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June 2015

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EQUAL ACCESS

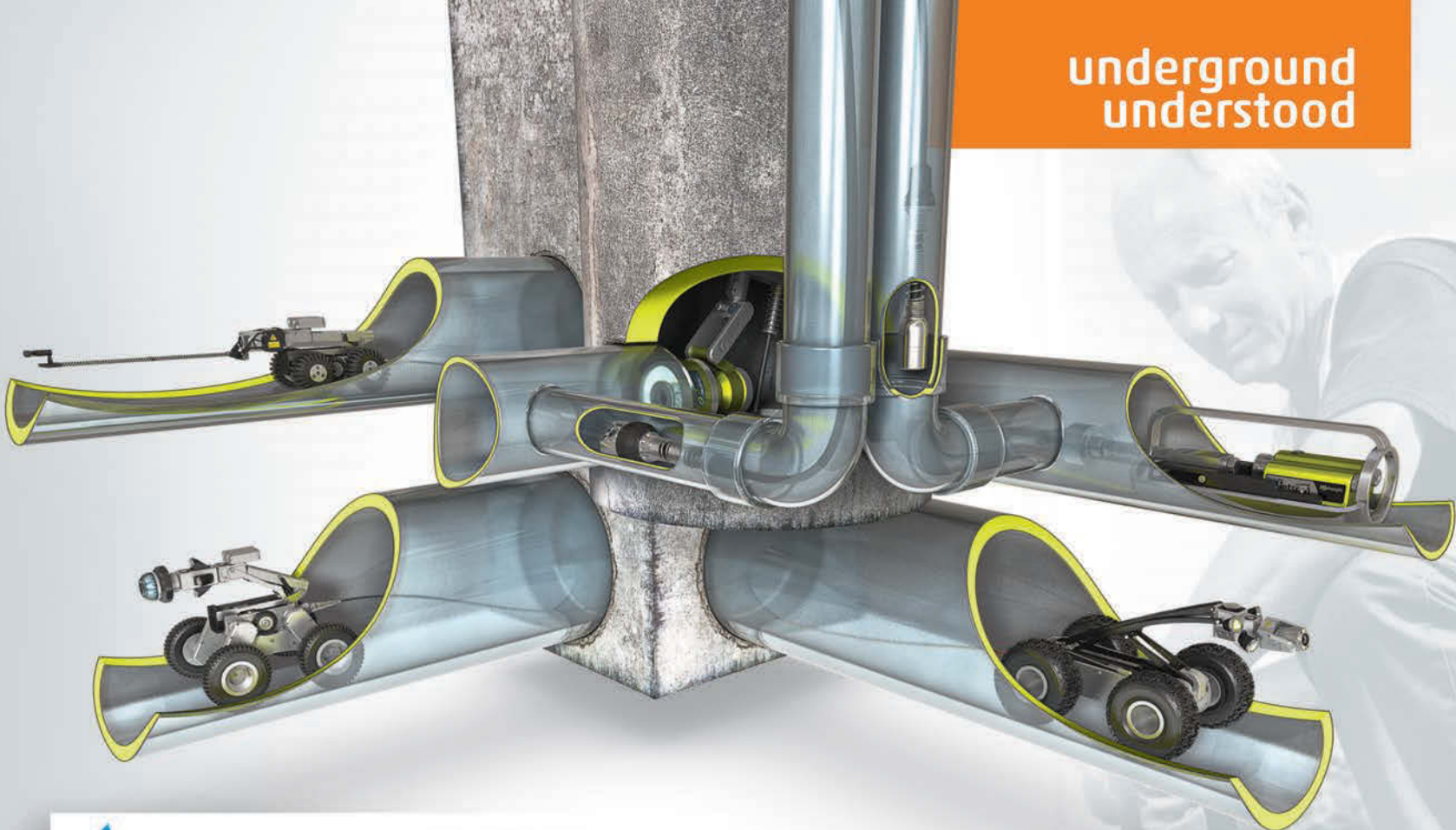
Wood Buffalo strives to
provide equal sewer and
water service to all residents in its
25,000-square-mile service area

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Steve Polem, supervisor of the
Underground Services branch
of the Regional Municipality of
Wood Buffalo, Alberta, Canada

underground
understood



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INSIDE:

PUMPS, LIFT STATIONS AND CONVEYANCE



ON THE COVER:

Steve Polem, supervisor of the Underground Services branch of the Regional Municipality of Wood Buffalo, at the Fort McMurray yard with a Tornado hydrovac (Petrofield Industries).
(Photography by Greg Halinda)



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MEETING THE NEEDS OF MANY

Balancing the demands of a diverse customer base spread across a broad geographic range presents special challenges



FROM THE EDITOR

Luke Laggis

You are all responsible for providing the same level of clean water and quality service to all your customers. It's a challenge, but it's one you meet every day.

In the Regional Municipality of Wood Buffalo in northeastern Alberta, Canada, it's a challenge of much greater proportions: The municipality's water and sewer service area comprises 25,000 square miles. That's larger than the whole state of West Virginia. Served by one utility.

The municipality, profiled in this issue of *MSW*, aims to ensure that all rural residents are provided with high-quality water and sewer service that is dependable and economical. The department's motto is, "No resident goes without if we have anything to say about it." That's not always easy, given the vast distances involved. From its operations base in Fort McMurray, the distance from the southernmost service area in Conklin to Fort Chipewyan in the north is more than 200 miles, and some of it is only accessible by air.

While some rural residents have relied on private contractors to sup-

ply water and provide sewage pumping services, the municipality will soon be offering those services to every resident of Wood Buffalo at the same utility rate Fort McMurray residents pay for water and sewage services.

That's pretty impressive for a small department covering such a massive land area.

A different story to the south

By comparison, California is roughly 164,000 square miles in size, about six and a half times the size of Wood Buffalo's service area. Imagine if the entire state was served by only six or seven utilities.

In reality, California is served by approximately 950 water utilities. But as the state and its many utilities deal with a historic drought and a new mandate to cut water use, they too are tasked with balancing the needs of a diverse customer base spread over a wide and varied geographic area.

Water needs vary greatly from the arid south to the more temperate north, and from large cities like

Los Angeles and San Diego to small mountain towns. And of course there's the state's agricultural industry, which demands massive volumes of water.

On April 1, Gov. Jerry Brown issued an executive order mandating a 25 percent reduction in water use for all urban water users, but not all Californians have jumped on board. Overall conservation rates were only 2.8 percent in February. At the time of this writing, the State Water Board was considering an emergency water conservation regulation to meet the mandatory 25 percent reduction in urban water use statewide. A sliding scale would lower mandates for communities that have been conserving water.

The fact that agricultural users are not included in these regulations — water allocations from the State Water Project and Central Valley Project for agricultural users have already been reduced to historically low levels — is another source of contention. If the farmers get all the water they need for optimum crop production, the rest of the state will suffer. And if farmers are forced to further

reduce their usage, it will have a significant effect on everything from employment to the price you and I pay for a head of lettuce at our local grocery stores. Balancing these needs is a huge challenge, and it's not going to get any easier.

It will be interesting to see what happens as California moves through this year's fire season and into the warmest, driest months of the year. Conservation is no longer an ideal or a feel-good-by-paying-it-forward mindset of the minority. It's real. It's necessary. And it needs to happen immediately.

Those of you in other regions of the country aren't likely faced with such dire circumstances, but California's dilemma still illustrates the importance, now more than ever, of conservation and careful stewardship of our resources.

Enjoy this month's issue.

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

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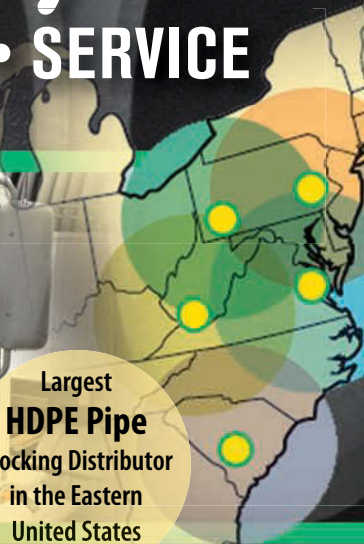
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HOT TOPIC

Wildfires Could Put More Strain on Drought-Stricken California

The number of wildfires in California has increased over the past several years and, with new water use regulations amid unprecedented drought conditions, there's even more cause for concern. The number of wildfires so far this year is 50 percent above average, which puts even more stress on depleted water supplies. "We're very, very concerned about forest fires and what its impact will be up here," says John Collins, general manager of the Alpine Springs County Water District. mswmag.com/featured



HEAVY METAL?

How Pink Manhole Covers Can Deter Theft

Manhole covers are a common target of thieves, even when scrap prices are low. So how can theft be prevented? Learn why the City of Danville (Virginia) began painting their manhole covers pink, along with other unconventional ways municipalities have kept their infrastructure out of scrapyards. mswmag.com/featured



FORT WORTH FLOODS

Stormwater System Improvements Reveal Needs, and Results

Flooding in central Texas — also known as Flash Flood Alley — can happen with little warning. It's a problem Fort Worth has been tackling head-on since forming a stormwater utility in 2006 after flash flooding claimed more than a dozen lives over a 10-year period. While excessive rainfall still poses a risk to specific areas of the city, the initiatives have had a huge impact on public safety. mswmag.com/featured

OVERHEARD ONLINE

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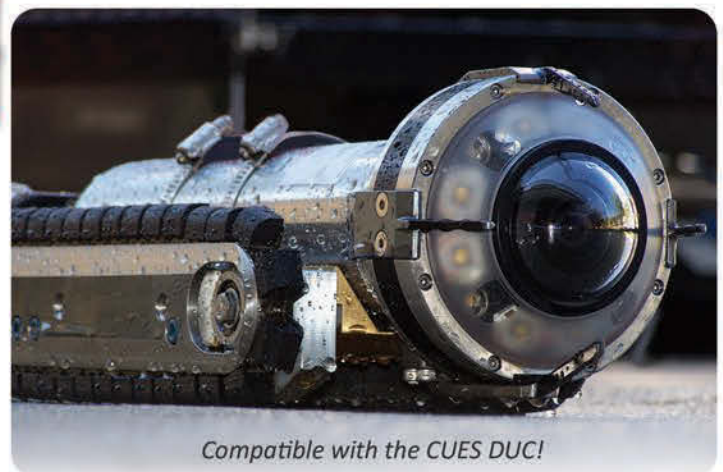
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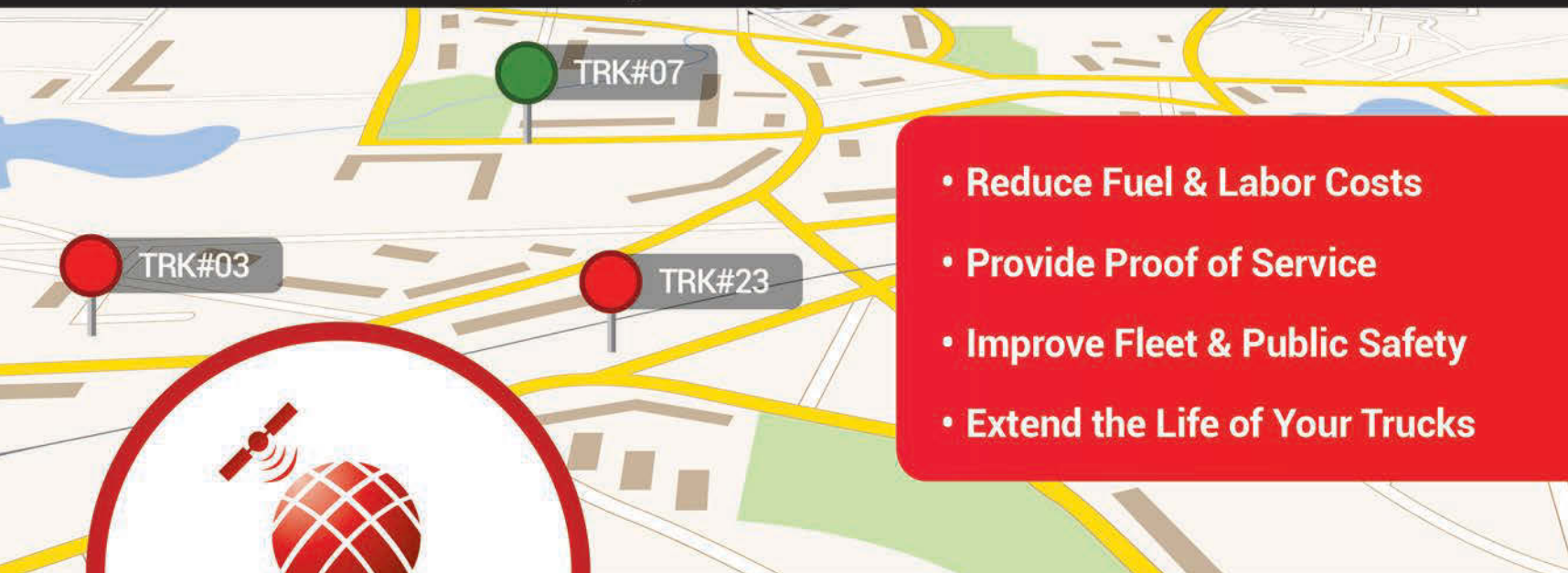


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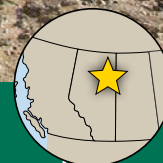
EQUAL ACCESS

Wood Buffalo strives to provide equal sewer and water service to all residents in its 25,000-square-mile service area

By Peter Kenter



Utility operator Alex Bowers clears an ice blockage from a catch basin on a residential street in Fort McMurray, Alberta, Canada. (Photography by Greg Halinda)



The Regional Municipality of Wood Buffalo in northeastern Alberta, Canada, provides utility service to a huge area of almost 25,000 square miles, serving a mix of rural and urban populations. The municipality's Environmental Services Department is driven by a goal of providing equal service to all its residents. It delivers on that promise through an aggressive maintenance program that sees its entire sewer and water system inspected and maintained annually.

Fort McMurray is the urban hub of the RMWB, which was formed through amalgamation in 1995 and includes the hamlets of Anzac, Conklin, Fort Chipewyan, Fort McKay, Gregoire Lake Estates, Janvier South and Sapræ Creek.

"The RMWB's Environmental Services Department operates all

public water and wastewater infrastructure within the municipality, but a utility has not yet been formed," notes Travis Kendel, the manager of the Sustainable Operations branch of Environmental Services, the department that is responsible for operation and maintenance of the water, sewer and stormwater systems of the municipality. "The RMWB has approval from its council, as of Oct. 14, 2014, to take all necessary steps to form the utility."

