up and hit 'record.' It's that simple. That return on investment is so compelling to customers."

**"It's a direct response to feedback we get from shows such as WWETT. Many municipalities run 6-inch sewer lines and need inspection systems that are compatible with them."**

– Jake Wells

The JetScan Mini is available as a complete system, or the stand-alone 6-inch nozzle can be purchased separately for use with a camera from an existing JetScan. Wells points out that the camera nozzle has been beta tested in several markets, and the feedback was positive.

"The operators that have used it like that it can fit into tighter areas and will also work with larger lines," he says. "The nozzle fits into multiple-size skids, which makes it versatile. It's a direct response to feedback we get from shows such as WWETT. Many municipalities run 6-inch sewer lines and need inspection systems that are compatible with them."

Many of EnviroSight's longtime customers eagerly anticipated the launch of the JetScan Mini, with some even offering to buy the test model right off the WWETT Show floor. The response was exactly what Wells was looking for.

"This is consistently the show to be at for this industry," Wells says. "We had an extremely productive week, and it seems that the attendees at the 2015 show were there to buy. That certainly makes for an exciting time for our crew."

Wells says EnviroSight is already looking forward to the 2016 WWETT Show. While he won't go into any specifics regarding EnviroSight's plans, he promises the company will again bring its "newest and best" wastewater industry innovations to the show floor.

"We try to roll out something big here every year," he says. "That's why we circle this day on the calendar. This show is that important." 866/936-8476; [www.envirosight.com](http://www.envirosight.com). ♦

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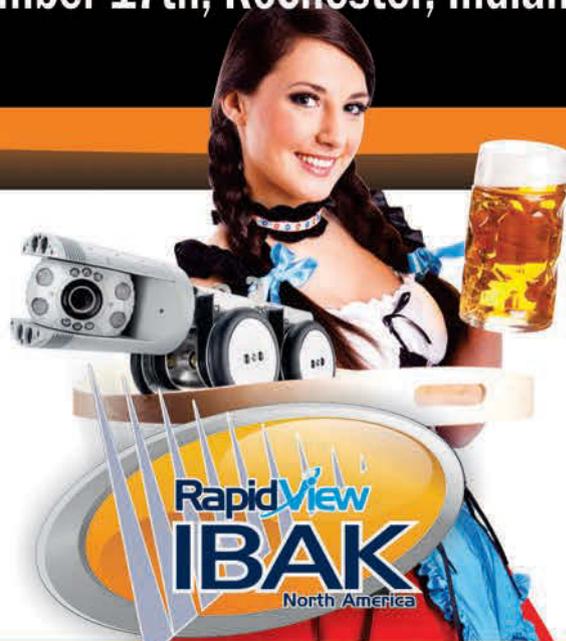
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# SYSTEM CONSOLIDATION BRINGS CHALLENGES

Grundfos integrated pumping system efficiently matches utility's water pressure with demand

By *Brian James*

Between 1990 and 2010, the population of Cottonwood, Arizona, located in the state's second fastest growing county, nearly doubled. This growth put significant strain on the community's aging and disjointed water delivery systems, which served a customer base of 30,000.

Residents were faced with frequent water outages that would last a day or two, as well as inconsistent pressure and continual water hammer noises in their homes.

Due to the rapid growth, the city's water supply was managed through a patchwork of four separate and privately owned water systems, each controlling individual, and sometimes overlapping, service areas. And since the systems weren't connected, they lacked the efficiency of a single, integrated water utility.

"If a municipality does not own the water system within its boundaries, it does not control its own destiny," says Cottonwood Development Services General Manager Dan Lueder. "A private water company is worried about the bottom line and making money; the city is more concerned about providing and conserving water."

For Cottonwood, this necessity to address water conservation was especially crucial: Averaging a mere 12 inches of rain annually, the city faces some serious water supply challenges.

The situation was further complicated by variations in the length of the waterlines and elevations of the rural community's water distribution network. For example, one booster station had to pump water nearly 6,300 linear feet with a 200-foot rise in elevation.

## Controlling its own destiny

In 2005, the city devised a water management strategy that included



**Cottonwood Development Services General Manager Dan Lueder was responsible for integrating four privately held, separate water systems — representing roughly 10,000 primarily residential service connections — into a single municipal utility department.**

modernizing its water system with effective monitoring, control and pumping technology — a development made possible by intelligent, demand-based municipal pump technology from Grundfos. The strategy was developed subsequent to the city acquiring the private water companies, which presented a number of piping and pumping challenges.

One of Lueder's first tasks was integrating these separate water systems — representing roughly 10,000 primarily residential service connections — into a single municipal utility department. In 2004, the city began incorporating the private water systems and establishing a water division, responsible for supplying and distributing water through storage tanks, 28 wells, fire hydrants, pumps and water meters.

"We had to link these stand-alone, independent networks to one another and merge them into one interconnected system," explains Lueder. "We did a lot of work identifying pressure zones. It has been an interesting experience to basically take us from the 20th to the 21st century in water supply and water delivery."

## Prematurely aging pipes

The majority of pumps in the city's existing distribution system were constant-speed, across-the-line pumps that would pump well water into a holding reservoir, and then to service stations and individual communities.

*(continued)*

**Doug Ryan, sales engineer with Grand Canyon Pump and Supply, checks water pressure levels of the Grundfos Hydro MPC BoosterpaQ integrated pressure boosting system in Cottonwood, Arizona. The booster system delivers reclaimed water for irrigation in nearby residential developments, as well as a vineyard project at Yavapai College's Verde Valley Campus.**

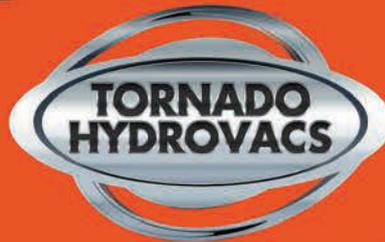
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# BETTER

In addition to pressure surges, the fixed-speed pumps could not provide incremental pressure; the pumps were either off or running at top speed.

For example, if the pressure in the hydro-pneumatic holding tank dropped below 50 psi, a pump would activate to replenish the tank to about 75 psi. This pressure swing subjected the pipes to a 25 psi pressure change, which stressed and prematurely aged the lines, many of which dated back to 1930.

With roughly 100 miles of pipe in the system, the constant pressure surge and water hammer caused significant leakage and capital repair costs for the city — as many as five to seven leaks per week in the mainline, in addition to one or two leaks in the service lines.

The issue came to a head in 2006 when two 11-year-old booster pumps showed signs of failure, recalls Doug Ryan of Grand Canyon Pump and Supply's Phoenix location, which provides equipment sales and application support to the city. Instead of replacing like-with-like, Ryan presented a new water boosting option for the reconfigured system.

## Packaged solution

"The city's contracted civil and sanitary engineer originally advocated a custom-designed pumping station that, in addition to being costly, was a problem for the city's long-term plan to relocate that station in seven months," explains Ryan. "As an alternative, we recommended a 'plug-and-play' packaged boosting solution that the Cottonwood municipal staff could pipe and install on its own, saving considerable up-front design and labor costs."

Ryan chose the Grundfos Hydro MPC BoosterpaQ, an integrated pressure boosting system that offers up to six vertical multistage CR pumps in parallel operation, designed to optimize pumping efficiency over a range of flow rates. Ideal for water supply systems, these integrated pumping systems utilize an advanced controller that adjusts pump speed and stages additional pumps as necessary to meet fluctuating system demand.

Moreover, the packaged unit could easily be moved from one location to another, an important feature for Cottonwood as it reconfigured its pumping network. In fact, Ryan notes that one of the city's booster systems is now operating in its third application.

"The engineered system's flexibility was a real advantage for us," says Lueder. "You just hook up a water inlet and outlet, establish power, key in the setpoint and turn it on. The integrated pump system does the rest."

Lueder notes that ease of installation was critical to the city's decision to purchase the product. "The advanced controller determines the most efficient combination of pumps and speed to exactly match any duty condition."

## Matching output with demand

With the fixed-pressure design, according to Ryan, one or more of the pumps were online all the time to keep the system pressurized. "But the new packaged system would deliver the exact pressure necessary to achieve



**Left: Speed control and pump staging allow the Grundfos variable-speed motors and advanced control software to maintain high efficiency. Top: The pressure booster system helps deliver reclaimed water over a range of elevations within the utility's service area. Above: The Grundfos Hydro MPC BoosterpaQ is an integrated pressure boosting system that offers up to six vertical multistage CR pumps in parallel operation, designed to optimize pumping efficiency over a range of flow rates.**

optimal performance — all without direct human intervention," he notes.

"Rather than running flat out at top horsepower to reach the desired pressure, the more energy efficient option is to design a system that starts from zero and ramps up to the desired speed to maintain a constant pressure and stages additional pumps as necessary to meet the specific flow demand. Since demand for municipal water delivery varies throughout the day, why not vary output?"

With variable-speed motors and advanced controllers, high efficiency is maintained with both speed control and pump staging. According to Ryan, another advantage of the new pump is the ability to further reduce pipe fatigue and energy use by switching from constant to proportional pressure. He explains that at lower flow rates, such as overnight, the pump controller will automatically lower the pressure setpoint, since there is less frictional headloss.

