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City engineer
Lake Havasu City, Ariz.

UP TO THE CHALLENGE

Lake Havasu City earns accolades
for innovative sewer project

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2013

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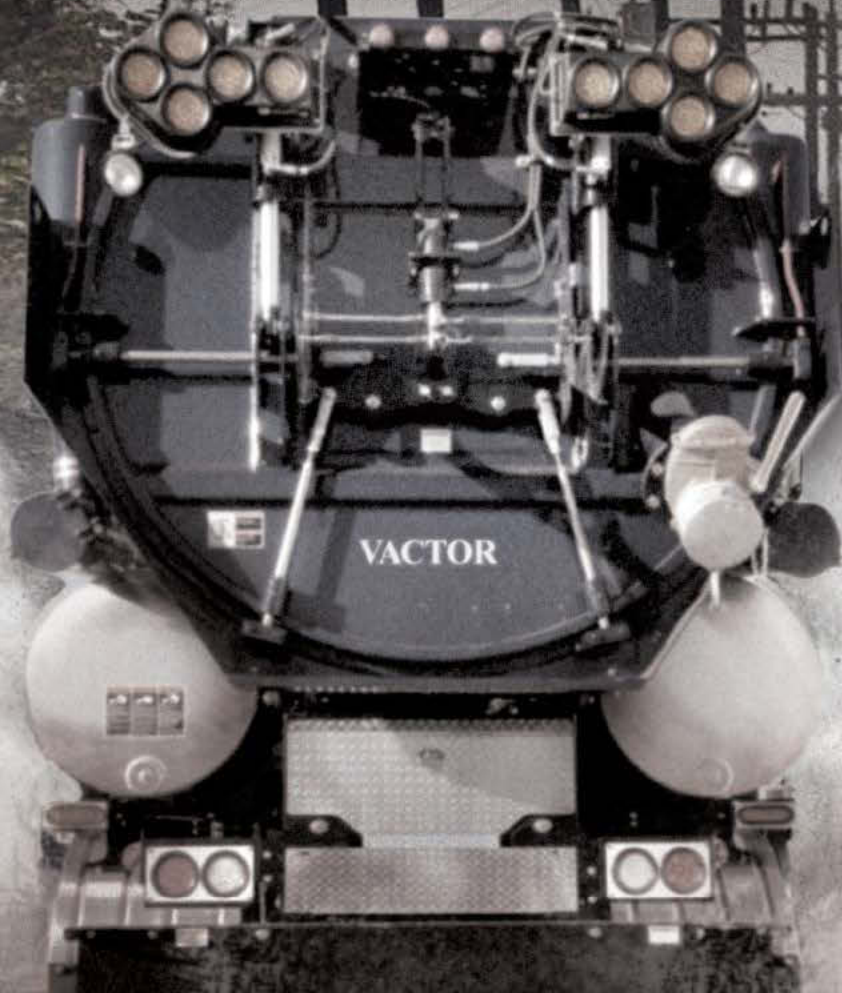
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ON THE COVER:

Greg Froslic, city engineer for Lake Havasu City, Ariz., helped guide the city's wastewater utility through a 10-year construction project that included the installation of 268 miles of sewer main and 334 miles of laterals. The project wrapped up ahead of schedule and under budget. (Photography by Jillian Danielson)



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FIXING THE LEAKS

Getting water loss under control will take dedication, support and a big investment

No one cries when thousands of gallons of treated water leak out of a transmission main several feet below their daily lives, but far too many complain when their water utility needs to raise rates or add fees to pay for infrastructure improvements.

Conveyance systems are the lifeblood of the water and wastewater industry. Much like our own blood, it's easy to take it for granted and just assume it will keep pumping.

In July, *The Bergen Record* of Bergen County, N.J., ran a story by

staff writer James M. O'Neill detailing the treated water lost annually by the state's water utilities. Clearly New Jersey has a serious problem, but it's shared by utilities across

the United States: Aging infrastructure is failing and significant investments are required.

O'Neill's story said that United Water, North Jersey's largest water supplier, could not account for 26 percent, or 10.6 billion gallons, of the water it treated and pumped

The remedies are not cheap: The U.S. EPA estimates the repair, rehabilitation and replacement of New Jersey's water infrastructure will require a \$4.7 billion investment. Nationwide, the EPA puts those costs at \$350 billion over the next 20 years.

in 2011. The Borough of Ho-Ho-Kus reportedly couldn't account for 33 percent. And a 2009 state audit found that a staggering 45 percent of the drinking water pumped in the City of Camden was unaccounted.

The remedies are not cheap: The U.S. EPA estimates the repair, rehabilitation and replacement of New Jersey's water infrastructure will require a \$4.7 billion investment. Nationwide, the EPA puts those costs at \$350 billion over the next 20 years.

Still, there are water utilities setting good examples. The Philadelphia Water Department's concerted efforts to reduce water system leaks are producing good results. The utility, profiled in this issue, maintains 3,159 miles of water mains from 6 to 93 inches. The average age of mains is 68 years, and the city claims the oldest active piping in the country, dating back to 1822.

The department fields a 20-person team dedicated to detecting water main leaks, covering approximately 1,000 miles of line each year in leak listening surveys, so that the system is scanned, on average, once every three years.

All told, the PWD repaired 954 water main breaks and over

2,500 leaks in 2011. Between 2000 and 2011, the program showed an economic benefit of more than \$16 million.

The Public Water Supply District No. 1 of Ralls County, Mo., also profiled in this issue, reports great success in reducing their own water losses.

The water district purchases and distributes 450,000 gpd to 6,300 residents in eight communities and surrounding rural areas. Before 2006, the district lost 40 million gallons per year. Unable to find certified operators and qualified staff to address the problems, the board of directors hired Alliance Water Services in 2001.

From 2004 to present, water losses dropped from 27 percent to 10 percent through aggressive meter change-outs and leak detection programs that culminated in two major pipe replacement projects totaling \$5.375 million. The operations team ran accountability audits, improved system maintenance and safety, and computerized billing, collections and financial reporting. In 2012, the district earned the System of the Year Award from the Missouri Water and Wastewater Conference Northeast Section for its achievements.

Our infrastructure needs work, but it's not a hopeless situation, as Philadelphia and Ralls County clearly prove. The key is formulating a good plan, getting the backing of municipal officials, and being dedicated to seeing the plan through.

I hope the Philadelphia and Ralls County stories can provide a bit of optimism and inspiration. They are great examples of what well-run utilities can do.

Enjoy this month's issue. ♦



FROM THE EDITOR

Luke Laggis

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FOCUS: WATER

TWO TALES OF A CITY

The Philadelphia Water Department relies on innovation to manage its assets with respect for ratepayers

By Peter Kenter

Philadelphia is one of the oldest cities in the country but the Philadelphia Water Department's (PWD) approach to stormwater management, sewer overflow and water system leak detection represent a significant evolution in the methods in which the city manages its infrastructure. At the heart of these initiatives is a passion for effective asset management and an emphasis on the bottom line.

Sewer and stormwater and management

The City of Philadelphia's sewer and stormwater system is managed under the guidance of its Green City, Clean Waters initiative, which treats the region and its systems holistically. Composed of both traditional grey infrastructure and green initiatives, the plan goes back to 1999 and was based on a concept developed by current water commissioner Howard Neukrug.

"He sketched out the plan on a napkin, which he still has in his office," says Christopher Crockett,

deputy commissioner of Planning & Environmental Services with the PWD. "He outlined a \$1 billion green infrastructure program that leveraged our current grey infrastructure. The idea passed a triple bottom line analysis that assessed the environmental, social and economic benefits of the plan. It also seemed to coincide with a time where development along the Delaware and Schuylkill rivers was taking off and we were seeing a number of changes in the social development of the city. It was the right idea at the right time and we got to work on it."

The PWD received considerable guidance and encouragement from the U.S. Environmental Protection Agency and the Pennsylvania Department of Environmental Protection in officially establishing the plan in 2004.

Working with regulators

"It's one of the first large green infrastructure programs in the country and the regulators worked with us to demonstrate how it could work and meet the targets of



Water distribution repair worker Craig Brennan, left, water conveyance supervisor John Bevan, and water efficiency program manager George Kunkel review recordings of leaks to determine where repairs are needed (leak correlator system from Sewerin). Once the location is established, the maintenance and repair team is directed to the proper spot for repairs. (Photography by Jack Ramsdale)

environmental regulations," says Crockett. "They clearly wanted it to succeed as much as we did."

The department operates 1,827 miles of combined sewers, 749 miles of sanitary sewers, and 720 miles of stormwater conduit, with some of the infrastructure dating back to the early 1800s. The PWD targets a 120-year replacement rate for sewer infrastructure.

"Some of the system is lined with bricks and the work of the craftspeople is so good you'd think it could last another few centuries," says Crockett. "In many cases, the damage inflicted on the system results from normal city activity, but it's holding up better than some of the

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Philadelphia
Water Department,
Philadelphia, Pa.

YEAR CITY ESTABLISHED:
1682

POPULATION SERVED:
2.3 million

AREA SERVED:
135 square miles city,
plus 230 square miles regional

DEPARTMENT STAFF:
1,800

INFRASTRUCTURE:
3,159 miles of water mains,
1,827 miles of combined
sewers, 749 miles of sanitary
sewers, 720 miles of
stormwater conduit

**ANNUAL DEPARTMENT
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\$655.2 million (2012-13)

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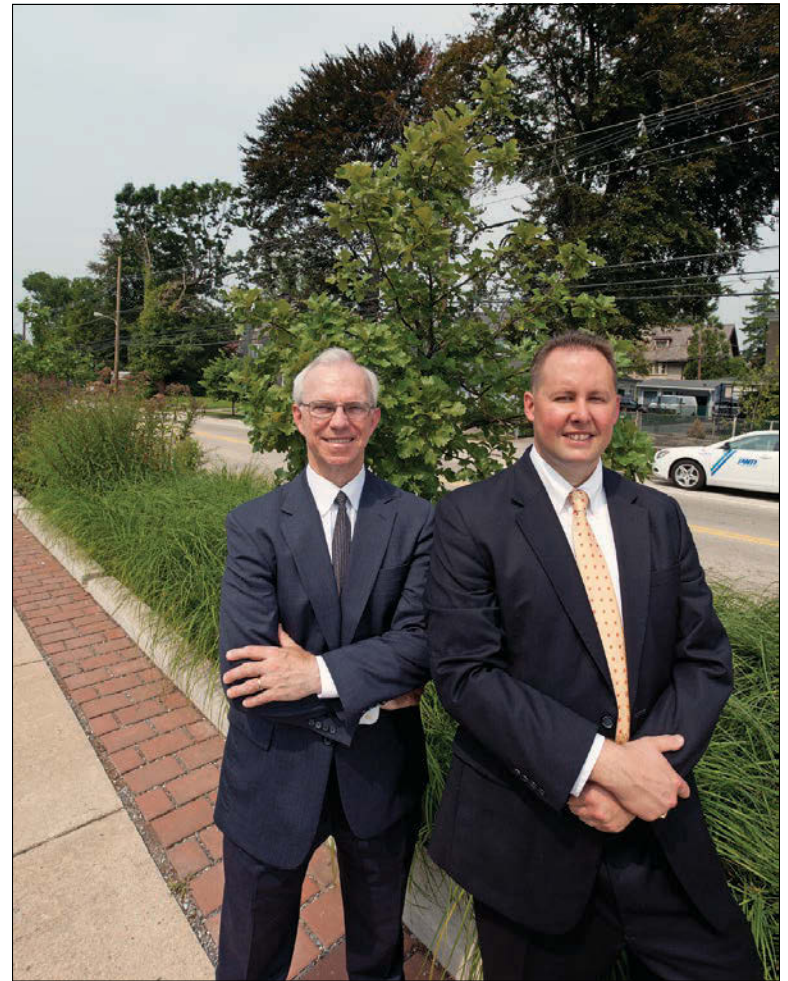


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The Philadelphia Water Department's Queens Lane Reservoir includes bump-outs for rainwater reclamation, reservoir banks and the purified water reservoir.

George Kunkel, P.E., water efficiency program manager, left, and Christopher Crockett, Ph.D., P.E., deputy commissioner of planning and environmental services, stand in front of one of the city's green bump-outs by the Queens Lane Water Reservoir that have been constructed to recapture rain water and return it to the earth. The bump-outs were reclaimed from on-road parking spaces and are planted with all native species.



“It’s one of the first large green infrastructure programs in the country and the regulators worked with us to demonstrate how it could work and meet the targets of environmental regulations. They clearly wanted it to succeed as much as we did.”

Christopher Crockett

projects from the 1950s when the work became more mechanized.”

The projects under the initiative are diverse, encompassing both system expansion and improvement, and source reduction. Replacement of eight miles of sewer mains per year and concrete relining of other sewer infrastructure by contractors, for example, falls under the plan. Under the ongoing Philadelphia Sewer Assessment Program, the system is inspected on an ongoing basis using closed circuit television cameras operated by in-house crews.

Major capital investments

Major capital projects under the initiative include a \$200-million, 25-year plan to expand its Northeast Water Pollution Control Plant by 215 mgd to 650 mgd in wet weather. The PWD is also currently building a \$47-million sanitary sewer overflow in Manayunk along the Schuylkill River.

“This is a big project about the size of a football field in a downtown business district with a lot of restaurants and traffic congestion,” says Crockett. “We had to remove a recreation center which will be rebuilt on top of the project when it’s finished, but we simply had to face the fact that this was the only location where it could be built.”

The PWD also negotiates with satellite clients who depend on the department’s wastewater treatment plant to reduce inputs into the system.

“We’re partnering with them to reduce their peak flows to something more manageable, in part by helping them find solutions to their own I&I problems,” he says.

Green initiatives

The PWD is also pursuing specifically green initiatives as part of its program, such as the use of porous asphalt for street paving.

“There are a lot of win-wins with projects like this,” says Crockett. “Porous asphalt allows precipitation to drain into the ground underneath the pavement instead of entering the stormwater system. We are working to demonstrate to the streets department that porous asphalt reduces ponding and freeze/thaw damage while improving snow removal issues.”

Initiatives such as this require considerable cross-department communication and planning. For example, last year, the city’s transit system created its first green roof bus stop, replete with a rooftop garden that diverts water from the stormwater system.

“We love to find these chocolate and peanut butter moments,”

THE ARCHAEOLOGY OF ASSET MANAGEMENT

An important component of effective asset management is an emphasis on thorough record keeping. The City of Philadelphia has maintained records of its sewer and water infrastructure dating back to the 18th century.

“I’m not sure how far back our department goes,” says Christopher Crockett, deputy commissioner of Planning & Environmental Services with the Philadelphia Water Department (PWD). “We’ve existed in previous forms from the Watering Committee to Public Works to the current PWD, but I know we have reports on the water supply dating back to 1799.”

Crockett says he continues to refer to informative reports on the system going back to the late 1800s.

“I love going through all of this history,” he says. “Everything is an archaeology project. I’m also impressed with the work people accomplished in previous centuries — they were consummate professionals. Maybe without phones, email and computers they didn’t do a million things at once and could concentrate more on the quality of their work.”

(continued)

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Water distribution repair workers Joe Pasquarello, left, and Craig Brennan set up magnetic microphone sensors to listen for leaks and record the sounds. By setting up microphones in different locations, the operator can determine where the leak is located.



Water conveyance supervisor John Bevan runs a hydrant to find the pressure rating and determine if there is a leak.

“We love to find these chocolate and peanut butter moments. Maybe there’s a project that’s on hold, but the PWD might be the catalyst that moves it along, or allows another project to piggyback onto it. You won’t hit a home run with every pitch, but you may keep moving that project closer to completion.”

Christopher Crockett

says Crockett. “Maybe there’s a project that’s on hold, but the PWD might be the catalyst that moves it along, or allows another project to piggyback onto it. You won’t hit a home run with every pitch, but you may keep moving that project closer to completion.”

Crockett says that some sewer and stormwater projects are considered more acceptable to the public when they’re combined with an obvious improvement to above-ground infrastructure.

