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December 2022
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SYSTEMWIDE APPROACH

Dramatic transformation reduces Pennsylvania utility's I&I and SSO issues

PAGE 20

The Upper Montgomery Joint Authority in Pennsburg, Pennsylvania, has been using every tool at its disposal to fight I&I.

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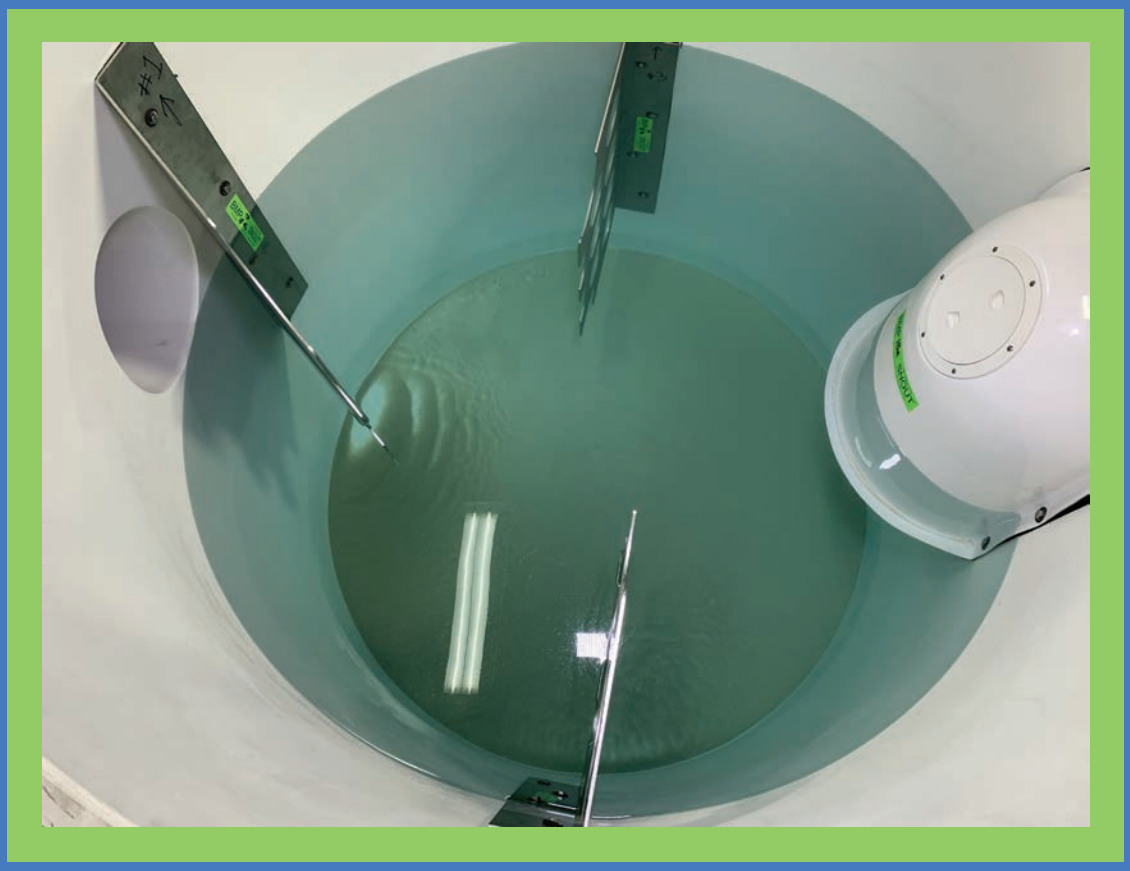

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ON THE COVER: A crew member at the Upper Montgomery Joint Authority in Pennsburg, Pennsylvania, smoke tests to identify inflow and infiltration sources. (Photography by Hannah Beier)

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Luke Laggis

Luke Laggis

A DIP IN THE HOLY WATER

Too few appreciate the work of delivering clean, safe water from source to spout

I was looking for some inspiration for this column when a quiet ding announced Anthony Drew's arrival at the top of my inbox. A fellow editor at COLE, he'd been reading a book of essays over the weekend and came across Joan Didion's 1977 essay *Holy Water,* in which she discusses her fascination with water.

While Didion's writing was brilliant, what stuck out to me more was her obsession with the movement and management of water.

"As it happens my own reverence for water has always taken the form of this constant meditation upon where the water is, of an obsessive interest not in the politics of water but in the waterworks themselves, in the movement of water through aqueducts and siphons and pumps and forebays and afterbays and weirs and drains, in plumbing on the grand scale. I know the data on water projects I will never see. I know the difficulty Kaiser had closing the last two sluiceway gates on the Guri Dam in Venezuela. I keep watch on evaporation behind the Aswan in Egypt. I can put myself to sleep imagining the water dropping a thousand feet into the turbines at Churchill Falls in Labrador. If the Churchill Falls Project fails to materialize, I fall back on waterworks closer at hand — the tailrace at Hoover on the Colorado, the surge tank in the Tehachapi Mountains that receives California Aqueduct water pumped before — and finally I replay a morning when I was seventeen years old and caught, in a military-surplus life raft, in the construction of the Nimbus Afterbay Dam on the American River near Sacramento."

There are politics involved in any municipal endeavor, but water is life, not politics.

In some ways I get to live Didion's passion and look at the industry through her curious but informed eyes. I sometimes think about water and weather in the same — if somewhat less poetic — terms, and about what utilities in different parts of the country are dealing with while they work to keep water flowing to their customers' taps. I look at the ski report and wonder if the snowpack will be sufficient to serve Denver Water's needs. When hurricanes roll in I think about Miami's efforts to combat sea level rise and make its systems more resilient. I think about rain over Texas and wonder if it's filling the 26-square-mile reservoir — Bois d'Arc Lake — that the North Texas Municipal Water District built to provide a more sustainable future for the communities it serves.

I also appreciate that Didion makes the distinction between the politics of water and the water itself. There are politics involved in any municipal endeavor, but water is life, not politics. They may play a role in the supply of water, but they'll never impact our need for it. And your work at its core is for people, communities and the environment, not political gain. Humans need clean, safe water regardless of political affiliation.

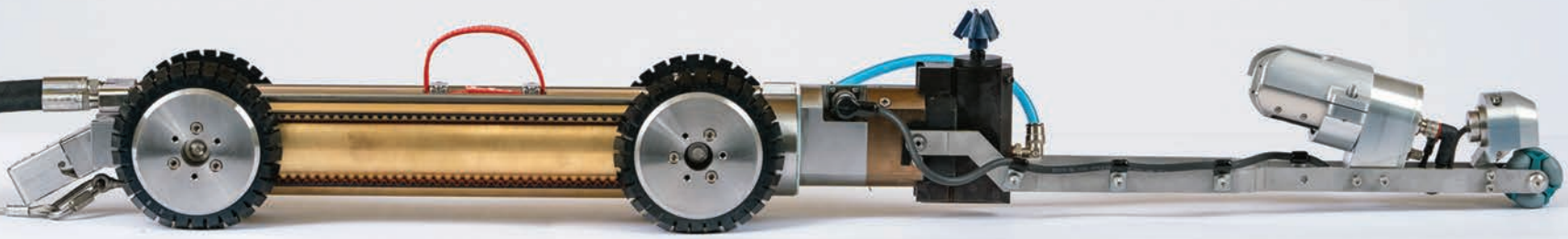
While lawyers and judges will discuss water rights and allotments, they'll never change our baseline need for water, so make sure you're using your voice and your knowledge to educate people about the need to quit wasting it.

Enjoy this month's issue. ✦

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

A CUT **ABOVE**

PIPE INSPECTION AND REHABILITATION SOLUTIONS



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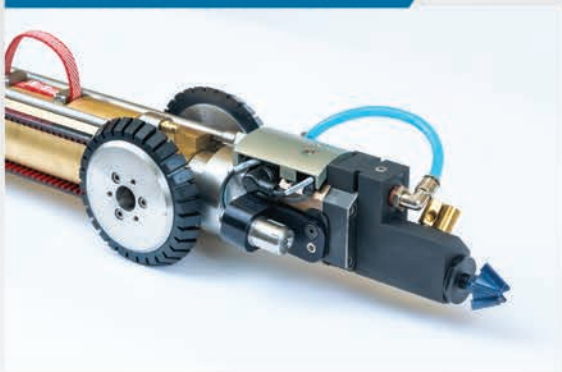

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OVERHEARD ONLINE

"While we are preparing for a fourth year of extreme drought, we still need to plan for swings between severely dry conditions and large storms and flooding."

— ***Amid Weather Extremes, California Urges Flood Preparation Even During Historic Drought***
mswmag.com/featured

EUROPEAN HACKATHON

Participants Tackle Water Crisis

A team of hackathon participants recently developed an innovative app to promote sustainable water consumption. Team WatApp won HackZurich 2022's Xylem Water Challenge with its social gaming app that helps people make smart water choices in their everyday lives, build long-term water-saving habits and share their results with friends **mswmag.com/featured**

WATER RISK IMPACT

A Hit to U.S. Economy

New research launched recently by global professional services company GHD titled "Aquanomics: The economics of water risk and future resilience" reveals droughts, floods and storms could result in a total loss of $3.7 trillion to the United States gross domestic product between 2022 and 2050. It's the largest dollar impact faced by any of the countries included in the study. **mswmag.com/featured**

SALT WATER INTRUSION

Underwater Sill in the Mississippi

Unsafe salinity levels have been detected at municipal drinking water intakes in Plaquemines Parish, Louisiana. As a result, the U.S. Army Corps of Engineers, New Orleans District began construction of an underwater sill in October across the bed of the Mississippi River channel to prevent further upriver progression of salt water from the Gulf of Mexico. **mswmag.com/featured**

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READY FOR THE NEXT STORM

Coastal community protects sensitive environment thanks to a new approach to system monitoring

By Mary Shafer and Suzan Chin-Taylor

One of the oldest port cities in the state of Florida (est. 1831), Apalachicola is known as the oyster capital of the world. The health of that and other fisheries depends greatly on the quality of water flowing from the Apalachicola River into Apalachicola Bay.

Located on the Gulf of Mexico, about halfway across the panhandle region, Apalachicola also depends on its tourist trade, another industry that relies on clean water for an attractive recreational environment. Standing watch over the quality of that water are the staff of the city of Apalachicola Collections Department. They handle water and wastewater issues, while the Public Works cover stormwater concerns.