"By loading pump curve data directly into the controller, the Hydro MPC BoosterpaQ system can continuously estimate proper flow rates," explains Ryan. "The controller uses the flow rate calculation to determine how to adjust the proportional pressure setpoint."

Engineers utilized this proportional pump control setting in some of the city's installations to further optimize energy consumption and minimize water loss during low flow rates because of the reduced pressure requirement. Ryan anticipates that additional applications will leverage the proportional pump control feature as the community and its water division matures.

Since the program began in 2005, the city has installed nine of the pressure boosting systems. The water utility also retrofitted seven of its water extraction stations with Grundfos' SP submersible pumps, which feature

energy-efficient, variable-speed drives.

"Not all of our systems have Hydro MPC BoosterpaQs in them," Lueder says. "Because of space limitations or other issues, some existing pumps were retrofitted with variable-speed drives in order to align output with demand."

### Liquid gold

Eliminating pressure surges in the system has slashed the number of pipe breaks and leaks requiring repair. Moreover, because some of the booster pumps leverage Grundfos' proportional pressure setting, which lowers water pressure/volume during off-peak demand cycles, the reduced flow volumes translate into less wear and tear on the infrastructure, as well as less water lost to leaks.

From 2010 to 2014, the city saw a 30 percent reduction in the number of leaks and saved more than \$38,500, over and above the electrical cost savings, Lueder says. And in 2014, the city drew less water from the ground than the combined volume used by the private water companies in 2000.

"These savings have not been lost on the community," reports Cottonwood Mayor Diane Joens. "Water conservation is critical to communities like Cottonwood. We're a model for how rural water systems can adopt new technologies to meet the demands of growth while conserving water and

saving energy."

The level of unaccounted water has dropped from 40 percent to 11 percent, which Lueder also attributes to the reduction of leaks since installing the packaged booster systems.

"In addition to the energy savings from the more efficient pumps, our overall water usage level has dropped," Lueder says. "We're drawing less water from the aquifer today than five years ago, which is imperative if we are to bridge the water crisis facing the Southwest."

Just as importantly, since the new booster systems were installed, the city has experienced a reduction in complaints about pressure swings and water hammer noises.

Although the initial investment in a packaged system such as the Hydro MPC BoosterpaQ is higher than some alternatives, Lueder says you can't put a price on reliability. "We've had no sustained system outages since we installed the Grundfos solutions. It is extremely reliable and has built-in redundancies; if one pump kicks off, another compensates. Even for a small community like ours, the premium performance and energy savings are worth the investment." ♦

*Brian James is business development manager for Integrated Packaged Pumping Systems in North America for Grundfos.*

**"In addition to the energy savings from the more efficient pumps, our overall water usage level has dropped. We're drawing less water from the aquifer today than five years ago, which is imperative if we are to bridge the water crisis facing the Southwest."**

– Dan Lueder

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# STRENGTH IN NUMBERS

Aligning with industry organizations helps achieve common goals

By *Ted DeBoda, P.E.*

**N**ASSCO's mission to set standards for the assessment and rehabilitation of underground infrastructure is accomplished through education, technical resources and industry advocacy. To make the greatest impact, NASSCO needs partners. NASSCO continues to work with other leading industry organizations to improve the success rate of everyone involved in underground infrastructure assessment and rehabilitation.

In 2013, NASSCO signed a memorandum of understanding with the Water Environment Federation to collaborate on bringing standards and essential training to the industry. NASSCO and WEF continue to collaborate on a series of webinars to inform a wider audience about practical applications of a variety of trenchless technologies including chemical grouting, construction inspection for trenchless rehabilitation, manhole rehabilitation and pipe bursting. NASSCO will continue to offer workshops in support of WEFTEC and the WEF Collections Specialty Conference, contribute to the WEF Operations Challenge, and work closely with the WEF Collections System Committee to promote essential training and usher in technological advances to our industry.

This year, NASSCO has also formed a partnership with the Trenchless Technology Center at Louisiana Tech University, a university/industry cooperative research center. The technology center's mission is to advance trenchless technology by serving as an independent source of knowledge, research and education.

NASSCO and the TTC have formally come together to mutually endorse quality maintenance, assessment and rehabilitation standards to sustain waste-

water collections systems, and the need for thoroughly trained, qualified and certified practitioners, all of which are critical components of the public health infrastructure. Specific initiatives include extending education and training through webcasts, workshops, manuals and technical presentations at conferences attended by NASSCO and TTC. Additionally, the organizations will work to jointly encourage standardization of pipeline, manhole and lateral assessment training and certification, jointly promote NASSCO's Sewer History Exhibit and collaborate on specific projects as opportunities arise.

As our industry continues to grow, so do our partnerships and alliances with organizations such as WEF and TTC. For example, NASSCO is currently discussing ways to partner with the Center for Underground Infrastructure Research and Education at the University of Texas –Arlington. The center was established in 2002 to promote research, development and training in underground infrastructure construction and renewal technologies through research, outreach and education. With an ultimate goal to enhance safety, develop new and cost-effective rehabilitation solutions, create a better-trained and more diverse workforce, develop new modes of technology transfer and create road maps for pipeline inspecting, real-time monitoring, GIS, GPS and renewal integration, its mission aligns well with NASSCO's.

The ultimate objective in partnering with these highly respected organizations is to disseminate quality information to make the greatest impact on successful trenchless projects, which will benefit the industry and our communities. ♦

NASSCO (National Association of Sewer Service Companies) is located at 2470 Longstone Lane, Suite M, Marriottsville, MD 21104; 410/442-7473; www.nassco.org

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# MAINTAINING FRIENDLY SERVICE

Andy Hall has combined technical skill with a human touch to build an award-winning career in fast-growing Rio Rancho

By Jack Powell

**Lead collections operator Andy Hall from the Utilities Services Division in Rio Rancho, New Mexico. (Photography by Eric Draper)**

**Y**ou need a water meter installed, a main fixed, an angry customer soothed. Whom do you call? If you're the Utilities Services Division in Rio Rancho, New Mexico, the answer is easy: Andy Hall.

Hall, employed by CH2M HILL, is lead collections operator for the water and wastewater utility and its 90,000 customers. He has applied his underground systems expertise, mechanical aptitude and ability to calm frayed nerves since 1996, parlaying a confident yet plain-spoken style into an award-winning career that makes him a favorite of his boss, co-workers and city residents.

Hall, an Albuquerque native, received the 2012 Outstanding Distribution System Operator Award from the Rocky Mountain Section of the AWWA. The award recognizes exceptional performance, dedication and teamwork – qualities Hall has displayed throughout his time helping to ensure a reliable, high-quality water supply for the state's third-largest city.

Hall also received one of 16 Joseph M. Kaplan Safe Driver of the Year Awards from the National Safety Council for 2012. The award recognizes drivers who have logged at least 15 years or 250,000 miles without a

preventable accident.

"I never expected to win either award," says Hall. "I was so surprised when I got the AWWA award. It was really the great team I work with that deserved it for all the good things they do. I get things done and teach them what I know. As for the Safety Council award, I just focus on driving safely wherever I go."

### Underground skill

Hall took a circuitous route to the Rio Rancho utility. After graduating from Rio Grande High School, he spent two years at Albuquerque Technical Vocational Institute (now

Central New Mexico Community College). Then he got a job as a contractor for Qwest Communications International (now CenturyLink), installing underground telephone and cable TV lines.

One place he served was Rio Rancho, a fast-growing community and economic hub of Sandoval County, in the Albuquerque Basin west of the Rio Grande, which bounds the northeast corner of the city. There he met operators from the water utility, who were impressed with his background and easygoing manner and asked him if he wanted a job. Eager for a change after nine

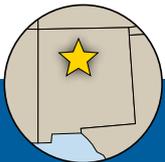
**Right: Rio Rancho lead collections operator Andy Hall (left) talks with co-workers Shawn Sandoval (center) and David Alcon during a break in the field. Below right: Hall places a lid on a new water meter while his crew backfills the excavation. Bottom right: Hall (left) speaks to co-worker Richard Sims while repairing a broken waterline.**

years, Hall quickly agreed.

CH2M HILL sent him to training programs, and eventually he earned his Level 4 Water Treatment Operator and Level 2 Wastewater Operator licenses, along with a commercial driver's license. He needs the CDL to operate backhoes for trenching in water main repair and to drive tandem dump trucks that carry excavated soil, piping and equipment.

### A day's work

Hall's work mainly involves maintenance. He's responsible for all water meter installations and replacements, repair of water main and sewer lines, and dealing with Rio Rancho utility customers. "That's what I like doing best," he says. "Some folks visit with you; others cuss you out and complain. But that's what makes the job enjoyable. You're out in the field working with people, talking with them, explaining why a line broke and tell-



**PROFILE:**  
**Andy Hall,**  
**Rio Rancho (N.M.)**  
**Utilities Services**  
**Division**

**POSITION:**  
 Lead collections operator

**EXPERIENCE:**  
 19 years

**EDUCATION:**  
 Courses at Albuquerque  
 Technical Vocational Institute

**CERTIFICATIONS:**  
 Level 4 Water Treatment  
 Operator, Level 2  
 Wastewater Operator

**GOALS:**  
 Stay at Rio Rancho and do the  
 best job possible for the city

**WEBSITE:**  
[www.ci.rio-rancho.nm.us](http://www.ci.rio-rancho.nm.us)



ing them what you're going to do to solve the problem."