“If you piggyback a stormwater project onto one involving the installation of street furniture, new tree plantings, or a park with a permeable asphalt basketball court, they tend to see it as a quality of life improvement,” he says.

Crockett’s advice to other juris-

dictions pursuing green infrastructure solutions is to do what works best, not necessarily assume that green infrastructure represents the best solution for each project.

“Maybe in your area grey is best or green is best,” he says. “I’d describe our system as grey with green on top. However, if the best solution for one city is a tunnel, then build a tunnel. It depends on your needs and situation. Use the Goldilocks principle to create the mix that’s right for your situation — not too hot, not too cold, but just right.”

Water system leak detection

The PWD supplies treated water

not only to its own citizens but also to communities in the city’s suburbs. A critical component of that delivery is controlling water loss and leaks and auditing those results with an eye to the bottom line.

The city maintains 3,159 miles of water mains ranging in diameter from 6 to 93 inches. The average age of mains is 68 years, although the city also claims the oldest active piping in the country, dating back to 1822. About 65 percent of mains are made of cast iron, and 25 percent are newer mains made of ductile iron. Other materials account for 10 percent.

The department fields a 20-person team dedicated to detecting water main leaks. The team covers

approximately 1,000 miles of line each year in leak listening surveys, so that the system is scanned, on average, once every three years.

Extensive asset records

“We believe that this is just about right for our system,” says George Kunkel, water efficiency program manager with the PWD. “We’ve been working to that schedule for more than 30 years. We’ve been consistently maintaining asset records and our leak detection tracking data, costs and savings goes back to the late 1970s. We’ve got a good basis for a cost-benefit argument supporting that schedule.”

Areas of the city prone to leaks receive more frequent attention, up to once every 18 months, while newer infrastructure lags slightly at four years.

“We field two or three crews during the day shift, and two during the night shift, from 10 p.m. to 6 a.m. when the city is quieter and we can more easily detect leaks in noisier areas using acoustic equipment,” says Kunkel. “They perform general sounding using acoustic listening devices and when they have a suspicion of where the leak is, they pinpoint it using a leak correlator. The team will do further checking manually and mark the location with spray paint, then refer the location for repair.”

Acoustic leak detection works best in smaller mains located close to the surface. For larger diameter transmission mains buried deeper, the department has conducted a five-year pilot study using Sahara, a technology service offered by Pure Technologies. Sahara employs an acoustic sensor outfitted with a parachute that’s inserted into a tap on pipelines 16 inches in diameter or larger. Tethered outside, the device is carried through the main along with the water flow, as a human operator outfitted with a locating tool shadows its passage on the surface.

Sahara has located 76 leaks in more than 36 miles of mains since 2007. Some of those leaks were found in challenging locations that included mains running under a creek, beneath wooded parkland and below an interstate highway.

All told, the PWD repaired 954 water main breaks and over 2,500 leaks in 2011.

“We field two or three crews during the day shift, and two during the night shift, from 10 p.m. to 6 a.m. when the city is quieter and we can more easily detect leaks in noisier areas using acoustic equipment.”

George Kunkel

District metering study

The PWD has also conducted a three-year pilot district metering study conducted from 2007 to 2010 through the Water Research Foundation. Under the study, a specific district in the water system was isolated through engineered valving while water flow was maintained and tracked through a single supply pipe.

“It’s a common technique internationally, particularly in the UK,” says Kunkel. “The idea is intuitive and one of those things where you ask yourself why you didn’t think of it sooner. We typically see water consumption falling to a minimum and leveling off in the wee hours of the morning. If you collect consumption data over weeks and suddenly see a rise in demand, we can determine whether that demand on the system is related to consumption, or emerging leakage.”

The study not only helped to isolate leaks in this specific district metered area, but also allowed the department to moderate historic pressure levels through the use of pressure reducing valves, to achieve a further degree of leakage control.

“Water pressure influences the rate of leakage,” says Kunkel. “In a pinhole leak, a much higher leakage rate occurs at 150 psi of pressure compared to 50 psi of pressure. Pressure management targets the weeps and seeps at pipe joints and fittings that are very pressure-dependent. International studies have shown that, over time, pressure controls also lessen stress on the overall distribution infrastructure, leading to fewer main breaks and extended system life.”

The city also continues to upgrade customer meters, verify the accuracy of system flowmeters, and categorize all unbilled treated water.

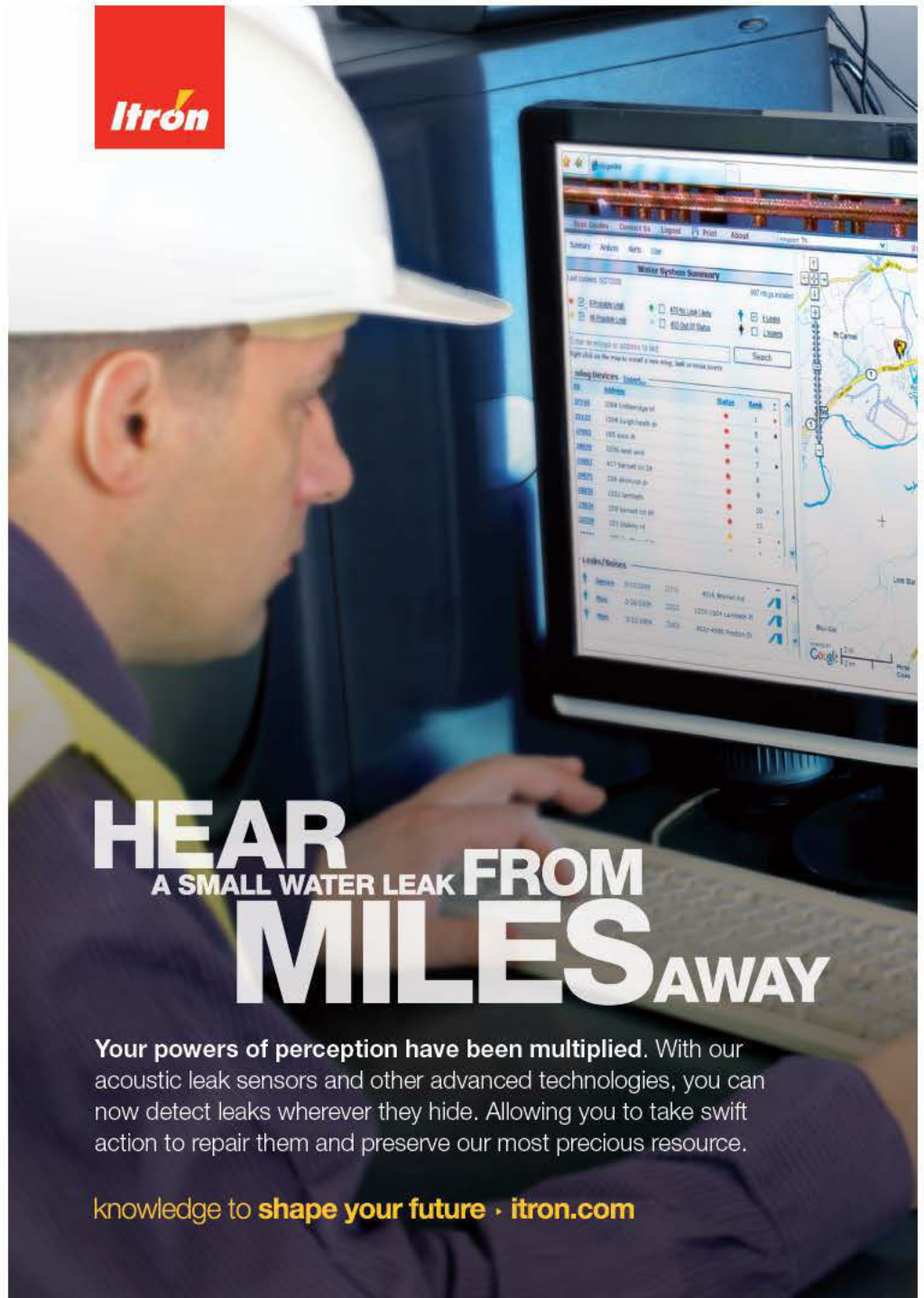
Quantifying success

The PWD has annually quantified the results of its water loss control program for the period from 2000 to 2011 and uses free software supplied by the American Water Works Association (AWWA). The reports demonstrated that program efforts showed a positive economic benefit of more than \$16 million over that time.

The PWD is also using CapPlan Water software from Innovyze to crunch a century of data on pipe materials, locations, geographic features and age of infrastructure. Using that information, CapPlan

will provide the department with probability and consequence tools to execute informed infrastructure planning with limited financial resources.

Kunkel’s advice to any utility regarding leakage management: “All water utilities should conduct leak detection at a time interval that is appropriate for them. No matter whether leak detection is conducted every three years or every five years, it’s important to set up tracking procedures to determine the value of that program and how it impacts the bottom line. The AWWA provides excellent guidance on how to collect and assess leak detection data.” ♦



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ELIMINATING LOSS

Award-winning water district targets leaking lines and inaccurate metering in bid for greater efficiency

By *Scottie Dayton*

From the moment Public Water Supply District No. 1 of Ralls County, Mo., turned on the pumps in 1971, the new distribution system leaked.

About 30 percent of the district is hilly and rocky. Contractors installing the solvent-weld, thin-walled

PVC pipes tossed them into trenches without bedding, then backfilled. "Rocks cracked or punctured some pipes the day they were laid," says Jon Rogers, local manager of Alliance Water Resources, a provider of management and contract operations services in Missouri and surrounding states.

The water district purchases 165 million gallons of water annually from the city, distributing an average of 450,000 gpd to 6,300 residents in eight communities and surrounding rural areas. Before 2006, the district lost 40 million gallons per year. Unable to find certified operators and qualified



PROFILE:
Public Water Supply District No. 1 of Ralls County, Mo.

INCORPORATED:
1967

POPULATION:
6,300

AREA SERVED:
213 square miles

INFRASTRUCTURE:
350 miles of distribution mains, five elevated storage towers totaling 750,000 gallons, three pump stations

ANNUAL BUDGET:
\$1.964 million

STAFF:
7

WEBSITE:
www.alliancewater.com

Alliance employees Tyler Stuhlman, left, and Devon Muehring install a new Neptune T-10 meter with R900 radio frequency (RF) meter interface units (MIU). (Photography by David Owens)



(continued)

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“If crews drove past meters in the construction zone, they replaced them with Neptune R900 radio-read units. We installed 1,000 in 2008, and that really jump-started the program. Now it takes one day to read the meters.”

Jon Rogers

The Ralls County team includes, from left, Alliance system manager Jon Rogers, Alliance employees Mike Elliott, Tyler Stuhlman and Devon Muehring, Alliance foreman Roger Nichols, and Keith Deaver, president of the water supply district’s board of directors.

FILLING THE TRAINING VOID

The inability to find certified operators and qualified staff led the Public Water Supply District No. 1 of Ralls County, Mo., to hire Alliance Water Resources. However, the staff that local manager Jon Rogers brought with him also was not certified.

A group effort solved the situation. The Missouri Department of Natural Resources and Missouri Rural Water Association provided the majority of training, and Alliance’s parent office supplied the rest. Today, all of Rogers’ staff, including the office manager, has distribution certification from the DNR.

“Each agency focuses on different training areas, giving my people a better knowledge of what is happening in the industry and the different techniques,” says Rogers. “Technology changes so rapidly that it takes considerable effort to stay on top of it. My staff welcomed the opportunity to advance their personal development, and take ownership of providing customers with quality water and service.”



Devon Muehring, left, and Tyler Stuhlman open a hydrant to drain a water tower.

staff to address the problems, the board of directors hired Alliance in 2001.

From 2004 to present, Rogers and a staff of six reduced water loss from 27 percent to 10 percent through aggressive meter change-outs and leak detection programs that culminated in two major pipe replacement projects totaling \$5.375 million. They ran accountability audits, improved system maintenance and safety, and computerized billing, collections and financial reporting. In 2012, the district earned the System of the Year Award from the Missouri Water and Wastewater Conference Northeast Section for its achievements.

Early efforts

The district, running 30 miles along the Mississippi River, has three pump stations, five elevated storage towers totaling 550,000 gallons, and 350 miles of distribution mains. Although the city sits on a vast alluvial plain, it draws surface water from the river.

Rogers’ team spent the first three years evaluating the situation. They began by auditing 1,600 customer- or self-read meters to verify billing accuracy. “Most residents made honest errors, such as omitting the zeros in the meter’s last digits,” says Rogers. “Others estimated their water usage rather than read the meters.”

Although those incidents contributed to expenses exceeding revenue, they weren't significant enough to account for the major discrepancy Rogers saw over the summer. Wondering what was going on, he asked his office manager and part-time assistant to look at accounts for appreciable seasonal variances.

"We located some 100 swimming pools filling at 30,000 gallons," he says. "The owners were spacing out payments over three or four months. Because the board wanted to keep the self-read meters at that time, we educated the owners and brought a billing system with better accountability." The remaining 1,100 meters were employee-read, a task requiring three days per month.

Metering progress

Having cleared the low hurdles, the team determined its first project. The district had a \$500,000 transmission main that was never activated because it needed a pump station. In 2004, contractors built it, installed three 20 hp Gorman-Rupp pump skids, and put the main online to improve service. Customers noticed.

The team then evaluated water loss to control affiliated costs and came up with five areas requiring attention. Meter accuracy topped the list. Some 5/8- by 3/4-inch-diameter residential meters were more than 35 years old and registered more than four million gallons. "We estimated that 30 percent, or more than 800 meters, were below American Water Works Association standards for replacement," says Rogers.

As six field workers maintained the system, they began replacing a minimum of 250 of the worst meters a year with T-10 meters from Neptune Technology Group. "Changing out the meters made a huge difference in our revenue, bringing in \$70,000 the first year," says Rogers. "In hindsight, that money is repaying the majority of the Rural Development Loan we secured to replace some infrastructure."

In 2008, Alliance implemented automatic meter reading as part of Phase 1, a 54-mile pipe replacement project. "If crews drove past meters in the construction zone, they replaced them with Neptune R900 radio-read units," says Rogers. "They installed 1,000 that year and it really jump-started the program. Now it takes one day to read the meters."

By 2010, all the meters met AWWA accuracy standards. The next year, 500 more meters received radios as part of Phase 2, a 20-mile pipe replacement project. "We'll be a totally radio-read district by March 2013 when we replace the remaining 220 self-read meters," says Rogers.

The replacement program recycles every 10 years for 10 percent of the units.

Tuning the system

During the meter change-out program, pressure switches governed water tower accuracy. "If something went wrong in the middle of the night, the tower overflowed and we'd lose quite a bit of water because there was no alarm system," says Rogers.

Alliance hired Navionics, a computer SCADA company, to connect the four towers and send alerts when they had anomalies. "During high winds and heavy rains, the system calls us 50 times, but that's okay," says Rogers. "We can see it's a communication problem and not an overflow or power failure."

The district had overlooked the Badger master meters in the past. Although they were in good condition, Alliance implemented an annual program to calibrate them for accuracy.

The same could not be said for the valves. Many were missing or lost, and those that remained had not been exercised. "There were no records," says Rogers. "We developed a program and our field workers identified, documented and downloaded GPS coordinates on all the valves."

One bad boy

With items two, three and four checked off the list, Rogers' team turned their attention to the final problem, the cracked or broken distribution piping. From 2001 to 2006, the district had more than 10 leaks per month. Although the system has one pressure zone with mains tied together equally, elevation differences enable some customers to have water pressures of 40 psi while others on the same line have 200 psi.



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Alliance System manager Jon Rogers, left, oversees as foreman Roger Nichols and employees Tyler Stuhman and Devon Muehring clean out and shut off water tower valves.

"We found the 200 psi leaks at the bottom of hills very quickly," says Rogers. "Those at the top of the hills were more challenging." To identify the primary replacement areas in the system, field workers originally used rented leak correlators, but the PVC pipes dampened sound, making pinpoint accuracy difficult.

