TREATMENT PLANT OPERATOR
tpo™
DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS
tpomag.com
JANUARY 2020

TECH TALK:
Air stripping for VOC removal | 46

IN MY WORDS:
Energy auditing in New Hampshire | 40

Chris Compton
Maintenance Manager
Louisa, Va.

Common Cause

SOPHISTICATED PROCESSES HELP AN EXPERIENCED TEAM MEET TOUGH PERMIT LIMITS | 22

HOW WE DO IT:
Bioelectrode sensing to monitor BOD | 28

ProSeries-M®

PRECISION PERFORMANCE JOINS FUNCTION & INNOVATION

Flex-Pro® M-3

PERISTALTIC METERING PUMPS

Precision dosing of the harsh chemicals often used in water and waste water treatment, including peracetic acid.

CHEM-FEED® Skid Systems

ONE AND TWO PUMP MODELS ARE AVAILABLE

Constructed of chemical resistant polyethylene with a drop-in-place design. Can be Equipped with the Proseries-M® Pump of Choice.

Blue-White is ISO 9001:2015 Certified

PRECISION CHEMICAL METERING FOR OVER 60 YEARS

Blue-White®

www.proseries-m.com • www.blue-white.com

5300 Business Dr., Huntington Beach, CA 92649 USA • 714-893-8529 • info@blue-white.com

MADE IN THE USA

SIMPLE. EFFICIENT. INTELLIGENT.

Generate Revenue with *Raptor*® Septage Acceptance Plants

NOT YOUR ORDINARY RECEIVING SYSTEM

Grow your septage, FOG, and sludge receiving business with a Raptor Septage Acceptance or Complete Plant.

Speak to one of our experts at **630.837.5640**, email us at **sales@lakeside-equipment.com**, or visit **www.lakeside-equipment.com** for more product information.

Raptor Septage Acceptance Plant

Removes debris and inorganic solids from municipal and industrial septage, FOG, and sludge. This heavy-duty machine incorporates the Raptor Fine Screen for screening, dewatering and compaction. Accessories include security access and automated accounting systems.

Raptor Septage Complete Plant

With the addition of aerated grit removal, the Septage Acceptance Plant is offered as the *Raptor* Septage Complete Plant.

LAKESIDE EQUIPMENT CORPORATION
Water Purification Since 1928

Cleaner Water for a Brighter Future®

advertiser index January 2020

Facebook.com/TPOmag Twitter.com/TPOmag
Youtube.com/TPOmagazine
Linkedin.com/company/treatment-plant-operator-magazine

KELLER

Grace under pressure

LevelRat non-fouling level transmitter

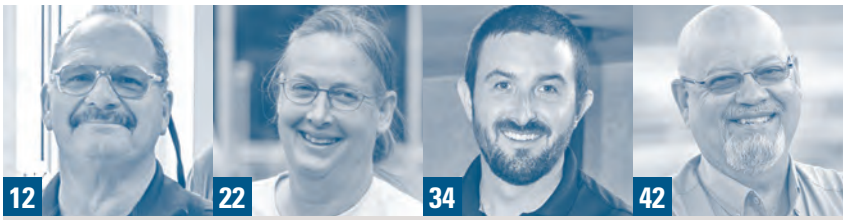
- Durable non-fouling diaphragm design
- Lifetime guaranteed lightning protection
- Custom pressure ranges and cable lengths
- Analog + digital output standard
- Ships in 3 business days ARO
- 2 year warranty

877-2-KELLER
kelleramerica.com

contents

January 2020

top performers



coming next month: February 2020 FOCUS: **Biosolids Management and Headworks; WWETT Pre-Show Issue**

» Let's Be Clear: A new commitment to water recycling and reuse » Top Performers: Garon Goularte, Monterey One Water, California | Raed Armouti, P.E., Crawford, Murphy & Tilly, Missouri | Rhonda Harris, CH2M Hill, Dallas | Olivenhain Municipal Water District, San Diego » How We Do It: Fighting filter flies in Cullman, Alabama » Sustainable Operations: Saving energy in Somersworth, New Hampshire » In My Words: An association for industrial operators » PlantScapes: Creative landscaping and informational signs in Wilsonville, Oregon » Hearts and Minds: Training day for Milwaukee-area teachers » Technology Deep Dive: Advances in SCADA and data history

ARSENIC IS NOT A GAME

Ready to make the right move?

AdEdge is your one-stop resource for arsenic treatment systems for any size community. We now supply Bayoxide E33 adsorptive media and E33 media replacements for the largest and the smallest systems. As always, AdEdge offers competitive pricing, experienced engineers, and unparalleled support.

With AdEdge's arsenic treatment systems' global success history, why would you go anywhere else?

When you're ready to make the right move, call us at **866.823.3343**.

AdEdge™ water technologies

www.AdEdgetech.com

TREATMENT PLANT OPERATOR tpo

DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

Published monthly by COLE Publishing, Inc.
1720 Maple Lake Dam Rd., P.O. Box 220, Three Lakes, WI 54562

Call toll free 800-257-7222 / Outside of U.S. or Canada call 715-546-3346
Mon.-Fri., 7:30 a.m.-5 p.m. CST

Website: www.tpomag.com / Email: info@tpomag.com / Fax: 715-546-3786

SUBSCRIPTION INFORMATION: A one year (12 issues) subscription to *TPO*™ in the United States and Canada is FREE to qualified subscribers. A qualified subscriber is any individual or company in the United States or Canada that partakes in the consulting, design, installation, manufacture, management or operation of wastewater and water treatment facilities. To subscribe, return the subscription card attached to each issue, visit tpomag.com or call 800-257-7222.

Non-qualified subscriptions are available at a cost of $60 per year in the United States and Canada/Mexico and $150 per year to all other foreign countries. To subscribe, visit tpomag.com or send company name, mailing address, phone number and check or money order (U.S. funds payable to COLE Publishing Inc.) to the address above. MasterCard, VISA and Discover are also accepted. Include credit card information with your order.

ADDRESS CHANGES: Submit to *TPO,* P.O. Box 220, Three Lakes, WI 54562; call 800-257-7222 (715-546-3346); fax to 715-546-3786; or email nicole.labeau@colepublishing.com. Include both old and new addresses.

Our subscriber list is occasionally made available to carefully selected companies whose products or services may be of interest to you. Your privacy is important to us. If you prefer not to be a part of these lists, please contact Nicole at nicole.labeau@colepublishing.com.

ADVERTISING RATES: Call 800-994-7990 and ask for Phil or Kim or email phil.hahn@colepublishing.com or kim.bruss@colepublishing.com Publisher reserves the right to reject advertising which in its opinion is misleading, unfair or incompatible with the character of the publication.

EDITORIAL CORRESPONDENCE: Address to Editor, *TPO,* P.O. Box 220, Three Lakes, WI 54562 or email editor@tpomag.com.

REPRINTS AND BACK ISSUES: Visit www.tpomag.com for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email jeff.lane@colepublishing.com. To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email nicole.maney@colepublishing.com.

CIRCULATION: 68,563 copies per month.

It Takes All Kinds

DIVERSITY AND INCLUSION EMERGE AS KEY PRIORITIES FOR THE WATER ENVIRONMENT FEDERATION AND EFFORTS TO BUILD A NEW-GENERATION WORKFORCE

By Ted J. Rulseh, Editor

Together we stand, divided we fall
Come on now people, let's get on the ball and work together
Come on, come on, let's work together, now now people
Because together we will stand, every boy, every girl and a man

The words above came over the PA and the crowd filed in for the Opening General Session at the Water Environment Federation's Technical Exhibition and Conference. And I wondered: Why are we listening to Bob "The Bear" Hite and Canned Heat at a clean-water industry conference?

It didn't take long to find out. The call to "work together" fit in perfectly with one of the session's themes: diversity and inclusion. WEF President Thomas Kunetz, P.E., devoted a large share of his message to that topic.

REFLECTING COMMUNITIES

Kunetz observes that the world is transitioning from an industrial to an entrepreneurial economy. "More and more, individuals are having to rely on their own resourcefulness to earn a living," he says. Therefore, "The water sector workforce needs to be composed of people who are self-learners, creative, resourceful, able to adapt to constant change.

"In addition to the right education, the water workforce of today should be a reflection of the community it serves. Right now it is not. According to a recent study by the Brookings Institution, the water sector workforce is two-thirds male and 85% white.

"We in the water sector are standing on the threshold of a golden opportunity. We need talented, energetic and adaptable young people with fresh perspectives to fill the ranks of our workforce. And there is a diverse group of talented individuals available to fill those roles, to bring their perspectives, which will make the water workforce more creative and more resourceful. The trick is to let them know that we exist, that we have great jobs waiting for them."

I was surprised to learn that one-third of the clean-water workforce is composed of women; I would have guessed a much smaller share. So I took that revelation as good news. The bottom line is that the industry needs the talents and perspectives of people of both genders and all ages, colors, backgrounds and countries of origin.

HOW ARE WE DOING?

With that in mind, I did a little soul-searching about *Treatment Plant Operator* and how we represent diversity on our pages. We're conscious of it,

"In addition to the right education, the water workforce of today should be a reflection of the community it serves. Right now it is not."
THOMAS KUNETZ, P.E.

and we have been ever since the magazine was founded 10 years ago. On our covers and in the profiles that we publish about outstanding plants and operators, we've had what to me seems a good representation of the workforce as it exists.

We most often select our profile subjects from among winners of awards given by WEF Member Associations and other operator groups. Those organizations and their award winners seem to be quite diverse. However, I haven't gone back over 10 years of issues to count up the numbers of women and people of color featured and pictured in our articles.

So I'm wondering: What do you think? Are we doing the job where diversity is concerned? I would be interested in your perceptions. Send a note to editor@tpomag.com. I promise to respond, and we will publish a sampling of the reactions.

A saying I heard often as a kid was: "It takes all kinds of people to make a world." It also takes all kinds to make an industry. The more diverse we are, the stronger we'll be. It brings to mind the words from another Canned Heat song belted out by The Bear:

When you've got troubles, have no place to go
I'm sure you'll find someone who'll help you know
It's the same all over
It's the same all over
It's the same all over, good people everywhere you go. **tpo**

@tpomag.com

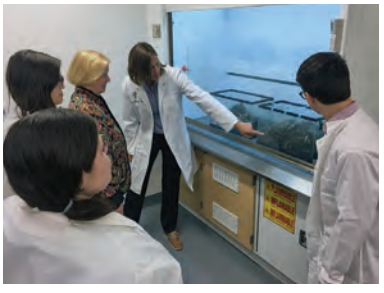
Visit the site daily for new, exclusive content. Read our blogs, find resources and get the most out of *TPO* magazine.