On a typical day, Hall gets in about 8 a.m. "We can't start earlier because folks would complain about the noise," he says. He does safety briefings and talks with his team about anything that might have happened overnight. Then he gets them ready to go out into the field, assigning various repair jobs as they come up. After that, Hall makes his rounds, checking on completed work, taking water samples and figuring out what else needs doing.

While he usually leaves at 4:30 p.m. to drive back to the house he built two years ago in Albuquerque, Hall is one of five lead operators who take calls around the clock. When he joined the utility, it was just Hall and one other operator on call, so he was busy all the time responding to emergencies. Several years ago, he was called out on Christmas Eve to fix a water main break, then turned around and came back to work Christmas morning. As usual, Hall took it in stride: "It's all part of the job of keeping the water flowing."

### Growing needs

The Rio Rancho utility has doubled in size as the city grew from a





**Andy Hall (center) and his crew at the Rio Rancho Utilities Services Division. Left: Hall supervises the hydroexcavation of a waterline.**



sleepy suburb of Albuquerque into a major community. Growth naturally means more infrastructure to keep in good order. That includes nearly 400 miles of water main, 200 miles of water distribution pipes, 250 miles of wastewater collections systems and the pumps that draw water from 1,000- to 3,000-foot-deep wells in the Santa Fe Group Aquifer, then deliver some 50 mgd to homes and businesses.

“My principal work is fixing sewer line leaks, broken mains and faulty meters,” says Hall, unfazed by the challenges. “We all work like crazy to repair leaks and breaks because we know how much everybody relies on water. If a line breaks for whatever reason, we’ll shut down the street, dig up the line, stop the leak, fit the line back together, flush the system and test for bacteria to make sure the water is safe to drink. And we’ll do everything as quickly as possible so homes and businesses aren’t disrupted too badly.”

### Calming customers

System mapping completed over the years helps the team locate the right valves and isolate breaks quickly. In a typical year (if such a thing exists) Hall and the operators handle about 900 service line leaks and 30-plus main breaks. The many potential causes include tree roots, careless excavation by contractors, the area’s acidic soil, winter freeze-ups, and deterioration from 50 years or more in the ground. Whatever the reason, the utility relies on Hall to mollify customers.

“We have issues with our infrastructure just like any other municipality,” says Hall’s boss, Cliff Leeper, project director for CH2M HILL, which also provides wastewater support and SCADA services. “That’s why we need someone like Andy who can handle people, deal with the issues and make sure the work is completed in a responsible way. He’s been here a long time, so he’s well versed in our processes and well

## CUSTOMER RELATIONS, HALL-STYLE

Since 1996, Andy Hall has dealt with all kinds of customers: worried homeowners, good-natured types who just want to cook and take a shower, and red-faced screamers certain the utility broke their water main deliberately. It takes talent to handle each type.

“Most of the customers we deal with are great,” says Hall. “Some of them get upset when their water service goes off, but that’s understandable – it’s the same as not having use of your phone or cable TV or electricity. Others get pretty frustrated, and we have to calm them down,

respected by his peers, co-workers and our customers for his dependability and willingness to help.”

### Part of the team

Hall’s co-workers are equally enthusiastic about his approach to the job. Operator Robert Paynter, who has worked with Hall for almost 10 years, calls him “a great hands-on guy who’s always willing to show you new things. I’ve learned a lot from Andy. We’ve fixed mains together and done tons of meter installations and repairs. He’s a heck of an operator in terms of dealing with customers and getting the equipment to work.”

**“I was so surprised when I got the AWWA award. It was really the great team I work with that deserved it for all the good things they do. I get things done and teach them what I know.”**

– Andy Hall

Fellow operator and lifelong Rio Rancho resident Robert Crites agrees. “He has taught me a lot about installs and operations, so much that I can fill in for him when he’s out for the day. Andy is very patient, and he’ll help out even when he’s not on call.”

Hall prefers to see himself as someone who simply enjoys his job: the stability of working for a good company, the chance to get into the community and help make things right, and the ability to provide for his wife, Robin, an Albuquerque schoolteacher, and their son and daughter.

“I like being out in the field working with our guys and our customers,” says Hall. “Every day is different. Sometimes it’s the weather – we can have temperatures well below zero on occasion. We’ll see pipes breaking as a result, or water meters freezing. Basically, I like people: talking to them at job sites, helping them understand what we’re doing.” ♦

tell them what we’re going to do and assure them that we’ll get their water back as soon as possible.”

Good customer relations, Hall says, requires listening, empathizing and treating each customer courteously, regardless of demeanor. Sometimes that involves a detailed explanation of the task at hand. Other times it means telling a joke or keeping things upbeat. Still others demand a grin-and-bear-it attitude – and more than a little patience.

Says Hall, “A few folks have threatened me – and I’m about 6 feet tall and weigh about 260 pounds. But we’ve all learned to keep our cool and to respond in a respectful way, which nearly always defuses a bad situation. That’s just one of the things that makes my job interesting. You’d never have that interaction being cooped up in a plant.”

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# PIPELINE INSPECTION, SURVEYING AND MAPPING

By Craig Mandli

Blockages or damage in a municipal water or sewer line can wreak havoc on a utility budget. This selection of crawler cameras, GIS GPS tools, self-contained inspection vehicles, laser profiling equipment, camera and data systems, and software can help stay ahead of potential problems and save money.



## Crawler Cameras

### 1 Cobra Technologies CP Series

The **CP Series** portable inspection systems from **Cobra Technologies** have the functionality of a truck-mounted system in a compact, go-anywhere package. The portable platform with wheels and collapsible handle makes transportation of this unit easy for any operator. Its lightweight cable allows for crawler productivity but can also support multiple crawlers for 6- to 48-inch lines, while the auto level rewind supports cable reels with 600- to 1,000-foot capacity. It comes with a built-in DVD recording, a daylight LCD monitor, Touch Pro Data Logger and CAMS Office software. **800/443-3761; www.cobratec.com.**

### 2 CPI Products TrapMaster

The **TrapMaster** from **CPI Products** allows for most standard push camera systems to negotiate bends and corners and 180-degree P-traps in 4- to 6-inch pipes while centering the camera at all times. Eight wheels are mounted on two separate skids spaced roughly 2 inches apart. The front section mounts to the camera head while the rear mounts at the optimal spot along the camera head or spring push cable. Each section of the skid has four rocking SeamLeapers that swivel back and forth and adjust to various radiuses in the pipe, providing better wheel contact and maneuverability. **413/443-0925; www.cplproducts.com.**

### 3 EnviroSight ROVVER X SAT

The **ROVVER X SAT** lateral launch crawler from **EnviroSight** helps locate potentially deadly gas line cross bores, as well as performing other lateral inspections where residential access is impractical. It crawls up to 500 feet down mainlines as small as 6 inches, then launches its auto-leveling pan/tilt illuminated camera as far as 100 feet into laterals 4 inches and larger. It is fully compatible with ROVVER X automated cable reels and the DCX5000 controller. It comes with a steerable six-wheel drive for maximum maneuverability, a built-in selectable 412/640 Hz sonde (on the articulated launch camera), and interchangeable wheels to address a variety of pipe conditions. It also comes with front and rear crawler body cameras to monitor push-cable feed. **866/936-8476; www.envirosight.com.**

### 4 Insight Vision Cameras IRIS

The **IRIS** Windows app-operated mainline crawler from **Insight Vision Cameras** can be used to inspect pipes from 6 to 12 inches, and up to 18 inches with a larger wheel set. The ultra-portable and heavy-duty unit comes with 750 feet of advanced tether cable, pan-and-tilt and a 10-inch LCD touch screen. The system includes a six-wheel-drive transporter and uses four powerful LED lights to illuminate a large area. The camera and transporter are controlled via a hand-held pendant. Video will display on the reel unit as well as to an external monitor via HDMI or a dedicated Wi-Fi-enabled Windows tablet, allowing easy file management and post software reporting. **800/488-8177; www.insightvisioncameras.com.**



## 5 Inuktun Services Versatrax 150

The **Versatrax 150** remote inspection crawler from **Inuktun Services** is able to operate in pipe diameters 6 inches and up, and is fully modular to adapt to almost any sewer inspection challenge. It can travel up to 1,500 feet in a single run at a rate of 30 feet per minute. It comes with a Spectrum 90 aluminum or stainless steel camera and the assistance of high-intensity LED lighting to transmit high-quality images back to the operator for analysis and capture by a digital video recorder. Intuitive controls allow for ease of operation, while clutched tracks and an optional powered tether winch provide easy retrieval. **877/468-5886; www.inuktun.com.**

## GIS GPS

### 6 Pipelogix GIS

The **Pipelogix GIS** module added to ArcMap lets supervisors view all surveys performed on an asset. The toolbar filters survey data in the master database to highlight pipes with problems and also lets the user select the condition from an exported layer to jump the associated video to the condition for viewing. Seeing the problem where it exists on the pipe makes it easier to schedule repair and cleaning crews. The condition export can be done to a feature class in a geodatabase or to a shape file. A project of surveys in a database can be created in ArcMap using the toolbar. It starts the inspections and the CCTV inspector just completes them. The module is compatible with ArcGIS 9.3.1 through 10.2. **866/299-3150; www.pipelogix.com.**

## Inspection Vehicles

### 7 Aries Industries vehicle-mounted inspection system

Inspection vehicles from **Aries Industries** provide a professional working platform with state-of-the-art control centers for municipal pipeline inspection. Trailers, high-cube trucks and cargo vans are custom designed and built to meet specific requirements. They include easy operation, with ample room to work and storage space for equipment and tools. Design options include existing floor plans or customized packages. Electronic control systems are mounted in custom-designed racks, with efficiently designed workspace for operator convenience. A cable reel with a self-aligning roller bearing system provides easy cable payout and long tractor pulls.

