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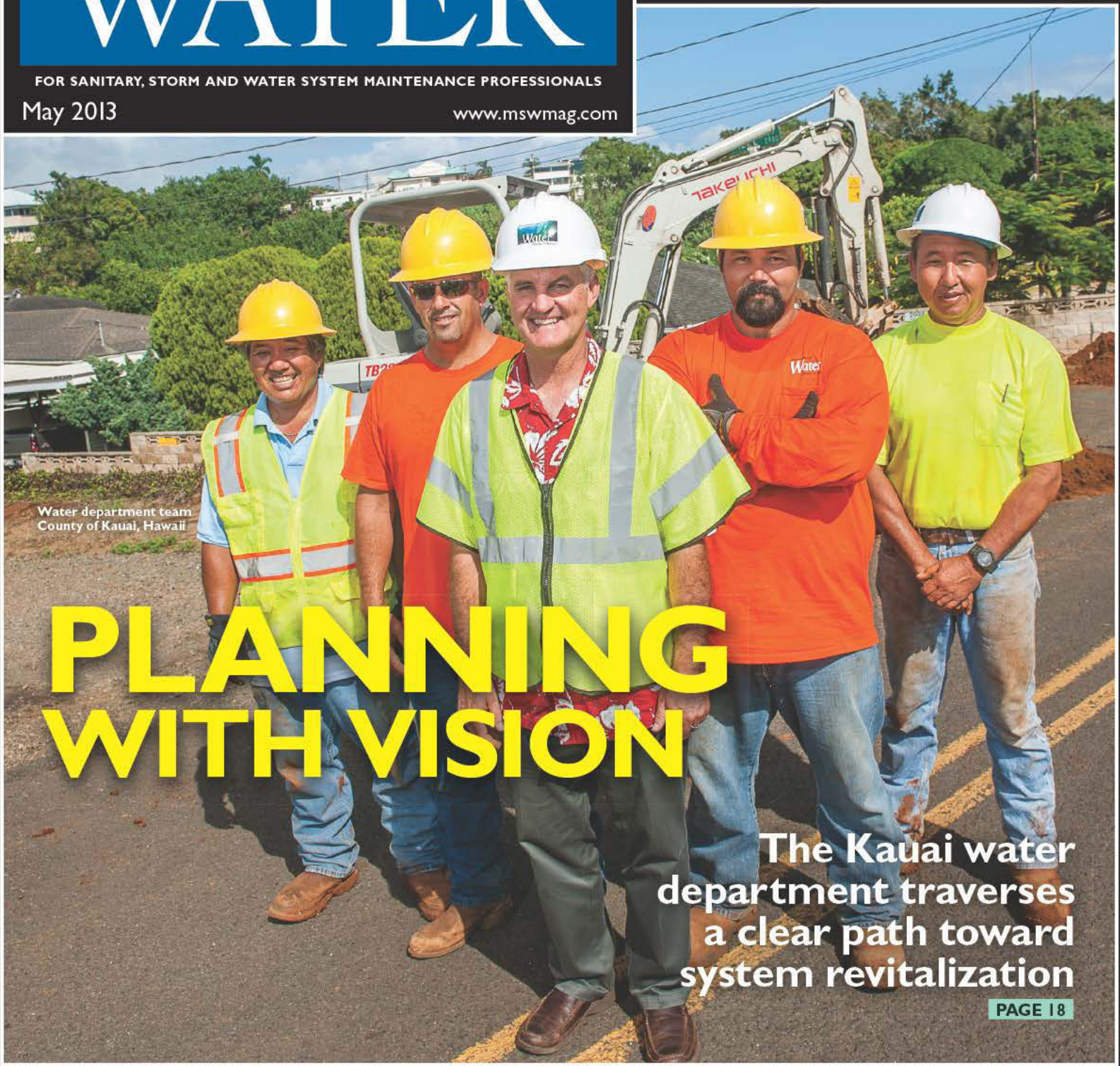

Water department team
County of Kauai, Hawaii

PLANNING WITH VISION

The Kauai water department traverses a clear path toward system revitalization

PAGE 18

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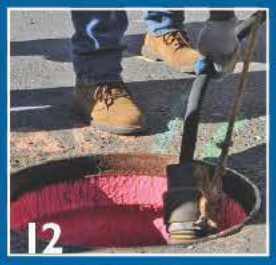
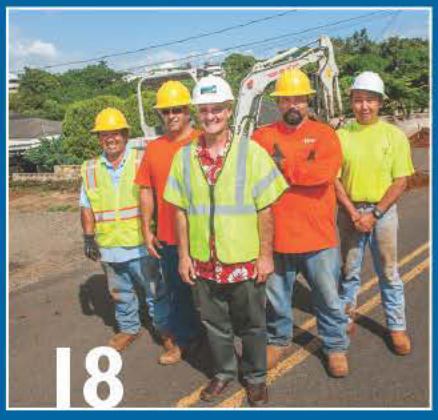
WATER SYSTEM MAINTENANCE AND INFRASTRUCTURE



ON THE COVER:
The Kauai, Hawaii, water department team includes, from left, lead pipefitter Craig Shirai, equipment operator Corey Silva, Deputy Manager of Engineering William Eddy, pipefitter Jeffery Silva and lead pipefitter Brian Fujii. The department has been successfully following a 20-year plan to tie several separate water systems together and improve overall efficiency. (Photography by Dianne Reynolds)



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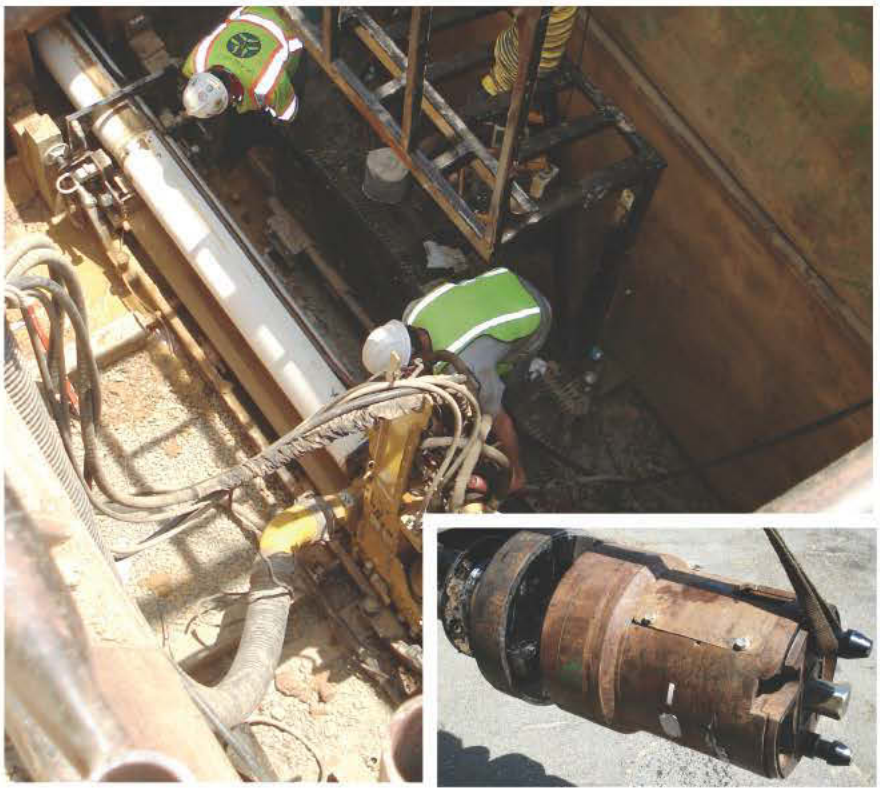
MAKING The GRADE

This is the second in a series of case studies chronicling intricate sewer installations completed using the AXIS® guided boring system. The first installment appeared in the March issue.



AXIS system emerges victorious
after encounter with challenging soil conditions

When David Howell reviewed the drill plan for a sewer line extension job situated in the heart of Alexandria, Va., he felt confident this was the perfect project to try the new AXIS® guided boring system.

Howell, project manager for Indianapolis-based Midwest Mole, became excited about the AXIS system after witnessing its capabilities during a demonstration by trenchless experts with Vermeer. The AXIS system is a pit-launched installation method engineered to achieve pinpoint on-grade accuracy, while eliminating some of the more cumbersome steps involved with other techniques.

The Old Town Alexandria job — originally specified to be installed using open-cut — involved four challenging bores of various lengths and drilling depths based on the pitch required for the gravity-flow sewer to flow freely. After explaining the advantages of the AXIS system with Alexandria city officials, there was overwhelming support in favor of adjusting the plan to reflect a more non-invasive trenchless approach.

SAND/CLAY COMPOSITION

"This job had a number of challenges that made the AXIS system the ideal choice," Howell says. "Short, precise bores were required; the narrow streets and restricted access; and crowded existing infrastructure would have made it difficult to complete using open-cut. We were able to drill beneath the Jefferson Davis Highway without an interruption to traffic flow or inconvenience to local business."

The drill plan specified an invert of 0.5 percent to ensure unimpeded sewer flow. Penetrometer samples gathered in advance revealed variations in the sandy soil profile data; information that was beneficial in making tooling selections and determining proper drilling fluid mixture. After analyzing the data, a 13½-inch (34.3 cm) flat-faced sand/underwater cutter head with three-bar shark and two-bar scraper was selected for the job.

TOOLING SELECTION

"We decided to use the sand cutter with the inlet ports approximately 20 percent closed," Howell explains. "In coarse sand we normally would have used a smaller inlet in the sand cutter, but since we expected some clay in our bore path, we decided this was the best setting. The sand cutter was modified for the second, third and final bores after completing soil tests to determine the conditions we could expect for each of the subsequent bores."

Upon the successful completion of the first bore, the cutting head was removed and replaced with a 14-inch (35.6 cm) backreamer used for pulling through the pipe. Sections of PVC pipe in 10-foot (3 m) increments were then pulled back through; a process that was repeated after completing each bore.

Each bore presented a unique set of challenges; none of which were an impediment to the capability of the AXIS system, but rather an opportunity for everyone involved to better understand how the system would react in the sandy conditions. Actual drilling time was less than one week; with the length of the four bores collectively spanning 950 feet (289.6 m).

"This job is a classic example of why trenchless technology and new methods like the AXIS system are so important and such an advantage for many types of infrastructure installations," Howell says. "The AXIS system works great with small diameter pipe because of its on-line and precision grade capabilities. We were able to successfully negotiate some challenging ground conditions that ordinarily would have caused us some grief. But the AXIS system was well-suited for the challenge."

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SHARING COMMON GOALS

Utilities all strive for greater efficiency and performance, so take the lessons of your peers to heart

FROM THE EDITOR

Luke Laggis

This month's issue of *MSW* is a great example of the wide range of stories we cover. Some utilities are large, some are small, but they all have common goals and all offer unique perspectives on how to improve systems and provide better services to customers in an era when greater demands are pitted against ever-shrinking budgets.

The Macon Water Authority in Macon, Ga., provides a great case study in improving operations. Up until 2006, the maintenance employees for the authority, which handles water purification and distribution as well as wastewater collection and treatment, were stationed at individual plants and answered to individual plant supervisors.

Repairs were generally limited to immediate needs, and individual plant supervisors set priorities without regard to what was most important for the whole system. And because repair parts were stored elsewhere at an MWA warehouse, fixing problems often required extra time for workers to go get what they needed, then return to the plant to make the repair.

Beginning in 2006, the authority took a long, hard look at its operations. The MWA brought all of its mechanics into a centralized maintenance department under a single maintenance manager. The change has brought much greater efficiency and has finally shifted the focus from crisis management to preventive maintenance, where it should have been all along.

In Hawaii, the Kauai County Department of Water has been working to improve its own efficiencies. The department currently operates 11 unconnected water systems covering 68 square miles, primarily along the island's coast. The department is following a comprehensive plan that calls for uniting the separate water systems and ensuring an abundant supply of quality water for the future on firm financial footing. The island's geography, climate and remote location all present challenges, but the department is tackling those challenges and building a better system for residents.

Sometimes the most difficult problems require a shift in thinking and a new approach.

The department is replacing pipes and aligning them with public roadways — older lines frequently followed the shortest route — to provide easier access and better maintenance. The work is primarily dig and replace, and they're doing it all — $125 million since the plan was implemented — on a tight budget without the luxury of raising rates any higher.

Back on the mainland, Minden, La., is overcoming its own challenges. Despite its small size — population 13,000 — and a capital budget funded almost entirely through grants, the wastewater utility has been steadily improving its sewer infrastructure over the last decade.

At one point, Minden had a very serious I&I problem, but through smoke testing and the development of a GIS mapping system on par with cities far larger, the utility was able to effectively target the problem. Average daily flow was reduced by well over 20 percent, and maximum flow after significant rain events fell from around 7 mgd all the way down to 3 mgd. It wasn't a big budget that solved the utility's problem; it was careful planning, a progressive approach and creative use of funding, none of which is dependent on size or budget.

Regardless of the size of your utility, there are lessons to be learned in these stories. Sometimes the most difficult problems require a shift in thinking and a new approach. All three of these stories illustrate what can be done when people work together with the bigger picture in mind. I hope they can serve as some inspiration to you.

Enjoy this month's issue. ✦

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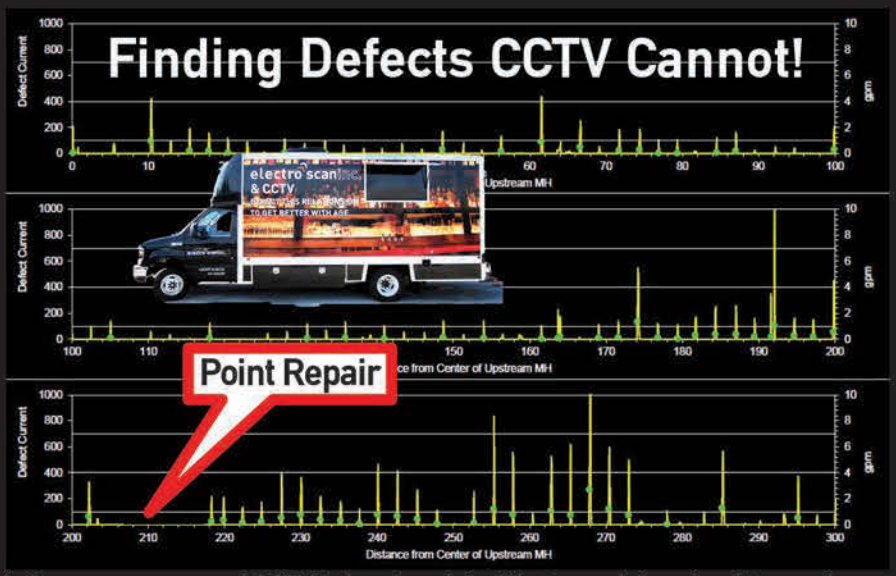

(Above) Sewer agency used CCTV to locate a defect that was determined to require a Point Repair at 210 feet. A Point Repair was completed and the Contractor used CCTV to certify the repair. Then, the pipe was Electro Scanned.

Good News: The Point Repair was successful -- no electrical readings!

Bad News: The Sewer Pipe had numerous other defects not seen by CCTV.

NOT SEEN ON CCTV

If You Use CCTV to Find Infiltration, You Might Be Fixing The Wrong Pipe.