Equal access to services

The municipality aims to ensure that all rural residents are provided with high-quality water and sewer service that is dependable and economical. That's not always easy, given the vast distances involved. The distance from the farthest south

service area in Conklin to the farthest north in Fort Chipewyan is more than 200 miles, and some of it is only accessible by air.

The region's economy is driven by resource development, with oil and gas leading the way. A need for workers has driven a population increase of more than 125 percent since the year 2000. The current population is estimated at about 116,000 with about 61,000 located in the urban service area of Fort Mac. That includes an estimate of the area's "shadow population" of short-term and temporary workers.

"The unknown size of the population is difficult to design for," says Kendel. "These numbers fluctuate depending on areas of oilsands development as well, causing our demand areas to change."

The underground infrastructure

PROFILE:
Environmental Services, Regional Municipality of Wood Buffalo, Alberta, Canada

YEAR MUNICIPALITY ESTABLISHED:
1995

CUSTOMERS SERVED:
116,000 (75,000 permanent; 41,000 nonpermanent)

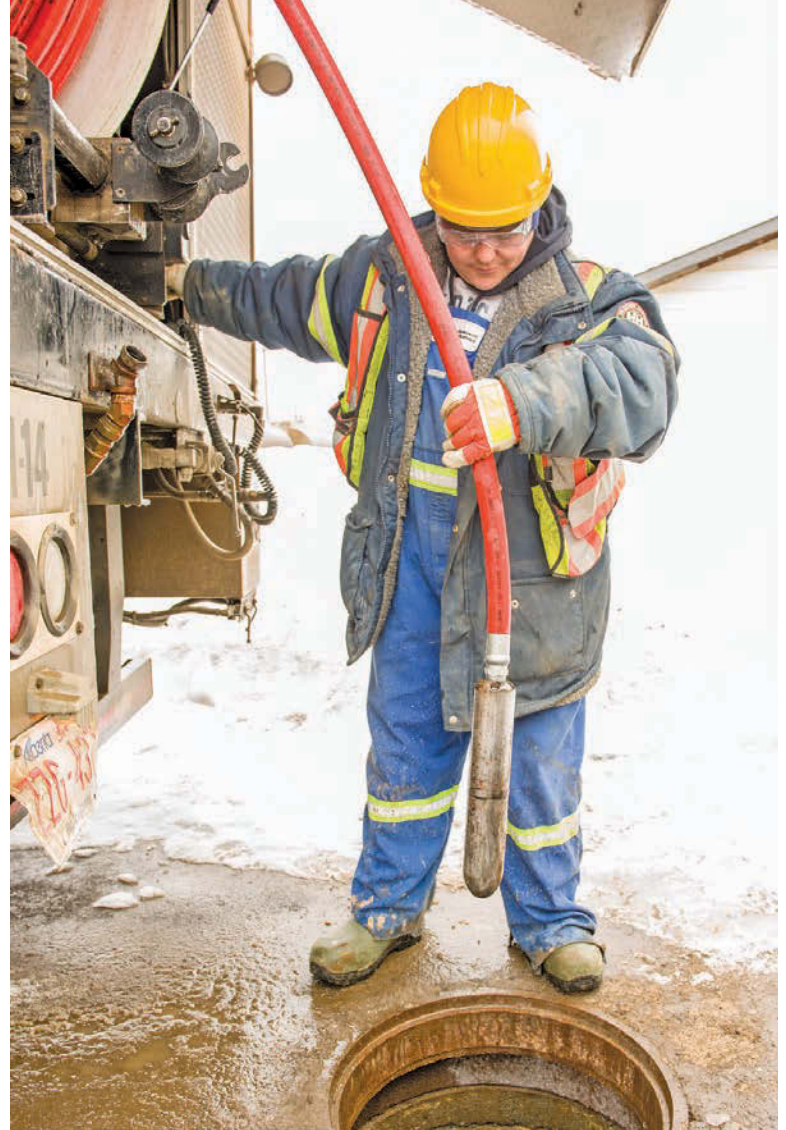
AREA SERVED:
24,570 square miles

DEPARTMENT STAFF:
239

INFRASTRUCTURE:
Sewer — 305 miles

ANNUAL DEPARTMENT OPERATING BUDGET:
\$69.4 million (2015)

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of the municipality is relatively young and robust, with pipes in the ground averaging an age of about 20 to 30 years.

"This can be attributed to the recent economic booms the RMWB has experienced and the drive for urban and rural development that accompanied them," says Kendel. "Most newer water pipes are PVC, with some ductile iron in the older areas."

A wastewater treatment plant serves the urban portion of the RMWB with wastewater conveyed through a combination of gravity sewers and force mains. Sewage lagoons serve outlying hamlets and the rural population.

Climate extremes

Wood Buffalo is subject to a wide variety of climate extremes. The average winter temperature hovers just below zero degrees Fahrenheit with summer averages above 60. However, residents can also swelter in temperatures approaching 100 degrees.

"Seasonal weather swings can greatly affect the costing of a project, for example providing winter heating for construction during extreme cold," says Kendel. "Spring, summer and fall present their own unique problems with swamp and muskeg conditions. During seasons where rain is possible and river breakup season in the spring, the

proximity of some areas to rivers poses the risk of flooding as well. The same holds true for repairs to existing infrastructure in traditionally wet areas."

Steve Polem is supervisor of operations in the Underground Services branch of Environmental Services. He's worked for the municipality since 1997 and reports to Hughie Gillis, head of Underground Services, who has worked there since 1990.

Many of the department's workers are veterans, with 20 to 35 years of local experience under their belts.

Upsizing for growth

"The population is twice as large as when I started working here, so a lot of the work we're doing with new infrastructure involves upsizing the systems to handle the current population," says Polem. "With the level of growth, all of the infrastructure tends to need upsizing in the most heavily populated areas, so we try to coordinate upgrading sewer, water, roads and sidewalks all at once in different sections of town."

The municipality has upgraded its sewage system using cured-in-place pipe lining and pipe bursting, but those projects, in addition to major construction, are generally handled by outside contractors.

"All of our new construction goes quite deep to get below the



Clockwise from top left: Utility operator Alex Bowers uses a Schonstedt HeliFlux magnetic locator to search for a sewer line leading to a frozen underwater catch basin; Bowers melts an ice blockage in a catch basin with a 600 psi stream of hot water from a Hotsy boiler unit; equipment operator Andrew Sceviour lowers the jetting hose from a Vactor Ramjet into a manhole to clear the line of grease and solids; equipment operator Joe Andrews (left) and laborer Steve Gregory remove impacted dirt from the holding tank of a Petrofield Tornado Hydrovac. The dirt was excavated during the installation of new sewer lines in a growing subdivision of Fort McMurray, Alberta.



The Underground Services team of the Regional Municipality of Wood Buffalo includes (from left) equipment operators Joe Andrews, Alton Stewart, supervisor Steve Polem, foreman Gus Connolly and laborer Steve Gregory. They are flanked on the left by a Hotsy boiler unit and a Petrofield Tornado Hydrovac on the right.

frost line,” says Gillis. “Our engineering standard is 3.5 meters [11.5 feet] on the water side and 2.5 to 3 meters [8 to 10 feet] on the sewer side.”

While new construction might expose pockets of the petroleum-rich soils of the oilsands, most excavations replace that soil with fresh

granular material, so it’s not often encountered in repair work.

The size of the region makes effective travel to all parts of the system virtually impossible. Ice roads allow truck travel during the winter, but emerging swamp and muskeg in the warmer months makes air

travel the only reliable form of transportation. To ensure the residents are well served, some workers with Underground Services are permanently stationed in hamlets such as Fort Chipewyan.

“Even within our service maintenance area, we sometimes have to

drive an hour and a half to answer a call,” Polem says.

In-house crews handle emergency response calls, which are generally related to water pipe leaks caused by frost heave or slow erosion of the pipe walls by pockets of acidic soil. Sewer backups are often

FORESIGHT IN FORT MAC

The Regional Municipality of Wood Buffalo has identified sewer construction as one of the key drivers of development according to its 2009 Wastewater Master Plan. One such project was an upgrade of the sanitary sewer system in the heart of Fort McMurray.

The Gregoire Sanitary Sewer project offered significant challenges, however, including a route that would pass underneath a developed urban area, a playground, a soccer field and busy Highway 63, and close to the environmentally sensitive Saline Creek valley. With the path of the sewer line cutting through oil-rich soils, disposal of excavated material was also a potential concern.

RMWB worked with the Alberta offices of Associated Engineering and drilling contractor, Direct Horizontal Drilling, to develop a plan that would limit the impact of installing a mile-long section of 600 mm steel pipe using trenchless, horizontal directional drilling. The path of the excavation included a complex curve underneath the Saline Creek and one section of sewer pipe that would have to be buried more than 160 feet deep under an actively sliding slope.

The public soccer field was selected as the project staging area. With the use of noise-reducing equipment and extensive sound barriers, the project was granted a 24-hour construction permit.

The overhead route

Rather than shut down Highway 63 during pullback of the continuous length of pipe, the project partners arranged for staging above the highway using industrial cranes and steel A-frames erected along the road.

While the drilling mud from the operation could be disposed of at sites used by resource drilling projects in the area, the project partners identified an old cement plant that could use the drilling fluid as part of a site remediation project.

The \$16 million Gregoire Sanitary Sewer project was completed in 2012, on time and more than a million dollars under budget. The project has since earned a number of awards, including a 2014 Award of Excellence from the Consulting Engineers of Alberta and runner-up for the 2012 Trenchless Project of the Year from the Northwest Chapter of the North American Society for Trenchless Technology.

caused by a buildup of frozen grease, particularly around hotels and restaurants.

"We often have to go in with a combo truck and a Hotsy hot-water unit to melt and remove the blockage," says Gillis.

The department supplies its workers with professionally rated cold-weather gear to handle outdoor work in the dead of winter when temperatures routinely drop below -40 degrees Fahrenheit.

An aggressive maintenance program

However, Wood Buffalo isn't resting on its laurels, given the excellent condition of its infrastructure. The entire sewer system is inspected yearly using the department's Cubex van and CCTV camera. Crews operate four Vactor combo trucks to clean the entire system annually as well.

The water system is also completely flushed and scaled annually.

While some rural residents have relied on private contractors to supply water and provide sewage pumping services, the municipality is making good on its commitment to provide equal service to all residents. The department will soon be offering water delivery and sewage pumping service to every resident of Wood Buffalo at the same utility rate Fort Mac residents pay for water

and sewage services.

"We have eight Peterbilts — four sewage trucks and four potable water trucks with insulated aluminum tanks — waiting to go into service at the delivery yard in Edmonton," says Gillis.

The new municipal service will be initiated in the spring. While the sewage will be transported to the region's lagoon system for now, a new waste-

water treatment plant is currently under construction in the hamlet of Anzac.

"The department's motto is that no resident goes without if we have anything to say about it," Polem says. "We will do what we can to make that happen, whatever it takes." ♦

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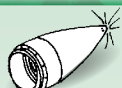
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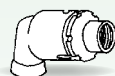
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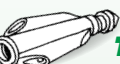


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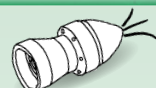
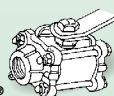
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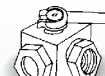
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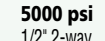
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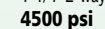


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The Pump People

MINDFULNESS MATTERS

It may sound counterintuitive, but slowing down just might ramp up productivity in your workplace

By Ken Wysocky

For many people, the word “mindfulness” conjures an array of imagery, such as a group of yoga-pants-clad vegans assuming physics-defying poses that only a chiropractor could love, while eucalyptus-scented candles burn and Krishna Das music plays softly in the background.

Well, hold on to your yoga mats: Mindfulness is going mainstream — and busting a lot of stereotypes in the process. In fact, AON Hewitt, a business-consulting firm, estimates that 35 percent of American employers now offer such stress-reduction programs, and that includes respected entities ranging from Google, Aetna and Target to General Mills, Intel and Time Warner.

And why not? After all, only the most unmindful company or organization *wouldn't* want more focused employees who think more clearly, make better decisions, handle stress more effectively, build better internal and customer relationships and are, in general, happier people. Other benefits include reduced employee turnover, increased productivity and decreased absenteeism. What's not to like?

To be clear, we're not talking about turning workers into Stepford-ish robots that suddenly become living personifications of smiley-face emoticons. Instead, mindfulness programs better equip workers to handle the stresses and strains caused by reduced staffing, increasing workloads, constant technological connectivity with work, striving for that precarious proper life/work balance, and ever-fluctuating priorities and responsibilities. And along the way, mindfulness programs might even improve your organization's bottom line.

To appreciate the benefits of mindfulness, consider its polar opposite — mindlessness, says Kimberly Schaufenbuel, program director of executive development at the University of North Carolina Kenan-Flagler Business School. “As employees and individuals, we can all relate to mindlessness ... think about when you've gone through your day, going through the motions, being distracted and relying on past assumptions and experiences,” Schaufenbuel noted while speaking during a recent webinar sponsored by the Human Capital Institute (www.hci.org).

“And also think about the times you've experienced mindless service — spoken to someone who's physically with you, but not mentally there,”

she adds. “And what are the business and relationship consequences of those behaviors? They're pretty significant.”

Mindfulness defined

So what exactly is mindfulness? There seems to be as many definitions as there are yoga positions. But in essence, mindfulness is an “in-the-moment” state of mind — a total awareness of the present that keeps at bay the endless and mindless chatter and clatter that all too frequently wracks our brains — and makes us less efficient.

Achieving this pure clarity of mind is no simple task, as evidenced by a recent University of Virginia study in which most of the 700 participants found it difficult to sit in a room, alone with nothing but their thoughts for company. In fact, 67 percent of the men and 25 percent of the women in the study actually chose to press a button and *shock themselves*, rather than quietly contemplate their innermost thoughts.

Shocking? Perhaps it is — until you stop and think about it. After all, we live in a society that's all about external stimulus. Internal reflection? Not so much.

“Mindfulness is something most people would rather avoid because when we're not multitasking, we tend to focus on things we haven't yet figured out, like difficult personal or professional challenges,” Schaufenbuel says. “Technology provides us with limitless ways to stay busy and avoid reflection.”

If all this sounds a bit too mystical and “out there,” perhaps this will convince you: Emerging science backs up everything that mindfulness proponents are championing. “Eastern wisdom is changing Western business in a meaningful way, and it's finally being backed by neuroscience evidence,” Schaufenbuel notes.

In 2011, Harvard researchers, using magnetic-resonance images, proved that participants in a mindfulness-based stress reduction program experienced increased growth of gray matter in brain regions that control learning, memory, emotional regulation and perspective taking. Another study performed by neuroscientist Richard Davidson at the Center for Investigating Healthy Minds demonstrated that mindfulness boosts cognitive flexibility, well-being, empathy, creativity and innovation. And other stud-

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.