Rogers reverted to old-school methods: dividing the district into zones, evaluating customer consumption, and calculating areas with the highest water loss. Then the crews volunteered to go out at 1 a.m., close the valves, and listen. "They tracked down leaks by walking the line," he says.

After staff added the numbers over two years to determine the replacement areas, local district engineer Klingner and Associates designed the projects. C&S Construction in New London, Mo., won both bids.

Vindication

In 2007-08, the Phase 1 project for \$3.24 million upsized 4-inch mains to 6-inch SDR 21 or C900 PVC pipe wherever the line had volume or hydraulic issues, or the possibility of them. All work was open-cut, sometimes trenching right on top of the old main. Along one section, the excavation was kicking out a stainless steel repair clamp at each 10-foot glue joint.

"Over five years, we had repaired

every joint for 120 feet," says Rogers. "Our funding agency was on site taking pictures and they were amazed. Seeing those clamps justified why we needed the loan."

Rocks again proved challenging, and required a rock trencher for more than a mile. "At one point, the rock was so hard that C&S advanced 50 to 80 feet per day for five days," says Rogers. Crews bedded the pipe on 6 inches of trucked-in soil or crushed limestone, then covered it with 6 more inches of the same material before backfilling.

"Over five years, we had repaired every joint for 120 feet. Our funding agency was on-site taking pictures and they were amazed. Seeing those clamps justified why we needed the loan."

Jon Rogers

"Klingner and Associates had a construction inspector on site at all times," says Rogers. "Our field workers operated valves and oversaw flushing to make sure the disinfection was completed correctly."

Phase 2 and beyond

The second project for \$2.135 million upsized 2- to 6-inch mains to 6 inches and above to tie the middle of the distribution system to the outlying areas. Caldwell Tanks, a subcontractor of C&S Construction, built a 250,000-gallon water tower for additional storage capacity, then tied the towers together to improve hydraulic flow

Jon Rogers and Devon Muehring check readings from a sampler at a sewer treatment location near Hannibal Lake (3700 Sampler, Teledyne Isco).

between them. They upsized those lines to 8 and 10 inches.

"The two replacement projects reduced our leaks to less than five per month," says Rogers. "They're tough to find because they are so small, but they represent the last 10 percent of water loss."

In 2011, crews evaluated 105 miles of pipe by closing the valves at night, listening, and walking the lines. Rogers is researching leak correlators while staff evaluates Phase 3. "The first two projects revealed some outlying issues such as 2.5- and 3-inch mains," he says. "They're spurs less than a mile, but we want them standardized to keep our repair parts inventory manageable."

Having overcome major water accountability challenges, the next big project for Rogers' team was working with the city to evaluate options that would provide customers with better water quality. They began by each investing \$50,000 to conduct an engineering study to ensure the district would comply with reduced disinfection byproduct levels by October 2013.

However, the City of Hannibal's treatment plant, built in 1908, would not meet upcoming drinking water standards for cryptosporidium, trihalomethanes and haloacetic acids. The district, city and Alliance are looking at options that include changing the treatment process, replacing the plant, or switching from surface water to groundwater because groundwater meets the current standard more readily.

"We're trying to establish a strategy based on what standards could look like in five years, then invest in ways to meet them today," says Rogers. "The cost of capital projects has doubled over the last eight years, so making the best decisions now will keep us compliant, while advancing and saving money in the future." ♦



WATCH THEM IN ACTION

To learn more about Public Water Supply District No. 1 of Ralls County, view the video at www.mswmag.com.

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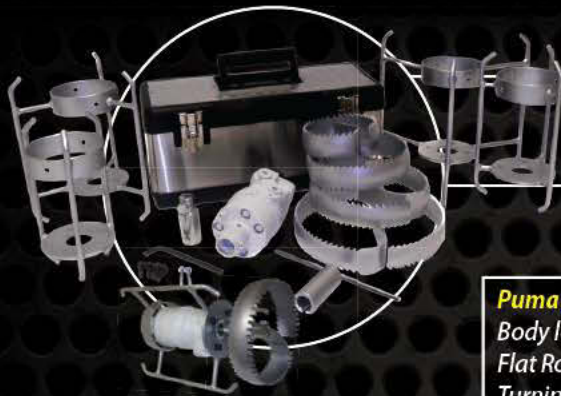
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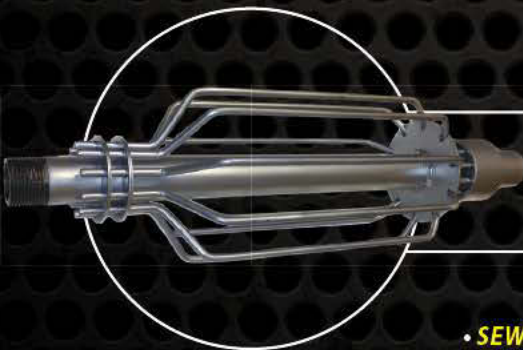
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GET READY FOR INDY

Pumper & Cleaner Expo will return to the Hoosier State in 2013

By Luke Laggis

The Pumper & Cleaner Environmental Expo International will return to Indianapolis Feb. 25-28, 2013, bringing back everything that made the 2012 Expo a huge success along with some new features to help attendees get even more out of their time in Indy.

"Once a year there is a gathering of the best in the industry," says Bob Kendall, co-founder of COLE Publishing and president of COLE Inc. "The best manufacturers, dealers and suppliers meet with the best pumpers, cleaners and service contractors. This gathering provides unequalled opportunity to see, learn, grow and develop their businesses."

Education Day will kick off the 2013 Pumper & Cleaner Expo, providing an opportunity to acquire the strategies and technical know-how to push your business or utility forward. Topics cover everything from *Pump Choices and Settings* to *The Science and Engineering of Onsite Wastewater Treatment*. Pumpers, cleaners and other wastewater professionals will have the opportunity to learn from the industry's top experts, gaining insight on best practices and strategies for growth and success. Education Day also facilitates free dialogue among your peers, so you can seek and share advice and experiences that competitors might otherwise keep to themselves. It's a

day dedicated to helping you expand your knowledge base and improve your craft.

The learning opportunities won't end when the final session lets out on Monday afternoon. Educational seminars are also slated for Tuesday and Wednesday, and Roundtable Discussions will be held Thursday morning. In fact, this year's Expo features one of the most expansive lineups of educational opportunities in the event's 33-year history. You can learn about new tools, technologies and methods for solving specific problems, fine-tune your knowledge of basic in-the-field practices, and learn business leadership skills that can help transform your performance and profit. And on top of it all, Expo education courses count toward continuing education credits in many states. Check out the Expo website (www.pumpershow.com) for specific information on your state.

Of course, it's not all about the classroom. It's really the massive display of tools, trucks and technology that steals the show. The Pumper & Cleaner Expo is the only place you can meet all the major manufacturers, kick the tires on the latest equipment, and network with the people who know this industry best.

A record 92 percent of attendees at the 2012 Expo said they'd be coming back in 2013, so you



"There's no better place to network with others who understand your business. The free exchange of knowledge and experience is priceless. There's no better place to learn how to become more profitable."

BOB KENDALL



Education Day at the Pumper & Cleaner Environmental Expo provides a full day of great learning opportunities spanning a wide range of topics.

can be assured of rubbing elbows with the best people in the industry.

"There's no better place to network with others who understand your business," says Kendall. "The free exchange of knowledge and experience is priceless. There's no better place to learn how to become more profitable."

Last year, 501 exhibitors filled over 550,000 square feet on the show floor, and the response is already up from new companies



Attendees pack the hallways outside the show floor just prior to the opening of the 2012 Pumper & Cleaner Environmental Expo. The Expo returns to Indianapolis Feb. 25-28.

ing distance of the Convention Center. Find your favorite spot to meet up with clients, colleagues and friends, and find out what Indy's "Hoosier Hospitality" is all about.

While you're planning your itinerary, be sure to keep Tuesday night open for the Industry Appreciation Party and Craig Morgan concert at the JW Marriott Hotel, connected to the Convention Center. It promises to be a great night.

In fact, the Expo promises four great days. If you haven't been to the Expo, jump onto the website and take a look at everything it can offer you and your business. It's easy to plan the trip, and you'll walk away with a better perspective on your business and the industry as a whole.

See you in Indy. ♦



The 2013 Expo will occupy over 550,000 square feet of exhibit space at the Indiana Convention Center in downtown Indianapolis.

interested in the 2013 Expo. An initial list of exhibitors can be found in this issue, and the list is continually updated on the Expo website, which you can also use to preview the educational sessions, study the interactive floor plan, plan your itinerary and search for hotel rooms. Three new hotels

near the airport will provide convenient accommodations for those with early or late flights.

Indy also has plenty to offer outside the Expo hall, including a wide range of museums, entertainment venues and shopping opportunities, and there are hundreds of restaurants within a short walk-

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Utility workers Josh Wehner, left, and Jason Carter use their Vactor 2100 to clean out a sewer line at the Refuge Golf Course and Country Club. (Photography by Jillian Danielson)



FOCUS: SEWER

UP TO THE CHALLENGE

Arizona wastewater utility tears up yards and streets without burning any bridges

By Jim Force

You wouldn't think a community could complete a 10-year sewer construction project, tearing up over 90 percent of its streets and 70 percent of its private property parcels, and do it under budget, ahead of schedule, and without an uprising by the citizenry.

In the case of Lake Havasu City, Ariz., however, you'd be wrong.

In a project that began in 2002, the city has just finished removing nearly 22,000 septic systems and installing 268 miles of sewer main, 334 miles of laterals, 30 pumping stations and over 3,500 manholes throughout its residential community. The project is designed to curtail nitrate pollution of the groundwater and protect the municipal drinking water supply. Innovative practices reduced costs, accelerated construction and caused as little disruption to customers as possible. For its efforts, Lake Havasu City was named wastewater project of the year by the Arizona Water Association, and the Arizona Chapter of the American Public Works Association.

"It was a tremendous undertaking," says city engineer Greg Froslier, summing up the infinite number of details and challenges that had to be addressed. "I didn't have any gray hair when we started, but we can look back on the project today and be proud of our accomplishments!"

A water community

Lake Havasu City is situated on a slope overlooking the Colorado River on the western boundary of Arizona, across from California. The city was formed in 1963 as a planned community, and was incorporated in 1978. Its waterfront is a popular spot for boating and fishing. The year-round population is just over 50,000, but the community swells with visitors during both the winter and summer seasons.

While the original commercial and business areas were sewered and served by a small wastewater system that included two treatment plants, the city's residential

(continued)



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“It was a tremendous undertaking. I didn’t have any gray hair when we started, but we can look back on the project today and be proud of our accomplishments!”

Greg Froslic

neighborhoods have traditionally relied on septic systems — approximately 25,000 of them. Over the years, these systems leached nitrates into the shallow groundwater, threatening the city’s drinking water supply and causing pollution of Lake Havasu and the Colorado River itself.

Following beach contamination in the mid-1990s, the Arizona Department of Environmental Qual-

ity drilled monitoring wells and conducted testing that revealed over 300,000 pounds of nitrates per year were leaching into the groundwater. Where the monitoring wells tested high for nitrates, the department prohibited conventional septic systems within one mile of the well, and suggested that the community take remedial measures or face a future where no more development or septic systems would be allowed.

Froslic says that was a strong incentive. “We conducted public informational presentations at all the area schools, basically letting people know what we were up against,” he says. The estimate for pumping and destroying all septic systems and replacing them with sewers was \$463 million, and the original schedule stretched out

over 12 years. “The real estate community was especially supportive,” Froslic says. “They realized that a moratorium on development would have been detrimental to the city’s economy. Delay was not a choice.”

The community’s connection with the river also helped. “Here, people can look out of their windows and see the river,” Froslic explains. He believes that acted as a motivation to accept the project and be proactive about the solution. Plus, the project would help to significantly reduce the amount of pollutants reaching the endangered Lower Colorado River, which supplies drinking water to more than 25 million residents.

Rather than face either the building moratorium or a consent decree, the community’s taxpayers approved the \$463-million bond

issue in November 2001, with almost 85 percent in favor. Working with the engineering firm of Burns and McDonnell, the city began planning for the massive project.

Empathy with homeowners

At the time, existing law prohibited completion and activation of the lateral connection to an individual home until the entire

PROFILE: Lake Havasu City, Ariz.



FOUNDED:
1963

SERVICE AREA:
43 square miles

POPULATION SERVED:
55,000 (23,000 customers)

INFRASTRUCTURE:
268 miles of mains, 334 miles of laterals, all PVC pipe, mostly 8-inch; three wastewater treatment plants (8.2 mgd total design capacity); 48 pump stations, plus 28 personal and private stations under contract

NUMBER OF EMPLOYEES:
8 in wastewater collection division

ANNUAL OPERATING BUDGET:
\$1,658,271

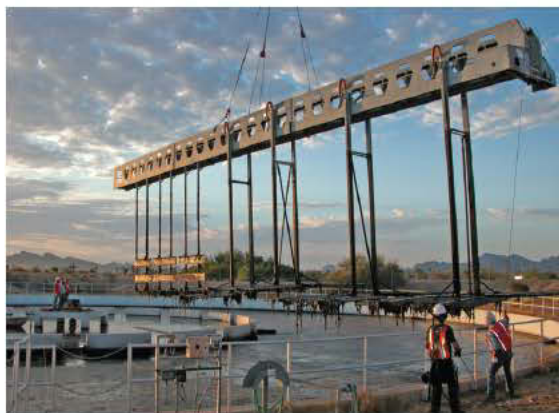
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The Lake Havasu team reinforces bars for an aeration basin at the North Regional WWTP.



PHOTOS COURTESY OF GREG FROSLIE

The team replaces the aeration bridge at the Island Wastewater Treatment Plant.



NEW SYSTEM CREATES NEW MAINTENANCE PRIORITIES

The additional sewer lines in Lake Havasu City have appreciably changed the size and scope of the jobs of wastewater division manager Doug Thomas, utilities supervisor Ed Donahue and their collections crew.

They are now responsible not only for 90 miles of old pipe (half of which is clay) that served the original areas of the city, but several hundred miles of new PVC pipe, many more pumping stations, and additional wastewater treatment facilities.

“We had 17 city-owned pump stations, but now we have 48, plus 18 personal pump stations and 10 private pump stations that we also maintain under separate contracts with the owners,” says Thomas.

Lake Havasu City also expanded one of its existing treatment plants, made improvements to a second, and built a brand new 3.5 mgd membrane plant as part of the new sewer project. The additions bring total design wastewater treatment capacity to 8.2 mgd. Furthermore, all collections and treatment facilities are now tied into the utility’s new SCADA system, supplied by HSQ Technology.

The changes have required new procedures for maintenance, cleaning and odor control.

Thomas and Donahue explain that prior to the project, the city had one 1992-vintage Vactor 2100 vacuum truck and a single CCTV video unit. They added a second Vactor 2100 in 2004, and another in 2010 to replace the original vehicle. In addition, they now use outside contractors to video their sewer lines.

“Our old video unit is in need of repair, which would be expensive,” Donahue says. “Plus the technology has advanced considerably. The contractors have units that are far superior to what we have.”

Donahue says the city’s practice is to clean and inspect the system section by section, moving completely across the city over a three- to five-year period.

“With the city situated on a hillside, we clean from the top, doing a section of roads down to the main pumping station,” he says. “In flatter areas of the system, or in areas with a lot of restaurants, we clean more frequently.”

(continued)

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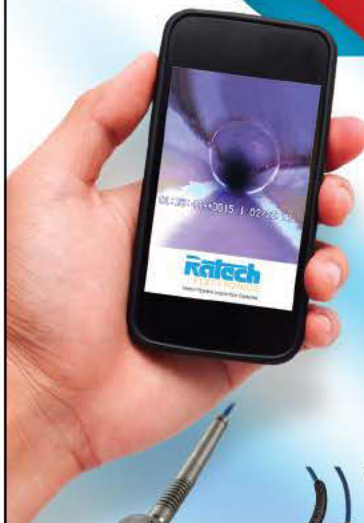
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Josh Wehner cleans out a manhole at Rotary Community Park with the vacuum hose from a Vactor truck.

system was finished, tested and approved by the state. In the case of Lake Havasu City, that would have resulted in an extraordinarily long time between the beginning and completion of construction in the neighborhoods — a major inconvenience to homeowners. Working together, the city and the state created the Partial Engineers Certificate of Completion (PECOC)

“The real estate community was especially supportive. They realized that a moratorium on development would have been detrimental to the city’s economy. Delay was not a choice.”