Heavy-duty diamond-plate flooring provides wearability. A heavy-duty workbench provides ample space for equipment setup and repair. All-weather operation is possible with optional equipment room heating and cold-weather doors. **800/234-7205; www.ariesindustries.com.**

### 8 CUES vehicle-mounted camera system

Made to withstand severe conditions and ergonomically designed for comfort and efficiency, **CUES** vehicle-mounted systems can include TV inspection equipment for sanitary and stormwater lines, laser and sonar pipe profiling systems, mainline joint and lateral sealing, and lateral reinstatement cutters for the relining industry. Equipment can be ergonomically mounted to inspect 6- through 200-inch mainlines and 3- through 8-inch lateral services. Truck- and trailer-mounted systems are available for mainline, manhole and lateral joint sealing, and can be equipped with CCTV equipment and decision support software for TV inspection with documented condition assessment. Granite XP software is available to integrate data seamlessly with enterprise asset management systems. **800/327-7791; www.cuesinc.com.**

## Laser Profiling Equipment

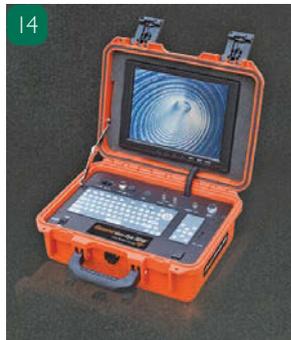
### 9 Hilti PM 2-LG

The **PM 2-LG** self-leveling line laser from **Hilti** has highly visible green beam technology, where two green laser lines perform a multitude of applications with maximum visibility. Applications such as leveling junction boxes, cable trays, radiators, pipe installations, suspended ceilings and aligning doors and windows can be completed quickly and accurately. Transferring reference heights are also easily performed. It has an ergonomic and compact design for easy handling and a rubberized housing and pendulum lock for increased durability. Calibration Service helps ensure reliability and accuracy, as the lasers will be calibrated and adjusted as needed, with the calibration confirmed in writing. **800/879-8000; www.us.hilti.com.**

### 10 Rausch USA KS135 Scan

The **KS135 Scan** from **Rausch USA** comes with two laser diodes integrated into a mainline camera head that projects lasers onto the pipe wall. It is designed to perform CCTV inspection, crack measurement and

(continued)



laser profiling. No lengthy, manual field calibration is necessary — simply place the profiler in the pipe and begin instantly. As it travels through the pipeline, it performs conventional CCTV inspection while taking accurate joint and crack measurements using the integrated laser diodes. On the return trip to the manhole, the rotating camera head analyzes the pipe profile. All data is instantly and accurately generated on site using the POSM software. It can be used in pipes from 8 to 48 inches in diameter. **717/709-1005; www.rauschusa.com.**

## Mainline TV Camera Systems

### 11 Amazing Machinery Viztrac II AM240-200

The **Viztrac II AM240-200** pipe inspection camera from **Amazing Machinery** has 200 feet of durable 1/2-inch push cable with a fiberglass rod inner core, a 20-inch cage reel and attached water-sealed case containing the controls, a high-resolution 7-inch LCD monitor and wheels to increase mobility. It also has a 1-inch, powder-coated, lay-flat frame with an upright rolling stand; a 1 3/8-inch O.D. metal camera housing; nine dimmable high-output 5 mm LED lights; high-resolution color camera with a self-leveling head; scratch-resistant sapphire glass lens; high-grade 512 Hz sonde locator with an average range of 12 to 15 feet; and an integrated digital video recorder with remote control, compatible with most standard SD cards. **800/504-7435; www.amazingmachinery.com.**

### 12 Electric Eel Ecam PRO 2

The **Ecam PRO 2** from **Electric Eel Mfg.** allows the operator to quickly inspect 3- to 10-inch pipelines and locate a wide variety of pipeline problems. It comes with a rugged stainless-steel-housed 1.68-inch-diameter self-leveling color camera with sapphire lens, 20 LED light ring and high-resolution CCD element. A flexible camera spring navigates 3-inch P-traps. The auto iris adjusts lighting automatically. It provides a 512 Hz sonde and a 10.4-inch daylight-readable display with an on-screen footage counter. Sixteen pages of text writing are available with memory saves and click touch controls with one-touch recording. It can record directly to a USB flash and includes voice-over recording and audio/video out jacks, an 8X zoom function, adjustable light controls and a two-hour battery with built-in charger. It comes standard with 200 feet of Kevlar-braided 1/2-inch pushrod, a rug-

ged powder-coated steel tube and bar construction with a secure-locking reel brake. It rolls on 8-inch wheels for easy maneuverability. **800/833-1212; www.electriceel.com.**

### 13 Forbest Products FB-PIC3688

The **FB-PIC3688** pan-and-tilt pipe inspection camera system from **Forbest Products Co.** allows users to take panorama pictures with remote directional control for over 20,000 continuous hours. It comes with 400 feet of 9 mm fiberglass cable, a reel with a meter counter and 2-inch waterproof 360/180-degree pan-tilt high-resolution color camera head with zooming that can work under the water no more than 30 meters. The heavy-duty waterproof control box includes a 10-inch LCD color screen with USB and built-in SD card for recording. The built-in rechargeable battery pack lasts about three hours. **650/757-4786; www.forbestusa.net.**

### 14 General Pipe Cleaners Gen-Eye SDW

The **Gen-Eye SDW** video inspection and location system from **General Pipe Cleaners** has a Wi-Fi transmitter inside the command module that sends video to a smartphone or tablet. A free app lets operators view and record video inspections at a range of up to 500 feet. Older SDN systems can be upgraded with the Wi-Fi feature. The unit includes a 10.4-inch LCD screen, built-in waterproof keyboard, integrated SD recorder and a heavy-duty Pelican case. Weighing 12 pounds, the unit comes with a docking arm to mount on a full-size reel to troubleshoot 3- to 10-inch lines, or on a mini-reel for 2- to 4-inch lines. It has a built-in voice-over microphone with switch, LED dimmer control, camera test port, video and audio out connections for external recording devices, and AC and DC power cords. **800/245-6200; www.drainbrain.com.**

### 15 Hathorn Corporation Magnum DVR

The **Magnum DVR** command module from **Hathorn Corporation** has USB recording and a navigation menu that is simple to use and easy to learn. With its 10.4-inch daylight-readable monitor, images can be seen clearly in bright sunlight. The system has a full-size keyboard, 16 pages of text writing, 512 Hz sonde, on-screen footage counter, 8X zoom, microphone, speaker and two-hour built-in battery with smart charger. Several reel options are available along with three camera head sizes. The command module can also be programmed to work with other manufacturers' reels. **905/886-2835; www.hathorncorp.com.**



## 16 KEG Technologies KleenSight

The **KleenSight** camera nozzle from **KEG Technologies** can clean and inspect sewer mains in one pass. The 1080P HD self-leveling camera ensures a high-quality video for clear condition assessment. Videos can be emailed or sent to the cloud to share with co-workers or customers. A high-performance nozzle is used to propel the camera nozzle and also clean the line, eliminating the need to pre-clean. Video is recorded to a 16 GB internal memory, where it is stored until the memory is full and the files are written over. Any Wi-Fi-capable device can access and download the data when the KleenSight is set to Wi-Fi mode. The system is designed to work with existing flush and camera trucks, and the MPEG 4 format videos are compatible with most software currently on the market today. **866/595-0515; www.kegtechnologies.net.**

## 17 MyTana MS11-NG

The **MS11-NG** mid-size inspection system from **MyTana Mfg. Company** is suitable for inspecting 3- to 4-inch lines up to 150 feet long. The monitor, control box, pushrod reel and camera are contained in a single piece of equipment with a carrying handle. In addition to color self-leveling, the camera head has a built-in 512 Hz transmitter for locating trouble spots, even in cast iron pipes. Wi-Fi transmission of video is available, so inspections can be simulcast to a smartphone, tablet, laptop or other Wi-Fi-equipped device with the free MyTana Viewer app. An optional recording device captures inspection records to provide to customers. **800/328-8170; www.mytana.com.**