INFILTRATION SCORECARD

	How Do They Compare?	CCTV	Electro Scan
1	Automatically Finds Potential Sources of Infiltration	N	Y
2	Automatically Finds Leaks Inside Joints	N	Y
3	Automatically Finds Leaks at Service Connections	N	Y
4	Automatically Finds Sources of Infiltration at Cracks	N	Y
5	Automatically Finds Leak Locations (within 0.4 in or 1 cm)	N	Y
6	Automatically Measures Size of Leaks (Est. GPM or LPM)	N	Y
7	Automatically Finds Defects That Leak from Bad Couplings	N	Y
8	Automatically Finds Defects That May Still Leak After Repairs	N	Y
9	Automatically Finds Defects That Leak in Re-Lining Projects	N	Y
10	Automatically Finds Defects After Service Re-Connections	N	Y
11	Automatically Finds Leaks, If Silt or Debris on Bottom of Pipe	N	Y
12	Able to Conduct Inspections, If Sewer Pipe Is Full of Water	N	Y
13	Able to Determine Size of Potential Leak, If Roots Are Present	N	Y
14	Automatically Finds Leaks at Joints, If Grease Is Present	N	Y
15	Able to Determine Size of Leaks, If Pipe Has Encrustration	N	Y
16	Requires Active Infiltration to Identify Defect at Source	Y	N
17	Contains Moving Parts That Could Clog from Debris or Silt	Y	N
18	Requires Bypass During Inspection, If Pipe Full	Y	N
19	Requires Special Training and Certification to Identify Defects	Y	N
20	Relies on Visual Observations to Record Defects	Y	N
21	Ave. Speed of Inspection (6-20" Sewer Main)	3ft / min	50ft / min

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FOCUS: SEWER

NO SIZE RESTRICTIONS

Minden, La., employs sound strategies to upgrade its system on a tight budget

By Erik Gunn

The city of Minden, La., might be easy to miss on a map. Its population of 13,000 people could fit in the Mercedes-Benz (Louisiana) Superdome five times over with seats to spare. And Rick Broussard, who manages water and wastewater services for the city, says his department isn't anything too special.

Broussard is being modest.

Despite its small size and budget, Minden has been steadily improving its sewer infrastructure over the last decade. It has undertaken a series of repair programs to reduce inflow and infiltration and improve the condition of its pipes and manholes.

And it has done so, as Broussard is proud to note, without having to borrow money. Funds for some maintenance work have come out

of the city's ordinary cash flow, and Minden has also made canny use of grant money from various state and federal sources to cover the costs.

Mapping the problems

If you want to see the newest pieces of sewer maintenance machinery in action, you won't find any of them here. "Our biggest piece of equipment is a backhoe," Broussard says.

Instead, what you'll find is a story of professionalism and can-do equal to that of any big city department. And while Minden may not be able to invest in many of the newer tools of the field as quickly as larger cities do, the city also doesn't shy away from thoughtful commitment to the technology it needs to do the job.

It's had a GIS-based utility mapping and asset management system in place for 10 years, and Broussard hears from vendors and colleagues in the municipal sewer field that it's on a par with cities several times larger.

"There are no small towns that I know of that have this system," he says.

Minden made "some significant leaps" about a decade ago when it contracted with an engineering firm to do a major study of its sewer system using smoke tests and other tools. The study produced the GIS map that Minden still uses to keep tabs on the system.

The study was prompted by chronic sewer system overflows largely due to I&I. The city had little clue where the system's main I&I problems were located, and Broussard was able to persuade city officials that the study would be a good use of Minden's sewer rehabilitation funds.

"We did it because we felt like we had to," Broussard says. "It cost us half a million dollars to do the study. It's paid for itself over and over and over again."

The map is precise within a little more than three yards, making location far more accurate than previously was possible. "We're able to pull up manholes and accurately measure the distance between them," he says.

It also stores detailed data about each manhole, including its composition and condition, along with photos of the site.

"The contractors gave us a huge book of information that prioritized leaks in the sewer system," Broussard says. "It allowed us to identify places in the city that needed immediate attention."

Working down the list

In the years since that first study, the city has worked its way down that list. The steps are generally the same: hiring a contractor to clean and conduct video inspections of the lines, further identifying the top priorities for repairs or replacement, and then lining or replacing the sewers with the worst damage.

"We were running on an annual budget for sewer rehabilitation of about half a million dollars a year," Broussard says. "But budgets have gotten tighter the last couple of years, and we're relying almost exclusively on grants."

Typical projects run in the neighborhood of $500,000, which might cover about 6,000 feet of sewer.

Broussard says his department has been able to spend about $2 million dollars over a two- or three-year period and make major improvements. The city's far enough along on the list that officials can now go back and look at less obvious and less serious areas in the system.

Trenches and trenchless

Some of the rehab projects have required open cut and full replacement, while others have used cured-in-place pipe lining. It isn't always initially clear which is the right approach.

Broussard recalls a 550-foot segment of sewer that was supposed to be lined. "After I looked at the video, though, I said, 'No, we'll have to open cut it,' " he says. The video inspection had uncovered numerous dips in the line that inhibited flow — a problem that lining the existing pipe wouldn't rectify.

That experience points out another thing that Minden has learned: how to work closely with its outside contractors.

"We did it because we felt like we had to. It cost us half a million dollars to do the study. It's paid for itself over and over and over again."

Rick Broussard

Cured-in-place pipe is inserted into an existing 30-inch concrete sewer pipe during a 2011 relining project in Minden, La. Insituform Technologies was the contractor for the $340,000 CIPP project and Riley Company of Louisiana, Ruston, La., was the project engineer. The city received $250,000 in funding from the Emergency LGAP (Louisiana Government Assistance Program) for the project.

PHOTO COURTESY OF RICK BROUSSARD

OPPOSITE PAGE: From left, distribution operators John Bierden and Greg Deloach, collection operator Arzie Jones and distribution operator Calvin Williams set up to clean a line segment. (Photography by Anne Easley)

PROFILE: Minden (La.) Public Works/ Wastewater Department

POPULATION SERVED:
13,000

SERVICE AREA:
City of Minden, La. (15 square miles)

WASTEWATER TREATMENT PLANT CAPACITY:
2.44 mgd

AVERAGE DAILY FLOW:
1.5 mgd

INFRASTRUCTURE:
130 miles of sewer mains; 1,000 manholes; 15 lift stations

ANNUAL REVENUE:
$2 million (wastewater only)

ANNUAL BUDGET:
$1.06 million (wastewater only)

EMPLOYEES:
8 full-time (wastewater only, including superintendent)

WEBSITE:
www.mindenusa.com

GIVE AND TAKE WITH CONSULTANTS

Given its size and budget, the city of Minden, La., still relies heavily on outside contractors. The city would have to be about twice as populous for more in-house work to be cost-effective, says Rick Broussard, manager of water and wastewater services for the city.

Outside contracting can add costs, but it has also saved the city money by eliminating the need for a lot of specialized equipment — whether trench boxes for deep digging or combination trucks for major cleaning jobs — that it might not run often enough to justify the cost.

"It's a lot cheaper for us to have a contractor come in than for us to have all that capability on hand," Broussard says.

At the same time he sees another advantage in the small number of employees in both the sewer (eight full-time) and water (10 full-time) operations: Everyone is a lot closer to the work.

"A lot of things that happen involve the superintendent and myself and sometimes the Public Works director," Broussard says. "It's good in a way — the small department enables us to be constantly informed as to what's going on."

And even though Minden relies heavily on outside contractors, the city's Public Works team still provides plenty of input.

"Towns that are smaller than Minden rely mostly on engineers who come in, even apply for the grant and do all the work," he says. "They're pretty much totally dependent on what the engineer suggests. We're able to do some of that on our own.

Minden has managed to form strong relationships with certain contractors who understand the city's need for involvement. And while it has to bid projects over $150,000 and pick the low bidders, Broussard says the city does what it can to make sure it maintains those relationships. "When you find people like that, you've got to make the extra effort to make sure you keep them."

Broussard isn't in favor of simply handing the project over and letting contractors make all the decisions (see sidebar).

Most of the city's original sewer lines are clay tile pipe, with some cast iron lines. When they're replaced, Minden uses PVC pipe, with ductile iron where a line is crossing a creek or has to be close to the surface of the ground. "We like to keep at least 3 feet of cover over the top," Broussard says.

When lining is involved, products from Suncoast Infrastructure and Insituform Technologies are usually closest to the specs Minden uses. Up to now, the city has primarily relied on heat-activated epoxy liners, but may consider ultraviolet-cured products in the future.

Major project

One of the bigger projects in recent years took place in 2012. It covered a total of 11,000 feet of sewer, with 6,400 feet of that using CIP rehabilitation and another 4,500 feet of open cut replacement. Additionally, 30 new manholes were installed in the open-cut segments, and 28 manholes were rehabilitated

in the designated repair areas.

For manhole rehab, Minden specifies SpectraShield from CCI Spectrum. Broussard says the product gained favor over standard epoxy because it uses a layer of expanded foam over epoxy. That proved to be less likely to crack all the way through when used in unstable ground or where the area is subject to vibration from heavy vehicle traffic, he says.

"We tried it, and on our first job with it we were delighted with the process," he says. "We've been satisfied with it ever since. It's been seven or eight years, and we have not had any of the manholes give us a problem."

The whole 2012 project, funded by a Louisiana community development block grant, came in at $732,000. That wasn't all one stretch of line, Broussard explains; sewer block grants generally are capped at $800,000, so the city has learned how to bundle several projects together to get as close to that ceiling as possible.

The Minden Public Works/Wastewater Department team includes, from left, John Bierden, James Williams, Dwayne Shyne, Gary Carter, Greg Edwards, Rickey Barnes, Arzie Jones, Jerry Foster, Rick Broussard, Calvin Williams, Richard Smith, Robert Perryman, Dean Barr, Gary Floyd, Henry Ary, Eric Lee, Greg Deloach and Chris Gilbert.

Noticeable impact

The succession of repairs over the years has had a noticeable impact. "When we first started, our wastewater treatment plant had 1.8 mgd go through," Broussard says. "That could easily go up to 7 mgd when we had a rain event of 2 or 3 inches of water in a day."

The plant's three screw pumps, capable of 2,200 to 2,500 gallons a minute each, couldn't keep up with the flow during those peak times.

It's been years since problems have gotten that bad, he says. Average flow has fallen to 1.4 mgd, and while a couple years of below-average rainfall in 2010 and 2011 contributed to the lower flow, the moisture picked up in 2012 to slightly above average. The highest flow produced by a significant rain event now, however, is down to about 3 mgd.

And sewer overflows, which occurred at least monthly before the city began the repair program, are now no more frequent than once

Water/Wastewater Manager Rick Broussard, left, and Water Distribution/ Wastewater Collection Supervisor Eric Lee utilize the GIS system to prioritize troubled areas within the sewer system.

every three months. "We've had a significant reduction," Broussard says. "A lot of it has been these rehabilitation projects."

The road ahead

Broussard does hope, eventually, to see the city invest in a sophisticated pan-and-tilt camera with more powerful lighting. He thinks he could probably put two full-time operators to work conducting further sewer system evaluations and inspections with the camera. Currently, he points out, it costs about $6 per foot to clean and inspect, which works out to nearly $2,500 just for a 400-foot stretch of sewer.

The city's water system is next on the mapping agenda. The source of a water system malfunction can often be a lot harder to diagnose than sewers, Broussard notes. Stopping the flow in a water main break might require trial and error to find which valve or valves will do the trick. And valves need to be exercised frequently — something that hasn't always been done in the past — or else crews risk breaking an old valve when they try to shut it off.

All that means mapping the system is going to be a lot more complicated and undoubtedly a lot more expensive, Broussard says.

Given the city's track record, it's a fair guess that he'll find a way to get it done. ✦

MORE INFO:

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Broussard uses a Trimble GeoXH GPS tracker to map a manhole location.

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Deputy Manager of Engineering Bill Eddy, left, pipefitter Jeffery Silva, equipment operator Corey Silva and lead pipefitter Craig Shirai (out of view) work to replace copper piping. (Photography by Dianne Reynolds)

FOCUS: WATER

PLANNING WITH VISION

The Hawaiian island of Kauai is meeting the challenges of its geography, climate and remote location while revitalizing its aging water system

By Peter Kenter

The County of Kauai Department of Water, charged with the task of supplying water across the island of Kauai, Hawaii, is working to unify and modernize its water system under its comprehensive Water Plan 2020. The plan, devised in 2000, aims to upgrade aging water infrastructure, unite separate water systems and ensure an abundant supply of quality water for the future on firm financial footing.

The department currently operates 11 unconnected water systems ranging from Haena in the north to Kekaha in the south. While the island covers more than 560 square miles, the water distribution system covers 68 square miles, primarily along the island's coast.

The department monitors, operates and maintains 50 deep well pumping stations, 19 booster pumping stations, four tunnel sources, 58 storage tanks, 75 control valve stations and over 400 miles of pipeline serving approximately 66,000 residents. All department revenues are derived from water sales.

"The island has unique challenges in securing its water supply. One side of the island receives 13 inches of rain per year, while the other is the wettest location on Earth, receiving 455 inches annually."

Bill Eddy

Unique supply challenges

"The island has unique challenges in securing its water supply," says Bill Eddy, deputy manager and engineer with the department. "One side of the island receives 13 inches of rain per year, while the other is the wettest location on Earth, receiv-

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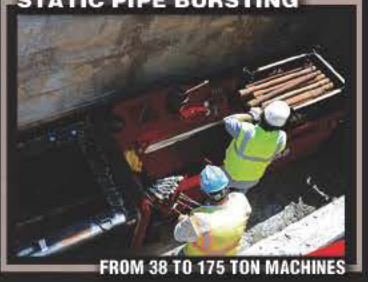

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From left, Mayor Bernard Carvalho Jr., Department of Water Board Chair Daryl Kaneshiro, County of Kaua'i Council Chair Jay Furfaro, and project manager Dustin Moises attend a dedication ceremony for a new 500,000-gallon tank in Oma'o, led by kahu (or pastor) Ipo Kahaunaele.

ISLAND WATER PROJECTS BEGIN WITH A BLESSING

The first step in any major construction project undertaken by the County of Kauai Department of Water is the blessing of the project by a Hawaiian kahu, a local spiritual leader.

"The grounds of the island are sacred in so many ways," says Bill Eddy, deputy manager with the department. "We have a priest or priestess bless the grounds in any project that involves digging."

Eddy notes that the original Hawaiians didn't possess iron tools and used wooden or stone tools instead.

"Because digging in firm ground was so difficult, they buried their ancestors in the sand or in caves," he says. "When we break ground to construct a pipeline in the sandy areas along the coast, we sometimes come across a burial site, so we have the area blessed and ask forgiveness for disturbing the dead."

Any contact with historic artifacts or burial sites is also overseen by a cultural monitor, an archeological expert, the Kauai Burial Council and the State Historic Preservation Division to ensure that any bones of the deceased — iwi — are treated with care and respect.

"At the end of a project, we also hold a dedication ceremony in which we give thanks for keeping the workers safe," Eddy says. "Improving the water system is considered good work that improves the lives of island residents."

ing 455 inches annually. This is also the oldest of the main Hawaiian islands and the most eroded. Fresh rock is more permeable, but old rock doesn't offer good geology for wells, so we still need to practice water conservation despite the heavy rainfall in parts of the island. Our water supply relies 85 percent on groundwater and 15 percent on surface water."

Water is pumped into storage tanks, then transmitted through a pipe system ranging from 3/4 inches in diameter for those lines serving just a few customers on isolated routes to 24-inch mains. The distribution system is comprised of everything from galvanized steel to asbestos cement, cast iron, ductile iron, concrete cylinder and PVC. Pipes range in age from brand new up to 90 years old.

A thorough survey of the system conducted in the late 1990s revealed deficiencies in pipe condition, along with concerns about system capacity, water supply levels, storage capacity and the financial needs of the system.

Craig Shirai feeds 1-inch soft copper pipe through a hole bored by the Grundomat horizontal boring tool from TT Technologies.

The survey rated the condition of the overall system as poor, noting the deterioration of pipelines and mapping a series of vulnerable mainlines located in remote areas with poor access that impeded repair and maintenance.

That study preceded Water Plan 2020, a thorough roadmap to revitalizing the water system.

"I was the director at the Maui Water Board at the time that Water Plan 2020 was being developed," says David Craddick, current manager and chief engineer at Kauai. "I watched with some amazement at the number of community meetings that were held by manager Ernest Lau at the time. The community was heavily involved in developing the plan, and that's why the plan has been implemented without much further debate in financing the projects."

To date, $125 million of a proposed $600 million has been spent on the program with the department making good progress on its construction schedule.