Travis Wade, Apalachicola's city manager, works closely with William Cox, the city's lead wastewater plant operator, to monitor the efficiency and effectiveness of the sanitary sewer system. Their most vexing problem today is getting a handle on inflow and infiltration issues that threaten water quality.

Growing danger

Like many established cities in the eastern U.S., Apalachicola's wastewater collections system, and its wastewater treatment plant, are approaching the end of their initial design life. Tree roots seeking water worked their way into cracks and through pipe joints, where settling and subtle ground movement caused seams to separate.

Eventually, stormwater also found its way into the pipes through these pathways, creating a widespread problem with infiltration. Though most of the system's main and lateral lines have largely been replaced by modern PVC pipes, there are still places where the water seeps in, and sometimes in a significant way.

Another source, Cox explains, was "road construction and other types of utilities coming through and damaging existing lines. It just creates so much infiltration that the utility couldn't handle that much flow coming in anymore."

When they become aware of them, city crews have been digging up these types of damaged pipes and repairing them with a concrete-and-fabric patch over the top to prevent them serving as infiltration ingresses. "That's something we'll be seeking grant money for, because I would love to replace all of our terra cotta pipes with PVC or a harder, better substitute. Flooding caused by ineffective stormwater drains results in infiltration into the sewer system." Wade says.

With its location right on the Gulf, Apalachicola's sanitary system is also susceptible to massive inflow

PROFILE:
City of Apalachicola, Florida, Collections Department

POPULATION SERVED:
Approximately 3,000

GEOGRAPHIC AREA:
Roughly 4 square miles

EMPLOYEES:
6

COLLECTIONS SYSTEM:
Approximately 300 miles of collection mains, of which approximately 200 are vacuum and the rest gravity feed; comprised of 8- to 10-inch-diameter pipes, predominantly PVC and 4-inch laterals; 430 vacuum pits and buffer tanks; 4 lift stations; 300 manholes; 1.0 mgd treatment plant currently running 300,000 gpd

WEBSITE:
www.cityofapalachicola.com

> "It took days, and that exhausted everybody with the city. We were all almost dead."
>
> Travis Wade

Apalachicola City Manager Travis Wade works closely with William Cox, the city's lead wastewater plant operator, to monitor the efficiency and effectiveness of the sanitary sewer system. (Photography by David Adlerstein)

during tropical storms and hurricanes. Between drenching tropical downpours, high tides and significant storm surge, the system can be easily overwhelmed with both fresh and saltwater inundation.

Trial by flood

One particular storm, Hurricane Sally, brought the system's weaknesses into high relief as it came ashore in nearby Alabama as a Category 2 storm on Sunday, Aug. 30, 2020.

"The guys on the field crew worked 24 hours a day," Wade recalls. "I actually went out with them one night and worked until 1 or 2 o'clock in the morning, just helping to find leaks in the system or areas where (infrastructure was) overwhelmed. We sent out our 800-gallon pump wagon — now we have two (we bought an extra one because of that event) — but we also had two local vendors in the area who brought their pumper trucks out and helped. We called in the city of Tallahassee, which sent three very large pump trucks, and it took all of that for us to get on top of the situation. It took days, and that exhausted everybody with the city. We were all almost dead."

That Sunday, 7.85 inches of rain fell, triple the previous record for that date. Another 2 inches fell the next morning, making the total two-day deluge just under 10 inches. Apalachicola's wastewater treatment plant is rated for 1 mgd, with an average flow of 300,000 gpd. Then-mayor Kevin Begos reported the following Wednesday to *The Apalachicola Times* newspaper that the math suggested, "roughly 347,571,200 gallons of rain fell on the city in a little over a single day, not including more in greater Apalachicola."

The sheer volume of water completely overwhelmed the entire sanitary system. Begos allowed that neighboring Eastpoint's collections system "crashed too, but ours was worse."

Hybrid system

The incident led collections field crew supervisor Rhett Butler to seek out advice from Michael Pringle, director of operations for Flovac Vacuum Sewer Systems, an engineering firm and manufacturer of vacuum sewerage systems.

Flovac engineers understood that Apalachicola's location at the shore makes it environmentally sensitive as well as an engineering challenge

> **"The depth that our lines were at, it was going to cost all kinds of money to do trench boxes."**
>
> **Wayne Cox**

because of its high water table. Those are the reasons the city had previously purchased an Airvac Inc. vacuum sewerage system and installed it to extend the existing gravity system, but they were still experiencing surcharges and SSOs on their now hybrid system.

"The city elected to go with another type of sewer system," Cox says. "The depth that our lines were at, it was going to cost all kinds of money to do trench boxes. Then having to well point the system to get everything pumped low enough to where they could safely work in that area. … It just made more sense — and was a lot cheaper — to go with a vacuum system where you wouldn't have to dig as deep."

To keep a handle on costs, they decided to continue using the gravity system for the higher-elevation north side of Apalachicola as well as construct the new vacuum system primarily south of Martin Luther King boulevard, a main east-west artery through the city.

"The vacuum system predominantly serves the outlying areas of town and the river," Cox says. "Going to the west, it's got the majority of the community." This was enabled by the ability of the vacuum system to accommodate the higher water table at the lower elevations toward the Gulf shoreline.

Timely data

Pringle believed adding the Flovac monitoring system to the vacuum segment would extend functionality and be part of the solution to the city's massive I&I woes. He met with the mayor and his team and introduced them to the system. The FMS places sensors in each of the vacuum collection pits, tracking changes in vacuum pressure, which indicates flow volume. Higher pressure means more volume, and if that number rises, something unusual is going on regarding sudden influx of water from somewhere. The sensors transmit alerts when flows go outside established parameters, which are picked up by Flovac's digital smartphone app and transmitted wirelessly to users.

Assistant field crew supervisor John Marshall checks the Flovac Monitoring System at one of Apalachicola's vacuum pits.

City engineers worked with Flovac to determine how the FMS could be successfully deployed in Apalachicola and were able to deploy the system within a couple weeks. The unique functionality of the FMS, Pringle says, is due to in-house design coupled with the ability to make performance changes remotely.

Because the city has not implemented any kind of GIS digital asset management, managers and field crews were both impressed with the fact that the FMS app serves some of the same purposes for the vacuum side of their collections system. This has proven a boon to both preventive maintenance and emergency response.

"Because of the Flovac monitors, we're able to know where we have a problem, sometimes even before we get an alarm from our vacuum

The Apalachicola team includes (from left) field technician Freddie Kilgore, field crew supervisor Rhett Butler, assistant field crew supervisor Marshall and field technician Johnny Harris.

Field crew supervisor Rhett Butler and his team are responsible for operating Apalachicola's vacuum sewer system.

station auto-dialer," Cox says. "This monitoring system will actually text us and let us know which station is messed up, and it will tell us before we even get the alarm from the system."

One of the advantages of the FMS is that it is customizable to each system's needs, and Butler and his field crew members, John Marshall and Johnny Harris, fine-tuned the system by adjusting the vacuum pressure on those pits and the monitors. "This allowed us to make it an even better system for our town," Wade says.

Getting better

As much as the new technology has helped, it hasn't solved all of Apalachicola's I&I woes. There are still problems with aging infrastructure.

"We do still have infiltration on both the gravity and the vacuum systems," Cox says. "I can't really say from a plant operator's standpoint that we've seen a dramatic reduction in I&I at this point because for everything that gets fixed in one area, it seems like there's something new showing up in another.

"But these monitors have actually allowed us to determine — like, we know for a fact — when we need to pay attention to something. We've got one pit right now that every time the tide comes in, it starts operating inconsistently. So we know (from the monitor data) that we have something going on with that one. Now it's just a matter of getting out there and making the repair. But there again, we don't have monitors on every single connection that's out there.

About a year and a half ago, the crews lined 25 of the most deteriorated manholes in the gravity system. They also maintain four lift stations with two pumps each, which are being ravaged by H2S. But right now, Cox says they're just trying to identify I&I locations. "That's the first challenge. We're trying to get the funding to do that. That's going to have to be something that comes from the legislature, because with our city, we're not able to afford that."

"Because of the Flovac monitors, we're able to know where we have a problem, sometimes even before we get an alarm from our vacuum station auto-dialer."

William Cox

Stepping up

They've been consistently seeking such funds, writing grant applications for infrastructure studies.

"We have a pressing need for a stormwater study, too," Wade says. "We have I&I in our stormwater system ... roads collapsing, because the dirt above is being pulled down through the storm drains and leaving the road hovering over the base. We have that in a lot of places and it's dangerous. Then if it's asphalt, it just falls through when we have a hole there. We have some concrete … one day you realize you're looking down on a crack and it's 14, 18 inches deep under the concrete road, and you pray to God a garbage truck doesn't run through there and fall in. We have a street that's closed down right now because of that."

Still, the Collections Department feels a sense of accomplishment from getting a handle on the most extreme and destructive facets of their continuing I&I issues. Cox is proud that they all stepped up to the plate when they realized how bad the situation was and made use of all available resources to fix it.

Like Butler reaching out to Pringle, Cox says it's important to recognize your own limitations and get past them by leveraging other people's knowledge. "Don't be afraid to ask questions from other people who have experience and expertise, and whatever their advice is, don't take that for granted." ✦

REGIONAL IDIOSYNCRASIES CHALLENGE I&I AWARENESS

William Cox, the city of Apalachicola's lead wastewater plant operator, says Rhett Butler and his field crew have worked with the Florida Rural Water Association to conduct smoke testing to analyze areas where they have infiltration concerns. However, that proved frustrating and yielded little insight.

"One of our current issues, especially on the gravity system, is that — due to the depth of it, and due to the height of our water table — smoke testing for broken or damaged lines almost doesn't do you any good. With the high water table, the smoke can't work its way up through the soil. So, unless you have an open clean-out cap or somebody moved a home like a trailer or a camper and just broke the pipe off at the surface, you won't really know anything with the smoke."

Under these conditions, which are constant, the field crew is pretty much limited to televising the lines to look for consistent flow. This type of inspection, as well as regular preventive cleaning and maintenance — jetting and vacuuming — are contracted out on the gravity side.

We invite readers to offer ideas for this regular column, designed to help municipal and utility managers deal with day-to-day people issues like motivation, team building, recognition and interpersonal relationships. Feel free to share your secrets for building and maintaining a cohesive, productive team. Or ask a question about a specific issue on which you would like advice. Call editor Luke Laggis at 800-257-7222, or email editor@mswmag.com.