ANTIBIOTIC RESISTANCE

Direct vs. Indirect Reuse

With climate change comes not only increasing water shortages, but longer periods of drought. As lawmakers look to wastewater recycling to stem the gap in water resources, the question is not whether reuse is necessary, but how best to approach it. This online exclusive article examines some of the benefits of a direct reuse approach in light of antibiotic resistance.

tpomag.com/featured



STUDYING A FATBERG

Educating Customers

A recent sewer blockage in Macomb County, Michigan, offered a rare opportunity to delve into the origins and characteristics of fatbergs. This particular fatberg extended over 100 feet long, weighed about 19 tons and threatened raw sewage discharge into local rivers. Now, parts of the fatberg are on display to educate the public about flushable wipes and FOG accumulation.

tpomag.com/featured

OVERHEARD ONLINE

"There are certainly proven technologies to safely recycle water. But as we embark upon this major future investment, we need to explore how the process can be improved."

Water Recycling Demo Plant Begins Operations in Los Angeles

tpomag.com/featured

APPRENTICESHIP PROGRAM

Addressing Operator Shortage

There's no time like the present to start planning for the water/wastewater operator retirement wave. That's the thought process behind a new apprenticeship program in Vermont that is generating a surprising amount of interest. The program provides water utilities with new employees and gives job training in a solid career to Vermonters.

tpomag.com/featured

Join the Discussion

Facebook.com/tpomag
Twitter.com/tpomag

Emails & Alerts

Visit **tpomag.com** and sign up for newsletters and alerts. You'll get exclusive content delivered right to your inbox, and you'll stay in the loop on topics important to you.

AquaPrime®

CLOTH MEDIA FILTRATION SYSTEM

ADVANCED TREATMENT FOR PRIMARY WASTEWATER AND INDUSTRIAL APPLICATIONS

The **AquaPrime®** filtration system utilizes OptiFiber PF-14® pile cloth media in a disk configuration with three zones of solids removal to effectively filter wet weather flows without the use of chemicals. The system is designed to handle a wide range of flows in a fraction of space compared to conventional clarifiers.

AquaPrime is ideal for primary filtration, primary effluent filtration and industrial wastewater due to its proven removal efficiencies and high quality effluent, even under varying influent conditions.

- Specifically designed floatable and settled solids removal zones
- Reduced energy costs in the secondary process due to reduction in organic loading
- More solids for increased biogas production in anaerobic digesters
- A footprint that is 15-20% of conventional primary treatment

Linda County Water District, Olivehurst, CA

- Primary Filtration Application
- TSS removal greater than 75%
- BOD removal up to 60%

A "Green" Advantage Product
Lower Energy • Small Carbon Footprint

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

www.aquaprimefiltration.com | 815-654-2501

Step by Step, A to Z

SOPS AT WINCHESTER'S WATER PLANT GIVE TEAM MEMBERS A CLEAR ROAD MAP TO EFFECTIVE AND EFFICIENT OPERATIONS, MAINTENANCE, REPAIRS AND SAFETY MEASURES

STORY: **Jim Force** | PHOTOGRAPHY: **Kevin Blackburn**

The Percy D. Miller Water Treatment Plant has a design capacity of 10 mgd.

If the operators at the Percy D. Miller Water Treatment Plant are experts at operating their systems, it's because they wrote the standard operating procedures manuals themselves.

"We came up with the idea while talking about emergencies like the bird flu crisis," says Farrell Owens, manager of the facility in Winchester, Virginia. "What would we do if we had 25% or 50% of our staff out? If we had good SOPs, could other people come in and do the work?

"So we went over every section of the plant — every building, every pump, every valve — and developed pictures, descriptions and procedures, by operators for operators. Plus, we rewrote the instructions so everybody could understand them."

A NEW ATTITUDE

The original facility was built in 1957; it was upgraded in 2012. It is designed to process 10 mgd of water drawn from the North Fork Shenandoah River and deliver it to the distribution system. The plant uses conventional flocculation, sedimentation, filtration and disinfection stages. Fluoride is added to the finished water, as is AQUA MAG blended phosphate (Carus Corp.) for corrosion control.

The staff works 12-hour shifts, including one team member who floats and performs the lab work. Brian Broadstreet is chief operator; Wade Arnold, Zach Reinitz, Patric Cunningham and Brian Armel are lead operators; James Dowd and Brandon Linquist are operator trainees.

Patric Cunningham, right, lead operator, teaches Brandon Brown, operator trainee, about “running the boards” and documenting the numbers in the hypo tank room.

The 2012 upgrade made significant changes and coincides with the string of awards the plant has won from the Virginia Department of Health. A change in attitude helped make a difference, too. “We always knew we could make good water,” Owens says. “We got rid of the ‘that’s how we’ve always done it’ thing. The change in attitude helped a lot.” He credits Broadstreet for leading the effort.

MAJOR IMPROVEMENTS

A new chemical facility, an Automatrix SCADA system and a new two-meter belt press (Evoqua Water Technologies) were highlights of the plant improvements. Previously, sedimentation solids were placed in a lagoon and pumped out periodically.

“We paid a lot to have all that water hauled away,” Owens says. “We added the press, and now we pump solids from the settling basin to our gravity thickener and press them to 21% to 22% solids. Then we put them in a roll-off that a Maryland firm hauls away for us. It’s a lot less costly.”

At the same time, the plant team cleaned out and lined both lagoons with new plastic, changed its flocculators from horizontal to vertical, and replaced the old chain-and-scraper mechanism with new plastic components. “The horizontal flocculators required a penetration through a wall, with a very large sprocket attached to the smaller motor and gearbox,” Owens says. “We had constant leaks.”

With the vertical flocculators (Evoqua), there is no wall penetration and no sprocket, and operators can better adjust flocculator speed. The new plastic chain (also Evoqua) is lighter and uses a smaller motor and gearboxes.

The chemical feed system has changed, too. “We used to feed caustic soda to control pH,” Owens says. “But we’ve changed from ferric chloride for coagulation to polyaluminum chloride. Now, it’s rare to need a pH adjustment.”

The plant maintains low turbidity despite wide variance in the source water, which can reach 500 NTU and even higher after rainfalls.

Percy D. Miller Water Treatment Plant, Winchester, Virginia

www.winchesterva.gov

BUILT:
1957, upgrade 2012

AREA SERVED:
City of Winchester

POPULATION SERVED:
29,000

SOURCE WATER:
North Fork Shenandoah River

TREATMENT PROCESS:
Conventional

CAPACITY:
10 mgd (6.08 mgd average)

SYSTEM STORAGE:
7 million gallons

AWARDS:
Gold Award, Virginia Department of Health, 2018; Silver and Bronze awards nine times since 2007

ANNUAL BUDGET:
$3.1 million (operations)

The plant also added a new high-service pump station, equipped with 500 hp Flowserve pumps and a pair of 1.5 million-gallon storage tanks, increasing pumping and storage capacity and adding capability to expand with service area growth.

EXCELLENT CLARITY

The filters (The Roberts Filter Group) have a mixed-media bed of sand, rock and anthracite coal. Backwashing typically occurs every 100 hours. "Since we started using polyaluminum chloride as our coagulant, we get 100 hours before backwashing every time," Owens says. "Before, not only was ferric hard on the plant, but we'd get about 70 hours of filtration before backwashing, maybe 60 hours in winter."

> "Our plant is always capable of putting out good water, no matter what the river brings us."
> **FARRELL OWENS**

The treated water is chlorinated, then goes through the storage tanks for adequate contact time. Additional storage is provided by two ground tanks and one elevated tank. Total storage capacity is 7 million gallons.

The stored water is excellent quality. Turbidity is the critical measure, and the plant has an exceptional track record there. "We normally average 0.02 to 0.03 NTU," Owens says. That's despite wide variance in the turbidity of the source water, which usually runs about 10 NTU but can spike to 500 NTU if there's rain in the nearby mountains.

"I've seen it get as high as 700 NTU," Owens says. "But our plant is always capable of putting out good water, no matter what the river brings us." The team constantly monitors turbidity using a Hach TU5300 meter. "We optimize the coagulant feed at the flash mix process before the water goes into the flocculators," Owens says. "Ultimately, that will mean less work for the filters. That's the key to low turbidity."

The team does not have responsibility for the distribution system serving Winchester, a network that includes some of the first wooden pipes installed in the U.S. According to a video on the plant's website, the pipes were fashioned out of 10-inch oak logs; a horse-driven boring machine made the holes down the centers.

STANDARDIZING OPERATIONS

While Owens and his team have figured out how to operate the plant efficiently and effectively, their jobs don't end there. Owens makes a big point

FINALLY, THE TOP

The Gold Award from the Virginia Department of Health culminated a long climb toward perfection at the Percy D. Miller Water Treatment Plant.

"For 12 years, we'd been waiting for this," says Farrell Owens, facility manager. "We won the Silver Award seven times and the Bronze Award twice since 2007. We were always capable of producing good water."

Indeed. According to the award recognition, the plant met strict standards for turbidity at least 95% of the time in tests taken at 15-minute intervals at all hours of the day during a one-year period. The plant's average turbidity is in the range of 0.02 to 0.03 NTU, from surface water that averages about 100 NTU and that can reach several hundred NTU in rainy weather.

"Our goal every day is to provide our customers with the best and safest drinking water possible," says Perry Eisenach, director of Winchester Public Services. "We were very proud to receive the award, as it is recognition of the water treatment plant team's hard work, dedication to detail and excellent customer service."

The award is administered by Health Department's Office of Drinking Water. The program's performance goals for water clarity and filtration were developed using studies and research by the U.S. EPA, the American Water Works Association and the waterworks industry.

Team members at the Percy D. Miller plant include, from left, Patric Cunningham, lead operator; Brandon Brown, operator trainee; Farrell Owens, manager; Brian Broadstreet, chief operator; and Brian Armel, lead operator.

about the plant's complete manual of SOPs, how they were developed and their reader-friendly style.