“It's like building muscle through weight lifting. If you do it repetitively, you'll strengthen that muscle ... and create positive changes in brain structures by strengthening neural connections.”

– Kimberly Schaufenbuel

WORKPLACE STATE OF MIND

Most employees pride themselves on their ability to multitask. But studies show that multitasking is vastly overrated; instead, employees are much more efficient if they practice mindfulness. How can you create a mindful culture? Here are four quick tips offered by the University of North Carolina Kenan-Flagler Business School:

1. Tell employees it's OK if they take 15 minutes before the start of each day to sit and be aware of the sensations of their breath and body.
2. When they feel stressed, teach them to employ the **STOP** technique: **Stop** what they're doing ... **Take** five conscious breaths ... **Observe** the sensation of their body and what they're thinking about ... then **Proceed** with the task at hand.
3. Perform just one task at a time.
4. Encourage workers to take one- to five-minute breaks every one and a half to two hours; use that time to stretch, breathe or take a quick walk.

ies indicate that mindfulness reduces levels of a stress-related hormone called cortisol, reduces blood pressure, boosts immune systems and improves sleep quality.

Breathing is the mechanism or gateway to a truly mindful state. While teaching mindfulness techniques is not possible within the limited confines of a magazine article, suffice it to say that focusing only on each breath taken — each inhalation and exhalation — quells the noise that clamors within our brains. If you lose concentration, just bring your focus back to the breathing. As the modern-day guru of mindfulness, Jon Kabat-Zinn, once noted, "Pay attention to attention ... be aware of awareness."

It takes practice, for sure; cessation of thought is not for the undisciplined among us. But there are plenty of training resources available and most people can get the hang of it with about 100 hours of practice, Schaufenbuel says. And practicing mindfulness for even just a few weeks can bring about a variety of physical, psychological and social benefits.

"It's like building muscle through weight lifting," she says. "If you do it repetitively, you'll strengthen that muscle ... and create positive changes in brain structures by strengthening neural connections."

"And you don't need to sit on a floor for an hour to achieve mindfulness," she adds, noting that mindfulness proponents may have to debunk some deep-rooted stereotypes in order to gain a foothold in the workplace. "All you need is 10 minutes a day and the chance to learn some techniques."

At first, asking employees to slow down in order to act faster and perform better may seem at odds with most corporate goals of speed and quick goal attainment. But in the long run, it'll all make more sense as the benefits of mindful employees begin to emerge. And in an era when employee engagement is of primary concern to so many companies, mindfulness programs just might be the answer — with no yoga mats, eucalyptus candles or chiropractors required. ♦



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GPS FOR ANY FLEET

GPS Insight offers scaled-down tracking software geared toward smaller municipalities

By Craig Mandli



GPS Insight regional sales manager Jen Gillham (center) and marketing events coordinator Brie Ann Gaylord discuss the various features offered in their Standard Edition fleet and asset tracking software with a WWETT 2015 attendee. (Photo by Craig Mandli)

Fleet and asset tracking software from GPS Insight gives municipal utilities complete visibility into mobile operations to reduce costs and drive efficiencies.

Geared toward smaller fleets of one to 25 units, it tracks anything from utility trucks to heavy equipment, providing customizable software that allows managers to gather information in a variety of ways. The 2015 Water & Wastewater Equipment, Treatment & Transport Show allowed GPS Insight personnel to share just how their product fits across several industry sectors.

“Providing these options is all about keeping up with the industry trends,” says Jen Gillham, regional sales manager with GPS Insight. “The Standard Edition is perfect for the ‘mom and pop’ shops and small municipalities on a tight budget. It’s a pretty minimal upfront investment.”

The Standard Edition allows municipalities and service providers to track crews, heavy equipment and other assets. With real-time monitoring, management can see

all fleet activity and easily dispatch vehicles. Crews are kept safe by monitoring driving habits and hours worked, as well as quick emergency response. It is Web-based and can be accessed from any mobile device.

“The program can keep track of every stop, proving when, where and how long technicians are on site,” says Gillham. “It really provides a lot of oversight very easily.”

During an outage or event, dispatchers can instantly determine the closest truck to a particular location and send directions to the driver via email, SMS text message, or to a Garmin navigation device. If a customer wants to know when a technician will arrive, the manager can provide a quick, accurate answer. The software allows users to go back as far as needed to look up the history of a specific vehicle’s location and activity data, which could help refute any claims and prove job completion.

“Not only will companies like these features, their customers will, too,” Gillham says. “There’s no more ‘We think the tech will be arriving between 8 and 11.’ The manager

can locate the truck, determine where the tech is in their workload for the day, and provide the customer a more accurate estimate.”

For cost-conscious municipalities, eliminating excess idling and speeding, and identifying unauthorized vehicle usage can reduce monthly fuel costs. The routing function proactively assigns the shortest/fastest route to an outage location. Managers can analyze historical routes to determine unnecessary trips, and coach technicians to become more efficient. Fuel card reports are also available to flag non-fuel or fraudulent fuel purchases. Management is also immediately alerted when vehicles or equipment are moving where or when they shouldn’t to aid in stolen equipment recovery. Real-time mapping allows managers to report the location to the authorities, saving time and money in replacement costs. Around-the-clock technical support is also available to users.

“The size of the company or municipality doesn’t matter,” says Gillham. “You get the same support

whether you have four units or 4,000. We help get you set up, and within a week you can be tracking your whole fleet.”

Gillham says the WWETT Show was the perfect opportunity to get GPS Insight in front of the company’s target market — municipalities and service providers. The main goal was to let companies, regardless of size, know that there is a GPS program available that will suit them. The company’s Pro Edition is geared toward fleets of more than 25 units, while the Enterprise Edition is aimed at large companies and municipalities that have in excess of 350 units.

“We’re trying to wave our flag to let these people know that they have options,” Gillham says. “That’s why a show like this is so perfect for us. We want these companies and cities to know that keeping tight track of assets is important, regardless of how big you are.” 866/477-4321; www.gpsinsight.com ♦

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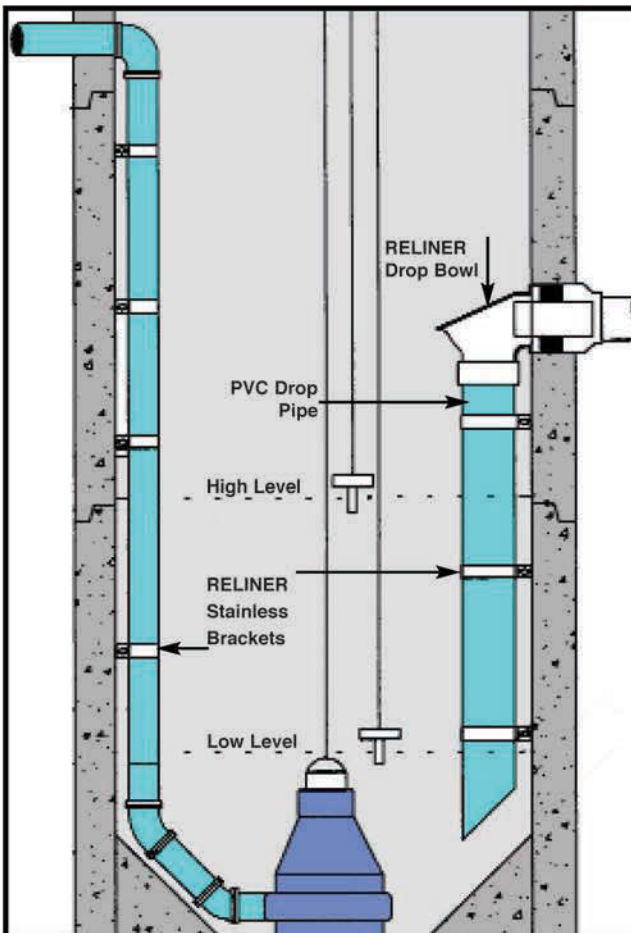
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FAMILY AFFAIR

Linda Schick and her team work methodically to maintain the collections system in their small seaside community

By *Scottie Dayton*

Being responsible for twins joined at the hip doesn't phase Linda Schick of Fairhaven, Massachusetts.

She takes her duties as sewer and wastewater superintendent at the Fairhaven Water Pollution Control Facility and West Island Treatment Plant personally. "At some point, the collections system and treatment plant components stopped being objects and became family," she says.

The members are mainly advanced senior citizens. They leak, creating huge inflow and infiltration problems. They collapse from fatigue or block structurally. Their valves creak and motors whine, but repairs are difficult because many replacement parts are no longer available.

"Almost every upstream event affects the Fairhaven plant negatively because the equipment is vintage 1987," says Schick. "We're not a flush community. Consequently, my team excels at working with the resources at hand."

An unidentified individual aware of Schick's steadfast devotion wrote on a nomination form that her "dedication to the department were assets often taken for granted, but should be rewarded by her peers." The New England Water Environment Association agreed, giving her the 2014 Operator Award.

Moving targets

Schick's greatest challenge is prioritizing work in a location domi-

nated by high water. Fairhaven abuts the Acushnet River, which flows into Buzzards Bay, an arm of the Atlantic Ocean. Residential sump pumps discharging to the 75-mile collections system are the major source of inflow and infiltration.

Leaking clay pipe from the late 1800s and early 1900s, as well as newer piecemeal PVC repairs, exacerbate the condition. Stringent sewer inspections have ended poor installations, allowing Schick to complete asset management studies and determine priorities.

"It's difficult to keep up with them," she says. "We're trying to replace all the clay pipe, but almost every time we attack one section of town, something fails somewhere else." Flow studies identified 1940s to 1960s neighborhoods with asbestos concrete pipe as the greatest source of infiltration.

For many years, the lack of proper equipment stymied Schick's efforts. "I've wanted a CCTV pipeline inspection system since becoming superintendent in 1988," she says. "In 2012, we got a Quickview Zoom and ROVER X system [Envirosight] in a Ram ProMaster van. It's made a world of difference."

By not hiring contractors, in-house sewer inspections save the town \$1,500 to \$2,000 per day, and the three full-time sewer/pump station technicians accomplish more work. As NASSCO Pipeline Assessment and Certification Program users, they pro-



Sewer and Wastewater Superintendent Linda Schick at the Fairhaven Water Pollution Control Facility. (Photography by Ed Collier)



Above left: Wastewater treatment plant operator Doug Pinard (right) gets some instruction regarding the department's new CCTV van from sewer system maintenance craftsman Dana Hathaway. **Left:** Lab tech Lee Barlow works on some samples from Fairhaven and neighboring communities at the Fairhaven Water Pollution Control Facility. **Above:** Superintendent Linda Schick (left) and foreman Jeff Furtado check out the progress on a sewer main replacement project.

PROFILE:

Linda Schick,
Fairhaven
(Massachusetts)
Water Pollution
Control Facility



POSITION:

Sewer and wastewater
superintendent

EXPERIENCE:

28 years

EDUCATION:

University of Massachusetts
Dartmouth, Master of
Biology and Business
Administration

CERTIFICATIONS:

Operator VII-C, Collection
System IV; NASSCO
Pipeline, Manhole and
Lateral Assessment

MEMBERSHIPS:

New England Water
Environment Association,
Water Environment Federa-
tion, Massachusetts Water
Pollution Control Association

GOALS:

Digitize archives, re-evaluate
certification testing

duce the reports and videos accom-
panying repair contracts instead of
hiring consulting engineers.

"All 10 employees are cross-
trained on the collections system
and in the two plants," says Schick,
who spent a year as a laboratory tech-
nician before advancing to her pres-
ent position. She holds a Master of
Biology and a Master of Business
Administration, the equivalent of 10
years of experience.

Her team includes assistant
superintendent Rene Robillard (28
years) and operators Jeff Furtado
(15), Doug Pinard (13) and Victor
Oliveira and Kyle Winderlick (five).
Maintenance craftsmen Dana Hath-
away (16), Joseph Bonneau (12) and
Matt Manzone (four); combined
heat and power operator Robert
Gomes (17); laboratory technician
Lee Barlow (12); electrician Ray Pac-
zosa (26); and mechanic Joseph
Frates (11) round out the team.

Heart stoppers

At least 50 percent of the collec-
tions system is unsound, and 25 per-
cent of the pipes are clay. Some are
so brittle and close to collapse that
crews are afraid to use the truck-
mounted jet rodder (SRECO-FLEX-
IBLE) before inserting the camera.

Their fears are valid.

Just before a Memorial Day
weekend, the rodder brought back
voluminous debris as the crew
flushed a 10-inch clay main. They
stopped cleaning, expecting to
return on Tuesday, but a section of
pipe collapsed Saturday morning.
Schick found a contractor who
worked with the team on a point
repair that took most of the holiday.
Another contractor rehabilitated the
entire main using lining systems
from Insituform Technologies.

Winters as severe as the last two
brought unique challenges. "We
haven't used the CCTV much this
year because we haven't seen the
manholes for a while," Schick says.
Fairhaven received 6 feet of snow.

Fortunately, crews were able to
monitor a manhole on an 8-inch clay
sewer that filled regularly with grit
and debris. The pipe runs under the
middle of the town's main thorough-
fare. "Because there isn't a depres-
sion in the roadbed, we believe the
break is somewhere off site, and
debris is washed down from it,"
Schick says. "Nevertheless, this line
keeps me awake at night wondering

if the call will come saying a vehicle
fell in."

Spare that tree

Part of this historic seaside com-
munity's charm is its hundreds of
mature trees, guarded by protective
owners who voice their concerns to
the Board of Public Works when they
have sewer problems. "We're one of
the few municipalities still entering
homes to clean laterals," Schick says.
"It's the board's way of showing your
tax dollars at work."

Although the department has
legal right of entry, the risk of lia-
bility is daunting. Many older homes
have cellar traps with an unnaviga-
ble U-curve. Rodding would dam-
age plumbing before ever reaching
the road. Laterals often run through
two or three properties, causing
easement worries should the pipe
break under someone else's yard.

To defuse the situation, Schick
tries to persuade owners to intro-
duce RootX into their laterals 30
days after they are cleaned. In 2005,
she began a program of installing
10 sidewalk service clean-outs per
year at troublesome locations. "Ten



The wastewater staff in Fairhaven, Massachusetts, includes (from left) mechanic Joseph Frates, sewer system maintenance craftsman Matt Manzone, treatment plant operator Doug Pinard, lab tech Lee Barlow, Superintendent Linda Schick, sewer system maintenance craftsman Dana Hathaway, combined heat and power operator Robert Gomes and electrician Ray Paczosa.



years ago we were averaging four to five service calls per week,” Schick says. “Now we enjoy numerous weeks of blissful silence.”

Rag-goo

When the pipes aren’t calling, the 15 pump stations are gagging on rags. Most failures occur at stations with submersible grinders moving less than 50,000 gpd. Schick is unsure why they must be deragged so frequently. “I think the answer is some kind of maceration before the pumps,” she says.