FOSTERING A SENSE OF PRIDE

Companies can stop The Big Quit by recognizing employees for good performance

By Ken Wysocky

For more than a year now, approximately 4 million American workers a month have left their jobs — that's nearly 49 million in 2021 alone, according to federal statistics. This unprecedented worker exodus has become known as The Great Resignation or The Big Quit.

As this trend continues unabated, consultant and author Bob Nelson, Ph.D., believes there's a remedy available for beleaguered companies: thoughtful and intentional recognition programs that foster a strong sense of pride among employees, both in their work and the companies that employ them.

Bob Nelson

"Whatever you're trying to get more of from employees, you'll get it if you recognize them for doing it," says Nelson, owner of Nelson Motivation in San Diego, a keynote speaker and author of business books including *1,501 Ways to Reward Employees*. "If you want any type of behavior from an employee — or even a spouse, your kids or your neighbors — thank them for the things they do that you want them to do more of.

> **"Whatever you're trying to get more of from employees, you'll get it if you recognize them for doing it."**
>
> **Bob Nelson**

"It's a very simple but very powerful concept."

Nelson says his years of research into the power of recognition and employee pride — including a three-year study that involved 47 American companies — revealed why so many managers don't recognize employees. The most common one was they didn't feel it was important, says Nelson.

Managers also said they didn't have time, believed it wasn't part of their job description or feared offending those employees who weren't getting recognized. Some managers even felt that because they didn't get recognition, they didn't feel the need to recognize employees.

"It looked like a long list of excuses to me," he says. "Ever since then, I've spent my career trying to help managers and organizations see the power of this pride principle and get in the game."

Recognition pays off

But there are a host of compelling reasons to keep recognition top of mind. Or, as Nelson puts it, "If you see something, say something."

For starters, a dispirited workforce leads to high turnover and low engagement. The cost of replacing an employee is estimated to be about 40% of their income (or up to two times the salary of senior executives). Furthermore, a Gallup poll shows that the cost of involuntary turnover is $1 trillion for businesses across the U.S.

As if that isn't convincing enough, Gallup says that actively disengaged employees cost businesses in the United States anywhere from $450 to $550 billion annually. Gallup results also show that disengaged employees have 37% higher absenteeism, 49% more work accidents and commit 60% more errors.

On the positive side, consider that a study Nelson conducted in 2021 with Rick Garlick, Ph.D, also a researcher and consultant, determined that when compared to employees with low levels of individual pride in their work, high-pride-level employees are:

- 10 times more likely to be satisfied with their jobs.
- Eight times more likely to recommend their company as a good place to work.
- Eight times more likely to look forward to going to work.
- Seven times more likely to feel they're paid fairly.
- Six times more likely to happily spend the rest of their careers with their present employers.
- Six times more likely to stay at their current job even if offered significantly higher pay to work elsewhere.

Given that consistently high levels of recognition result in strong individual pride, there's clearly a hand-in-glove relationship between the two that's worth cultivating, Nelson says.

Effective recognition matters

Many companies believe they already recognize employees because they hold a company-wide holiday party or give employees token gifts for things such as employment anniversaries or reaching certain work anniversaries. In other cases, managers think it suffices to make time to celebrate employee birthdays by serving cake at a team gathering.

While well-intended, these are ineffective methods for recognition, Nelson asserts, because they're perfunctory and don't truly make employees feel valued.

"What you're actually doing is reinforcing presence, not performance," he explains. "You're merely reinforcing the fact that they show up for work. This ends up creating a culture of entitlement, as in, 'I'm here, so reward me.'"

Performance-based recognition is much more effective, Nelson notes.

"If you want good performance, recognize good performance," he says. "It becomes a self-fulfilling strategy. And people who perform well feel great about themselves. It helps them learn and grow, and the company benefits from their progress."

While there's a possibility of overdoing recognition to the point that it becomes meaningless because everybody gets a trophy, that won't happen if the recognition is sincere, specific and strategic.

Power of empowerment

Empowering employees is a great way to generate pride. As an example, Nelson cites a Connecticut-based company, Boardroom Inc., a book and newsletter publisher. Years ago, the company established an "I Power" program, which encourages all employees to submit two suggestions a week for improving the business.

> **"If you want good performance, recognize good performance."**
>
> **Bob Nelson**

A volunteer employee — a different one every week — evaluates all suggestions the same week they're submitted. If the employee deems an idea worth pursuing, the suggestion is returned to the employee who submitted it, along with permission to implement it.

Company officials credit the program for eventually increasing annual revenue by 500% in a 3-year-period as well as boosting employees' morale and energy while virtually eliminating turnover, Nelson says.

In one case, a shipping clerk suggested that the company trim the paper size of the books it publishes by 1/16th of an inch, which would qualify them for a lower shipping rate. The result? An annual savings of $500,000 a year.

Another company gives out "unsung hero" awards. It finds candidates by calling customers and asking them to identify employees who provide great customer service.

"Just ask your customers who they always ask for when they call your company," Nelson suggests. "Then invite a representative from that company to come in and present the award. This makes the employee a hero — they're on cloud nine."

Only thing to it is to do it

Nelson says annual employee surveys that pose strategic questions are a great tool to help companies understand if their employees lack a sense of pride in their work or the company.

Of course, it's also critical to measure the effectiveness of recognition programs. As Nelson points out, the late management guru Peter Drucker once said you can't manage what you can't measure.

But for companies plagued by things such as high turnover and low engagement, the most important thing is to ignite a pride movement through strategic recognition.

"If companies won't do it, managers should just work it into their own behavior," he advises. "Don't worry about upper management, worry about what you're doing for your direct reports — strive to catch them doing something right.

"It's shockingly simple," he continues. "There probably are hundreds of studies that make a clear case that the power of recognition is real — that whatever you recognize gets repeated.

"The potential for increasing pride is there for every employee and every company," Nelson concludes. "It's just a matter of tapping into it, you turn it on and it becomes a flood." ✦

CHOOSING TO STAY SAFE

Bad habits and lackadaisical attitudes can be corrected before they cause problems

By Ronnie Freeman

Unsafe behaviors are the most common cause of workplace incidents causing injuries, fatalities and property damage. It is estimated that unsafe behaviors cause up to 80 to 90% of incidents.

What this means is employees are making decisions to be unsafe, and this creates negative consequences. Unsafe behaviors do not always end in an injury or property damage, however, as employees often get away with their decisions to work unsafely. Unfortunately, this can form bad habits that will eventually lead to that injury or property damage incident.

Some common examples of unsafe behavior

- Not wearing PPE when a hazardous condition calls for it
- Taking shortcuts even when the employee knows the risks
- Using a cellphone while driving or operating heavy equipment
- Not wearing a seatbelt while driving or operating heavy equipment
- Operating tools and equipment that workers have not been trained to operate
- Choosing to not lock out/tag out when performing maintenance or repairs
- Working in a trench that is not stable or dug correctly
- Working in a confined space that has not been properly tested for hazards
- Allowing oneself to become distracted
- Ignoring safety policies and procedures

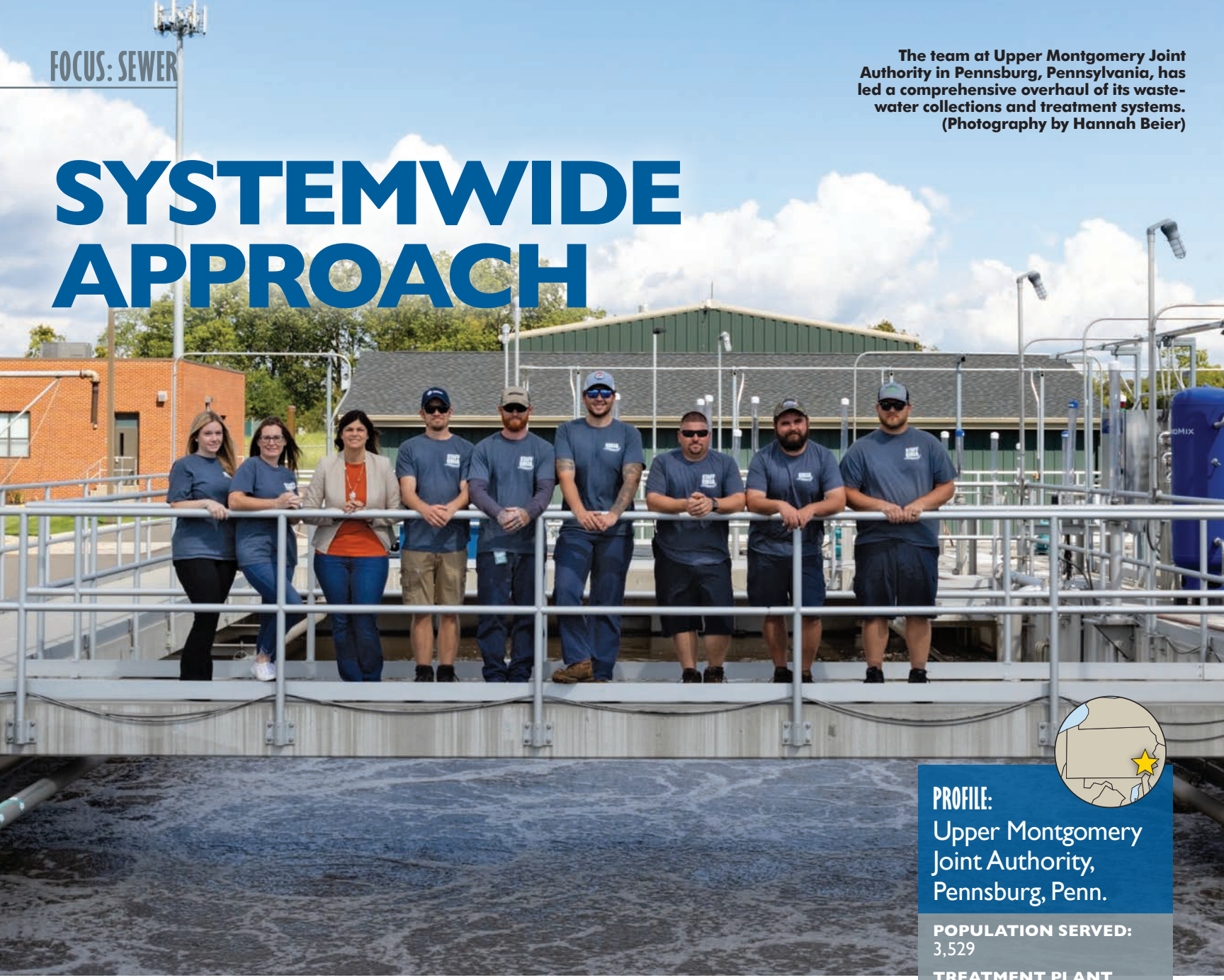
There are many more examples that could be listed here, but these tend to be the most common. Workers who consistently work unsafely are taking unnecessary risks with not only their own safety but also the safety of their co-workers and, in some cases, the public. Employees need to understand that unsafe behaviors are a choice they make, even if in some cases it has become a habit and they don't realize what they are doing. The good news is that making the decision to work safe can change unsafe behavior into safe behavior.