He made a presentation on the SOP program at the 2017 Virginia American Water Works Association meeting, stressing the need for operator involvement and plain language. "Sit down with key personnel and write out a list of all the components that make up your facility," he says. "Don't leave anything out, no matter how small it may seem. You can take things out later if needed."

He also talked about the scope of the SOPS, starting at the beginning of the plant. "Start where the water enters the plant and follow the flow pattern all the way to the end," he advises. "That keeps the project on track."

At Winchester, that meant starting at the river dam and continuing to the river rake, the raw water pumping station, the flash mix operation, flocculators, sedimentation, sludge withdrawal, chain-and-flight mechanism, and chemical feed and disinfection, as well as instrumentation and controls.

(continued)

Farrell Owens shows one of the books of standard operating procedures that have been created for every area of the plant and every process.

STEP BY STEP

At each process step, Owens and his team made a list of items to include in each SOP. They include the equipment name, manufacturer, serial and model numbers; the purpose of the equipment; operating instructions; maintenance procedures; safety precautions; and contact information. The information is straightforward and understandable.

For example, a section about the dewatering system states: "It is very important to remember that there are a lot of moving parts on the belt press and to stay clear of these parts when in motion." Then comes a series of clearly written steps:

- Step One: The operating station is a touch screen and will likely be off when you approach it. Simply touch the screen and the startup screen will appear.
- The Auto Cycle Status screen will appear and show "Ready" outlined in black toward the top middle of the screen, to the right of that in the top right corner.
- There is a blue box that reads "Belt Press Auto Mode." This means that the press is in the auto mode and not in manual. To switch to manual, simply touch the blue box and it will turn yellow.

Emergency procedures are also straightforward:

- In the event you need to stop the belt press in an emergency, simply pull on the emergency E-Stop red wire, which runs the length of the belt press on both sides, or hit the E-Stops, which are also located on both sides of the belt press.
- Returning back to the start is simply doing everything you just did, only in reverse.

The instructions are accompanied by clear graphics that show the equipment components and use arrows and captions to point out key features, including on and off buttons.

LANGUAGE LESSON

One of Owens' presentation slides is titled "Watch Your Language, Young Man." By this he means that instead of using the jargon and techno-talk that has grown up around the water and wastewater field, write in plain, understandable language. And call something by the same name throughout.

For example he points out that the blended phosphate used at the Winchester plant can be referred to as blended phosphate, PO4, AQUA MAG or corrosion inhibitor. Likewise, the plant's disinfectant can be referred to as hypo, chlorine, bleach or disinfectant.

"Every facility has language that applies specifically to its environment, and this industry has language specific to the water and wastewater fields," Owens says. "Every SOP should have language and details as if the person reading it has never worked in this field. Maybe they have never been to your facility. They may not even be interested in doing the work.

"In emergencies, you might be using existing personnel from other departments. You should stick to the most common name in the plant, preferably what it is on the SCADA screens or paperwork."

> "Every SOP should have language and details as if the person reading it has never worked in this field."
> **FARRELL OWENS**

As in all water utilities, Owens and the Winchester team are always on the lookout for new employees. "We advertise with the city," Owens says. But finding and training employees are two different sides of the street. That's where the SOPs come in handy, written by operators, from one end of the plant to the other.

"They're just about the best training tool we have," Owens says. Process improvements, a change in attitude and clear SOPs written by staff members — it's a winning combination. tpo

The facility uses an automated Raptor screening system (Lakeside Equipment).

featured products from:

Carus Corporation
800-435-6856
www.caruscorporation.com

Evoqua Water Technologies LLC
www.evoqua.com

Flowserve Corp.
972-443-6500
www.flowserve.com

Hach
800-227-4224
www.hach.com
(See ad page 19)

Lakeside Equipment Corporation
630-837-5640
www.lakeside-equipment.com
(See ad page 3)

The Roberts Filter Group
610-583-3131
www.robertsfiltergroup.com

WIPE OUT CLOGS

Flushable wipes are clogging sewer systems across the country. Vaughan has the clear solution. Since 1960, Vaughan Chopper Pumps have delivered guaranteed performance in the toughest applications. Our Chopper Pumps easily handle difficult solids like disposable pads, wipes, duster cloths and diapers.

- Expedited pumps and parts delivery
- Self-Priming Chopper pump models available
- Flows over 13,000 gallons per minute
- Pumps easily maintained with external adjustments
- Discharge sizes from 3" to 16"
- Heat-treated and hardened components
- Try and buy program available upon request
- Non-clogging guarantee on all Chopper pumps

MANUFACTURED IN THE USA

Wipe out your clog worries, contact Vaughan for more information.
ChopperPumps.com | 360.249.4042 | info@chopperpumps.com

Chopper

Patty Potty

'No Wipes in the Pipes'

PATTY POTTY HELPS DELIVER MESSAGES ABOUT PROTECTING WASTEWATER COLLECTIONS SYSTEMS IN A HUMOROUS, MEMORABLE FASHION

By Sandra Buettner

Patty Potty is on a mission to save sewer systems from flushable wipes and other things people flush that don't belong there.

Her "No Wipes in the Pipes" campaign is getting traction in Texas cities and around the world. The campaign, started in 2014 by the San Jacinto River Authority and Payne Communications in Houston, is building up followers on social media.

According to Patty (a fictional character created as the campaign spokesperson), "People are flushing all kinds of things down the toilet that they shouldn't be. It's not a trash can, but people treat it as such. Some products and wipes are advertised as flushable, but they aren't. They might flush down, but they aren't biodegradable. Instead of breaking down, they get caught in wastewater treatment plant screens and filters. That costs cities money to clear and repair, not to mention the stress it puts on pipes and pumps."

A STAR IS BORN

"We needed a character who would be memorable and be a role model to educate people on how they can help cities to extend the lives of sewer systems," says Patty, played by Michelle Simpson, outreach specialist for Save Water Texas. "We wanted to make it fun at the same time."

The Patty Potty character is a housewife from the 1950s who is completely in charge of her home. She is bossy and prissy and attacks things head-on, especially wipes. When out speaking, she asks the audience to take the Patty Potty Pledge — to put only the three Ps in the toilet: poo, pee and toilet paper.

Her speaking venues have ranged from classrooms with 15 children to industry conferences with 500 or more attendees. Using humor, she has proclaimed her no-wipes message for the Texas Water Conservation Association, the American Water Board of Directors annual meeting, other Texas water conferences, and municipal utility district board meetings.

"If you can make people laugh, you have them," Patty says. "It's a great way to connect with your audience, and the message becomes much more memorable. It's also a great way to get the audience engaged and to participate." Patty is a hit with all age groups: After one industry conference, an audience member came up to her and asked where she'd been all his life.

PROMOTING THE MESSAGE

The campaign is funded through sponsorship packages on the Patty Potty website (www.pattypotty.com) along with promotional materials available to cities, such as bill stuffers, posters, bumper stickers, magnets, tote bags and display items.

> "If you can make people laugh, you have them. It's a great way to connect with your audience, and the message becomes much more memorable."
> **PATTY POTTY**

Patty also promotes a fats, oils and grease campaign that educates audiences on the dangers of putting those items down the drain. "I tell them that just because they were told they could do it doesn't mean they should," Patty says. "Many are hearing the message for the first time, so it is an uphill battle attempting to change behavior."

She encourages other cities and states to follow her on Facebook, Twitter and YouTube and to share the information worldwide. Patty won't stop until the whole world gets the message. **tpo**

85 Years of Water Analysis Innovation

+ 100 Countries Providing You with Local Service Support

+ 117 Customer Training Courses

+ 1,100 of Your Questions Answered Daily

+ 11,800 Products Available to You Online

+ 135,000,000 Tests Conducted Annually by You

+ 2,304,000 Claros™ Measurements Taken by You Per Day

At Hach, our focus is you. Your process. Your permits. Your challenges. No matter how many patents, projects, or installations we earn, your success is the true measure of our success. **It all adds up to you.**

See the Power of Hach.

Learn more at hach.com/wastewater

HACH®

Be Right™

The Fingerville Wastewater Treatment Facility has received a Platinum 7 Peak Performance Award from the National Association of Clean Water Agencies for seven years of 100% permit compliance.

Cleaner Than the Creeks

MULTIPLE AWARDS ATTEST TO THE SUCCESS OF SPARTANBURG WATER IN PRODUCING HIGH-QUALITY EFFLUENT AND A LONG RECORD OF FULL PERMIT COMPLIANCE

By Steve Lund

When a water utility has won as many awards as Spartanburg Water, for sustainable management and consecutive years of 100% permit compliance and more, it must be doing a few things right.

Spartanburg Water received the 2019 Sustainable Water Utility Management Award from the Association of Metropolitan Water Agencies. It also won a Platinum 7 Award from the National Association of Clean Water Agencies for seven years of 100% compliance at its Fingerville Wastewater Treatment Facility, Platinum 6 awards at the Clifton-Converse and Page Creek wastewater treatment facilities, and a Platinum Award at the Cowpens Wastewater Treatment Facility.

The Page Creek Wastewater Treatment Facility is one of two Spartanburg Water plants honored with Platinum 6 awards for six years of perfect permit compliance.

In the previous two years, the utility, in northwestern South Carolina, received recognition from various organizations for permit compliance, operational excellence and customer service. It also won a Utility of the Future award in 2018 from the National Association of Clean Water Agencies.

Rick Jolley, wastewater treatment manager, Spartanburg Water

"For years and years, Spartanburg Water has really been on top of its game as far as compliance," says Rick Jolley, wastewater treatment manager. "That's what we've tried to drill into all of our operators. They own it. They own compliance. It all comes back to them. They're the ones who have to make adjustments."

EXTRA BASIN CAPACITY

Spartanburg Water has resiliency designed into its treatment systems. That helps the utility get through heavy rainfalls or extended rainy periods without exceeding permits.

"In fall 2018, we had torrential rainfalls, but we have a lot of redundancy in our plants," Jolley says. "We have enough basin space that the operators know what they can do. They know we can only send so much through the plant.

"It really comes down to being a shell game in a sense. You've got to sort out where you're going to put water and when you are going to put it there. Then you've got to constantly be thinking about bleeding it off and getting it through the system."

Spartanburg Water has eight wastewater treatment facilities with a combined 32 mgd capacity (about 14-15 mgd average flow). The largest is the A. Manning Lynch Wastewater Treatment Facility with 25 mgd design capacity and 11-12 mgd average flow.

