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Aldo Licitra
NPDES manager
Temecula, Calif.



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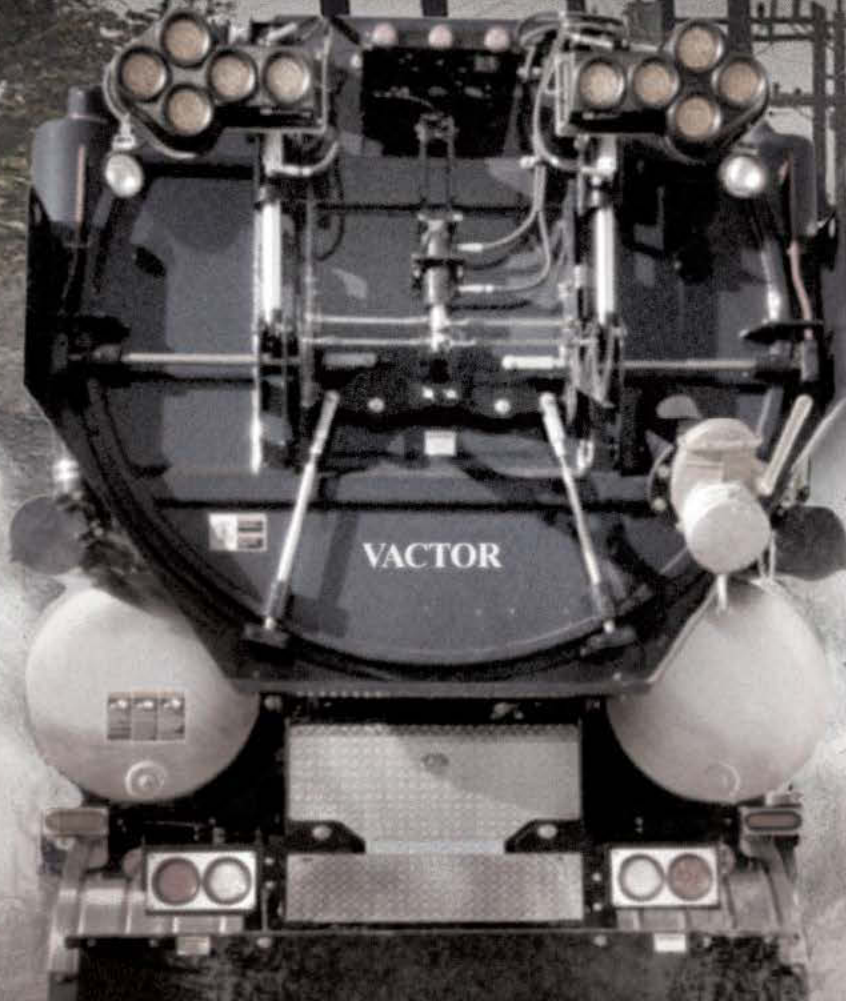
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INSIDE:

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COVER:
The City of Temecula, Calif., had no formal NPDES program until it hired Aldo Licitra in 2003. Licitra has since gained support from developers and the business community in limiting polluted runoff that was impacting the Santa Margarita Watershed. (Photography by Bill Wechter)



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LESSONS IN LEADERSHIP

In honing leadership skills, it pays to take advice and inspiration wherever you can find it. That includes looking to the military.

Most of us know the term “oxymoron.” It’s essentially a phrase that seems self-contradictory. One common example is “military intelligence.” This month’s “Human Side” column gives lie to that characterization. It describes a format the military uses for giving complete and crystal clear orders. When it comes to leading a team and directing projects, what is more important than communicating to all the right people exactly what must be done?

When leaders struggle

The plain fact is that the military, all criti-

cism aside, has developed excellent methods for training and developing leaders — officers. Leadership is, to say the least, important for an organization whose job is to put warfighters and high-dollar equipment on the line in battles with incredibly high stakes.

Now, hierarchy and command-control approach that is essential in the military doesn’t translate very well to civilian workplaces. The streets are littered with the bleached bones of managers who tried the “my way or the highway” style of leadership. But that doesn’t mean civilian organizations can’t learn anything from the military.

Look at the five-part order format described in the column and ask yourself if following it, or something similar, could be helpful for a manager in almost any setting.

I know from experience how hard it can be to lead effectively. Many of us get promoted into leadership by virtue of being excellent performers. But we soon discover that being a leader takes entirely different skills than being a technician. And without proper training, we’ll flounder. And the result is that our department’s performance — and probably our service to customers, will suffer.

On the front lines

For an example, look to almost any



FROM THE EDITOR

Ted J. Rulseh

retail setting you can think of. The fast-food restaurant that served you a chicken sandwich still raw on the inside, the excessive lines at the grocery store checkout, the hardware clerk who sold you exactly the wrong part to fix your kitchen faucet — all these are as likely to be failures of leadership and training as mistakes or negligence by the front-line people.

Many aspects of leadership are challenging — dealing with individual workers’ peculiarities, knowing how to inspire people to unite behind an initiative, giving feedback, fostering teamwork, determining compensation. But one of the most essential requirements of leadership is giving orders or, to put it more delicately, direction.

Finding the line

There’s often a fine line between giving too much direction (being a control freak or a micro-manager) and giving too little. One of my failings as a manager was buying a little too deeply into the idea that a leader should simply tell what must be done and let the subordinate decide how. That works fine when the subordinates are well experienced, but in my case they were not, and they needed more direction than I was giving.

Something like the five-part order format might have been useful for me to know. In all likelihood it would not be appropriate to follow in certain situations, but it could be a useful tool for a manager to have in his or her kit.

The point here is that where leadership skills are concerned, it pays to look for advice and help in multiple places, and the military easily can be one of them. Consider giving the “Human Side” article a good read, and giving the military order format a test spin on a project. It looks like a clear and simple way to get and keep a project on track, especially one — like many municipal and utility projects — that has a lot of moving parts. ♦

Comments on this column or about any article in this publication may be directed to editor Ted J. Rulseh, 877/953-3301; editor@mswmag.com.

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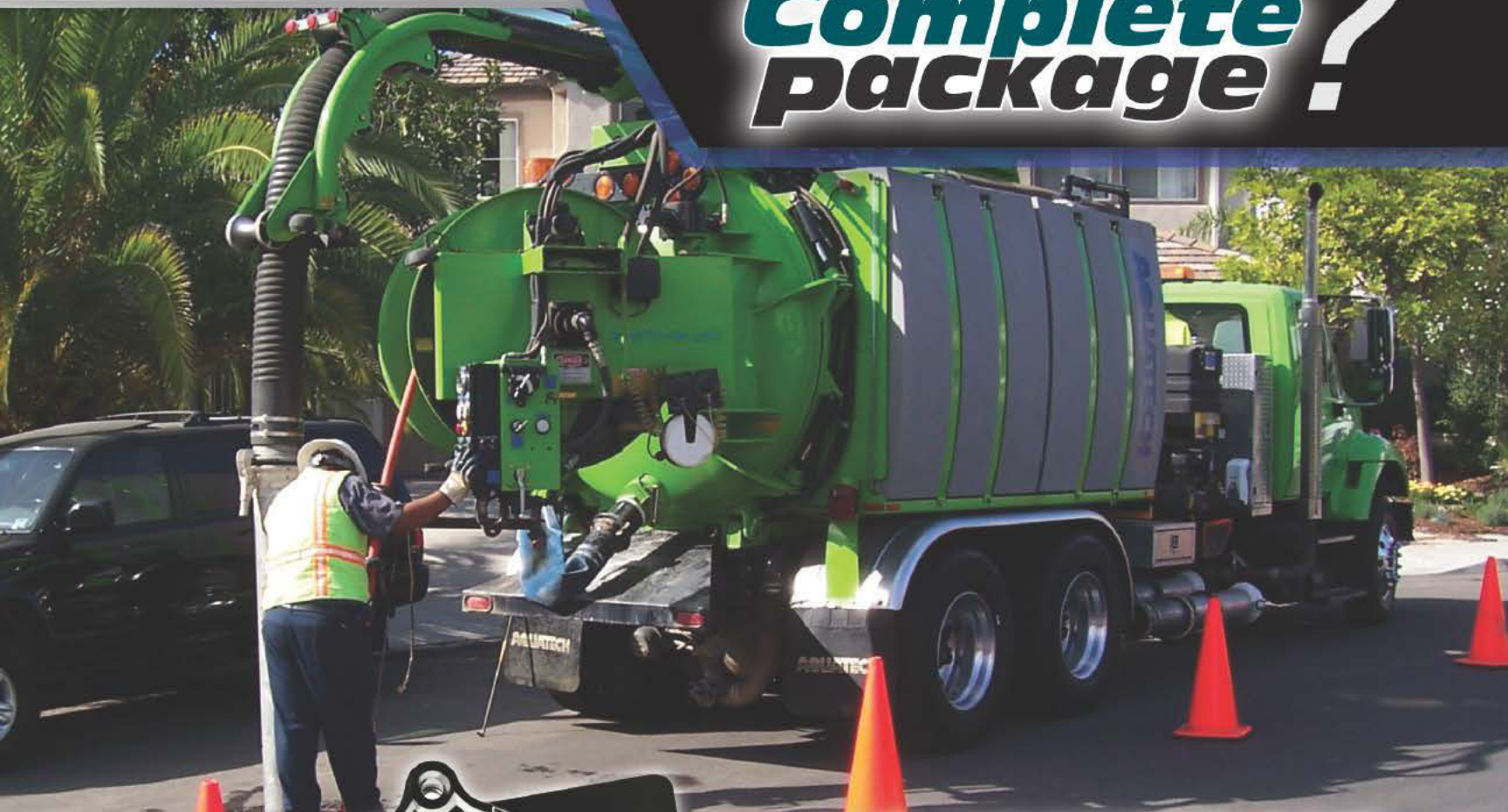
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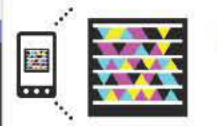
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City of Sierra Vista CCTV operator Brandon Pascual monitors a video inspection from the CUES camera van. (Photography by John Buono)

FOCUS: SEWER

POWER OF PERSUASION

Technically sound programs and gentle persistence helped Sierra Vista pretreatment coordinator Hector Hagele get FOG under control

By *Scottie Dayton*

Cleaning fat, oil, and grease blockages from sewers in Sierra Vista, Ariz., was an unending nightmare for Hector Hagele. He swore that if he ever had the chance to change how food establishments handled FOG, he would pursue it.

Hagele got his wish when the city built its Environmental Operations Park in 2002. The facility includes a 10-acre automated wastewater treatment plant that handles 4 mgd without chemical or mechanical means. FOG in the all-natural process would lower pH and affect the microorganisms, so engineers limited it to 25 mg/l at the headworks — the strictest requirement in the state.

Hagele, now a Grade 3 water and wastewater operator, also completed the Pretreatment Facility Inspection Program from California State University, Sacramento. That background, communication skills, and rapport led to his becoming the city's pretreatment coordinator.

Hagele went restaurant to restaurant, educating owners about the effects of FOG. He developed relationships with Community Development and Engineering. He also established standards and construction guides for grease interceptors and directions on how pumpers should clean them. Restaurant owners and managers vilified him, but Hagele persevered, driving home the point that busi-

nesses generating waste products should be responsible for them.

Four years passed before the pretreatment program produced results. Today, hot spots are down from 17 to five, and only one is grease related. Overflows have been reduced from 12 to one per year. In 2007, the Arizona Water and Pollution Control Association named Hagele the Wastewater Pretreatment Operator of the Year.

Voyage of discovery

Before 2002, monsoons scoured the sewers, delivering huge chunks of grease to the headworks. One 7-foot-tall mound went through the bar screen, bent the chain and motor, and broke the screen. Vibrations from the impact moved the



PROFILE:

City of Sierra Vista (Ariz.) Department of Public Works, Pretreatment Program

CUSTOMERS SERVED:
46,600

SERVICE AREA:
130 square miles

INFRASTRUCTURE:
200 miles of sewer mains,
3,500 manholes

ANNUAL BUDGET:
\$2.4 million (wastewater)

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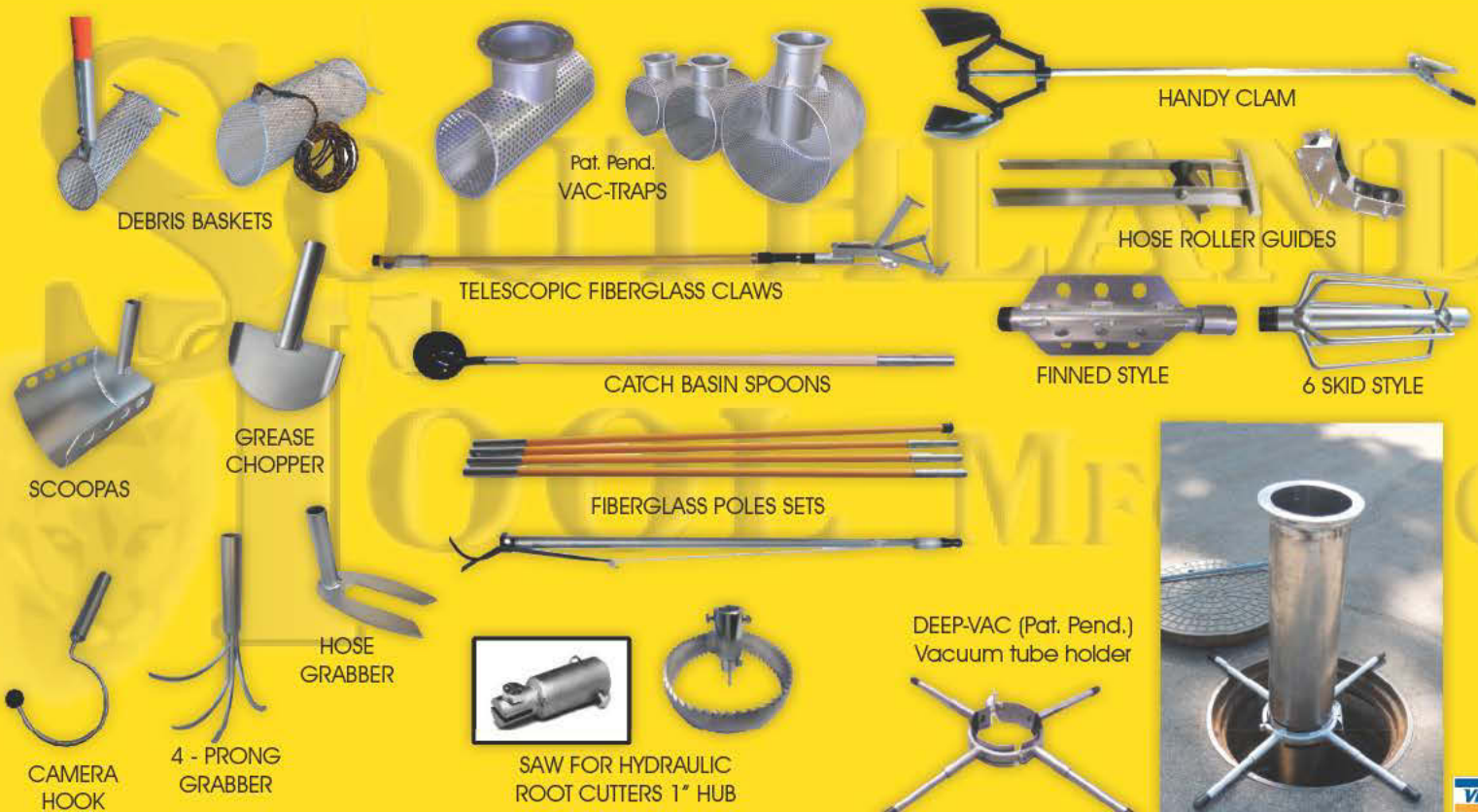


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Pretreatment coordinator Hector Hagele displays FOG samples that have been processed by the SPE-DEX 1000XL system from Horizon Technology.



Jet rodder assistants Dan Lewis, left, and David Martinez assemble tubing on the Vector truck for cleaning a section of sewer line.

dump container to one side.

“People fight change, especially if it affects profit margins,” says Hagele. “But if you stay strong and true to your objective and overcome that fight, change will work. As proof, we haven’t had a problem at the headworks since 2007.”

Hagele began by visiting every

“FOG is a bigger problem than most people realize.

For example, soups have lots of fat, yet even my department thought only about fried foods.

Broadening that mindset was one key to success.”

Hector Hagele

business that could jeopardize the eight treatment lagoons. He stressed the proper way to dispose of waste and promoted a spirit of cooperation. “If you succeed, we succeed,” he told them, “and we will work with you to achieve that goal.”

Most food establishments didn’t even know what a grease trap was, or the difference between a trap and interceptor. “A grease trap is measured in pounds and an interceptor in gallons,” says Hagele. “A standard 40-pound grease trap holds 20 gallons. That’s too small to do any good.”

Hidden problems

The 2002 city standard specified that food establishments have a 1,500-gallon three-compartment grease interceptor with 5-gallon stand-alone sample box. When

Hagele enforced the rule, managers went through the roof. One sandwich shop owner insisted that installing an interceptor was unnecessary because no food was cooked — and yet his grease trap was full.

Hagele tracked down the culprits — squeeze containers for ketchup, mayonnaise, and salad dressings. A health department rule prevents workers from topping off bottles, so they rinsed some 20 containers five to 20 times per day. “That’s a lot of FOG going down the drain,” says Hagele.

Even after the owner installed the interceptor, FOG samples averaged 360 mg/l. Hagele used the city’s SPE-DEX 1000XL extractor designed for [EPA] method 1664A from Horizon Technology to analyze samples. The manager solved the problem by putting baby bottle liners in the containers. When they are nearly empty, workers toss the liners in the trash.

“FOG is a bigger problem than most people realize,” says Hagele. “For example, soups have lots of fat, yet even my department thought only about fried foods. Broadening that mindset was one key to success.”

Dig in, stand firm

Another key was insisting on quality materials. Some concrete interceptors delivered to the city leaked, undermining the soil and causing larger leaks. In one case, the material was so porous that the tank burst under pressure. Another arrived green. Others had two compartments with provi-

STAYING ON THE CASE

FOG control is just one facet of the Sierra Vista pretreatment program. Besides inspecting food establishments, pretreatment coordinator Hector Hagele inspects medical and dental facilities, print and auto shops, dry cleaners, and senior home care facilities for hazardous materials that could enter the sewers.

When he discovered the home care facilities flushing pharmaceuticals down toilets, he required them to contract a disposal service and keep a maintenance log. Hagele told dental technicians pouring X-ray fixative down drains the same thing. He then returned monthly to check documentation. He also inspected oil separators in automotive shops to keep hydrocarbons from reaching wastewater treatment lagoons.

“At first, many companies didn’t fill out the maintenance logs because they thought my visit was a one-time thing,” says Hagele. “That’s where most cities fail. They don’t have an individual making sure what is supposed to happen does, and that requires one-on-one interaction with business owners.”

Hagele’s annual Day-After-Thanksgiving Grease Recycling Event is another facet of the pretreatment program. His team erects a tent in the Sierra Vista Mall, and a Tucson grease recycling company collects the peanut oil used for frying turkeys.