Deciding to work safely

- Hold yourself to a higher standard of working safely. This benefits both you and others. Not dealing with an injury is always a win.
- Decide to set the example of working safely. This will encourage others around you to work safely too.
- Feel compelled to stop work to address safety hazards instead of ignore them. Do not allow others to put your safety at risk either.
- If you see something, say something. Speaking up when you see a co-worker working unsafely may not be popular, but it might save that worker from a devastating injury.
- It takes time and practice, but making the decision to keep distractions at a minimum can pay dividends when you complete your tasks on time and safely.

Nobody wants to deal with a workplace injury. Some injuries can cause a long time away from the job, cause unbearable pain and suffering, create financial issues at home and create issues for your co-workers who are having to take up the slack due to your absence.

So, if you are guilty of unsafe behavior, the good news is that it just takes a decision to change and become a safety advocate in your workplace. It may not be popular at first, but the benefits far outweigh the negatives of an injury or costly property damage incident. ✦



The team at Upper Montgomery Joint Authority in Pennsburg, Pennsylvania, has led a comprehensive overhaul of its wastewater collections and treatment systems. (Photography by Hannah Beier)

SYSTEMWIDE APPROACH

PROFILE:
Upper Montgomery Joint Authority, Pennsburg, Penn.

POPULATION SERVED:
3,529

TREATMENT PLANT CAPACITY:
11 mgd

WEBSITE:
www.umja.org

Dramatic transformation reduces Pennsylvania utility's I&I and SSO issues

By Traci Barnes

The Upper Montgomery Joint Authority's infrastructure was aging, and a combination of substantial inflow and infiltration along with increased frequency of weather events was causing problems for the entire community.

For UMJA, the solution wasn't as simple as fixing an I&I issue because the collections system and the treatment plant are inextricably linked through age, climate change and a growing community.

While collections system improvements were necessary, the authority decided to start with the treatment plant upgrades, including converting from trickling filters to an activated sludge process and tertiary filtration, adding a third final clarifier for capacity, and a pump station upgrade.

"Prior to the 2020 upgrade, the treatment plant was often hydraulically overloaded when it rained. During rain events and high flows, a portion of the flow was diverted into a storm basin bypass and treated with gas chlorine before being directly discharged to the reservoir," says Jenn Leister, the authority's executive superintendent. "We don't have a combined system, but it performed like one."

Even during a relatively insignificant rain event of just 1 or 2 inches, manholes were overflowing and pump stations were either running at high levels or overflowing.

First steps

The treatment plant sits on an idyllic point overlooking the Green Lane Reservoir in Pennsburg, Pennsylvania. It is surrounded by meadows, wildflowers and water. In 2012, amid the I&I challenges, Leister's predecessor at UMJA and the board of directors started discussing how to fix the prob-

"We don't have a combined system, but it performed like one."

Jenn Leister

Workers from Performance Pipelining set up a sewer line bypass ahead of some repair work.

lem of bypasses at the plant. The board decided on activated sludge to meet future-focused low nutrient permit limits such as those required by the Chesapeake Bay standards while also addressing the high flow situation.

UMJA settled on a combination of well-established and more innovative technologies to help augment the process performance. Two of the more innovative implementations were the sidestream enhanced biological phosphorus removal and FuzzyFilters for tertiary treatment.

Woodard & Curran, an integrated science, engineering, design-build and operations company consulting on the project, was in the midst of a Water Research Foundation study to look at the fundamentals of the S2EBPR process while the UMJA project was at the conception stage.

Paul Dombrowski, chief technologist with Woodard & Curran, says that while only a handful of other S2EBPR plants were online in the U.S. then, dozens more had been operating successfully in Europe, proving the reliability of the technology.

All in all, the entire plant upgrade comprises several new updates:

- A new operations building and SCADA upgrades
- A new influent screen building
- A new filter building
- A new grit removal system
- Influent PS-EPS-1 upgrades
- Fuzzy filters for tertiary treatment
- New CCT (chlorine disinfection tanks) and post air tanks
- New biological nutrient removal reactors with sidestream fermentation
- Sludge pumping upgrades

The plant and collections system upgrades weren't mandated by the state or EPA, but Leister says everyone felt like it was the right thing to do. "We had to fix the flagship system and take care of our residents and customers," she says. "As far as here at the treatment plant, the right thing to do is not bypass into our drinking water source."

A Performance Pipelining crew member sets up for a lining project with an LMK Technologies 5-Line machine.

I&I Issues

Even after the plant upgrades, UMJA saw flows above the 11 mgd that the new plant was designed to handle. That's when Leister decided to take a hard look at the collections system. While minor work had been done previously, it was time to put a comprehensive plan in place.

"We had to fix the flagship system and take care of our residents and customers."

Jenn Leister

A crew member uses a Hurco Power Smoker to identify sewer system inflow and infiltration points.

That plan included the purchase of a new inspection van to replace their outdated equipment and a new jetter truck to clean lines. Next, they upgraded to flowmeters with real-time monitoring. "Once we discovered excessive flow in a particular area, we televised the area to identify if the I&I was coming from breaks, cracks, root intrusion or illegal connections," Leister says. "These findings allowed us to build a project in-house, saving on engineering costs. We would also smoke and dye test as needed during the illegal connection inspections and after lining work to verify that the lining was effective."

They were able to move quickly using the state's cooperative purchasing program, COSTARS, which also saved on procurement costs and provided competitive pricing. With the $6 million in their reserves, the authority targeted approximately 78,000 linear feet of mainline, about 8,500 feet of lateral televising, cured-in-place pipe lining of 600 laterals and about 83,000 feet of mainline, sanitary manhole lining, installation of 11 backflow preventers for homeowners experiencing backups, smoke testing and third-party sump pump inspections.

On the private side, many of the lateral inspections are done during a home sale. The authority works with the title company and the real estate agent on a pass/fail inspection. If it's determined that the lateral needs to be upgraded, they can hold it in escrow. However, Leister explains that while they were doing lateral inspections on UMJA's side, they would peek at the laterals on the homeowner's side too. Once problems were found, UMJA sent out a notice of violation and a repair deadline. Their roles and rights state that homeowners must fix any deficiencies on their side.

It's been a challenge, but Leister says that once they communicate with the homeowner why it's so important to do the repairs, they are usually on board.

Since UMJA has done the collections system work and the plant upgrade, they are seeing a 39% flow reduction.

Dedicated team

While Jason DiPietro, the chief operator of UMJA, credits much of that reduction to the work on the collections system, Paul Dombrowski, chief technologist at Woodard & Curran, says the credit goes equally to the knowledgeable, capable and dedicated staff.

"Even my collections system guys have an excellent understanding of how this plant works and can troubleshoot a lot of things," says DiPietro,

TANK OF SHAME NO MORE

Upper Montgomery Joint Authority's old overflow basin has been out of commission since the new plant went online. Jenn Leister, executive superintendent of UMJA, calls it their tank of shame. There was a time when that tank filled, which happened pretty often during wet weather events; they hit the wastewater with chlorine and sent it right into the reservoir along with their treated effluent. But that was then. Soon their tank of shame will be part of the Green Lane Freshwater Mussel Rearing Center.

UMJA is working with the Academy of Natural Sciences of Drexel University and the Partnership for the Delaware Estuary to repurpose the old overflow basin into a satellite research and rearing center for juvenile and near-adult freshwater mussels. Water from the Green Lane Reservoir will be piped into the tank and flow through a series of floating Flo N' Gro aquaculture platforms containing the mussels, and then the filtered water will be returned to the reservoir.

There was a time when freshwater mussels were common throughout the lower Delaware River Basin, but today they are few and far

Work trucks and a Dyna-Vac trailer are loaded and ready to head to a job site.

The UMJA's CUES-equipped inspection van has helped the utility tighten its collections system.

"We push this thing every day to run as best as it can."

Jason DiPietro

who was a lab tech when the upgraded plant went online. "I want my whole crew to understand this plant as well as I do," said DiPietro. "We push this thing every day to run as best as it can. Our goal is to use no chemicals and make this run as good as we can, and that just starts with caring."

The UMJA staff's passion is evident in the amount of outreach they do. Leister's eyes light up when she talks about community involvement — everything from tagging along to a trout release with a group of second graders to inviting kids on site to paint manhole covers. You can't help but have some of that passion rub off on others.

For example, when DiPietro is speaking at a local high school, he's looking for kids like him — students who get that spark in their eyes while he's talking. He pulls them aside and shows them a door to a potential career. One that doesn't require a college degree, but if they work hard, one where they can earn a good living.

UMJA also developed and implemented an outreach program to get their FOG problem under control.

They go to every restaurant equipped with flyers and a slideshow and speak with the owner. They explain what's happening at the plant because of FOG and, to top it all off, they show them a video of their restaurant's lateral caked in grease. That drives the message home better than anything.

"I feel there's been a noticeable difference in grease just by making people aware of what it's doing when they don't clean their grease traps. And I don't know if it goes hand in hand, but we've also seen a significant reduction in SVI (sludge volume index) over the past couple of months. I'm sure it's not solely related to the FOG program. But I've seen less FOG in the bar screen. I've seen less FOG in the wet well."

Outreach and education were the carrot, and soon UMJA plans to begin using the stick. They will start conducting unannounced inspections at restaurants with fines attached for non-compliance.

Environmental science

DiPietro says they had seen an uptick in the number and severity of wet weather events in recent years. On an average day, they have 1.5-2 mgd, and during a storm, that increases to 15 mgd within an hour.

The work to cut back on the infiltration has helped. Where those surges would last for three to five days, now as soon as the rain stops, they see the flow going down within minutes. During a significant wet weather event, they come out of their storm mode within 12 hours of the rain stopping and return to a baseline within 48 hours.

But for Leister, she received the best news from an AP environmental science class at the high school just down the road from UMJA. They were, of course, recently at the plant for a tour. Unbeknownst to her, the class had been tracking nutrients in the reservoir just behind the treatment plant as part of a capstone project.