Current work involves a continuing emphasis on replacing pipelines.

"Each of the old pipe materials continues to display its own weakness," notes Eddy. "We're seeing failures in the joints and rubber gaskets of asbestos cement pipe that have caused us a lot of trouble. Cast iron lines become brittle and are subject to full circle cracks, often due to tree roots or ground shifts. PVC reaching the end of its service life is subject to lateral cracks, particularly the thinner material installed decades ago."

A newly installed water meter from Badger Meter.

Ductile iron is faring much better, with occasional pinholes presenting the worst problems. Eddy notes that the island is fortunate to possess largely neutral soil. While aggressive soils in Oahu and

PROFILE: Department of Water, County of Kauai, Hawaii

YEAR ESTABLISHED:
1960

POPULATION SERVED:
66,000

AREA SERVED:
68 square miles

DEPARTMENT STAFF:
75

INFRASTRUCTURE:
400 miles of water mains

ANNUAL DEPARTMENT BUDGET:
Operating, $25.4 million; capital, $26.2 million (2013)

ASSOCIATIONS:
American Water Works Association, Hawaii Water Works Association, National Rural Water Association

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Jeffery Silva (foreground) and Corey Silva clean caked red Kauai dirt off a Grundomat horizontal boring tool (TT Technologies).

> **"I watched with some amazement at the number of community meetings that were held by manager Ernest Lau at the time. The community was heavily involved in developing the plan, and that's why the plan has been implemented without much further debate in financing the projects."**
>
> **David Craddick**

Honolulu are notorious for attacking water infrastructure, the exterior of iron pipe fares well in Kauai, making ductile iron the replacement material of choice.

Mains buried deeper

The Kauai team is now burying new mains deeper than in the past. "Some of the older pipes were buried less than 3 feet deep, and we're now adding 3 feet of cover to the top of the pipe," Eddy says. "We're enforcing the new standard to see if it has an effect on breakage."

Sections of older pipelines are also being aligned with public roads as they are replaced. "From the 1920s to the 1950s, they were typically aligned along the shortest route, which caused them to be installed through pastures, forests and private property," Eddy says. "Access and maintenance has been a problem with these pipelines."

In-house crews tackle mainline replacement jobs up to 500 feet in length. The work is primarily dig-and-replace.

"We have also done several horizontal directional drilling (HDD) projects using both HDPE and fusible PVC C900," Eddy says. "Most HDD work has been done at stream crossings, a few of them under emergency conditions when existing pipelines were damaged during severe winter storms. We did one slipline job on an old 27-inch steel pipe, sliplined with 16-inch HDPE."

Outside contractors are engaged in larger projects, often shipping in workers and equipment by barge.

Switching to RFPs

During fiscal year 2011-12, the department switched from a traditional low bid process to a request for proposal system. While the major transition temporarily slowed the pace at which projects were advertised, the new approach is expected to provide higher-quality contractors that will assist the department in remaining on schedule and on budget.

The department currently has no leak detection program in place, because it has found it challenging to attract qualified technicians to the island. Kauai has already purchased SubSurface LD-12 listening devices, FCS Permaloggers and ZCorr correlators, but currently uses its SCADA system to detect most large leaks.

Repair crews are split into two teams, with field crews handling pipelines and distribution located along the coast, and plant crews handling wells and storage tanks located

Bill Eddy, deputy manager and engineer, County of Kauai Department of Water.

further inland toward the mountains.

"There are no direct roads to some of those tanks, so it could take an hour and a half by four-wheel drive," says Eddy.

The department operates a fleet of Ford Rangers and F-150s, 250s, 350s and 450s to ply the island's rough terrain.

> **"From the 1920s to the 1950s, [pipelines] were typically aligned along the shortest route, which caused them to be installed through pastures, forests and private property. Access and maintenance has been a problem with these pipelines."**
>
> **Bill Eddy**

Crews use a backhoe with a 4-in-1 bucket combo and a skid-steer loader to deal with 90 percent of leaks. The small size of the equipment works well on narrow residential roads and minimizes damage to asphalt, which comes at a premium price on the island. Pipelines are generally repaired with splices and stainless steel clamps.

"We also recently acquired an older Vactor truck and we're rehabilitating it," Eddy says. "We intend to use it for potholing, trench dewatering, and valve and meter vault cleaning."

The department continues to work on a slate of pipeline and tank projects within the 2020 plan. One near-term goal involves interconnecting the individual water systems, which will not only provide redundancy, but also reduce pumping costs where the market price of electricity hovers around 45 cents per kWh.

Replacing experience

Maintaining the engineering, inspection and fiscal staff to implement Water Plan 2020 has also presented a challenge to its completion.

"A large number of longtime experienced staff members retired within the past 10 years and much of their knowledge and expertise went out the door with them," Eddy says. "We've struggled to replace the institutional knowledge of the people who retired. We also struggle to recruit new professionals, especially young engineers. I suspect that the overall number of college students graduating with civil engineering degrees is relatively low nationwide. We've also had trouble recruiting new graduates who were born and raised on Kauai to return to Kauai. I suspect that young graduates prefer to go out and see the world before returning to their home base."

A $60 million Build America Bond was recently issued for a combination of water system replacement and water system expansion projects. However, budgeting continues to pose a challenge.

"We conducted a water rate study over the past two years and found that the ratepayers are currently paying all that they can handle," Eddy says.

Despite its challenges, the goals of Water Plan 2020 remain firmly in place.

"It's been a valuable tool for us for the past 12 years," Eddy says. "Each of the individual programs within the plan — the asset replacement program, the water system expansion program and the financial plan — have been updated several times since 2000. However, the original plan is the foundation and anchor that we continue to count on." ✦

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ABOVE: Executive Director Tony Rojas addresses maintenance and plant personnel during the weekly planning meeting. LEFT: A member of the Water Distribution crew opens a valve on a water main in a residential area. (Photography by Steve Schroeder)

FOCUS: WATER

CONSOLIDATE AND CONQUER

Macon Water reconfigured its maintenance program and improved efficiency across the board

By Erik Gunn

Almost seven years ago, the Macon Water Authority turned its handling of maintenance upside down, or as department personnel would probably consider a more accurate description, right side up.

Until then, maintenance employees for the authority, which handles both water purification and distribution and wastewater collection and treatment for the central City of Macon, Ga., were stationed at individual plants and facilities the MWA operates. They answered to the individual plant supervisors.

Repairs were generally limited to responding to immediate needs in every operation. The priorities were set by the individual plant supervisors without regard to what was most important for the whole system. Crisis management was the norm.

And because repair parts were stored elsewhere at an MWA warehouse, fixing problems often required extra time for workers to go get what they needed, then return to the plant to make the repair.

A new approach

Beginning in 2006, the authority took a long, hard look at its operations. The MWA brought all of its mechanics into a centralized maintenance department under a single maintenance manager. "It has paid off in efficiency," says Ray Shell, assistant executive director at the MWA.

But that's just part of the story at MWA.

"It was all part of a larger effort for us to improve the management and maintenance of our asset," says MWA Executive Director Tony Rojas. "It probably took us as much as five years from beginning to end, but we were very methodical about our actions."

Today, the authority manages those maintenance tasks with extensive high-tech help: a computerized maintenance management system and software that keeps track of the location and condition of every

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pump, pipe and valve in both the water and the sewer system. But perhaps most important is the MWA's proactive approach — one that extends beyond maintenance to include conservation of the natural resource that many of its customers take for granted: the community's water supply.

It wasn't necessarily cheap; Macon spent a lot up front over the years to make the needed changes, Rojas says. But Rojas and Shell have no doubt that it was worth it, and that it will pay back in the long run by holding down operating costs, extending the life of the authority's infrastructure, and preserving the community's resources for a long time to come.

Musical birthplace

Macon is perhaps best known as a seedbed for American popular music. R&B stylist Otis Redding, rock pioneer Little Richard, and seminal southern rockers The Allman Brothers Band all hailed from the community, as did the founders of Capricorn Records, the Allmans' label.

With a population of about 92,000 in the city and 160,000 in the broader metro area, Macon's demand for water is fairly typical of a community its size, Rojas says. The biggest water and sewer customers include a couple of large industries. There's a zipper factory owned by the international company YKK, which uses water for electroplating all those zippers. And there's also a mill operated by Graphic Packaging International, a maker of boxes and other paper-based packaging products.

Water bills go to a total of 52,000 accounts. The sewer customer base is smaller, with 41,000 accounts. The authority also sells wholesale water to adjacent Monroe County.

The authority's water supply comes originally from the Ocmulgee River, which feeds the authority's reservoir.

"We are about as far south as you can go in this part of the country and still have a surface water treatment plant," says Shell. "Everybody uses groundwater south of here."

The location has kept Macon free from the sort of territorial water-supply conflicts that many communities experience, Rojas says. And both the quality of the water supply and Macon's state-of-the-art water treatment facilities helped the city earn the distinction of having the nation's best-tasting water as judged by the American Water Works Association in 2009.

Turning points

There wasn't one single turning point that sent Macon on the path of continual improvement it's been traveling for many years now. But one important event dates back nearly 20 years, when Hurricane Alfredo flooded the authority's water plant in 1994. "Macon was without drinking water for 21 days," says Shell.

With federal help, the authority built a new water treatment plant. The facility was constructed on higher ground next to a 5.9-billion-gallon reservoir the authority built in 1994 to hold water collected from the Ocmulgee until it's ready to be used. The new treatment plant went online in 2000.

The reservoir gives sediment in the water time to settle out, and the treatment plant uses chlorine dioxide and activated carbon filtration to help further purify the water before it goes to the customers' faucets.

Having the reservoir "has really benefited us through these droughts we've seen," Rojas says. "We haven't suffered or had any problems in being able to supply water to our customers."

The water authority hired Rojas, who was the city manager of another Georgia community at the time, as its executive director in 2002, and Shell as his deputy in 2005. Rojas and Shell say a lot of the credit for supporting the changes employees have made over the last decade goes

PROFILE: Macon (Ga.) Water Authority

POPULATION SERVED:
51,000 (water),
45,000 (sewer)

SERVICE AREA:
Macon and immediate metro area

WATER TREATMENT CAPACITY:
60 mgd

INFRASTRUCTURE:
1,425 miles/water mains,
977 miles/sewer mains

ANNUAL REVENUE:
Water: $23.5 million
Sewer: $19.3 million
(For year ending 9/30/2011)

CAPPING WATER LOSS

Organizing its maintenance program along more professional lines has enabled the Macon Water Authority to take a longer-range, bigger-picture approach.

The authority's water loss audit program is an example, says MWA Executive Director Tony Rojas.

The authority has also launched a watershed protection plan. That's something called for under federal law, but Rojas and Deputy Director Ray Shell believe Macon's plan stands above those of other communities because it sets higher standards.

The plan began with a review of every valve in the city's water system to make sure they weren't rusted open or shut. Along the way, details of each valve were written up in the asset management database — down to its specific location.

Shell says in the past, if they had a waterline break in a busy part of town they would sometimes be unable to find the valves to shut it off, so the water would run for hours while they were poking around looking for a valve to shut it off and isolate it. Better information in the asset management database has solved that issue, Shell says, and now the authority can better respond to emergency situations.

A maintenance employee uses the Caterpillar/ISO generator control system.

Distribution employee William Tanksley, left, and warehouse clerk Dwayne Harris assemble a maintenance kit for work order preparation.

(continued)

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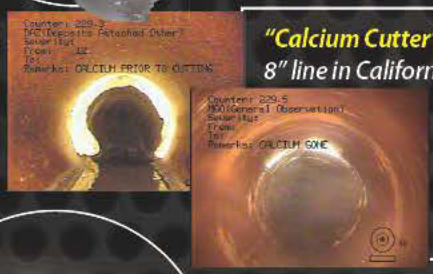

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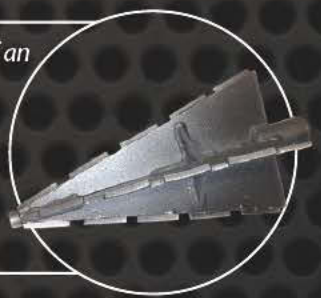

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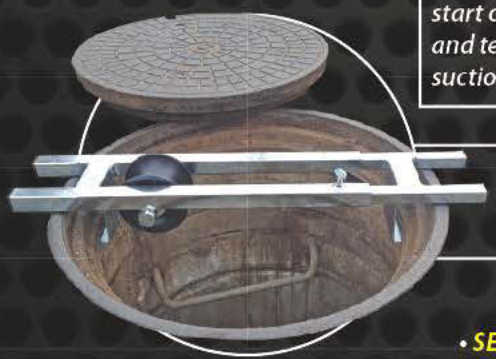

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Assistant Maintenance Manager Andy Tate reviews instrumentation settings on one of five high service pumps.

to the late Frank Amerson Jr., a prominent member of the local construction industry who served on the authority's elected governing board for 35 years, 27 years as chairman. He died in September 2012.

"[Amerson] understood and appreciated the value of water and sewer infrastructure," Rojas says. "He worked with the board so they were able to get us the things we needed."

The goal was to reorganize the authority staff so that it operated more like a business, and one that was attentive to the needs and convenience of the customer, Rojas says. "We had good employees," he explains. "We just needed to give them direction and give them an opportunity to do business in a way that would allow them to succeed."

It was that goal that led the authority to consolidate maintenance employees into their own department, with a maintenance supervisor directing their work across all of the authorities' properties.

The change provided several advantages, Shell and Rojas say. For one thing, it made the best use of employees' individual expertise. A talented pump repair person, for instance, could be dispatched to fix failing pumps anywhere in the system, not just at the plant where he was stationed under the old arrangement.

It also made it easier to begin focusing on preventive maintenance and prioritizing repairs instead of just responding to whatever local fire was burning at the moment.

The new organization has made it easier to keep more maintenance work in-house, although Macon still makes use of outside contractors, especially for highly specialized repairs.

Job titles changed as well. Macon created four positions of maintenance planner. The people in that job are coordinating the maintenance work — triaging based on how serious it is and working out the logistical details.

The authority also began using written work orders to help sort out the tasks to be completed, in contrast to the less formal approach of the past.

"It was all part of a larger effort for us to improve the management and maintenance of our asset. It probably took us as much as five years from beginning to end, but we were very methodical about our actions."

Tony Rojas

"How it was done before — you'd just know something's broken and it needs to be fixed," says Rojas. "You might have some idea of what it is, and the crew might drop by the warehouse and pick up a few things they think they need. Then when they get to the job and see what it is, they need this part and this part and this part …"

The maintenance planners aren't supervisors, but they do set the priorities for the rest of the maintenance crew.

"They define the work, look at all the needs, and do all the shopping for supplies," Shell explains. The maintenance planner establishes which materials are needed for a job, special tools that may be required, or even regulatory permits that the authority would have to take out in order to do the work.

Executive Director Tony Rojas

"When the crew shows up in the morning and they're assigned by the foreman to a particular work order, they go into the warehouse and get the kit. Inside the box is all that's needed to do that job. They go out to the job with one visit, and they start their work."

Ray Shell

The planners make rounds on the system checking out every item that needs repairs.

Then they assemble repair kits for the rest of the workers to use — and to make sure they have all the parts they need to do it right the first time.

"When the crew shows up in the morning and they're assigned by the foreman to a particular work order, they go into the warehouse and get the kit. Inside the box is all that's needed to do that job," Shell says. "They go out to the job with one visit, and they start their work."

Maintenance workers have also learned to exercise judgment. For instance, under the old arrangement, every lift station would get a visit each year — 52 in all.

Now the number of lift stations is up to 58, but they actually don't need to be visited as often, thanks to the city's SCADA monitoring systems, which keep an eye on the lift stations by remote control.

Put to the test

Another part of the revised approach was testing every valve and other moving part in the system — the dynamic assets. Using Computerized Maintenance Management System software, the authority assembled an inventory of all of its assets. The database is linked to the city's GIS mapping system, and there are some 26,000 photos of system assets.