He also established three dropoff locations for homeowners to bring grease and oils throughout the year. Companies making biodiesel fuel collect it. “The community thinks these are great programs, because otherwise the oil would probably end up in landfills,” says Hagele.

(continued)

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Pretreatment coordinator Hector Hagele, left, with CCTV assistant Angelo Valdez, center, and jet rodder assistant Dan Lewis.

sions for a slide-in baffle.

Hagele asked Bob Camp, building administrator, to conduct 24-hour leak tests on the tanks. "This is one example of how the relationships I built with Public Works and City Hall proved invaluable," he says. "My request was an extra headache for Bob, but he saw its value and agreed."

Rejecting inadequate tanks and establishing construction standards had the desired effect. "The ones we receive now look like works of art," says Hagele. "And business owners are assured of purchasing high-quality tanks."

He then placed the burden of sizing grease interceptors on the city's mechanical engineers. If the tanks failed the FOG limit, which Hagele increased to an achievable 100 mg/l, those engineers had to rectify the problem. They began calling Community Development and were referred to Hagele. He explained the sizing process and the importance of going larger rather than smaller.

"We hadn't communicated with mechanical engineers before, and opening that channel was crucial," says Hagele. "For instance, they allowed one woman to put a bakery in a strip mall without installing a grease interceptor."

"I didn't see the zoning inspection until after the business opened. When I told the owner that she needed a grease trap to stay in business, she was beside herself, having spent all her money on equipment. This never would have



ance. "The teamwork between divisions has improved food service compliance from 10 percent when the program began to 85 percent," he says.

Squeaky clean

Hagele's biggest challenge was

was only half the equation. Getting them clean was Hagele's next challenge. He followed pumpers to learn what they did and saw that some cleaned a 3,000-gallon interceptor in as little as 15 minutes. After they left, he opened the tank. "They had pumped the

to clean a full tank the first time," says Hagele. "From then on, maintenance is simple." When pumpers responded to the callback, managers made sure they pumped the water, then pressure washed or scraped the tank walls.

The experience made Hagele more aware of maintenance logs. If they showed recent cleanings, he opened the tanks for managers. Often, the compartments were full. "I explained that FOG left for long periods lowers pH, and acidic water will erode concrete interceptors in time," he says. "They all became very attentive to the pumpers' work, but the key was having someone inspect on a regular basis."

Persuasive tools

Hagele has yet to fine or close non-compliant businesses — instead, he uses persistence and various

"I don't know where this program would be without the cooperation of city engineers, Community Development, sewer televising and cleaning crews, and other agencies."

Hector Hagele

happened had the engineer called me. Potential businesses need to know the facts from the moment they apply for the license."

Communication with Community Development was another key as it enabled Hagele to examine permits, meet with new business owners, and explain pretreatment requirements. He also reviewed zoning inspections for compli-

strip mall owners renting space without grease interceptors to food establishments. "No business will install a \$20,000 interceptor in a rented building," he says. "We told property owners not to rent to anyone unwilling to install an interceptor. They didn't like that, so most landlords now split the cost with the lessees."

Installing grease interceptors

sample box and removed the top layer of solidified grease, but left the greasy water," he says.

Hagele showed such tanks to restaurant managers. He explained that the walls were thick with grease, which diminished the tank's capacity, caused samples to exceed FOG limits, and increased the frequency of pumpouts. "It should take one-and-a-half hours



Angelo Valdez lowers the CUES camera into a manhole for inspection.

WATCH THEM IN ACTION
 To learn more about the Sierra Vista Department of Public Works, view the video at www.mswmag.com

persuasive tools to sway attitudes. Besides drawing monthly samples, he works with collections system crews to televise sewers downstream of resistant establishments using a CUES camera van and OZII pan-and-tilt camera on an Ultra Shorty 21 transporter. After creating a history on the pipe, he shows it to owners.

He suggests that if a stoppage occurred and properties were inundated, his documentation would stand up in court. "Reason with them like that and they'll come around," he says. "But it took four years of pulling samples and televising to see results."

To educate the constantly changing restaurant personnel, Hagele created a slide presentation dra-

matizing what happens when FOG goes down the drain. Images show laterals and mains coated with it. Hagele equates FOG to cholesterol in arteries. His next image of a 100 percent blocked pipe is followed by a contractor saw-cutting a floor to remove a clog that overwhelmed a jet rodder. "They learn that our program protects infrastructure, property, and our wastewater facility process," he says.

Hagele discovered another FOG source when he watched staff cleaning greasy kitchen mats in restaurant parking lots instead of in mop sinks. The detergents and hot water eroded the asphalt and ran into storm drains. Hagele speci-

fied that food establishments install 50-square-foot outside curbed wash-down areas plumbed to the grease interceptor. "Once owners realized that they didn't have to resurface the asphalt again, they accepted the idea," he says.

Getting it right

While working with restaurants on FOG control, the city inspected and cleaned its 200 miles of sewer every year with a Vactor 2100 combination truck with 18-cubic-yard debris tank, dual-action water pump delivering 60 gpm/2,500 psi, and 1,000-gallon water tank with heat exchanger. Crews use a Warthog nozzle from StoneAge to remove grease and a floor cleaner with eight jets from KEG Technologies to clean debris in the inverts. But until the pretreatment program took root, they never caught up with the incoming FOG.

"It takes manpower and time to jet and vacuum grease, then dump it at our drying beds," says Hagele. "By requiring properly sized and maintained grease interceptors, the FOG is gone and we clean the lines quicker and better.

"I don't know where this program would be without the cooperation of city engineers, Community Development, sewer televising and cleaning crews, and other agencies. Their expertise made it possible to establish ordinances and standards that enabled us to get it right from the beginning." ♦

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Working well under pressure



Social media is a source of news and information during the Pumper & Cleaner Environmental Expo.

any message shows you all other tweets in that category.

Similarly on Facebook and LinkedIn, you can announce your company's attendance at the Expo as well as any related news and events. You'll also want to keep an eye on Facebook to see what's being posted at www.facebook.com/MSWmag and www.facebook.com/pumpershow, and share thoughts and impressions about the show.

COLE Publishing, which creates this magazine and organizes the Expo, will have a mobile site for attendees to use at the event. The site will feature a searchable

While at the Expo, you can send out real-time updates of what's going on all around you using Facebook or Twitter. You can also use YouTube to stream videos and Flickr to upload photos.

Another use for technology on the Expo floor could guarantee you get the "show discount" on a purchase. Suppose you see a product you like, but need authorization to buy it. Now you don't have to wait to discuss it after you get home. Simply snap some photos and email them to the boss. If he or she doesn't understand how the item works, make a video of the sales representative demonstrating it.

I spy ... QR codes

While walking around the Expo, you may see QR codes on printed materials in some exhibitors' booths. QR stands for "Quick Response" and refers to those black and white squares that are really a two-dimensional barcode readable by a variety of devices including smartphones.

The amount of information that can be contained in a QR code is about 4,300 characters. That's enough for a business professional to include contact information and some personal background or product information, which is more than will fit on a standard business card.

Newer smartphones come with QR code readers installed. If your phone doesn't have one installed, try Google Goggles or on an iPhone, the App Store to download a free reader.

Once you have the QR code reader installed, simply activate the application and take a quick snapshot of the data label with your camera.

If you'd like to use a QR code on your own company materials, the technology for creating them is usually free. There are also dozens of Web services that will create them for you.

A NEW WAY TO TRADE SHOW

Technology and social media will help you make the most of the Pumper & Cleaner Environmental Expo

By Judy Kneiszal

Not long ago, all a trade show attendee needed to make the most of the event was a stack of business cards and a comfortable pair of shoes. But look around the 2012 Pumper & Cleaner Environmental Expo International and you'll see organizers, attendees and exhibitors armed with smartphones, tablets, notebook computers or laptops. They will be texting, tweeting, emailing, blogging, photographing and recording video. At the end of each day, complaints of tired, aching feet may be accompanied by complaints of tired, aching thumbs.

Like it is the other 51 weeks of the year, social media is a source of news and information during the Expo. But, during Expo week when so much is happening in one

place at one time, social media can be even more crucial to your business communications. While attending the Expo, Feb. 27-March 1 at the Indiana Convention Center in Indianapolis, you can use social media both to keep track of what is happening at the show and to share information with others at the show and back home.

Social media at the Expo

If you are on Twitter, search for comments about the Expo using hashtags and also use them in your own tweets so other people interested in the show can find them. The hashtag symbol (#) used before relevant keywords in a tweet categorizes the tweet to show more easily in Twitter search. Clicking on a hashtagged word in

list of exhibitors and booths, a general schedule, and a more detailed educational schedule. Check out the mobile site at <http://m.pumpershow.com>.

One thing you don't want to do is waste time at the Expo, so make sure your team has Internet-ready smartphones or tablets set up with the right applications for social media use. Be sure to bring chargers to power up devices at night and have a large enough memory card if you are going to take a lot of pictures or video.

In general, using social media at a trade show is easiest on a mobile device. A laptop computer can be inconvenient and cumbersome to carry around on the floor, but handy when you want to download photos off your phone at the end of the day.

There are plenty of places a QR code can be used, especially at a trade show. Try putting a code that contains all your contact information on your business card and then attach it to your show badge so people you meet can simply scan your card. If you want to be more memorable, have the QR code put on a baseball cap and ask people to scan you!

Suppose you see a product you like, but need authorization to buy it. Now you don't have to wait to discuss it after you get home. Simply snap some photos and email them to the boss. If he or she doesn't understand how the item works, make a video of the sales representative demonstrating it.

You can also put a QR code on flyers, brochures and other print collateral. That way, people have the option of scanning or taking these items with them. Those who

are more technology oriented will appreciate you lightening their load. You may find after the show you've distributed fewer business cards, but made more contacts. And having your contact information scanned to someone's phone makes it much less likely to get lost.

The party isn't over

When the show is over and you're back at the office, don't assume your Expo social media efforts are over. Follow up with the leads you generated by connecting with them on LinkedIn or sending follow-up notes via email. Upload more media and recap the event for those who couldn't make it this year.

And then ... begin planning your social media strategy for next year's Expo. Did you observe other attendees using technology and social media applications in ways you hadn't thought of but would like to try? Could some of the things you tried have been done more effectively or efficiently? You've got a year to gear up for next year's Expo! ♦

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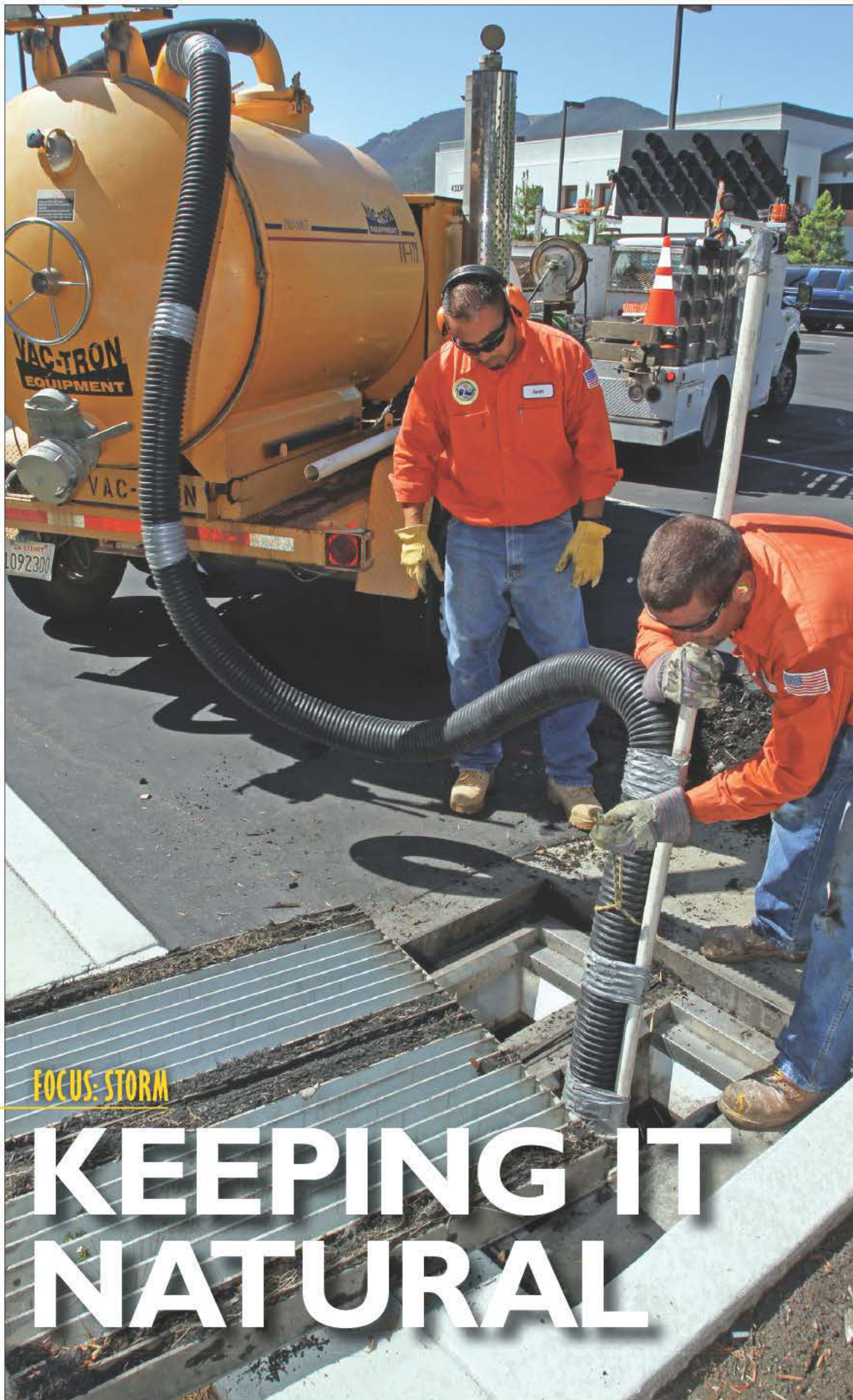




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FOCUS: STORM

KEEPING IT NATURAL

A collaborative approach helps a Southern California city get buy-in from developers and the business community for strict stormwater rules

By *Scottie Dayton*

Situated at the confluence of the Santa Margarita River with Murrieta and Temecula Creeks, the City of Temecula, Calif., acts like a catch basin. Any polluted runoff upstream eventually enters the city, then the river.

The area gets no snowmelt, and rainfall averages 12 inches a year, mostly from January through March. So developers typically paid little attention to construction runoff and over-irrigation.

Although the city abided by its MS4 permit requirements, it had no formal NPDES program until it hired Aldo Licitra in 2003. As an associate engineer in the Public Works Department, his job was to expand everyone's knowledge of the regulations, then enforce them.

At first, Licitra faced stiff resistance from developers and contractors. He also struggled with natural legacy pollutants that tainted the city's reputation with the San Diego Regional Water Quality Control Board.

Licitra walks a tightrope between appeasing developers and protecting the environment. The Santa Margarita River is one of the last

City of Temecula Public Works employees David Davis, right, and Juan Jaime use a Vac-Tron truck to clean out a storm drain with catch basin filters in the parking lot of a commercial building. (Photography by Bill Wechter)



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BELOW: A cistern is a central collection system for final filtration of stormwater before it enters a natural drainage channel. **RIGHT:** The City of Temecula Water Quality Team includes, from left, public works inspector Matt Beile, NPDES engineer Aldo Licitra and senior public works inspector Rudy Shabec. Silt fencing and spillways at a residential construction site can be seen in the background.



free-flowing rivers in Southern California and is mostly pristine. In 2003, the NPDES budget was \$365,000. When the new MS4 permit came out in November 2010, the budget rose to \$900,000. Overcoming the burden placed on the general fund and taxpayers is the city's next challenge.

End of the line

Temecula, in southwest Riverside County, lies 60 miles north of San Diego, between the upper and lower regions of the 740-square-mile Santa Margarita Watershed. "Everything from the upper watershed runs through our city, and that led the regional board to identify us as the nearest jurisdic-

tion when it identifies pollutants downstream," says Licitra. "But it isn't always ours."

The city incorporated in 1989, but explaining its 30-square-mile boundary to the regional board remains a challenge. "They believe that Temecula Valley and the wineries belong to us instead of the county," Licitra says. "Consequently, we've been held responsible for most of the nutrients coming off those properties."

The area's 18 wineries constitute the most important winemaking region in Southern California. Licitra visited some of them in 2003 to check for illegal discharges and found that most owners knew about water-quality issues and had

some mitigation measures in place to capture runoff.

Nevertheless, the board claimed the city had a major agricultural problem because laboratory analysis of creek sediment showed phosphorus and nitrogen. "We have no agriculture," says Licitra. "Those pollutants are from decades of agricultural runoff."

Nutrient levels rose from 2000 to 2007, when the city boomed with the construction of master-planned communities, large commercial centers, light industrial parks, medical office buildings, and homes. To attract buyers, developers over-irrigated lush lawns and flower gardens. As urbanization continued, landscape runoff ended up

in Murrieta and Temecula Creeks, which are dry nine to 10 months per year.

Licitra hit the pavement with his stormwater campaign. "People appreciate the quality of life here and the



PROFILE:
City of Temecula
(Calif.) Department
of Public Works,
NPDES Program

CUSTOMERS SERVED:
105,000

SERVICE AREA:
30 square miles

EMPLOYEES:
157

ANNUAL RAINFALL:
12 inches

INFRASTRUCTURE:
70 miles of storm drains,
1,650 catch basins

ANNUAL BUDGET:
\$900,000 (stormwater)

WEBSITE:
www.cityoftemecula.org

CAUGHT RED-HANDED

Most residents of Temecula are environmentally conscious and report poor neighborhood housekeeping practices to Aldo Licitra, head of the NPDES/water-quality program. Licitra or NPDES inspectors respond immediately, issuing citations for blatant illegal discharges and requiring mitigation of downstream damage.

"We've issued quite a few citations throughout the residential and business communities, and the word travels," he says. "Once people realized the city had this dedicated program and inspectors to enforce it, they complied." He recalls a resident who embraced the old axiom: "The solution to pollution is dilution." A neighbor reported him for dumping blue dye powder into a gutter. Inspectors arrived in time to keep him from hosing the evidence down the drain.

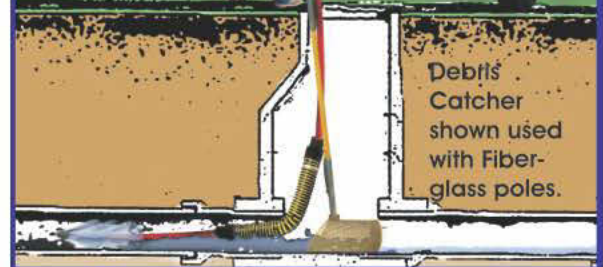
"Adding water to a small amount of pollution only makes it a bigger problem," Licitra says. "While labels may state the product is nontoxic, phosphorus free, and environmentally friendly, that refers to human contact with it. Dyes eventually cloud water and end up killing fish."

Inspectors educated the homeowner, wrote a citation, and required him to clean up the dye with a broom and flathead shovel as far as it had traveled down the gutter.