## 18 Pearpoint/SPX P350 flexitrac

The modular **P350 flexitrac** portable crawler system from **Pearpoint/SPX** has interchangeable main components to suit specific needs. Options include a manual or powered drum, three interchangeable cameras and a range of wheels and tires, and users can determine the cable length and crawler size. The command module is also fully compatible with the P340 flexiprobe, allowing access to a range of pushrod reels, cameras and accessories. Survey data can be transferred from a compact flash to a PC or laptop via USB 2.0. FlexiSight Windows-based software edits video and converts reports to Word format. An integrated report writer creates inspection reports on site. It can fit in the trunk of a car and can be wheeled on site using the ergonomic barrow design. **800/688-8094; www.spx.com.**

## 19 Radiodetection Corporation GatorCam 4

The **GatorCam4** pipeline video inspection system from **Radiodetection Corporation** has a ruggedized controller with an integrated lithium-ion battery that removes the need for an external power lead. A push-button fuel gauge provides quick indication of remaining power even when the controller is switched off. It can be configured to suit most inspection requirements. A range of pushrods is available, from the extra-flexible 100-foot plumber's reel up to the 500-foot extra-stiff rod designed to push for longer distances. Both 1- and 2-inch cameras are available and can inspect pipes with diameters from 1 to 12 inches when used with skids. **877/247-3797; www.radiodetection.com.**

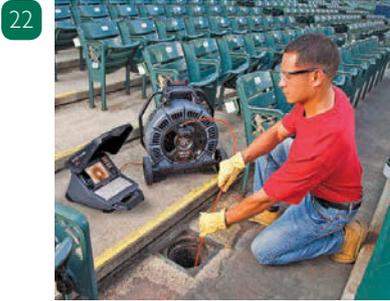
## 20 RapidView IBAK North America POLARIS

The **POLARIS** camera system from **RapidView IBAK North America** has a three-axis range of movement for effective inspection of branching, small-diameter pipeline systems. The ability to pan and tilt is enhanced by the camera's pivot arm, which allows the operator to choose direction while moving through the pipeline and encountering tees and wyes. It keeps the pipe in clear view on the monitor and allows for laser measurement of pipe diameter and other observations. It has upright picture control, wide-angle view (plus or minus 120 degrees), powerful LED lighting and low-light sensitivity. **800/656-4225; www.rapidview.com.**

## 21 Ratech Electronics Elite SD Wi-Fi

The **Elite SD Wi-Fi** pipeline inspection camera system from **Ratech Electronics** allows operators to record pipe inspections wirelessly to an iOS or Android device, and take live video and digital still photos that can be immediately uploaded to YouTube. No USB thumb-drives, SD cards or DVDs are needed. Download the app to an iPhone or iPad and stream the video wirelessly. The Wi-Fi interface is available on any current or existing Ratech system and is available with a sun-readable 10-inch LCD monitor and either a self-leveling camera, small ultra micro camera or pan-and-tilt push camera. Systems come in cable lengths from 100 to 400 feet. **800/461-9200; www.ratech-electronics.com.**

(continued)



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## 22 RIDGID camera and monitor system

The combination of the **SeeSnake CS65 Digital Reporting Monitor** and **SeeSnake Max rM200A Camera** from **RIDGID** allows inspections to be quickly documented by automatically generating professional multimedia reports. The CS65 has a 6.5-inch daylight-readable display, integrated water-resistant keyboard, and one-touch image and video recording to one or two USB drives and the built-in 1 TB hard drive. The internal hard drive can store 1,000 hours of standard video, 10,000 hours of high-compression video or more than 100,000 photos. It includes custom text overlay, Phototalk voice annotation and job management. Compact and 18-volt lithium battery powered, the CS65 docks to the rM200A for easy storage and wireless transport. The rM200A is capable of inspecting 1 1/2- to 8-inch pipe with 200 feet of push cable. A bright, self-leveling camera head provides a clear, right-side-up view. **800/769-7743; www.ridgid.com.**

## 23 Ritec GmbH RiFlexio S

The flexible **RiFlexio S** push camera from **Ritec GmbH** can be pushed over deposits or staggered pipe joints. By pressing a button of the remote control, the camera head is lifted upward, and in this lifted position it can be pushed over the obstacle. Its extremely slim construction allows the camera to turn off into pipes 2 to 3 inches in diameter. The camera head can turn 90 degrees side-to-side inside pipes without losing its endless rotation capability. **www.ritec-tv.de.**

## 24 RS Technical Services QuickPeek

The compact **QuickPeek** portable video inspection system from **RS Technical Services** comes in a lightweight, easily transportable yet durable stainless steel housing. It can be used to inspect lines 2 to 10 inches in diameter and up to 300 feet in length. It comes with a high-resolution color, low-lux, self-leveling camera with high-intensity LED lighting, high-impact sapphire lens and 512 Hz in-line transmitter. The unit also features a 2-inch sleeve and 3-inch finned skid, 200-foot pushrod, 7-inch bright LCD monitor with adjustable viewing angle, easy-access control center and sun shield that reduces glare and protects the monitor during transport. It has an AC/DC input, video/audio I/O, condenser microphone and keyboard for text annotation. Options include an onboard or external battery pack; SD digital card recorder or laptop interface; additional roller skids for 6-, 8- and

10-inch straight runs; 100- to 300-foot pushrod assembly; and a 512 Hz receiver with depth readout. **800/767-1974; www.rstechserv.com.**

## 25 Spartan Tool SparVision 200

At 25 pounds, the **SparVision 200** pipe inspection camera from **Spartan Tool** is self-contained for easy on-the-job maneuverability. Outfitted with iPad Air or Samsung Galaxy S10 technology, it includes telestration to actually draw on the screen to indicate problems. It has a full on-screen QWERTY keyboard and Wi-Fi for freedom of movement and simple emailing of video. Its 200 feet of ultra-slick pushrod travels quickly and easily through the drain, and the self-leveling camera head simplifies diagnosis. It enables instant snapshots and includes a standard 512 Hz locating beacon and distance counter. **800/435-3866; www.spartantool.com.**

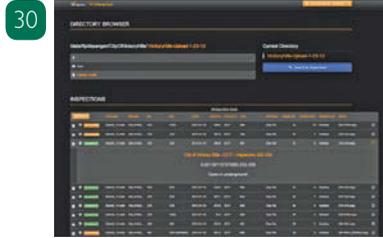
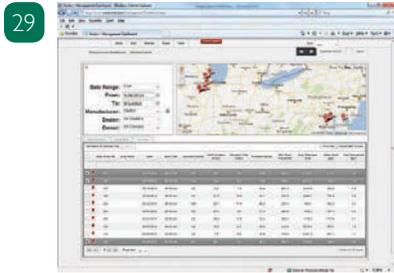
## Recording/Archiving/Data Devices

### 26 Echologics EchoShore

The **EchoShore** advanced technology platform from **Echologics** is designed to monitor water transmission mains. It is easy to deploy, simple to maintain and can be applied throughout transmission systems on any pipe material. The system leverages components of LeakFinderRT, creating a network that continuously monitors critical water transmission mains and alerts operators to leaks before they result in main breaks. The system collects data and uploads it to a secure server, where it is then analyzed to determine the location, with an alert then sent to the operator. The platform has a high degree of monitoring flexibility such as static pressure, flow, temperature, chlorine levels, acoustic anomalies and other operator requirements. **866/324-6564; www.echologics.com.**

### 27 InfoSense SL-DOG

The **Sewer Line Data OrGanizer**, or **SL-DOG**, from **InfoSense**, provides data downloading, cloud management and visualization support for the Sewer Line Rapid Assessment Tool (SL-RAT). The SL-RAT uses active acoustics to provide a fast assessment of blockage condition in gravity-fed sewers to focus sewer cleaning and CCTV inspection efforts. SL-DOG software is composed of two parts — one that resides locally on the SL-RAT user's Windows-based PC and allows the user to download field data, includ-



ing the GPS coordinates where measurements have been made, and a cloud component that allows for management of users, validation of test results, workforce productivity measurement and generation of data files that are compatible with a variety of GIS and work order management systems. It is U.S. EPA validated. **877/747-3245; www.infosenseinc.com.**

## 28 Sensaphone Sentinel

The **Sentinel** from **Sensaphone** is a cellular-based system that remotely monitors up to 12 different environmental and equipment status conditions, including tank levels, power failures, flow rates, pump status, turbidity and temperature in water and wastewater applications. When it detects issues, it instantly sends alerts via phone, text or email over standard cellular networks. The system is ideal for operations where Internet or landline connectivity is unavailable. Users can access information and make system changes from any Web-enabled device. It stores all readings in the cloud, which protects against data loss, provides unlimited information storage and allows multiple devices to be managed from one account. No software is required, so installation, integration and management are easy. It can deliver daily event reports and generate an audit trail of user data activities. Ethernet-based models are also available. **877/373-2700; www.sensaphone.com.**