Even before that, though, "we redesigned our business processes," says Rojas. "We looked at how we did everything."

Up to that point, some individual facilities in the system used software and others didn't. As part of the process redesign, everyone was put on the same software.

Now, weekly meetings among the plant operators are the starting point to assembling the weekly list of tasks. Although an emergency might push something to the top of the pile, generally the maintenance crews have their work planned out for the week ahead.

Supervisors had to adjust to the idea of not declaring every repair an "emergency," Shell and Rojas acknowledge. But they've learned. "They've developed a level of respect for that emergency list that they don't violate," Shell says.

Maintenance budgets remain the responsibility of the treatment plant supervisors.

Getting used to it

Rojas says that being more efficient saves money in the long run. So does making repairs promptly before a defect becomes more costly to fix.

That doesn't mean spending less on maintenance overall, however. "We've actually spent a good bit more money on maintenance," Rojas says. "But then it's done a lot in terms of improving operations."

He and Shell credit elected officials for supporting the agency's drive to improve and authorizing spending for the tools to do the job right, like the GIS map-based Asset system.

"I think we are seeing continual reductions in the cost of operations as we improve the system," adds Shell. "Many times we're fixing things that never worked to begin with, and seeing reductions in our operating costs."

As is often the case with change, it didn't come easy for Macon employees. But they did adjust.

"This did not happen without pain and gnashing of teeth," Shell says. "There are those who wanted to go back to the 'good old days' at first." That eventually passed, he says, and now everyone's on board. "I'm proud of what we achieved." ✦

MORE INFO:

Caterpillar, Inc.
309/675-1000
www.cat.com/power-generation

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.

CLIMB OUT OF YOUR SHELL

Introverts can be strong workplace leaders if they take the proper initiative

By Ken Wysocky

In a world that seems to increasingly favor sizzle over steak, introverts inevitably suffer in the workplace. In many respects, they're similar to NFL offensive linemen: They quietly go about their business in unassuming, workmanlike fashion — unsung heroes that shun the limelight.

Extroverts, on the other hand, are the workplace quarterbacks, grabbing the spotlight and dominating the workplace highlight reels. And along the way, they inadvertently put introverts on the business end of a figurative stiff-arm when it comes to promotions and plum assignments.

So what are introverts supposed to do? Go on feeling powerless and overlooked? Join Introverts Anonymous? ("Hello, my name is Bill, and I'm an introvert.") Or bust out of the mold by going all extrovert on their colleagues, suddenly becoming the life of the workplace party? None of the above, says Jennifer Kahnweiler, Ph.D., an internationally known speaker and executive coach, and the author of a new book called *Quiet Influence: The Introvert's Guide to Making a Difference.*

"Introverts often are overlooked, ignored and passed over for promotions," she says. "But they don't need to become extroverts to succeed. They just need to understand their strengths."

For proof, Kahnweiler points to famous introverts such as Bill Gates, Tim Cook, Colin Powell, Warren Buffett and Meryl Streep, to name a few. Moreover, research studies show that introverted leaders deliver better outcomes than extroverts when managing proactive employees.

"It's encouraging and validating to see that there's not just one way to lead," Kahnweiler says. "An introvert can achieve results — be a quiet leader."

Moreover, introverts bring many talents to the workplace. They tend to be creative and self-aware; excel at research and preparation; enjoy serious, one-on-one interactions that can encourage others and resolve conflicts; and are adept at developing well-thought-out arguments that can skillfully influence others.

Introvert: A definition

It's generally considered that noted psychologist Carl Jung first made the terms "introvert" and "extrovert" popular in the 1920s. Later, the well-known Myers-Briggs Type Indicator Instrument, a personality-assessment test commonly used by large corporations and universities, made the terms an even more permanent part of the socio-psychological lexicon.

But strictly speaking, just because you're shy doesn't mean you're necessarily part of the 40 to 60 percent of the population that considers itself introverted. Kahnweiler says introversion is more of a hard-wired orientation, marked by specific defining characteristics. In short, you're probably an introvert if you fit this pattern of traits:

- Crave solitude
- Work better alone or in small groups
- Think carefully before speaking
- Prefer depth over breadth
- Possess good listening skills
- Prefer writing over talking (would rather email than talk)
- Are reserved, calm and low-key
- Shun attention

Introverts are challenged in ways that extroverts, who dominate the workplace by being better self-promoters, can't fathom. Kahnweiler categorizes what she calls introverts' "hard realities" into four main groups:

People exhaustion. Introverts get their energy from within. As such, spending too much time with other people leaves them exhausted — a definite drawback in a workplace that typically expects people to always be "on."

Negative impression. To unknowing outsiders, introverts may appear bored, angry or depressed, because they don't often outwardly express emotions.

Underselling. Introverts don't sell themselves very well because they don't like attention. "That's a problem, because nature abhors a vacuum," Kahnweiler says. "If managers don't see you or hear from you, they tend to pass you over for opportunities, because you're not on their radar."

Work overload. Introverts don't like conflict, so they don't often say no. And if they do a good job, they become a go-to person. "But if they don't communicate with their manager about priorities or cannot say no, they tend to get overloaded," Kahnweiler says. "On the other hand, everyone knows extroverts are overworked because they're always telling you how overworked they are."

> **"Introverts often are overlooked, ignored and passed over for promotions. But they don't need to become extroverts to succeed. They just need to understand their strengths."**
>
> **Jennifer Kahnweiler, Ph.D.**

Here's the game plan

Kahnweiler emphasizes that introverts can make meaningful changes and still remain true to themselves. "They need to honor and recognize who they are … then leverage their strengths to make a difference and lead," she explains.

"To do that, they must first figure out what's not working for them … decide what they want to get better at, like public speaking, for example," she continues. "Or participate in meetings. I do a lot of employee coaching and webinars, and I can pretty much guarantee that introverts will ask me how they can do better at meetings."

After that, Kahnweiler offers the following suggestions to help introverts break out of their shells:

Prepare. If an introvert wants to succeed at handling high-stakes meetings, for instance, they need to think well in advance about what

kind of comments they can make or questions they can ask. In other words, get a copy of that agenda for a big meeting well beforehand. And when the opportunity arises to speak, don't hesitate; it doesn't get any easier the longer you wait.

"Preparation is a huge sweet spot for introverts because they're very good at research, as well as foreseeing and anticipating objections," Kahnweiler notes.

Push. Step out of your comfort zone far enough that it feels uncomfortable, but not too uncomfortable. "When we're uncomfortable, that's when we learn," she says.

Communicate. Because introverts tend to be the wallflowers of the office world — as in out-of-sight, out-of-mind — get proactive about passing on pertinent information to higher-ups and team members, such as updates on a project's status or even a personal accomplishment. Don't wait for them to ask — find out what they need and deliver it.

Match medium to message. Since introverts prefer writing to talking, it's tempting to use email when personal interaction would be more effective. "Texting and email may be great for quick exchanges, but they miss the mark in critical high-touch areas, including developing relationships and delivering difficult news," Kahnweiler points out.

Practice, practice, practice. Take every opportunity to practice whatever you're doing to improve weaknesses. "Learning new skills and behaviors may be uncomfortable at first, but with conscious repetition and refinement, you can manage your introversion," she says. ✦

About the Author

To learn more about Jennifer Kahnweiler, visit www.aboutyouinc.com.

NEW WATER TOOLS FLOW IN

The American Water Works Association's ACE13 will showcase the most innovative products and services from all aspects of the water industry

By Craig Mandli

Everything water will be under one roof in June, as the American Water Works Association's 2013 Annual Conference & Exposition (ACE13) is coming to Denver, Colo. June 9 – 13. More than 450 service providers will exhibit, showcasing the most innovative products and services from all aspects of the water industry. Exhibitors will offer hands-on understanding and expert insights from pipes to valves, meters to hydrants, engineering services to tank-related products, membrane filtration systems to laboratory equipment, security to wastewater and more.

Here's a look at just a portion of the products and services that will be featured.

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ACE13 PRODUCT PREVIEW

1 AA Thread Seal Tape

High-density, cross-laminated **joint wrap** from AA Thread Seal Tape can be used for both standard and wide joints up to 24 inches in diameter. It provides protection against punctures and tears where they are most likely to happen due to sharp metal from sheared heads on mechanical joints. It is available in 100-foot rolls, and can be cut to a specific length to wrap a vast range of joint widths. It is an easy and economical way to protect joints from external corrosion for the life of the pipeline. **847/526-2120; www.aathread.com.**

2 Analytical Technology

The **Q46H residual chlorine monitor** from Analytical Technology continuously monitors free or combined chlorine directly using a polarographic membrane sensor. Monitors are available with one of three digital communications protocols (Modbus/Profibus/Ethernet) or three 4-20 mA outputs for chlorine, pH and temperature. This system is also available pre-wired and pre-plumbed with optional sample flow controls, and mounted to a PVC back plate. **800/959-0299; www.analyticaltechnology.com.**

3 Anthrafilter

Anthrafilter provides **filter media replacement service** across North America. The company services all types of filters, including gravity, pressure, traveling bridge-type systems and others. They perform under-drain repairs, removal, disposal, supply and installation. Anthracite filter media, filter sands and gravels, garnet, greensand and activated carbon are removed. The method is efficient, clean and safe. **800/998-8555; www.anthrafilter.net.**

4 Aqua-Aerobic Systems

The **Aqua UltraFiltration Membrane System** from Aqua-Aerobic Systems offers a compact, T-rack design, zero break fibers and no air scouring. The multibore fibers are made of polyethersulphone with seven capillaries per fiber for superior strength. The alternating top and bottom feed and inside-out filtration flow provides uniform filtrate and backwash flows to minimize plugging, chemical usage and cleaning frequency. They are ideal for reverse osmosis pre-treatment plants and drinking water, industrial water, tertiary wastewater, and reuse applications requiring low effluent-suspended solids or phosphorus. **800/940-5008; www.aqua-aerobic.com.**

5 ASA Analytics

The **ChemScan mini oP in-line analyzer** from ASA Analytics is ideal for Sequesterant monitoring where combinations of Poly and Ortho-Phosphate are used. It utilizes years of experience and proven technology to provide reliable and accurate analysis of the ortho-phosphorus fraction. The device has been designed from the ground up to minimize maintenance requirements, including large ID sample tubing to eliminate plugging. It only needs quarterly service for reagent change out. **262/717-9500; www.asaanalytics.com.**

6 Badger Meter

The **Dynasonics DXN portable clamp-on ultrasonic meter** from Badger Meter is designed for systems engineers to quickly troubleshoot problems and verify sensor, pump and valve flow performance during system commissioning and diagnostics. Non-invasive, portable and easy to install, it captures more than 50 flow readings per second and automatically switches from transit time to Doppler modes as needed. Applications include clean, solids-bearing or aerated liquids in closed full pipes 1/2-inch and larger. **262/639-6770; www.badgermeter.com.**

7 Blue-White Industries

The **ProSeries-M M-2 peristaltic metering pump** from Blue-White Industries is designed for use in small to mid-sized municipal water and wastewater treatment systems. It permits standardization to a single pump model, because it can be used with a wide variety of aggressive and viscous chemicals. The firmware is field upgradable, and the pump has feed rates from .007 to 15 gph, pressures to 125 psi, a 200:1 Turndown Ratio, 4-20mA input and output (dual input ready); industrial ethernet, Profibus, ProfiNet and Modbus. **714/893-8529; www.blue-white.com.**

8 Brentwood Industries

The **SedVac sludge removal system** for drinking water plants from Brentwood Industries cleans the sedimentation basin floor, removing solids without clogging, regardless of influent quality. Its header is designed to engulf and funnel the sludge blanket to the discharge hose. Powered by industry proven cable-drive technology along a guide track anchored to the basin floor, it is capable of operating daily or continuously in plants up to 380 feet long. **610/374-5109; www.brentwoodindustries.com.**

9 Caldwell Tanks

The **TAP-APP or Air Pulse Protection mixing**

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system from Caldwell Tanks is an active mixer that utilizes pulses of air to efficiently mix potable water storage tanks. It incorporates advantages of active and passive mixing technologies by consistently mixing while using no moving parts within the water container. This patented mixing technology greatly reduces typical tank mixing times, even in tall or large capacity tanks, which allows the use of intermittent pulsing cycles, reducing operating costs. **502/964-3361; www.caldwelltanks.com.**

10 Calgon Carbon Corporation

Calgon Carbon Corporation's **Potable Water Service (PWS) Program** makes Granular Activated Carbon (GAC) more economical and environmentally friendly. Through the service, the GAC a utility needs to achieve quality standards is engineered, delivered and installed by company professionals. Payment is on a monthly or quarterly basis. When a municipality's activated carbon becomes saturated, the spent carbon is reactivated through the company's Custom Municipal Reactivation (CMR) process, for an even greater economic and environmental benefit. **800/422-7266; www.calgoncarbon.com.**

11 Cambridge Brass

The **Cambridge Coupling** from Cambridge Brass connects any two pipes of varying sizes and materials. It can attach to any pipe material through a wide range of sizes, which reduces repair time and required inventory. Installation is simple and requires minimal tools. It connects to a variety of pipe styles and sizes. **800/724-3906; www.cambridgebrass.com.**

12 CertainTeed Corp.

Certa-Lok C900/RJ restrained joint PVC pipe from CertainTeed Corp. is a non-metallic joint-restraining system designed for use in municipal water and fire protection systems and other restrained joint applications. It requires no special heat-fusion equipment, saving contractors a significant amount of time and money. Joints are assembled as the pullback continues, so streets remain open and clear. **866/284-7473; www.certainteed.com.**

13 Data Flow Systems

Symphony - Harmonious Pump & Flow Management from Data Flow Systems utilizes SCADA to coordinate the system-wide operation of sewer lift stations for the purpose of reducing force main pressures and equalizing flow into a wastewater treatment plant or master. The result is a significant reduction in energy costs and a solution to daily peak flow and pressure spikes. It addresses the random operation of each lift station operating on a common force-main, and synchronizes the pumping activity on a minute-by-minute basis. **321/259-5009; www.dataflowsys.com.**

14 Denso

Denso's **Petrolatum Wax Tape System** provides above and belowground protection to pipelines, fittings, tank bases, steel structures and more. The systems can easily be applied by hand to minimally prepared surfaces in arctic and tropical temperature environments. **888/821-2300; www.densona.com.**

15 DN Tanks

AWWA D110 prestressed concrete tanks from DN Tanks can be used for potable water, wastewater, chilled water and other liquids. They offer expanded construction capacity, technical expertise and proficiency in multiple types of proven tank designs to provide customized liquid storage solutions. They are designed to meet varying project requirements with the ability to withstand seismic activity, extreme climates and severe site conditions. **855/368-2657; www.dntanks.com.**

16 Eagle Microsystems

The **VF-100 feeder** from Eagle Microsystems is ideal for feeding dry chemicals in water and wastewater systems. It is constructed of stainless steel and has direct drive to ensure optimum performance in harsh environments. It is available with a large range of options including solution tanks, wetting cones, extension hoppers, stands and custom controls. It is durable, reliable, fully customizable, and comes with a two-year warranty. **610/323-2250; www.eaglemicrosystems.com.**

17 ECC

ECC **floating ball blankets** provide highly effective solutions to difficult water storage problems for municipal utilities. By placing a sufficient quantity of hollow plastic balls onto the surface of a liquid, the balls automatically arrange themselves into a close packed formation over 91 percent of the surface area. **910/245-2241; www.eccllc.us.**

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ACE13 PRODUCT PREVIEW

18 EJ

The **Storz Nozzle Connection** from EJ is an option for all the company's WaterMaster BR250 and CD250 model fire hydrants. This connector provides a quarter-turn pumper nozzle attachment, matched with a ductile iron cap. Remove or install the cap using various square- and pent-size standard operating nuts, along with Storz C wrench outer lugs. Existing WaterMaster hydrants can be retrofitted with a new nozzle in both 4- and 5-inch sizes. The design provides consistent cap appearance and colors. **231/536-4543; www.ejco.com.**