"The teacher said he has seen a significant reduction in phosphorus and nitrates in the reservoir. We didn't even know he was doing this. And I'm like, oh my gosh, this is wonderful news!" ✦

between. That decline is not good because mussels are filter-feeders, and adult mussels can filter 10-20 gallons of water per day from spring to fall. On top of that, mussels can live for 30-100 years, so each mussel can potentially clean hundreds of thousands of gallons of water.

Two goals of the research will be to test whether mussels can be used to promote water quality in fabricated aquatic systems and whether they can be used as native "indicators" for measuring stream health and pollution.

The new UMJA rearing center will also provide experiential learning and research opportunities for elementary, high school, college, graduate and post-graduate level students that could potentially lead to careers in the sciences and engineering, especially for students from underserved communities.

Leister sums it up by saying, "What used to be our tank of shame is now going to be used for something that will have a positive effect on the environment and everything we're doing here at the plant."

A FASTER FIX FOR LEAD

BlueConduit's software uses existing data to predict the location of lead lines and expedite removal.

By Tim Dobbins

BETTER MOUSETRAPS

PRODUCT:
BlueConduit software

MANUFACTURER:
BlueConduit
ww.blueconduit.com

APPLICATION:
Machine learning software to locate lead service lines

BENEFITS:
Locate lead pipes for removal

USER:
City of Toledo, Ohio

The city of Toledo's residents are getting safer water thanks to an ongoing underground makeover.

In 2014, the Ohio city had a drinking water advisory due to an algae bloom in western Lake Erie. That brought water quality to the forefront and initiated an effort to provide the best drinking water possible. To do that, the city put lead service line removal at the top of their to-do list.

"We knew we had to prioritize lead exposure," says Mark Riley, administrator for the city of Toledo's Department of Public Utilities. "We researched Flint, Michigan, because of the issues they had, to see what sort of partnerships they were using, and they introduced us to BlueConduit."

BlueConduit is a water analytics company that developed machine learning software to locate lead service lines. Not only did Flint's contamination issues pave the road for Toledo's lead removal plan, but it is also the reason BlueConduit developed a specific software in the first place.

Eric Schwartz, co-founder of BlueConduit, says the Flint crisis raised the question of how many people have lead contamination, to which he says no one had a good answer.

"As a data scientist, I realized this was an opportunity to really help cities like Flint figure out how many lead pipes existed and which homes have lead pipes, and guide the resource allocation so the process can be efficient and equitable," Schwartz says.

And that's exactly what BlueConduit did. They helped the city of Flint locate lead pipes and create public-facing maps to help inform the community about replacement.

BlueConduit's software takes existing data about lead pipes, formulates an inspection plan to verify what is known and unknown and from that, makes predictions of where lead lines may be. It provides real-time maps so water utility managers and consumers can see progress on lead pipe replacements in their community.

"We have been able to leverage the BlueConduit work to mobilize more than $10 million in funding to replace lead pipes."

Mark Riley

Getting started

The software was an obvious choice for Riley and the city of Toledo, and they have now been working with BlueConduit for over two years.

The beginning stages were all about building a base of information. "They began by collecting data on all of our service lines, especially documentation on lead lines," Riley says. "They wanted to see what type of pipe material we had from the city side as well as the pipes going into the customer's home."

Cities are urged to upload any data they have about their service lines and parcels so from the very beginning, the software can build from what is known, like how many homes, and which homes have actually had eyes on material in recent years.

Gathering as much preexisting data as possible is crucial to the process. The more data city officials could provide from the start, the more accurate predictive models would become.

"BlueConduit helped our staff understand what sort of information was needed and how to transfer it," Riley says. "They were very straightforward and thorough, asking a lot of questions to make sure they understood how we keep our city data."

"BlueConduit helped our staff understand what sort of information was needed and how to transfer it."

Mark Riley

Using the data

After collecting available data, BlueConduit created early models that predicted areas with the highest probability of lead service lines.

From those early predictive models, city officials were able to do curbside inspections of homes to see firsthand and confirm what type of material was being used. "We could then plan our lead service line replacement program to first target the neighborhoods with the greatest concentration of lead," Riley says.

The models are constantly being updated with new data as officials replace pipes and visit more areas of the city for inspections, making them more and more accurate over time.

Data collected, as well as the corresponding maps and models, are not only available to city officials but to anyone interested. Riley welcomes and encourages the public to stay engaged, so maps are available in a public online portal.

"We worked with Toledo to put together a map of the entire city with predictions, address by address online, so anyone can access the information at any time," Schwartz says.

And according to Riley, the portal is getting a lot of attention thanks to media blasts and a YouTube video highlighting the research while helping customers identify pipes in their home. It's important to Riley that the public is involved, knowledgeable and feels comfortable asking questions when crews are working near their homes.

Keeping citizens feeling comfortable throughout the process of replacing lines is also a priority. "One of the key things we're doing during the pipe replacement is providing residents a water pitcher with filter at no charge," Riley says. "That way they know that while we are doing the work, they have safe water."

The accuracy of the predictive models has also been a significant factor for securing funding. "We have been able to leverage the BlueConduit work to mobilize more than $10 million in funding to replace lead pipes," Riley says.

So not only is the software helping locate lead pipes, but it's also allowing the city to act in a much faster way than originally anticipated.

Changing the game

Before working with BlueConduit's software, the city of Toledo predicted it would take around 30 years to replace all the lead service lines in Toledo, but now with the predictive model, they are hoping to achieve that goal in about seven years.

"Because we've been able to leverage the BlueConduit work to rally significant funding, our timeline for replacement has significantly advanced," Riley says. "Without BlueConduit, we would have had to rely on historical records and inefficient ways of checking pipe. This would have cost the city more money and likely placed a bigger burden on our ratepayers."

Riley and the city of Toledo will continue to use the software until the goal of complete lead service line removal is achieved. ✦

A NATURAL APPROACH

The solution to sewer system overflows might be right under your feet

By Anson Liski

Organic and naturally occurring microbiological solutions, combined with other trenchless rehabilitation efforts, provide an affordable and sustainable way forward for municipalities plagued by urban wet weather and other sanitary sewer overflow catalysts.

Whether it's hard rain and flash flooding or downhole blockages that become suppressive, SSOs are all too common. Overflow events occur when sewer entrances and exits are both submerged, and the supply of water is greater than the total capacity of the pipes. With nowhere to go, wastewater is forced one of two ways: backward to the point of origin or out into the environment. Both have serious environmental ramifications. As these problems grow more prevalent, municipalities need more effective ways to address them.

Uptick in SSOs

According to the U.S. Environmental Protection Agency, there are as many as 23,000-75,000 SSOs per year — not counting backflow events in which wastewater flows back into buildings. The uptick in SSOs will only grow worse over time. Underground infrastructure is aging and often undersized for current demand, and overflow events will happen more frequently as sewer systems are pushed to and beyond their limits.

Each SSO comes with significant ramifications, including damage to the environment, infrastructure and human health. As it's pushed back to the point of origin, or overflows into spillways, untreated wastewater spreads pathogens and biohazardous materials — with potentially harmful effects for anyone exposed. Repairing infrastructure damage demands taxpayer funds, and environmental contamination manifests in additional health concerns.

Underground infrastructure is being pushed to and beyond its limits and replacing even part of a sewer system is an enormous undertaking — with an equally enormous price tag.

Infrastructure obstacles

There are tremendous costs involved with re-piping sanitary sewers, and even modern trenchless rehabilitation methods aren't always sufficient for increasing sewer capacities. While current challenges represent long-term hurdles to clear, municipalities can address SSO events in the short-term by attacking buildups and blockages that stymie sanitary sewer flow — including fatbergs and other FOG-related buildups.

Buildups within sanitary sewers exacerbate an already significant strain on flow capacity. A 2-foot sewer pipe with a 6-inch fatberg around its internal circumference has effectively lost 75% of its capacity. And pipes with several inches of FOG buildup can experience efficiency reductions up to an order of magnitude below what they're designed for and capable of handling. Attacking these buildups is paramount to infrastructure rehabilitation in the face of rising overflow events.

So, what can be done to mitigate SSO events and the damage they bring? Custom microbiological solutions — aka bioaugmentation — reduce FOG and other blockages to restore flow capacity in wastewater and sanitary sewer systems.

Natural approach

Microbiology is a natural approach to reducing both the prevalence and severity of SSOs — and extending the life of current sanitary sewer infrastructure. Combined with other trenchless rehabilitation efforts, it's a way forward for municipalities plagued by

urban wet weather and other SSO event catalysts.

There's a tremendous amount of work necessary to maintain and modernize existing wastewater infrastructure. And while much of the work comes from engineering sewers with larger flow capacity, custom microbiological treatment plays an essential role in regulating sewer and wastewater treatment environments. Preventing FOG buildups, eliminating H_2S and protecting infrastructure against corrosive elements is essential to reduce the frequency of SSO events.

Better solution

The use of bioaugmentation in wastewater treatment is nothing new. Changing the form of microbiology and how it is introduced into the system is now making bioaugmentation that solves collection system pains possible and affordable. Autonomous bio-dosing offers a streamlined method for accomplishing what is needed to allow soil microbiology to perform the work it was designed to do.

One such technology for bio-dosing is the EBS-Di from EnBiorganic Technologies. The unit generates and activates customized microbiology at a rapid pace, on a massive scale just before it enters the wastewater system, typically at a lift station. Bacteria are introduced at a level that overwhelms the inappropriate or problem nutrients or contaminants. Unlike traditional bioaugmentation methods and indigenous microbiology (gut bacteria), soil microbes are an efficient facultative anaerobic consortium that can perform without oxygen.

In the case of the EBS-Di, there is no capital expenditure or additional operational expense because it is provided by subscription, or through the technology as a service model. The EnBiorganic technical team remotely controls and monitors the unit, and a local trained licensed provider handles routine servicing.

Fewer impediments

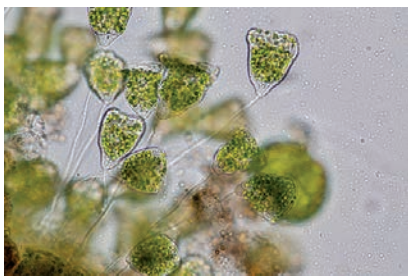
The longevity of custom bioaugmentation solutions makes them essential to sewer maintenance and rehabilitation. Continuous microbiological treatment, in sufficient quantities, removes biofilm comprised of FOG and other organic materials, and makes the sewer environment inhospitable to future buildups. Without indigenous microbiology that causes the biofilm to kickstart accumulation, sewer infrastructure faces fewer impediments to full flow capacity.