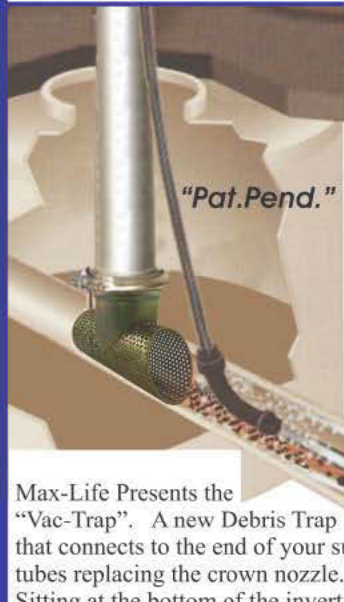
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Debris Catcher shown used with Fiberglass poles.



"Pat. Pend."

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Grit Catcher for use with Poles

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"Pat. Pend."



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beauty around them,” he says. “They don’t want to spoil it. Most changed their habits when informed about the consequences of their actions.”

Teamwork

To carry out NPDES requirements more effectively, the county, the city, and 26 other municipalities agreed that the Riverside County Flood Control and Water Conservation District would be the principal permittee, and they would be co-permittees.

Because Riverside County was one of the last to go through the MS4 permit process, the district adapted stormwater education materials from other counties further along in the process. To ensure consistent in-house training, the district and co-permittees hired engineering firm AEI-CASC Consulting to teach NPDES compliance seminars.

“We wanted staff from all the cities to be on par with each other,” says Licitra. “The courses were far more in-depth than the information we gave to the development community, and each module dealt with a different aspect of our MS4 permit.”

Meanwhile, Licitra visited construction sites and talked to contractors and developers about what was coming. After 15 years as

“We didn’t want them viewing us as the originator of all their environmental compliance problems.”

Balancing act

The work was complicated and challenging because many developers didn’t know how to address the requirements. They wanted details on what to install and how to install it, but Licitra could offer only general guidance.

“If we told them how to install a pollution control device and they did it wrong, there was a chance that the liability could fall back on the city,” he says. “Furthermore, the regional board could view any violations and citations they issued to developers as the city not doing its job well. It was a balancing act between protecting the city and protecting developers.”

The development community reacted with frustration and stiff resistance. “The requirements had been around for 10 years, but this was the first time municipalities were mandated to enforce them to that extent,” says Licitra. “We tried everything possible to work with contractors without coming down like the new sheriff in town.”

The co-permittees opened many in-house training workshops to developers. Licitra got support from the Business and Industry Association (BIA) representing contrac-



David Davis, right, and Juan Jaime lower a sensor from Industrial Scientific to measure levels of oxygen and carbon dioxide inside of a cistern, a central collection system for final filtration of stormwater before it enters a natural drainage channel.

“Gaining the residential and development communities’ cooperation has been through one-on-one contact. The accomplishments of the stormwater program are a result of the support I receive from our executive management team.”

Aldo Licitra

an environmental consultant in the private sector, he understood NPDES and knew how to broach the subject in a non-threatening manner. “My NPDES inspector at the time had worked with other cities and knew how to intercept pollutants,” says Licitra.

The two explained that controlling sediment runoff was just the start. After that, contractors had to control runoff from paints, concrete washouts, and non-visible pollutants. “We used the back door approach, explaining how the mandate was passed down to the city, and now we were obligated to enforce it,” says Licitra.

tors and developers. BIA leaders explained to members how the permits would affect the industry and urged them to comply. The association also developed its own NPDES training program for inspectors, engineers, water-quality managers, planners, and building and safety staff.

Licitra spoke at BIA and Inland Erosion Control annual seminars and continues to do so. “It allows me to share information and keep us all on the same page,” he says. “Our task now is to ensure that we prevent any additional pollutants from commingling with legacy pollutants.”

Downstream dilemma

The fourth-term NPDES permit deems irrigation runoff an illegal discharge, and the regional board directed the city to decide how to regulate it. Licitra distributed education materials about the ruling and collaborated with the Rancho California Water District, the city’s water provider. Growing concerns over drought caused the district to raise rates to deter excess water consumption. It also implemented a tiered rate system where users paid more if they surpassed a base allotment.

The drought of 2009 created a new stormwater challenge. Fires in much of the county left deep deposits of ash on the ground. “It was as fine as talcum powder and we’d sink in while walking through it,” says Licitra. “Then the rainy season arrived. We knew the regional board would be on us if that volume of ash reached Murrieta Creek.”

The city, Riverside County, and

private entities collaborated to control the ash, building four large detention basins to intercept the water as it flowed over business and industrial sites. Property owner associations cleaned the basins after each rain. Despite their efforts, residual waterborne ash flowed into the storm drains.

Because the fires were widespread and overwhelming, the regional board finally issued temporary permit exemptions. “Vegetation has grown in the burn areas, reducing the residual ash problem with every passing year,” says Licitra.

Pristine environment

Long-held respect for open spaces is helping Temecula meet its fourth-term permit. The city, population 105,000 and 90 to 95 percent built out, has 34 parks and numerous conservation set-asides. In addition, suburban communities with large lots limit density, as do large master-planned commu-

(continued)

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An infiltration basin in a new residential development in Temecula collects stormwater and filters it through layers of rock and sand into the ground, helping to replenish the groundwater aquifer.

nities that include required open spaces. In 2011, the city annexed 500 hillside acres.

"We could build there, but the area is just too beautiful," says Licitra. "Residents want natural places set aside for conservation." That dovetails with the three main elements of the new low-impact development (LID) requirements:

- Stop construction and return the environment to pre-development conditions.
- Conserve what is on site if building must proceed.
- If unable to do that, trap, retain, and infiltrate a specific volume of stormwater, or first flush, to replenish the groundwater.

"The big LID guns are infiltration and retention-based BMPs such as basins, rain gardens, ponds, infiltration trenches, and biocells," says Licitra. "If they aren't feasible, we recommend treatment-based BMPs like sand filters. Manufactured products are the last choice because they are not considered natural BMPs."

Making progress

Public Works is responsible for 70 miles of storm drains and 1,650 catch basins. "A dedicated crew inspects the basins just before the rainy season, then again later in the year," says Licitra. "They clean those with filters twice a year to avoid flooding and change the filters annually."

The crew uses a Vac-Tron PMD 500 GT vacuum truck with a

500-gallon debris tank, 225-gallon freshwater tank, and a jetter putting out 15 gpm/2,200 psi. They capture cleaning water at the outlet of the basin box to keep it from reaching the creeks.

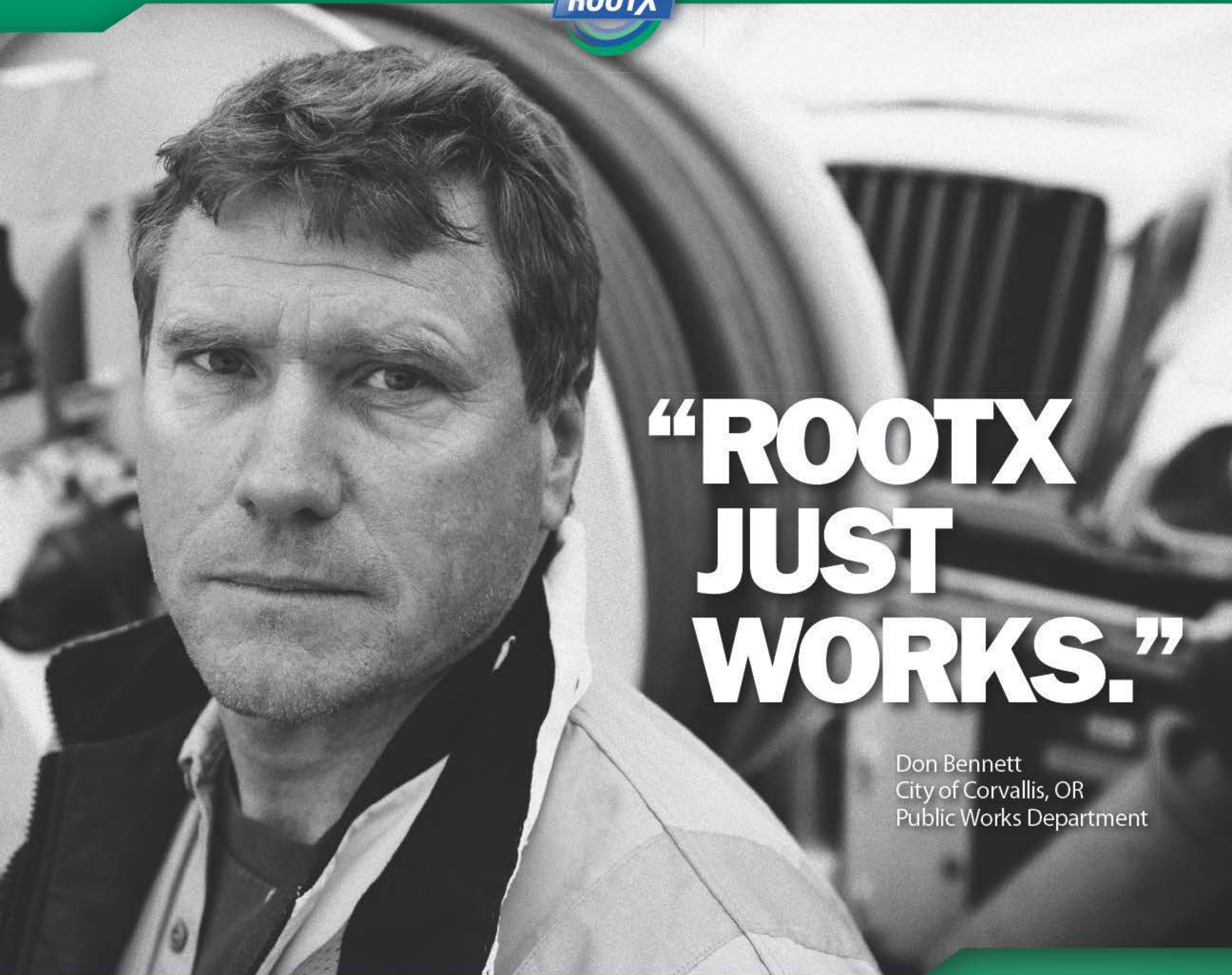
"Maintenance isn't as intense anymore," says Licitra. "Going door-to-door in neighborhoods and talking with people about dumping trash into storm drain pipes really paid off. Gaining the residential and development communities' cooperation has been through one-on-one contact. The accomplishments of the stormwater program are a result of the support I receive from our executive management team."

Licitra worries that the new prescriptive permit will remove developers' creative input and cast the city in the role of enforcer. "I'm proud of our program, but these new requirements will be a lot more difficult to implement and manage," he says. "It's the difference between taking baby steps and an Olympic broad jump." ♦

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EYE ON ELECTRICITY

A power monitoring system designed in-house helps the Florida Keys Aqueduct Authority keep a tight rein on pumping costs for its water distribution system

By Jim Force

Sitting in his office, Roy Coley can see the amount of electrical power being used by the pumps in the vast Florida Keys Aqueduct Authority water distribution network. The authority's customized power monitoring system continuously records and displays power consumption in cost per thousand gallons pumped and allows operators to make changes in the pumping system if power costs rise above optimum levels.

"Right now, we're at 21 cents per thousand gallons pumped," says Coley, director of operations for the authority. "That's about where we need to be."

Along with pipe corrosion, the cost of power is the major challenge for the authority as it pumps drinking water from the mainland to the inhabitants of the Keys, a 130-mile-long string of islands that stretches into the Atlantic Ocean off the southern tip of Florida.

"We spend more than \$3.5 million a year on electricity, most

of it for pumping," Coley says. "We needed a system that would enable us to monitor and control those costs. When we couldn't find one suitable for us in the marketplace, we decided to develop our own." The system has been operational for just a few months, so comprehensive cost data isn't yet available. But Coley says the authority is already optimizing pumping strategies based on power costs.

Water to paradise

The authority was formed in

1937 to ensure a reliable source of clean drinking water for the Keys. Before that, residents and visitors relied on cisterns to collect rainwater, and on freshwater shipped in from the mainland by railcar or barge.

A steel water pipeline was constructed in 1939 and enlarged in 1980, linking the authority's J. Robert Dean water treatment plant in Florida City with the chain of islands all the



The Florida Keys Aqueduct Authority team includes, from left, Aaron Sipe, distribution system operator B; Sandy Companioni, distribution operator B; Tracy Butler, distribution operator A; Greg Gato, operations supervisor; and Marty Kaiser, welder/mechanic. (Photography by Johnny White)



PROFILE:
Florida Keys
Aqueduct Authority

FOUNDED:
1937

AREA SERVED:
About 50 keys and outer
islands covering 137
square miles

POPULATION SERVED:
80,000 residents,
1 million vacationers

EMPLOYEES:
256

INFRASTRUCTURE:
132-mile-long main
transmission line,
650 miles of community
distribution lines,
five major pumping stations

ANNUAL BUDGET:
\$34 million (operations)

WEBSITE:
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FCAA operations director Roy Coley stands in the lift while Aaron Sipe, distribution system operator B, works on a pipeline hung from a bridge.

“We get visitors all the time. They want to see the system in action and ask how we did it.”

Roy Coley

way to Key West. The authority’s motto is “Bringing Water to Paradise.”

The Biscayne Aquifer is the primary water source. At the Dean treatment facility, the water is treated with lime softening, passed through dual-media filters, and dosed with chloramines and fluoride. The plant also includes a reverse osmosis desalination system so that, if demand calls for it, up to 6 million gpd of water from the brackish Floridan Aquifer can be added to the supply.

Five 800 hp motors and a pair of 500 hp motors (SPX Flow Technology vertical turbine and Flowserve units) move the water through the transmission line at pressures up to 250 psi. The pipe begins with a diameter of 36 inches, narrows to 24 inches, and ends at 18 inches.

In case of a power outage, the authority maintains four 1,000 hp diesel pumps and 45,000 gallons of fuel in storage. The diesel pumps were run for 28 days continuously after Hurricane Andrew in 1992.

Booster pumping stations at Key Largo, Long Key, Marathon, Ramrod Key and Stock Island maintain the desired line pressures. Distribution pipelines connect with the mainline and carry water into the various communities on the islands. In case of emergencies, a number of storage facilities throughout the system provide 45 million gallons of reserve capacity. Seawater desalination plants at Stock Island and Marathon are available to produce up to 3 million gallons of freshwater if needed.

FIGHTING CORROSION

Nearly every water utility fights corrosion of pipes, valves, and other equipment, but at the Florida Keys Aqueduct Authority, the battle goes on day after day because of the unique saltwater environment and the setting surrounding the main water distribution line, which stretches 132 miles from the Florida mainland to Key West.

“Our pipeline goes under water, under ground, and above ground,” says Roy Coley, director of operations. “It’s hung from bridges. It follows causeways. Corrosion remains one of our biggest challenges.”

To protect the line, the authority has two crews of six or seven specialists who do nothing but check for and repair corrosion, working every day examining piping sections.

The authority uses two main corrosion control methods. One involves hand-applying a corrosion-resistant wax coating from Trenton Corp. to pipe surfaces. The second is cathodic protection. Through a series of 700 rectifiers supplied by Universal Rectifiers, low-voltage electricity is applied along the line to prevent or control corrosion.

Any underwater repair work is contracted out to Logan Diving of Jacksonville, Fla. Coley says the weather and human traffic also affect the transmission line. “Hurricanes can and do damage the line,” he says, “and it’s not uncommon for boats or fishermen to knock something loose or put a dent in the surface.”

Monitoring power

Everyone on the authority’s payroll is energy-conscious and works to reduce power consumption.

But certain conditions were working against the authority’s ability to achieve the most economical performance.

(continued)

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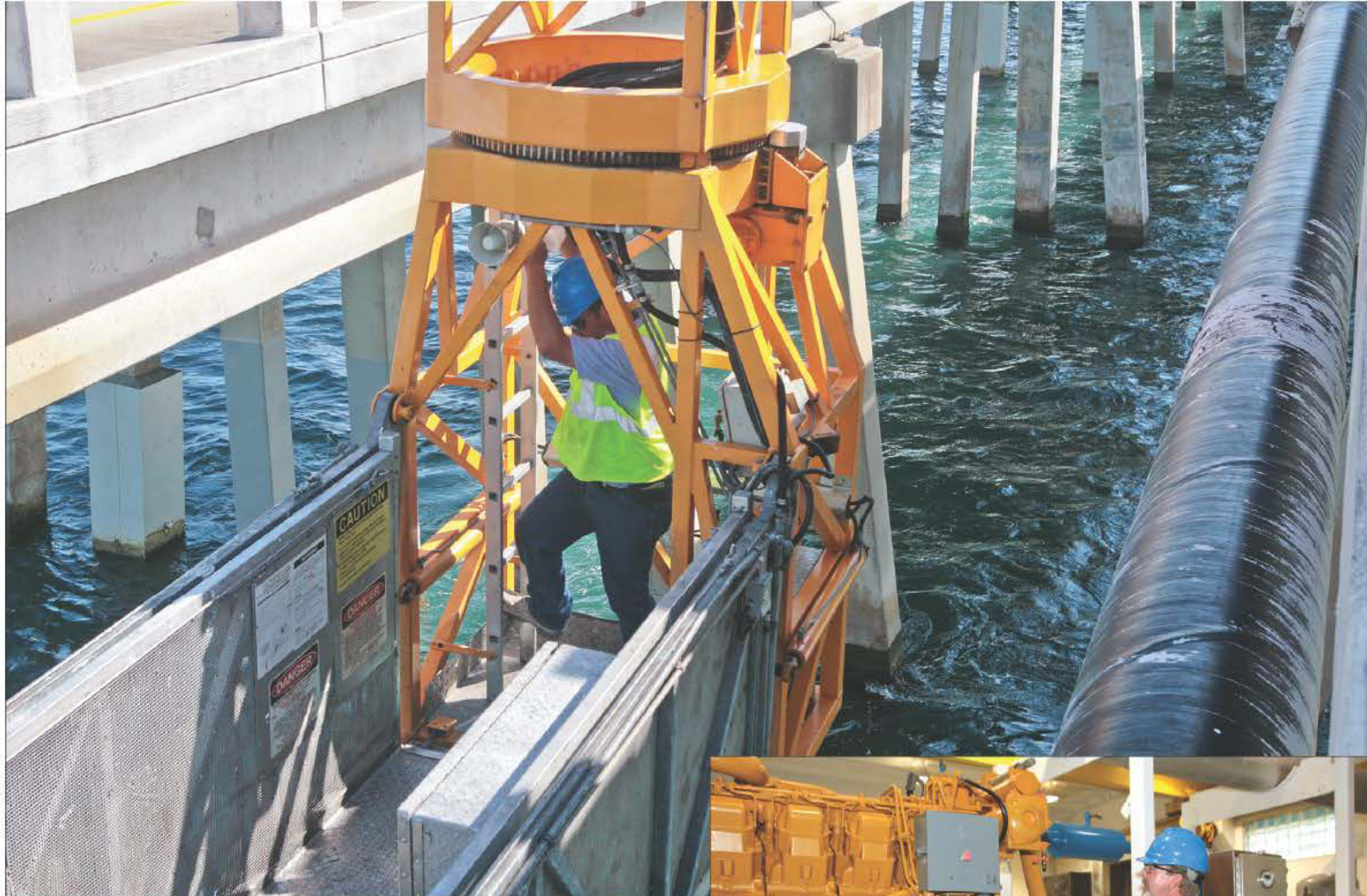
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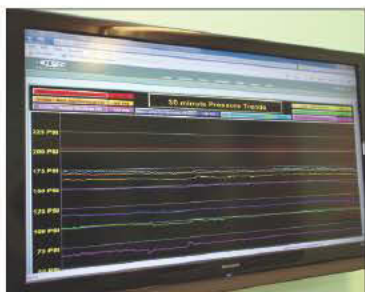


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ABOVE: Sandy Companioni, distribution system operator B, moves into position in the lift. **LEFT:** The SCADA system displays accurate pipeline pressures at various locations throughout the Keys. **RIGHT:** Mike Colonna, plant operator and maintenance mechanic A, operates the Ramrod Key booster pump station.