Greg Froslic

process, which allowed homes to be connected to the sewer system as each segment of the project — manhole to manhole — was completed and tested.

Not only was it the first use of the PECOC process in Arizona, the new procedure also allowed the city to draft its construction contracts so that homeowners would experience as little upset as possible.

“Normally, you’ll have contractors milling pavement, laying sewer

main, and installing manholes, and then moving on to the next section before the first group of homes is completely finished, trenches back-filled, and landscaping complete,” Froslic explains. “It leads to what amounts to a small parade of contractors working across a person’s property. Homeowners can’t wait; getting it wrapped up is their biggest concern.”

City project manager Jeremy Abbott was responsible for contract language that “sequenced” the project. “He tightened up the specifications, so the construction was laid out in steps,” Froslic says. “The connections had to be made and property restored before the contractor could move on to a new section.

“Contractors couldn’t walk away and leave a mess in the yard. Experience showed us that customers wouldn’t tolerate more than 60 days of construction activity in their neighborhood, so we modified the contract language to reflect this; we specified that once a section of pavement was milled, all work had to be completed, including repaving of the street, within a maximum of 60 days. Monthly payments to the contractors were based on the sequencing.

“In other words, any main line pipe installed by the contractor

GETTING TO THE ROOT OF THE PROBLEM

Even though Lake Havasu City is in the desert, tree roots can be a problem.

“People plant drought-resistant species like palms and oleanders,” says wastewater division manager Doug Thomas. “And even though there aren’t that many, they’re thirsty and they’ll extend their root systems into the sewers if they can find a crack or joint that’s open.”

Especially in the older clay pipe section of the system, the Lake Havasu City crew uses spinner nozzles on its vacuum trucks to cut and clear roots. Occasionally, they have contracted out for chemical root control services.

Odors have been another issue. “As we added more force mains as we expanded the system, we had more problems with odor complaints,” says Donahue. “Also, it’s very hot here.”

To combat the hydrogen sulfide, the city uses chemical injection systems that pump a calcium nitrate solution (TriOxyn from AH Water) into the mains. At the pump stations, biofilters from Siemens help to further reduce odors. “The complaints are way down,” Donahue says. “The system has been very effective.”

The new SCADA system has been effective, as well. “It monitors all the pump stations, plus the treatment facilities,” explains Thomas. “It’s been somewhat challenging, adding more pump stations and integrating them into the system.”

He says a key to success has been close coordination between the contractor and the city’s system integrator. “We actually structure each contract to include our systems integrator and the city’s electrical engineer and designer,” says Thomas. “They are directly involved in pre-construction meetings, assuring that the new systems will be able to talk to each other and to the city’s system.”

was not eligible for payment until all of the properties on that segment were connected and the landscaping was restored. We kept the parade as short as possible.”

Other innovations

In addition to the PECOC process, other innovations helped move the project along and save both money and time.

“Standard specifications were refined after each individual area was constructed, and issues encountered with the specifications or with the community were addressed and resolved,” Froslic says. In addition, the city developed and continuously updated a database on all project information and correspondence among all parties, most importantly the residents.

The city also took advantage of state regulations relating to “curvilinear” sewer main construction. “Since this is a planned commu-

nity, and most of our streets are curved,” explains Froslic. “We were allowed to bend the pipe around the curves in many areas, greatly reducing the number of manholes required.”

Froslic notes that had the city been held to the customary manhole requirements — based on straight sewer sections — they would have had to construct as many as 9,500 manholes. With the curvilinear arrangement, that number was reduced to 3,891 and at a cost of around \$3,500 each, that added up to quite a savings.

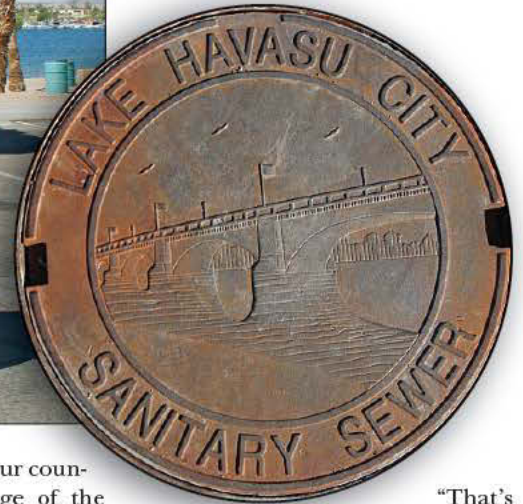
“As long as we met a minimum radius, our designs were acceptable to the DEQ,” says Abbott.

Another cost-savings factor was the relative isolation of Lake Havasu City. “Many of the contractors had to mobilize from out of state to get here,” says Froslic.

“They moved families and offices here, and having done that, it made



The Lake Havasu City team includes, from left, wastewater division manager Doug Thomas, project manager Jeremy Abbott, city engineer Greg Froslic, utility supervisor Ed Donahue, utility lead Ray Brown, utility worker I Josh Wehner, and utility worker I Jason Carter.



Lake Havasu City won the Wastewater System Project of the Year Award in 2012 from the Arizona Water Association.

water service connections and over 28,000 feet of mainline water pipe. The local gas utility repaired or replaced nearly all its lines.

But even Lake Havasu City's patience grew thin at the end, and in 2009 the city began to explore options to accelerate the completion of the project. "Based on project history, we determined that the contractors could accomplish more connections within the same contract duration, so we adjusted the project boundaries and combined the last four years of construction into two," says Froslic.

"During the first year of the project, we connected 157 homes within a 12-month construction contract," he explains. "But in the last

year — at the urging of our council — we took advantage of the competitive situation and managed three construction contracts which had between 1,200 and 1,600 homes each, connecting 4,286 homes within a 12-month construction period.

"That's how we were able to finish two years ahead of schedule and more than \$100 million under budget." ♦

sense for them to bid competitively so they could keep people and equipment in town. There were not many other projects in the area."

Froslic says the city worked with some 20 contractors over the length of the project.

It also helped that poor economic conditions increased the competition among suppliers and contractors. "They were hungry for work," Froslic says. "They really sharpened their pencils."

All of the city's new sewer pipe is PVC. Approximately 80 percent is 8 inches in diameter, and the mains at the lower end of the system — where the flow volumes are larger — vary in diameter from 12 to 18 inches.

The milling of the streets (over 5 million square yards of asphalt were removed and replaced) afforded the opportunity to replace other infrastructure, including over 15,000

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EDUCATION DAY SEMINARS

MONDAY
FEBRUARY 25TH

NAWT

National Association of Wastewater Technicians

- 8 a.m. Introduction to Pressure Distribution
- 9:30 a.m. Designing Systems, Boundaries and Barriers from a Soils Perspective
- 11 a.m. Pump Choices and Settings: Decisions for Proper Operation
- 1:30 p.m. Operation and Maintenance of Pressure Distribution Laterals
- 3 p.m. Installing with Management in Mind: How to Get the Most out of Your System
- 4:30 p.m. Design and Maintenance of Grease Interceptors

NEHA

National Environmental Health Association

- 8 a.m. What Makes a Professional in Onsite Wastewater Systems?
- 9:30 a.m. Part One: The Science and Engineering of Onsite Wastewater Treatment
- 11 a.m. Part Two: The Science and Engineering of Onsite Wastewater Treatment
- 1:30 p.m. Education and Training: Professionalization of the Practitioners
- 3 p.m. Management Models: Management and Becoming a Management Entity
- 4:30 p.m. The Future of the Onsite Wastewater Industry: How to Make it Work for You!

SSCSC

Southern Section Collection Systems Committee

- 8 a.m. Seven Powerful Tools for CCTV Inspection Perfection
- 9:30 a.m. Easements – A Collection System Maintenance Nightmare
- 11 a.m. Nozzle Science – The Next Generation of Tier 3 Nozzles and Beyond
- 1:30 p.m. Pass or Fail – Is Your Company Going To Make It? How to Ensure Success
- 3 p.m. Social Media and Web-Based Promotion: Is it Right for Your Business?
- 4:30 p.m. Pipeline Relining and Rehabilitation Solutions

NASSCO

National Association of Sewer Service Companies

- 8 a.m. Ultraviolet Manhole Rehabilitation
- 9:30 a.m. Convey Your Stormwater and Plug Your Holes!
- 11 a.m. Jet Up! Sewer and Storm Water Cleaning
- 1:30 p.m. Rethinking Collection Maintenance with Sewer Line Rapid Assessment Tool or SL-RAT
- 3 p.m. Case Study of Cleaning Large Diameter Sanitary Sewers and Siphons
- 4:30 p.m. Pipeline Assessment Certification Program (PACP) 2013 Update Workshop

NOWRA

National Onsite Wastewater Recycling Association

- 8 a.m. Time Dosing ... Why? How? And How Much?
- 9:30 a.m. Loading Rates – How Much Can the Soil Take?
- 11 a.m. Troubleshooting Pumps, Floats and Panels
- 1:30 p.m. The Dirty Dozen – Toxins That Kill Septics
- 3 p.m. How Installers Can Use the Poor Economy to Increase Profits
- 4:30 p.m. Are Seepage Pits Really Bad?

- 8 a.m. Designing Drip Dispersal Systems
- 9:30 a.m. Soil Erosion Control During and After Septic System Installation
- 11 a.m. Decentralized Wastewater Collection System Maintenance

NOWRA Room 2

SCOTT HUNTER

Business Coach

- 8 a.m. - 5:30 p.m. | 2013 - Your Best Year Ever

WJTA/IMCA

WaterJet Technology Association

- 8 a.m. Safety and Efficiency – You Don't Have to Choose!
- 9:30 a.m. Selecting the Best Jetting Tip Doesn't Have to Be Scary
- 11 a.m. Hydroexcavation – The Non-Destructive Solution

PHIL STEIN

Vacuum System Information

- 1:30 p.m. | Understanding the Power: Physics of Vacuum and How it Works

NEXSTAR

General Business

- 1:30 p.m. | The Art and Science of Business Management
- 3 p.m. | The Business of Contracting

PSAI

Portable Sanitation Association International

- 4:30 p.m. | GAP: Good Agricultural Practices



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TUESDAY TRACKS

FEBRUARY 26TH, 2013

TRANSPORTATION AND LAND APPLICATION

- 8 a.m.** Driver Compliance and Certification: How to Meet DOT Requirements
- 9:30 a.m.** Staying in Compliance with 503 Regulations for Land Application
- 11 a.m.** Land Application: Case Study of a Long-Term Operation

INDUSTRY SAFETY

- 8 a.m.** One Piece Nozzles Enhance Performance and Safety
- 9:30 a.m.** Confined Space Entry Permit and Equipment Review
- 11 a.m.** Utility Line Locating

SSCSC

- 8 a.m.** Making Emergency Response Your Business
- 9:30 a.m.** How to Protect and Maintain Sewer Hose From Mini Jetters to Combination Units
- 11 a.m.** How to be Successful in the Cleaning/CCTV Business

GENERAL BUSINESS

- 8 a.m.** New Untapped Techniques to Capture Today's Customers
- 9:30 a.m.** 10 Steps to Marketing Success
- 11 a.m.** Cloud Computing for Small Business and the Field Service Industry

SEWER COLLECTION & REHABILITATION

- 8 a.m.** Chemical Grouts and Grouting Methods
- 9:30 a.m.** Watch Your Assets – Remote Monitoring Can Save You Big Bucks
- 11 a.m.** Lateral Connection Rehabilitation: Biggest Bang for the Rehabilitation Buck

SPANISH/ESPAÑOL

- 8 a.m.** T.B.D.
- 9:30 a.m.** T.B.D.
- 11 a.m.** How to Overcome the Difficulties of Doing Business in South America

WEDNESDAY TRACKS

FEBRUARY 27TH, 2013

SEWER COLLECTION & REHABILITATION

- 8 a.m.** Cash for Compliance: The New Boom in Home Sewer Replacement
- 9:30 a.m.** Trenchless Point Repairs, a Low Cost Permanent Solution
- 11 a.m.** Penn State University Performs Manhole-to-Manhole Lining In-House

GAS, OIL & MINING

- 8 a.m.** How to Decide What Dewatering Option is Best for You
- 9:30 a.m.** Blower 101: The Basic Operation of the Positive Displacement Blower
- 11 a.m.** Principles and Equipment of Hydro-Pneumatic Vacuum Excavation

GENERAL BUSINESS

- 8 a.m.** Save Money – Move Your Business to the Cloud
- 9:30 a.m.** Morally Bankrupt
- 11 a.m.** Measuring Success Matters: Your Ads, Your Agents, Your Technicians

MUNICIPAL

- 8 a.m.** Benefits of Digital Side Scanning Inspection Camera Systems
- 9:30 a.m.** Application for Sewer and Storm Nozzles
- 11 a.m.** Grinder Pumps & Application

PORTABLE LIQUID WASTE

- 8 a.m.** A View from the Receiving End: Regulatory Challenges in FOG Programs
- 9:30 a.m.** T.B.D.
- 11 a.m.** Now You Smell Me, Now You Don't: Deodorants

NEW TECHNOLOGY

- 8 a.m.** T.B.D.
- 9:30 a.m.** New Technology for Locating Sewer Line Leaks
- 11 a.m.** Solve Decentralized System Malfunction Issues and Site Challenges