> "For years and years, Spartanburg Water has really been on top of its game as far as compliance. That's what we've tried to drill into all of our operators. They own it."
>
> **RICK JOLLEY**

The plant has a 10 million-gallon basin that can be used for temporary storage in a high-water surge. It is also connected to a large pump station that used to be a wastewater treatment plant and has additional basin capacity.

"We always manage to be able to move water around," Jolley says. "Our other plants have enough basin capacity, too. It's all about sustained capacity and handling peak loads. It takes work and a lot of focus, but it enables them to stay in compliance."

DISINFECTION ALTERNATIVE

Spartanburg Water continuously looks for efficiencies and ways to reduce risk. The team is exploring the use of peracetic acid instead of UV light or chlorine for disinfection. Peracetic acid doesn't leave residual sodium in the effluent the way chlorine disinfection does, and it requires less electricity than UV.

"In a couple of our plants, we're looking at peracetic acid." Jolley says. "It's very environmentally friendly and takes little electricity to run. It'll be a proving ground. It will show our ability to handle a different disinfection system." Peracetic acid is being tested at a plant that has a UV system due for replacement. It is also being considered at a plant that uses chlorine disinfection.

"We tend to want to get away from using chlorine gas," Jolley says. "We run chlorine gas at our main plant. We have large, 1-ton cylinders there. We want to take that risk out. In other plants, we use the liquid version, sodium hypochlorite. Then you have to dechlorinate with sodium bisulfide. There are more chemicals involved. It tends to be costly, too."

Although peracetic acid has been embraced by the U.S. EPA as a wastewater disinfectant for only a few years and has been considered expensive, the cost has been dropping as the process is used in more places. "What kept people from using it in wastewater treatment was the expense," Jolley says.

Conversion of a chlorine plant is not difficult because disinfection with peracetic acid requires less contact time: "If chlorine is taking 30 minutes, peracetic acid is taking close to 10," Jolley says. On the other hand, if a UV plant is converted to peracetic acid, it's likely more contact time will have to be built into the disinfection process. That's a potential problem, but solving it might be worthwhile to achieve the savings from peracetic acid as the costs come down.

"It's two to three times cheaper using peracetic acid compared to UV, and you don't have the capital and operation and maintenance costs," Jolley says.

TEAM EFFORT

Whatever the disinfection method, the goal is to discharge water that is cleaner than the receiving stream. "I would wager we could go upstream from any of our outfalls and we could compare that sample to what's coming out of our wastewater treatment plants, and our plants would far and above exceed the quality of water that's in the river."

That has even been true through some big rain events, when stormwater infiltration stresses the plant capacities and dilutes the influent, causing other problems. "You dilute what's coming in, you have less food for the microorganisms," Jolley says. "You have certain limits for TSS and BOD going out, and we have a percentage reduction we have to achieve.

"We have to keep our eyes on the ball, especially at some of the smaller plants. We have to make sure we're doing the right things. It's a team effort between all of the people. They pay perfect attention to what's going on, and they are ready to react." **tpo**

Common Cause

SOPHISTICATED PROCESSES AND AN EXPERIENCED OPERATOR TEAM KEEP A SMALL VIRGINIA FACILITY IN COMPLIANCE WITH TOUGH PERMIT LIMITS

STORY: **Jim Force** | PHOTOGRAPHY: **Kevin Blackburn**

Dedicated team members like Ryan Amos help the Zion Crossroads plant meet demanding standards such as a 0.6 mg/L effluent phosphorus limit.

It was a case of turning a problem into an opportunity.

The Zion Crossroads Wastewater Treatment Plant was organically and hydraulically overloaded. At the same time, residents of a nearby historical district were concerned about the plant's discharge going through their community from an old impoundment built years ago for flood control.

The solution? Build a new plant able to produce Class 1 effluent for reuse in golf course irrigation or discharge through a 10.5-mile force main to the South Anna River.

The new plant, in Louisa, Virginia, 20 miles east of Charlottesville, features a five-stage Bardenpho biological nutrient removal process (Ovivo) and Ozonia UV disinfection (SUEZ Water Technologies & Solutions). It went into operation in 2011.

According to Wesley Basore, wastewater operations manager with the Louisa County Water Authority, the effluent meets some of the tightest standards in Virginia due to state-of-the-art processes and the efforts of a proud and capable staff. "We're one of only five

Zion Crossroads Wastewater Treatment Plant, Louisa, Virginia

www.louisacountywaterauthority.org

POPULATION SERVED:
2,500

AREA SERVED:
Spring Creek development, 58 commercial properties

FLOWS:
700,000 gpd design, 150,000 gpd average

RECEIVING WATER:
South Anna River or golf course irrigation

TREATMENT LEVEL:
Tertiary

TREATMENT PROCESS:
5-stage Bardenpho

BIOSOLIDS:
Centrifuged and landfilled (option to land apply)

ANNUAL BUDGET:
$2.8 million operations, $300,000 for plant security and improvements

> “I’ve seen plants the same size as ours with many more sensors. Ours have worked beautifully since day one.”
>
> **NANCY PUGH**

localities under the oversight of the Department of Environmental Quality – Northern Regional Office doing reuse,” he says.

“We were discharging through the Historic Green Springs community, a 10,000-acre district with historical homes. The old plant was not meeting permit, operating at about 120% of our organic capabilities and right at our 100,000-gpd hydraulic design.”

A NEW LOOK

The new plant has a design capacity of 700,000 gpd and produces high-quality effluent that contributes to the irrigation of the 18-hole golf course at the 626-home Spring Creek development (build-out is 1,200 homes). About 20,000 gpd is still pumped through the pipeline to the river. “It takes 14 days for the water to get to the outfall,” Basore says. “We like to keep water moving in the pipeline to keep it from going stagnant.”

Wastewater is collected from the Spring Creek community and about 58 commercial establishments, including a 1 million-square-foot retail distribution center (dry goods and refrigerated items), which has a pretreatment permit. Contaminants of concern there are zinc and copper. “We’re working with them on that, including bench-scale testing supervised by our engineer, Dewberry of Richmond,” Basore says. “It’s a permitting issue and affects our land application allowance.”

At the plant, wastewater is moved through an on-site pump station to the headworks, which contains a mechanical bar screen and an aerated grit collector. Through a splitter box, the water can be directed to an equalization basin, the BNR process, or both, depending on flow volume.

The BNR process consists of a first-stage anaerobic zone, followed by an anoxic stage, an aerated reactor, a second anoxic stage and final reaeration before the water flows to the secondary clarifiers. At present, the plant operates a single clarifier basin, keeping the other in reserve for maintenance.

From the clarifiers, the flow passes through two AquaDisk cloth media filters (Aqua-Aerobic Systems). Then it’s on to post-aeration, the UV units, reaeration, and discharge to the reuse impoundment or by five-stage effluent pumps (Goulds Water Technology, a Xylem brand) to the pipeline.

“We opted for vertical UV units because it was easier to replace individual bulbs,” Basore says. “With our old horizontal system, if a bulb went out, we’d have to pull the entire rack.”

Aerial view of the Zion Crossroads Wastewater Treatment Plant.

DOUBLE WINNERS

It's great when a water or wastewater utility team member wins a statewide award. It's even better when two team members are honored.

That was the case last year at the Louisa County Water Authority, where Nancy Pugh, chief operator, and Chris Compton, maintenance manager, won awards from the Virginia Rural Water Association.

Pugh, who has been with the authority for 12 years, was named Wastewater Operator Specialist of the Year. She is responsible for operation of the Zion Crossroads Wastewater Treatment Plant. "This is the third utility I've worked for and the smallest," she says. "I was surprised but pleased to receive the award."

She isn't bothered by working in a man's world: "When I sat for my first license exam, there were about 300 men and four women testing." She enjoys working in the environmental field. "It's in my family," she says. "My dad was an environmentalist. It's great to have a job doing something I believe in."

Compton has been with the authority for 16 years. He's a jack-of-all-trades, handling maintenance for water and wastewater, tending lift stations, reading and installing meters, using a line locator, monitoring new infrastructure and running the water well system, including all Virginia Department of Health water-quality testing.

He is licensed in both water and wastewater and likes the variety: "There's always something to do. It's not the same thing every day. The days fly by." Compton was surprised by the award and honored to attend the state conference for the first time.

"It was great to meet people, share situations and talk with vendors," he says. "When I started, technology was minimal in the field. Now there has been so much advancement in equipment: I am amazed at just how far it has come in the last decade. This is an ever-growing field, and we're going to need water forever."

ABB flowmeters monitor flow rates, and Hach ORP and dissolved oxygen sensors control the reactors. Hach turbidity sensors are installed at the filters as part of the reuse permit. Nitrates are also monitored using Hach sensors for chemical control.

"We adjust chemicals off the nitrate sensors, and the aerator speeds are controlled by the DO sensors," Basore says. The ORP sensors control the recycle gate and the percentage of recycle that is fed back into the first anoxic zone. A carbon source is fed into the second anoxic zone to minimize nitrate levels. Alum is added at reaeration for phosphorus control.

Nancy Pugh, chief operator and winner of the Virginia Rural Water Association Wastewater Operator Specialist of the Year award.

REDUNDANT SYSTEMS

"I've seen plants the same size as ours with many more sensors," says Nancy Pugh, chief operator. "Ours have worked beautifully since day one."

The treatment process features a great deal of redundancy. "We did that to ensure against violations," Basore says. "Our BNR system has dual aerators, and we have a chlorine system on site as a backup for disinfection. That's in case we'd have an *E. coli* outbreak in either the reuse or outfall line."

In addition, the plant has two final clarifiers and two cloth filters. "We run just one basin because of flow, which averages 150,000 gpd," Basore says.

The plant operates under a tiered permit in addition to a reuse permit. At 700,000 gpd (design capacity), the requirements are 3.4 mg/L for total nitrogen and 0.4 for total phosphorus, among the strictest in the state. At flows below 311,000 gpd, the limits are 6 mg/L for total nitrogen and 0.6 for total phosphorus. In 2018, the plant average effluent total nitrogen was 2.4 mg/L and total phosphorus was 0.12 mg/L.

Because of the Chesapeake Bay watershed rules, the plant's limits are locked. Reuse helps because any discharge not flowing to the river doesn't count toward the plant's effluent limits.

Solids are digested, then dewatered to about 20% solids on a centrifuge (Andritz), which Basore says was chosen because it produces a small, concentrated side stream. The cake is landfilled, but land application is available as a permitted alternative.