For one thing, the operators at the pipeline control center in Florida City practiced various pumping strategies based on who was in charge of the pipeline at the time. For another, the authority has a variety of pumps in service along the line, including older and newer models, some variable-speed drive and others constant drive. And three different power suppliers serve the authority: Florida Power and Light at the beginning of the service area and smaller regional companies serving the middle and far western end of the Keys. All have different rate structures.

"We knew we had to reduce our power consumption, but when I talked with our executive direc-

tor about the situation, it was obvious that turning off the lights and shutting down our computers at night wasn't going to be enough," says Coley. At about this point, Coley recalled his earlier days as a water manager in northern Alabama and his visit to a local automobile tire manufacturing plant.

"One of the things that struck me was that they had a system that told them what the power usage was per tire, and as power costs fluctuated, when was the best time to make tires," Coley says. "If the power costs got too high, they might just shut the line down and send everybody home until the costs came down again."

The right units

That got him thinking about a



similar system for the authority's water system. "I shared these ideas with our IT people, and they went out into the market, but they couldn't find anything commercially available that would accomplish what we wanted," he says. "Finally, we reached out to the engineering firm CH2M HILL and asked them to design such a system for us."

Coley was adamant on one point: He wanted the system to report energy consumption in cents per thousand gallons. "That's what we understand in the water business," he says. "I didn't want something that expressed results in kilowatt-hours or engineering calculations."

The system uses monitoring

equipment from Schweitzer Engineering Laboratories, positioned at all five of the major pumping stations on the transmission line. The equipment tracks the real-time cost of power from the various suppliers, as well as the power consumption at all pumping stations. There are 14 pumps in the system, supplied by Fairbanks Morse, Aurora, Flygt (Xylem), SPX Flow Technology, Goulds Water Technology and Flowserve.

Depending on the location, the equipment can monitor power consumption at an entire site like a booster station, or at an individual feeder location or specific motor. At each location, a programmable logic controller (PLC) polls the power monitor for the

real-time kW, then uses this reading to perform calculations based on the utility rate structure for that site. An additional PLC in Florida City summarizes data from all the other PLCs.

Wonderware (Invensys Operations Management) software reads and displays the values from the PLCs, logs ampere and volt data from each power monitor, and stores these calculated values for historical trending. A dedicated server at Key West generates reports using XLReporter software, and updates the historical database.

Many benefits

Coley ticks off some examples of how the power monitoring system helps his team save on electrical costs:

- By monitoring power consumption and the fluctuating electricity rates, the authority can determine the best (and worst) times to top off the system's storage tanks.
- The team can use the power suppliers offering the lowest-cost electricity at any given time, limit or higher-cost sources, or eliminate them if their rates are too high.
- Operators can determine whether it is more cost-effective to operate a particular pump at 100 percent of capacity, or keep it at a lower flow rate and supplement the flow with another pump that costs less to operate.
- Operators can track changes in demand (important in view of the transient tourist population) and supply adequate drinking

“We spend more than \$3.5 million a year on electricity, most of it for pumping. We needed a system that would enable us to monitor and control those costs. When we couldn't find one suitable for us in the marketplace, we decided to develop our own.”

Roy Coley

the exact cost per thousand gallons pumped at any time, and to see the immediate effects of changes to the pumping protocol, make the system already worth the investment.

Furthermore, “we are enjoying some positive publicity because of the innovation,” says Coley. “We get visitors all the time. They want to see the system in action and ask how we did it.” For water professionals, that's just one more reason to make a trip to “Paradise.” ♦

water at lowest possible pumping costs.

While Coley and the authority won't have specific power costs savings numbers until the system has been in operation for a few more months, he is pleased with the early results. The ability to know

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Billy Bell

Utility Supervisor II - City of Raleigh, N.C.

"I came back with some really good ideas."

The 2011 Expo was Billy Bell's first, and he attended with five colleagues. "The most impressive thing was the new technology - the cameras, sewer cleaning equipment and rehab equipment on the exhibit floor," he says. "New technology has helped us tremendously. It's amazing how far it has come from the past. The sales representatives were very helpful. Any of questions about the products, they could answer. You really have to see this for yourself."



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Education Day

Monday, February 27th

SSCSC

Southern Sections Collection Systems Committee

- 8 a.m. Rust into Gold
- 9:30 a.m. Maintaining Collection System Easements
- 11 a.m. Sanitary Sewer Overflows: What To Do When It Is Flowing Down the Street
- 1:30 p.m. Finding Success and Growth in the Pipeline Cleaning Business
- 3 p.m. Evaluating and Optimizing the Efficiency of a Combination Truck
- 4:30 p.m. CCTV Inspection Essentials

NOWRA

National Onsite Wastewater Recycling Association

- 8 a.m. Aerobic or Anaerobic - Which One Is Better?
- 9:30 a.m. Mound Systems – Not Just for Wisconsin!
- 11 a.m. Dead Bacteria - How Overuse of Cleaners and Household Products KILL
- 1:30 p.m. Onsite Electrical
- 3 p.m. Managing Commercial Wastewater Treatments
- 4:30 p.m. Choosing the Right Float to Control Your Pump

NAWT

National Association of Wastewater Transporters

- 8 a.m. What I Need to Know About Trucking Safety
- 9:30 a.m. Setting the Dose, Establishing the Pump Delivery Rate & Relative Control Sensor Adjustment
- 11 a.m. Certification and Septic System Inspections
- 1:30 p.m. Is There Value in Processing My Own Sludge?
- 3 p.m. Maintenance Frequency Standards and Requirements
- 4:30 p.m. Working with Small Communities: System Management

NEHA

National Environmental Health Association

- 8 a.m. Promoting Competence: What's in It for Me?
- 9:30 a.m. Septic Tank Science
- 11 a.m. Advanced Treatment - What Does That Mean?
- 1:30 p.m. Successfully Dosing Pipe Networks
- 3 p.m. Pump Replacement
- 4:30 p.m. The State of the Industry: The Forecast, The Strategy, The Tools

NASSCO

National Association of Sewer Service Companies

- 8 a.m. Sewer Ops and CMOM - Leveraging the CMOM Process for Operational Benefit
- 9:30 a.m. Larry Keist - Developments in Water Main Linings
- 11 a.m. Culvert Rehabilitation: Have It Your Way
- 1:30 p.m. Manhole Lining: The Secret to a Successful Installation
- 3 p.m. Inspection of Pipelines Under Full Flow Conditions
- 4:30 p.m. Sewer and Industrial Equipment Rental - What are the Options?

BUSINESS TRACK

General Business - Scott Hunter

- 8 a.m. Keeping Employees and Customers Happy - Part 1
- 9:30 a.m. Keeping Employees and Customers Happy - Part 2
- 11 a.m. Keeping Employees and Customers Happy - Part 3
- 3 p.m. How to be Successful and Profitable in Any Economy - Part 1
- 4:30 p.m. How to be Successful and Profitable in Any Economy - Part 2

WJTA

WaterJet Technology Association

- 8 a.m. Accessorizing Your Vacuum Unit
- 9:30 a.m. Good Craftsmen Have Heavy Toolboxes
- 11 a.m. Waterjet Technology: Applications and Equipment

PSAI

Portable Sanitation Association International

- 1:30 p.m. Cost Analysis: Delivery, Removal, Moves and Tip-Overs - Part 1
- 3 p.m. Cost Analysis: Delivery, Removal, Moves and Tip-Overs - Part 2

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- 8 a.m. Social Media: Friend or Foe?
- 9:30 a.m. Taking it to the Web, Infinity and Beyond!



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Tuesday Sessions

February 28, 2012

MUNICIPAL TRACK

- 8 a.m.** Inspecting and Locating Laterals
Edward A. "Digger" Diggs - CUES, Inc.
- 9:30 a.m.** Get Quality Results From Your Inspection Management Program!
Rod Thornhill, Cori Criss - Infrastructure Technologies
- 11 a.m.** Using Chemical Grouts to Protect Mainlines, Laterals, Manholes and Lift Stations
Daniel Magill - Avanti International

SEWER AND DRAIN TRACK

- 8 a.m.** Contractors Need to Improve Jetting Sales
Nick Woodhead, Ken Bryson - US Jetting
- 9:30 a.m.** Lift Station Backup Pumping
Majid Tavakoli - Thompson Pump
- 11 a.m.** Optical Advancements Improve Range and Clarity of Pipeline Zoom Inspection
Richard Lindner - EnviroSight

BUSINESS TRACK

- 8 a.m.** Market Like the Green Bay Packers
Jerard Nighorn - Lenzyme, Inc.
- 9:30 a.m.** Training is the Key to Unclogging a Messy Business
William Raymond - Nexstar Network
- 11 a.m.** How to Make Profits That Drop Straight to the Bottom Line
Jenny Alday - One Biotechnology

PORTABLE RESTROOM TRACK

- 8 a.m.** How Your Portable Toilet Company Can Save Money By Saying "No"
Joel Smith - Clear Computing
- 9:30 a.m.** New Emission Standards for Service Trucks
John Olson - Satellite Industries
- 11 a.m.** New Portable Restroom Products
David Roncadori - J&J Chemical Co.

LIQUID WASTE TRACK

- 8 a.m.** What You Should Know About ATUs and How to Evaluate and Service Them
Doug Dent - Ecological Labs
- 9:30 a.m.** From the Kitchen to the Grease Trap to the Landfill
Dennis Brunetti - FloTrend
- 11 a.m.** The Evolution of Effluent Filters
Theo Terry - Bear Onsite

Wednesday Sessions

February 29, 2012

PIPE RELINING TRACK

- 8 a.m.** Advances in Monitoring Technology Help Ensure Proper Liner Cure
Jake Wells - Pipeline Renewal Technologies
- 9:30 a.m.** UV Cured Fiberglass Pressure Liner
Richard Montemarano - LightStream
- 11 a.m.** New Braunfels Utilities Performs Manhole-to-Manhole Lining in-House
Travis Bohm - Perma-Liner Industries

INSTALLER TRACK

- 8 a.m.** Installation and Operation of Float Switches
Brett Wilfong - SJE-Rhombus
- 9:30 a.m.** STEPPing Up
Dennis Hallahan P.E. - Infiltrator Systems

BUSINESS TRACK

- 8 a.m.** Septic, Sewer & Portable Business Valuation Basics
Jeff Bruss - COLE Publishing
- 9:30 a.m.** Inexpensive Marketing, Promotion & Advertising Ideas for Septic, Sewer & Portable Companies
Jeff Bruss - COLE Publishing
- 11 a.m.** Making the Most of Mobile Marketing
Jeff Bruss - COLE Publishing

GAS, OIL AND MINING TRACK

- 8 a.m.** Vacuum Equipment in the Marcellus Shale Region
Mark Nixon - MORO USA
- 9:30 a.m.** How to Vacuum More Efficiently with a Positive Displacement Blower
Jeff Peterson - Higon, Inc., a division of Ingersoll Rand
- 11 a.m.** Why Choose Hydroexcavation? Opportunities in the Oil and Gas Exploration Industry
Neil McLean - Hydro Excavation Consulting Unlimited

INDUSTRY SAFETY TRACK

- 8 a.m.** Cross Bores, Deadly but Preventable - Your Actions Can Save Your Life
Mark Bruce - Can Clay
- 9:30 a.m.** Is the Air in Your Manhole or Confined Space Safe to Breathe?
Ed Fitzgerald - Jack Doherty Companies
- 11 a.m.** OSHA: Introduction to Soil Analysis
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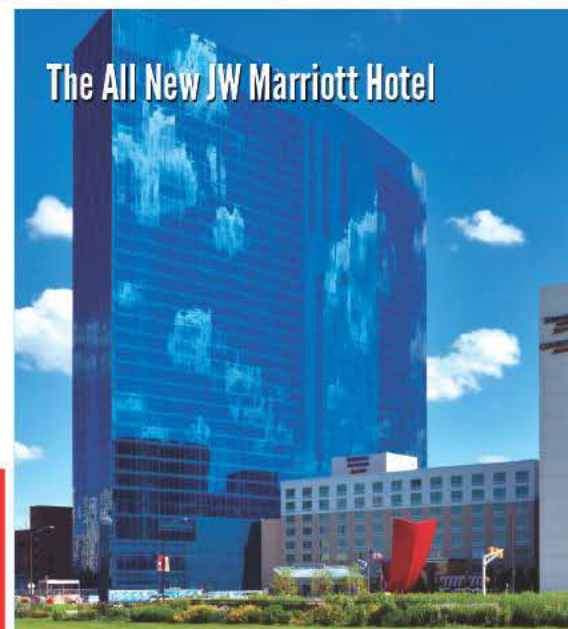
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See ad page 70	Advanced Infrastructure Technologies, LLC 3055 Kashiwa St., Torrance, CA 90505 800-992-0222 310-534-4000 Fax: 310-534-4020 www.advancedworld.com sales@advancedworld.com	Envirosight, IPEK, RIDGID, VeriSight			HDD, Flash Drive/ USB Thumb Drive, SD Card, Compact Flash, DVR, CD, DVD, VHS	YES	YES		YES	YES	YES
See ad page 27	ARIES Aries Industries, Inc. 550 Elizabeth St., Waukesha, WI 53186 800-234-7205 262-896-7205 Fax: 262-896-7099 www.ariesindustries.com sales@ariesindustries.com	Aries	2" to 120"	100' to 2000'	Flash Drive/ USB Thumb Drive, SD Card, DVR, DVD	YES	YES	YES	YES	YES	YES
See ad page 59	Central Oklahoma Winnelson 5037 NW 10th St., Oklahoma City, OK 73127 888-947-8761 405-947-8761 Fax: 405-947-1934 www.centralwinnelson.com krjones@winnelson.com	RIDGID, General Wire	3/4" to 12"	30' to 325'	Flash Drive/ USB Thumb Drive, DVD		YES	YES	YES		YES
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<p>Rausch Electronics USA, LLC 370 New York Ave., Chambersburg, PA 17201 717-709-1005 Fax: 717-709-1009 www.rauschtv-usa.com reusa@rauschtv.com</p> <p>See ad page 61</p>	Rausch	6" to 60"	1000' to 1700'	HDD, Flash Drive/ USB Thumb Drive, SD Card, DVR, CD, DVD	YES	YES	YES		YES	YES
<p>RS Technical Services, Inc. 1327 Clegg St., Petaluma, CA 94954 800-767-1974 707-778-1974 Fax: 707-769-8806 www.rstechserv.com sales.info@rstechserv.com</p> <p>See ad page 31</p>	RS Technical Services	2" to 200"	100' to 3000'	HDD, Flash Drive/ USB Thumb Drive, SD Card, Compact Flash, DVR, CD, DVD, VHS	YES	YES	YES	YES	YES	YES
<p>TV Ferret Inc. 840 State Rte. 50, Burnt Hills, NY 12027 518-399-2211 www.tvferret.com info@tvferret.com</p> <p>See ad page 53</p>	TV Ferret	2" to 102"	100' to 1500'	DVR	YES	YES	YES	YES	YES	
<p>Vivax-Metrotech Corp. 3251 Olcott St., Santa Clara, CA 95054 800-446-3392 408-734-1400 Fax: 408-734-1415 www.vivax-metrotech.com info@vxmt.com</p> <p>See ad page 64</p>	Vivax-Metrotech Corp.	2" to 8"	60' to 400'	HDD, Flash Drive/ USB Thumb Drive, SD Card, Free DVD- burning software	YES	YES	YES	YES		YES

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BETTER MOUSETRAPS

PRODUCT:

Mónashell biofiltration system

MANUFACTURER:

Anua
800/787-2356
www.anua-us.com

APPLICATION:

Lift station

BENEFITS:

Eliminated odors

USER:

Oconee County Utility Department, City of Watkinsville, Ga.

Seashells, a byproduct from the food industry, have high levels of calcium carbonate that neutralize acid byproducts of sulfide oxidation. The large surface area promotes vigorous biological activity without chemicals or carbon. (Photos courtesy of Anua)

SHELL GAME

A biofiltration system helps a Georgia wastewater utility eliminate hydrogen sulfide and mercaptan odors at a lift station

By *Scottie Dayton*

“The biofilter took away a major headache and stopped the complaint calls. It’s a sustainable, cost-effective solution to achieving odor-free air.”

Chris Thomas

Two force mains with strong waste loads delivered 300,000 gpd to the Mars Hill lift station in Watkinsville, Ga. The station lies near a church and retirement home. Neighborhood residents complained to Chris Thomas, director of the Oconee County Utility Department, about the odor.

One 5-mile section of 6-inch force main serving many restaurants delivers hydrogen sulfide and mercaptan odors to the station. Waste from a bakery on a 3-mile section of 8-inch force main produces sweet alcohol. The odor was so complicated that Thomas called

in experts to treat it.

“We tried everything they recommended, from hydrogen peroxide and chlorine to aerating and a misting system,” he says. “Nothing cured the problem. We realized we would have to step up to something more costly and complex.”

Thomas invited makers of odor-control units to conduct tests. “We wanted to avoid continued chemical costs and high maintenance.” Thomas visited pilot installations of the Mónashell biofiltration system from Anua. Maintenance involved adding a little water to the unit and replacing the media as required. The system eliminated odors.

Modular system

Each biofilter is custom-built based on the quantity of air and quality of influent. The Mars Hill unit is 8.5 feet square and weighs 20,000 pounds with the shells. Workers poured a concrete pad to prepare for its arrival. “We also needed piping and a water source,” says Thomas. “Everything else is pre-engineered.”

The skid-mounted modular system has a bolted fiberglass-reinforced paneled housing and shell media, control panel, two fiber-reinforced plastic irrigation sumps, two 0.4 hp water recirculation pumps, and a 1 hp V-belt fan



The custom-built, pre-engineered Mönashell bio-filtration system from Anua is 8.5 feet square and weighs 20,000 pounds with seashells.

with unit-to-fan ductwork and vertical exhaust stack. The blower moves air at 465 cfm.