19 Elster Perfection

Hydrosert stainless steel adapters from Elster Perfection products are available in both male and female in sizes 3/4 through 2 inches. They allow the installer greater flexibility when installing HDPE to stainless components such as gate valves or air release valves. The product line of no-lead connections provides a quick, easy to install, leak-proof connection and repair for HDPE potable and wastewater systems. **800/544-6344; www.elster.com.**

20 Emerson Process Management

The **FCL free chlorine measuring system** from Emerson Process Management doesn't use an expensive sample conditioning system or messy reagents to control pH. Instead, it automatically compensates for pH changes in the sample using a membrane-covered amperometric sensor. A constant head overflow sampler ensures correct sample flow to the sensors. It is available with the easy-to-use 1056 intelligent analyzer. **800/854-8257; www.rosemountanalytical.com.**

21 Endress+Hauser

The **OUSAF11 sensor** from Endress+Hauser is designed to measure optical absorbance by a process fluid. Using visible and near-infrared wavelengths of light, it is ideal for product loss detection, interface detection, and suspended solids and turbidity measurements. The sensor emits light in both the visible and near-infrared regions, and absorption by the process fluid is determined using an optical sensor mounted in the sensor head. **888/363-7377; www.us.endress.com.**

22 Farwest Corrosion Control

The **POWERMAG 1000** from Farwest Corrosion Control is a cathodic protection controller designed to automatically provide a constant, IR-free potential to internal water tank surfaces using magnesium anodes without the need for AC power, batteries or any other external power. The system, which is simple to install and easy to use, enables full control over low maintenance sacrificial magnesium anode systems with no over-voltage issues. It requires no external power or batteries. **310/532-9524; www.farwestcorrosion.com.**

23 Fluid Conservation Systems

The **TriCorr Touch** from Fluid Conservation Systems uses information gathered from acoustic leak noise sensors placed at intervals along a pipeline to identify and locate leaks in a water distribution system. It automatically runs 55 different filter combinations on the correlation data, which allows it to check the quality of the results and optimize filter settings as required, until the clearest and most accurate result is presented. **800/531-5465; www.fluidconservation.com.**

24 Filtronics Inc.

EM-mini packaged water treatment systems from Filtronics are factory assembled, fully self-contained and specifically designed for applications from 5 to 100 gpm or less. Available in standard configurations, they feature a smaller footprint at the lowest capital cost in the industry. To optimize performance, they utilize NSF certified Electromedia, which allows higher filtration rates, minimal chemical dosage, and eliminates the need for replacement. **714/630-5040; www.filtronics.com.**

25 Fisher Tank

Welded steel tanks from Fisher Tank provide safe, economical water storage for municipalities and water treatment facilities. Designs can include aeration/mixing systems, ladders, handrails, exterior piping and appurtenances as dictated by the site, weather conditions, usage and other factors. Welded steel tanks offer flexibility in design, exterior paint, future modification options, and minimal maintenance costs. **803/359-4173; www.fishertank.com.**

26 Ford Meter Box Company

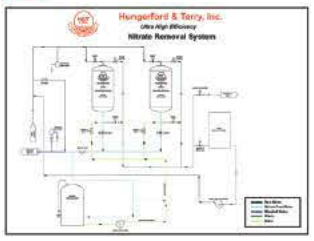
The **FS300 stainless steel saddle** from Ford Meter Box Company incorporates a redesigned band with new gasket technology to produce a saddle rated for 250 psi working pressure. Available in 2- through 36-inch pipe sizes, the saddle offers tapped outlet threads in sizes 1/2 through 2 inches. **800/826-3487; www.fordmeterbox.com.**

27 Grundfos Pumps

Hydro MPC BoosterpaQ systems from Grundfos Pumps can be used in a wide array of different applications, including pressure boosting, municipal water transfer, industrial process, and HVAC applications. They are designed to meet specific customer demands for capacity and control. The intelligent cascade control ensures the optimum number of pumps required to meet demand runs at any time. **800/921-7867; www.grundfos.us.**

28 Hach Company

The Hach **AF7000 streaming current monitor** was designed for the optimization of coagulation processes in drinking water. Partnering a simple and straightforward layout with an optional automatic flush feature, it allows for easy access to perform routine maintenance, while maximizing



uptime and keeping your readings accurate. Its heavy-duty construction and fast response allows for accurate 24/7 monitoring of source water. **800/227-4224; www.hach.com.**

29 Halogen Valve Systems

The **Terminator Actuator emergency shut-off system** from Halogen Valve Systems closes 150-pound cylinder valves containing toxic gas in less than five seconds when activated from remote sensors and switches. The operator is then required to correct the condition before manually reopening the valve to restart the system. It has a self-contained battery system that operates the motorized closing mechanism even during a power failure. **877/476-4222; www.halogenvalve.com.**

30 Hendrick Screen Company

Bar screens from Hendrick Screen Company can be utilized in the municipal water and wastewater, fish diversion, power distribution, industrial and OEM markets. They include passive water intake screen, flat intake and fish diversion screens, header laterals and pipe laterals, sieves and strainer screens. They are constructed from 304 and 316L stainless, and copper nickel, are ISO 9001-2000 certified, and offer design and specification preparation assistance. **270/685-5138; www.hendrickscreenco.com.**

31 Hungerford & Terry

The **Ultra High Efficiency Nitrate Removal System** from Hungerford & Terry features vessels completely packed with high-efficiency resin and specially designed tank internal distributors to provide uniform distribution of water and regenerant throughout the resin bed. Regeneration is counter-current to insure that the lower portion of the resin bed receives the greatest exposure and becomes the most highly regenerated portion of the bed. **856/881-3200; www.hungerfordterry.com.**

32 Industrial Test Systems

The **eXact Micro 20 dual wavelength photometer** from Industrial Test Systems is waterproof and quickly does on-site testing for over 30 direct-read water quality parameters without lookup tables. It features a narrow-band wavelength filter for optimal accuracy, long-life LEDs, and a built-in cell for ultra-performance. Each parameter stores the 20 previous results for a total of over 600. It calibrates and automatically selects the optimal wavelength (525 nm or 638 nm) for each parameter. It is sold in two kits with instructions and reagents. **800/861-9712; www.sensafe.com.**

33 Itron

The **100W ERT module** from Itron, when deployed with an integrated Leak Sensor, monitors a utility's entire distribution system around the clock, acoustically surveying the integrity of the system to help find small leaks before they become large and costly. It offers full two-way communications to the meter and time-synchronized interval meter data. It can be used as a standalone leak detection system unattached to a water meter in either AMI fixed network or AMR mobile environments. **866/374-8766; www.itron.com.**

34 Keller America

The **Leo Record digital pressure gauge** from Keller America combines a high-accuracy digital pressure gauge with an integral, programmable data logger for water system pressure monitoring. This battery-operated instrument is available in pressure ranges from 0-10mBar to 0-30,000 psi, offers 0.1 percent FS TEB accuracy, and stores 57,000 data points. It interfaces with Keller's PC-based software via USB for setup and data download. **877/253-5537; www.kelleramerica.com.**

35 Koch Membrane Systems

The **TARGA II hollow fiber ultrafiltration system** from Koch Membrane Systems offers cost effective, safe, high-quality water for drinking, seawater RO pretreatment, industrial water treatment and tertiary wastewater treatment. Its membrane design is based on PES chemistry to increase chlorine tolerance, and it has one of the highest membrane packing densities per cartridge available in the market. Ideally suited to meet drinking water requirements, the membrane achieves 4-log virus removal. Its intelligent process controls handle fluctuating feed flow with minimal operator intervention. **888/677-5624; www.kochmembrane.com.**

36 Kruger USA

The **Xtream Ultrafiltration system** from Kruger USA provides a modular, compact solution for efficiently producing drinking water from surface and groundwater. It incorporates the Dow UF membrane, which has installed over 746 million gallons per day globally. The hollow fiber has a dense layer on both the inside and outside surfaces, forming a double-walled structure that makes it very durable and less prone to breakage than single-skin membranes. Its fouling resistance is improved by making the membrane surface more hydrophilic than the underlying PVDF polymer. **919/677-8310; www.krugerusa.com.**

37 LUDECA INC.

VIBCONNECT RF from LUDECA INC. is a wireless condition monitoring system for machine components. The sensor unit monitors machine vibration, bearing condition and temperature, and transmits the relevant data to the bridge where it is evaluated. It not only monitors the condition of roller bearings and other rotating components, but also detects damage caused by cavitation. It allows technicians to monitor plant equipment that extends over a large area without the need to install cabling. **305/591-8935; www.ludeca.com.**

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ACEI3 PRODUCT PREVIEW

38 MARS Company

The **System I water meter test bench system** from MARS Company complies with AWWA meter testing specifications and ISO 4064 standards. Its meter management software package, M3, exports meter testing results and information to the utility's customer information system. These results are important for trending analysis and revenue recovery programs. The system provides meter testing from 5/8- through 12-inch meters, along with field test units. **800/782-5268; www.marswater.com.**

39 Mazzei Injector Company

Injectors and Pipeline Flash Reactors (PFRs) from Mazzei Injector Company transfer ozone, a powerful oxidizer, into a water stream, solving water quality issues ranging from disinfection to reduction of organics and aesthetic issues like color, taste and odor. In wastewater applications, they provide rapid aeration within a compact footprint in force main and post treatment applications. When retrofitting an existing water or wastewater system, they can replace fine bubble diffusion systems to increase mass transfer. **661/363-6500; www.mazzei.net.**

40 McElroy

The **Pit Bull 26 fusion machine** from McElroy is compact, lightweight and rugged, with the ability to butt fuse pipe sizes from 2-inch IPS through 6-inch DIPS. All models come standard with a 6-inch IPS insert set. It features a Centerline Guidance System and a semi-automatic locking cam system that maintains force during the cooling cycle. **918/836-8611; www.mcelroy.com.**

41 McGard

The **FiberShield manhole cover** from McGard is constructed of a durable, fiber-reinforced polymer material with multiple security points. It is lightweight and easy to handle and transport. It attempts to eliminate the lifting and dropping injuries caused by heavy cast iron manhole covers. Weighing 80 percent less than cast iron, it exceeds an H20 traffic rating. It is installed in seconds and can be removed without bending over. It requires a McGard key to operate and has no scrap value, eliminating missing covers. **888/888-9192; www.manholelocks.com.**

42 Medora/SolarBee

The **GridBee THM Removal System** with floating spray nozzle from Medora Corporation/SolarBee effectively removes trihalomethanes from potable water storage tanks and clearwells. Scalable systems include four standard sizes and easily install through a 24-inch hatch. The long-life nozzle and intake treat all incoming water and minimize THM formation downstream. Performance is guaranteed. **866/437-8076; www.medoraco.com.**

43 Mission Communications

The **Manhole Monitor** from Mission Communications is ideal for proactive sewer monitoring programs. It immediately notifies the technician before effluent backs up into a manhole, and tracks the time and duration of the surcharge or overflow. Early warnings of flood conditions keep the municipality compliant with the EPA. It is designed and tested to IP68 specifications for submersion and has a rugged and serviceable waterproof enclosure. Reliable, encrypted data is transmitted over 4G radios directly to a Web portal, where reports and data can be read. The monitor can be installed in under two hours, with nominal modifications needed. **877/993-1911; www.123mc.com.**

44 Myron L Company

The **ULTRAPEN PT3** from Myron L Company is an ORP and temperature tester that is as accurate and stable as benchtop lab equipment, but with the versatility and convenience of a pen. It features dip and scoop sampling for standing bodies of water and vertical streams, offering real-time analysis before atmospheric and other environmental conditions can affect the chemistry of the sample. Constructed of durable aircraft aluminum, it is fully potted for extra protection with easy-to-read LCD and one-button functions. **760/438-2021; www.myronl.com.**

45 Nicor

Read-Rite polymer replacement meter pit lids from Nicor are non-floating rectangular tank lids that are H20 load rated, ADA compliant and UV resistant. Nicor produces over 65 different molds including rectangular, circular and oval. They can be mounted to any AMR/AMI system to the underside or recessed area in the lid. Sizes range from 7 inches round to 17 x 30 inches rectangular. The lids can be combined with the company's Hydroconn In-Line Connector for a disconnect point between the AMR/AMI endpoint and the meter's register. **707/484-0835; www.nicorinc.net.**

46 Primary Flow Signal

Primary Flow Signal's **HVT-FV Venturi flowmeter** is engineered to provide traceable accuracy and survive decades of service. It can be custom manufactured to suit process requirements, in sizes from 3/8 to 180 inches, and deliver accuracies of +/-0.50 percent of actual reading. **877/737-3569; www.primaryflowsignal.com.**

47 Pristine Water Solutions

Aquadene products from Pristine Water Solutions can be used in municipal, industrial and commercial water systems. Technologies include municipal drinking water treatment programs, corrosion and sterilization programs, cleaners, commodity chemicals, polymer applications, and boiler and cooling tower applications. They have long been industry standards for reduction of iron and manganese and for maintaining lead and copper levels below national requirements. **800/562-1537; www.pristinewatersolutions.com.**

48 Raven Lining Systems

Raven 405 ultra high-build epoxy lining from

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TANK INDUSTRY CONSULTANTS TIC

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Raven Lining Systems is used to protect and rehabilitate water and wastewater infrastructure. Its high physical strength allows it to be designed as a structural lining in manholes, pipelines, tanks and other deteriorated structures. It has a broad range of chemical resistance, but specifically protects against the hydrogen sulfide and sulfuric acid commonly found in wastewater. It exhibits superior bond to concrete, steel, masonry, fiberglass and other surfaces. **800/324-2810; www.ravenlining.com.**

49 RDP Technologies

The **TEKKEM Slaker** from RDP Technologies is fully automatic, requiring little or no regular operator attention. The operating system takes input from load cells to precisely monitor the weight of water and lime that are added. This information is combined with data from a thermocouple. Adjustments are made in the lime/water ratio to maintain optimum processing temperatures in the face of changes within the variables affecting the slaking reaction. **610/650-9900; www.rdptech.com.**

50 Romac Industries Inc.

The **Romac Alpha restraint coupling** from Romac Industries is a wide-range, ductile iron coupling that also provides restraint. With two torque-off bolts on top, it installs in about three minutes without having to use a torque wrench. Its wide range covers ductile iron and IPS PVC pipe diameters. It is manufactured in the U.S., and has a maximum working pressure of 350 psi. **800/426-9341; www.romac.com.**

51 Shimadzu Scientific Instruments

The online **TOC-4200 analyzer** from Shimadzu Scientific Instruments utilizes the industry-standard 680-degree C combustion catalytic oxidation method to support analyses from 5 to 20,000 mgC/L full-scale. It can measure samples with TOC concentrations from 0 to 1mgC/L. A high-salt sample combustion tube kit increases the period between necessary maintenance by 10 times, while a variety of pretreatment units are available to best match a sample's characteristics. **800/477-1227; www.ssi.shimadzu.com.**

52 Siemens Water Technologies

The **Clearlogx Process Optimization System** from Siemens Water Technologies is an automated chemical feed system that optimizes soluble organic removal, reduces chemical costs and enhances municipal water treatment plant performance. It optimizes a water treatment plant's water chemistry, reducing the formation of disinfection by-products while decreasing the possibility of membrane fouling. It can maximize the removal of total organic carbon (TOC) up to 50 percent, even after implementation of enhanced coagulation. **978/614-7111; www.siemens.com/water.**

53 Sigma Corp.

The **One-Lok Series SSLD split wedge-action restraining gland** from Sigma Corp. provides an effective way to conduct repairs and service on in-ground ductile iron piping without compromising the existing system. Because the glands can be used with a two-piece backup ring, they are compatible with existing ductile iron bell x spigot pipe joints. These restraining glands are now considered the preferred means of securing new installations of ductile iron and PVC pressure pipes. **609/668-1053; www.sigmaco.com.**