An Allen-Bradley SCADA system (Rockwell Automation) monitors and controls plant functions.

LICENSING ISSUES

While meeting tight discharge limits is an ongoing challenge for the Zion Crossroads staff, another

(continued)

The plant has two final clarifiers and two cloth filters that put the finishing touches on water for reuse or discharge.

The team at the Zion Crossroads plant includes, from left, Harley Brooks, operator; Ryan Amos, trainee; Chris Compton, maintenance manager; Robert Ziolkowski, operator; Nancy Pugh, chief operator; and Wesley Basore, wastewater operations manager.

> "Maintenance helps us, and we help maintenance. We're one big group of people working for a common cause."
> **WESLEY BASORE**

video profile

To learn more about the Zion Crossroads Wastewater Treatment Plant, watch a video profile at tpomag.com

Zion Crossroads Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	306 mg/L	1.4 mg/L	10 mg/L
TSS	195 mg/L	1.0 mg/L	10 mg/L
Total nitrogen	61.5 mg/L	2.4 mg/L	6.0 mg/L
Total phosphorus	8.01 mg/L	0.12 mg/L	0.6 mg/L

pressing issue is in play. "We're fast approaching an operator shortage," Basore says. "Maybe we're already there. Nancy and I are near retirement."

It's difficult to find operators who hold a Class 1 license: "Reuse is a driver for advanced operator levels. But operators moving up into the higher classification — that's not happening."

It's more than just studying and passing the tests: "It truly is that some of the test questions deal with things operators have never even heard of. If they don't pass, they start to question themselves."

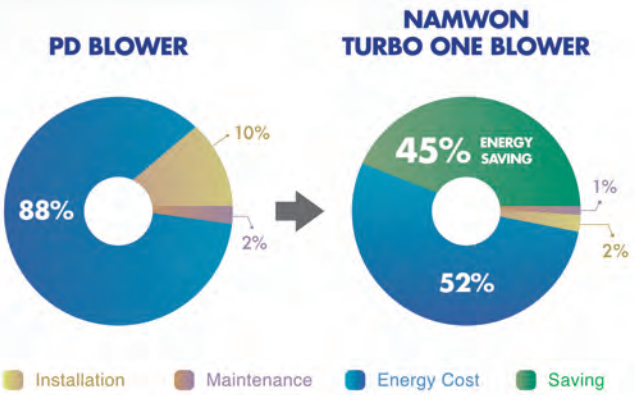
Closed-book testing can lead to as high as 80% failure rates, Basore maintains. "A lot of those questions on best practices are really a matter of one's individual perspective. The correct answer can be subjective at best. How are other states dealing with this?"

For now, Basore (Class I) has a qualified staff. In addition to Pugh (Class I), Rob Ziolkowski is a Class 2 operator, Harley Brooks is Class 4 and Ryan Amos is a trainee. They rotate through 12-hour shifts during the week and 8-hour shifts on holidays and weekends.

"We all work together," Basore says. "We have responsibility for water as well as wastewater. Maintenance helps us, and we help maintenance. We're one big group of people working for a common cause." **tpo**

Brooks rakes biosolids. Each container holds 14 cubic yards. The plant sends a few containers per month to the landfill.

DISCOVERING NEW FRONTIERS WITH TURBO BLOWER INNOVATIONS



Saving energy is all about making deliberate choices:
it's time to choose Namwon Turboone's full- fledged blower.
Equipped with unmatched speed & high efficiency PMSM and VFD, our blower will surely reduce your operating costs.

Compared to a standard PD blower, our unique equipment is the eco-friendly, cost-saving alternative that uses 45% less energy, has a 100% oil-free air foil bearing, and a precisely-manufactured impeller that cannot be replicated.

List of Agency

Poland: Conces www.conces.com.pl / conces@conces.com.pl
Chile: Sobitec www.sobitec.cl / joaquin.mardonez@sobitec.com
U.K: Hadron www.hadronengineering.co.uk / chris@hadronengineering.co.uk
Thailand: PREMIUM www.premium.co.th / premium@premium.co.th (For Eng)
India: TMVT www.tmvt.com / ashutosh@tmvt.com

NAMWON TURBOONE

T. +1 929 4626 529(USA) / +82-1544-2280(KOREA) E. turbosales@nwturbo.com W. www.nwturbo.com

Better Through Biology

A BIOELECTRODE SENSOR PLATFORM SOLVES A COMPILATION OF CHALLENGES FOR A WASTEWATER TREATMENT PLANT ON PRINCE EDWARD ISLAND

By Scottie Dayton

Periodic foaming in an aerated digester and a drop in dissolved oxygen were affecting the performance of the Montague Wastewater Treatment Facility in Three Rivers, Prince Edward Island.

"We knew something was upsetting the biology, but not what it was because the digester returned to normal in a day or two," says Tommy MacLeod, operator. "The situation was exacerbated by our dewatering problems. We occasionally lacked the storage capacity to waste."

The Montague Sewage and Water Collection and Treatment Corp. authorized the installation of variable-speed drives on the digester blowers to handle fluctuations in dissolved oxygen. That helped but didn't address the root of the problem, which turned out to be the addition of two microbreweries to the collections system.

Proving they were responsible required evidence. "We needed scientific data to persuade the owners to work with us toward an amicable solution," MacLeod says.

Fortunately, the town had been in partnership with Island Water Technologies since 2014. The agreement enabled Island Water Technologies to use the Montague plant as a working laboratory. In May 2018, the company began a 12-month pilot of its Sentry technology. Its bioelectrode sensors gave MacLeod real-time insights to variable biological conditions, the necessary irrefutable data and some surprises.

> "Except for checking that nothing has caught on the influent sensor, the system is maintenance-free, and the technology is great."
> **TOMMY MACLEOD**

PACKAGE PLANT

Installed in the 1970s, the 400,000-gpd (design) activated sludge package plant averages 200,000 gpd from 2,000 residents and some small industries. It originally had the clarifier in the center of its round structure and the activated sludge process in the outside ring. In 2002, an upgrade changed the clarifier to an aerated digester for more storage, and a contractor built a new clarifier and 10,000-gallon storage tank.

In 2016, two 40-by-60-foot Geotube containers (TenCate Geosynthetics) were installed on outdoor concrete dewatering pads. "Each step was an improvement, but the sludge still freezes in winter," McLeod says. "We can't waste from early to mid-December until the spring thaw. Residents complain of the odor associated with aging sludge for 21 days or longer because we can't dewater."

Each container holds wasting from one season. In 2018, dewatering produced 27.5 cubic yards of cake for land application. "We're breaking ground in spring 2020 to install a 120,000-gallon two-compartment aerated precast tank," MacLeod says. "It should give us more control over everything in the plant."

PHOTOS COURTESY OF ISLAND WATER TECHNOLOGIES

Influent arrives at the Montague return activated sludge package plant.

HOW IT WORKS

The Sentry sensors amplify that control. According to Island Water Technologies, the technology monitors biological activity in wastewater streams. Every living organism releases electrons during respiration (breathing), and the sensors measure how many electrons are generated by those organisms to ascertain their health.

The sensors arrive inoculated with bacteria, which need one to three days to acclimate to the environment. Once a robust biofilm is established, a bioelectric current passed through the sensors enables them to measure electron transfer. This value is displayed on an online dashboard, updated every 60 seconds. Typically, shock loads cause a drop in activity, while increased organics accelerate metabolic activity, producing a significant spike in respiration and electrons.

FAR LEFT: Bryce Stewart, engineer in training with Island Water Technologies, installs an in-line Sentry sensor in the influent channel using a PVC rail mount. NEAR LEFT: The Sentry sensor in the influent channel is attached to PVC pipe with U-bolts and fixed to a rail. The sensor connects to an online dashboard, enabling operators to monitor remotely for shock loads and other events affecting the plant.

Share Your Ideas

TPO welcomes news about interesting methods or uses of technology at your facility for future articles in the How We Do It column.

Send ideas to editor@tpomag.com or call 877-953-3301

The subscription-based bioelectrode sensor platform monitors influent wastewater organic loading and fluctuation, providing correlations to BOD to help optimize aeration. The units are installed like pH or dissolved oxygen probes, with the difference that sensors need surface biofilm growth and do not need regular cleaning.

QUICK INSTALLATION

Patrick Kiely, Ph.D., founder and CEO of Island Water Technologies, and Bryce Stewart, engineer in training and project manager, consulted with MacLeod on the best locations for the sensors. They chose the influent channel, the third chamber of the aerated digester, and the Montague River outfall. The first two are in-line sensors attached to PVC pipe with U-bolts and fixed to a rail. The two drop-in sensors at the outfall use standard industry fittings.

Island Water Technologies installed everything in less than two days. "If there is a problem with the control panel or sensors, they repair it," MacLeod says. "Except for checking that nothing has caught on the influent sensor, the system is maintenance-free, and the technology is great."

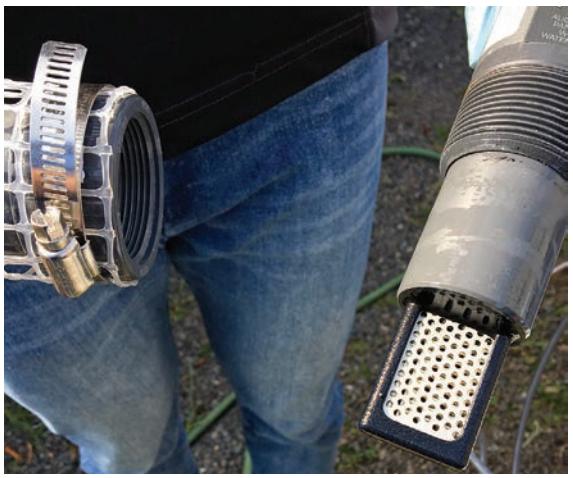
Stewart trained town and plant personnel on how to use the dashboard. "It's simple to learn and navigate," MacLeod says. "Data is presented with options to view on hourly, daily, weekly, monthly or customized intervals. Spotting changes in the normal pattern is easy, and when those spikes are consistent, it's time to investigate."