When activated, the unit pulls in air from the lift station. An internal air deflector box directs the flow up to the distribution zone. The vacuum created by the fan in the outlet box draws the waste airstream through the shells, a byproduct from the seafood industry. High levels of calcium carbonate in the shells neutralize acid byproducts of sulfide oxidation, while the large surface area promotes vigorous biological activity without chemicals or carbon.

As air passes through the media, water captures odorous compounds. Then the microorganisms on the shells and in the water oxidize them. Clean air leaves through the stack on the fan outlet.

"We top off the sumps at the bottom of the unit with a continual trickle of water, about 5 gpd," says Thomas. "It's enough to replace evaporation losses and to refresh the recirculating water."

Spray heads recirculate the water onto the media. As the water drains down, it makes contact with the incoming odorous air. The water collects in the base of the unit, then drains back into the sump for recirculation to the irrigation grid.

Breath of fresh air

After bringing the biofilter on-

line, the staff noticed a sharp decrease in hydrogen sulfide odor the next day. Each morning brought more improvement until the area was completely odorless. Earlier testing by Black & Veatch verified that the biofiltration system attains a neutral pH, removing more than 99 percent hydrogen sulfide, 98 percent ammonia, and more than 95 percent sulfur compounds.

Workers check the lift stations every other day and clean a small screen on the biofilter weekly. They also read the airflow gauge and initially ran pH and simple lab tests to check the health of the system. "The frequency of the tests dropped as we established a baseline that determined how often we needed to do them," says Thomas. "The first four months we watched for changes."

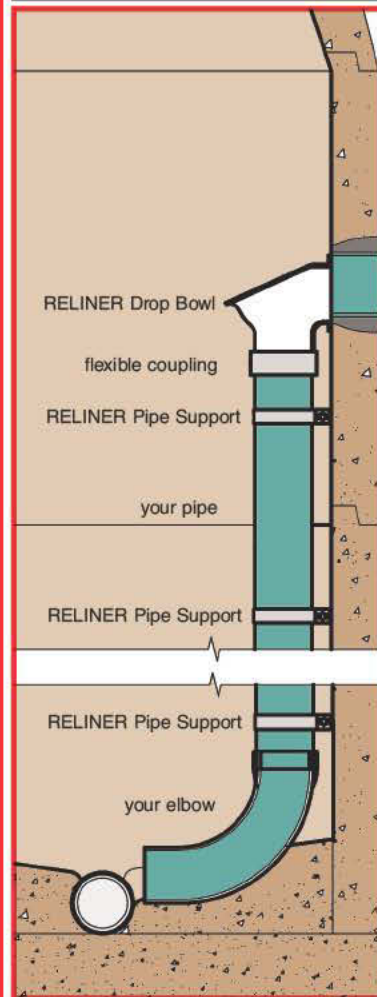
The unit has an alarm for low flows or low water levels, but it is not tied to an autodialer or SCADA system. Thomas believed that was unnecessary, as the crew is always checking the stations.

"We did see a 5 to 8 percent increase in power consumption over last year's figures," he says. "However, the biofilter took away a major headache and stopped the complaint calls. It's a sustainable, cost-effective solution to achieving odor-free air." ♦

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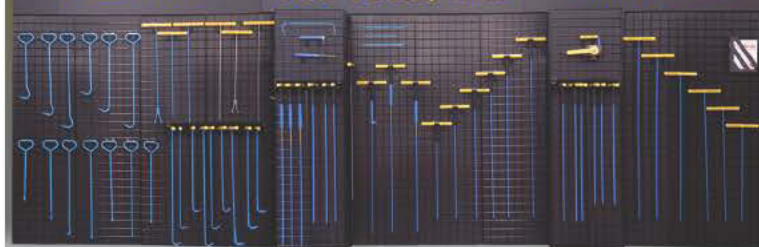
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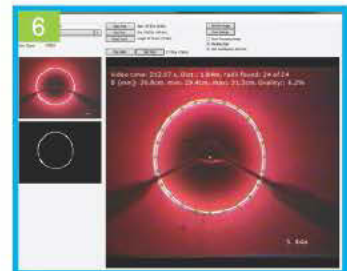
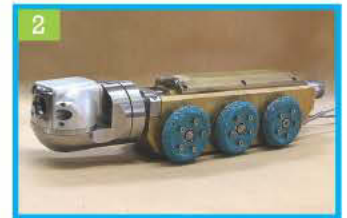
2012 PUMPER & CLEANER EXPO PRODUCT PREVIEW MAINLINE!

Looking Down the Line

Mainline pipe inspection technologies highlight new offerings on display at the 2012 Pumper & Cleaner Environmental Expo

Pipeline inspection equipment again takes center stage at the 2012 Pumper & Cleaner Environmental Expo International. Manufacturers will present their latest offerings, from powerful and versatile transporter vehicles, to mainline/lateral inspection systems, to small, portable package systems – plus survey and reporting software.

You can visit the exhibits to see the newest products as well as a vast array of established equipment to fit any need for inspecting pipes from household laterals to large storm and interceptor sewers. Visit www.pumpershow.com for a complete list of exhibitors and to plan your days at the Expo.



Mainline Pipe Inspection

1 Aries Industries Inc.

The Pathfinder XL inspection tractor from Aries Industries Inc. features six-wheel steerable drive, enabling it to maneuver over virtually any obstruction or offset joint. Standard tires range from 3 3/8 inches for relined 8-inch pipe to optional 10-inch tires with bolt-on gear-reduction side plates for 36-inch and larger pipe. It also converts from wheeled to tread-track. 800/234-7205; www.ariesindustries.com; Expo booth 10100.

2 Cobra Technologies

The PTZ camera/crawler from Cobra Technologies is designed for lined 6-inch pipe. Used with the 6-inch Cobra 150 crawler, the 18-inch-long system is capable of operating in 6- through 24-inch pipes. The Cobra V10 stainless steel camera features automatic iris, focus, zoom and Luxeon lighting modules, capable of lighting pipe through 24 inches in diameter. 800/443-3761; www.cobratec.com; Expo booth 6017.

3 CUES Inc.

The LAMP II, self-propelled inspection probe from CUES Inc. performs pan-and-tilt inspections of mainline sewer pipes with simultaneous viewing of the adjacent lateral. The unit has two cameras – one for pan/tilt/optional zoom (mainline) and one for lateral launching. The fiberglass push cable can inspect up to 120 feet into a lateral; the stainless steel option can inspect up to 100 feet. 800/327-7791; www.cuesinc.com; Expo booth 8066.

4 Envirosight LLC

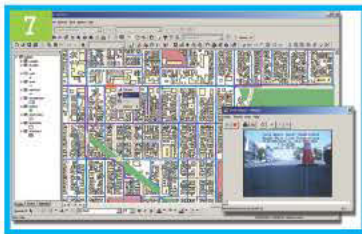
The ROVVER X crawler from Envirosight LLC offers three laser options with the WinCan-compatible touch-screen control pendant. The steerable, six-wheel pipe inspection system has a crawl range up to 1,650 feet and digital recording. Other features include bolt-on carriage and remote lift for inspecting pipe 4 to 48 inches in diameter with the camera centered. 866/936-8476; www.envirosight.com; Expo booth 8128.

5 Pearpoint Inc.

CCTV inspection vehicle conversions from Pearpoint Inc. can be made compatible with many pipe survey data collection software packages. Vehicles, including hi-cube, step and utility vans, are available, along with the Freightliner Sprinter, all-terrain vehicles, trailers and retrofits. 800/688-8094; www.pearpoint.com; Expo booth 2030.

6 Pipeline Analytics

WinCan v8 pipe inspection and asset management software from Pipeline Analytics enables a video inspection crawler equipped with laser profiling hardware to capture pipeline geometry. The module accepts standard and HD video and uses machine vision generated by the laser accessory, enabling it to reconstruct the pipe cross-section frame by frame. 877/626-8386; www.pipelineanalytics.com; Expo booth 8127.



7 PipeLogix Inc.

The GIS module from PipeLogix Inc. imports asset details from shape files, personal geodatabases or enterprise geodatabases as well as visual layers. Data seen in the field is accessible, organized and viewable in the office directly from maps. 866/299-3150; www.pipelogix.com; Expo booth 9128.

8 RapidView IBAK North America

The ORION 2.5 camera system from RapidView IBAK North America features pan, tilt and zoom functionality while maintaining a wide-angle view. The camera rotates automatically around pipe joints, providing a picture that is always right side up. Low-light technology enables users to inspect 60-inch pipelines. 800/656-4225; www.rapidview.com; Expo booth 2065.



9 Ratech Electronics Ltd.

The Plumber's Inspector PC-Xi portable inspection system from Ratech Electronics Ltd. is made for pipes and drains as small as 2 inches in diameter. The all-in-one lightweight system uses your portable laptop computer for recording. 800/461-9200; www.ratech-electronics.com; Expo booth 9084.



10 RS Technical Services

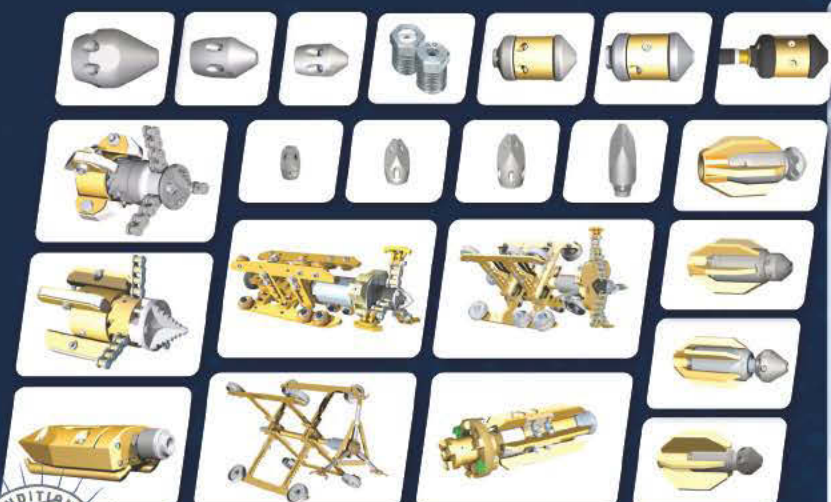
The GEN2 zoom mainline and lateral inspection system from RS Technical Services can perform inspections in 6- to 24-inch pipelines from a single integrated unit. Locatable via a built-in 512 Hz sonde, the system features a pan-and-tilt mainline camera and auto upright lateral camera. 800/767-1974; www.rstechserv.com; Expo booth 4037.



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2012 PUMPER & CLEANER EXPO PRODUCT PREVIEW



A Full House

It's going to be wall-to-wall tools and equipment to build your business at the 2012 Pumper & Cleaner Environmental Expo

By Ed Wodalski

Ask any regular attendee of the Pumper & Cleaner Environmental Expo International what keeps bringing them back for more. They'll tell you a main attraction is seeing all the latest products for the industry in one gigantic location.

With hundreds of vendors, and an all-new venue in downtown Indianapolis, it'll be a challenge to see it all. This year the exhibit hall will be open from 9 a.m. to 5 p.m. Tuesday and Wednesday, Feb. 28 and 29, and from 9 a.m. to 2 p.m. Thursday, March 1.

To make sure you don't miss a thing at the Indiana Convention Center, there's an interactive floor plan on the Exposition website (www.pumpershow.com) to help plan your visit. Whether you're a first-time visitor or long-time guest, we're certain the 32nd annual Expo will have all you need to build efficiency and profitability for your business.

Here's a look at some of the products and services you won't want to miss.



Pipe Repair/Drainage

1 Ace DuraFlo Systems LLC

A re-piping alternative, the ePipe process from Ace DuraFlo Systems LLC restores small diameter pipes (down to 1/4 inch) in-place, limiting the need for digging. The process prevents the leaching of metals and contaminants, such as lead, from entering drinking water. It seals pinhole leaks and can be installed in a matter of hours. 800/359-6369; www.aceduraflo.com; Expo booth 4093.

2 Bowman Tool Co.

The Dominator 430 reinstatement cutter from Bowman Tool Co. operates in 6- to 30-inch relined pipe. Lateral reinstatement is achieved with a 0.8 or 1.2 hp crossflow air motor. A 2.5 hp geared air motor is available for 8-inch and larger pipe. 717/432-1403, www.bowmantool.com; Expo booth 10069.

3 Formadrain Inc.

The 30-day open-time resin from Formadrain Inc. eliminates liners lost because of time restraints or unforeseen difficulties. Liners can be shipped pre-wet. The steam-cured system can be used for laterals, spot repairs and lateral-main-connections. Pipe diameters range from 2 to 48 inches. 888/337-6764; www.formadrain.com; Expo booth 3113.

4 HammerHead

Static, pneumatic and lateral pipe bursting systems from HammerHead include the Portaburst line of lateral bursting systems and the Hydroburst line of static pipe bursting systems that feature up to 175 tons of pullback to replace even non-fracturable water and sewer lines up to 24 inches in diameter. 800/331-6653; www.hammerheadtrenchless.com; Expo booth 10060.

5 Advanced Drainage Systems Inc.

Articulating drain chambers (Arc 36, 36 HC, 36 LP, Arc 24 and Arc 18) from Advanced Drainage Systems Inc. feature an optional side port coupler that snaps into the center or either end of the chamber for cleanout access while allowing for 10-degree articulation. 800/733-7473; www.ads-pipe.com; Expo booth 9129.

6 Infrastructure Repair Systems Inc.

Mainline and lateral point repair systems from Infrastructure Repair Systems Inc. are available with push or pull lateral carrier and four weight options. The lateral repair system can navigate 90-degree turns. The no-dig, ambient-cure system can repair 4- to 36-inch-diameter pipe up to 15 feet in length. 877/327-4216; www.irsi.net; Expo booths 4007, 4008.



7 MaxLiner

The CLS complete lateral system from MaxLiner seals lateral pipelines at the connection interface, starting from inside the mainline and into the lateral. The lining system allows 90-degree bends. Laterals can be lined after the main liner has been installed. Laterals without a cleanout can be lined from the mainline. 276/656-1225; www.maxlinerusa.com; Expo booth 8138.

8 Perma-Liner Industries Inc.

Perma-Main liner from Perma-Liner Industries Inc. is a non-woven, needle-punched felt that's stitched and tape seamed. The steam-cured continuous air inversion lining is available in 600-foot lengths for 6- through 24-inch-diameter pipes. 866/336-2568; www.perma-liner.com; Expo booth 7025.

9 Pipeline Renewal Technologies

The MicroPro lateral cutter from Pipeline Renewal reaches 100 feet into 3- through 10-inch lines. Using remote-inflated air bladders, the cutter's arm positions itself remotely and clamps for precision cutting in vertical or horizontal orientation. 866/936-8476; www.pipeliner.com; Expo both 8131.

10 Pow-R Mole

The Dry Bore steerable horizontal thrust boring system from Pow-R Mole is designed for installing new pipes in ground where accuracy is critical. The system features detection technology in the head of the pushrods to accurately establish its location underground to within inches. 800/344-6653; www.powrmole.com; Expo booth 1006.

11 RODDIE Inc.

The PB-40 pipe bursting machine from RODDIE Inc. for 4- and 6-inch sewer laterals can be powered by a tractor or the available 13 hp pack. It includes a built-in crib back, which allows users to restage the ram within its own chassis to pull the head into the pit without using timbers or a cage. 408/224-7777; www.rodдиеunderground.com; Expo booth 10023.

12 TRIC Tools Inc.

The V24 pipe bursting pulling unit from TRIC Tools Inc. operates directly in line with the pipe, eliminating the pulley wheel. The puller delivers 29 tons of pulling force at 3,000 psi and accepts cable from 3/8 to 3/4 inches. 888/883-8742; www.trictools.com; Expo booth 12102.

Sealants/Plugs

13 American Highway Products

The Sewer Lid Seal Kit from American Highway Products eliminates lid vibrations and reduces noise, while providing a hermetic seal against water infiltration and odors. One kit seals eight standard 23-inch-diameter lids. 888/272-2397; www.ahp1.com; Expo booth 8135.

14 AP/M Permaform

The CentriPipe culvert and sanitary sewer pipe renewal system from AP/M Permaform is designed for structures between 30 and 120 inches in diameter. Self-consolidating PL-12,000 mortar is pumped into damaged inverts, which permanently seals the bottom of the pipe, fills inverts and makes a new structure base to keep water from leaking in or out. 515/296-9610; www.permaform.net; Expo booth 1041.

15 Avanti International

AV-100 chemical grout is available in either powder or liquid from Avanti International. Made for the long-term control of groundwater and infiltration, the ultra-low viscosity, chemically activated gel has the same viscosity as water, enabling it to permeate the substrate and cure to form a matrix with the soil and porous rock. 281/486-5600; www.avantigrout.com; Expo booth 10061.

16 Cretex Specialty Products

Seal Green brush-on, polyurethane sealant from Cretex Specialty Products is made to seal and protect manhole chimneys without the need for sandblasting or priming for adhesion. Sealant is available in cans or cartridges for spray-on application and cures in place to form a flexible, watertight barrier to inflow and infiltration. 800/345-3764; www.cretexseals.com; Expo booth 8162.

17 LMK Technologies Inc.

The Insignia sealing system from LMK Technologies Inc. includes O-rings, connection hats and end-seal sleeves for groundwater infiltration at lateral/mainline connections and manhole penetrations. The products swell three to five times on contact with water, forming a watertight seal. 815/433-1275; www.lmkenterprises.com; Expo booth 2080.

18 Logiball Inc.

Test and seal lateral packers from Logiball Inc. stop infiltration of groundwater at lateral connections and lines from the mainline sewer access. Packers are available for 6- through 24-inch mainlines with 4-, 5- or 6-inch-diameter laterals. Grouting distances from the main can be completed up to 30 feet. 800/246-5988; www.logiball.com; Expo booth 10075.



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19 Parson Environmental

Parsonpoxy FP from Parson Environmental is a two-compound, flexible, high-strength, corrosion-resistant, 100 percent solids polyamine epoxy/urethane hybrid that will bond to properly prepared surfaces without primer. Made for internal or external manhole frame and cone section or joint repair, the epoxy can be applied using a putty knife or brush. 800/356-9023; www.parsonenvironmental.com; Expo booth 12018.

20 Savatech Corp.

Large multisized pillow shaped pneumatic blocking and bypass plugs from Savatech Corp. are designed for stopping and bypassing in pipe from 24 to 120 inches. They can be used in large round, oval or elliptical pipelines and seal most types of pipe (concrete, plastics, iron). 386/760-0706; www.savatech.com; Expo booth 2006.

21 Sauereisen Inc.

The SewerGard No. 210X 100 percent solids epoxy polymer from Sauereisen Inc. is a protective lining that provides a chemical-resistant barrier for concrete, masonry, brick and steel substrates. It can build up to 125 mils in a single coat and offers strengths in excess of 15,000 psi. 412/963-0303; www.sauereisen.com.

22 Sealing Systems Inc.

Flex-Seal Utility Sealant from Sealing Systems Inc. is a plural-component aromatic urethane, featuring 800 percent elongation and tensile strength of 3,200 psi. It prevents inflow/infiltration and provides corrosion protection at the grade adjustment ring or joint section. 800/478-2054; www.ssissealingsystems.com; Expo booth 2134.