Retrofitting pump stations from the 1960s and early 1970s is high on the priority list. The work includes installing choppers in most of the pumps. In addition, the three-mem-

ber crew flushes and cleans major stations on a weekly cycle to prevent the accumulation of rags. Once a year, Schick hires a contractor with a vacuum truck to empty the wet wells for a thorough inspection.

“At least 50 percent of pump station and collections system maintenance is due to rags,” Schick says. “When the men are fighting them, they aren’t inspecting mains and attacking I&I. Now that I have CCTV equipment, I want a dedicated crew using it.”

Grease from numerous restaurants also helps clog sewers and pump stations. “We’re constantly switching vendors to find a degreaser that works with the aggressiveness of older products,” Schick says. “Cur-

rently, we’re experimenting with Grease-X [RootX], while trying to educate food staffs about grease interceptors and how to clean them.”

Time and tide

Rags and grease aren’t the only threats to the stations. Fairhaven averages a hurricane per year, and a major hurricane every five or six years. Power outages abound, causing trouble for remote stations abutting water. Trying to shut them down during a blow can even be life threatening. “The last hurricane hit on a full moon,” Schick says. “The high tide came in so fast we almost didn’t arrive in time, let alone get out.”

From 2010 to 2014, electrician Paczosa retrofitted all 15 stations with

components and software from Mission Communications. Although not a true SCADA system, it allows operators to start and stop pumps remotely.

Paczosa is one of Schick’s invaluable people. After 26 years on the job, he knows how to bypass or jury rig things that don’t work. He reroutes wiring, retrofits parts from old pump stations to work in newer ones and has learned instrumentation. “Ray’s also a great mechanic and services our HVAC system,” Schick says. “He’s saved us tons of money.”

After the 1987 upgrade to the Fairhaven treatment plant, Schick was shocked to learn some components were not on the emergency generator. Hurricane Bob delivered the news in 1991. During the weeks it took to

TEST ANXIETY

As education coordinator for the Massachusetts Water Pollution Control Association, Linda Schick finds the 80 percent failure rate of operators taking grade advancement exams to be unacceptable.

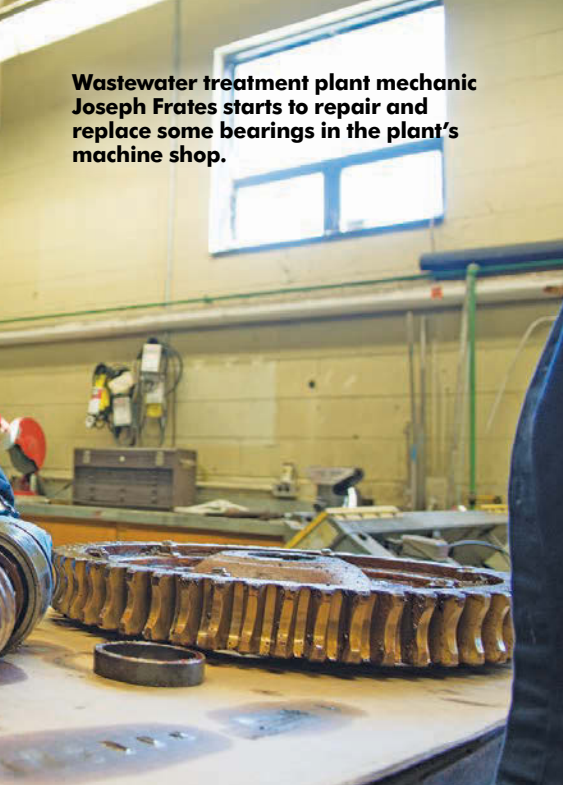
Schick’s position as sewer and wastewater superintendent gives her firsthand experience with the condition. “I have four guys who are good operators but lousy at taking tests,” she says. “They and other operators are very mechanical and can figure out anything, but it doesn’t show up in the way they are tested.”

Fairhaven’s Board of Public Works pays for the preparatory exam

courses, and Superintendent Vincent Furtado is a trainer. “He’s held private sessions with the guys, the village has spent lots of money on courses and they still don’t test well,” Schick says. “They look at that piece of paper and their minds go blank. Consequently, the industry is losing good people who should be promoted but aren’t because they can’t pass a written exam.”

Schick’s frustration runs deep, as the problem increases exponentially as plants become more complicated. She is working with the MWPCA Education Committee, examining how to change the status quo and improve passing rates. “As I approach retirement, education is huge for me,” Schick says. “I want to make sure the next generation of operators has what it needs to keep plants running.”

Wastewater treatment plant mechanic Joseph Frates starts to repair and replace some bearings in the plant's machine shop.



restore power along the coast, Fairhaven was the only community able to accept septage. Paczosa had quickly wired the septage tanks to the Caterpillar generator.

To the rescue

Wiring necessary plant components to the generator didn't prevent all emergencies. One night during a storm, flood alarms went off in the cellar of the sludge building. When Paczosa arrived, he found 5 feet of water threatening the 50 pumps. He killed the power, then called Schick and other workers. Together, they brought in a portable pump and discovered water coming up through the drains. "We don't know how, but with no other place for the water to go, it got into the flow equalization return and caused the flood," Schick says.

Paczosa baked the waterlogged motors and temporarily relocated as many controls as possi-

ble upstairs. With the arrival of seed sludge, operators had the plant running in 48 hours. "Officials from the state Department of Environmental Protection were impressed," Schick says. "Ray made it possible." He later moved all the controls in the sludge building upstairs.

One of Schick's proudest accomplishments, however, is digitizing the collections system using Mapsonline (PeopleGIS). As technicians put the geographic information system together, they found older sections of town completely undoc-

umented. Today, they are moving through those zones categorizing and coding everything per PACP condition grades, enabling Schick to develop I&I and repair plans.

"Getting the camera truck is another proud accomplishment," she says. "I believe in preventing failures rather than reacting to them. As I approach retirement, I also want to archive as much information as possible so my family is properly cared for when I leave." ♦

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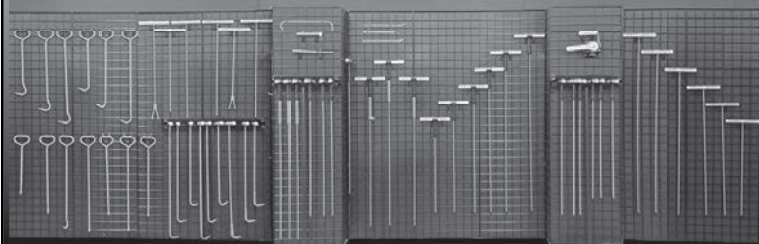


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IMPROVING PIPELINE CERTIFICATION

Updates to PACP Version 7.0 reflect extensive peer review and recommendations to get involved

By Ted DeBoda, P.E.

Our members and staff have been working diligently on the new and improved Pipeline Assessment Certification Program Version 7.0, including the Manhole Assessment Certification Program and Lateral Assessment Certification Program, which are scheduled for release this spring.

As PACP expands both in popularity and impact, NASSCO is challenged to continually improve the curriculum in order to sustain our mission to set industry standards for the assessment and rehabilitation of underground infrastructure. We are energized about these changes, and I deeply appreciate the time and attention the peer review committee — which consisted of an unprecedented 65 collections system professionals — gave to the evaluation of the technical updates, educational benefits and risk management appendix.

Let's take a look at some of the highlights of the improved, more user-friendly PACP Version 7.0.

Technical updates:

- Descriptions of technical issues, such as deterioration mechanisms and stages of sewer collapse.
- An improved header form that redefines fields and includes new options for materials, weather and consequence of failure (CoF).
- Addition of infiltration code modifiers (barrel, lateral, connection and joint).
- Simplified MACP Level 1 requirements.

- Addition of new LACP codes and condition grades as well as other technical improvements.

Educational updates:

- Streamlined training materials to better follow the PACP manual.
- Clarified rules for continuous defects.
- Moved the buckling code into a modifier of the deformed code.
- Added new codes for surface damage (to provide more detailed options such as surface spalling of the coating and corrosion tuberculation).
- Updated color-coded chart to help field personnel identify codes for header fields such as pipe materials and weather codes.
- Added an illustrated appendix to help identify pipe shapes and materials.

Risk management appendix:

- The new appendix describes asset management using PACP to calculate risk based on likelihood of failure (LoF) and CoF.
- LoF is defined using the PACP quick rating based on the collective condition grades within a segment.
- CoF factors are discussed in detail to include specific examples.
- The appendix ends with calculation of risk and graphical interpretations when plotted on a risk diagram.

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DISINFECTING AT THE SOURCE

Cleaning system for sewer equipment helps prevent the spread of bacteria, viruses

By Kyle Rogers



TJ Suiter (right) designed the Vanguard System to remove pathogens from sewer cleaning equipment as it's retrieved. The system contains four high-pressure sprayers connected to the truck's water tank and a 5-gallon tank for antibacterial cleaning concentrate, all operated by a small control box.



Disinfecting the jetter hose as it is being retracted from the sewer will prevent raw sewage and all the viruses and bacteria it contains from contaminating the outside environment.

It's a simple concept. But in more than 25 years in the wastewater business — whether it was cleaning sewer lines or overseeing jobs — TJ Suiter says it is a concept he didn't often see practiced.

"I noticed there is really nothing out there that is removing all the bio-hazards that are coming out of the sanitary sewer system at the source," says Suiter, owner of Colorado-based Hydro Products. "As workers are launching or retrieving the jet hose from the reel, they are exposed to raw sewage. Then they're transferring all those viruses and bacteria that are on their gloves to other parts of the equipment: the vacuum or jet controls, their personal cellphone or drinks they might have if they're out there on a hot summer day."

That's why three years ago, Suiter invented the Vanguard System, designed specifically to keep sewage and its associated pathogens where they belong — the sewer.

"The people who work on these maintenance trucks sometimes feel like they're bullet-proof. Well, they're not. Viruses don't have any respect for people."

— TJ Suiter

How it works

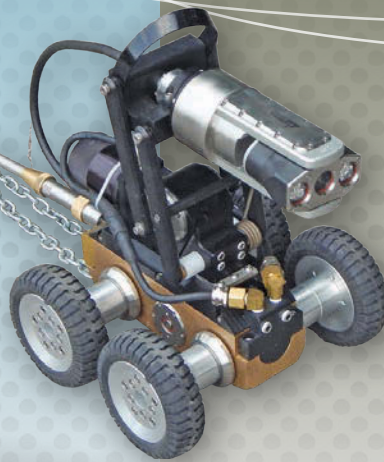
The Vanguard System can be set up with a roller frame that sits over the manhole, or with the new spray collar design. Each contains four high-pressure sprayers connected to the truck's water tank and a 5-gallon tank holding an antibacterial cleaning concentrate. The system is operated by a control box that combines water from the truck's tank with the cleaning solution. The amount of cleaning solution per gallon of water can also be adjusted via the control box.

"As the hose is being retrieved out of the sewer, it is being sprayed at that source, so all the bacteria and viruses are going right back into the sewer," Suiter says. "When you open a manhole, you'll usually see several different lines coming in and every time you're going to clean a different line you have to grab that hose to steer it into the correct line. Since that hose was just in the sewer, with all those viruses and bacteria, all that gets on your gloves."

"With the Vanguard System, it's coming out and getting washed off as it's being spooled up. Now you're able to touch a clean hose as you guide it into the next line. And you're also hitting balls of tree roots or any number of things that will stop the hose's progress jetting the line. So you'll have to grab that hose numerous times during the run and help it along."

(continued)

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The system also includes a hand gun attachment that can be used to disinfect the surrounding area or other equipment that comes into contact with sewage.

"The spray gun is there because there is a lot more that goes into the sanitary sewer than just the jetting hose," Suiter says. "You can wash down the vacuum tubes, cameras, the nozzles, your gloves, boots, tools, toolboxes, etc."

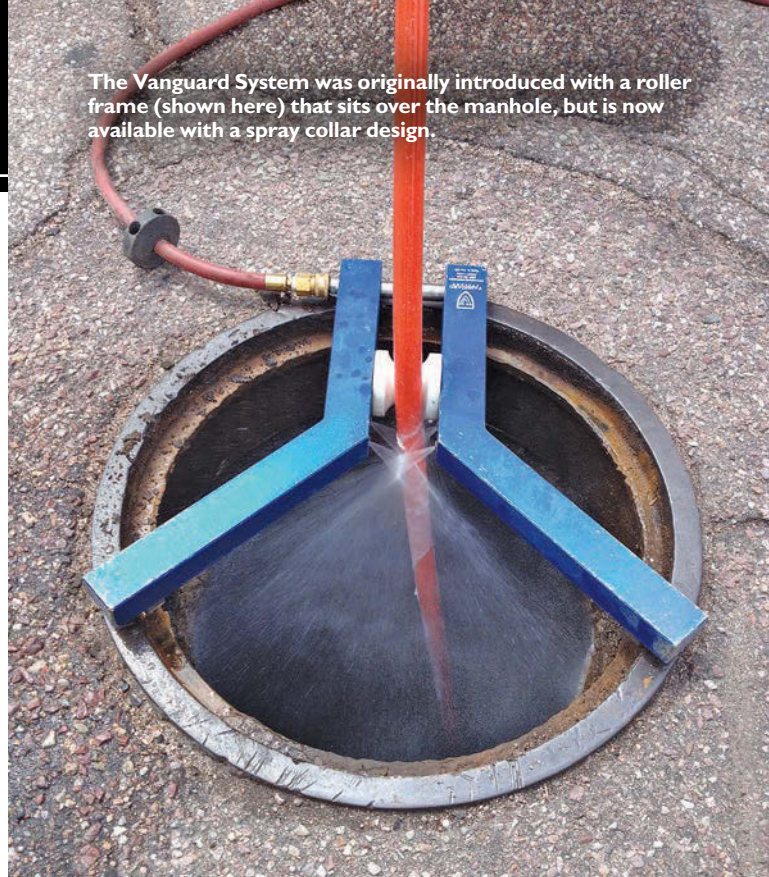
98 percent

Suiter sold his first three units of the Vanguard System about three years ago to the City of Colorado Springs. He immediately received positive feedback, but the city also wanted quantifiable data that showed the effectiveness of the Vanguard System. A Denver-area independent laboratory was hired to follow Colorado Springs crews for a day swabbing equipment the system was used on. After three weeks of culture growth, the lab had some data: The system reduced bacterial counts by up to 98 percent. Colorado Springs ordered 11 more units to outfit the rest of its fleet.

Suiter says that level of equipment disinfection is especially important in today's world where wastewater workers are at greater risk of contracting an illness because of their work environment.