ADVANCED INSTALLER COURSE

- 8 a.m. - 5 p.m.** Presenters: Jim Anderson and Dave Gustafson
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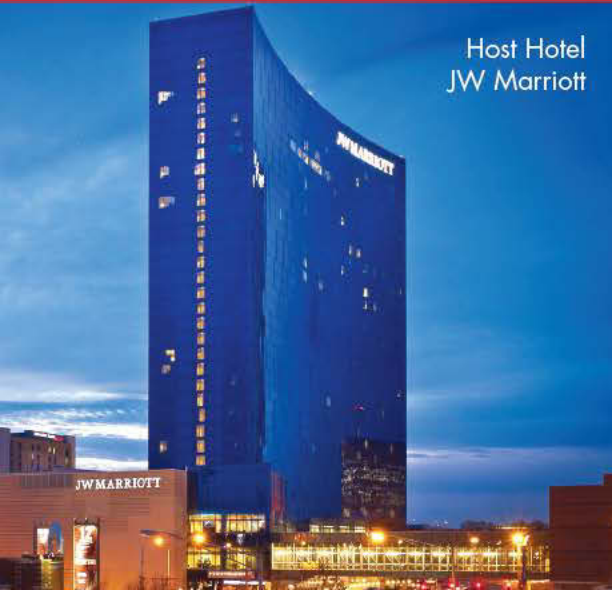
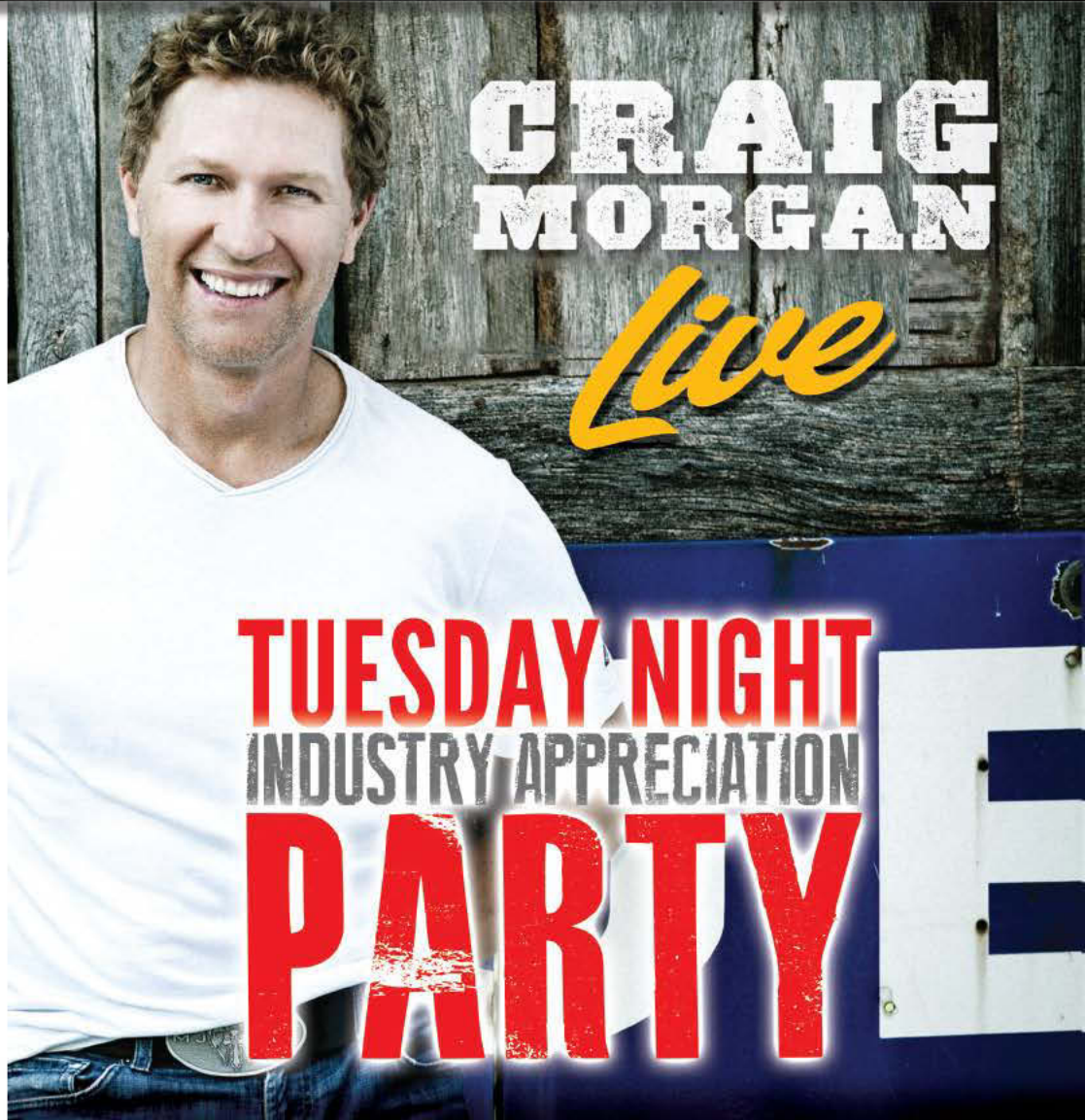
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MAKING A GOOD SEAL

QuickLock repair technology moves into potable water pipes

By Gil Longwell

Repairing the joints in larger diameter iron or steel pipes of a potable water supply system has never been an easy process. The traditional approach of digging up and replacing each lead-sealed

bell joint one at a time is expensive and time consuming, not to mention disruptive to traffic and customers. Restoring street surfaces every 10 to 13 feet adds tremendous non-pipe repair-related costs to these projects.



Bellefonte Water and Sewer Department crew member Brett Meyer uses a hydraulically powered circular saw to cut out a section of the old water main to gain access for the repair work.



Sleeves and their individual liners sit ready for assembly. The camlock is clearly visible inside each sleeve. (Photography by Gil Longwell)

The Rausch USA QuickLock point repair system eliminates most of the excavating and resurfacing costs by sealing these joints from inside the distribution pipe. Performing joint work from inside the pipe allows the infrastructure owner to avoid most of the hassles typically associated with these jobs. The Rausch Electronics USA inside-the-pipe repair or maintenance technology is approved by the U.S. EPA for potable water systems. This repair process was also approved by the Pennsylvania Department of Environmental Protection.

This technology was observed in the course of a scheduled job on a hot July day in the Borough of Bellefonte, Pa. The Borough's public works crew's assignment was to replace every joint in a 600-foot section of a 50-year-old, 12-inch-diameter, ductile iron waterline under one of the borough's busiest streets. Bellefonte is located about 10 miles from State College — home of Penn State University — and is the first municipality in the Commonwealth to implement this technology.

Crew members included Ron Pletcher, Dave Kleinfelter, Greg Brown and Brett Meyer. During the work, borough manager Ralph Stewart and William Comly Jr.,

TECHNOLOGY TEST DRIVE

EQUIPMENT:

Rausch USA QuickLock point repair system

MANUFACTURER:

Rausch Electronics USA

LOCATION OF DEMO:

Bellefonte, Pa.

DEMONSTRATED BY:

Ralph Stewart, William Comly Jr., Ron Pletcher, Dave Kleinfelter, Greg Brown and Brett Meyer from the Borough of Bellefonte, along with Rudy Ellgass, Josh Frankenfield and Jeff Rager of Rausch USA

LIST PRICE:

\$145,000 as demonstrated, which includes deployment trailer, tractor and camera, control software and all incorporated components

the public works superintendent, stopped by to see the system in operation. Rausch president Rudy Ellgass, marketing coordinator Josh Frankenfield and national product consultant Jeff Rager were on site to both observe and, if necessary, offer instruction.

Walk around

There are three components to the QuickLock system that are used in conjunction with a Rausch tractor and its related control system, a CCTV camera, the associated data and image recording systems and an appropriate deployment platform.



Bellefonte Water and Sewer Department crew member Dave Kleinfelter holds the sleeve in position as the operator inflates (expands) the bladder. The packer, pushrod, tractor, control cable and air hose are all visible. The train is supported on the temporary work platform.

The packer is an expandable rubber cylinder mounted on four wheels. The wheels are sized to carry the cylinder roughly in the horizontal centerline of the pipe being serviced. When a sleeve is positioned on the packer, the bladder is expanded sufficiently to hold it during transport to the joint being repaired. The packer is the first component of the work train to enter the pipe.

An 18-inch-long hollow twist-lock connected pushrod joins the packer to the pushing tractor. The hollow pushrod allows compressed air to be introduced into or withdrawn from the cylinder. At the tractor's forward end, the pushrod snaps onto a fitting. This fit-

ting is on the forward end of an air supply tube that has a conventional male quick-disconnect compressed air fitting. It is through this fitting, which is positioned near the back of the tractor, that the long hose from an air compressor is secured to the work train.

The final component is the expandable two-piece stainless steel sleeve assembly that is carried into the pipe. Shipped in two parts, an unbroken EPDM rubber seal and the V4A stainless steel sleeve it will slide into must be joined before deployment. Once in place at a joint site, the packer's bladder and the sleeve and its EPDM seal are expanded. The seal has raised ridges at either end

that are compressed to conform to the receiving pipe's irregularities. The sleeve's internal cam lock system secures it into place. Once a sleeve is positioned at a joint site, the packer is deflated and withdrawn along with the tractor, completing the repair.

In addition to joint repair, the sleeve also isolates the lead seals associated with bell style joints. If linear cracks are encountered, multiple sleeves can be placed. In this application, each subsequent sleeve overlaps the prior sleeve by about an inch.

Additional support components were required to successfully deploy and position each seal. These included a Rausch Series M tractor fitted with a KS135 pan-and-tilt camera. Rausch's preferred POSM inspection software controlled the tractor's movements and displayed the camera's imagery.

All of this was mounted in the borough's deployment platform, a custom outfitted 12-foot (l) by 6-foot (w) by 6 1/2-foot (h) utility trailer. The onboard ELKA 600 cable reel's capacity of 1,000 feet of control cable is the only limit to the distance this system can reach. An air hose of equal length is the only addition necessary to make an inspection camera support platform joint-repair ready. In Bellefonte's case, the hose was carried, deployed and recovered on a manually operated hose reel.

The packer's wheel stance is wider than the sleeve's unexpanded diameter. To accommodate sleeve loading, the packer's wheels are easily removed and reinstalled using a simple push-button locking system.



Operation

Work on this project started the day before the actual repair when a rough 12- by 8-foot pit was dug around the water pipe. The excavation bottom was about 2 feet below the bottom of the pipe to accommodate the workers, work platform and the hydraulically powered circular saw that was used to sever the pipe. Before closing isolation valves at either end of the segment, appropriate work zone traffic control measures were re-established. Because this is a borough-owned street, no street-cut permit was needed. When breached, the pipe's roughly 2,400 gallons of isolated water filled the pit. The pit was drained by a pair of trash pumps with the discharges directed to a nearby storm drain.

A 5-foot section of pipe was removed and a temporary work platform using a 2 x 12 plank and several cinder blocks was placed in the breach. With the plank's surface and the pipe bottom at nearly the same elevations, the process of introduction and retrieval of the work train was simplified.

Rausch recommends a camera inspection before placing the first sleeve. This inspection revealed unexpected debris that had to be flushed by partially opening the

A sleeve is steadied in position on the packer before the operator expands the bladder, which will secure the sleeve for transport to the repair site.



upstream valve. There was no way to know the debris situation prior to breaching the pipe. When the debris was cleared, the location of each joint was noted and a quick condition assessment was completed.

The first sleeve was introduced and pushed into place at the farthest joint. This process was controlled from the deployment trailer using standard Rausch POSM controls. The operator positioned the sleeve so that half was on

“This repair process is working out well for the borough. From a single road cut we can handle many joints. We figure each road cut costs about \$4,000 including road restoration costs, but there is a lot more benefit than a dollar savings. We inconvenience fewer residents and leave most of the road intact.”

Ron Pletcher

either side of the joint. Using manually operated valves mounted in the control cabin, the bladder on the packer was expanded until the self-locking cam locks inside the sleeve were fully expanded and securely locked. Close inspection using the camera verified the installation.

The train was retrieved and the next joint was sealed. The process was repeated until all the joints were sealed. Soon, the crew was working at a pace of one joint every 13 minutes. The workflow is always from the farthest point to the point of entry. When the work was completed in the upstream segment, the process was repeated in the downstream segment. Careful selection of the entry point enabled the entire run between valves to be addressed from a single breach point.

Because the job could not be completed in single day, it was nec-

essary for the borough to restore water service to the affected customers. This was done using a pre-cut length of pipe held in place using a Dresser coupling. This process is essentially a long-term repair solution which, in this case, was used first to restore water overnight and then reinstalled, permanently, when all of the joints accessible from this breach were addressed. When all joints were restored and the permanent patch was in place, the crew and deployment vehicle were free to begin setup at the next site.

Equipment used to repair potable water systems must be dedicated to those tasks as disinfection of the tractor, camera, packer and associated hose and cable would be challenging. Even with dedicated equipment, the crew regularly sprayed down the equipment with a chlorine solution between deployments.

Observer’s comments

The joint-sealing process is neither complex nor physically challenging. Site preparation and restoration are more challenging since nearby buried infrastructure must be identified and protected.

A practiced crew like that at Bellefonte develops a rhythm. All crew members worked each task. This cross-training is foresighted as it leaves all crew members fully skilled in every task.

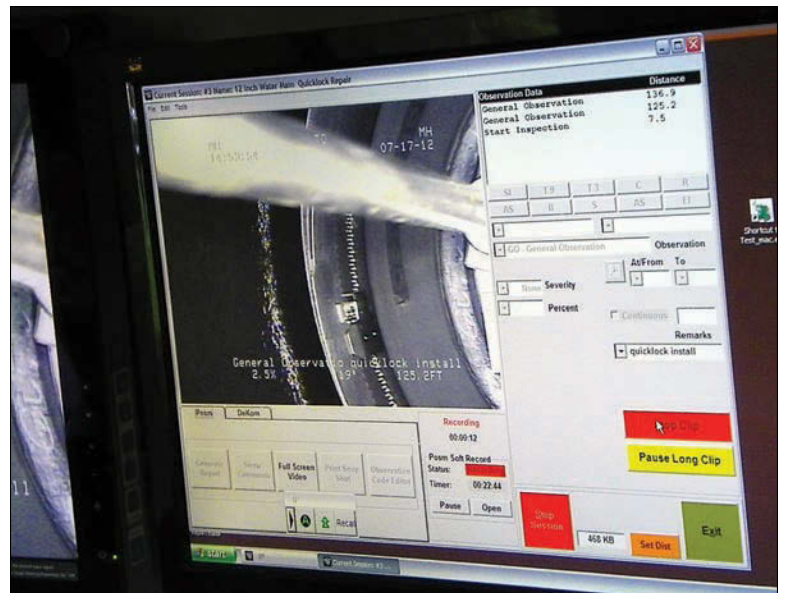
The packer/pushrod is an easy add-on to most manufacturers’ tractor/CCTV systems. It requires no task-specific software and only slight modifications to install the bladder control valves at the operator’s station in the deployment vehicle.

Owner’s comments

“This repair process is working out well for the borough. From a single road cut we can handle many joints. We figure each road cut costs about \$4,000 including road restoration costs, but there is a lot more benefit than a dollar savings. We inconvenience fewer residents and leave most of the road



Rausch USA’s Jeff Rager monitors progress from the control cab as he works the pneumatic controls that inflate and deflate the bladder.



From inside the control room, the operator can observe the camlock’s expansion and self-locking in progress.

intact,” said Ron Pletcher, assistant public works superintendent.

“Every time we do these repairs, we get better. The old way we were lucky to repair a single joint in a day when you consider excavation, repair and restoration tasks. We can repair joints and isolate lead solder. Our customers win,” says Dave Kleinfelter, head of the Water Department.

Manufacturer’s comments

“Worldwide, there are over

100,000 sleeves in use in both sewer and water pipes. Bellefonte expressed an interest in the QuickLock product and process to solve leak and lead isolation challenges in their water distribution system. We appreciate the borough’s pioneering spirit being on the cutting edge of this technology,” says Rudy Ellgass. ♦



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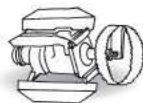
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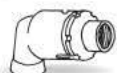


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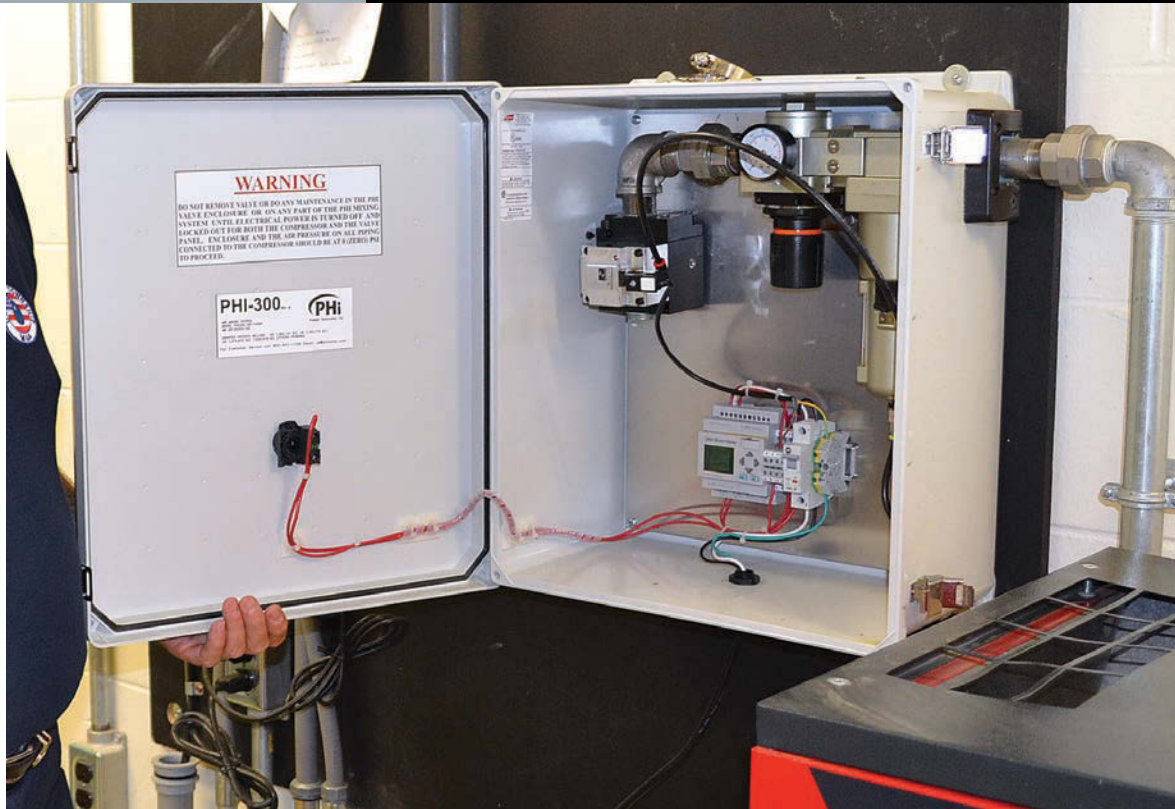


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Components in the PHI 300-Series Pulse Mixer includes the electro-pneumatic valve in the upper lefthand corner. The air pressure regulator is at the top, and to the right is a 40 micron air filter with auto-drain. Centered on the bottom is the on/off switch and programmable smart relay for setting pulse duration, frequency, and timer-mixing schedules. (Photos courtesy of Riordan Materials Corp.)