54 Singer Valve

The **Model 106-SPI-MV** from Singer Valve is a single point insertion electromagnetic flowmeter installed and calibrated in conjunction with a Singer valve to provide an accurate flow rate. It is available for valve sizes from 4 to 36 inches. With no moving parts and a single-piece design, the sensor contains nothing to wear or break, and is generally immune to clogging by sand, grit or debris. It is profiled for the valve body, further enhancing its measurement accuracy by allowing precise determination of mean velocities. It comes pre-calibrated, and can be installed with any standard Singer pilot system. **604/594-5404; www.singervalve.com.**

55 Tank Connection

RTP (rolled, tapered panel) tank construction from Tank Connection is a top-bolted tank design ideal for use in municipal water and wastewater applications. If a project involves a single water tank or an integrated municipal water storage system, the firm offers multiple services and creative solutions. From the quote stage through order process, drawing approval, material fabrication and field installation, they provide streamlined processing and customer service. **620/423-3010; www.tankconnection.com.**

56 Tank Industry Consultants

Tank Industry Consultants provides **professional engineering and inspection services** to water storage tank owners. The firm offers a complete line of engineering and inspection services for water storage tanks, and has been involved in more than 11,000 storage tank projects. This extensive experience coupled with the professional expertise of the firm's engineering and field personnel result in the practical "know how" needed for a successful storage tank evaluation, construction or rehabilitation project. **317/271-3100; www.tankindustry.com.**

57 Team Industrial Services

The **InsertValve** from Team Industrial Services is a quick and economical fix for different sized piping, providing valve control without having to replace pipe. For instance, an 8-inch valve can be installed on an existing 6-inch pipe for immediate valve control. It has mechanical joint connections, allowing for downstream pipe removal and replacement. Technicians can mirror the process on the other side when capital improvement is scheduled in that direction. **800/662-8326; www.teamindustrialservices.com.**

(continued)

ACE13 PRODUCT PREVIEW

58 Thermal Edge

Enclosure air conditioners from Thermal Edge include condensate evaporation, programmable digital controller and a thermal expansion valve, making them ideal for temperature control inside heat-sensitive enclosures. A Condensate Evaporation Package is standard on all units. Eliminating the drain, and reducing the power consumption by using the condensate to precool the refrigerant, the units lower the load on the compressor, thereby lowering the power used. **888/580-0202; www.thermal-edge.com.**

59 Trihedral Engineering Limited

VTScada 10.2 monitoring and control software from Trihedral Engineering Limited is a fast, stable, all-in-one solution built for telemetry applications of any size. It supports almost any combination of PLCs or RTUs. Unique server architecture means superior hot-backup with fewer computers. A built-in polling toolset replaces expensive hardware. Instantly roll back to any past configuration. Slippy Maps allow you to pan and zoom across remote sites using smartphones and tablets. **800/463-2783; www.trihedral.com.**

60 TrojanUV

The **TrojanUVTorrent UV disinfection system** from TrojanUV reduces maintenance requirements and costs while incorporating efficient technologies for large-scale drinking water disinfection. It incorporates the company's Solo Lamp to offer medium-pressure and low-pressure high output lamp technologies. Advantages of the system include lower life cycle costs, easy maintenance and reduced environmental impact. **888/220-6118; www.trojanuv.com.**

61 Underground Solutions

Fusible PVC pipe from Underground Solutions is available in diameters from 4 to 36 inches, including Fusible C-900, Fusible C-905 and FPVC. It produces a fused monolithic, fully-restrained, gasket-free, leak-free piping system ideal for trenchless (horizontal directional drilling, pipe bursting and sliplining) or conventional "open-cut" installations. The combination of standard fittings, as well as less weight and more flow for a given pressure class ensure cost savings. **858/679-9551; www.undergroundsolutions.com.**

62 Utility Service Co.

The **Water Well Asset Management Program** from Utility Service Co. is a custom-designed preventative maintenance program that includes regularly scheduled cleaning and monitoring to maintain peak performance, lower operational costs and extend service life. The company has partnered with Subsurface Technologies, Inc. to offer a broad range of well rehabilitation technologies, including a sustainable approach to improve and maintain well performance. It delivers asset management programs for the unique characteristics of each well. **855/526-4413; www.utilityservice.com.**

63 Verder

The **Verderflex Dura hose pump** from Verder is available equipped with a motor-mounted variable frequency drive for increased dosing power. The user-friendly system provides installation flexibility and precise dosing/metering controls for real-world municipal and industrial chemical feed applications. It features a 10-button keypad for local control and programming, plus a Dura hose pump with one-piece flange connections, compact footprint, and increased hose life up to 40 percent. **877/783-7337; www.verder-us.com.**

64 Videx Inc.

CyberLock from Videx Inc. enables municipal water utilities to track and control access to all areas of a facility. Cylinders and padlocks are built with stainless steel components to withstand wet, corrosive environments. The locks and keys record openings and unauthorized attempts to gain entry, providing an audit report that can help water utilities meet EPA security guidelines. Re-keying will never again be necessary because the keys cannot be duplicated and a missing key can be blocked from accessing locks. Each key is programmed with access permissions based on time, date and authority level. **541/738-5500; www.cyberlock.com.**

65 Vivax-Metrotech

The **LOG CORR system** from Vivax-Metrotech is a field correlator mixed with a set of noise loggers and a pin-pointing tool designed to detect leaks. The number of sensors combined with the precision of a correlator make the system unique. This form of leak detection allows the operator to locate even the most difficult leaks quickly and precisely, saving valuable time. The pinpointing feature enables the operator to confirm correlations directly on site. Its GPS-based leak navigator will lead technicians to the previously correlated leak position. **800/446-3392; www.vxmt.com.**

66 Watts Water Technologies

The **HF scientific HF-38Fluorimeter** from Watts Water Technologies is an extremely sensitive, handheld, ruggedized instrument designed for field-testing of toxic heavy metal contaminants in water supplies. It requires no special skill or knowledge of chemistry to operate, and is designed for use with HF heavy metal sensors. Through the use of DNA sensors, a reaction that fluoresces in the presence of a target contaminate substance, such as lead, is measured to determine the concentration of the target heavy metal. **978/688-1811; www.watts.com.**

67 WesTech Engineering

The **Trident HS package treatment system** from WesTech Engineering provides multiple-barrier protection for surface water, groundwater and industrial process water treatment. Individually and collectively, the four major treatment stages of the system maintain superior effluent performance. The multiple-barrier process is well suited for all surface and groundwater applications, including high turbidity and color, variable water conditions, enhanced coagulation operation, and cold-water conditions. **801/265-1000; www.westech-inc.com.** ✦

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READING BETWEEN THE PIPELINES

Utilities have new technology options available to improve remote monitoring systems

By Peter Kenter

Sewer and water utilities have long been turning to sophisticated sensors and monitoring devices designed to keep tabs on a host of information ranging from flow volumes to leaks and line integrity. How that information is transmitted to the utility is a critical decision that impacts not only the cost, but also the reliability of the data reported.

Industrial automation specialist ProSoft Technology of Bakersfield, Calif., primarily offers its clients two different remote monitoring methods — private radio frequency (RF) and industrial cellular technology — or a combination of technologies. The company has no financial interest in promoting one technology over another. Its specialty is creating communications modules and their associated software to ensure that monitoring technology of any type can communicate effectively with any of hundreds of networks and all major protocols in a cost-effective manner.

"A lot of larger companies want to focus on their core networks, but they don't want to get locked out of a project because their system won't talk natively to their clients' supervisory control and data acquisition (SCADA) system," says Jim Ralston, Product Strategy/Wireless Product manager with ProSoft. "That's where we come in."

Designing the project

Remote monitoring technologies are particularly useful on large water district systems that include pumps and water mains in remote locations. To help utilities design a waterline monitoring project, Ralston must first take down details on the length of the line and on how many monitoring stations the client wants to place along its length. The distance from the monitors to the company's SCADA system is also critical.

Next, engineers will determine how much reporting data is required, for example, simple data, photographs or streaming video. How quickly the data is required and how often the monitors are polled is also an important consideration, determining the maximum data throughput of the system.

Finally, the terrain of the area will be analyzed to determine what sort of communication system will be most reliable and cost-effective, given such potential impediments as hills, valleys, buildings and other structures such as dams and pumping stations or even foliage.

Choosing a monitoring system

In the 1990s, the traditional method of transmitting waterline data was to lease telephone lines from the phone company to poll the electronic devices involved, says Ralston. However, that technology has continued to fall out of favor with ProSoft clients.

"Phone companies are reluctant to stretch their land-based systems to reach pumps and water mains located in remote areas," he says. "The conversion from analog telephone signals to digital was also problematic, as was the cost of a host of monthly land-based phone bills. Also, with phone lines in remote areas, some of our clients were experiencing reliability issues. They received repair and troubleshooting service on a schedule well below the priority reserved for residential customers, leading to system outages and higher maintenance costs."

"In many cases, simply upgrading the RF system to something faster than might have been installed years ago provides a significant improvement."

Jim Ralston

The satellite option

Satellite monitoring service, on the other hand, uses satellite systems to relay monitoring data back to headquarters. This technology might suit an extremely remote site where other technologies would prove more expensive to establish. However, the third-party satellite monitoring service may also be costly, ranging typically around $200 per month per data monitoring point.

"When you add up a number of pump stations and multiply by $200, that can add up to a significant operating cost for the monitoring system," says Ralston.

The move to RF

For a private RF monitoring system, the cost is limited almost entirely to purchasing and setting up the RF transmitter, receivers and antenna systems. Depending on the terrain, surrounding buildings and foliage, the system may also require the installation of transmission towers, which would add to capital cost. However, the long-term cost of operating the RF equipment is negligible, largely because the client owns the system and there are no recurring charges or third-party transmission costs involved.

"Also, with complete ownership of the system, they would know exactly what to troubleshoot, and how to fix any problem," says Ralston. "In many cases, simply upgrading the RF system to something faster than might have been installed years ago provides a significant improvement."

A case-in-point — a current project at the Padre Dam Municipal Water District (PDMWD), located in Eastern San Diego County, which serves several communities from Santee to Alpine. Relying on old radio technology, the district's existing system employed a 4,800 baud modem to transmit data from all 70 monitoring points across 85 square miles in a less-than-blazing 90 seconds.

The radio transmitters were replaced with ProSoft Technology Industrial Spread Spectrum Radios in mid-2010.

Challenges included the site terrain, which ranges in elevation from 100 to 2,600 feet. "There are many natural and man-made difficulties, which made line-of-site an almost impossibility, even though some of our sites are on the highest points around the county," says Rich Mellor, SCADA technician with the PDMWD. "Using some ingenuity and the radio's repeater ability, we were able to use some of the 900 MHz radios as repeaters, allowing us to pass information through very difficult terrain."

ProSoft's wireless engineers assisted Padre

Dam officials with a field study and helped the client create a communications system using nine 2.4 GHz radios linked in a circular pattern. This allowed the district to drive communications in any direction should one radio ever fail. The system works with local 900 MHz radio and control devices to transfer microprocessor data gathered along the line to the central office at high speeds, where it's stored on a ControlLogix programmable logic controller (PLC).

At some of Padre Dam's remote locations there is no AC power, so some of the RF sites were powered by solar energy and backed up by batteries. "This was a learning curve, between the size of the panels and the type of batteries," says Mellor.

Parabolic antennas and wireless radio monitors were phased in over time to limit disruption to the water system. "We had to be careful to not interrupt operations too much," Mellor says.

The system received an acid test more than a year ago when a motorist struck a hydrant and destroyed one of the system's microprocessor units.

"Within a just a few seconds, we recorded an alarm of low pressure and total loss of communications with that site," Mellor says.

Industrial cellular data

ProSoft is seeing considerable interest from large water districts in industrial cellular data technology as a method of remote polling. As cellular networks expand, more and more remote sites are covered by either Code Division Multiple Access (CDMA) or Global System for Mobile Communications (GSM) networks, providing access to 3G and 4G cellular data service.

The company's cellular data system employs Ethernet cellular radio modems powered by 12-volt DC batteries or solar power. The units are small enough to fit into the palm of a hand, and employ external antennas for extended range.

The technology has been employed by the Cobb County-Marietta Water Authority (CCMWA) in Georgia, which currently operates three cellular radios, one of them solar-powered, to monitor water pressure at remote sites.

The utility was initially leasing a landline for one site that was costing it a telephone bill of $500 per month.

"We were considering converting to DSL (digital subscriber line) or even cable, but the service isn't available or too costly to install at some locations," says Craig Scheibel, process control programmer with CCMWA.

In 2010, the authority accepted ProSoft's recommendation to move to cellular monitoring devices. The cost of the cellular line? Less than 10 percent of the cost of a landline on a two-year contract with AT&T.

The units are installed with minimal technical assistance, relying on contractors to tap the main and assist on the water side of the project.

"Once it's installed, we log in to our firewall and verify we have a connection, and then patch the unit into the SCADA system," says Scheibel.

With three years of cellular service under its belt, the authority plans to install an additional four cellular monitors.

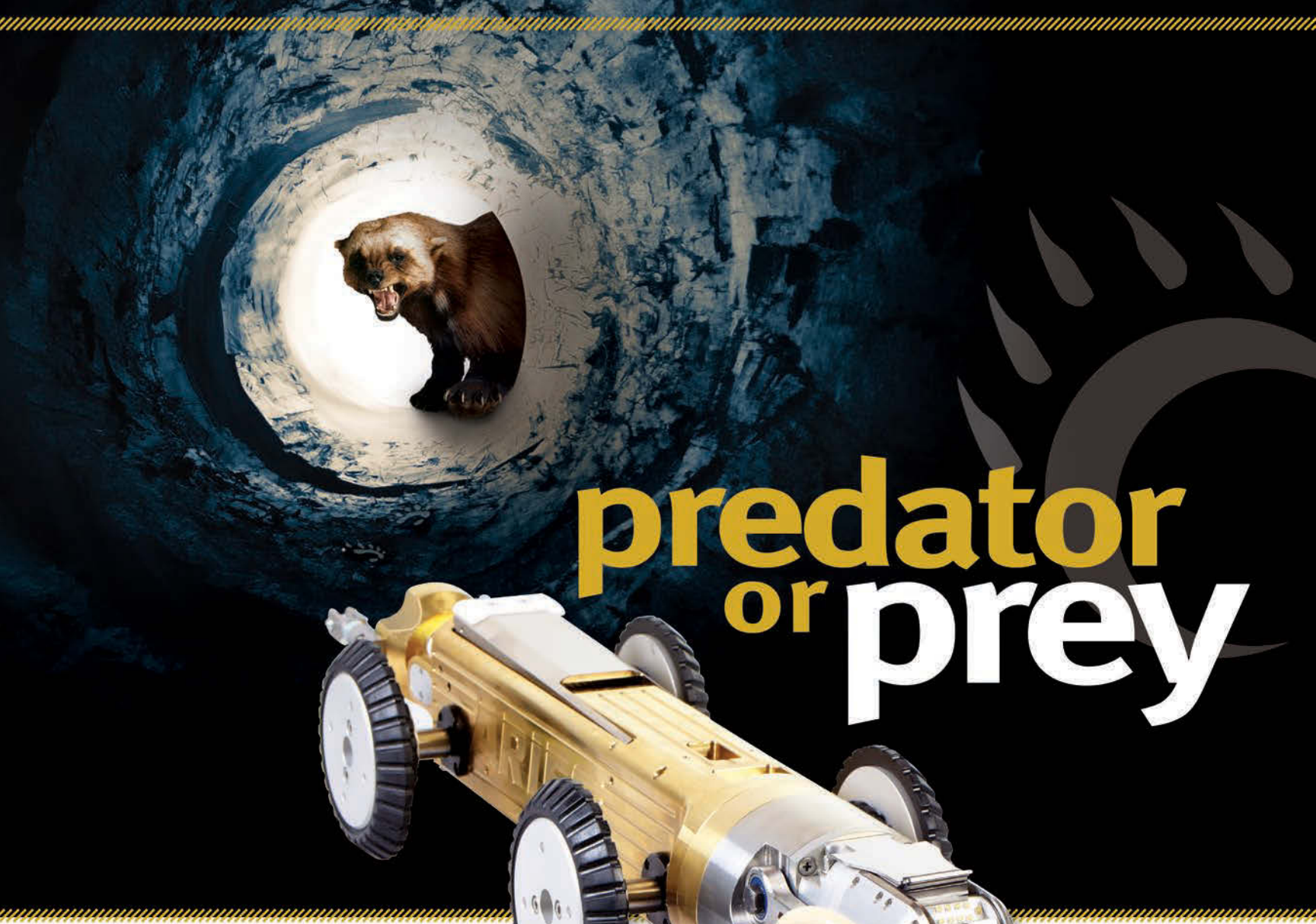
"We like the system's durability and versatility," says Scheibel. "The modems are tough and operate in a wide variety of temperatures and climatic conditions. We've also learned a lot about operating the units on solar power. Even during long periods of rain and grey weather, they receive enough power to carry through. All of the four additional monitors will be solar-powered."