## 29 Vactor Manufacturing VactorTRAK

The **VactorTRAK** data collection system from **Vactor Manufacturing** monitors and reviews sewer cleaning operations on Vactor 2100 Plus combination sewer cleaners equipped with the system. It collects and transmits comprehensive, operational intelligence to a secure, hosted website where the public utility or professional contractor customer is able to access information from any Internet-connected device, such as a smartphone, tablet or laptop. The sewer cleaner operator can enter the job work order number to correspond to the daily dispatch work list, allowing the operations manager or supervisor to view the activity performed for any specific job. **800/627-3171; www.vactor.com.**

## Software

### 30 t4 Spatial t4 Underground

The **t4 Underground** program from **t4 Spatial** provides a cloud-based, software-as-a-service solution that makes all wastewater data and related assets searchable, visible and immediately actionable from anywhere, on any device. It enables PACP-compliant sewer inspection videos and data for proactive sewer network analysis, maintenance planning, risk assessment, regulatory compliance and distributed decision-making. It integrates and correlates all past, present and future wastewater inspection videos and data with a wastewater district's existing GIS and CMMS data, and requires no CAPEX and no in-house IT costs. **805/921-3000; www.t4spatial.com.**

### 31 Vivax-Metrotech LACP and PACP-ready control module

The **vCam-5** control module from **Vivax-Metrotech Corp.** comes preconfigured to work with both LACP and PACP software packages. By using the module's RS232 socket and video composite sockets, the needed two-way communication to run LACP and PACP on a PC or CATV truck's computer is achieved. The communication between the control module and PC allows for the text overlay to be sent to the control module and to control the distance counter. On the other end, the PC receives raw video, date, time and distance out from the control module. **800/446-3392; www.vivax-metrotech.com.** ♦

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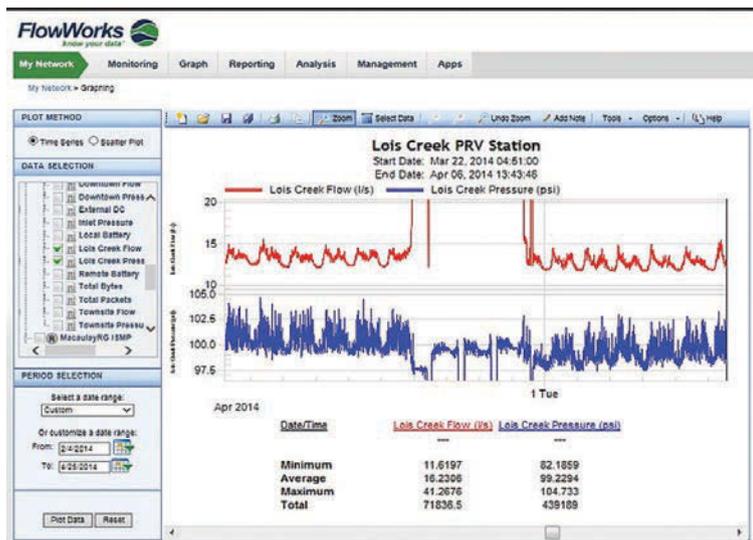


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### Software enables easier operations and asset management

#### **Problem:**

The City of Kimberley, British Columbia, Canada, has made significant investments in monitoring instrumentation for its water and wastewater systems, and was seeking a data management solution. The project identified the need to provide leakage control flow monitoring and solve the city's need to monitor and alarm other processes at its facilities. Data was collected manually and alarm notifications were done through a third-party auto-dialer system.

#### **Solution:**

In October 2013, the city implemented **FlowWorks** to monitor the operation of its water systems. Chris Mummery, the City of Kimberley utilities supervisor, stays how useful FlowWorks data processing tools are for making informed decisions. "With FlowWorks, we know what's actually going on in the field. Operations staff and management alike utilize FlowWorks on a daily basis. The first thing I do in the morning after checking my emails is go to FlowWorks and track trends. We have been able to pick up on leaks and issues at PRV stations much, much faster than in the past." The city no longer needs to manually record compliance monitoring data and performance reporting is much easier, freeing up time for both operations and management personnel.

#### **RESULT:**

The City of Kimberley has expressed intentions to expand its use of FlowWorks to include all of its water and wastewater sites, along with weather stations and temperature sensors on the road to the Kimberley Alpine Resort. **888/400-3288; www.flowworks.com.**

### Digital solution eliminates paperwork for field crews

#### **Problem:**

Field crews in Menomonie, Wisconsin, fill out paperwork each day for inspections and general work. Countless hours were being consumed making sure the paperwork was filled out correctly and turned in to office staff for recordkeeping. With efficiency becoming more critical, crew leaders sought a better solution.



#### **Solution:**

CAD data was the only digital data that Menomonie had to work with, so with a little hard work, the CAD data was converted into an Esri Geodatabase. Both **iWater** and HD Supply Waterworks staff worked with city stakeholders to design digital forms in the **inFRAMAP Form Designer**. Key input from the field crews was used to configure the software around their needs, and managers were able to configure the reports based on internal, county and state requirements.

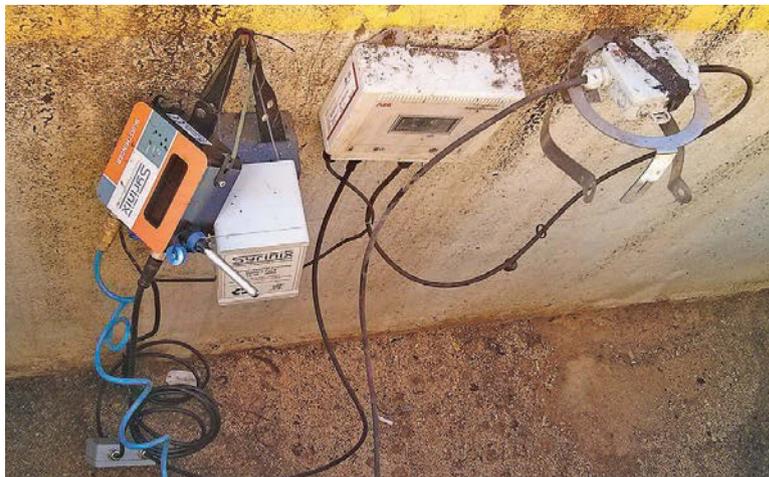
#### **RESULT:**

The city is now operating in a fully digital environment, reducing citywide staff time. Supervisors can take advantage of the reporting tool to see how crews are progressing. GIS, IT and office staff also benefit from the straightforward software deployment, centralized data management and ease of administration. **877/482-5834; www.iwater.org.**

### Detection units help lower frequency of burst pipe events

#### **Problem:**

A U.K. utility company discovered a residential district metered area (DMA) had a higher-than-expected burst pipe frequency. It was suspected



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that an inlet valve on the reservoir feeding the DMA was the most likely cause, and existing logging equipment was unable to prove this case to an acceptable level for investment purposes.

### Solution:

Five **TransientMinder** units from **Syrinx** were deployed at key locations around the residential area. The units provide high frequency, continuous logging and high-resolution time synchronization for transient location and source detection. The customer portal RADAR provides companies with data relating to the units deployed. Continuous raw data is sent securely via GSM to the RADAR portal for processing through a series of automated complex algorithms. An SMS alert for the transient event is sent and approximately five minutes of data is sent to the servers for immediate display on the portal.

### RESULT:

The units confirmed that the inlet valve was the source of the transient activity and, in turn, increased burst frequency. The level of detailed analysis and data for both the location and cause gave the knowledge required to move ahead with the replacement of the inlet valve to address the high burst and leak occurrences caused by those transients. The solution is predicted to result in a 45 percent reduction in burst mains, a 59 percent reduction in other leak types and a significant reduction in distribution input. [www.syrinx.com](http://www.syrinx.com). ♦



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# Product Spotlight

Universal service saddle reduces need for extra inventory

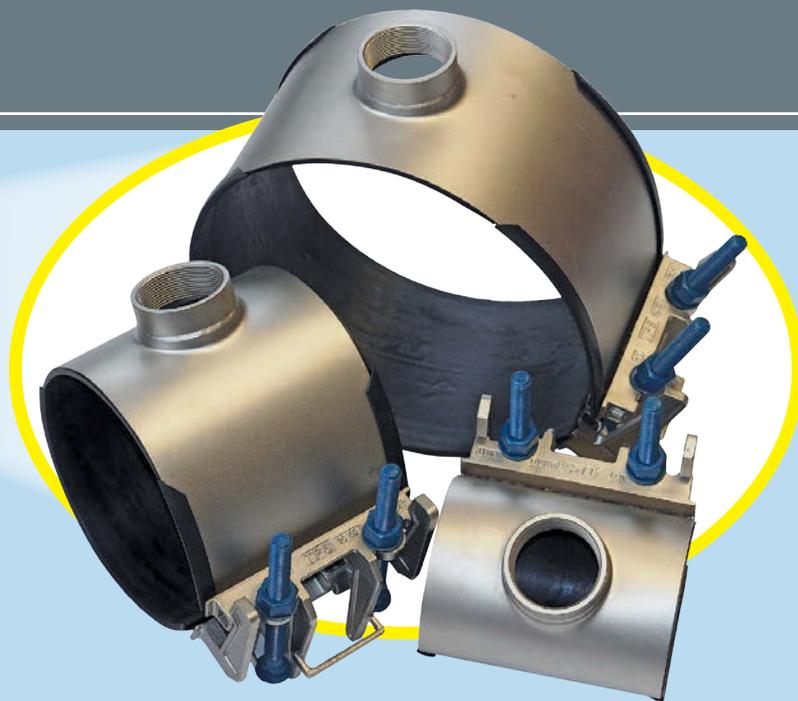
By Ed Wodalski

The Triple Tap T3 stainless steel universal service saddle from Total Piping Solutions is designed for all types of pipe, including ductile iron, cast iron, PVC, asbestos cement, steel and HDPE. The saddle's double range band reduces the need to keep extra sizes on hand.