MIXING IT UP

Pulsed hydraulic mixing system helps a New Jersey municipal authority manage grease in its largest pump station

By *Scottie Dayton*

“By the second day, we could see grease breaking up. Within a week, most of it was in solution.”

Mike Cusick

The 1.5 mgd RCA Pump Station, located in a commercialized area of Deptford, N.J., always had grease problems, but they grew worse with the development of 40 food establishments and the Deptford Mall.

The Deptford Township Municipal Utilities Authority increased the pumping schedule from twice a year to quarterly, but that still wasn't often enough. Power cables rising and falling with the thickness of the grease cap weakened the cables' support system. When it failed under the weight of a 12-inch-thick cap, the cables fell into the wet well and were sucked into the immersed pumps, stopping all three of them.

The ensuing emergency, which required two weeks of bypass pumping and several thousand dollars to repair the damage, convinced the authority to look for a permanent solution. Assistant superintendent Mike Cusick found the PHI-300 mixing system from Pulsed Hydraulics on the Internet. After a demonstration of the technology, the authority ordered a unit with two bubble-forming plates. Within a week, the grease was gone.

Dealing with FOG

The pump station, built in the mid-1970s, was upgraded in 2010. “We went from a two-pump dry well system to three 200 hp submersible wet well pumps from KSB, each

delivering 2,000 gpm at 140 feet total dynamic head,” says Cusick.

Technicians cleaned the 15-foot-diameter well with a jetter vacuum truck on a Sterling chassis from Clean Earth/Safe Jet Vac. The grease returned within one to two months. Disposing of it at the Gloucester County Utilities Authority septage pretreatment facility cost \$600 per load.

Operators tried controlling the grease odor with deodorizers and enzymes, but they were ineffective. “Nobody complained, but anyone driving past the pump station could smell it,” says Cusick.

The authority sought to control grease at the source by educating food establishments about the

problems. Some cooperated; others did not. "Newer buildings have grease interceptors," says Cusick. "Older ones have grease traps, but many aren't maintained. Until the authority completes its development of a grease ordinance, we have to deal with it."

Plate tonic

Carl Janson, president of Pulsed Hydraulics' distributor, Riordan Material Corp. in Blue Bell, Pa., demonstrated the mixing system with a Hydro-Pulse bubble-forming plate in the wet well. He plugged the Pulse Mixer control panel into an electrical outlet at the station.

"We brought a mobile air compressor and Carl hooked the air lines to it," says Cusick. "Installation was that fast and easy."

Janson weighted the stainless steel plate with 35 pounds, then lowered it 20 feet onto the grease blanket; however, the unit was not heavy enough to break through and sink to the bottom. "Carl

turned on the system, and 100 psi bursts of air coming from underneath the plate gradually worked a hole in the blanket," says Cusick.

With the plate on the floor of the well, an electro-pneumatic valve with high-flow factor (Cv) that opens and closes in milliseconds released a massive, well-formed bubble every 30 seconds. The air burst powered liquid and sediment off the bottom, forcing them upward to smash into the grease. As the shock waves broke up the blanket, bubbles began breaking the surface, moving liquid and solids tangentially to the walls and down the sides to the bottom to complete the mixing cycle.

The Pulse Mixer with Allen-Bradley PanelView Plus 700 terminal (Rockwell Automation) controls the bubble-pulse intensity, duration and intervals. Its main components are the electro-pneumatic valve, a pressure regulator and 40 micron filter with auto-drain to control mixing air pressure (typi-

resolved itself," says Cusick. "It was an easy process."

The grease cap was too dense for the demonstration unit to remove it completely, so Cusick says the authority took a leap of faith and ordered a unit with two plates.

Before it arrived, the authority bought a QRS 5.0 (5 hp) 150 psi rotary air compressor from Chicago Pneumatic. An electrician hard-wired the power to the compressor and the wall of the pump station where the Pulse Mixer would be installed. Laborers ran two airlines underground and through a hole they drilled in the facing wet well wall. The work took two days.

Confident the bubble-forming plates would work their way through the grease blanket, the authority did not pump the wet well before installing the system. Janson programmed its operation.

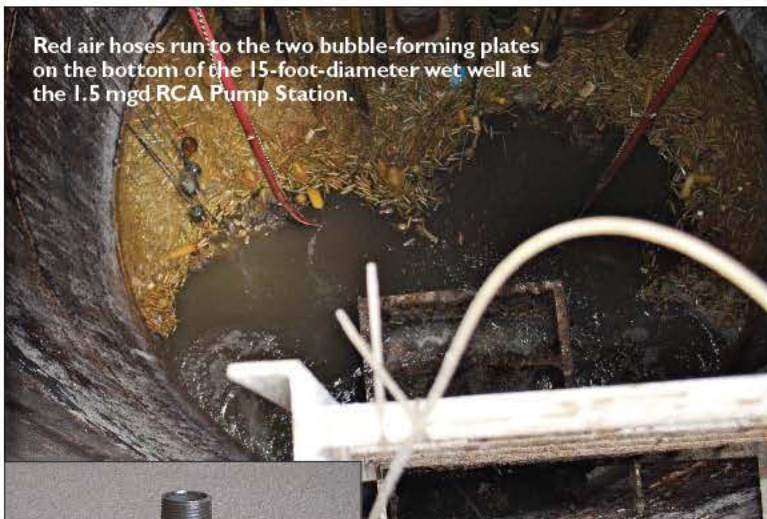
"By the second day, we could see grease breaking up," says Cusick.

"Within a week, most of it was in solution." The remaining deposits disappeared soon after and did not return.

The technology also reduced odors by 50 to 70 percent. "You have to be close to the wet well to catch any odor now," says Cusick. "It's no longer discernible from the road."

Based on saving \$2,400 in annual disposal fees, the authority expects a return on investment in four to five years. After the system ran for four months, Janson returned to adjust the air pressure and mixing schedule to maintenance levels. "That will save us more money, but it is too early to say how much," says Cusick. "The system also has extended the service life of the pumps and decreased maintenance."

The authority plans to install single-mixing systems in other pump stations with grease problems. ♦



Red air hoses run to the two bubble-forming plates on the bottom of the 15-foot-diameter wet well at the 1.5 mgd RCA Pump Station.



Bubbles formed by the Hydro-Pulse plate power liquid and sediment off the bottom of the wet well and force them upward. The vigorous mixing action keeps grease in suspension.

cally 50 psi), and a switch to set the mixing speed at low, medium or high based on the liquid's viscosity. Everything fits in an 18- by 16- by 8.5-inch NEMA 4X enclosure.

Dynamic duo

Initially, grease clogged the openings in the plate, but the longer the system ran, the more effectively it worked. "We cleaned the plates three times before the situation

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STAYING ON TOP OF EDUCATION

NASSCO will release updated and expanded PACP manual in 2013

By Ted DeBoda, P.E.

Keeping pace with new information, technology and methods is critical to NASSCO's focus on setting industry standards for the assessment and rehabilitation of underground pipelines and to assure the continued acceptance and growth of trenchless technologies. Updating content used to inform and instruct the Pipeline Assessment and Certification Program (PACP) is no exception.

PACP is the North American standard for pipeline defect identification and assessment, providing consistency to the methods in which pipeline conditions are identified, evaluated and managed. The goal of PACP is to have pipeline system owners create a comprehensive data-

base to properly identify, plan, prioritize, manage and renovate their pipelines based on condition evaluation.

The ultimate objective of PACP is to ensure that each and every project is a success. As such, the quality of the education and training is critical. It is imperative that PACP educational content be updated and refined as we collect more information and better data.

NASSCO is preparing to revise the PACP manual by the end of 2013. We have established a team of industry experts to review all comments made to the current PACP manual, Version 6.0.1, which was released in 2010. In addition to content changes, we intend to further enhance the PACP training with

The ultimate objective of PACP is to ensure that each and every project is a success. As such, the quality of the education and training is critical.

an overview of technologies such as sidewall scanning, radar, sonar, laser profiling and basic information on pipe sizes and shapes.

In order to carefully and completely make revisions that will keep the manual relevant for the next four to five years, we will also incorporate as many software changes as possible, and evaluate the manual's format for easier updates moving forward. Both PACP and MACP will be included in this comprehensive review, and changes will be made to both the training program and exams.

In addition to the team that

NASSCO has assembled, we would also like to solicit comments from current PACP users. In order to effectively gather comments and suggestions, NASSCO will be conducting workshops at the 2013 Underground Construction Technology Conference in Houston, as well as at the 2013 Pumper & Cleaner Environmental Expo in Indianapolis. For more information, please contact Diego Calderon at diego@nassco.org. ♦

Ted DeBoda is executive director of NASSCO. He can be reached at director@nassco.org.

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FROM THE MIDDLE DOWN

Proper training is critical for managing good internal communications

By Ken Wysocky

What do many workplaces have in common with Paul Newman in the 1967 classic, *Cool Hand Luke*? As the prison captain in the movie so eloquently put it, “What we’ve got here is failure to communicate.”

The effects of poor communication are as evident as a water-main break: high rates of employee turnover, reduced productivity, increased employee stress and illness that can subsequently lead to higher health insurance costs. Add to all that the fact that employees are being asked to work harder and longer hours — often with fewer resources — and you have a recipe for a toxic workplace, says Cynthia Kyriazis, a time-management and productivity consultant at Productivity Partners Inc. in Overland Park, Kan.

“There’s an awful lot of discussion around engagement and disengagement of employees these days, because employers are expecting more from them ... and there’s concern about a mass employee exodus if the economy improves,” she says. “How you communicate is critical because it impacts employees’ self-esteem.

“If you aren’t motivating them or communicating well with them, and just treating them like workhorses and not acknowledging when they do something well or go the extra mile for a colleague or a customer, it makes them wonder why they’re staying at their job. Or often times, they second-guess

themselves, and think (they’re not getting praise because) they’re not working hard enough. Or that they’re going to lose their job. Or that they’re in the wrong kind of job.”

Middle managers are key

Years ago, respected management guru Peter Drucker pointed out that the reason for most employee problems is middle managers that communicate poorly with employees. To that end, Kyriazis notes that these “middle men” play a critical role in any

organization’s efforts at improving communication.

“They need to be able to approach employees and communicate with them in ways that don’t demean them, but help them get their job done,” Kyriazis says. “They also need to acknowledge when an employee does something smarter, better or faster.”

Part and parcel to that is a simple but effective rule of thumb any manager should follow: Praise employees in public if possible, but correct errors in private. If nothing else, however, managers should go to the employee’s work station, desk or office — not ask the employee to come to the man-

ager’s office — to personally offer a verbal pat on the back.

Why? In some surveys, employees say the number one thing that motivates them is having their boss come to their work station and tell them what a great job they did on a project. “As a motivator or a reward, money is rarely in the top five in surveys,” Kyriazis says. “It’s not always about money or bonuses.”

Set clear expectations

Another must for effective communication: Set clear expecta-

tions for projects and assignments. That includes deadlines, budget details, the end goal, who will be involved and anything else that might impact the employee. And don’t forget periodic follow-ups to be sure the project is progressing and the employee is getting the resources and support to help them accomplish the assignment, she says.

In addition, top-down communication is no longer acceptable. Years ago, it was assumed — especially by Baby Boomers — that a supervisor would dictate what an employee needed to do and how they should go about doing it, with no questions asked. These days,

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.

not so much — especially when managers supervise younger employees, who are used to contributing input and ideas.

“You need to ask some open-ended questions ... help them feel like they’ve been heard,” Kyriazis says. “It needs to be a conversation, not a one-way dialogue.”

Speaking of one-way communication, many managers mistake modern technology — such as email, Twitter, smartphones, text messaging and the like — for effective communication. In reality, when it comes to establishing goals or outlining the parameters of a project, nothing beats a face-to-face meeting, Kyriazis says.

“I know people sometimes are ‘meeting’ to death, but you can’t run a department through just email,” she notes. “Generally speaking, technology usually enables a bad communicator to keep communicating badly.”

Kyriazis says delegating duties also can help managers improve communications. How? First of all, employees generally crave opportunities to grow beyond the strict confines of their job, and will appreciate when managers offer such opportunities. Moreover, handing off some responsibilities that a manager knows an employee can handle will create a stronger bond of trust between a manager and an employee.

“New managers are afraid of losing their jobs, so they tend to micromanage, which doesn’t build engagement or delegation or communication with employ-

ees, or develop them professionally," she says.

Training is critical

Kyriazis concedes that the basics of good communication are essentially simple — no brain-surgery skills required. Yet poor communication still hampers many organizations from achieving their goals. She attributes part of that to employees who, due to layoffs and other trying work conditions related to the recession and budget woes, are promoted quickly without any training in basics, such as communication or delegating.

It's even more difficult in organizations that employ large numbers of specialists who technically are very good at what they do, but never received any guidance regarding so called "soft skills," such as communication, listening, negotiating and so forth. As such, it's

imperative that organizations take time to properly train managers about the finer points of communication, she says.

"It's difficult, because in this economic climate, dollars for training and coaching managers get cut in budgets," Kyriazis points out. "I see it in organizations ranging from non-profit groups to small businesses to Fortune 500 companies.

"It takes a concerted effort, too, not just telling a manager to go to a junior college and take a class," she continues. "Management then needs to ask employees who receive training for a report on what they learned, and then watch and listen to them and see if there's a difference in how they manage — see if they're more comfortable and confident in their approach. The organizations that invest in this kind of training are the ones that will reap the benefits." ♦

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LOCATION AND LEAK DETECTION

By Briana Jones

Digital logging system

The **Enigma** from **ADS Environmental Services** is a digital correlation logging system used to locate leaks in buried water pipes. It combines noise logging and correlation into one operation to provide improved operational efficiency. Units include a carrying case, are available with three or eight optically programmed recording pods, and feature three user-defined start time and recording intervals. Pods are placed on listening locations and collected after recording intervals expire.



The pods are then placed back into the case, which automatically downloads the sound files and transfers them to the provided Enigma PC-based correlating software. The software automatically performs 27 correlations (eight-pod system) and displays the results in thumbnails color-coded in decreasing confidence (red, yellow, blue). Each thumbnail can be clicked on for complete full-screen correlation information and advanced filtering. Results can be overlaid on Google Maps for ease of location. Pods can be reprogrammed and redeployed within minutes for the next 27 correlations allowing a user to cover large areas in a short time. Loggers come standard with built-in, magnetically coupled accelerometers. Hydrophones are also available for plastic pipe. **800/633-7246; www.adsenv.com/leakdetection.**

Electrical current inspection

The **ES-38** inspection unit from **Electro Scan** for sewer laterals automatically identifies and quantifies all cracks, joints and connection defects using technology to measure the variation of electrical current inside pipes. **800/975-6149; www.electroscan.com.**



Underground locator

The **All Materials Locator (AML)** from **SubSurface Instruments Inc. (SSI)** locates PVC piping along with other underground metallic and non-metallic pipes and cables. The highly sensitive locator uses advanced, ultra-high microwave frequencies to find nearly any subsurface object that has an edge. The unit can locate plastic, metal, wood, cable and pipe. It functions in clay, wet soil, snow or standing water without the need for a separate transmitter and receiver, wires, clips or clamps. The lightweight locator is designed for the utility, water, gas and cable industries. **855/422-6346; www.ssilocators.com.**



R/T locating system

The **830 R/T** (receiver/transmitter) locating system from **Ditch Witch** is designed to provide best performance at a high active frequency. The high-frequency locator can trace poor conductors, such as underground tracer wire, and locate short lengths of utility infrastructure.