LEARNING THE FACTS

At first the plant team tested CBOD every second Wednesday, and the results were always less than 10 mg/L. Then the sensor data showed huge spikes on Thursdays, indicating a biological feeding frenzy. Testing on Thursdays revealed 240,000 mg/L BOD in the waste stream. "We traced it to one brewery dumping trub — sediment including hops debris, spent yeast or yeast slurry," MacLeod says. "Our provincial discharge limit is 300 mg/L BOD."

Town officials talked to the brewery owner, who agreed to drain off the water, dispose of the yeast elsewhere and handle spent hops more carefully. Conditions at the plant improved, but the spikes continued.

One spike surprised MacLeod. It revealed that just an inch of rain upset the microbiology significantly. "We always saw the result of inflow and infiltration when it rained, but we didn't have a clue how much it took to affect the plant," he says. "Now we have an advantage. If heavy rains are forecast, there is a nine-hour delay before the water arrives. If the solids are high in the clarifier, we have time to waste enough to reduce the risk of a hydraulic overflow."



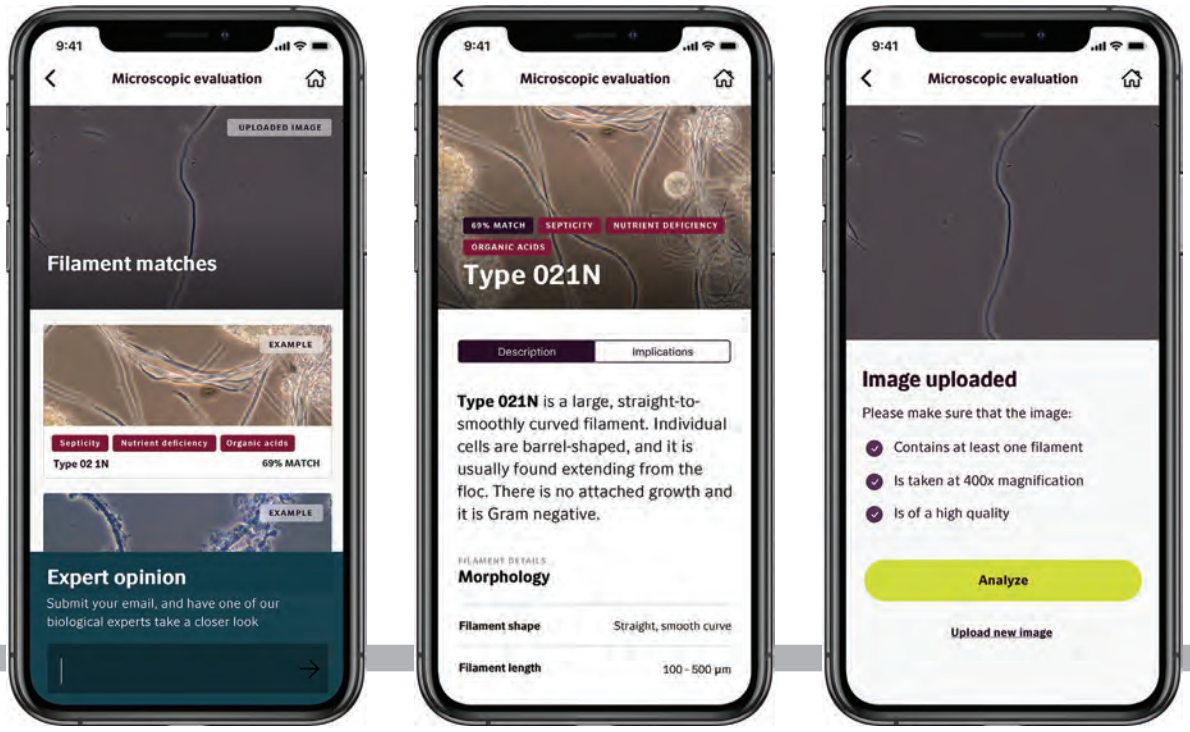
Protective screen meshes are available for sensors installed in high-strength waste streams.

That brings MacLeod back to the worst-case scenario of heavy rains and tanks full of stabilizing biosolids. "The sensors pointed out we were playing with fire, because we're upstream from a food fishery," he says. "We hope this knowledge will help accelerate funding for the new 120,000-gallon storage tank."

FINDING A REMEDY

More online research into brewing convinced MacLeod that the still-visible spikes on Thursdays were due to the breweries washing the yeast and hop fermentation vessels. He confirmed that by visiting the breweries and spying spent hops outside the doors.

Three months of collected data gave MacLeod his evidence. "The records show that what they are dumping is too strong for the plant," he says. "I plan to visit the owners on a Thursday, share the information and ask them to work with me to remedy the situation. All it would take is for them to discharge on different days and at times when plant flows are quieter." **tpo**



Plant Assistant reports on microscopic evaluation of filaments can be displayed on desktop computers or mobile devices.

Filament Identification by App

NOVOZYMES OFFERS A FAST AND SIMPLE WAY FOR CLEAN-WATER PLANTS TO TROUBLESHOOT PROBLEMS CAUSED BY FILAMENTOUS BACTERIA

By Ted J. Rulseh

Excessive filamentous bacteria can cause severe disruption in clean-water plants, most notably poor settling in final clarifiers.

When a filament issue arises, it's essential to find the cause, and that starts with a microscopic study to determine the abundance and species of filaments present. Some plants have the equipment and expertise in-house to make the determination. Some do not and therefore need to consult with experts.

Traditionally, that means sending samples of activated sludge to a laboratory for examination, a process that takes time and delays resolution of the problem. Now, believe it or not, there's an app for that. Novozymes, a company that offers enzyme and microbiological solutions to clean-water plants, as well as biofuel producers, bakeries and breweries, has developed Plant Assistant, a web-based application that can identify and score common wastewater filaments from a microscopic picture.

The company's data scientists and biological experts have used thousands of images of filaments to train the algorithm to identify and differentiate specific characteristics. At present, the app can identify eight filaments with more than 90% certainty, and plans are underway to expand that capability. Anders Klitholm Jessen, manager of digital transformation, and Matthew Livingston, global marketing manager, talked about the app in an interview with *Treatment Plant Operator.*

tpo: How did your company develop the capability to create this tool?

Livingston: For a long time, we have developed expertise around doing microexams. We have people on staff who are adept at identifying filaments, understanding their morphology and doing the right staining techniques. One advantage we have is that because we have visited a number of treatment plants over a long time, we have a good understanding of how to do these examinations.

tpo: How did you get the idea to automate the identification process?

Livingston: In brainstorming around how we could use digital tools, we noted that filament identification is something that's labor intensive and requires a certain skill set. So we asked our information technology specialists if this was something that could be automated, and they tended to think it was possible.

> "In principle, a well-trained expert can distinguish filament A from filament B. A machine is also able to do it via machine learning."
> **ANDERS KLITHOLM JESSEN**

tpo: How did you go about training the algorithm?

Klitholm Jessen: Through our many contacts in the industry, we have received samples from municipal and industrial facilities that are experiencing different issues. Our experts have used these samples to show different images in order to teach the algorithm. The training is based on about 100 to 150 images per filament. That's a little over 1,000 images that we have in our initial dataset. We are now looking to obtain more images to

make the algorithm even better. We plan to expand the scope so we can identify up to 20 filamentous organisms and potentially also higher life forms, floc particles and other microorganisms.

tpo: About how many types of filamentous bacteria do clean-water operators commonly see in their treatment processes?

Livingston: About 20 are considered the most prevalent, according to reference manuals. From our experience, about 10 of those are the most common. As you get into the teens, you see them less frequently; then once in a while organisms pop up that are not very common at all.

tpo: What distinguishing features do these filaments have that your app can recognize?

Livingston: There are different sizes. Some are straight; some are curved; some are bent. Some are skinnier or fatter. The cell shapes are different — some are square, some rectangular, some sausage shaped. Some filaments are smooth and have a casing or sheath on the outside. Some have bacteria growing perpendicular to the filament, so it looks like a hairy filament. Some features are easy to tell apart, and some are more difficult.

tpo: Can you train an algorithm to recognize even the smaller differences?

Klitholm Jessen: We are able to identify most of the filaments at a normal magnification of 400x, although some require a larger magnification. In principle, a well-trained expert can distinguish filament A from filament B. A machine is also able to do it via machine learning. With enough data, the algorithm can be trained to recognize the different filaments with reasonable accuracy.

tpo: When a filament problem arises at a treatment plant, is it typically just one filament, or can there be multiple filaments in the mix?

Livingston: It can be either. The benefit of identifying the filament is that it enables operators to understand the cause. Most filaments are associated with specific substrates such as organic acids, sulfides, or fats, oils and grease (FOG) or with certain parameters such as low dissolved oxygen, low food-microorganism ratio, or a deficiency of nitrogen or phosphorous. If one driving condition is causing the filaments, you may see multiple filaments within that category. Sometimes there are multiple causes, and you may identify multiple filament types.

> "We are not looking at this as a pay service. We see it as something that can be useful throughout the industry. It's a way to help people who have problems confirm those issues and speed their path to a solution."
> **MATTHEW LIVINGSTON**

tpo: What equipment does a plant need in order to use the app?

Klitholm Jessen: The two critical things a plant needs are a phase-contrast microscope and a device on which to run the app. That can be a desktop or laptop computer, tablet or smartphone.

tpo: Do users receive any guidance on how to create the images for analysis?

Livingston: If someone can take a high-quality picture at 400x, then we would be able to use that as the preliminary round. You can assess the abundance of filaments using a light microscope, but to identify the filaments, you really need a phase-contrast scope.

tpo: Once operators acquire the necessary image, how do they use the app?

Klitholm Jessen: They upload the image to the app. Our algorithm analyzes the image and returns a list of potential matches. It lists each filament with a match accuracy based on the image: for example, Filament A, 78%; Filament B, 29%; and so on. The app includes a reference library that they can use to check the results against if they're not fully satisfied with the answer.

tpo: Once the image is uploaded, how long does it take to get the answer?

Klitholm Jessen: It takes between half a second and three seconds. If you compare that with the traditional way of mailing samples and getting results back from experts, it's fair to say there is quite a substantial improvement.

tpo: How do users pay for this service?

Livingston: We are not looking at this as a pay service. We see it as something that can be useful throughout the industry. It's a way to help people who have problems confirm those issues and speed their path to a solution. Some filament issues can be addressed using technologies we have.

tpo: What are examples of problems your technologies can help solve?