"Viruses and bacteria are getting stronger; they're not getting weaker," Suiter says. "And there are fewer effective antibiotics out there. All the low-hanging antibiotic fruit is gone, so it's getting extremely expensive and very time consuming to come up with new antibiotics that will treat infections."

"The people who work on these maintenance trucks sometimes feel like they're bullet-proof," he adds. "Well, they're not. Viruses don't have any respect for people."



The Vanguard System was originally introduced with a roller frame (shown here) that sits over the manhole, but is now available with a spray collar design.

The genesis

A period of volunteering at a hospice with terminally ill patients is where the concept of the Vanguard System first began to develop for Suiter. He observed hospice workers flushing the contents of bedpans down the toilet, untreated.

"And those same workers were wearing all this high-tech safety gear and actually incinerating it, including gloves, gowns and even the sheets and clothing from those patients. But the workers outside the hospice were not being protected at all."

The Centers for Disease Control and Prevention does not currently recommend disinfection of patient waste before disposal into the sewer system, and the U.S. Environmental Protection Agency does not have any registered disinfectants that can be used for that purpose.

"Their position is basically, we don't recommend anything to kill pathogens in wastewater. It will be taken care of at the treatment plant," Suiter says. "That's all well and good if you're working with that water coming directly out of the wastewater treatment plant where all this raw sewage has been cleaned up. But the people we're trying to protect are the ones between the hospital and the treatment plant."

Cost-savings benefits

The Vanguard System is modular so it can be installed on a new truck or retrofit on any existing truck for approximately \$6,000.

"When you consider that the average hospital stay is several thousand dollars a day, it's a pretty inexpensive investment to protect your workers," Suiter says.

He recalls one of his contacts in Texas recently had a worker diagnosed with hepatitis. It led to a five-week hospital stay.

"The wastewater manager there said, 'You know, for the cost of this one individual being sick, we could've outfitted the entire fleet and been money ahead.' From just that single incident."

"Especially in light of the recent Ebola scare in the U.S., I think it's important that workers are able to actually wash down that area where a hose is coming out," Suiter adds. "This is a very rapidly evolving problem and there's really not an end in sight, so I think it's best to be on the front end of this thing rather than the back. The best defense is always good offense." ♦

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UNDERGROUND UPGRADES

Middlesex Water works to update its water distribution infrastructure, reduce leakage and improve customer service

By Jim Force



Construction foreman Shane Inman (left) and construction inspector Gary Colfer examine the installation of new 8-inch ductile composite iron pipe. (Photography by Jeffrey Herring)

In the nationwide campaign to improve municipal infrastructure, the Middlesex Water Company is pulling its weight. In September 2013, the company wrapped up the latest project in a 20-year program to rehabilitate water mains, service lines and hydrants throughout areas of New Jersey where it provides water services.

In South Amboy, the company spent some \$4 million to clean and line 11,900 linear feet of 6- to 8-inch water main, enlarge another 9,000 feet of main from 4 to 8 inches, and replace 31 hydrant assemblies and 475 water service lines.

The project, called RENEW, is meant to bring aging waterlines up to modern standards and ensure service for the full lifetime of the pipe, according to Richard M. Risoldi, vice president and chief operating officer. The company, which owns and operates water utility and wastewater systems in New Jersey, Delaware and Pennsylvania, upgraded a portion of South Amboy's waterlines in 2011. The recent work is a continuation of a planned upgrade to the company's 730-mile water distribution system.

"Rehabilitation of mains, rather than more costly replacement, is often the most viable solution, helping to restore the original useful life of older pipe while maintaining operating costs," says Risoldi. "The RENEW program translates into less lost water through leaks and enhanced water quality and pressures for our customers." Funding for the project has come from the New Jersey State Revolving Loan Fund.

Well connected

Headquartered in Iselin, New Jersey, the publicly traded Middlesex Water was incorporated in 1897. Its workforce numbers more than 270. In Middlesex County, the company serves more than 60,000 retail customers, including about 2,200 in South Amboy. Raw water for about 75 percent of the service area is drawn from the Delaware and Raritan Canal. It is treated with conventional disinfection, coagulation, filtration and post-chlorination at the 55 mgd Carl. J. Olsen Surface Water Treatment Facility, named for the company's fourth president.

The rest of the area is served from four wellfields containing 31 wells in the northern part of the service territory. Four small treatment plants disinfect the groundwater before distribution. The largest plant uses air stripping to remove volatile organic compounds. The company also purchases 3 mgd from a neighboring utility.

The Middlesex County operation includes 24 million gallons of storage. Seven million gallons flow by gravity from an elevated storage tank, and the remainder is pumped from above-ground storage facilities into the distribution system. The system is managed through a state-of-the-art enterprise resource planning (ERP) system (Oracle) connected to a geographic information system (Esri) and a Water GEMS hydraulic model (Bentley). The ERP system includes mobile workforce management.

This technology "connects all the dots," according to Risoldi: "Our



mobile workforce management system is connected via our ERP system to customer service. As our



PROFILE: Middlesex Water Company, Iselin, New Jersey

FOUNDED:
1897

SERVICE AREA:
55 square miles

POPULATION SERVED:
450,000

SOURCE WATER:
Delaware and Raritan Canal,
four wellfields

TREATMENT CAPACITY:
67 mgd

TREATMENT PROCESS:
Conventional

INFRASTRUCTURE:
55 mgd treatment plant, 31
wells, 4 wellfield treatment
plants, 730 miles of distribu-
tion lines, 5 pumping stations

SYSTEM STORAGE:
24 million gallons

ANNUAL REVENUES:
\$110.4 million (2012)

WEBSITE:
www.middlesexwater.com

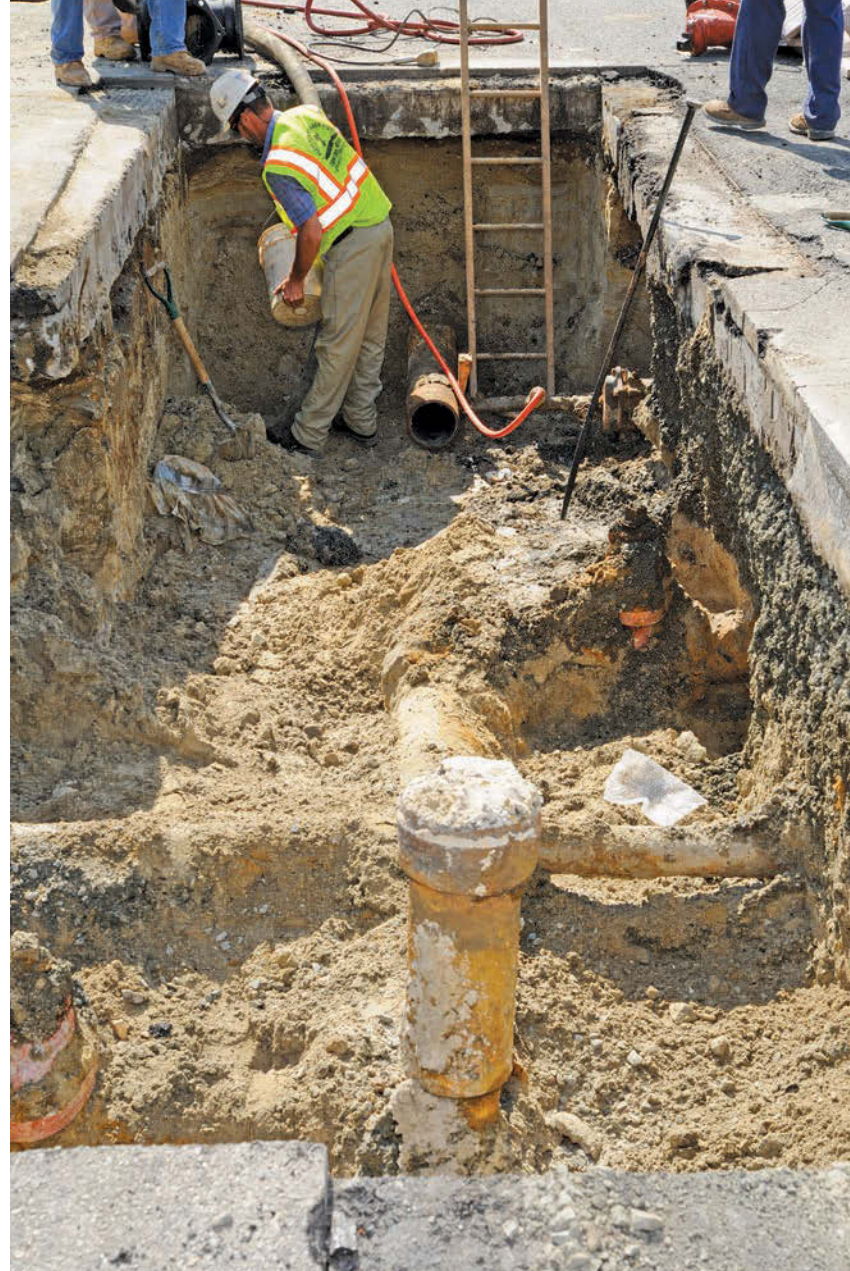
staff is made aware of a problem, an electronic activity form is filled out and sent wirelessly to our field people, who investigate the issue and make the necessary repairs. The information on the repairs is sent back to customer service and made part of the customer record.

“Dispatchers watch the mobile application in real time. They can see the trucks moving and view all of the outstanding work routed to our mobile personnel. It has improved our response time and personal productivity. It’s very efficient.” The SCADA system uses Wonderware (Invensys) as the operator interface software.

“People are concerned about a project that is a bit disruptive like this. We did a lot of public education before the project started, meeting with the town council and meeting with the people who were affected.”

Brian Carr

The Middlesex Water team performs all routine maintenance on valves, small mains and hydrants. Other work, including annual leak surveys in specific sections of the system, has traditionally been contracted out. However, the company is now implementing its own leak detection system.



Left: Construction foreman Shane Inman checks a new hydrant installation in South Amboy, New Jersey. Above: Workers prepare to tie in new and existing water pipe in the access hole. The project is part of the utility’s RENEW program.

unlined vintage pipes consisting of bare iron,” says Brian Carr, senior project engineer. “Water causes oxidation and mineral deposit that restricts the inside diameter, by up to half in some cases.”

The aim was to remove the mineral deposits, restore the original diameter and then trowel a 1/16-inch coating of cement on the inside walls so that the iron would no longer come in contact with the water. “We worked with 600-foot sections,” Carr says. “We disconnect the section and supply water temporarily to the customer through a bypass pipe that lies on the ground and is disinfected and properly marked for

South Amboy renewal

The RENEW project in South Amboy included water mains in a specific area targeted through analysis of water quality and load and pressure data, dating back several years.

To clean and line the old 6- and 8-inch mains, the lines were first scraped with an abrasive rotary tool and then flushed. “These were old



Water is pumped out of an access hole as workers prepare to tie in new water pipes in South Amboy.

BATTENING DOWN THE HATCHES

It's an accident of geography, but one of the biggest challenges faced by Middlesex Water Company is its location along the East Coast, an area prone to damaging floods and storms in recent years. In dealing with such events, the company's emergency response and diverse geographic structure have helped significantly.

Bernadette M. Sohler, vice president of corporate affairs, says the company has a fully integrated emergency management team, with coordinators in each of seven regional companies.

"They are connected as part of a single incident command structure," she says. "They report and manage developments, coordinate activity and leverage assets, shuttling human resources and equipment around as needed."

During Superstorm Sandy in October 2012, all power was out and refineries were shut down in the company's New Jersey service area, resulting in a diesel fuel shortage. The emergency team obtained fuel from its subsidiary in Delaware, which was less affected by the storm. The fuel was needed to power company facilities, which were on emergency generators for an extended time.

"We're located in the path of storm surges and hurricanes," says Sohler. "Emergency preparedness is a big deal and one of our highest priorities."

The company has constantly revisited and adjusted its plans as storms have become more widespread, more frequent and longer lasting. In such emergencies, Middlesex Water assists other area water and wastewater utilities.

"We work to maintain relationships with the municipalities we serve, our wholesale customers and the state emergency response team throughout the year," says Sohler. "We communicate constantly during emergencies. We want to serve as a resource wherever we are needed."

safety reasons."

The customers are on the bypass system for an average of three weeks. They have water continuously except for the few minutes it takes to connect and disconnect the bypass piping. Temporary hydrants are installed to maintain fire protection. The company's cleaning and lining contractor took video images of the piping before and after the repairs. Company officials inspected and approved the work. The oxidized material removed from the sections was collected and landfilled.

Improving service

In other parts of the South Amboy system, 4-inch pipe was replaced with 8-inch pipe, laid in an open trench next to the old lines. The new pipe is cement-lined ductile iron. Concurrent with main cleaning and enlargement, the RENEW project renewed service lines to some 475 customers and replaced 31 hydrants.

"The old service lines were gal-

vanized for the most part, with some plastic, and were in bad shape," says Carr. The new lines are all copper. The work required service technicians to enter homes to pull meters and clean the service lines. That took a strong public education effort on the front end.

"People are concerned about a project that is a bit disruptive like this," says Carr. "We did a lot of public education before the project started, meeting with the town council and meeting with the people who were affected. We issued press releases, sent letters, posted information to our website and over social media, and even created a short video to educate customers about the project, the process and how it ultimately would benefit them."

The biggest issue was getting the town and customers comfortable with the project — to see that short-term inconvenience translated to long-term value. "You're dealing with people who are not used to



This piece of 6-inch cast iron pipe was pulled up after more than a century in the ground. It's being replaced as part of the RENEW program. Right: New 8-inch ductile iron pipe awaits installation.



this," Carr says. While the latest work wrapped up in November, Middlesex Water planned to resume the RENEW program in the spring. "We've done about 85 miles of cleaning and lining to date and have 125 miles left to do," he says.

Life extension

And while that will help restore the useful life of the piping serving the citizens of this central Jersey area, it's only the beginning, as far as Middlesex Water is concerned.

"We're restoring the mains so they can carry water, but these pipes are aging," Risoldi says. "We're seriously thinking about the use of materials that will not just bring back the normal life span of these lines but will actually extend their life."

The company is looking at cured-in-place pipe lining as one way to accomplish that. "We're experimenting now, looking at costs. If they're reasonable, we're looking to do that next," Risoldi says.