Nominal sizes range from 4 to 16 inches. Sleeves range from 2 to 16 inches. "We have 14 different saddle sizes to accommodate what normally would be 30 to 50 different saddle sizes," says Mark Langenhan, president sales & marketing, Total Piping Solutions. "It's got the potential to reduce inventory in an area that has a wide array of pipe types or material types by up to 70 percent."

Made in the USA, all versions of the saddle, which has a maximum working temperature range of 150 degrees F, have an insulating boot to prevent contact with the pipe, reducing the potential for corrosion when used on ferrous materials.

"We selected the optimal material for universal coverage with all types of pipe material," Langenhan says. "You don't have to worry about any bimetal-



lic or other corrosion issues once it's buried. It's 100 percent stainless steel construction. We use 304 stainless steel Teflon-coated bolts and 316 nuts."

The outlet design features an extruded branch with high-strength welds to resist threaded service valve installation torque and fatigue cracking. The service saddle is rated to 250 psi working pressure (tested to 375 psi) and uses NSF-61 approved NBR rubber.

"You just latch the bolts and tighten it up. It's a very fast installation process," Langenhan says. "It's got a handle and thumb hold to draw the sides together. The proprietary lug system includes a high-range side and a low-range side in one closure piece without having to change bands or differentiate saddles from size to size, depending on pipe diameter."

Branch connections are available in 1/2- to 2-inch diameters. Outlets come in CC or NPT threaded pitches. The saddle exceeds all industry safety standards, including AWWA C800. **716/372-0160; www.tps.us.**

## General Pipe Cleaners sectional drain cleaner

The Model 88 sectional drain cleaner from General Pipe Cleaners clears 200-foot drainlines of tree roots and other stubborn stoppages. Users connect one end of the cable to the front of the machine and put the other end into the drain. When turned on, the drain cleaner cable corkscrews itself into the line while the operator safely stands behind the machine. The drain cleaner has a 3/4 hp motor that drives a 3.5-to-1 gear head and spins 8- to 10-foot quick-coupling cable sections in 3- to 10-inch lines. **800/245-6200; www.drainbrain.com.**



## TT Technologies plastic pipe splitting heads

Plastic pipe splitting heads from TT Technologies are capable of splitting and replacing plastic gas service and mainlines from 1/2 inch to 4 inches in diameter. The hardened heat-treated steel cutting blades are available in various designs and sizes to match the type of plastic host pipe and soil conditions. **800/533-2078; www.tttechnologies.com.**



## Coxreels LG Series hose reel

The Little Giant LG Series hose reel from Coxreels is designed for tubing and air/water applications. Made for commercial and industrial settings where space is limited, the reel weighs 9 to 13 pounds, depending on the model, and is 10 5/8 inches tall. The reel has a continuous radius grommet design made from bearing-grade, FDA-compliant CoxComposite that does not pinch or catch the hose during operation. Other features include low pull tension to reduce the chance of stretching the hose and a noncorrosive CoxComposite ratchet hub with self-lubricating bronze bearings for smooth rotation. **800/269-7335; www.coxreels.com.**



## Bionetix wastewater bioremediation

Micro 14, a blend of 14 natural ingredients from Bionetix International, a subsidiary of Cortec Corp., is designed to stimulate activity in nutrient-deficient soils, groundwater or wastewater. Applications include oil spill cleanup, wastewater treatment, sludge treatment, lagoons and ponds. **800/436-7832; www.bionetix.ca.**



## RIDGID transportable pipe beveller

The B-500 transportable pipe beveller from RIDGID produces a consistent, high-quality bevel in less than two minutes without flames or sparks, replacing traditional beveling such as grinding. The unit mounts to the end of pipes 4 inches or greater in diameter with a maximum wall thickness of a 1/2 inch, as well as flat plates up to a 1/2-inch thick. Interchangeable heads allow bevels to be cut accurately at 30 degrees, 37.5 degrees or 45 degrees. Features include speed monitoring with LED indicators that assist the operator in keeping the beveller moving at an optimal pace. **800/769-7743; [www.ridgid.com](http://www.ridgid.com).**



## HammerHead pneumatic percussion drilling system

The Roughneck R600 pneumatic percussion drilling system from HammerHead Trenchless Equipment is designed for drilling solid rock with bit diameters of 7.25 to 8 inches. The R600 joins model R400, designed for 5.25-inch straight and offset bits, and the R500 for straight and offset bits to 6.25 inches in diameter. Capable of penetration rates of 150 fph, the hammers feature a heavy-duty, high-flow housing, pullback kit, control station/oiler and drill conversion kit. **800/331-6653; [www.hammerheadtrenchless.com](http://www.hammerheadtrenchless.com).**



## McElroy socket fusion tool

The Spider 125 socket fusion tool with universal clamping from McElroy Manufacturing is designed for installations using 63 mm to 125 mm PP pipe in overhead, vertical and tight workspaces. Universal clamping accommodates any size pipe or coupling, eliminating the need for inserts. The 15-pound tool comes with a carrying case and full assortment of heaters and heat adapters. **918/836-8611; [www.mcelroy.com/fusion](http://www.mcelroy.com/fusion).**



## Water Cannon hot-water pressure washer

The hot-water diesel pressure washer skid package from Water Cannon features a General or Anнови Reverbri pump that delivers up to 8 gpm and 4,000 psi. Powered by a Kubota Z602B1 or DH902B1 engine, the roll-cage protected pressure washer is designed to destroy stubborn contaminants in commercial settings. It has a 12 VDC diesel-fired Beckett burner that delivers 118-degree F water temperature (210 maximum), 15-gallon fuel tank, 40 amp charging system and battery box. **800/333-9274; [www.watercannon.com](http://www.watercannon.com).**



## Aqualogy noninvasive leak detection

Ice pigging and iDroloc leak detection from Aqualogy offer an alternative to conventional pipeline cleaning and assessment methods. Ice pigging uses an ice slurry, forced by pressure to remove sediment built up inside pipes. Ice pigging can be used with any pipe material. iDroloc uses tracer

gases to prevent interruption to the water service and can be applied to detect leaks in large-diameter mainlines, small distribution pipes or connections within an urban area. The robotic system is designed to work with helium, which naturally rises to the surface and is easily detected. **[www.aqualogyuk.com](http://www.aqualogyuk.com).**



## Peerless battery disconnect switch

The TR Series battery disconnect switch from Littlefuse Commercial Vehicle Products (distributed by Peerless Electronics) cuts all battery power from vehicle electrical systems for applications needing two-circuit switching or both positive and negative. The dual-pole, 500 amp continuous current rated master disconnect switch features an ingress rating of IP67 and IP69K, enabling it to be mounted in exposed areas. The switch has a maximum operating voltage of 48 VDC. **800/285-2121; [www.peerlesselectronics.com](http://www.peerlesselectronics.com).**



## Reed dual socket, adjustable wrench

The L2N1ADJ dual socket, adjustable ratchet wrench from Reed Manufacturing enables workers to access nuts in tight locations. The two back-to-back socket sizes (1 1/4 and 1 1/16) feature a 12-point design that helps sockets grip and hold for pipeline and construction work. Loosening the large wing nut swings the socket head from side to side. Flipping the socket head by disassembling the wing nut and bolt makes it possible to use either socket opening. The wrench weighs 2.3 pounds and has a torque rating of 200 ft-lbs. **800/666-3691; [www.reedmfgco.com](http://www.reedmfgco.com).**



## Armstrong pump-less volute kit

The E.2 pump-less volute kit from Armstrong Fluid Technology is designed to upgrade, renew or replace all working parts of E Series model circulators. The kits are suitable for hydronic fluid and potable water applications and are compatible with the original E Series. Features include a water slinger to protect the motor against water intrusion, stainless steel shaft, seal, permanently lubricated bearings and bellows-style mechanical seal with silicon carbide wear surfaces. **800/356-9845; [www.armstrongfluidtechnology.com](http://www.armstrongfluidtechnology.com).**



## Val-Matic seated swing check valves

Metal-seated swing check valves from Val-Matic are designed for municipal and industrial water and wastewater applications. Metal seating is standard on Series 7900 oil cushion swing check valves and an option on Series 7800 valves. Both the removable body seat and integral disc seat are made from C95400 aluminum bronze. The valves are designed, built and tested for compliance with ANSI/AWWA C508, NSF/ANSI 61, NSF/ANSI 372 and MSS SP-71/MSS SP-136. **630/941-7600; [www.valmatic.com](http://www.valmatic.com).**



(continued)

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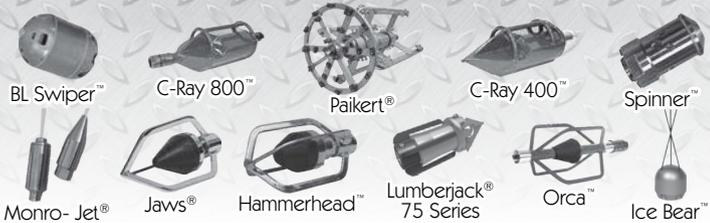


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## PRODUCT NEWS

### Crescent self-adjusting pipe wrench

The CPW12 12-inch, self-adjusting pipe wrench from Crescent, a member of the Apex Tool Group, is designed for one-handed performance in a variety of jobs.