As old biofilm is removed, it does not reform and is instead replaced by a thin biofilm developed from the continuous application of specific microbiological formulations that do much more than simply remove the old, indigenous biofilm. These remarkable bacteria also replace the microbiome within wastewater treatment environments, decrease biosolid production, increase energy efficiency and stabilize treatment processes to produce cleaner effluent that exceeds environmental impact regulations.

Beyond a reduction in SSOs and surcharge events, municipalities will find themselves with lower wastewater treatment costs, better results and fewer barriers to wastewater treatment.

Custom bioaugmentation is a sustainable strategy every municipality can adopt today with immediate and long-term benefits. ✦

Underground infrastructure is being pushed to and beyond its limits and replacing even part of a sewer system is an enormous undertaking.



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Sheila Joy is executive director of NASSCO. She can be reached at director@nassco.org.

PACP TURNS 20

NASSCO's Pipeline Assessment Certification Program has been helping accurately diagnose pipe defects for two decades

By Sheila Joy

NASSCO is celebrating 20 years of providing our industry with consistency and quality in the assessment of sewer conditions, with nearly 40,000 PACP-certified industry professionals throughout North, South and Central America.

The idea for NASSCO's Pipeline Assessment Certification Program came from former NASSCO president (2007-08) Rod Thornhill, who continues to be one of NASSCO's most knowledgeable and well-respected PACP trainers.

Rod saw great value in the condition assessment program developed by The WRc Group for use in the United Kingdom and knew that with some modifications it could serve the U.S. market well. He brought the idea to NASSCO's then-executive director, Mike Burkhard, who agreed that NASSCO should invest time and resources to make this idea a reality. Shortly thereafter, a partnership with WRc was formed, and a small group of industry professionals came together to make PACP a reality.

Rod's vision for PACP came from the lack of any standardization of CCTV data. Rod believed this lack of standardization meant many things:

- Data collected was limited to single project use.
- Data between CCTV software vendors could not be exchanged.
- Data quality was poor because there was no way to independently confirm coding of data was correct.

Since no standard existed, the shelf life of CCTV data was often only a few months, or until a project was completed, or when CCTV software was retired. With PACP the industry now has the ability to accumulate mass quantities of data in perpetuity.

Through years of hard work, many hours and commitment in the modification of WRc's *Manual of Sewer Condition Classification* for conditions and materials specific to North America, PACP was launched in 2002.

Today, PACP has grown to become the industry standard throughout North America. Through its partnership with the Latin American Society for Trenchless Technology, PACP standards are gaining a significant foothold in South and Central America. Over the years the program has also grown to become a prerequisite for additional NASSCO-developed training, including the Lateral Assessment Certification Program and its Manhole Assessment Certification Program.

We do not see the growth of PACP-certified professionals slowing down. While COVID was extremely disruptive to many industries, it accelerated NASSCO's development of virtual sessions to offer PACP and NASSCO's Inspector Training Certification Programs to an even wider audience.

To learn more about NASSCO and our many training programs, please visit www.nassco.org/education-and-training. ✦

Get the EDge Training and Continuing Education Courses

PACP TRAINING

Dec. 5, 8 am EST
Virtual
Includes: PACP, MACP, LACP
Trainer: Jerry Weimer

Dec. 5, 8 am EST
Birmingham, AL
Includes: PACP, MACP, LACP
Trainer: John Schroeder

Dec. 6, 8 am EST
Virtual
Includes: PACP, MACP, LACP
Trainer: Paul Booth

Dec. 6, 8 am PST
Santa Cruz, CA
Includes: PACP, MACP, LACP
Trainer: Brandon Conley

Dec. 7, 8 am EST
Virtual
Includes: PACP, MACP, LACP
Trainer: John Jones

Dec. 12, 8 am MST
Virtual
Includes: PACP
Trainer: Brandon Conley

Dec. 14, 8 am EST
Virtual
Includes: PACP, MACP, LACP
Trainer: Brandon Conley

Dec. 28, 8 am EST
Virtual
Includes: PACP, MACP, LACP
Trainer: Jerry Weimer

Dec. 28, 8 am PST
Virtual
Includes: PACP, MACP, LACP
Trainer: Brandon Conley

Jan. 4, 8 am EST
Virtual
Includes: PACP
Trainer: Jerry Weimer

Jan. 17, 8 am PST
Virtual
Includes: PACP, MACP, LACP
Trainer: Jerry Weimer

ITCP TRAINING

Dec. 1, 8 am EST
Virtual
Includes: ITCP-Manhole Rehab
Trainer: Tim Back

Dec. 21, 8 am EST
Virtual
Includes: ITCP-Manhole Rehab
Trainer: Tim Back

Dec. 28, 8 am EST
Virtual
Includes: ITCP-CIPP
Trainer: Lou Krch

Jan. 11, 8 am EST
Virtual
Includes: ITCP-CIPP
Trainer: Lou Krch

Jan. 17, 8 am EST
Virtual
Includes: ITCP-CIPP
Trainer: Gerry Muenchmeyer

Jan. 18, 8 am EST
Virtual
Includes: ITCP-Manhole Rehab
Trainer: Tim Back

NASSCO PRO TRAINING

OTHER CLASSES FORMING
Contact one of the trainers listed above if you are interested in having a class at your facility or in your area.

Product Spotlight

Municipal waterline offers durability and easy installation

By Craig Mandli

In municipal water infrastructure, time is money. But the "time" part of the equation is twofold. Not only do products need to be installed quickly, they need a long life span. According to REHAU, MUNICIPEX PEXa piping checks both boxes.

MUNICIPEX pipe is manufactured using a high-pressure peroxide method for crosslinked polyethylene, also referred to as PEXa. In addition, it is co-extruded with a PE shield that protects the pipe when exposed to ultraviolet light. This provides MUNICIPEX with enhanced benefits over other municipal piping, according to Simon Koenig, REHAU's MUNICIPEX product manager.

"Because the molecules are cross-linked, the pipe is more rugged and is designed to take more abuse," he says. "But because it is also more flexible, it is easier to work with."

MUNICIPEX is available in four variations: water service, pre-insulated, force main and reclaim. The water service line is designed to deliver potable water from the water main to any residential or commercial structure. Pre-insulated is specially designed for water distribution in cold climates that require an extra level of protection from freezing, or when laying pipe below the frost line is not possible. It consists of MUNICIPEX carrier pipe protected by a CFC-free polyurethane foam insulation and a corrugated LDPE outer casing. Color-coded with a green co-extruded coating, force main is designed for conveying wastewater under pressure from the discharge side of a pump or pneumatic ejector to a discharge point. The newest addition to the product line, reclaim, transports reclaimed water from the water treatment facility to the point of use. It is color-coded with a purple PE shield that protects the pipe against UV light for an extended time and indicates use in reclaimed water applications.

According to Koenig, the benefits of using MUNICIPEX have quickly made it the market leader in the industry. Not only is it durable enough to be installed using whatever natural backfill material is available, it can be stretched up to 500% before fracture, it is kink-resistant, and can be easily repaired with only a heat gun. Its material is corrosion resistant and offers the pricing stability that isn't found in the copper market.

"When we talk to our customers, they appreciate that MUNICIPEX is much easier to install, with less force and no recoil," Koenig says. "It really is the perfect alternative to the alternative waterlines out there." **800-247-9445; www.municipex.com**

EasyDig 4-foot trench cage for hydrovacs

Designed to be used with a hydrovac, EasyDig's 4-foot-diameter circular trench cage is new to the excavation industry. A hand-moveable aluminum trench cage breaks down into half-circle pieces that can be moved in the back of a pickup. Each half circle is less than 50 pounds. The latest design is engineered to 28-foot depth, depending on soil conditions. With a built-in access/egress ladder, EasyDig was created specifically for sewer and water utility repairs. This latest version comes with a lid that locks onto the trench cage to keep the excavation safe from passersby. **855-485-3279; www.easydig.ca**

VMAC UNDERHOOD40 air compressor

VMAC's UNDERHOOD 40 Van Series for 2022 Mercedes-Benz Sprinter vans is equipped with a 2.1 L turbo diesel engine. This latest rotary screw air compressor is engineered specifically for 2019-2022 Sprinter vans and produces up to 40 cfm of continuous air at 100 psi, with a 150 psi maximum. The vehicle-integrated air compressor is mounted in the Sprinter's engine compartment, freeing up to 10 cubic feet in the cargo area. A combined air/oil cooler and air/oil separator tank is the only component installed in the cargo area, taking up only 1.7 cubic feet. The total air compressor system weighs only 85 pounds, which reduces GVW by as much as 290 pounds. **800-738-8622; www.vmacair.com** ✦

SPECIAL REPORT

Patterson Davit Crane lifts large loads in tight spaces

With a boom that can be adjusted to nearly 45 degrees, the Patterson Davit Crane offers adequate reach and allows for clearance over obstructions such as handrails. The low maintenance, easy-to-assemble design is available in ½-ton and 1-ton capacities and comes standard with a hot-dipped galvanized finish and stainless steel hardware to prevent rust and corrosion in wet work environments. Following Patterson's tradition of safety-focused innovation, the davit features a reliable brake to keep loads in position without creeping. For over 160 years Patterson has been a trusted supplier of winches, rigging, fittings and custom products for lifting applications. Patterson Davit Cranes are made in the USA and deliver on the company's promise of helping businesses run safer, easier and faster.

800-322-2018; www.pattersonmfg.com/davit-cranes

SPECIAL REPORT

OZ Lifting Products CompOZite davit crane

OZ Lifting Products' patented CompOZite davit crane is made of advanced composite materials that make it 40% lighter than equivalent capacity steel davits. With a total weight of only 83 pounds for the boom, mast and winch combined, a single crane is commonly moved to multiple base locations throughout a treatment plant. A ratchet screw jack allows the user to adjust the boom from horizontal to 45 degrees while under load and the 360-degree rotation of the crane allows a full range of motion. Smart-latch technology at the boom/mast means no tools are required for assembly. A zinc-plated finish on all non-composite parts provides added corrosion protection. AC and DC electric winches are optional, or a manual winch comes standard with a drill drive adapter. The cranes are made in the U.S. and each one is individually tested and certified at 125%.