Larger-diameter mains — 30 inches and above — are also getting attention: "We're developing a larger asset condition assessment, determining the condition of our larger mains and determining which technology we're going to use. These are older mains and concrete pipes. They're known to fail. We want to be proactive in their repair." ♦

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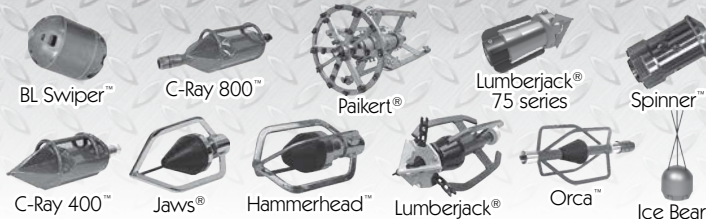


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PUMPS, LIFT STATIONS AND CONVEYANCE

By Craig Mandli

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The **EyeOnWater** mobile app from **Badger Meter** is designed for customers of water utilities that have implemented BEACON Advanced Metering Analytics. The app gives consumers direct access to their water consumption data and provides tools to help them manage water usage. **800/876-3837; www.badgermeter.com.**

5 Greyline Instruments PSL 5.0

The **PSL 5.0 Pump Station Level Controller** from **Greyline Instruments** is designed for sewage lift stations, wet wells and storage tanks. It includes a noncontacting ultrasonic sensor. A loop-powered pressure sensor can also be connected for redundant sensing in applications with foam or grease. It will continuously recalibrate the pressure sensor and automatically



switch back and forth from ultrasonic to the pressure sensor as required. An automatic pump runtime logging and reporting system helps operators to plan pump maintenance and identify lazy pumps before they fail. **888/473-9546; www.greyline.com.**

6 Mueller Co. Remote Pressure Monitoring System

The **Remote Pressure Monitoring System** from **Mueller Co.** supplies accurate pressure data, allowing water system operators to reduce leakage volumes, energy costs, system maintenance costs, customer complaints and water quality problems. The pressure sensor, typically installed two per district metering area, reports at user-defined intervals via cellular service and a secure Web server. Beginning with pressure monitoring, the communications backbone can be integrated into existing SCADA systems or used as a stand-alone monitoring platform. **800/423-1323; www.intelligentwatertechnology.com.**

7 OTEK Corp. New Technology Meter

New Technology Meters from **OTЕК Corp.** make it easy to view readings with a digital display for easy, clear readings. It has an automatic 51-segment bar graph that reads in three colors — green/safe, yellow/caution and red/danger — for quick reference of process status. Units are customizable and configurable to be HMI and MMI compliant. The software has been verified and validated. For ease of use in any application, they are available in loop, signal and external power models. This multi-purpose series of meters and controllers comes in 20 different industry standard housings in plastic or metal. **877/227-6835; www.otekcorp.com.**

8 Spire Metering Technology 280W-CI

The **280W-CI** commercial- and industrial-grade ultrasonic water meter from **Spire Metering Technology** has quad-path ultrasonic technology with no moving parts. Housed in an IP68-rated heavy-duty enclosure, it can replace mechanical water meters, including compound meters. It exceeds ISO4064 Class D/AWWA C750, and its quad-path technology improves accuracy and reduces the straight-pipe run requirement. It has a

wide dynamic range, leakage detection and a 10-year battery life. It is unaffected by magnetic interference, and is AMR/AMI ready with pulse, M-Bus, Modbus, 4-20 mA or wireless interface. **888/738-0188; www.spiremt.com.**

LIFT STATIONS

9 Baker Water Systems Division Monitor Booster Station

The **Monitor Booster Station** from **Baker Water Systems Division** is an economical and safe solution for increasing waterline pressure or filling water storage tanks. The Monitor In-line Pitless Booster houses a submersible pump and motor belowground in the low-pressure suction tank reservoir. It eliminates the need for a pump house, which reduces project cost and removes the hazard of confined space entry. The stations are controlled by variable-frequency drive control systems. Simplex stations can accommodate flows ranging from 5 to 5,000 gpm. Duplex stations add redundancy where required by code or where additional flow capacity is desired. Additional pitless boosters can be added as needed to accommodate flow rates as high as 30 mgd. Systems can be upgraded by increasing the pump size and reprogramming the controls. **800/356-5130; www.bakermfg.com.**

10 Gorman-Rupp ReliaSource

The **ReliaSource 8x9 Above-Ground Lift Station** from **Gorman-Rupp Company** is an engineered and manufactured wastewater lift station that offers a smaller footprint. It includes genuine Gorman-Rupp pumps, controls and enclosures, and is fully assembled and rigorously tested to operating conditions in state-of-the-art facilities. Every unit is backed by a worldwide network of factory-trained distributors and reliable parts service. **419/755-1011; www.grpumps.com.**

11 Orenco Composites DuraFiber Shelter

DuraFiber Shelters from **Orenco Composites** safely house equipment, generators and chemicals. They are strong, insulated (up to R24 insulation values) and lightweight. They are manufactured of fiberglass *(continued)*



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in a single piece with no joints or seams, using a closed-molded process that provides a superior structure, eliminates any chance of leaks and offers an aesthetically pleasing exterior. They are also easy to ship and set. They are available up to 12 feet tall, 20 feet wide and 40 feet long, with custom sizes also available. Interior surfaces are coated with a polyester gelcoat, while exterior surfaces are protected with a high-performance polyaspartic urethane. The roof is rated up to 100 psf, and the shelter itself can be rated for winds in excess of 160 mph. 877/279-0464; www.orencocomposites.com.

PUMPS/COMPONENTS

12 Flowrox Expulse Pulsation Dampener

The **Expulse Pulsation Dampener** from **Flowrox** settles pipeline pressure peaks and uneven flow. Dual hose technology with an outer reinforced layer for pressure retention and an inner flexible process layer creates an expansive cavity for air changes capable of absorbing up to 90 percent of the pulsation caused by pumping. The in-line design allows for both vertical and horizontal installation, providing greater flexibility when dealing with tight installations. It relieves the stresses of breaking diaphragms or bladders and is naturally resistant to wear, corrosion and most chemicals, giving it a long product life cycle. The dampener cleans itself on every pulse and doesn't collect sediment or particles. It combines a pulsation dampener with a connection hose for ease of pump maintenance and alleviation of pipe stresses. It is easy to install on any pulsating pump from any manufacturer. 410/636-2250; www.flowrox.us.

13 Giant Industries GP5100

For applications that have limited space, the **GP5100 Series** compact industrial triplex plunger pump from **Giant Industries** is rated up to 4,000 psi and up to 43 gpm. It comes with an SAE-C four-bolt mount and a hollow shaft that will accept standard hydraulic motors. It is constructed with a nickel-plated spheroidal cast iron crankcase; drop-forged, through-hardened, ground and polished crankshaft; bronze connecting rods; sight glass; vented dipstick; hardened, ground and polished stainless

steel plunger bases; solid ceramic plungers; nitrile seals with fabric reinforcing; stainless steel valves; and nickel-plated spheroidal cast iron manifold. 800/633-4565; www.giantpumps.com.

14 Godwin Dri-Prime NC150

The **Dri-Prime NC150** effluent pump from **Godwin**, a **Xylem brand**, offers flows to 1,767 gpm and discharge heads to 195 feet. It has Flygt N-technology with a hard iron (60 HRC), self-cleaning, non-clog impeller and insert ring. The Dri-Prime automatic priming system primes and re-primers from dry to 28 feet without operator assistance. It has a dry-running high-pressure oil bath mechanical seal with highly abrasion-resistant silicon carbide faces. Its close-coupled centrifugal pump allows for easy pump end or engine/motor changeover in the field. It can be customized with a diesel engine or electric motor, and can be mounted on a skid, highway trailer or in a quiet enclosure. It is available as a Godwin DBS for pump station backup. 800/247-8674; www.godwinpumps.com.

15 Griffin Pump hydraulic submersible pump

Hydraulic submersible pumps from **Griffin Pump & Equipment** are available in axial flow and trash-handling models. They range from 4 to 24 inches and are designed to handle water volumes up to 20,000 gpm and heads up to 140 feet. The impellers can handle solids up to 3 inches. They fit in standard manholes for sewer bypass and for moving liquids with heavy trash and solids content, such as sludge, trash, raw sewage, clear liquid and industrial effluent. 866/770-8100; www.griffinpump.com.

16 Goulds Water Technology 3SD

The submersible **3SD** dual-seal with seal sensor probe sewage pump from **Goulds Water Technology**, a **Xylem brand**, combines dual hard-face mechanical seals with a 300 series stainless steel keyed shaft motor. It has a cast iron, two-vane, semiopen, non-clog impeller with pump-out vanes for mechanical seal protection, ensuring maximum energy efficiency. The pump is balanced for smooth operation and capable of running dry without damaging the inner components. It comes in single- and three-phase options with a range of 1.5 to 5 hp, supporting several hydraulic

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requirements. It is certified by Underwriters Laboratories and the Canadian Standards Association. 866/325-4210; www.goulds.com.

17 Hammelmann Corp. HDP-196

The **HDP-196** sewer pump from **Hammelmann Corp.** has flows up to 160 gpm and pressures of 3,200 psi. It has a compact footprint and integral reduction gear, and is available in horizontal or vertical models with a reversible pump head, central or side suction connection, discharge connections on both sides, left- or right-hand driveshaft, and can operate at any angle. The water end is suitable for recycled water with high-grade solid ceramic plungers, wear-resistant valve seats, low flow velocity over suction and discharge valves, packing seal sets within rust-resistant stainless steel sleeves, a slow plunger speed, pressurized oil lubrication system and clockwise or counterclockwise rotation. It offers easy servicing with reversible valve seats, suction and discharge valves that use identical components, maintenance without removal of suction and pressure lines, service access at the front and above the unit, and fixed valve housing accessible via lightweight cover plates. 800/783-4935; www.hammelmann.com.

18 KSB Amarex KRT

The **Amarex KRT** jacket-cooled wastewater pump from **KSB** has a completely sealed, closed-loop cooling system to keep cooling passages free of debris. The cooling liquid inside the jacket is an environmentally safe propylene glycol and water mix. The 38/62 antifreeze mixture provides pump protection down to -4 degrees F. An impeller inside the closed-loop system circulates the antifreeze mixture so that it constantly flows around the motor, gathering heat, then over a heat exchanger, which dissipates the heat. The system is completely sealed against the pumped media as well as the air-filled motor housing. It can be installed in a variety of configurations to accommodate the requirements of any wastewater application. Monitoring sensors are teleservice-enabled to permit remote monitoring, and the epoxy sealed cable entry points provide safe operation, even if a cable is damaged or cut below the water level. 804/222-1818; www.ksbusa.com.

19 Moyno EZstrip Cake Pump

The **EZstrip Cake Pump** from **Moyno** has a specially designed feed chamber that can easily be disconnected, allowing access to the rotating assembly. The rotor can be separated from the conveyor, allowing removal of the rotor and stator all within its own assembled length. It has a full drive train including a rotor, stator and screw conveyor that can be removed in minutes without disconnecting pipework or removing the hopper. A large auger (feed screw) design is standard on all units. An optional ribbon screw conveyor assists blending or conveying products, and an optional separate bridge breaker ensures smooth feeding. A side inlet port allows addition of thin sludge for blending. It is available in cast iron with a choice of rotor and stator materials and a variety of hopper sizes. 877/486-6966; www.moyno.com.

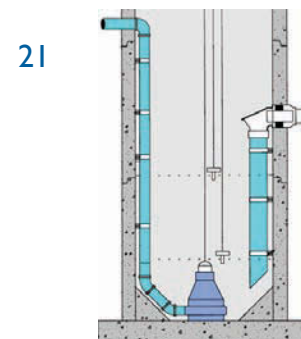
20 Pulsafeeder PULSAtron pre-engineered systems

Pre-engineered systems for **PULSAtron** metering pumps from **Pulsafeeder** include a compact, rugged, high-density polyethylene frame providing structure for single or dual metering pumps, with a full 1-inch drip rim perimeter. The piping assemblies use Schedule 80 piping, isolation ball valves and unions throughout. The inlet piping assembly includes a clear Y-strainer and calibration column for easy maintenance and measurement. The discharge piping assemblies incorporate pulsation dampeners, and a pressure gauge with isolator and discrete backpressure and pressure-relief valves. 800/333-6677; www.pulsatron.com.

21 RELINER/Duran Inside Drop

Inside Drops from **RELINER/Duran** extend pump life in lift stations by preventing aerated influent from being directly drawn into the pumps and causing cavitation. The drop pipe should always be extended below the low-limit level and cut to follow the slope of the base fillet. If there is no fillet, users cut the pipe at 45 degrees and maintain a distance from the floor or fillet of one pipe diameter. This creates a diffuser by directing the flow back against the structure, de-aerating the influent. 800/508-6001; www.reliner.com.

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22 Smith & Loveless S&L Non-Clog Pump

S&L Non-Clog Pumps from **Smith & Loveless** have an oversized, stainless steel pump shaft that minimizes overhang, resulting in significantly less shaft deflection and greater pump efficiencies. This is achieved through minimal pump heights and rigid construction. Shaft endplay is limited to bearing shake. Shaft runout is limited to 0.003 inches. Close tolerances are in all cases tighter than NEMA specifications. The pump impeller is designed for maximum efficiency. Trimming the impellers inside the shrouds leaves the back shroud full diameter to prevent stringy material from winding around the shaft and reducing efficiencies. **913/888-5201; www.smithandloveless.com.**

23 Thompson Pump Enviroprime System

Enviroprime permanently installed standby pump units from **Thompson Pump** can continue pumping despite power loss or primary pump failures. The automatic self-priming pump set can meet system demands during wet weather, routine maintenance, new construction or emergency repair. The lift station backup system uses programmable electronic controls, which make use of sensors that monitor levels in the wet well and initiate backup pumping as programmed. In addition to these SCADA-capable controls that send an alarm to alert the operator, the pumps are available with a Silent Knight canopy that dramatically reduces sound levels for residential areas. **800/767-7310; www.thompsonpump.com.**

24 Vertiflo Pump Company Series 800

The **Series 800** industrial-immersion sump pump from **Vertiflo Pump Company** is ideal for service in water, corrosive chemicals and hazardous liquids, including sump drainage, flood control and process drainage to meet EPA and OSHA requirements. It is designed for long life in severe services with minimal maintenance at heads to 230 feet and temperatures to 350 degrees F. It provides trouble-free operation in pit depths up to 26 feet and up to 3,000 gpm. It has carbon graphite line shaft bearings, semiopen impeller with external adjustment, high-thrust angular contact ball bearing, 416 stainless steel shafts to 1 15/16 inches, and a stan-

dard NEMA C face motor. Available construction materials include cast iron, all 316 stainless steel, 316 stainless steel fitted, Alloy 20, Hastelloy and CD4MCu. **513/530-0888; www.vertiflopump.com.**

SCADA SYSTEMS

25 Environment One Corporation iota OneBox

The **iota OneBox** telemetry system from **Environment One Corporation** enables control of pressure sewer grinder pumps from an office desktop or smartphone. It integrates into a SCADA network to provide information on tank storage capacities, power failures, blockages and faults. Diagnostics for individual properties, streets or whole networks are available in real time. It provides alerts even before the user becomes aware of any faults. It also provides trend analysis, report generation, peak flow demand determinations, flow smoothing and maximized efficiency of downstream infrastructure. **518/579-3068; www.eone.com.**