The wrench works on most common pipe, from 5/8 to 1 1/2 inches, including black iron, galvanized, PVC and copper. A black oxide finish resists corrosion. 919/362-1670; www.crescenttool.com.

### Exact Pipe Tools ductile iron portable saw

The PipeCut 280E portable saw from Exact Pipe Tools cuts ductile iron, multi-layer, copper and plastic pipe from 1.6 to 11 inches in diameter and 0.4 (steel) to 1.5 inches thick (plastic). The 20-pound saw with vacuum attachment includes interchangeable Diamond X discs for cutting ductile iron pipe (100 to 300 cuts) and tungsten-carbide-tipped blades for other material. 844/392-2800; www.exacttools.com. ♦



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## PEOPLE/AWARDS

The Stormwater 101 initiative by the borough of **Dormont, Pennsylvania**, earned the Governor's Award for Local Government Excellence, presented by the Governor's Center for Local Government Services. Dormont won in the Building Community Partnerships category for its program to compile information and mail it to local residents.

**Anne Arundel County's Department of Public Works** received a 2015 Best Urban BMP in the Bay award from the Chesapeake Stormwater Network. The department was recognized for the stormwater management project at its Central Water Facility in Millersville, Maryland.

**Benjamin Kuntz** was posthumously honored with a Governor's Urban Conservation Award. As the spokesman of the Kent County ad hoc committee, Homeowners Associations Resolving Problems (HARP), Kuntz was instrumental in gaining public support in Delaware for the newly created Kent County Stormwater Maintenance District and provided valuable community feedback.

## LEARNING OPPORTUNITIES

### American Water Works Association

The AWWA is offering:

- Aug. 12 – Treatment Tips and Tricks: Filtration Webinar

- Aug. 26 – Optimizing Filters: Assess Conditions, Rehabilitation and Management Webinar
  - Oct. 26 – Understanding Advanced Stormwater Management Techniques, New Brunswick, New Jersey.
- Visit [www.awwa.org](http://www.awwa.org).

### Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering Using WinSLAMM v.10.1: Meeting Urban Stormwater Management Goals R174 on Oct. 19-20 in Madison. Visit [epdweb.engr.wisc.edu](http://epdweb.engr.wisc.edu). ♦

## CALENDAR

### Aug. 2-6

StormCon North American Surface Water Quality Conference & Expo, Austin, Texas. Visit [www.stormcon.com](http://www.stormcon.com).

### Aug. 17-19

Smart H2O Summit 2015: Sustainable Water Solutions, San Francisco. Visit [www.smarth2osummit.com](http://www.smarth2osummit.com).

### Aug. 18-20

National Association of Flood and Stormwater Management Agencies Annual Conference, Jackson Hole, Wyoming. Visit [www.nafsma.org](http://www.nafsma.org).

### Aug. 23-26

American Society of Civil Engineers 2015 Pipelines Conference, Baltimore Marriott Waterfront Hotel, Baltimore, Maryland. Visit [www.asce.org](http://www.asce.org).

### Aug. 30-Sept. 2

American Public Works Association International Public Works Congress and Exposition, Phoenix Convention Center, Phoenix, Arizona. Visit [www.apwa.net](http://www.apwa.net).

### Sept. 28-30

National Rural Water Association WaterPro Conference, Oklahoma City. Visit [www.nrwa.org](http://www.nrwa.org).

### Oct. 7-9

National Utility Contractors Association 2015 Fall Leadership Conference, Embassy Suites, Omaha, Nebraska. Visit [www.nuca.com](http://www.nuca.com).

### Oct. 11-14

American Society of Civil Engineers 2015 Convention, New York City. Visit [www.asce.org](http://www.asce.org).

### Oct. 13-16

American Water Works Association 2015 Water Infrastructure Conference and Exposition, Bethesda, Maryland. Visit [www.awwa.org](http://www.awwa.org).

### Nov. 2-4

WJTA-IMCA Conference & Expo, Ernest N. Morial Convention Center, New Orleans, [www.wjta.org](http://www.wjta.org).

### Nov. 16-19

American Water Resources Association Annual Conference, Grand Hyatt Denver. Visit [www.awra.org](http://www.awra.org).

Municipal Sewer & Water invites your national, state or local association to post notices and news items in this column. Send contributions to [editor@mswmag.com](mailto:editor@mswmag.com).

# The Rudy Tool



RT1

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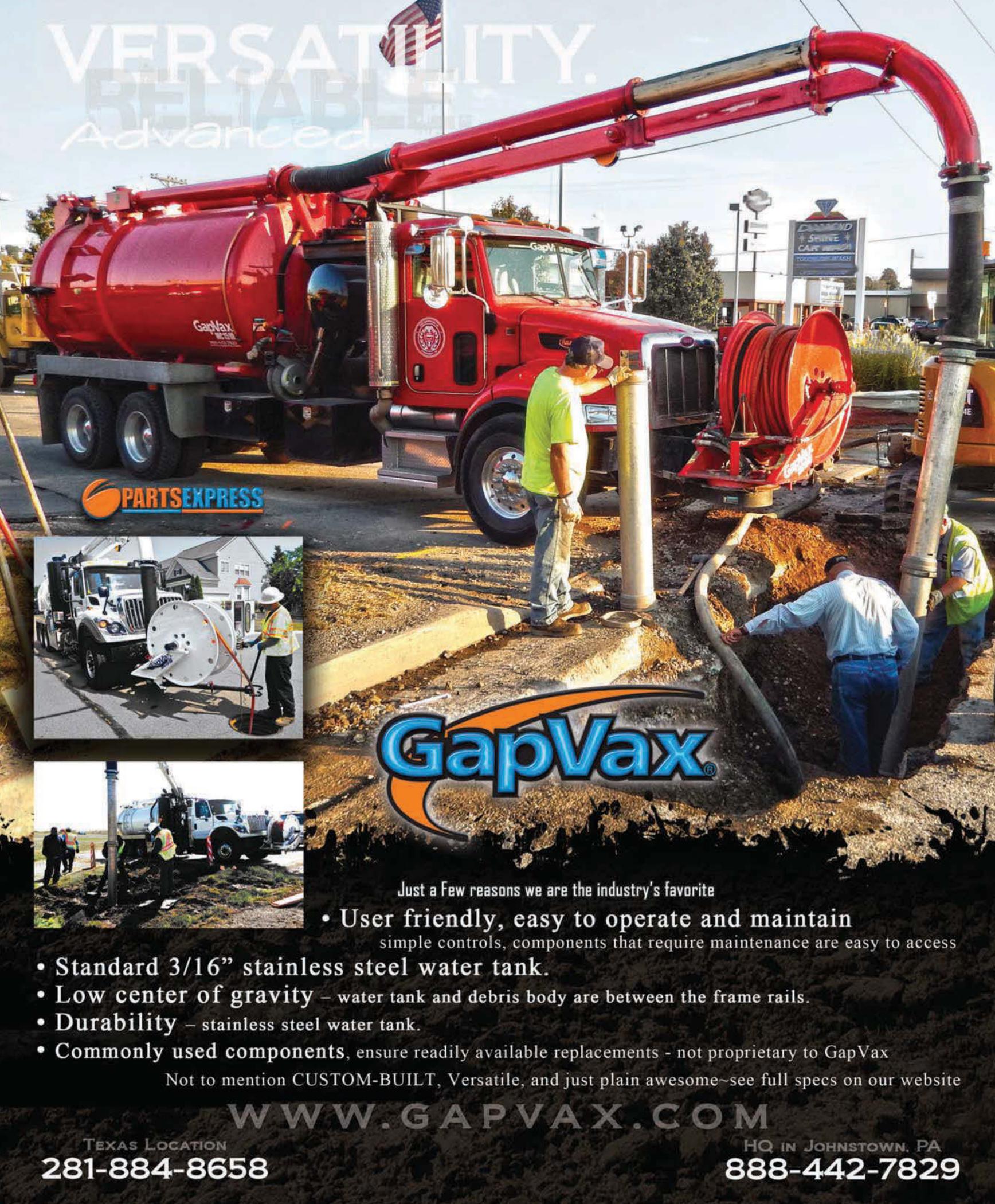
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