Livingston: For filaments driven by low DO, we don't have solutions that can help, but if we can help a plant identify the problem, that's good for us and good for them. For filaments driven by FOG, that's a problem we can solve using enzyme or microorganism formulations. In addition, sometimes there's a course of action that's not related to adding our product. Filament abundance can be such that we'll recommend they chlorinate their system to kill some of the filaments, and then reseed the system to get their biomass back to a healthy condition. We make some of those types of recommendations. tpo

Making a Big Splash

A WATER PARK WITH KID-FRIENDLY FEATURES BECOMES THE CENTERPIECE ON THE GROUNDS OF A KENTUCKY COMMUNITY'S NEWLY UPGRADED WATER PLANT

By Jeff Smith

Two ribbon-cutting ceremonies, exactly two years apart, marked major changes at the City of Danville, Kentucky, 12 mgd Coldiron-Watkins Memorial Water Treatment Plant.

The first, in August 2017, highlighted a five-year project that upgraded and expanded the plant, built in 1924 and improved during the 1950s and 1960s. The second, last August, is the one that instills civic pride in Andy Tompkins, plant superintendent.

"The completion of the Splash Park on the plant site demonstrates the commitment the city made to citizens when we started our project," Tompkins says.

KEEPING A PROMISE

Before construction could begin on the upgrade project, a popular city park with playground equipment in front of the plant had to be shut down. A church next to the park and separated by a fence had to make other arrangements for a parking lot. In addition, a portion of a well-used hiking trail system had to be relocated.

The city received a grant for community outreach and education from the Kentucky Division of Water and intended to rebuild the park as part of the expansion project, but budget constraints led the state to withdraw the grant.

Among citizen complaints about the delay were letters to the editor in *The Advocate-Messenger* newspaper. One, co-written by an 8-year-old and 10-year-old, said they missed the playground in front of the treatment plant. "We used to have an awesome playground but now they tore it out," read the letter. "Now it's in the dumpster."

Motivated to keep its promise, the city proceeded with plans to rebuild the park with intent to reapply for the grant. City staff collaborated with the church elders to relocate the fence and built a gazebo to accommodate church picnics.

FUN FEATURES

As part of a stormwater protection program, a 2-acre wetland and rain garden with native plants was developed as an educational park and interpretive area. Signage describes water treatment functions and the importance of stewardship.

The trail, which connects with a Wildlife Refuge across the street, now passes through the park, with strategically placed benches, picnic tables and restrooms. A wooden boardwalk and bridge cross near the wetland.

An iconic sycamore tree was spared during construction. More than 50 new trees and shrubs were planted, and mulch was added to the landscape. The area around an existing playground with swings, teeter-totters and climbing bars was enhanced with landscape paver stones.

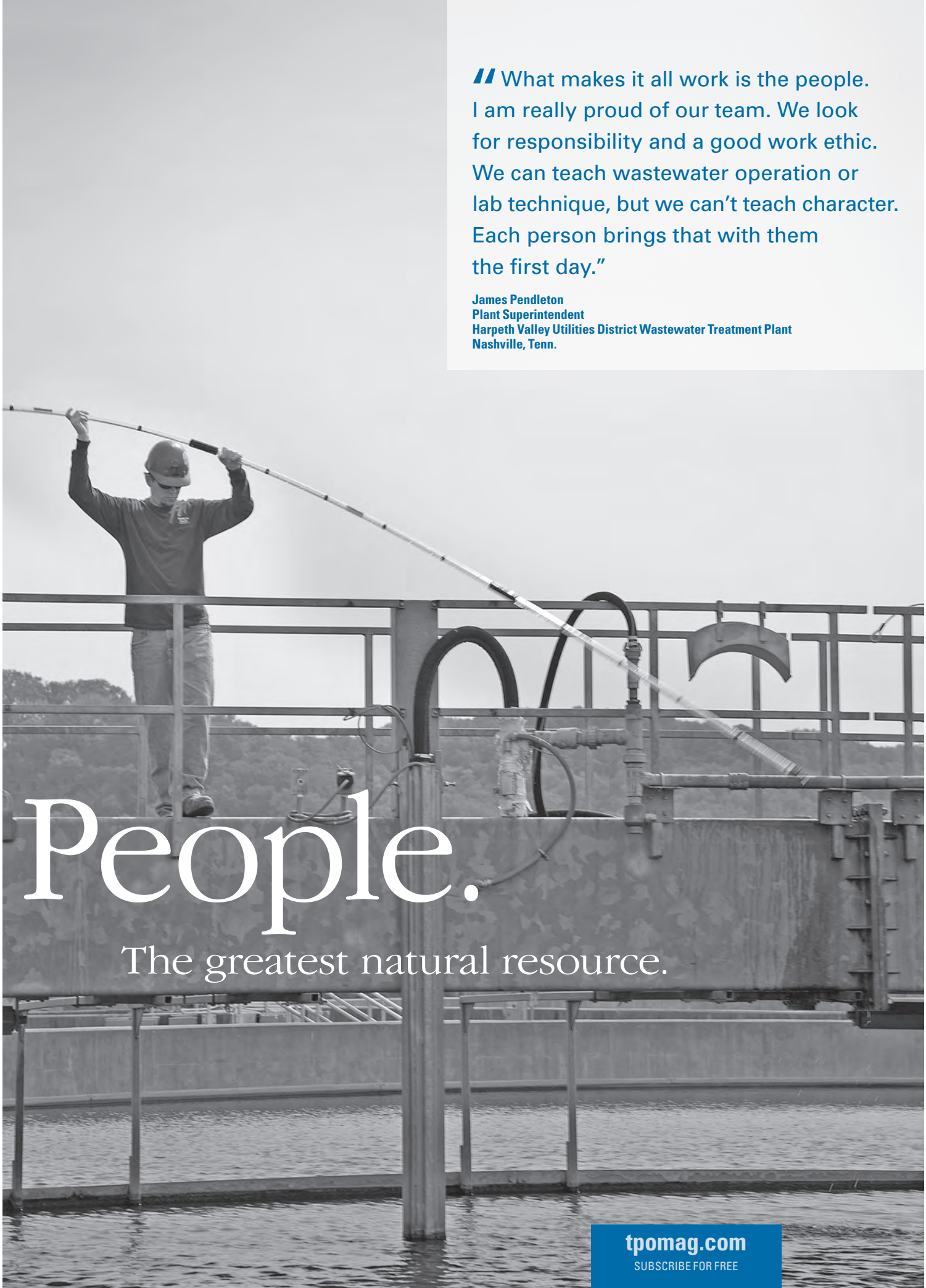
But the Splash Park is the big draw for the kids. Two overlapping 60-foot circles of 6-inch-thick fiber-reinforced colored concrete slabs form the base for eight aboveground water features. With names such as the Sneaky Soaker, Spiral Tunnel, Spinny Squirt and Fun-Brella, the features are supplied by 15 nozzles that intermittently deliver spray at 15 psi to each area.

BIG CELEBRATION

A programmable controller in a 4-foot-high aluminum cabinet anchored to a concrete slab controls the flow to each feature. The kiosk provides easy access for maintenance and is secure from the public. All waterlines have positive drainage to a low point for winterizing and maintenance.

More than 60 people attended the ribbon-cutting, celebrating the opening of the water park. The mayor and other city officials were on hand to recognize and express appreciation to those responsible for the project.

Tompkins was simply pleased with the turnout: "The weather was kind of steamy, but it was good to see the kids enjoying themselves in the splash play and to hear how we fulfilled our commitment." tpo



"What makes it all work is the people. I am really proud of our team. We look for responsibility and a good work ethic. We can teach wastewater operation or lab technique, but we can't teach character. Each person brings that with them the first day."

James Pendleton
Plant Superintendent
Harpeth Valley Utilities District Wastewater Treatment Plant
Nashville, Tenn.

People.

The greatest natural resource.

Superb Stewards

THE ILLINOIS VILLAGE OF MOUNT PROSPECT EARNS ACCOLADES FOR A DISCIPLINED APPROACH TO MAINTAINING ITS WATER SYSTEM AND CURTAILING WATER LOSSES

STORY: **David Steinkraus** | PHOTOGRAPHY: **Bradley Leeb**

The Illinois village of Mount Prospect has not had its own water plant for decades. It does have plenty of challenges to satisfy the demands of a suburban Chicago municipality, and it has one challenge found in few other places.

The village sits a couple of miles north of the concrete expanse of O'Hare International Airport. It's home to about 55,000 people with upper-middle-class incomes, a couple of business parks and a couple of golf courses within its 10 square miles.

Last year, diligent care for the water system earned the village a Utility Water Saver Award from the Illinois Section of the American Water Works Association.

One of Mount Prospect's seven water storage tanks, which as of 2019 had all been rehabilitated.

CONSTANT ACTIVITY

The village used to draw water from 17 wells and still has five, but those are only for emergencies. Water now comes from the City of Chicago's Jardine Water Purification Plant on the shore of Lake Michigan. The Northwest Suburban Municipal Joint Action Water Agency, a consortium of local governments, buys water from Chicago and pumps it to member municipalities, including Mount Prospect.

Three delivery structures connect the mains from the water agency to the village distribution system, says Casey Botterman, Mount Prospect's water and sewer superintendent. At no time is the system idle: "We always have something filling and something pumping," Botterman says. "We don't want to have something pumping and nothing filling."

Although they're a last resort, the deep wells are checked monthly. Technicians sample the water and run the pumps, but the water drawn goes into the storm sewer instead of the distribution system.

Although Mount Prospect depends on Chicago's water, the village distribution system has the capability to add chlorine for disinfection byproduct control. Where to add chlorine, and how much, is governed by daily residual sampling at each pumping station. "Usually the stations farthest away from the delivery structures are where the residuals are lower, so that's typically where we boost chlorine," Botterman says.

STEPPING UP REHAB

More complex samples, such as tests for coliform, are sent to an outside laboratory. The village is 100 years old, and its oldest pipes are about that same age. A 2015 study evaluated the village's needs and recommended rate changes and a program to replace aging pipes.

Every year, the village replaced lines, but only a small number because of budget constraints. "But since the water rate study we did, we have increased that to replace every water main within about 130 years," Botterman says. "At the rate we were going before, we were at about 600 years."

The village replaced about 4,000 feet of 10-inch cast iron water main in 2018 with class 56 ductile iron main and 4,500 feet in 2019. The 2018 work was in areas where there had been multiple main breaks: in and around downtown where the oldest pipes are. The job has worked out well for the

From right, maintenance workers Jake Sprow, Sean Feeney and Max Orlandi work on valve exercising, an important facet of the Mount Prospect distribution system maintenance program.