26 Flygt cloud-based SCADA

Cloud-based SCADA systems from **Flygt - a Xylem Brand** not only inform operators of issues so they can be addressed quickly, they alert to future situations that enable the operator to take preventive action, saving time and money. **855/995-4261; www.flygtus.com.**

27 Hadronex SmartCover Systems SmartTrend

The **SmartCover Systems SmartTrend** analytic tool from **Hadronex** uses advanced pattern recognition algorithms and signal processing to focus data from a large number of sites to predict future behavior, rather than react to alarms or reports of problems. It reads collections system patterns to warn operators long before any problem occurs that there may be leaks, line breaks, grit accumulation or FOG buildups without having to camera the system. Advisories can be sent via email or text message. The frequency of remote site analysis is user selectable, up to four times per day. It advises users concerning maintenance. **760/291-1980; www.smartcoversystems.com.**

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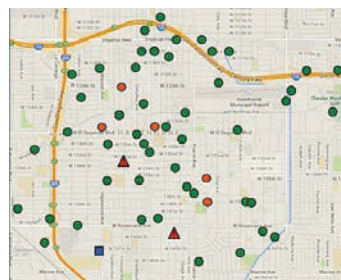
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28 iWater infraMAP

The **infraMAP Software** program from **iWater** allows seamless data collection and updates to a SCADA program. It includes redlining, one-click reporting, isolation traces, work orders, asset inspection forms and work history records. It connects the office with field crews and delivers the data they need when they need it. **949/768-4549; www.iwater.org.**

VALVES

29 Advanced Pedestals Polychek

The **Polychek** check valve from **Advanced Pedestals** has a fully opening flapper that allows the entire piping system to be pigged without being dismantled. Once installed, it eliminates the possibility of corrosion and leakage, as the exterior is constructed of 3608/4710 HDPE and fusion welded into place. This also eliminates the need for transitions, unions and other metal fittings, which can corrode, leak, and add extra cost and time to the installation. The inner workings are constructed of plastic resins that aren't susceptible to corrosion or distortion by temperature or chemicals. The flapper hinges are made of 316 stainless steel rod. It has NSF 61G approval. **940/668-4371; www.polychek.com.**

30 Asahi/America wafer check valve

PVC wafer check valves from **Asahi/America** are installed on the discharge side of pumps in applications such as aquariums, water attractions, water treatment and municipalities to prevent backflow flooding that could seriously damage pump systems. The wafer check valve's body, disc and stopper assembly are machined from solid PVC plate stock, which conforms to ASTM D1784 Cell Classification 12454A. They conform to ISO 5752 face-to-face dimensions and are easily installed by slip-fitting the valve between two mating flanges. Valves are available in PVC, 3 through 12 inches, with EPDM seals and no spring, standard. The 3- to 8-inch valves operate at a maximum pressure of 150 psi; with 10- and 12-inch valves at 90 psi and up to 120 degrees F. Optional seals in FKM and an ETFE-coated stainless steel spring are available. **800/343-3618; www.asahi-america.com.**

31 Cla-Val VC-22D

The hand-held **VC-22D** electronic valve controller from **Cla-Val** provides remote or local setpoint control for valves in a variety of fluid applications, including pressure control with upstream or downstream feedback, flow control with mag meter or electronic flowmeter, modulating level control, ratio control, altitude and level control. It has accurate and stable valve control, an IP68 submersible enclosure, and the ability to monitor and display multiple processes with accurate retransmission of parameters to SCADA systems. The controller has six analog 4-20mA and six digital inputs, four analog 4-20mA outputs, a two-output solenoid and two output relays. **949/722-4800; www.cla-val.com.**

32 DeZURIK Water Controls APCO ASU

APCO ASU Combination Air Valves from **DeZURIK Water Controls** are single-body combination valves with an air release and air/vacuum mechanism to deal with media containing grit, solids and grease. They provide varied and predictable airflow over a wide range of air release conditions. A large-diameter air/vacuum disc provides high-volume airflow for rapid venting during pipeline filling and allows high volumes of air to enter the pipeline during draining. During normal pipeline flow conditions, the dual-range air release prevents air buildup and resultant flow restrictions under changing conditions and through the full flow range. It is available in 1- to 4-inch sizes with all stainless steel construction and meets the performance requirements of AWWA C512 standard. **320/259-2000; www.dezurik.com.**

33 Ford Meter Box blow-off ball valve

Blow-off-style ball valves from **Ford Meter Box** are ideal for maintaining a healthy water main. Typically installed at the end of the pipeline, they can be used to flush sediment, relieve pressure or vent excess air. With a vertical discharge outlet and 300 psi rating, they can accommodate a hose or diffuser to meet individual needs. **260/563-3171; www.fordmeterbox.com.**

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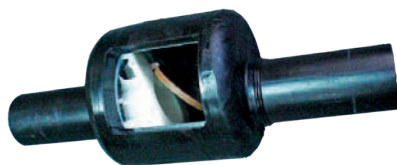
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34 Red Valve Co. Type A Pinch Valve

The **Type A Pinch Valve** from **Red Valve Co. / Tideflex Technologies** has a full-port opening and straight-through flow path to eliminate turbulence when open. The two-piece body acts as a built-in pneumatic actuator. Fabricated elastomer sleeves offer wear resistance and sealing on entrapped debris. Double-wall and cone sleeves are available for abrasive and high-pressure applications. 412/279-0044; www.redvalve.com.

35 Smith Flow Control USA EasiDrive

The **EasiDrive** portable valve actuator from **Smith Flow Control USA** allows valves to be operated without dedicated valve actuators. One person can efficiently drive multiple valves with a single tool, reducing fatigue and injury risk and saving cost and time. Its reaction kit prevents torque kickback, ensuring valve movement is always fully controlled and preventing operator injury and fatigue. The variable torque output feature, which prevents excessive torque being applied, ensures proper and safe valve operation. No permanent power supply is required, and it is suitable for all climates. It has wide-band torque capability with variable torque adjustment, and can be powered by air, electricity or battery. 859/578-2395; www.smithflowcontrol.com.

36 Val-Matic EnerG

The **EnerG** rubber seated ball valve from **Val-Matic Valve & Manufacturing Corp.** has a self-flushing contoured ball design that complies with AWWA C507. The Tri-Loc seat retention system provides a low-friction, wear-resistant seat that allows for adjustment or replacement without removing the valve from the line. When fully open, the valve provides 100 percent flow area. 630/941-7600; www.valmatic.com.



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City retrofits lift station wastewater pumps, slashes energy and maintenance costs



Problem:

Harleyville, located 60 miles northwest of Charleston, South Carolina, needed to update its 25-year-old lift stations, which suffered frequent clogging and skyrocketing monthly utility bills related to extended pump runtimes. The reliability of the entire wastewater transfer system seemed to derail every three to six months, when a pump failed or a station backed up because the pumps were unable to keep up with demand.

Solution:

The town retrofitted three of these lift stations with energy-efficient **Grundfos SLV** wastewater pumps. To overcome prior difficulties with pumps clogging, the team selected the optional **SuperVortex** impeller to help ensure that solids up to 3 inches in diameter pass freely through the solids-handling pump without jamming.

RESULT:

The project reduced energy use by 35 percent and cut \$25,000 in annual maintenance and repair expenditures. Peak pump operation time fell 80 percent from an average of 18 to three and a half hours per day. "There are zero maintenance costs or issues with the new pumps," says Harleyville Maintenance Superintendent Tommy Weeks. "I chuckle each time the repairman, who was accustomed to a significant amount of business from us, calls to ask when we think one of the pumps will be in for repair." **800/921-7867; <http://us.grundfos.com>.**

Electric pumps equal big savings for sewer bypasses



Problem:

Aging sewer infrastructure at a large municipality in North Carolina triggered one of the largest bypass projects in the state's history to rehabilitate the failing lines. Flows totaling 74 mgd from a 76-inch influent line and a 54-inch diversion line needed to be bypassed

into the two narrow doors on the treatment plant's bar screen building, which separates out the large solids and debris prior to treatment.

Solution:

Rain for Rent calculated the figures using four electric **DV 800c** skid-mounted 16-inch pumps for the majority of the bypass. The company designed dual bypass systems to accommodate the flows. The first system handled 57 mgd through two 24-inch HDPE pipelines traveling 800 feet into each door of the building. The second 17 mgd bypass used 18-inch HDPE next to the 24-inch lines, which also ran into the building from the suction pit 600 feet away. All treatment plant operations ran normally without interruption during the bypass.

RESULT:

The city was able to complete the project a month early due to the efficiency of the bypass, realizing even more cost savings. During the four-week project, the Rain for Rent crew operated safely during the 1,800 man-hours of on-site work. This solution saved the municipality in excess of \$100,000 in construction costs. **800/742-7246; www.rainforrent.com.**

City uses custom control valve to fix watershed environmental issue



Problem:

Bull Run Watershed provides water to Portland, Oregon, while also feeding the Sandy and Lower Columbian rivers below. The river temperature became too warm for some of the fish species to spawn. Conservation authorities requested the problem be fixed.

Solution:

City officials decided to alter the source from the dam that feeds the lower rivers, from the warmer top layer to the cooler waters in the deep part of the dam. To make this happen, they needed a valve that could handle flow differential from low up to 83,000 gpm and pressure differentials from 45 to 0 psi. Two **S106-2SC-PCO-MV-C-AC** valves from **Singer Valve** were installed, with an MCP-TP Control Panel. The valves were fitted with an anti-cav system to deal with large pressure drops and a single rolling diaphragm (SRD) to provide smooth flow regardless of the flow variance.

RESULT:

The 24- and 36-inch valves were set to run in parallel with dual solenoids in the pilot system, which allows the MCP-TP to control the valves individually and modulate the desired valve to the required setpoints electronically. With the anti-cav and SRD, the valve provides a stable solution that helps manage the river temperature so that the fish have the ideal temperature to recover. **604/594-5404; www.singervalve.com.** ♦

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Product Spotlight

Trailer-mounted vacuum excavator provides portable option for smaller cleaning jobs

By Ed Wodalski

The tandem-axle VX30-300 vacuum excavator by McLaughlin provides a maneuverable option for valve box, small drain and culvert cleaning, as well as potholing and small hydroexcavating projects.

"Having the 3-inch suction hose on the trailer vac is a lot easier for getting into tighter places and for handling by the operator than the 8- or 6-inch hose that's on the larger truck vac," says Jeff Wage, vice president for the McLaughlin Group.

The trailer-mounted unit weighs only 9,999 pounds and does not require a CDL to transport.

"Being portable, municipal employees are able to hook onto it with a fleet vehicle, and it's not a large capital expense," he says. "Sometimes smaller municipalities are not able to budget for a second sewer truck or large hydroexcavator truck, but they can get budgeted for a smaller trailer vac that can be used on some of the smaller jobs."

Part of McLaughlin's family of diesel-powered vacuum excavators, the VX30-300 has a 300-gallon spoils tank and 100-gallon water tank with 5.6 gpm (3,000 psi) pump. The unit has an in-tank washdown that delivers a high-pressure spray to help remove tough debris, and a three-stage cyclonic filtration system for wet and dry vacuum excavation and prolonged filter life.

The vacuum excavator is powered by a 31 hp Yanmar Tier 4i diesel engine with lockable enclosure for reduced noise output (about 92 deci-



bels). Options include reverse flow for pressure off-loading and a water heater for working in frozen ground and hard soil.

"If you're potholing and you get a stone or clog in your suction hose, you have the ability to create pressure in the tank and use a burst of air to dislodge anything that might be caught," Wage says. "You also have the ability to recirculate the water in your freshwater tank from the heater. You can run the water pump and heat the water up, eliminating freezing between the shop and the job site."

Other options include the Strong Arm, a heavy-duty, tank-mounted attachment with 200-degree rotation that extends 6 feet and carries the weight of the hose, reducing operator fatigue.

The cam-over locking system provides a 360-degree seal, even under reverse pressure, without additional clamping requirements. It also has a 50-degree dump angle and no in-tank parts for all-external maintenance. Controls are located curbside at the front control panel for operator safety.

"The high-dollar items on a trailer vac are the engine, the trailer chassis and the tank," Wage says. "On the tank, what's critical is not having anything that leaks or leaves debris on the road or in a residential area." **800/435-9340; www.mclaughlinunderground.com.**



McElroy confined space fusion machine

The In-Ditch 48 fusion machine from McElroy Manufacturing is designed for working with large-diameter pipe. The top-loading heater and facer provide flexibility in tight spaces with minimal excavation required. The fusion machine delivers up to 3,000 psi for 16-inch O.D. to 48-inch O.D. pipe. Features include removable jaws and clamp cylinders. **918/836-8611; www.mcelroy.com/fusion.**

Doosan Portable Power air compressor

The P185 T4F air compressor from Doosan Portable Power features a Tier 4 Final-compliant Doosan D24 engine with a low-maintenance diesel oxidation catalyst (DOC) aftertreatment system. Operating at 74 dBA, the air compressor deliv-



ers 100 psi at 185 cfm and 10 hours of runtime at 100 percent load with 500-hour service intervals. Applications include powering hand tools, sandblasting, sprinkler and irrigation line blowout, cable laying and pipeline testing. **800/633-5206; www.doosanportablepower.com.**



KSB wastewater pump cooling jacket

The Amarex KRT closed-loop, pump jacket cooling system from KSB features an environmentally safe propylene glycol/water mix. The 38/62 antifreeze mixture enables the closed-loop cooling system to protect the pump in temperatures down to -4 degrees F. An impeller inside the closed-loop system circulates the mixture so it flows around the motor, gathering heat, dissipating it into the pumped liquid via a heat exchanger. The system is completely sealed against the pumped media as well as the air-filled motor housing. **804/222-1818; www.ksbusa.com.**



Matrox multi-display video card

C420 low-profile, quad-output PCI Express graphics cards from Matrox Graphics are designed for stability, reliability and advanced multi-display capabilities. The fanless card can drive up to four displays or projectors at resolutions up to 2560 by 1600 per output. Secure mini DisplayPort connectivity prevents loose cabling. The C420 card is compatible with Microsoft Windows 7, 8.1 and Linux operating systems, and comes bundled with Matrox PowerDesk for Windows desktop management software. **514/822-6000; www.matrox.com/graphics.**

MaxLite LED retrofit lamps

LED DirectFit PL lamps from MaxLite convert existing four-pin fixtures to LED technology. The 13-watt plug-and-play replacement lights for compact fluorescent lamps operate off the fixture's existing ballast. Offered in two designs to suit horizontal or vertical mounting positions, the lamps are available in three color temperatures. They deliver up to 900 lumens and consume 50 percent less energy than the 26-watt CFL bulbs they replace. **973/244-7300; www.maxlite.com.**



Electric Eel eCam 2 inspection system

The eCam Pro 2 pipeline inspection system from Electric Eel Mfg. features a self-leveling color camera that negotiates 3-inch P-traps, one-touch recording to a USB drive, 200 feet of Kevlar braided pushrod, 512 Hz sonde and a 10.4-inch daylight-readable monitor. Other features include on-screen footage counter, two-hour battery with built-in charger, adjustable light controls, 16 pages of text writing, voice-over recording and 8X zoom. **800/833-1212; www.electriceel.com.**

Plate Locks polypropylene manhole cover

Polypropylene Wiser Riser manhole covers from Plate Locks Roadway Safety Products feature wedge-shaped spacers that bring the manhole cover to street grade. Interlocking spacers, available in 24-, 25- and 26-inch diameters, raise the cover level with inclined or uneven surfaces. The risers can be installed before or after repaving and imprinted with the type of utility below (sewer, water, storm drain). **541/821-3622; www.platelocks.com.**



Singer pressure management valve

The 106/206-2PR-630 pressure management valve from Singer is a flow-based pressure control system that provides high pressure as needed and automatically switches to lower pressure to reduce water loss due to leakage, alleviating pressures that cause downstream pipe bursts. No electrical power is required, making the valve completely submersible.