Ralston notes that cellular systems aren't limited strictly to data — they can also transmit images from a site.

He notes, however, that cellular isn't a catch-all solution.

"Cellular isn't necessarily as fast as a private RF network, but neither is satellite," Ralston says. "And RF is usually near 100 percent reliable, while cellular availability may be less. Currently, RF and cellular are becoming popular, with clients usually only going to satellite if those options are ruled out.

"However, we're finding that clients are not only interested in saving money. At the lowest price point, they're encouraged to improve monitoring and automation of their existing water system networks." ✦



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New PACP quizzes are now available on NASSCO website

By Ted DeBoda, P.E.

NASSCO (National Association of Sewer Service Companies) is located at 11521 Cronridge Drive, Suite J, Owings Mills, MD 21117; 410/486-3500; www.nassco.org

We discussed the many educational tools available on www.nassco.org in the January edition of "NASSCO Corner." We have also discussed our collaboration with other organizations such as the Water Environment Federation. We have worked with WEF to develop PACP questions for their Operations Challenge, a competition that combines five equally weighted skills tests in Collections, Laboratory, Maintenance, Process Control and Safety events.

As we produce new quizzes for the WEF event, they are added to our website for use by anyone who would like to sharpen their PACP skills. Below are a few examples. To check your score, click the PACP icon on www.nassco.org, follow the link to "PACP Sample Quizzes," and look for the *MSW* 2013 Quiz. ✦

Select the correct line of code for each CCTV photograph.

1) At 148.1 ft, a gas line is crossing the sewer.

Distance (feet) (meters)	Video Ref	Code		Continuous Defect	Value				Joint	C. Location		Img. Ref	Remarks
		Group/ Descript.	Modifier/ Severity		S/M/L	Inches 1st	Inches 2nd	%		At/From	To		
148.1		SAP								12	3		
148.1		VR											
148.1		OBI						5		2	7		Gas line

2) At 25.6 ft, liner discoloration on the top of the pipe.

Distance (feet) (meters)	Video Ref	Code		Continuous Defect	Value				Joint	C. Location		Img. Ref	Remarks
		Group/ Descript.	Modifier /Severity		S/M/L	Inches 1st	Inches 2nd	%		At/From	To		
20.0		B								8	4		
25.6		LFDC								12			
25.6		TSI				6	1			3			

3) At 50.4 ft, code the infiltration.

Distance (feet) (meters)	Video Ref	Code		Continuous Defect	Value				Joint	C. Location		Img. Ref	Remarks
		Group/ Descript.	Modifier/ Severity		S/M/L	Inches 1st	Inches 2nd	%		At/From	To		
50.4		IS								3			
17.0		XP											
50.4		IR								11			

4) At 86.0 ft, code the tap at 12 o'clock.

Distance (feet) (meters)	Video Ref	Code		Continuous Defect	Value				Joint	C. Location		Img. Ref	Remarks
		Group/ Descript.	Modifier /Severity		S/M/L	Inches 1st	Inches 2nd	%		At/From	To		
86.0		MCU								9	12		
86.0		TB								12			
23.7		DSGV				6				6	7		

WATER SYSTEM MAINTENANCE AND INFRASTRUCTURE

By Craig Mandli

Flexible pressure pipe

ADS PolyFlex pressure pipe from **Advanced Drainage Systems** features flexibility and durability that make it ideal for a variety of applications, including residential and commercial, well/pump systems, municipal service lines, landscape and agriculture irrigation systems, and farm and ranch water systems. It is strong and resistant to many common causes of damage, such as weather, human element, vibrations, surface loads and pressure surges. **800/821-6710; www.ads-pipe.com.**

HDPE pipe fittings

HDPE injection-molded **pipe fittings** from **Agru America** combine innovative molding machinery, high mold-design technology (including a special gating system) and high-grade steel. Principal applications include wastewater, potable water and gas distribution. The fittings are lightweight and corrosion-, biological- and chemical-resistant; offer superior flow characteristics; and have heat fusion joining for a leakproof system. **800/373-2478; www.agruamerica.com.**

Backup system

The **ReliaPrime** emergency bypass station from **Gorman-Rupp** operates on natural gas, features a 6-inch Super T Series pump capable of passing a 3-inch spherical solid, and offers a soundproof lightweight aluminum enclosure. The enclosure has lockable door panels, and can be removed for maintenance of the pump or engine. The unit is a complete, ready for hookup, backup package for emergencies and power outages, primary pump repair and additional pumping capacity. **419/755-1011; www.grpumps.com.**

Valve compression riser

The **American Highway Products Water/Gas Valve Compression Riser** is used to reduce cost and streamline the adjusting of utilities to the new grade when paving a road. Its compression design ensures a pressed-in bearing fit when installed, which enables installation before paving the road. It is compressed during installation, and the residual stress holds the riser in place. They start at a 1/2-inch rise and go up in 1/8-inch increments. This method saves time and money adjusting the utilities to grade. **888/272-2397; www.ahp1.com.**

Flowmeter with electronic display

The **CLA-VAL Model X144 e-FlowMeter** with X145 Electronic Display is a vortex shedding insertion flowmeter designed to be retrofitted into a CLA-VAL Automatic Control Valve to capture accurate flow measurement data without the need to install an in-line metering device. It provides a simple means to gain access to the information necessary to more effectively manage a distribution system, communicating performance data needed to achieve water quality and delivery objectives. The device displays flow rate, pressure and valve position. The unit is also equipped with a totalizer. It is SCADA-compatible and has customizable units. **800/942-6326; www.cla-val.com.**

Hydrant and valve inspector

The **Hydrant and Valve Inspector** by Trimble from **AMERICAN Flow Control** puts hydrant and valve maintenance and record-keeping directly in the hands of the mobile workforce. A barcode scan of an AMERICAN Flow Control hydrant or gate valve provides its specifications and exact GPS location, giving technicians a solution to asset location and management. **800/326-8051; www.american-usa.com.**

Portable integrated label printer

The **MPS 150 T Print Station** from **Graphic Products** is designed to interface with the DuraLabel 9000 label and sign printer to create extra-large custom pipe marker labels without IT department and network security concerns. The 10-inch touch-screen monitor mounts on the side of the printer and comes loaded with OSHA-ANSI-compliant software. It is seated in an adjustable bracket for ergonomic efficiency and ease of use. Use the pointer stylus to navigate the touch screen or the optional keyboard with track pad to create and print labels and signs. It provides 300 dpi print resolution, and prints on 4- to 9-inch supply widths at 3 inches per second. **800/788-5572; www.graphicproducts.com.**

Portable ultrasonic flowmeter

The **PTFM 1.0** portable transit time flowmeter from **Greyline Instruments** is designed to accurately measure clean liquids like water, oils and chemicals. Setup through the handheld meter is fast with a user-friendly five-key menu system. The clamp-on transducers mount on plastic or metal pipes, and ultrasonic signals are injected through the pipe between the two sensors. It works on full pipes with diameters from 1/2 to 48 inches, and features a large backlit display, totalizer, 4-20mA output and a data logger with USB output. It operates for 24 hours on internal rechargeable batteries, and comes with a rugged, watertight carry case. **888/473-9546; www.greyline.com.**

Level sensor flowmeter

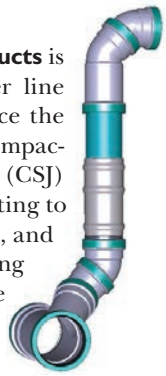
The **FL900 Series** flowmeter from **Hach Company** offers a selection of sensor technologies to accurately and efficiently solve any sewer flow monitoring challenge. It features level-only alarming and redundant-level functionality. In addition to the ultrasonic level sensor technology, radar, electromagnetic and acoustic Doppler velocity technologies are also available. The plug-and-play design allows for up to four sensor connections with auto-detection of sensor type, allowing users maximum flexibility. It is also available with Hach's Data Delivery Services (DDS) Program, which uses wireless loggers and sensors to provide real-time unedited flow data through FSDATA Web-based software. **800/368-2723; www.hachflow.com.**

Module and leak sensor

The **100W ERT** module from **Itron,** when deployed with an integrated Leak Sensor, monitors a utility's entire distribution system around the clock, acoustically surveying the integrity of the system to help find small leaks before they become large and costly. It offers full two-way communications to the meter and time-synchronized interval meter data. Its data collection technology provides utilities with flexibility, as leak detection data can be gathered using an AMI fixed network, mobile AMR, walk-by data collection or a hybrid solution, depending on what best fits the utility's business needs. It can be used as a stand-alone leak detection system unattached to a water meter in either AMI fixed network or AMR mobile environments. **352/239-0219; www.itron.com.**

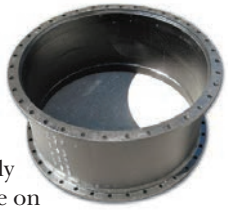
(continued)

Sewer risers



The **Vertical Riser System** from **Royal Building Products** is an integrated, multi-piece system that protects a sewer line installation from top to bottom. The system helps reduce the effect of static loads caused by construction traffic and compaction. A specially designed controlled settlement joint (CSJ) reduces sewer system exposure to soil settlement by adjusting to external forces exceeding 500 psi. The riser adapter, CSJ, and deep bell elbow all work together to help eliminate fitting breakage. In addition, the system also prevents pipe "spearing" due to over-insertion, and controls elbow issues caused by pipe pulling out. **800/232-5690; www.royalbuildingproducts.com.**

54-inch AWWA fitting



The 54-inch **MJ C-153 AWWA** fitting from **SIGMA Corp.** is unique, as standard sizes generally range from 2 to 48 inches. Increased demand for water service requires larger pipes, which in turn necessitates larger fittings. The fittings, which were previously available on a made-to-order basis, are now available on a move-to-order inventory system, in stock and ready to ship. It exceeds industry quality standards, and is hydrotested for quality assurance. **800/999-2550; www.sigmaco.com.**

Polymer mortar pipe

Centrifugally cast with computer-controlled precision, **HOBAS Pipe USA** fiberglass-reinforced, **polymer mortar (CCFRPM) pipe** is inherently corrosion-resistant and lasts 100 years or more. The pipe is ideal for virtually every installation method, including open cut, sliplining, jacking, microtunneling, two-pass tunnel, casing carrier and above-ground. It is available in sizes from 18 to 126 inches in pressure and non-pressure classes. The pipe has been tested and complies with NSF standard 61 for drinking water components. **800/856-7473; www.hobaspipe.com.**

Pipe fusion machine

The **McElroy Super 28** is a fusion machine for fusing 2-inch IPS to 8-inch DIPS polyethylene pipe. The machine features a diesel-powered, 28-fusion carriage on a TracStar 412/618 chassis. The configuration allows contractors to have a diesel-powered fusion machine on jobsites where gasoline is unavailable or not allowed. It can be ordered as a combination unit that allows fusion of branch saddles with a maximum base diameter of 9.63 inches onto any size pipe main. It comes standard with a facer, heater, insulated heater stand and lifting assembly. **918/836-8611; www.mcelroy.com/fusion.**

Rubber check valves

Proco Series 700 ProFlex rubber check valves help control back pressures from sewage treatment plants, outfalls and tidal operations. They are a fully passive device requiring no maintenance, outside power sources or manual assistance to operate. They can handle large obstructions without jamming or having swing gates binding open. They provide backflow protection from sewage slurries, outfalls to waterfronts from heavy rainfall, prevention from land erosion due to backflow conditions, and protection from saltwater to freshwater ponds and catch basins. **800/344-3246; www.procoproducts.com.**

Sound attenuated pump

Silent Knight sound-attenuated pumps from **Thompson Pump** feature canopy enclosures that lower noise levels by 20+ dBA to just 68 decibels or less from 7 meters and enclose the entire pump in a tamper-proof lockable case. They feature easily serviceable access areas, including doors that allow access to pump components for maintenance without disconnecting the suction piping, weather-resistant hardware, and insulation with moisture barriers. The noise-reducing canopy can conveniently be added to existing models in the field. **800/767-7310; www.thompsonpump.com.**

Strainer valve

The **ZS Strainer** from **Singer Valve** is designed to protect control valves and pipelines from foreign matter such as twigs, leaves and rocks that get caught in the flow and can cause blocks or equipment failure. It has a Z-plate design that provides a smooth laminar flow, which reduces downstream disturbance, making it ideal for locations ahead of automatic control valves. The corrosion-resistant 316 stainless steel screen allows for a large flow area and is easily removed due to the O-ring on top, which eliminates the need for a gasket when taking it apart. There are two body taps that allow for differential pressure measurement. It is available in 3-, 4-, 6- and 8-inch pipes sizes, 150-pound or 300-pound flanged. **604/594-5404; www.singervalve.com.**

Pipe supports

Pipe supports from **RELINER/Duran Inc.** are easily installed adjustable clamping pipe brackets made of non-corrosive 11-gauge 304 stainless. They securely attach pipes to manhole walls and other surfaces with no protruding hardware, and are fully adjustable to fit irregular surfaces. They attach to the drop bowl wall with 3/8-inch stainless steel bolts in non-corrosive shields. A wide range of clamp sizes 1.5 to 30 inches for SDR 35, Schedule 40, C900, CIOD, etc. are kept in stock. Other sizes are available. **800/508-6001; www.reliner.com.**

Portable valve exerciser

The **Model 70** from **Valve Boss** is a portable, one-person valve exerciser and operation machine that features a Honda 4-stroke engine and weighs 27 pounds. Applications include distribution valve exercising, wastewater sluice gate operation and stormwater/levee district valve operation. It also can be used as a powerhead for pipe-tapping equipment. **225/226-8668; www.valveboss.com.** ✦

Lining reduces lead leaching

Problem

Lead was leaching into drinking water systems in the City of Birmingham, Warwickshire, United Kingdom.

Solution

Morrison Utility Services, a leading U.K. utility service provider, used **ePIPE from ACE DuraFlo Systems** to coat 25 feet of 3/4-inch I.D. lead communication pipe running under a road, and lengths of 1/2-inch I.D. lead supply lines up to 35 feet. The process meets the U.K. Water Regulatory Advisory Scheme and Drinking Water Regulation 31 program. The epoxy is NSF-listed and IAPMO-approved for a two-hour return to service.

RESULT

The coating cured in the allotted time. After it was inspected, water service was restored. **800/359-6369; www.epipeinfo.com.**

Valve exercisers hitch to ATV

Problem

Exercising larger valves at the Clay Rural Water System in Wakonda, S.D., was a time-consuming chore for operators, as most valves were in ditches and fields. The city looked for a cost-effective, efficient alternative.

Solution

Hurco Technologies demonstrated hitch-mounted Spin Doctor valve exercisers in vertical and horizontal configurations with 800 ft-lbs of torque.

RESULT

Operators mounted both configurations of exercisers on the back of an ATV, enabling them to access valves effortlessly by reaching over fences and into tight spots. **800/888-1436; www.gethurco.com.**

PVC pipe maintains on-grade profile

Problem

During an upgrade of the Escambia County Utility Authority's wastewater collection system in Perdido Beach, Fla., conflicts between survey information for underground utility locations and actual alignments and depths made open-cut construction difficult and undesirable.