800-749-1064; www.ozliftingproducts.com

STORMWATER MANAGEMENT

By Craig Mandli

CATCH BASIN CLEANERS

1. Hi-Vac Aquatech B-Series Combination Sewer Cleaner

The **Aquatech B-Series Combination Sewer Cleaner** from **Hi-Vac** is suitable for any size municipality, water and sewer district, or contractor for cleaning storm drains, catch basins and sewers. It is available with multiple debris tank sizes and water tank capacities as well as various water and vacuum pump options. This scalability means each unit can be custom fit for use in any application. The rear-mounted hose reel design with 180-degree hydraulic articulation takes the operator off the street and away from traffic, providing a full 12-foot work radius beyond the truck's width. The rear-mounted hose reel also makes it easier for drivers to see, providing an unobstructed, 270-degree field of vision. The top-loading boom and one-piece vacuum hose provide unlimited 360-degree operation. **800-752-2400; www.aquatechinc.com**

I&I DETECTION/PREVENTION

2. Avanti International AV-100

AV-100 chemical grout from **Avanti International** is used to rehabilitate storm and sanitary sewer systems by eliminating infiltration in manholes, mainlines, joints, laterals and lateral connections, and before or after various forms of CIPP lining. It is injected after lining seals in the annular space between host pipe and liner, and lateral reinstatement, which are the primary sources of infiltration. It is an ultralow viscosity, chemically reactive gel with a similar viscosity to water. It can permeate anywhere water can travel and has adjustable cure times from seconds to hours, creating an effective, long-lasting water barrier while providing soil stabilization. **800-877-2570; www.avantigrout.com**

3. Cretex Specialty Products Internal Chimney Seal

Cretex Specialty Products Internal Chimney Seals are mechanical, so there is no need to worry about surface adhesion or stopping active leaks prior to installation. The seals eliminate and prevent manhole chimney inflow. During wet weather, clear water enters the manhole through deteriorated and broken chimney joints, which may burden the collections system. The chimney seal has a 50-year design life and is available in four widths, allowing complete chimney coverage up to 24 vertical inches with a single seal. **800-345-3764; www.cretexseals.com**

4. CUES LAMP II

The **CUES LAMP II** (Lateral and Mainline Probe II) can assist in locating buried assets and help prevent potential cross-bore risks. It is an inspection tool for identifying infiltration and inflow, potential cross bores, pipe defects, and structural conditions in lateral services and mainlines. When used with the optional Mini Pan & Tilt Cameras, it can inspect lateral services and traverse multiple bends and wyes when deployed with or against the flow. Mainline inspection is accomplished with a pan, tilt and 40-1 zoom camera. It can pull

1,000 feet of video cable, reducing traffic control expenses while increasing production, and launch 150 feet or more into the lateral. The package includes a detachable steering wand, self-leveling camera head, built-in lens wiper, 360-degrees pan and tilt, four banks of LEDs with variable light intensity, and a built in sonde with switchable frequencies. **800-327-7791; www.cuesinc.com**

5. Sauereisen Manhole ChimneySeal No. F-88

Manhole ChimneySeal No. F-88 from **Sauereisen** is an elastomeric lining composed of fiber-reinforced, asphalt-modified urethane. It is self-priming with water absorption of 0.05%. Applied by gloved hand at 1/8-inch minimum thickness, it provides a flexible barrier or gasket seal for the prevention of water infiltration. It resists the stresses and movement associated with freeze/thaw environments while maintaining ideal elasticity/adhesion over temperature ranges from negative 30 to 250 degrees F. **412-963-0303; www.sauereisen.com**

6. Subsite Electronics Steerable Storm Drain Tractor

Functioning on up to 2,000 feet of single conductor cable, the **Steerable Storm Drain Tractor** transports **Subsite Electronics'** mainline cameras deep into storm drains, sewer and water pipes 24 inches and larger. Its motorized camera lift allows the camera to be centered in pipelines up to 60 inches in diameter. The tractor offers three forward speeds, reverse and freewheel. Single-conductor cable technology provides significant cost and performance advantages through the interchangeability of components, backward and forward compatibility, and reduced downtime. Using the sky crane, operators can lower the tractor into pipes with ease due to the sturdy angled bracket at the back of the tractor and evenly distributed weight across the tractor and crane. The front bumper protects the unit and assists with deployment in unpredictable environments. Four-wheel drive and a 125W motor with high-efficiency gear exchange allow operators to efficiently inspect various pipe conditions. **800-846-2713; www.subsite.com**

7. Super Products Camel Max Series

Camel Max Series combination sewer cleaners from **Super Products** allow operators to tackle various applications with jetting, vacuuming and excavating. The product line comes in a variety of model configurations: 900 Dump, 1200 Dump, 1200 Eject and 1200 Wastewater Recycle. All 1200 models come


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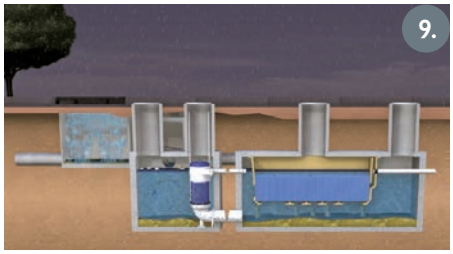
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standard with a high-dump subframe, eliminating the need to back up a ramp for debris removal. The 1200 Dump is capable of dumping into a 42-inch container while maintaining a low overhead height and a low center of gravity for increased stability. The 1200 Eject allows operators to have the only controlled way to dump safely into a 48-inch container without the need of additional containment products. The 1200 Wastewater Recycle enables operators to clean sewers without the use of freshwater, and is capable of cleaning nearly 3,000 feet of sewer pipe per day and saving 60,000 gallons of water per week. **800-837-9711; www.superproducts.com**

PRETREATMENT

8. Advanced Drainage Systems BaySaver Technologies Barracuda S4

The **Baysaver Technologies Barracuda S4,** a high-performance hydrodynamic separator from Advanced Drainage Systems, removes sediment and other debris from stormwater runoff, further protecting water resources. It is designed with internal teeth that mitigate turbulence in the storage chamber to prevent resuspension of captured contaminants. It is designed to be used in a single manhole configuration and offers multiple pipe configurations, flexible inlet/outlet positioning, quick installation, easy inspection and maintenance. **800-821-6710; www.adspipe.com**

9. BioMicrobics BioSTORM

The pre-engineered **BioSTORM** stormwater treatment system from **BioMicrobics** effectively filters and captures more than 90% of the common pollutants, such as trash, oils, sediment and other suspended solids that would otherwise end up in the combined sewer overflows, waterways or receiving environment in flows from 0.5 to 10 cubic feet per second. Used for primary and secondary applications, the versatility of the offline, two-phase design consists of a StormTEE deflector screen to physically separate trash (cigarette butts, etc.) and large debris, and a fixed-film media that acts to separate liquids from solids, and oil from water. They can be used together to form a complete system or separately for different sustainable site applications. The system allows for design flexibility and mounts easily in local precast tanks with minimal maintenance. **800-753-3278; www.biomicrobics.com**

10. Sealing Systems Flex-Seal 2.0

Flex-Seal 2.0 from **Sealing Systems** is an all-purpose sealant that adheres to many surfaces and has over 800% elongation. It is designed to prevent inflow and infiltration and to provide corrosion protection at the grade adjustment ring section or joint section of manholes and catch basins. It is 100% safe and Prop 65 compliant. The internal seal is manually applied using a paintbrush and the kit is designed to cover 12 vertical inches on a 27-inch-diameter manhole. **800-478-2054; www.ssisealingsystems.com**

STORMWATER MANAGEMENT

11. Enz USA Bulldog Manhole Nozzle

The **Bulldog Manhole Nozzle** from **Enz USA** was designed to clean lift stations and vertical pipes. It eliminates the disposal process by emulsifying the grease. This allows the operators to pump the resulting wastewater to a sewage treatment plant. A job that could take hours to do can now be done in 20 or 30 minutes. There is no water loss from leaks and it requires no maintenance. **888-369-8721; www.enz.com**

12. PRIMEX Rapid Set

The **PRIMEX Rapid Set** mounting system provides a complete, ready-to-install, compact lift station control package. It is an easy-to-install system that can save time and make installs look better than ever. Its welded, stainless steel, white powder-coated frame provides a durable yet clean controls package for fast installation. The powder-coated aluminum sunshield protects both operators and the controls from the weather. The additional mounting plate allows for operators to easily install any additional controls that the station may need. **844-477-4639; www.primexcontrols.com**

13. Warrior Trenchless Solutions Thermoform

Thermoform from **Warrior Trenchless Solutions** is a PVC-alloy structural pipe lining system designed for the trenchless rehabilitation of failing sewer and culvert pipes. It is an environmentally friendly, styrene-free thermoplastic. There are no harmful emissions, and it does not rely on any chemical reaction during installation. Factory-controlled production with rigorous material testing ensures a consistent quality product that conforms to and exceeds the expected standards. The material is highly flexible, allowing it to expand and fit tightly to the host pipe, including changes in shape and dimensions. It is produced in sizes ranging from 4 to 36 inches in diameter, and the wall thickness can be varied according to the application. All installers must be accredited and audited to ensure the highest quality work possible. **716-601-7760; www.thermoformliner.com** ✦

 By Craig Mandli

Manhole risers a fit for large metro sewer network

Problem:

Home to Birmingham, and more than 660,000 residents, Jefferson is Alabama's most populous county. Its sewer network includes 3,600 miles of pipe and 80,000 manholes. That last figure represents a sizable amount of annual maintenance; though manholes themselves are durable infrastructure, they do need to be kept at grade. If they're set low, water collects around the manhole lid causing excessive inflow and infiltration. If they're set high, they become a traffic hazard jarring vehicle tires, lid and rim continually.

Solution:

Pivoted Turnbuckle Manhole Risers from **American Highway Products** are used by sewer departments all over the United States and are based on a simple concept — tough, galvanized, flexible rings of steel are placed in old manhole rims and expanded with a pivoted turnbuckle (turned by hand with a screwdriver) that exerts thousands of pounds of force. This sets the riser tightly and precisely into old rims, even if they're worn or out of round.

RESULT:

They're quick and easy to install in five to six minutes, according to Brian Champion, Jefferson County Commission sewer construction maintenance supervisor, making them safer for crews due to their relatively light weight. They're also cost-effective compared to jackhammering and manual lifting. And they have a good track record. "We've looked at a lot of other options, and nothing else is made or designed as well as these risers — and quality matters," says Champion. "We keep these in stock and have been using them at least 18 years." **888-272-2397; www.ahp1.com**

Self-cleaning trashracks prove reliable in harsh storm conditions

Problem:

Though Texas is a drought-prone state, the risk of extreme rainfall and flooding events is projected to increase by 30 to 50% by 2036, highlighting the importance of the state's stormwater infrastructure. The city of Dallas Hampton Road Pump Station had operated without any protection in front of its stormwater intake grating. While the site is capable of handling up to 201 mgd, the pumps continuously clogged, lacking the water required to function. To clear the grates, operators used simple hand rakes, no small feat considering the grates were more than 100 feet long.