Services

23 American Express

The OPEN business card from American Express provides access to products, tools and services. Cardholders can track and manage spending online, earn rewards on business purchases, get answers 24/7 and tap into resources and other information. 800/528-4800; www.americanexpress.com/open; Expo booth 4101.

24 Blood Hound Inc.

The subsurface utility consulting firm, Blood Hound Inc., provides nationwide service, locating privately owned utilities not marked by one-call systems. The company specializes in electromagnetic locating (EM), ground penetrating radar (GPR), air and hydro vacuum excavation, GPS and utility mapping, pipe/sewer camera inspection (robotic and manual) and fault locating. 888/858-9830; www.bhug.com; Expo booth 531.

Trucks/Accessories

25 Aquatech Inc./Hi-Vac Corp.

The B-10 combination jet/vac truck from Aquatech Inc., a product of Hi-Vac Corp., is designed for sanitary and storm sewer cleaning, water leak repair and sewer line bypass for sewer repair/relining/replacement work. Features include single-engine drive for fuel consumption and reduced maintenance. 740/374-2306; www.aquatechinc.com; Expo booth 3080.

26 GapVax Inc.

The MC Advanced Series hydroexcavator from GapVax Inc. has a monitoring system that enables the operator to observe and troubleshoot from a single display (one inside and one outside the cab) as well as control hydraulics, blower and water pump operations with a complement of gauges. Body, boom and hose reel functions, vacuum break, throttle, area and safety lighting are wireless. 814/535-6766; www.gapvax.com; Expo booth 8110.

27 Pelican Worldwide

The Slider Valve gate valve for vacuum tankers from Pelican Worldwide features an easy-opening, lever action. Made of solid brass, the valve has threaded connections and is available in 2- and 3-inch sizes (4- and 6-inch will be available). 713/823-2844; www.pelicanworldwide.com; Expo booth 1132.

28 Super Products LLC

The Mud Dog 1600 hydroexcavator from Super Products LLC delivers up to 18 gpm at 3,000 psi. Its 8-inch, positive displacement vacuum system provides 5,800 cfm airflow and 28 Hg of vacuum. The onboard boiler is heated by dual 714,000 Btu/hr heaters. 800/837-9711; www.muddogeasy.com; Expo booth 1040.



29 Supervac 2000

The SVHT-6400 hydroexcavator from Supervac 2000 includes a 3,000-gallon carbon steel debris tank, hydraulic door locks, 1,200-gallon copolymer water tank and cyclone and cartridge filter. Other features include 525,000 Btu boiler at 10 gpm, a 6,000 psi/10 gpm high-pressure water pump, and 100 feet of 3/8-inch hose. 866/839-5702; www.supervac2000.com; Expo booth 8148.

30 Vacall

AlluVac P Series combination sewer cleaners from Vacall use a positive displacement blower system powered by the chassis engine rather than a second engine, reducing fuel consumption, service time and emissions. Units have a front-mounted pivoting hose reel and an 8-foot, 6-inch extending boom with 180-degree rotation. 800/382-8302; www.vacallindustries.com; Expo booth 10064.

31 Vac-Con Inc.

The Vac-Con Inc. combination machine is available in 3.5- to 6-cubic-yard capacities with hydrostatically driven two- and three-stage centrifugal compressors or several optional positive displacement blowers up to 27 inches Hg. The unit offers a high-pressure, smooth flow water system up to 120 gpm/3,000 psi. 888/491-5762; www.vac-con.com; Expo booth 1080.

32 Vector Manufacturing

The Catch Basin Plus from Vector Manufacturing with fan and air-routing system delivers increased vacuum pressure in the single-stage and dual-stage fan configurations. The design and ergonomic controls make it easy to operate and maintain. 800/627-3171; www.vector.com; Expo booth 8076.

33 VT Hackney Inc.

The P/2000 aluminum service body mounted on an Isuzu NPR diesel chassis from VT Hackney Inc. features a rear drop floor, three-step entrance, double swing-out barn-style rear doors and pull-out walk ramp for loading of heavy equipment. 800/763-0700; www.hackneyservice.com; Expo booths 11118, 12116.

Inspection Systems/Smokers

34 Electric Eel Mfg. Co. Inc.

The eCAM Ace and eCAM Pro pipeline inspection camera systems from Electric Eel Mfg. Co. Inc. feature a stainless steel housed 1.68-inch-diameter camera, 20 LED light ring and high-resolution CCD element. A flexible camera spring enables the systems to navigate 3-inch P-traps. 800/833-1212; www.electriceel.com; Expo booth 9040.

35 Hathorn Corp.

The Optimum HDD12.1 video inspection system from Hathorn Corp. features a 12.1-inch HDMI monitor, adjustable lighting, 512 Hz sonde, 16 pages of text writing, 8X zoom, voice recording, spill-proof keyboard, on-screen footage counter, multiple reel selections (including other brands) and three-hour battery pack. 905/886-2835; www.hathorncorp.com; Expo booth 8089.

36 Hurco Technologies Inc.

The PowerSmoker 2 leak detection system from Hurco Technologies Inc. utilizes indoor-safe and laboratory-tested LiquiSmoke to identify leaks in new plumbing construction prior to inspection and to find sewer odors. 800/888-1436; www.gethurco.com; Expo booth 5038.

37 RIDGID

The SeeSnake nanoReel N855 industrial inspection camera system from RIDGID is made for ultra-small diameter lines, ranging from 3/4 to 2 inches. It can make tight turns and push up to 85 feet of cable. The system can be used with all SeeSnake monitors and recorder options as well as the microEXPLORER digital camera. 800/769-7743; www.ridgid.com; Expo booth 8000.

38 Superior Signal Company LLC

The Superior 5E Electric Smoker from Superior Signal Company LLC includes heavy-duty, industrial grade flexible hose. Used with Superior smoke candles, the smoker takes 30 seconds to three minutes to cover all applications. 800/945-8378; www.superiorsignal.com; Expo booth 9148.

39 Vivax-Metrotech Corp.

The vCam Inspection System from Vivax-Metrotech Corp. includes a modular control module with an 8-inch color LCD display, dual-frequency sonde, digital recording to the internal hard drive or SD card, full-function keyboard, internal microphone, AC/DC power, rechargeable batteries and USB interface. 800/446-3392; www.vivax-metrotech.com; Expo booth 10019.



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Maintenance/Safety Devices

40 Bright Dyes

FLT orange fluorescent water tracing dye products from Bright Dyes work for leak detection and input metering. The dyes act as vivid labels for water and are easily detectable at 1 ppm. They are available in tablet, liquid, powder and wax forms and come in three fluorescent colors (yellow/green, red, orange). 800/394-0678; www.brightdyes.com; Expo booth 9124.

41 BW Technologies by Honeywell

The GasAlert Max XT II portable four-gas detector from BW Technologies by Honeywell combines one-button operation with an integrated, high-flow sampling pump (SmartSample) for reliable protection in confined spaces and other hazardous areas. Air samples can be obtained from as far as 75 feet. 888/749-8878; www.gasmonitors.com; Expo booth 1134.

42 Jameson LLC

Duct Hunter traceable rodders from Jameson LLC enable one person to trace or map underground pipe before digging. Transmitters connected to the unit transmit a signal that radiates through the soil from the rod. A receiver detects the frequency and continuously marks the buried pipe. 800/346-1956; www.jamesonllc.com; Expo booth 1113.

43 Mainline Backflow Products

The Adapt-a-Valve Inspection Chamber from Mainline Backflow Products can be used as an inspection chamber, extendible backwater valve to protect properties against municipal back surges or to pressure test or isolate sewer laterals using the isolation gate. 877/734-8691; www.backwatervalve.com; Expo booth 3123.

44 MAX-LIFE Manufacturing Corp.

The Vac Trap debris trap from MAX-LIFE Mfg. Corp. features a 6- to 24-inch throat for easier connection to 6- or 8-inch vacuum tubes and back stop-leg that prevents the device from becoming stuck in a pipe. 888/873-6295; www.flexmax.com; Expo booth 8163.

45 Municipal Sales Inc.

Bio-Septic FOG bio-stimulant nutrient from Municipal Sales Inc. increases the metabolic reproductive rate of naturally occurring bacteria that reduce fats, oils and grease in grease traps, sewage lines and pump stations. 518/812-0000; www.septicdrainer.com; Expo booth 9006.

46 Prototek Corp.

The TruCore Sludge Sampler by SIM/TECH FILTER from Prototek Corp. is made for core sampling wastewater and other fluids. The 8-foot tube sampler breaks down into 2-foot sections for easier transportation (case included). The sampler is marked every foot and has a replaceable gasket. 800/541-9123; www.prototek.net; Expo booth 10051.

47 RootX Inc.

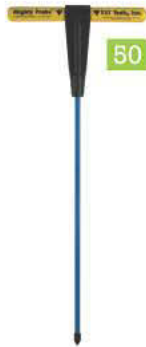
The self-foaming, root-killing herbicide from RootX Inc. is made to control root growth in sewer pipelines and inhibit re-growth. The herbicide can be applied from the package or with existing sewer cleaning equipment. 800/844-4974; www.rootx.com; Expo booth 403.

48 Safety Corporation of America

The ultraSHORE trench shoring system from Safety Corporation of America, made of corrugated aluminum, features panels that can be used horizontally or vertically and are stackable. They are safe for bury depths to 12 feet in Class C soils. 800/746-7464; www.shoring.com; Expo booth 8055.

49 Southland Tool Mfg. Inc.

The Deep-Vac manhole tube holder from Southland Tool Mfg. Inc. clamps around tubes in any location. The unit is designed for manholes from 24 to 36 inches. Extensions are available for larger openings. 714/632-8198; www.southlandtool.com; Expo booth 1041.

**50 T&T Tools Inc.**

The Mighty Probe from T&T Tools Inc. features a specially designed insulated handle, making it safer while retaining the benefits of a steel probe. The high-strength steel shaft is available in lengths from 3 to 6 feet (1/2-foot increments) with a replaceable tip. 800/521-6893; www.mightyprobe.com; Expo booth 402.

51 Vaporooter

The Jet Set Commander chemical root control system from Vaporooter uses foam consisting of metam sodium and dichlobenil to kill roots. Metam sodium penetrates root cells destroying roots on contact while dichlobenil bonds to pipe walls, joints and cracks, preventing new root growth. 800/841-1444; www.vaporooter.com; Expo booth 210.

Cleaning Tools**52 Arthur Products Co.**

The Mongo waterjetting cleaning tool from Arthur Products Co. features a flexible centering device and six individually detachable guide vanes made from high-impact polymer. The tool is made to conform from 12-inch I.D. to 48-inch I.D. pipe and engineered to operate at up to 10,000 psi. 800/322-0510; www.aquanoz.com; Expo booth 3107.

53 Enz USA Inc.

The Golden Jet 10.060A/B/CTR turbine cleaning nozzle from Enz USA Inc. delivers operating flows as low as 8 gpm at 2,000 psi. Made for cleaning 2.5- through 8-inch pipes, the nozzle can remove roots, grease, solids, mineral deposits, concrete and grout. The kit includes pre-cut chains, skids and two head styles. 877/369-8721; www.enzusainc.com; Expo booths 1085, 1093.

54 NozzTeq Inc.

The BL Swiper sewer and storm cleaning nozzle from NozzTeq Inc. can clean 12- to 30-inch pipes. The nozzle combines water flow from the jets with airflow in the pipe. 866/620-5915; www.nozzteq.com; Expo booth 2040.

55 Petersen Products Co.

The Drain-Jet Pro drain flusher from Petersen Products Co. is designed for use with high-pressure jetters. The air-filled unit has NPT thread for connecting directly to the jetter hose. It is flexible for navigating bends and can be used as a pipe plug with the outlet end closed and standard threaded pipe plug. 800/926-1926; www.petersenproducts.com; Expo booth 212.

56 StoneAge Inc.

The Warthog WU-3/8 and WU-1/2 nozzles from StoneAge Inc. operate in 3- to 6-inch inner diameter hose and are available with 3/8-inch or 1/2-inch inlet ports, either NPT or BSPP. 866/795-1586; www.stoneagetools.com; Expo booth 9078.

57 USB-Sewer Equipment Corp.

The Twister rotary sewer nozzle from USB-Sewer Equipment Corp. cleans sewer and stormwater pipelines from 6 to 24 inches of grease, scaling, roots and tuberculation. The nozzle is equipped with an adjustable guide skid. 866/408-2814; www.usbsec.com; Expo booth 8091.

Jetters/Hoses/Reels**58 Cam Spray**

The PJ3708 portable, high-flow drain jetter from Cam Spray delivers 8 gpm at 3,700 psi, while the PJ4007 delivers 7 gpm at 4,000 psi. Equipped with a 50-foot reel-feed hose and designed to be used in conjunction with the 200DS4 remote hose/reel package, the jetters feature a 27 hp electric-start Honda engine with 2:1 gearbox-drive pump. 800/648-5011; www.camspray.com; Expo booth 230.

59 General Pipe Cleaners

The JM-3055 Jet-Set waterjet drain cleaning machine from General Pipe Cleaners clears grease, sand, ice and other stubborn stoppages. The unit has a 5.5 gpm/3,000 psi pump with removable 300-foot capacity hose reel mounted on a heavy-duty tubular frame with four pneumatic tires and wheel brake. 800/245-6200; www.drainbrain.com/jets; Booth 4052.

60 Hannay Reels Inc.

The Direct Drive 6200 Series heavy-duty sewer cleaning hose reel from Hannay Reels Inc. can carry up to 500 feet of 1-inch I.D. hose or 900 feet of 3/4-inch hose. An external hose connection allows tightening without removing all the hose from the spool. 877/467-3357; www.hannay.com; Expo booth 8077.



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61 NLB Corp.

The 125 Series convertible waterjetter from NLB Corp. delivers operating pressures up to 40,000 psi (6,000, 8,000, 10,000, 15,000, 20,000, 25,000, 35,000 and 40,000). Conversions require a simple kit and can be completed in about 20 minutes. 248/624-5555; www.nlbcorp.com; Expo booth 2081.

62 Piranha Hose Products Inc.

The 1 1/2-inch, 2,500 psi sewer cleaning hose from Piranha Hose Products features a yellow, polyolefin tube, double layer of high-tensile synthetic braid reinforcement and an abrasion-resistant orange cover. An ultra-slick Slither cover for negotiating tough bends is available. 800/250-5132; www.piranhahose.com; Expo booth 5017.

63 Reelcraft Industries Inc.

Series SD 10000 low-profile, spring retractable hose reels from Reelcraft industries Inc. can handle up to 50 feet of larger diameter 3/4- and 1-inch hose. The compact reel is made for mounting in truck cabinets or other limited space areas. 800/444-3134; www.reelcraft.com; Expo booth 3081.

64 Sewer Equipment Co. of America

Mongoose jetters from Sewer Equipment Co. of America can be mounted on trailers, trucks or in vans. All units can be upgraded to have rotating extendable hose reels. Hose reels can be fitted with up to 600 feet of 1/2-inch hose. A seven-function wireless remote upgrade is available. 800/323-1604; www.sewerequipment.com; Expo booth 6025.

65 Spartan Tool LLC

The Model 740 trailer-mounted waterjetter with propane fuel conversion kit from Spartan Tool LLC produces 12 gpm/4,000 psi and cleans pipe up to 12 inches from a 150-gallon water tank that includes a hydrant-fill top opening with 100 feet of 5/8-inch hose. 800/435-3866; www.spartantool.com; Expo booth 8062.

66 US Jetting LLC

The 6,000 psi high-pressure jetting unit from US Jetting LLC for sewer and drain cleaning applications cuts roots and removes scale deposits and grease accumulation. The 6018 run dry pump powered by an 80 hp Kubota turbocharged diesel engine allows for outputs of 6,000, 5,000 or 4,000 psi at 18 gpm. 800/538-8464; www.usjetting.com; Expo booths 5000, 5001.

Dewatering/Grease Handling

67 BDP Industries

The DSP screw press from BDP Industries handles up to 200 lbs/hr of digested waste sludge or 400 lbs/hr of raw sewage. Features include an independent rotary concentrator ahead of the dewatering screw that typically will thicken sludge as diluted as 0.5 to 5 percent. The design is unaffected by tramp materials such as rocks, tree limbs and plastics. 518/527-5417; www.bdpindustries.com; Booths 10044, 10045, 10048.

68 Schier Products

Great Basin indoor/outdoor polyethylene grease interceptors from Schier Products feature a Diffusion Flow design for maximum grease separation and storage. The units are certified to ASME A112.14.3 standards and offer highway-rated composite covers. 800/827-7119; www.schierproducts.com; Expo booth 1131.

Pumps/Controllers

69 FW Murphy

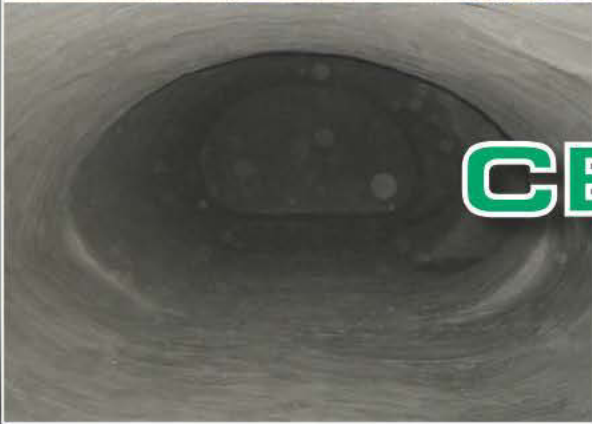
EMS PRO and EMP PRO Lite pump controllers from FW Murphy meet the varying needs of industrial, engine-driven equipment applications. The EMS PRO all-in-one controller is made for use across multiple engine lines. It features numerous start/stop and throttling options via the back-lit operator interface mounted behind a lockable door. 918/317-4100; www.fwimurphy.com; Expo booth 1145.

70 Hibon Inc.

The SIAV and VTB three-lobe series of air injection blowers from Hibon Inc., a division of Ingersoll Rand, are capable of attaining 28 inches Hg vacuum at 93 percent vacuum. The dry, positive displacement blowers feature an oil- and water-free design. 514/631-3501; www.hibon.com; Expo booth 10041.

71 Pat's Pump & Blower

The Myers-Aplex E Series pump from Pat's Pump & Blower delivers flows up to 110 gpm and pressure ratings to 3,000 psi. Easily serviced in the field without removal, the pump features abrasion-resistant valve assemblies and internal gear reductions of 3.95 to 1. 800/359-7867; www.patspump.com; Expo booth 5012.



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ALL FLOWING TOGETHER

The FlowWorks data monitoring Web platform provides a single place to analyze flow information from multiple locations and devices

By Ted J. Rulseh

A key challenge in sanitary sewer flow monitoring has been turning flow information from multiple field devices in scattered locations into readily actionable data. The FlowWorks data management platform from FlowWorks Inc. addresses that challenge.

FlowWorks is a Web-based system that receives data from any major manufacturer's flowmeters, rain gauges and other monitoring

devices, adds information from SCADA systems, and pulls it all together in a single, secure environment where engineers can use tools to perform analyses and create and publish reports.