The unit has a variety of automatic features, including gain control, auto depth, and visual and audio feedback. The ruggedly built, construction-grade system has an IP65 environment rating, and a battery life of 150 hours on the transmitter and 75 hours on the receiver. Adaptive filtering ensures that the unit is highly responsive in all modes of operation, providing left-to-right guidance quickly regardless of mode or operator style. In PV (peak verify) mode, the system gives operators an additional way to verify location. **800/654-6481; www.ditchwitch.com.**



Smoke tester

The **Air-Loc Smoke Tester** from **Cherne Industries** is available as a liquid smoke blower or a traditional smoke bomb smoke blower, allowing accurate detection of inflow, infiltration and cross connections. Made of aluminum casting, the lightweight tester makes transportation easy.

The tester also includes a poly fan blade that has high volume capabilities and can generate up to 3,769 cubic feet of airflow per minute. The unit is available with a Honda or Briggs & Stratton engine. Each engine has an easy-to-start vertical pull recoil starter. **800/843-7584; www.cherneind.com.**



Manhole smoker

The self-contained **Turbo-Fog MH-75** manhole smoke blower uses leakproof liquid smoke cartridges to create dense, white smoke. Made of 11-gauge steel with a powder-coat finish, the blower generates over 7,500 cfm. No additional smoke bombs or garden sprayers are necessary. The unit is available with a Briggs & Stratton or Honda engine. **800/394-0678; www.turbo-fog.com.**



Laptop-based inspection

The **MY400** municipal inspection system from **MyTana Mfg. Company** is designed for small to medium municipalities that operate, document and maintain sanitary sewer systems. The system includes a self-leveling color camera, which has 36 Super Brite LEDs for illuminating large lines, and a built-in 512 Hz transmitter for locating. The DCB12 control system incorporates a touch screen with drop-and-drag icons to easily identify common problems.

The laptop-based system also allows for easy recording, uploading and backup of inspection activities. The unit includes 400 feet of pushrod and an AccuStic 512 Hz locator/receiver, which pinpoints problems before digging the sewer line. The Super Sonde is also included, providing a stronger signal for locating deeper problems in the lines. Different system configurations and related accessories are available. 800/328-8170; www.mytana.com.



Pan n' tilt camera

The **Pan n' Tilt** push camera from **Ratech Electronics** is a portable inspection system for pipes and drains as small as 3 inches in diameter. Camera options include black and white, color, self-leveling, micro and pan n' tilt. The camera can be retrofitted to existing Ratech systems or used as a stand-alone unit. It rotates 330 degrees up/down and 220 degrees left/right, allowing users to easily view the pipe condition in detail. The cost-efficient unit is adaptable to the company's Jet Cam.

Combining the camera with a Ratech control unit such as the Elite SD gives recording capability using SD/USB drives and allows MPEG video capture and JPEG image capture. Also included is an on-screen display overlay system providing electronic distance counter, time, date and eight pages of memory for listing problems and displaying company information. Standard 200-foot gel-rod cable is included. Longer lengths are available. 800/461-9200; www.ratech-electronics.com.



Smoke blower

The **Model 20** smoke blower from **Superior Signal Company** is designed for smoke testing of sewer lines to detect sources of inflow and other faults. Used with the company's classic smoke candles, the unit provides visible smoke that finds faults at a long distance. The Superior 3C classic smoke candle produces a volume of 40,000 cubic feet of smoke in three minutes, with the option of joining W3C smoke candles to create larger volumes of smoke for a longer time, when two or more candles are linked together.

The blower can also be configured with the company's smoke fluid system to offer a liquid-based alternative for mainline sewer inspection, featuring an insulated heating chamber with stainless steel injector to maximize dry smoke output, and produce high-quality liquid-based smoke. 800/945-8378; www.superiorsignal.com.



Digital detector

The **LD-18** digital water leak detector from **SubSurface Leak Detection** reduces ambient, intermittent noises from dogs barking, cars passing by, footsteps, people talking, etc. The digital electronics samples sounds every few thousandths of a second, and if it detects an intermittent sound, it suppresses the sound instantly. The unit can identify continuous leak sounds even in difficult situations such as busy streets. It is not necessary for the user to listen with the headphones if the detector hears the leak on the asphalt or the ground directly over the pipe. 408/249-4673; www.subsurfaceleak.com.




Sonde locating kit

The **PCS-800** pipe/cable and sonde locating kit from **Schonstedt Instrument Company** consists of a portable, belt-holstered pipe and cable locator, a 512 Hz sonde and various accessories. The instrument is capable of detecting all buried metallic pipes or cables, by direct connect or inductive means.



(continued)

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or highplains@tds.net

February 4-5, 2013 - (TBA) AZ
Contact: Janine Lane at (928) 782-5882
or janinel@ccals.arizona.edu

NAWT Vacuum Truck Technician:

January 8, 2013 - East Lansing, MI
MI & NAWT - Contact Mark Scott at (989) 275-5011 or msscott@i2k.com

March 6, 2013 - Ruidoso, NM
N-MOWA - NAWT. Contact: Jace Ensor at 575-937-8304 or nmowa.president@gmail.com

Operation and Maintenance Training Certification:

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Operation & Maintenance, Level 2
Instructors: Nick Weigel or Kit Rosefield
Go to www.COWA.org

January 2013 (TBA), Colorado
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Contact Kim Seipp at (303) 622-4126 or highplains@tds.net

February 6, 2013 Kearney, NE
NOWWA - Contact: Jason Orton at (402) 476-0162 or jason@h2oboy.net

March 1-2, 2013 Helena, MT
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Either of two available 512 Hz sondes allows crews to pinpoint blockages or areas needing repair inside a pipe. In combination with an insertion device such as a push or tractor-style camera, pneumatic clean-out rodder or snake, the sonde or beacon emitting a 512 Hz signal is traced aboveground with the receiver. This enables quick and accurate location of the sonde, which means increased productivity by allowing more inspections, minimizing clean-out times, reducing excavation work and placing lines back in service more quickly. A free sonde is available for a limited time. 800/999-8280; www.schonstedt.com.

Utility line locator

The **SeekTech SR-20** utility line locator from **RIDGID** is powered by OmniSeek technology and uses a combination of multi-directional antennas, a mapping display and processing to provide users with information to effectively and easily locate underground utilities. The locator's high-resolution LCD, which is equipped with an automatic backlight function for low-light situations, displays line depth, current and field angle in real time to virtually guide users down the line.

The unit also offers a volume-adjustable audible function to let users know if they are on target. In addition to tracing transmitted



frequencies, the locator offers passive modes that allow users to search for undocumented metallic lines. By using a combination of different locate readings, users can quickly and easily confirm a good signal and locate, or realize that there is distortion due to signal coupling in congested areas. The unit is easily foldable for compact storage and portability. 800/769-7743; www.ridgid.com.

Handheld leak location

The **HL10** handheld acoustic water leak location device from **Vivax-Metrotech** is easy-to-use and compact with acoustic and visible values for leak survey and leak pinpointing while reducing leak location time. The unit has high-quality acoustic properties, which enable it to reliably locate tiny leaks. With three filter settings, the device can be adjusted to the individual task and to suppress interfering background noise. The visual LED indicator assists the leak location procedure and the simple, one-handed operation enables users to accomplish the task with little effort. A built-in LED light allows for work in low-light areas. Users gain versatility when combining the unit with the GM80 wind-protected ground microphone. 800/446-3392; www.vivax-metrotech.com.



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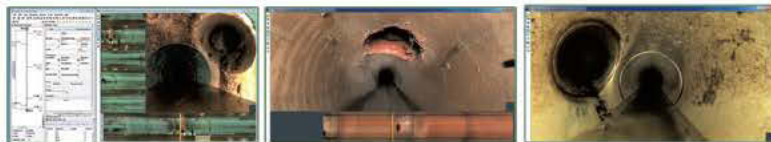
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Unit smokes out leaks

Problem

The strong smell of sewer gas forced management to close a golf clubhouse in Chicago, Ill. Unless the situation was resolved quickly, they would have to cancel or reschedule activities. They called a local plumbing contractor.

Solution

The contractor connected the discharge hose of a **Power Smoker 2 from Hurco Technologies** to a clean-out in the plumbing system, then forced a laboratory-tested safe and clean smoke through the pipes to locate the leak in a wall near the kitchen.



RESULT

The contractor found and repaired the leak in less than two hours. It was business as usual for the clubhouse. 800/888-1436; www.gethurco.com.

Leak detector prevents demolition

Problem

The maintenance provider at the Anna (Texas) Middle School called Bryan Spencer of Spencer Plumbing Co. after water surfaced in the parking lot.

Solution

Spencer used the **Gen-Ear acoustical leak detection system with filter, headphone and sensor technologies from General Pipe Cleaners**. Designed for cast iron, copper, steel and PVC lines, the locator detected two problems. "We fixed a small inside leak, then traced its source to an open field near the school," says Spencer. The leak channeled water down a ditch and beneath the parking lot, where it surfaced.

RESULT

"By pinpointing the problems so clearly and quickly, we saved the client thousands in demolition and repair work," says Spencer. "Gen-Ear is serving our customers and our business very well." 800/245-6200; www.drainbrain.com/genear.

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Leak detection system passes test

Problem

More than 300 miles of water mains in the District of Columbia Water and Sewer Authority are more than 100 years old. The utility wanted them evaluated for leaks.

Solution

The district chose the **STAR ZoneScan leak-detection system from Aclara** for a pilot project to locate suspected leaks in a four-block area. Workers placed acoustic sensing devices from Gutermann International on valves to monitor and analyze noise characteristics in the pipes. They used the fixed STAR Network AMI system for daily data collection. It automatically took readings in the middle of the night when they would be most accurate.



RESULT

The project located one leak that was verified and repaired, and pinpointed a probable leak. 800/297-2728; <http://bit.ly/STARZoneScan>.

Rapid inspection device uses acoustics

Problem

Charlotte-Mecklenburg Utilities Division in Charlotte, N.C., wanted to reduce sewer overflows without cleaning the entire 4,100-mile system. Officials searched for ways to determine blockages quickly and at a cost relative to CCTV inspections.

Solution

The division selected the **Sewer Line Rapid Assessment Tool from InfoSense**. The transmitter, placed in an open manhole, transmits tones. In a downstream manhole, the receiver compares the tones with sounds it should hear in a clean pipe. If the signal is degraded, algorithms analyze it and present the operator with a simple assessment in real time on a scale of zero to 10. The acoustic inspection takes less than three minutes without contacting the waste stream.



RESULT

Two operators working independently inspected 52,000 feet of gravity sewer for blockages in less than two weeks. Only 42 percent of the pipe required cleaning. The labor saved by not cleaning 100 percent of the line paid for the inspection devices. Operators have inspected almost a million feet of pipe so far. The technology won the 2012 Water Environment Federation Innovative Technology Award. 877/747-3245; www.infosenseinc.com.

Leak detection saves 7.2 mgd

Problem

Large-diameter water transmission mains in Dallas, Texas, develop leaks in summer as drying soil shifts the pipelines. The Dallas Water Utilities, which service 2.4 million customers, wanted to begin a leak detection program.

Solution

The city chose the **Sahara system from Pure Technologies**. Controlled from the surface, the inspection tool flows with the water, detecting leaks at the source in real time by identifying acoustic anomalies.



RESULT

Since the program began in 2004, technicians have found 116 leaks estimated at 7.2 mgd, and reduced catastrophic water main failures by 17 percent. 855/280-7873; www.puretechltd.com.

Fast and accurate locations

Problem

For months, technicians at Rockford (Mich.) Water tried to locate and repair a water pipe running to a fire hydrant.

Solution

Rick Kleopfer and Steve Beale from C&S Solutions, the **Radiodetection** distributor for the area, proposed using the **RD8000PDL multi-function pipe and cable locator and Tx transmitter**. Kleopfer and Beale set the equipment to 8 kHz and used both the Compass and Peak and Null modes to send the signal 800 feet along the pipe. The Peak and Null mode identified field distortion due to ground conditions or nearby utilities. The Compass feature visually indicated the pipe's direction, enabling the operators to follow the line and position the locator. The unit indicated the pipe to be around 3 feet deep. Workers then exposed the pipe exactly where the locator said it would be.

RESULT

Dennis Brinks of Rockford Water was impressed with the speed and accuracy of the project. "In a few minutes, C&S Solutions solved a problem that we had battled for more than a year," he says. 877/247 3797; www.radiodetection.com. ♦

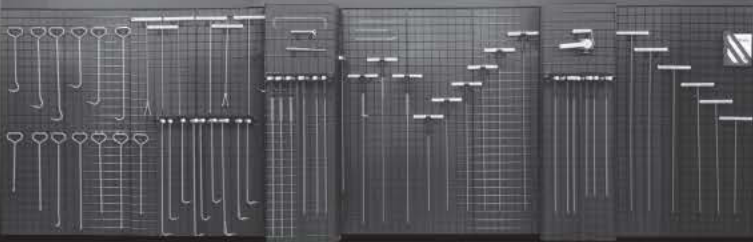


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Hach Company hosting Sewer Flow Monitoring webinar

Hach Company will host a Sewer Flow Monitoring webinar led by Kevin Marsh, vice president of Hach Flow Sales, on Wednesday, Nov. 7 at 1 p.m. EST. The webinar will demonstrate how Hach's Data Delivery Services (DDS) can provide accurate sewer flow data without the hassle. Participants will learn how DDS frees staff from flowmeter installations and maintenance, how reports are easily generated from secure centralized flow data, why DDS requires no flowmeter purchase, and more. To register, log on to www.mswmag.com/hach.

IDEX adds Trebor to Warren Rupp platform, names platform leaders

IDEX Corp. added Trebor International to the Warren Rupp platform. Located in Salt Lake City, Utah, Trebor manufactures ultrapure chemical pumps and liquid heating systems. IDEX has also promoted John Carter to president of the Warren Rupp platform and Fenton Challgren to president of the Chemical, Food and Process platform.



John Carter



Fenton Challgren

Hanson Pressure Pipe expands manufacturing facilities

Hanson Pressure Pipe expanded the manufacturing facilities at its Palatka, Fla., location. The expansion enables the facility to produce larger diameter, longer-laying lengths of B-303 bar-wrapped concrete cylinder pipe.

Red Valve offers product catalog

Red Valve's 28-page condensed catalog includes the latest information on its quality pinch valves, Tideflex check valves, non-clogging air diffusers, Redflex expansion joints and other flow control products, as well as product dimensions and applications.



Pipeline Analytics achieves Silver partner status

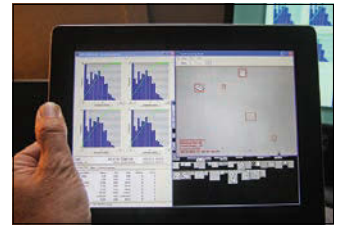
Pipeline Analytics, distributor of WinCan pipe inspection and asset management software in North and South America, achieved Silver Status in the Esri Partner Network. The accreditation recognizes WinCan software for integrating Esri's ArcGIS geospatial technology platform and the Pipeline Analytics team for becoming fully conversant in the platform.