Solution

Gator Boring of Pensacola recommended horizontal directional drilling using **Fusible PVC pipe from Underground Solutions.** Working in sandy soils made maintaining the on-grade profile more challenging. "The pipe's strength and stiffness were key factors in maintaining grade," says Eric Lyons of Gator Boring.

RESULT

"Having a fused joint PVC sewer line minimizes the potential for infiltration, which is a significant benefit," says Ed Bowles, P.E., the owner's engineer. **858/679-9551; www.undergroundsolutions.com.**

Utility cuts water loss in half

Problem

In 2009, the New Braunfels (Texas) Utilities calculated its average water loss at 2,000 gallons per mile per day along 456 miles of pipeline.

Solution

The utility purchased **leak detection equipment from Fluid Conservation Systems, a division of Halma Water Management.** The Permalog leak noise data loggers attach magnetically to pipelines and use advanced algorithms to discern the acoustic signature of leaks from background noise. The SoundSens "i" correlating noise logger and TriCorr correlator analyze data from acoustic sensors to approximate the location of leaks. The Xmic electronic ground microphones amplify noise generated by water escaping from buried supply lines under pressure, allowing users to pinpoint the leaks.

RESULT

Workers exercised 750 valves per year and scanned the city for non-surfacing leaks. By 2011, the utility estimated it had reduced its average water loss to 961 gallons per mile per day. "We tested many products in the field and found FCS to have the highest level of reliability," says Trino Pedraza, operations and maintenance division manager. **800/531-5465; www.fluidconservation.com.**

Pipe stops stormwater infiltration

Problem

The Vallecitos Water District in San Marcos, Calif., needed to replace an undersized, failing 21-inch sewer interceptor to stop stormwater infiltration.

Solution

Principal district engineer James Gumpel, P.E., chose **Flowtite pipe** for its durability, low maintenance, availability and cost. The lightweight fiberglass-reinforced polymer pipe has a smooth internal surface immune to corrosion. It is available in diameters up to 156 inches and different nominal stiffnesses.

RESULT

The contractor air-tested the pipe, which passed. No deflection was encountered after backfilling the trench. **909/909-7174; www.flowtitepipe.com.** ✦

Holden Industries acquires Vector Technologies

Holden Industries, parent company of Vac-Con, acquired Vector Technologies. Based in Milwaukee, Vector designs and manufactures industrial vacuum cleaning systems for hazardous and non-hazardous material handling. Holden Industries is an employee-owned company based in Deerfield, Ill., with manufacturing facilities in Illinois, Wisconsin, Ohio, Florida, Texas, Georgia, Michigan, California and Arizona, as well as India and Taiwan.

Federal Signal opens rental, service center

Federal Signal Corp.'s Environmental Solutions Group opened an FS Solutions rental and service center in New Brunswick, N.J., as part of the company's expansion of FS Solutions locations and service offerings. The ninth rental and service center stocks high-performance parts and accessories for Federal Signal's Guzzler brand of vacuum trucks, Vactor vacuum excavators and Jetstream waterblasters.

APWA's Walsh elected National Homeland Security Consortium tri-chair

American Public Works Association (APWA) member Christine Walsh, director of operations for Beloit, Wis., was elected to a one-year term as tri-chair of the National Homeland Security Consortium for 2013. Walsh will serve as chair of the Emergency Management Committee and represent public works on the Federal Emergency Management Agency (FEMA) Education Task Force and the Homeland Security Task Force.

Jason Andringa

Doug Hundt

Tony Briggs

Vermeer names leadership team

Vermeer named Jason Andringa president of forage and environmental solutions, and Doug Hundt president of underground and specialty excavation solutions. Andringa and Hundt will co-chair the executive team. Tony Briggs was named vice president of sales and distribution.

Xylem expands dewatering services across Europe

Xylem is expanding its dewatering pump rentals across Europe for the construction, municipal, mining and industrial sectors. A rental branch roll-out is scheduled over the coming years, including refurbishment of existing premises, new locations and selective acquisitions.

SOR launches mobile website

SOR launched a fully optimized website, www.sorinc.com, that can be accessed with a smartphone or tablet.

ADS opens distribution yard in Ontario

Advanced Drainage Systems opened a product distribution site in Morrisburg, Ontario. ADS has 56 manufacturing plants and 28 stocking service yards worldwide.

USB - Sewer Equipment names sales manager

USB - Sewer Equipment Corp. named Leighton White sales manager for the West Coast. He has 23 years of sales, marketing and management experience within the sewer industry. White will be responsible for sales, service and customer support in California.

Xylem offers water removal, flood control app

A mobile app of the Xylem Dewatering Handbook from Xylem provides users with access to dewatering, water removal and flood control pump product information from the company's Flygt and Godwin brands. The app is available for download from the iTunes App Store. https://itunes.apple.com/app/xylem-dewatering/id582035365?mt=8.

Power Zone becomes employee-owned

Power Zone Equipment of Center, Colo., became an employee-owned company with its sale to the Power Zone Equipment Employee Stock Ownership Plan. The pump distributor was founded by Don and Trevor Toews in 1999.

HammerHead hires communications firm

HammerHead Trenchless Equipment named business-to-business public relations firm Ellenbecker Communications its agency of record for all product lines. Ellenbecker will assist HammerHead's marketing department with new product launches, press events, site and application stories for the trade press and other projects.

Rock Mills' The Lifter featured on *Today in America*

The Lifter manhole cover remover from Rock Mills Enterprises was featured on "Improving Efficiencies through Innovative Technologies" as part of the *Today in America* industry series television show. ✦

Product Spotlight

Wellpoint pump offers fuel economy, low noise operation

By Ed Wodalski

NPC PT-90 wellpoint pump from National Pump & Compressor

The NPC PT-90 wellpoint pump from National Pump & Compressor, available for rent or sale, has 6-inch connections, with a flow rating of 396 gpm and 65 feet of TDH.

Built for the rental market and designed for use in hard environments by operators with limited training, the self-priming pump has unrestricted dry-run capability and no sensitive electrical controls for reduced downtime, says Lee Ramer, East Coast sales manager for National Pump & Compressor. The pump creates a pulsating vacuum that enables it to remain in place for extended periods without clogging.

"The NPC PT-90 is a high-quality, low-cost-of-operation solution for groundwater control with a focus on wellpoint and sock drain applications," Ramer says. "This is especially important in applications where transmission lines and other underground structures, common in the municipal sewer and water industry, are being installed and/or repaired."

The pump has a 90-percent efficiency rating and requires no daily maintenance. Powered by a 1D81Z Hatz engine (500 to 1,500 hours between service checks) that consumes less than 0.4 gallons of fuel per hour, pumps are available in open diesel, stackable frame, compact or economy canopy models. Enclosed units emit 49 dBa at 30 feet, approximately the level of a standard refrigerator.

The low decibel rating allows the pump to be used in areas sensitive to environmental noise, including residential, retirement homes and hospitals. "Noise reduction also creates an environment that is safer to work in. For example, personnel can communicate easier and alert one another to dangers," Ramer says.

The pump is manufactured in The Netherlands and has a cast iron casing. Internal moving parts are made of bronze and stainless steel, enabling the pump to be used in applications with higher mineral content (salt and iron) without damage. It can handle solids such as small stones, sand and leaves, and is fully self-lubricating with no need for additional sumps. Fuel capacity ranges from 26 gallons (PT open diesel model) to 79 gallons (PT economy model). Stackable frame and bare shaft models weigh 1,798.8 pounds; the PT economy canopy model weighs 4,707 pounds.

Other features include double-wall fuel containment and small footprint (models range from 6.5 feet by 2.1 feet by 2.5 feet for the bare shaft and electric models to 8.9 feet by 2.6 feet by 3.5 feet for the open diesel unit). **888/840-5886; www.npcrents.com.**

Titan in-bed diesel fuel tank

The 60-gallon, polyethylene, in-bed diesel fuel tank from Titan Fuel Tanks fits most full-size pickups. Made to resist the corrosive properties of diesel, biodiesel fuels and additives, the 51-pound customizable tank is fully baffled to prevent load shifting. It can be secured using eye-nuts or the optional utility riser bracket, which allows up to 4 inches of clearance for under-tank storage. **800/728-4982; www.titanfueltanks.com.**

Opto 22 LED dimmer

The Network LED Dimmer from Opto 22 uses pulse width modification (PWM) to control LED brightness (0-100 percent) for 9-30 VDC constant voltage LED lighting assemblies, including lamps, bulbs, strips, ropes and bars. When connected to an RS-485 serial network, multiple dimmers can be integrated into a lighting, automation or building control system that supports DMX512-A, modbus/ASCII or Optomux network protocols. **800/321-6786; www.opto22.com.**

KROHNE Tantalum mass flowmeter

The Tantalum straight tube Coriolis mass flowmeter from KROHNE, a version of the Optimass 7300, measures highly aggressive or corrosive fluids that require glass-lined piping or glass-lined process vessels. Tantalum has a similar chemical resistance to glass and is typically used with chemicals such as hydrochloric, sulphuric, nitric and phosphoric acids or bromine and chlorine. The meter intelligently tunes itself, independent of external forces and fluid density. **800/356-9464; www.us.krohne.com.**

SOR electronic pressure switch

The 805QS electronic pressure switch from SOR, designed for hazardous locations and limited spaces, offers supplemental continuous output (4-20mA or 1-5VDC). Switch set points and supplemental continuous output zero and span points are field-adjustable via the optional calibration kit. **800/676-6794; www.sorinc.com.**

Severn Trent UV disinfection system

The MicroDynamics Series OCS721 microwave-operated, open channel, ultraviolet disinfection system for municipal wastewater and water reuse from Severn Trent Services features long lamp life and a small footprint. Modules are National Water Research-validated for water reuse, and can be placed side by side in channels for design flexibility. **866/646-9201; www.severntrentservices.com.**

Vermeer pneumatic hole hammer

The Hole Hammer pneumatic piercing tool from Vermeer can operate in a range of soil conditions and applications. The moving-head design provides full striking force of the piston to the head of the tool. Residual energy generated helps the tool body travel through the compacted bore path. A mechanical reset for the head assembly ensures each blow compacts soil in front of the tool for increased production and accuracy. The ribbed body provides additional tool grip in loose soils. The piercing tool is available in 2-, 2 1/2- and 3-inch sizes. **888/837-6337; www.vermeer.com.**

Denso air cartridge gun

The Protal air cartridge gun from Denso North America sprays 1,000 mL cartridges and is designed for easy setup and minimal material waste and maintenance. The gun includes a swivel handle and optional shoulder strap. **888/821-2300; www.densona.com.** ✦

MUNICIPAL SEWER & WATER

Marketplace Advertising

WORTH NOTING

PEOPLE/AWARDS

Longwood Gardens received both the Diamond Award Certificate in the Water and Stormwater category from the American Council of Engineering Companies' Pennsylvania Chapter and an Honorable Mention as an Outstanding Project by the Philadelphia Chapter of the PA Society of Professional Engineers.

Warren County, Ky., announced the following commercial site recipients of its 2012 Stormwater Stewardship Awards:

- Project: **South State Contractors**
- Owner: **South State Contractors**
- Contractor: **Holland Inc.**
- Plan Preparer: **Anderson Engineering**

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

LEARNING OPPORTUNITIES

American Public Works Association

The APWA has a Modifying Operations and Facilities to Accommodate AFVs audio/Web broadcast on May 16. Visit www.apwa.net.

American Water Works Association

The AWWA has these courses:

- May 8-9 – Inspection and Assessment of Dams, Seattle
- Sept. 8-12 – Dam Safety 2013, Providence, R.I.

Visit www.awwa.org.

Water Environment Federation

The WEF has a Collection Systems: Optimize System Operations webcast on June 19. Visit www.wef.org.

Wisconsin

The Wisconsin Department of Natural Resources has these courses:

- May 7-9 – Pumps and Motors, Madison
- May 14-15 – Advanced Asset Management Practices for Water and Wastewater Utilities, Madison

Visit http://dnr.wi.gov.

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

- May 1-3 – Using HEC-HMS to Model Watersheds, Madison
- May 6-8 – Using HEC-RAS to Model Bridges, Culverts and Floodplains, Madison
- Oct. 14-15 – Using WinSLAMM v. 10: Meeting Urban Stormwater Goals P010, Madison

Visit http://epdweb.engr.wisc.edu. ✦

CALENDAR

May 13-15
American Public Works Association Sustainability in Public Works Conference, San Diego Sheraton Hotel & Marina, San Diego. Call 800/848-2972 or visit www.apwa.net.

May 19-23
World Environmental and Water Resources Congress: Showcasing the Future, Duke Energy Convention Center, Cincinnati, Ohio. Visit www.asce.org.

June 9-12
Water Environment Federation Collection Systems 2013: Gold Nuggets of Knowledge, Sacramento Convention Center, Sacramento, Calif. Call 703/684-2441 or visit www.wef.org.

June 9-13
American Water Works Association Annual Conference and Exposition (ACE 13), Denver. Visit www.awwa.org.

June 12
American Public Works Association-Washington State Chapter Northwest FOG Forum, Greater Tacoma Convention & Trade Center, Tacoma, Wash. Visit www.apwa-wa.org/chapter.

July 21-24
American Society of Agricultural and Biological Engineers, Kansas City, Mo. Visit www.asabe.org.

Aug. 18-22
StormCon: North American Surface Water Quality Conference and Exposition, Myrtle Beach Convention Center, Myrtle Beach, S.C. Visit www.stormcon.com.

Aug. 25-28
American Public Works Association International Public Works Congress & Exposition, McCormick Place, Chicago. Call 816/595-5241 or visit www.apwa.net.

MSW invites your national, state or local association to post notices and news items in this column. Send contributions to editor@mswmag.com.

classifieds

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POSITIONS AVAILABLE

SALES POSITION: Manufacturer of high-end sewer nozzles seeks representative for Eastern region. Easy to sell with good demo. Salary plus commission, vehicle, etc. Send resume to resume@nozzteq.com or call 866-620-5915. (CM05)

GapVax, Inc., a nationally recognized manufacturing business, is seeking a talented, highly motivated individual to fill a full-time Sales Position in the Midwest (Iowa based preferred) region. GapVax is the leading manufacturer of industrial and municipal vacuum units and hydro-excavation units in the United States. We provide the most reliable, comprehensive, and efficient mobile vacuum units in the industrial and municipal markets. Specifications of the position are listed on our website, www.gapvax.com, click on the Now Hiring link in the left hand column. Send resumes to Lthomas@gapvax.com or 575 Central Avenue, Johnstown, PA 15902. (CPMGBM)

POSITIONS AVAILABLE

Management Opportunity: American Residential Services/Rescue Rooter is looking to add General Managers in our locations in the Western U.S. and 16 other states. General Managers assume full operational responsibility for the profit and loss activities for the location they are assigned. Applicants must have a proven track record of successfully developing a solid performing team in both technical and sales areas. Applicants must have experience in preparing business forecasts, budgeting, recruiting processes, as well as identifying business trends and prospective problem areas and taking immediate action based on findings. Plumbing and drain cleaning experience a plus. ARS offers a competitive salary with bonus potential, benefit packages, 401(k), company paid life insurance, relocation available for the right candidate. ARS is an Equal Opportunity Employer. Send resumes to jshinn@ars.com. (C05)

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TV INSPECTION

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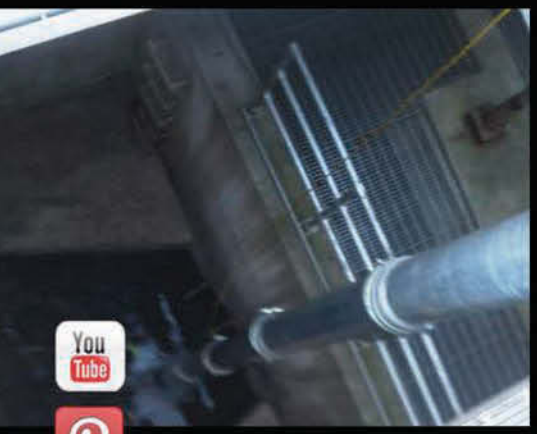

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