604/594-5404; www.singervalue.com.

Vactor hydroexcavator blower

The HXX HydroExcavator from Vactor Manufacturing is available with an optional Robuschi blower. The blower is rated for 6,176



cfm and 28 inches Hg. The hydroexcavator has a 3,000 psi variable water multi-flow pump with DigRight technology that allows the operator to select a maximum water pressure limit. **800/627-3171; www.vactor.com.**

Reelcraft reel paint options

Hose reels from Reelcraft Industries are available in bright red as well as secondary colors (white, black, blue, gray) and special orders. Parts are coated with a polyester powder coat for a corrosion-resistant finish. Paint samples are available. **800/444-3134; www.reelcraft.com.**



Vanair gas rotary screw air compressor

The Viper gas rotary screw air compressor from Vanair Manufacturing delivers 60 to 80 cfm at 100 to 150 psi and features an EFI certified Kohler engine. The 42-inch-long by 21-inch-wide by 30-inch-tall compressor fits behind the cab or can be mounted on the side-pack. **800/526-8817; www.vanair.com.**

Jenny Products C-Series air compressors

Four-wheeled, portable C-Series air compressors from Jenny Products feature single-stage C pumps and 6.5 hp Honda GX commercial engines. The compressors deliver 9.8 cfm at 125 psi and are available with 8-, 15-, 17- and 30-gallon powder-coated and ASME certified air tanks. Standard features include enclosed belt guard, anti-vibration feet, manual tank drains, stainless steel braided discharge hose, pressure-release safety valve and tank, regulator and outlet pressure gauges, pneumatic tires and lifting handles. Options include oil sight glass, lubricator and air line filter. **814/445-3400; www.steamjenny.com.**



Turner Designs C-Sense submersible logger

The submersible logger from Turner Designs, in partnership with Precision Measurement Engineering, works with the C-Sense pCO₂ sensor. The C-Sense logger package records time, date, internal temperature and the partial pressure of gas in liquids. **877/316-8049; www.turnerdesigns.com.**

Cultec automated drawing program

The StormGenie v.2.5 automated drawing program from Cultec is an AutoCAD plug-in tool that enables engineers, contractors and landscape architects to create preliminary stormwater system proposals, final designs and project-specific drawings for Contactor and Recharger stormwater chambers. The software can draw from Cultec's Stormwater Design Calculator and HydroCAD's Chamber Wizard. **800/428-5832; www.cultec.com.**



(continues on page 61)

RS Technical names president

RS Technical Services named Mike Sutliff president. He takes over for his father and company founder, Rod Sutliff, who passed away last year.

APWA names International Fellows

American Public Works Association (APWA), in association with the Eisenhower Institute at Gettysburg College, named Frank Pandullo, public works department utility and technical manager, Charleston, South Carolina, and Tom Jacobs, environmental director for the Mid-America Regional Council, Kansas City, Missouri, the 2015 Jennings Randolph International Fellows. Pandullo and Jacobs will conduct public works study tours and make presentations at partner association meetings in the Czech Republic, Slovak Republic and New Zealand.

Honda Power receives MarCom award

Honda Power Equipment received a Gold MarCom Award in the print and design and packaging category for the Honda HRX lawnmower carton. Administered by the Association of Marketing and Communication Professionals, winners were selected from 6,000 entries in 200 categories.

General Pump names sales representative

General Pump promoted Nick Viestenz to outside sales representative. He has been with General Pump for 12 years, working in research and development, customer service and inside sales.



Nick Viestenz

Safety Today launches websites

Safety Today launched its website for customers in the United States, www.safetytoday.com, and sister site for customers in Canada, www.safetytoday.ca. Product libraries on each site are presorted in line with relative national standards, including the American National Standards Institute (ANSI) and CSA International (Canadian Standards Association). The site also includes an overview of available safety training initiatives.



Safety Today website

Quadex rebrands, launches division

Quadex launched a rebranding campaign with the expansion of its products and services and introduced Quadex Lining Systems for pipe rehabilitation. The new division will license its turnkey pipe rehabilitation system featuring GeoKrete geopolymer to qualified contractors.

ASTM sponsors student intern

ASTM will sponsor Derek Burling, an electrical engineering student at the University of Wisconsin-Madison, for the 2015 Washington Internships for Students of Engineering (WISE) program.

Legacy Equipment expands facility

Legacy Equipment completed a 16,000-square-foot addition at its Salt Lake City facility. The addition includes six service bays and a 6,000-square-foot warehouse and paint booth.

PIP expands sales team

PIP named Dan Lessard regional sales manager in central Canada, John Harrison regional sales manager for western Canada, Mario Miron regional sales and marketing manager for Quebec and the Atlantic regions, Jerry Gascon ATG country manager for Canada and Kurt Reichart territory account manager for Canada.

GapVax website enables users to build their own truck

The Build-A-Truck feature from GapVax enables website visitors (www.gapvax.com) to design their own equipment by choosing the options that best meet their needs. Selecting Municipality or Contractor, users can design an MC Series combination jet/vac or HV Series wet/dry vacuum truck. Hydroexcavator options include debris and water tank sizes, debris tank material, duct work and cyclone material, interior debris tank coating, liquid load indicator, cold weather package, off-load, sound, boom and lighting options. Other options include toolbox, chassis, gauges and electronics. When finished, users can submit their design and receive a formal proposal for their truck.



GapVax website

Red Valve renews ISO certification

Red Valve Company of Carnegie, Pennsylvania, renewed its ISO certification. Red Valve has been ISO 9001:2008 certified since 2012.

Avanti International names vice president

Avanti International named Burt N. Babcock vice president of sales. He will focus on the company's national and global growth. ♦

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(continued from page 59)



Kohler mobile diesel generators

Model 145REOZT4 and 175REOZT4 mobile diesel generators from Kohler Power Systems are EPA-emission certified for non-road use and feature a DOT-certified enclosed trailer. Both units have John Deere Tier 4 Final 6.8 liter engines. The 145REOZT4 is capable of a 130 kW standby rating while the 175REOZT4 is capable of a 154 kW standby rating. Both models have 24-hour runtime fuel tanks, external emergency stop, stainless steel door latches and hinges, 110 percent environmental containment, single-point lifting eye and cold weather package. **800/544-2444; www.kohlerpower.com.**

NLB high-pressure waterjet pump unit

The Model 350 high-pressure waterjet pump unit from NLB Corp. has a 350 hp diesel engine and can be towed to job sites. Rated for a maximum operating pressure of 20,000 psi, it can be converted to operate at 8,000, 10,000 and 15,000 psi. Flows range from 26 gpm to 63 gpm. The pump is available in an UltraGreen configuration for compliance with the latest Tier 4F emission requirements. **248/624-5555; www.nlbcorp.com.**



Lowell multi-angle ratchet wrench

The Model 8E two-in-one ratchet wrench from Lowell Corp. has 36 teeth and a 10-degree handle throw for working in confined areas. The ergonomic stamped steel handle is 17 inches long, 1/2-inch thick and weighs 2 3/8 pounds. The wrench has a torque rating of 100 ft-lbs and is available with 11/4 by 1 1/16-inch and 1 1/8-by 15/16-inch hex socket combos. **800/456-9355;**

www.lowellcorp.com.

Coxreels T Series stainless steel reels

Spring-driven Stainless Steel T Series hose reels from Coxreels feature an extra-large chassis with dual pedestal-style design and Super Hub that provides triple axle support to reduce vibration and strengthen the structural integrity of the reel. The reels are made from electro-polished stainless steel with stainless steel fluid paths, offering noncorrosive performance in required applications. **800/269-7335; www.coxreels.com.**



Mr. Manhole 52-inch manhole cutter

The B-52 manhole cutter from Mr. Manhole has a 52-inch fixed cutting diameter with optional 40- and 60-inch-diameter cutters. Carbide cutting teeth, which can be replaced in seconds, bite through asphalt and concrete road surfaces, removing manhole frames and surrounding road surfaces in minutes. The tool is designed for small municipalities or contractors who perform fewer than 50 manhole frame adjustments a year. **419/741-9075; www.mrmanhole.com.** ♦

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PEOPLE/AWARDS

Brad Flack, president of Storm-Tex Services in Spring, Texas, was named Young Professional of the Year by the International Erosion Control Association. Flack is a Certified Professional in Erosion and Sediment Controls and a Certified Erosion, Sediment and Stormwater Inspector, lending his experience and training to his customers to consult them in all of their stormwater needs.

Construction EcoServices, based in Houston, was named the Contractor of the Year by the International Erosion Control Association. It pioneered the model for turnkey Stormwater Pollution Prevention Plan compliance services in Texas and manages stormwater quality on hundreds of commercial construction projects each year.

Hubbell, Roth & Clark Inc. announced the promotions of **Thomas LaCross** (he manages its Special Projects and Industrial Facilities Design Departments), **Bradley Shepler** (who will provide a wide array of civil engineering services to municipal clients and governmental agencies) and **Karyn Stickel** (who will head its new Asset Management Department). All three people are involved with stormwater projects.

The **Ed P. Reyes River Greenway**, a stormwater treatment facility that also provides free and open green space to the Lincoln Heights (California) community, won the 2015 Operations and Environmental Performance Award from the National Association of Clean Water Agencies.

Jerany Jackson, who works for Great River Engineering in Springfield, Missouri, was elected the 50th president of the Council of Landscape Architectural Registration Boards. She will serve as chairperson of the organization's board of directors through September. Jackson's expertise is stormwater conveyance.

The **University of Nebraska-Lincoln Stormwater Management Education Team** received a Community Landscape Award from the Nebraska Statewide Arboretum. It's being honored for projects that have significantly improved the green infrastructure of communities throughout the state.

LEARNING OPPORTUNITIES

American Public Works Association

The APWA is offering Best Practices for GPS Fleet Management Solutions, an audio/Web broadcast, on June 18. Visit www.apwa.net.

American Society of Civil Engineers

The ASCE is offering Pathogens in Urban Stormwater Systems: Understanding and Identifying Sources, an online seminar, on June 23. Visit www.asce.org.

Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering Using WinSLAMM v.10.1: Meeting Urban Stormwater Management Goals R174 on Nov. 5-6 in Madison. Visit web.engr.wisc.edu. ♦

CALENDAR

June 7-10

American Water Works Association Annual Conference and Exposition, Anaheim, California. Call 303/347-6181 or visit www.awwa.org.

July 26-29

American Society of Agricultural and Biological Engineers International Conference, New Orleans. Visit www.asabe.org.

Aug. 2-6

StormCon North American Surface Water Quality Conference & Expo, Austin, Texas. Visit www.stormcon.com.

Aug. 17-19

Smart H2O Summit 2015: Sustainable Water Solutions, San Francisco. Visit www.smarth2osummit.com.

Aug. 18-20

National Association of Flood and Stormwater Management Agencies Annual Conference, Jackson Hole, Wyoming. Visit www.nafsma.org.

Aug. 30-Sept. 2

American Public Works Association International Public Works Congress and Exposition, Phoenix Convention Center, Phoenix. Visit www.apwa.net.

Sept. 28-30

National Rural Water Association WaterPro Conference, Oklahoma City. Visit www.nrwa.org.

Oct. 11-14

American Society of Civil Engineers 2015 Convention, New York City. Visit www.asce.org.

Oct. 12-16

American Water Works Association 2015 Water Infrastructure Conference and Exposition, Bethesda, Maryland. Visit www.awwa.org.

Nov. 16-19

American Water Resources Association Annual Conference, Grand Hyatt Denver. Visit www.awra.org.

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Air Recovery System Cleaner



Versatile Hand Controlled Cleaning



Wide Swath Cleaning for All Surfaces



Air Recovery Works on Walls



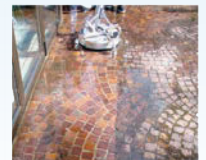
Cleans on Walls and Floors



Air Recovery Avoids Run Off



Air Recovery Graffiti Removal



Surface Cleaners Save Time

Industry Trained Staff available from 8:30 a.m. to 7:00 p.m. weekdays E.S.T.

Water Cannon, Un contacto en Espanol: llama al: 1.800.917.9274

Orlando | Phoenix | Minneapolis | Hattiesburg | Melbourne | Toronto | Bogota
International: 1-321-800-5763

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is proud to be a
MWBE

GapVax®

CUSTOM MANUFACTURING
 QUALITY INDUSTRIAL
 VACUUM EQUIPMENT
 SINCE 1989



BECAUSE PERFORMANCE MATTERS

- User friendly, easy to operate and maintain
- Standard 3/16" stainless steel water tank.
- Tube storage mounted at chest height.
- Shaft driven water pump.
- Low center of gravity – water tank and debris body are between the frame rails.
- Durability – stainless steel water tank.

You can't find a used GapVax MC on the used equipment websites because people keep them forever.
Contractor grade.

- Commonly used components, ensure readily available replacements - not proprietary to GapVax
- See full specs on our website

WWW.GAPVAX.COM

TEXAS: 281-884-8684
 HQ: 888-442-7829

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Each truck is supported by our robust dealer network, customer service and comprehensive on-line training.

Our manufacturing records date back to the first unit produced in 1986. We have the capabilities of providing you with technical service documents and parts for every single unit we have produced. Whether you have questions about parts or technical service, well-trained and dedicated personnel are standing by throughout the Vac-Con® network of dealers and service providers to assist you. **GO ON-LINE TO LEARN MORE.**

VAC-CON.COM/worldwide

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