The system also collects data from U.S. Geological Survey (USGS) and National Oceanographic and Atmospheric Administration (NOAA) environmental stations. Users can graph, analyze and edit real-time data and easily perform advanced

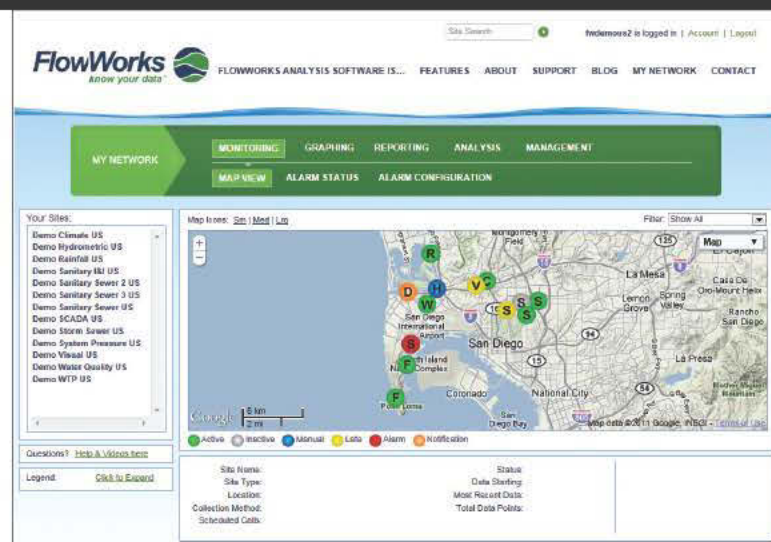


FIGURE 1. The FlowWorks front screen shows the locations, status and types of monitoring stations.

GRAPHICS COURTESY OF FLOWWORKS

calculations. The information can be used for critical functions such as inflow and infiltration (I&I) analysis and creation of rainfall intensity, duration and frequency (IDF) curves.

The data helps support regulatory compliance as well as system condition assessment and system modeling for capital planning on new projects and system rehabilitation initiatives. The analyses and calculations save significant time for in-house engineering departments and consultants, says Timothy Hicks, company president.

Hicks demonstrated the FlowWorks offering via Web meeting, using a special demonstration model that draws data from actual in-the-field monitoring devices.

Walk-around

Hicks described FlowWorks as a massive SQL database. "All the data comes to our central database, fully secure, fully supervised, and backed up hourly, daily and weekly," says Hicks. Customers can access their data—and only their own data—securely from any computer.

While SCADA information can feed the system, FlowWorks never "reaches into" the custom-

er's SCADA system, and so that environment remains secure, Hicks noted. Instead, FlowWorks sets up a system to which the customer transfers data files according to a predetermined schedule.

On top of the database is a computation engine that allows data from individual channels to be combined, monitored, alarmed and analyzed. Along with that customers have access to utilities that allow

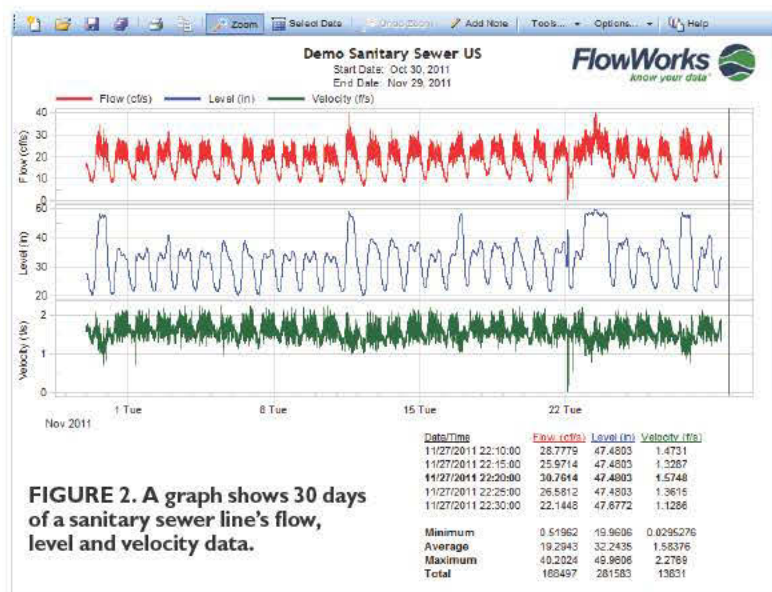


FIGURE 2. A graph shows 30 days of a sanitary sewer line's flow, level and velocity data.

TECHNOLOGY TEST DRIVE

PRODUCT:
FlowWorks flow data monitoring Web platform

SUPPLIER:
FlowWorks Inc.,
Seattle, Wash.
206/859-6999
www.flowworks.com

LOCATION OF DEMO:
Via Internet

DEMONSTRATED BY:
Timothy Hicks, president

LIST PRICE:
Setup \$150 per station; usage \$25 per month per station

(continued)



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FIGURE 3. A rainfall graph line (upper, blue) is added to show correlations between rainfall and flow, level and velocity.

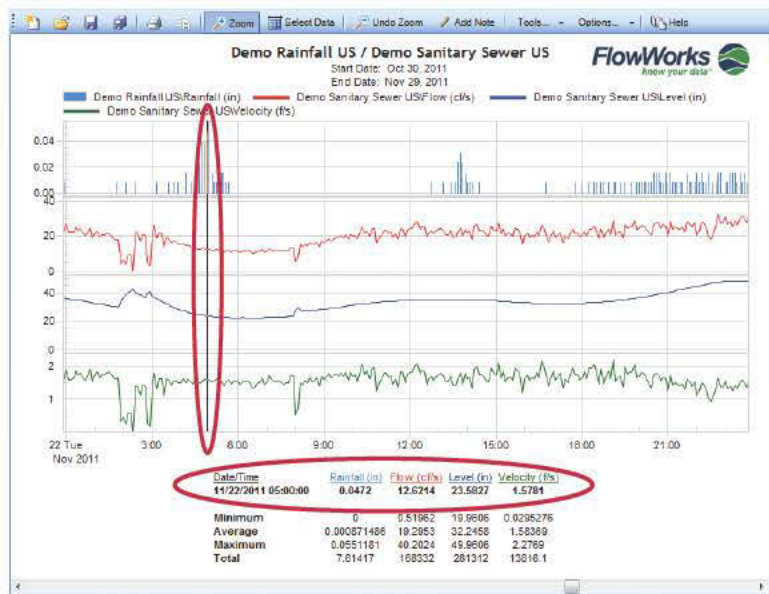


FIGURE 4. A measuring stick function allows the user to display instantaneous flow, level and velocity for any time of day.

them to graph, analyze and report. Data — including manual data — comes into the system at intervals the customer chooses. “Typically, data is live on FlowWorks within three minutes of being received by our server,” Hicks says.

Data comes from stations — physical locations such as a lift station or rainfall station. Each station can have multiple inputs — channels — such as for flow, level and velocity in a sanitary sewer.

Operation

To begin the demonstration, Hicks opened the front screen to reveal a map, then used the mouse thumbwheel to expand the map and show the company’s demonstration site in the area of San Diego, Calif. Colored dots on the map represented live stations being used anonymously for demonstrations, with clients’ permission (Figure 1).

Each station was color-coded

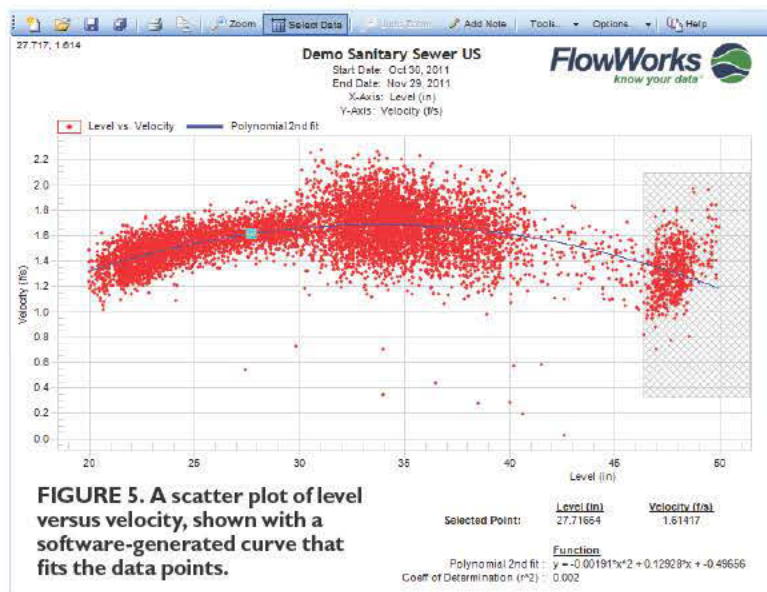


FIGURE 5. A scatter plot of level versus velocity, shown with a software-generated curve that fits the data points.

for its current status (green for properly functioning, yellow for late sending data, orange and red for alarm conditions, and blue for manual stations) and labeled with a letter for the type of station (for example, lift station or climate station).

A click on a sanitary sewer station brought up a box on the screen revealing that data was coming from a Teledyne Isco flowmeter, showing the most recent data sent, and listing the tools associated with the station. An expanded view also showed the station’s physical location (latitude and longitude), the data transmission interval (240 minutes), and the latest flow, level and velocity information.

Hicks then clicked a Tools icon and created a graph showing the last 30 days of flow, level and velocity data (Figure 2). Next, he clicked to open a rainfall station and quickly generated a graph with rainfall plotted against flow, level and velocity (Figure 3).

Zeroing in on a rainfall peak that clearly influenced the flow, Hicks drew a zoom box around it and expanded that section of the graph. He then adjusted the graph to show 24 hours of data. As he moved the cursor over the graph, a “measuring stick” tool revealed the instantaneous flow, level and

velocity for any point in time during that day (Figure 4).

Next, Hicks demonstrated scatter plotting, pulling up a graph of all individual data points for the past 30 days, plotting flow velocity versus level. He then went to the Tools menu and performed a curve fit. “We can do linear curves, or polynomial, exponential, Manning’s equation, logarithmic, and others,” he said. “If we’re trying to prove data and figure out what’s going on down in the sewers, this is a very powerful tool.”

He pointed out a cluster of data points separated from the curve, representing “outlier” data points likely caused by an issue such as a rag stuck in the flowmeter (Figure 5). “The customer can set an alarm based on this data, so that if they start getting data points that far away from the curve, the system sends a text or email to a technician saying go and inspect the meter,” Hicks said.

Returning to the rainfall and flow/level/velocity graph, Hicks demonstrated how to use an editing tool to replace clearly inaccurate data. The ability to edit data is crucial to the ultimate accuracy of sewer system modeling, he noted.

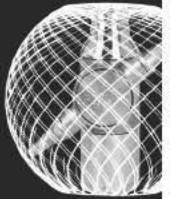
“If you want to model off the data, but you had a bird build a nest in a rain gauge, you would want to replace the flawed data

(continued)

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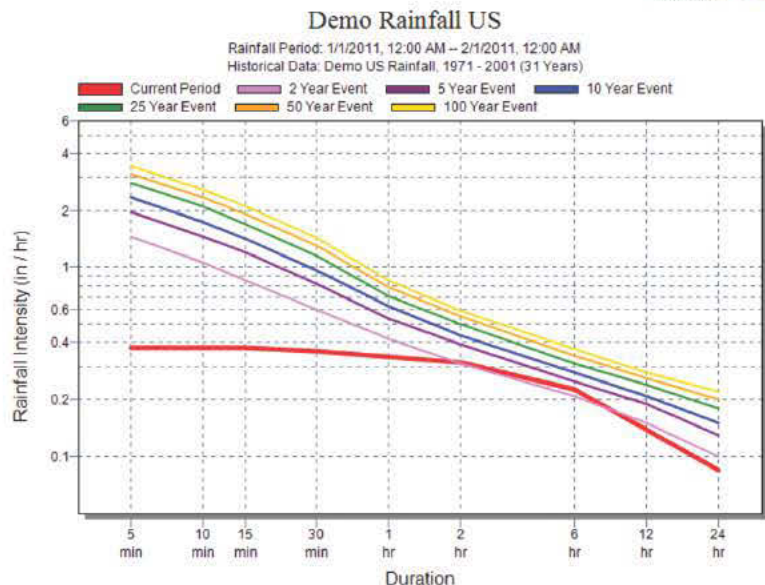


FIGURE 6. A rainfall analysis chart shows duration and intensity data from a current rain event (red line) plotted against historical data on statistically significant storms.

with sensible data so it doesn't skew your model. With this tool, you can cut and replace the data with some data from another gauge that was working," Hicks said.

Finally, Hicks demonstrated how to export a data graph into a Microsoft Word document as a high-resolution JPEG, or into a Microsoft Excel spreadsheet for analysis.

Hicks then turned to the calculation engine, used to perform advanced mathematical functions on real-time data. As an example, he showed how to use velocity and level information to calculate flow. "You can also use calculation to add channels together, such as by adding all upstream monitors to determine the total flow out of a basin," he observed.

He then reviewed an alarm screen showing stations in alarm, with orange and red (most severe) to indicate the alarm level. Users can query each station to see what rule was violated to trigger the alarm and to view an alarm history. Hicks also demonstrated procedures for using an Alarm Configuration tab to set up alarms.

Next, Hicks demonstrated how the system makes use of rainfall statistics and analyzes rainfall data

for sewer system operation and planning purposes. Data from rain gauges on the customer's system comes into the FlowWorks database and automatically populates rainfall charts. "These are statistical tables of how much rain fell in which intervals, and that is a big deal if you're doing modeling," Hicks observed. "These charts are auto-generated in real time."

Hicks showed how users can link a rainfall station to FlowWorks and use the intensity, duration and frequency (IDF) tool to plot a storm event as it occurs, in seconds. The tool produces historic rainfall curves depicting 2-year, 5-year, 10-year, 25-year, 50-year and 100-year storms (color-coded) and also plots a curve (in red) showing the current storm event (Figure 6). The curves help users identify when an interval during a storm event is producing statistically significant rainfall.

"Many clients use this tool to 'watch' a storm event as it occurs from the comfort of their desk and send out their operations crews as a storm event hits a certain severity rating to areas where they know issues may occur," Hicks said.

In conclusion, Hicks demon-



FIGURE 7. The red tracing on this graph indicates rainfall-dependent I&I in a sewer line and represents the difference between the green tracing (dry-weather diurnal flow) and the blue tracing (sewer flow during a current rain event).

strated an I&I Estimator tool. It produced a graph on which a blue tracing indicated the sewer system's response from a rainfall event and a green tracing showed the dry-weather diurnal pattern. The system automatically subtracts the two to reveal the rainfall-dependent I&I (Figure 7). "This is the holy grail for municipal wastewater engineers," Hicks said.

Observer comments

It was easy to see how the graphic, reporting and calculation capabilities in FlowWorks could save engineers from significant amounts of tedious work. The various reporting and calculation functions appeared to be intuitive, at least for an engineer or other professional experienced in sewer system operations and planning.

The system appeared to provide a "one-seat, one-screen" interface for reviewing the status of individual stations on an entire flow monitoring network and for making essential calculations to support planning decisions.

Supplier comments

Hicks emphasized the engineering time savings the FlowWorks

tools provide. For example, he stated that in calculating rainfall-dependent I&I, the tools "turn weeks of spreadsheet work into a couple of hours of FlowWorks work."

He noted that FlowWorks is purely a data manager: "We do not sell any hardware, software or field equipment, and we do not do any engineering. We work with the customer's equipment, engineering company and flow service provider to make sure they have what they need."

"Most customers already have the necessary equipment and only have to direct their data to FlowWorks. It doesn't matter whose meters they have, and it doesn't matter how they are receiving data. We work with their system to manage their data."

He noted that the database accommodates photos, videos, text and Word documents, and assorted other information. There is no limit to the amount of data customers can store, and FlowWorks stores historic data at no additional charge for as long as a user remains a customer. ♦

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Indy 2012



Indiana World War Memorial



Duckpin bowling at the Fountain Square Theatre.

AN OLD-TIME TWIST ON BOWLING

Duckpins, ball & biscuit and the Black Market all bring a bit of the past to present Indy hot spots

By Ted J. Rulseh

Fountain Square Theatre, a two-minute cab ride and only a mile and a half from downtown Indianapolis at the intersection of Virginia Avenue at Shelby and Prospect streets, was the first commercial historic district in Indiana. Its buildings span more than a century from 1871 to the present.

Extensively renovated starting in 1993, the building houses entertainment and events in the Fountain Square Theatre, art galleries and studios, two restaurants, seasonal rooftop dining, a cocktail bar, and duckpin bowling in either of two vintage alleys.

Duckpin bowling was born in Baltimore in 1900 and was a favorite of Babe Ruth. It uses smaller balls and pins and has different rules. The Action Duckpin Bowl has been restored with authentic 1930s vintage bowling equipment and eight lanes. A café area seats up to 120 guests, and surrounding windows give a great view of downtown.

The Atomic Bowl Duckpin, in the building's basement, has seven lanes with authentic 1950s and 1960s bowling equipment, along with displays of mid-century bowling collectibles. A café seats up to 90 guests. Visit www.fountainsquareindy.com.

Bar and lounge

The **ball & biscuit**, two minutes from downtown at 331 Massachusetts Ave., is a bar and lounge set in the cultural corridor of the Mass Ave neighborhood. True to its eclectic surroundings, it has the laid-back atmosphere of a Prohibition-era speakeasy.

From the 150-year-old quarter-sawn wood floor, to the distressed leather chairs, the exposed brick walls and the tin ceiling, the place is a neighborhood bar at heart. The menu includes craft beers, boutique wines and unique cocktails that range from pre-Prohibition classics to modern concoctions. Unique bar foods are

served in an atmosphere of background music conducive to good conversation. Visit www.ballandbiscuit.com.

Casual dining

Black Market is a new gastro pub at 922 Massachusetts Ave., four minutes from the Convention Center. It serves up "comfort food" with an Indiana flavor along with local beers and wines. Foods made with old-fashioned pickling and preservation methods often appear in the restaurant's dishes. Entrees like ale steamed mussels, rainbow trout, mushroom dumplings and the Black Market burger are served in

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a casual atmosphere where diners in a suit or jeans are equally welcome. Entree prices range from \$12 to \$22. Visit www.blackmarketindy.net.

Historic site

Dominating the five-block picturesque setting of War Memorial Plaza in downtown Indianapolis, the Indiana World War Memorial sits 210 feet above street level. This mausoleum-style limestone and marble memorial honors Hoosiers killed during World Wars I and II, the Korean War and the Vietnam War.

The memorial, at 431 N. Meridian St., includes multiple standing figures that symbolize courage, memory, peace, victory, liberty and patriotism. The Shrine Room, with 24 stained glass windows, provides the setting for a 17- by 30-foot

American flag suspended from the ceiling. A military museum in the basement follows the history of Indiana soldiers from the Battle of Tippecanoe through the most recent conflicts. Visit www.in.gov/iwm.