Oldcastle designs special pipe for Interstate project

Oldcastle Precast supplied customer engineered elliptical precast concrete pipe for the Minor Street spur stormwater drainage system, part of the Pennsylvania Department of Transportation's \$30 million I-95 Revive project. A portion of the 51-mile project involves widening and rebuilding the northbound on-ramp to include a spur ramp for Minor Street, which required deep fill. The precast pipe had to be engineered to withstand the weight of 30 feet of compacted fill. The pipe had an outside diameter of 55 inches by 80 inches with an approximate weight of 20,000 pounds.

Fluid Imaging offers remote operation for analysis system

Fluid Imaging Technologies offers remote operation for its line of portable, benchtop, submersible and PV series FlowCAM imaging particle analysis system. Remote desktop operation enables lab managers, water/wastewater engineers, research scientists, process engineers and others to start running a sample, monitor its progress, adjust measurement parameters and analyze images and data in real time.



Dekker Vacuum acquires HullVac Pump

Vacuum equipment manufacturer and supplier Dekker Vacuum Technologies acquired HullVac Pump Corp. of Ivyland, Pa. Operations for HullVac, provider of rotary piston and vane pumps, will move to Dekker's corporate facilities in Michigan City, Ind.

ISCO receives ISO certification

ISCO Industries received International Organization for Standardization ISO 9001:2008 certification for its quality management system. The Louisville, Ky.-based company is a supplier and custom manufacturer of high-density polyethylene (HDPE) piping products.

LMK Enterprises adds investment partner

LMK Enterprises Inc. brought on an investing partner and formed a new operating entity, LMK Technologies LLC. The company looks to expand investments both domestically and internationally along with a continued commitment to research and development.

Leidi Utility Supply partners with Applied Felts

Leidi Utility Supply, distributor of pipe and cable detection, inspection and maintenance equipment for Chinese municipal governments and agencies, partnered with Applied Felts to provide the Chinese market with felt liners for cured-in-place pipe (CIPP).

Medora to market SolarBee, GridBee brands

Medora Corp. of Dickinson, N.D., will market its solar- and electric-powered circulation equipment under the SolarBee and GridBee brands.

Dewberry promotes Bolton to VP, manager

Dewberry, a professional services company, promoted Robert J. Bolton to vice president and manager of its Denver office. Bolton joined Dewberry in 2010 with the acquisition of Integra Engineering, a company in which Bolton was a founding partner. He has 30 years experience in the water industry and will be responsible for day-to-day operations in Denver.



Robert J. Bolton

InfoSense receives water quality award

InfoSense received the Innovation Technology Award from the Water Environment Federation for its sewer line rapid assessment tool (SL-RAT). The tool provides collection system crews with a quick diagnosis of a sewer pipeline segment without the time and expense of a CCTV inspection.



Southland Tool supports California charity

Southland Tool Mfg. pledged its support to Caterina's Club as part of its business plan for future growth during a company gathering in July. The Anaheim, Calif., charity provides daily meals to 250 children, many raised by single parents. It also provides scholarships, piano lessons and dental work for those in need.

Pasteurization Technology forms sales partnership

Pasteurization Technology Group signed a sales partnership with Cortech Engineering to act as a representative in Southern California and Nevada. Cortech will offer PTG's line of chemical-free and energy-efficient wastewater disinfection systems.

Vac-Con launches municipal, contractor website

Vac-Con launched a new website (www.vac-con.com) for the municipal and contractor markets. The site includes product demonstrations, equipment photos and product information as well as dealer information pages.



RapidView names regional sales manager

RapidView IBAK North America named Jeff Paulik regional sales manager for the western United States and Canada. Paulik's background includes equipment procurement and distribution, marketing and administration. He will oversee efforts of all RapidView IBAK pipeline inspection products in his territory.

TRIC Tools receives export award

TRIC Tools received the Export Achievement Certificate from Jeffrey L. Bleich, U.S. ambassador to Australia in July. Earlier this year the company signed a distribution agreement with Drainchem Pty. Ltd. of Australia to distribute TRIC Trenchless pipe bursting products in Australia and New Zealand.

Echologics to assess pipe conditions in Singapore

Echologics will assist PUB, Singapore's national water agency, assess the condition of its water transmission mains, using the company's acoustic pipe Condition Assessment service. Echologics will acoustically survey approximately 1.6 km of cast iron and steel water transmission mains, ranging from 500 to 800 mm in diameter. ♦

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Product Spotlight

DW Guillotine pipe saw provides clean, safe cuts

By Ed Wodalski

The Diamond Wire Guillotine pipe saw from E.H. Wachs is designed to safely cold cut steel, ductile and cast iron pipe and bar from 4 to 16 inches in diameter, as well as PVC, clay and other materials. A single nylon strap secures the tool to the pipe, restricting tool motion and eliminating operator fatigue.

The saw features a quick-change, continuous loop diamond wire cutting element that is shielded for safety. "Operator safety is first and foremost," says Jeff Swiatowy, general vice president for E.H. Wachs.

Designed, manufactured and assembled in the United States for one-person operation, the saw is controlled by a simple manual feed control knob. A feed pressure indicator shows wire stress and tolerance during operation for both safety and longer wire life. "An experienced operator will be able to cut based on the audio tone the wire makes, but for the beginner operator, the gauge assists in determining the correct amount of pressure to apply during cutting," Swiatowy says.



Similar to a band saw, the pipe-cutting tool uses a pre-tensioned, twisted, diamond-bead media that is fed across pulleys. "As the wire runs through the machine, it corkscrews. This allows complete utilization of the diamond beads cutting 360 degrees," Swiatowy says. "One hundred percent of input power makes it to the cutting media because the wire is supported on bearing-mounted wheels, compared to chain saws that scrub power between the chain and the backer bar. This is why we can get more cuts per wire (typically 30 or more) and cut faster using just a Class II hydraulic circuit, such as a skid-steer or other equipment capable of producing 8 gpm at 2,000 psi," Swiatowy says.

A washdown system and spray coolant are included with the saw. "All diamond cutting media require water to cool the base metal securing the diamonds to the backer," Swiatowy says. "When we ship the machine, we include a wash-down wand, because the metal chips you're cutting are very fine, like dust. You want to rinse those out of your machine."

The saw weighs less than 75 pounds and is 34 1/2 inches long, 11 1/4 inches wide and 37 1/4 inches tall. 866/392-1060; www.turnvalves.com.



Diamond Wire Guillotine pipe saw from E.H. Wachs

Endress+Hauser ultrasonic biogas flowmeter

The Proline B 200 ultrasonic biogas flowmeter from Endress+Hauser measures the flow and methane content of biogas for process control, emissions reporting and energy balancing in anaerobic digesters and other biogas producing processes. The meter operates in temperatures of 32 to 176 degrees F and pressures up to 145 psi. Accuracy of volume flow is 1.5 percent of reading and accuracy of the optional methane measurement is 2 percent absolute. 888/363-7377; www.us.endress.com.



Ultra Electronics multi-channel contact closures

EOTec 2000 series multi-channel contact closures from Ultra Electronics-NSPI are designed to convert up to 10 contact closure inputs (switches, relays) into fiber optic signals for transmission over a single fiber optic link. Each module includes two inputs. An integrated backplane allows for communications between modules with no external intermodular connection. Power to all modules is derived from any standard EOTec 2000 power supply module through the integrated BUS connector, or from an external 24VDC source supplied directly to the transceiver module. 512/434-2850; www.ultra-nspi.com.



Parkson Aqua Guard UltraClean screen

The Aqua Guard UltraClean screen from Parkson is designed to reduce downstream clogging by up to 50 percent over previous models. Features include an independent brush drive, second spray bar and hybrid brush design. The new brush is wider and includes longer bristles to penetrate deep into screen elements, along with hybrid rubber strips that prevent long rags and hair from twisting around the brush. 888/727-5766; www.parkson.com.



Vac-Con Power Flex telescoping boom

The Power Flex telescoping X-Cavator boom from Vac-Con can rotate up to 315 degrees, articulate up to 110 degrees and lift up to 34 feet. The boom also telescopes out 8 feet for a reach up to 28.5 feet from the truck and is top-mounted on the debris tank for front or rear positioning. 888/491-5762; www.vac-con.com.

Westfall Model 3000 flow conditioner

The Model 3000 flow conditioner from Westfall Mfg. features two sets of tapered and curved vanes with precise geometrics and positioning to eliminate swirl and turbulence. The unit mounts directly into a pipeline and produces a fully developed velocity profile within six diameters downstream. The flowmeter is available in sizes from 1/2 to 120 inches in diameter and is two diameters long. The unit can be fabricated from PVC, FRP, 316 stainless steel and with or without a Teflon coating or other engineering materials. 888/928-3747; www.westfallmfg.com.



RIDGID 600 Series tube benders

The 600 Series bender from RIDGID can bend tubes 3/16 to 1/2 inch in diameter with bend radiuses from 5/8 inch to 38 mm. The two-stage handle system enables bends from 90 to 180 degrees without crossing handles, keeping bends in-plane and accurate. Features include visible gain marks to ensure properly aligned bending angles, extra-long handles for increased leverage, vise clamp block for extra stability and cushioned handle grips. 800/769-7743; www.ridgid.com.

All-Flo diaphragm pump sensor

The All-Safe DRM (diaphragm rupture management) pump sensor from All-Flo Pump Co. instantly alerts pump operators in the event of a diaphragm rupture. The system features an early warning sensor installed between the PTFE overlay and backup diaphragm that detects a leak if the PTFE overlay becomes compromised and before fluid enters the air section. A second sensor is installed in the air section. Should both diaphragms become compromised, the sensor will detect fluid in the air section. The sensors can be configured to turn on a warning light, sound an audible alarm or trigger a pump shutoff. The sensor system is powered by 120 VAC. 440/354-1700; www.all-flo.com.



ABB 600 hp panel drives

The DCS800-EP panel drive from ABB is rated at 400, 500 and 600 hp at 460 VAC. The unit includes a drive module mounted on a multi-level subpanel, along with AC contactor, fuses and control transformer as standard and optional components. The drive is UL 508A listed and has a 65 kA short-circuit rating. It is pre-wired and pre-tested for smooth startups. 800/752-0696; www.abb.com. *(continued)*

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KSB submersible pumps

The Amarex N submersible pump from KSB is available in eight models. Applications include wastewater treatment, sludge treatment and wastewater transport, including fluids containing long fibers and solids, fluids containing gas/air, raw, activated or digested sludge, drainage or water extraction and drainage of rooms subject to flooding. Grinder pumps with 2-inch discharge feature an S-type impeller to macerate and grind solids, carrying them through the pump for discharge. Vortex pumps feature an F-type impeller with discharge sizes from 2 to 4 inches. The KRT series has a closed-loop cooling jacket that does not use pumped media for cooling the motor. It avoids clogging, while providing lubrication to a double mechanical seal system for extended service life. It also dissipates heat, even if the submersible motors are completely exposed to the air, enabling the pump to work continuously at low water levels. 804/222-1818; www.ksbusa.com.

HEMCO UniFlow SE fume hoods

UniFlow SE Aire-Stream fume hoods from HEMCO are UL 1805 certified and offered in 48-, 60-, 72- and 96-inch widths in either constant air volume or restricted bypass models. 800/779-4362; www.hemcocorp.com.



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Reed Saw It blade guides

Blade guides for the Saw It pneumatic saw from Reed Manufacturing Co. are available in 21- and 30-inch lengths. The guides reach across the pipe section being cut and stabilize the blade to prevent whipping and vibration, extending blade life and squaring the cut. 800/666-3691; www.reedmfgco.com.

Hayward spring return manual limit switch

Spring Return "dead man handle design" LHB Series manual limit switches from Hayward Flow Control are designed for critical applications requiring compliance to safety standards or plant specifications where the valve must return to a closed position after operation. The LHB-SR ensures the handle will always return to its original starting position. The spring return fits all sizes of Hayward TB Series ball valves and 8-inch BY Series butterfly valves. 888/429-4635; www.haywardflowcontrol.com.



Envirosight ROVER measurement suite

ROVER Measurement Suite (RMS) image-analysis software for the ROVER X pipe inspection crawler from Envirosight enables operators to measure a variety of pipe attributes directly from the system's touch-screen control pendant. Using adjustable overlays, the software calculates flow level; pipe diameter, bend and offset; and the branch angle, clock position and diameter of service connections. All measurements can be stored in the system's onboard WinCam-based inspection reporting database. Measurements also can be offloaded to WinCan V8 software, the 3D module of which can build a virtual model of the inspected assets. 866/936-8476; www.envirosight.com.



Nu Flow high-temp, chemical-resistant epoxy

High-temperature, chemical-resistant epoxy (RN750NP) for pipe lining from Nu Flow Technologies can reach a maximum temperature of 210 degrees F, is 50 percent stronger, cures twice as fast and has a greater chemical resistance than standard epoxy. Applications do not include potable drinking water or European pipe systems. 800/834-9597; www.nuflowtech.com.



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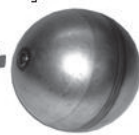
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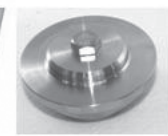
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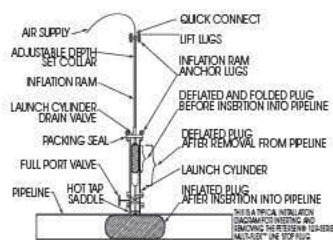
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WORTH NOTING

PEOPLE/AWARDS

Malibu (Calif.) Legacy Park received the Water Quality Improvement Award administered by the Water Environment Federation for transforming 15 acres in the heart of Malibu into a central park that has proven to be one of the most ambitious and innovative stormwater and urban runoff projects in California.

MSW welcomes your contribution to this listing. Please send notices of new hires, promotions, service milestones, certifications or achievements to editor@mswmag.com.

LEARNING OPPORTUNITIES

American Society of Civil Engineers

The ASCE has these courses:

- Nov. 8-9 – Pumping Systems Design for Civil Engineers, Pittsburgh
- Nov. 15-16 – Stormwater Treatment Using Detention Ponds and Commercial Devices, Charlotte, N.C.
- Nov. 27 – Seismic Assessment and Design of Pipelines, online
- Nov. 28 – Time Management, online
- Nov. 29-30 – Leadership Development for the Engineer, Las Vegas
- Nov. 29-30 – Structural Condition Assessment of Existing Structures, Washington, D.C.
- Nov. 29-30 – Structural Design of Industrial Facilities, Las Vegas
- Dec. 6-7 – Storm Sewer System Design Using SWMM, Atlanta
- Dec. 13 – Sustainable Stormwater Hydrology: Concepts to Reduce Hydrologic Footprint, online

CALENDAR

Nov. 4-8

American Water Works Association Water Quality Technology Conference and Expo, Toronto, Canada. Visit www.awwa.org.

Nov. 12-15

American Water Resources Association Annual Water Resources Conference, Hyatt Regency Jacksonville Riverfront, Jacksonville, Fla. Visit www.awra.org.

Feb. 11-15

National Utility Contractors Association Convention, Sheraton Phoenix Downtown Hotel, Phoenix, Ariz. Call 703/358-9300 or visit www.nuca.com.

Feb. 25-28

Pumper & Cleaner Environmental Expo International, Indiana Convention Center, Indianapolis. Call 866/933-2653 or visit www.pumpershow.com.

- Jan. 8 – Preparing and Implementing Construction Site Stormwater Pollution Prevention Plans, online
- Jan. 9-11 – Pumping Systems Design for Civil Engineers, Las Vegas
- Jan. 11 – Construction Stormwater BMPs, online
Visit www.asce.org.

American Water Works Association

The AWWA has a Regulatory Update webcast on Dec. 5. Visit www.awwa.org.

Water Environment Federation

The WEF has an Asset Management: Translating Data to Information Seminar on Nov. 14. Visit www.wef.org.

Wisconsin

The Wisconsin Department of Natural Resources has these courses:

- Nov. 6 – Personal Protective Equipment, Baraboo
- Dec. 4 – Permit-Required Confined Space Entry, Plover
- Feb. 28 – Government Affairs Seminar (location TBD)
Visit dnr.wi.gov.

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

- Nov. 12-13 – Using WinSLAMM v.10: Meeting Urban Stormwater Management Goals, Madison
Visit www.epdweb.engr.wisc.edu. ♦

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