Solution:

Duperon Self-Cleaning Trashracks are a reliable, automated screening system for the unique conditions of stormwater flow. Their design enables them to manage highly variable debris — from bottle caps to washing machines — as well as the ever-changing, often high-velocity flows inherent to stormwater. A continuously and automatically cleaned screen assures maximum efficiency due to uninterrupted water flow.

RESULT:

As funding became available, the city finished the Hampton Pump Station with a total of five units installed over a five-year period. "We have debris that varies from grass to very large tree trunks, and we wanted equipment that could handle all of that," says Dhruv Pandya, district manager for the city of Dallas Department of Flood Control. "The SCT performed efficiently and effectively, and the city has not looked back." **800-383-8479; www.duperon.com**

Grinder pumps help municipality implement a sustainable solution

Problem:

The East Cedar Creek Fresh Water Supply District in Texas sought a more reliable grinder pump solution due to service issues and overtime costs. The system includes 3,600 individual grinder pumps for residential and commercial use as well as pumps for 10 to 15 lift stations.

Solution:

Franklin Electric invited district engineers into their local lab to see firsthand what more efficient **FPS** pumps could accomplish. Grinding was the main concern, and Franklin put several products to the test, including the IGP-A Series and IGP-M Series – both designed for residential or light commercial sewage needs. The automatic and manual 208-230 volt/single-phase pumps are 2 hp, but perform closer to a 3.5 or 5 hp. The cutter system on the units is also designed not to bind up even if the pump stops running at the end of a cycle.

RESULT:

The district engineers liked what they saw and specified the pumps for known problem areas. Callouts are down significantly, and failure rates have improved. Now the pumps are considered the preferred solution for the district's grinder applications and will be installed as needed when issues arise with the current equipment. **866-271-2859; www.franklinengineered.com**

Epoxy lining provided for new manholes

Problem:

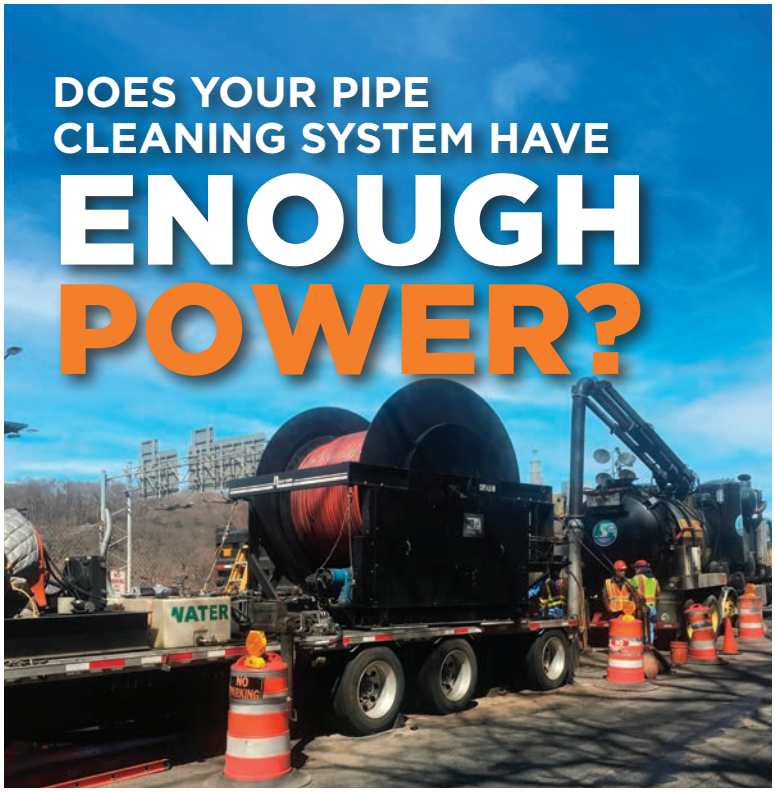
The city of Buckeye, Arizona, needed to build 41 new 60-inch manholes at the luxury community of Anderson Park. Project specs included full epoxy lining of the new infrastructure.

Solution:

Longtime **Neopoxy** client Manhole Coating applied **NPR-5304** corrosion-resistant epoxy using plural component spray equipment. The application took two weeks, at a thickness of 125 mils.

RESULT:

The new coating ensures worry-free corrosion protection for decades. **510-782-1290; www.neopoxy.com** ✦



CLASSIFIEDS

see photos in color at www.mswmag.com

JETTERS-TRAILER

The Hot Jet II® is a best-selling hot- and cold-water drainline cleaner featuring a 35hp Vanguard engine by Toyota and delivering 10gpm @ 4,000psi that cleans drains up to 300' and 12" in diameter. The HotJet II® is American made using nonproprietary parts for affordability and ease in serviceability making its return on investment truly impressive. Prices subject to change. Financing available.Contact us for current pricing and availability. **800-624-8186; sales@hotjetusa.com; www.hotjetusa.com** (MBM)

SERVICE/REPAIR

Dynamic Repairs - Inspection Camera Repairs: 48-hr. turn-around time. General Wire, Ratech, Ridgid, Electric Eel, Gator Cams, Insight Vision, Vision Intruders. Quality service on all brands. Rental equipment available. For more info. call Jack at **973-478-0893.** Lodi, New Jersey. **www.dynamicrepairs.biz** (MBM)

TV INSPECTION

Trailer-Mounted Proteus Mainline Camera System, dealer demo unit (less than 10,000 feet of usage): 2021 7' X 14' Tandem Axle trailer. Camera System Includes: Fully Synchronized Cable Reel w/ 1150' of cable; Fully-steerable, 6 wheel drive crawler; 120x zoom pan/tilt/continuous rotate camera w/ laser measurement. (Other wheel sets/lights/accessories available to center in up to 87" lines). Premium Trailer build-out includes: Onan gas generator. Front office area w/ pass-through door, upgraded fixed pedestal seat, 1TB i7 rack-mount computer, tons of storage, printer/scanner, & 34" Picture-by-picture monitor. Rear work area includes: Rear TV, tool box & work bench, 20 gallon wash down tank. List Price is $158k, will sell for $135K/OBO, FOB Weatherford, TX. Delivery available for an additional charge. **Call 817-851-2243 for more info.** (M12)

WORTH NOTING

PEOPLE/AWARDS

Andre Desilet, formerly the director of the stormwater department for the city of Fernandina Beach (Florida), was promoted to public works director. He now oversees stormwater, water and wastewater utilities.

Kate England was hired as the director of green infrastructure for the city of Boston. Among her duties is building and maintaining ecologically friendly and sustainable approaches to stormwater diversion.

CALENDAR

March 28-31
American Water Works Association / Water Environment Federation Utility Management Conference, SAFE Credit Union Convention Center, Sacramento, California. Visit www.awwa.org or www.wef.org.

April 16-19
American Public Works Association North American Snow Conference, Omaha, Nebraska (hotel TBA). Visit www.snow.apwa.net.

April 16-19
American Water Works Association Sustainable Water Management Conference, Minneapolis (site TBA). Visit www.awwa.org.

April 24-27
Center for Watershed Protection 2023 National Stormwater and Watershed Conference, The Westin San Diego Gaslamp Quarter, San Diego. Visit www.cwp.org.

May 1-3
International Erosion Control Association Municipal Wet Weather MS4 Stormwater Conference, Doubletree by Hilton Hotel, Chattanooga, Tennessee. Visit www.ieca.org.

June 11-14
American Water Works Association ACE23, Toronto (site TBA). Visit www.awwa.org.

June 27-29
Water Environment Federation Stormwater Summit, Kansas City Convention Center, Kansas City, Missouri. Visit www.wef.org.

July 17-19
American Water Resources Association Summer Conference, Hyatt Regency Denver Tech Center, Denver. Visit www.awra.org.

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

Pat's Pump & Blower announces retirements of founder and CFO

Orlando, Florida-based Pat's Pump & Blower announced the retirement of its founder Patrick Fender as well as its CFO Man Le. Pat and his brother Richard Fender started Pat's Pump & Blower in 1985. Le and Kevin Fender joined the company a year later. Going forward, Le and Pat will serve as consultants for the company. Kevin, a 35-year industry expert, is now the sole owner and president of Pat's Pump & Blower.

Duperon expands leadership team

Steve Macomber

Duperon Corp. welcomed Steve Macomber as business development manager. Macomber brings 25 years' experience and will lead the company's business development efforts. Hailing from Charlotte, North Carolina, he spent six years with Black & Veatch and more than 18 years working for equipment manufacturers in the screening, dewatering and thickening sector.

Franklin Electric adds to management team

Matt Murray

Mike Smith

Franklin Electric welcomed two new members to its growing industrial and engineered systems business unit. Matt Murray joins the company as senior business unit manager for industrial distribution, and Mike Smith joins as senior business unit manager for fleet. In their new roles, Murray and Smith will set the strategic vision for their segments, leading all commercial activities and supporting the needs and growth of Franklin Electric's customers.

Kent County DPW hires communications and marketing manager

The Kent County Department of Public Works hired Steve Farber as its new communications and marketing manager. Faber has a background in strategic communications, public relations and conservation. He holds a master's degree in public administration and nonprofit management from Grand Valley State University and a bachelor's degree in geography from Calvin University.

NLB relocates Northwest branch facility

NLB Corp. announced it relocated its branch facility in the northwestern United States to better serve customers in Washington, Oregon, Idaho, Montana, Wyoming, Alaska and western Canada. The move from Kent, Washington, to Lakewood, Washington, puts the branch in the heart of the Tacoma business corridor, easily accessible from the I-5 expressway. As before, the new branch provides sales, service and rentals for NLB's high-pressure water jet pumps and accessories as well as spare parts and training.

Inframark acquires Texas-based Certified Management

Inframark announced today the acquisition of Certified Management of Austin. CMA is a provider of financial, administrative and support services within the greater Austin, Texas market, serving 39 communities and more than 6,200 residential units. CMA is the second company to join Inframark's Community Management portfolio, as well as the seventh overall completed transaction for Inframark since the start of 2021. The financial terms of the transaction were not disclosed. ✦