Shopping

Midland Arts & Antiques Market in downtown Indy can keep you occupied for hours with four floors full of art and antiques from more than 200 dealers from around the Midwest. Located at 907 E. Michigan St., four minutes from the Convention Center, the market has been a destination for more than 15 years. Merchandise includes decorative items, works by local artists, furniture, pottery, vintage jewelry, 1950s collectibles, china and a great deal more. Visit www.midlandathome.com. ♦



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LESSONS FROM THE MILITARY

A five-paragraph operations orders format from the U.S. Army can help municipal leaders give crystal clear directions that lead to successful projects

By *Kenneth Stubbe*

Clear, simple and thorough directions — we all want them. Then why are they so hard to give, and so hard to get?

Perhaps we can learn something from an organization with worldwide operations that issues thousands of directions daily to coordinate thousands of independent working groups — one for which keeping everyone moving in the same direction is critical to the accomplishment of strategic national goals.

For years, the United States military has taught managers at all levels to use a simple five-paragraph format to give directions. It's known as Operations Orders (OPORD). The British, Australian and Canadian military forces use a similar format and fire and emergency responders use another closely related system.

The format was developed in the American forces during World War II as late, inadequate or misunderstood theater-wide operations orders to individual units led to excessive battlefield failures and missed opportunities. Of course, these failures were deadly stuff for front-line soldiers under fire.

Unclear and misunderstood directions are no treat for civilian managers, either. The five-paragraph format used to give directions in the U.S. Army follows an acronym called SMESC, for Situation, Mission, Execution, Service Support, and Command and Signal. The Army's memory device

for SMESC is Sergeant Major Eats Sugar Cookies. Consistent use of the format helps managers give simple, clear directions.

Situation

Situation is a brief description of the current status of the project, problem or task, where key players are, and the issues that affect what they have to do. An example:

"Six inches of snow is expected tonight. We're short the plow that broke down yesterday. Plus, we have to mix and load our own sand and salt, because Jones at the

piece of the operation fits. Manager's intent also provides general guidance on mission goals when things change dramatically.

Knowing intent allows the crew to adjust and work to overcome missing information or support when things don't go according to plan. The mission directions should give basic, specific information, so that someone reading them can answer the questions who, what, where, when, why and how. An example:

"Our goal is to safely clear the roads without causing any accidents and to make the roads safe for the public. As always, our first

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 Ted Rulseh at 800/257-7222, or email editor@mswmag.com.

about who will do what, the equipment and tools needed, and any subtasks that need to be assigned. It also tells crew members how to coordinate with other crews and complementary departments. For instance:

"If a snow emergency is declared this holiday weekend; we will meet at the county garage at the beginning of shifts and begin working in the designated 12-hour shift rotation until the snow emergency is lifted. At the beginning of each shift, route and task assignments will be given during the briefing but will generally follow standard

The SMESC format was developed in the American forces during World War II as late, inadequate or misunderstood theater-wide operations orders to individual units led to excessive battlefield failures and missed opportunities.

shed is gone for a funeral. Holiday traffic will make the roads busier. The near-melting temperature will make roads slippery, especially later this evening when it starts cooling off. Luckily, Lake County will lend us their extra plow and driver; and the sheriff will conspicuously post extra squad cars to slow drivers down."

Mission

The mission is what needs to be accomplished. It should also explain the manager's intent and the related organizational strategic goal that applies to the mission.

The manager's intent is a critical part of the mission directions because it gives everyone an idea of the big picture and how their

focus will be on keeping the main arteries and emergency routes clear. If you are plowing or sanding in an unfamiliar area, consult your route cards.

"Pull over to let traffic pass when it starts building up behind you, or at least every half mile. Pull over quickly but carefully if someone tries to pass you unsafely. As we know, drivers get restless but can't see through our plowing blizzard. Push big piles of snow out of the way, so that they don't block the lines of sight for drivers at intersections and other danger areas."

Execution

Execution is the specifics about how the mission is to be accomplished. It includes information

operating procedures. If you get ahead on your route, call the shift foreman to see if other drivers need help. Ask for help if needed to quickly plow a busy section of road."

Service Support

Service support explains the tools and logistics needed to accomplish the mission. For example:

"This weekend, if it's not snowing yet, call your crew leader an hour before the beginning of each 12-hour shift for a status report. After the snow emergency is called, meet as usual at the county garage for a briefing at the beginning of each shift. Make sure your radios are working and carry the standard package of tools and emergency supplies. Don't forget

to take along easy-to-eat food and beverages for the long shifts. Foremen will be available to replace you during needed breaks.”

Command and Signal

Command and Signal explains the means of communication, the chain of command, and what to do if there is a break in the chain of command. For instance:

“Shifts start 30 minutes after the county administrator calls a snow emergency. When crews get out on the routes after the briefing, use your radios to communicate. The shift foreman will be in charge. If the foreman is not available, call the assistant shift foreman. To report traffic emergencies, call the sheriff’s dispatcher, which the foreman will be monitoring, and then call the foreman. Coordinate help to each other and with the deputy sheriff squad cars through the shift foreman.”

The five-paragraph order can be used for everything from deploying work crews, to planning a weekly meeting, to scheduling the office work week. SMESC is a tool to make sure you share everything needed for your crew to accomplish the mission. A clear order means all players know their roles, everyone knows how to handle changes in the situation, and all involved work toward the same strategic goal.

The key to SMESC is consistency: Everyone knows how directions will be delivered, how to deliver them, and what to ask for if something is left out. ♦

About the Author

Kenneth Stubbe is a Certified Economic Development and Finance Professional. He studied leadership and management in the U.S. Army and at business school.

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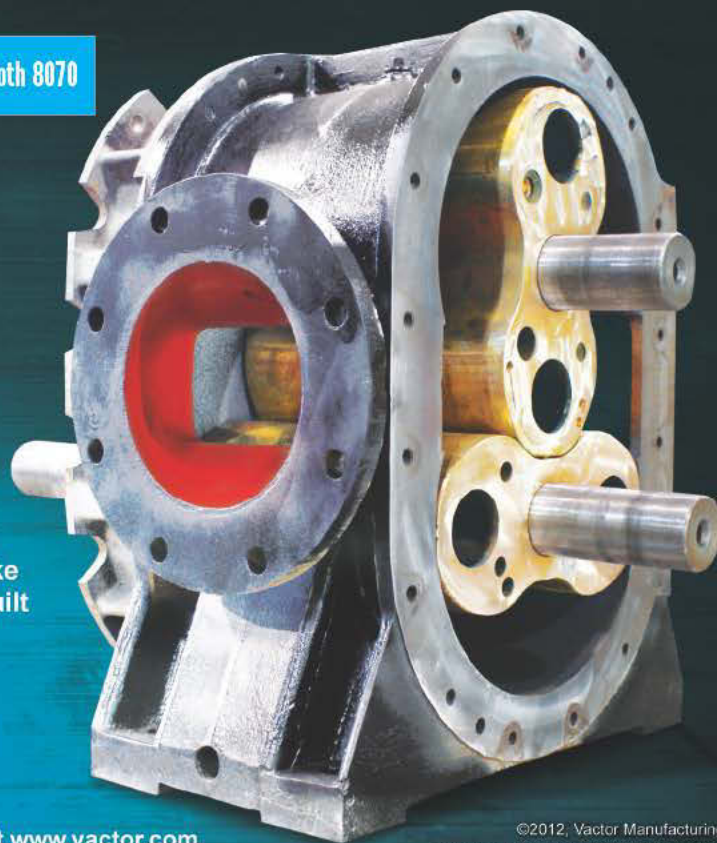
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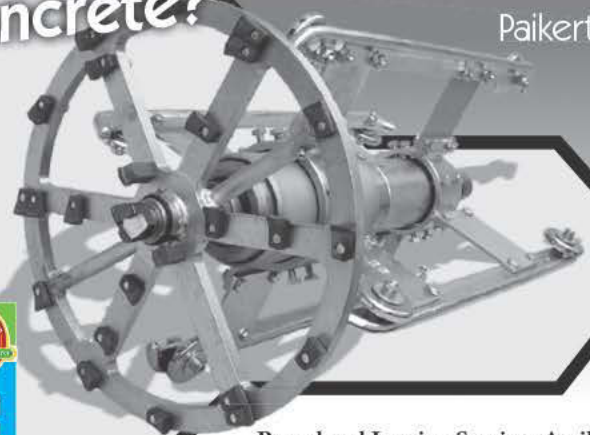
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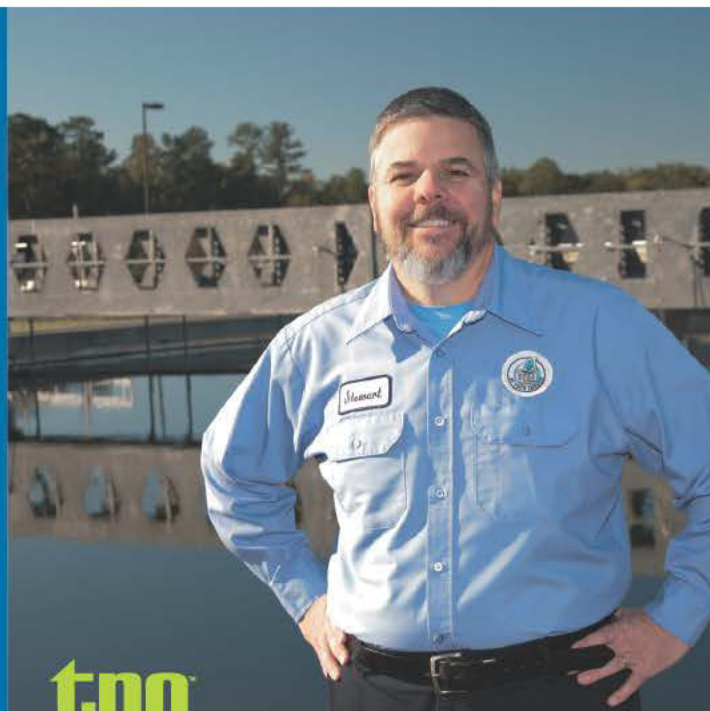


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Advanced Waste Receives Permit Modification

Advanced Waste Services' residual waste processing facility in New Castle, Pa., received a modification to its solid waste permit from the Pennsylvania Department of Environmental Protection. The permit modification will allow the company to accept for processing municipal waste generated from residential, commercial or institutional sources that exhibit characteristics similar to residual waste through the Form U Process, including car wash sediments, service station oils and coolants, municipal wastewater treatment sludges and nonhazardous chemical discharges.

Godwin Pumps Changes Name to Xylem Dewatering Solutions

Godwin Pumps of America Inc. changed its name to Xylem Dewatering Solutions Inc., effective Jan. 1. Godwin will remain the brand name for the company's Dri-Prime series of pumps.

Vacon to Deliver Drives for Winches in Norway

AC drive manufacturer Vacon will deliver liquid-cooled AC drives for active heave-compensated winches onboard a Norwegian-built inspection, maintenance and repair ship. Delivery of the 17 drives is scheduled for March.

Star Pipe Names CEO, President, Managers

Star Pipe Products named Ramesh Bhutada chief executive officer and chairman, promoting Dan McCutcheon to president. Navin Bhargava was promoted to executive vice president in charge of procurement, while Jason O'Nan was promoted to vice president in charge of sales and marketing. Pete Lisowski was promoted to national sales manager, Doug Allen was promoted to Southeast Division manager, Rich Mazur joined the sales team as territory manager for New England and upstate New York. Brian Pokropski joined the company as territory manager for the Mid-Atlantic area, Brian Kilgore joined the sales team as territory manager for Arizona, Southern Utah and Nevada and Jerry Hughes joined the sales team as territory manager for the Mid-Central area.



TRIC Tools Moves to New Headquarters

TRIC Tools Inc. has moved from Alameda, Calif., to its new headquarters near the Oakland International Airport. The building enables the company to consolidate operations, including a new research and development facility.

Insituform Completes Internal Reorganization

Insituform Technologies Inc. completed an internal reorganization where Delaware parent holding company, Aegion Corp., was created to provide corporate and administrative services for its operating subsidiaries (Insituform Technologies, The Bayou Companies, Corpro Companies, United Pipeline Systems, CRTS, Fibrwrap Construction Services and Fyfe). In the new structure, Aegion replaces Insituform as the public company. Insituform and its former direct subsidiaries are now direct subsidiaries of Aegion.

Neenah Names VP, Expands Distribution

Neenah Enterprises Inc. named Thomas A. Walton vice president-construction sales and operation. Walton brings 20 years of management, foundry operations and municipal sales to his position. The company also opened a distribution center in Stoughton, Mass., serving customers in the New England region. The center will carry materials for most municipal casting projects. ♦

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LEARN WHAT'S NEW IN 2012

NASSCO plans its annual meeting and a variety of training programs to help advanced professionals' skills in trenchless technologies

By Ted DeBoda, P.E.

There's something about resolutions at the start of each year that give us all a new perspective. At NASSCO, the National Association of Sewer Service Companies, we use the winter months to dive into new education and training opportunities that will set the stage for the coming year.

From Feb. 15-18, NASSCO members in good standing will gather for our biggest networking and technical event of the year at Caesar's Palace in Las Vegas, Nev. The four days will be packed with opportunities to network with other NASSCO members and, more

important, take part in technical discussions and presentations that focus on advances in trenchless technologies.

We will introduce new technologies and equipment to our industry in a forum that is designed to teach, not sell. This year, we will learn more about CIPP sensor strip technology, pipe joint defect analysis, sonar/laser/CCTV all-in-one tools, and grouting inspection tools. While attendees will leave with fresh knowledge, they will also partake in social networking events, including our annual golf tournament and banquet.

On Feb. 27, NASSCO will make a series of technical presentations during the Pumper & Cleaner Environmental Expo in Indianapolis, Ind. The day will be packed with presentations made

by NASSCO members on subjects that include CMOM (Capacity, Management, Operation and Maintenance), water main lining, culvert rehabilitation, manhole lining/sonar inspections, and equipment options for the industry.

As always, NASSCO conducts several training programs throughout the year for the Pipeline

training in pipe bursting and manhole rehabilitation early in 2012.

You can view the entire, updated schedule for PACP and ITCP training at nassco.org. Here are the PACP training schedules and sign-up information for March and April:

- March 6-8, PACP including manholes and laterals, Twins-

As always, NASSCO conducts several training programs throughout the year for the Pipeline Assessment Certification Program (PACP) and the Inspector Training Certification Program (ITCP).

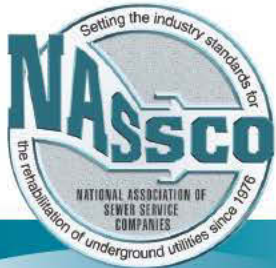
Assessment Certification Program (PACP) and the Inspector Training Certification Program (ITCP). To date, ITCP has focused on CIPP training. However, in response to many requests, we will provide additional classes for inspection

burg, Ohio; and April 30-May 2, PACP including manholes and laterals, Northville, Mich. Contact kaydoheny@doheny-supplies.com or call 248/939-3220.

- March 16-17, PACP only, Nashville, Tenn.; April 3, PACP Recertification, Owings Mills, Md.; and April 9-11, PACP including manholes and laterals, Owings Mills, Md. Contact dawn@nassco.org or call 410/486-3500.

Our mission is to set industry standards for the assessment and rehabilitation of underground pipelines, and to assure the continued acceptance and growth of trenchless technologies. We can achieve this goal only through a dedicated effort to keep our members and the industry informed of new advances and technologies. ♦

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



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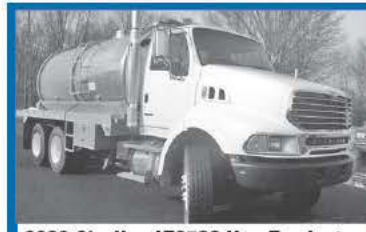
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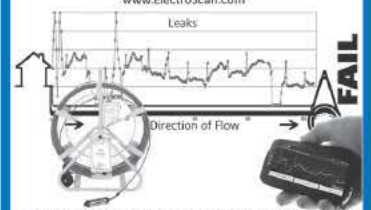
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- Feb. 23 – Understanding the Required EVT (Emergency Vehicle Training) for Fleets
- March 15 – Using Performance Measurements to Cope with Layoffs
- March 29 – Case Studies on Building Support for Flood Protection Projects
- April 3 – Clients and Consultants: How to Work Together for the Best Possible Project

Visit www.apwa.net.

ASCE

The American Society of Civil Engineers has these courses:

- Feb. 9-10 – Pumping Systems Design for Civil Engineers, Chicago
- Feb. 14 – Stormwater BMPs: What Works, What Doesn't and What About Maintenance, online
- Feb. 29 – Stormwater Management Alternatives for Small Commercial Sites, online
- March 8-9 – NPDES Stormwater Permit Compliance, Atlanta, Ga.
- March 8-9 – Pumping Systems Design for Civil Engineers, San Antonio, Texas

CALENDAR

Jan. 30-Feb. 2

American Water Works Association/Water Environment Federation Utility Management Conference, Hyatt Regency Miami, Miami, Fla. Call 703/684-2441 or visit www.wef.org.

Feb. 13-15

Iowa Rural Water Association Annual Conference, Coralville. Visit www.iowaruralwater.org.

Feb. 13-16

Colorado Rural Water Association Annual Conference, Colorado Springs. Visit www.coloradoruralwaterassociation.club.officelive.com.

Feb. 14-16

North Dakota Rural Water Systems Association Annual Conference, Fargo. Visit www.ndrw.org.

Feb. 22-23

American Water Works Association International Conference on Stormwater and Urban Water Systems Modeling, Marriott Courtyard Toronto Brampton, Toronto, Ont. Visit www.awwa.org.

Feb. 22-24

Montana Rural Water Systems Annual Conference, Great Falls. Visit www.mrws.org.

Feb. 27-March 1

American Water Works Association Membrane Technology Conference & Exposition, Glendale, Ariz. Visit www.awwa.org.

Feb. 27-March 1

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

Feb. 27-March 2

Rural Water Association of Utah Annual Conference, St. George. Visit www.rwaunet.net.

Feb. 28-March 1

Delaware Rural Water Association Annual Conference, Harrington. Visit www.drwa.org.

March 12-16

National Utility Contractors Association Annual Convention, Fort Worth, Texas. Call 703/358-9300 or visit www.nuca.com.

March 26-28

American Water Resources Association Spring Specialty Conference, Sheraton New Orleans Hotel. Visit www.awra.org.

- March 15-16 – Stormwater Treatment Using Detention Ponds and Commercial Devices, Las Vegas
 - March 20 – Sustainable Sites Stormwater Design and Water Efficiency Points for LEED Projects, online
- Visit www.asce.org.

AWWA

The American Water Works Association has a Financial Management: Cost of Service Rate-Making seminar March 19-21 in Portland, Ore. Visit www.awwa.org.

Wisconsin

The Wisconsin Department of Natural Resources has these courses:

- March 1 – IT/Security, Madison
 - March 8 – Utility Management Training, TBA
 - March 22 – Treatment Operations Seminar, Oak Creek
- Visit www.dnr.state.wi.us.

The University of Wisconsin Department of Engineering-Professional Development has a Using WinSLAMM to Meet TMDL, LID and MS4 Stormwater Requirements Seminar April 12-13 in Madison. Visit www.epdweb.engr.wisc.edu. ♦



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