The village has been recognized for its work on water conservation, which includes repairing and replacing inefficient infrastructure.

Village of Mount Prospect (Illinois) Water Utility

www.mountprospect.org/departments/public-works/water-sewer

POPULATION SERVED:
55,000

EMPLOYEES:
15 (water and sewer)

SOURCE WATER:
Lake Michigan

SYSTEM STORAGE:
8.89 million gallons

DISTRIBUTION:
170 miles of water mains

ANNUAL BUDGET:
$12 million (operations)

KEY CHALLENGE:
Aging infrastructure

future because a redevelopment is planned for a two-block area downtown. The replacement of old 6-inch lines with new 10-inch lines provides more capacity for fire suppression in the area.

Among the pipe replacements in 2019 were some in neighborhood cul-de-sacs. "We average two to three main breaks there a year," Botterman says. "Usually when we dig one up, there are multiple holes and multiple repairs."

When the work was done, the new water mains were looped so they came out of each cul-de-sac. Old mains cut through yards — not a good idea because of the digging necessary in case of a break. "Currently the breaks have not been in or between the yards," he says. "But our luck would eventually run out."

The Mount Prospect water utility team includes, kneeling, from left, Joe Markelonis, maintenance worker; John Frank, electrician; and maintenance workers Brad Coop, Jay Gomez and Tonya Bracher. Standing, Mike Schuster, foreman; Max Orlandi, maintenance worker; Doug Petro, foreman; Jake Sprow, Jeff Burger and Sean Feeney, maintenance workers; and Casey Botterman, water and sewer superintendent.

Botterman, water and sewer superintendent, checks the village's water quality utilizing Wallace & Tiernan analyzers and controllers (Evoqua).

SAVING WATER

The village's award-winning work on water conservation includes automated metering and submetering for multifamily housing, development of a plan to sustain the system, and repairing and replacing inefficient infrastructure.

"Definitely the amount of water used has gone down," Botterman says. Fewer people use municipal water on their yards because of the cost; and codes require water-efficient fixtures in buildings. Before automated metering, residents in apartment buildings would call in their meter readings. Once a year, the village would audit those accounts. "And, surprisingly, it was pretty accurate," Botterman says. "They were telling the truth."

The award nomination covered the village's multipronged water-conservation work. It includes:

- A twice-annual leak detection program
- Fire hydrant replacement running seven months each year
- Regular quality tests of commercial and other nonresidential water meters
- Replacement program for older water meters
- Locating and exercising of distribution system valves, plus valve repair and replacement
- A water main upgrade project.

In addition, a community education program provides dye tablets to residents at no charge. Tablets allow residents to see quickly whether the flapper valves in their toilets are leaking; as AWWA information points out, a leak of 100 drips per minute equals water loss of 350 gallons per month. Included in community education are annual open houses for the Public Works Department that typically attract more than 3,000 people who learn about their water supply through posters, hands-on exhibits and games.

RUMBLING CHALLENGE

The unusual challenge that Mount Prospect has is the set of three train tracks cutting through the middle of the village. These carry freight trains and commuter trains to and from Chicago and its suburbs. From about 5 a.m. to 1 a.m., commuter trains move through the village in both directions about once an hour — every 20 to 30 minutes during rush hours.

Water pipes run beneath those tracks. "We have valves on each side to isolate it if there is a break there," Botterman says. Fortunately there aren't too many locations where pipes cross the tracks. Still, the 2015 study called for replacing those pipes. That would mean some type of digging or perhaps directional boring, but the railroad's right-of-way extends into the soil, and it is unclear what restrictions the railroad may place on such a project.

(continued)

A BALANCE TO SUSTAIN GENERATIONS

Your mission is crystal clear - but the new technology and products you need to treat water in an environmentally safe and sustainable way can be harder to detect. There's only one event each year that delivers solutions for certified professionals in every aspect and stage of wastewater management: the **WWETT Show.**

Join your industry to discover the latest treatment innovations and most effective processes. It's your place to gather educational insights and learn innovative techniques. Your place to see demos of groundbreaking tools. And your place to refresh the technology behind the magic.

- **Explore the Marketplace** for tools and resources you need for your business
- **CEUs -** Education from the best and brightest speakers in the industry-customized for wastewater treatment professionals
- **Events to network** with your peers - or just kick back with friends.

wwett 20

CONFERENCE: FEBRUARY 17-20
MARKETPLACE: FEBRUARY 18-20
INDIANA CONVENTION CENTER

LEARN MORE at www.wwettshow.com
@wwettshow

JOIN THE COMMUNITY
REGISTER NOW

Proud Member of:

APWA · NASSCO · NASTT · NAWT · NOWRA

MAKING SUPPLY CERTAIN

Mount Prospect buys water from a large consortium of local governments — the Northwest Suburban Municipal Joint Action Water Agency — and has its own wells. It also has backups to make sure water keeps flowing to customers.

There are interconnections with the neighboring suburbs of Arlington Heights and Des Plaines, says Casey Botterman, water and sewer superintendent. The village also connects to Illinois American Water, which serves two small pockets of the village.

But in an effort to improve water security, the village is looking into another option. "The Northwest Water Commission has a transmission main to Arlington Heights that runs right through Mount Prospect," Botterman says. "This is a long-term project and we're at the beginning, but we are looking to have an interconnect with them. Then we would have two straws in Lake Michigan."

Both consortiums would supply Chicago city water, but if something ever went wrong with the primary supply from the water agency, the second connection would allow the village to operate a couple of valves and have a large supply of water.

Because of the complications involved in digging, the best potential solution is cured-in-place pipe lining. Next to the railroad tracks is another complication: U.S. Highway 14, under the control of the state Department of Transportation and with a water main beneath it. In late 2019, the village began lining 3,700 feet of 12-inch cast iron main under the road.

REGULAR MAINTENANCE

The state requires new pipe installations to be sleeved, and because of existing utility lines, new water pipes would have to be about 13 feet below grade. Current lines are 6 to 7 feet down. The estimated cost of laying pipe beneath the road makes lining attractive.

The top recommendation in the village's 2015 study was to enlarge the 12-inch main under the highway to increase the water supply capacity on the north side of the village, improve flow for fire suppression in the redevelopment and improve the movement of water to the village's elevated tank. Because of the complications of working under the road, the planned new 16-inch line will take an alternate route through neighborhoods. "It will be like a transmission main, but there will be residential taps off it," Botterman says.

> "We always have something filling and something pumping. We don't want to have something pumping and nothing filling."
> **CASEY BOTTERMAN**

In addition to the long-term projects, Botterman's crew keeps busy with annual work. Each spring and fall, a crew visits every hydrant and listens for leaks. Workers also replace 25 to 30 hydrants annually. They're old models and no longer manufactured, so as technicians pull the old hydrants, they save the parts.

TANK UPGRADES

Each year, workers operate one-quarter of the town's valves and in the process assess their condition. Five to 10 valves are replaced each year. Buffalo boxes, a type of curbside valve, are checked on a six-year cycle. "We check to see if, for one, we can locate it and get the key on it," Botterman says. "The result of the inspection will lead into our repair program if we need to dig something up or to locate, raise or lower one."

Jake Sprow removes a cover for valve exercising in anticipation of their water main lining project.

In 2019, the village finished rehabilitating the last of its seven water tanks, ranging from 1 to 2 million gallons. Six are steel, and the other is concrete. All roof beams on the last tank were replaced because of slight corrosion. There was some miscellaneous steel work, the interior was blasted and painted, and the exterior received spot priming and a full coat of paint.

It's a lot of work keeping up a system without a water treatment plant, but it keeps Mount Prospect on track for a future with reliable water. **tpo**

Energy Explorers

NEW HAMPSHIRE'S STATE GOVERNMENT BACKS AUDITS THAT HELP CLEAN-WATER PLANTS IDENTIFY AREAS FOR ENERGY SAVINGS AND THEN HELPS FUND THEIR IMPLEMENTATION

By Ted J. Rulseh

Energy takes up a large share of clean-water plant operating costs. Operators in New Hampshire are finding ways to drive energy costs down, with help from the state government and utility incentive program.

The program is led by the New Hampshire Department of Environmental Services in partnership with NHSaves, a collaboration of the state's electric and gas utilities that provides customers with information, incentives and support to save energy, reduce costs and protect the environment.

In four years since inception, the program has benchmarked electricity usage at 69 municipal wastewater treatment plants; conducted nine educational workshops for water and wastewater system owners, operators, managers and engineers; performed 35 comprehensive energy audits of wastewater treatment plants; and performed 11 comprehensive energy audits of drinking water facilities.

Leading the program for the New Hampshire Department of Environmental Services is Sharon Nall, P.E., supervisor of the Planning, Protection and Assistance Section within the Wastewater Engineering Bureau. Nall, who also chairs the New England Water Environment Association Energy Committee, talked about the energy audit program in an interview with *Treatment Plant Operator.*

tpo: How would you describe your responsibilities?

Nall: I handle all things sustainability for wastewater. That includes energy efficiency, asset management and climate resiliency, which encompasses flood resiliency, flood vulnerability assessments and power resiliency related to increased storm intensity with climate change.

> "At the plants we work with, we like to develop champions. Then we work with those champions, document their experiences and their savings, and use those successes to pull more people into the program."
> **SHARON NALL**

tpo: What was the genesis of the energy audit program for clean-water plants?

Nall: In 2015, we received a grant from the U.S. Department of Energy to help our municipal wastewater treatment plants become more energy efficient. Before that, we had written a first-in-the-nation right-sizing requirement into our design standards for wastewater facilities, mainly for blowers and pumps. The bulk of the grant went toward process-level energy audits at treatment plants. The DOE money is gone now, but because the program was successful, we've continued to support the audit through our Clean Water State Revolving Fund.

Sharon Nall

tpo: How does energy usage typically break down at treatment plants?

Nall: Typically, about 5% to 20% of the energy goes to lighting, building systems and HVAC. The rest of it is about process. We're finding it's really important for every plant to have an energy audit.

tpo: How do you decide which treatment plants to audit?

Nall: The primary driver for who gets selected is level of interest. If you tell them they are getting an audit and they're really not interested in doing it, they are not likely to implement what the audit finds. At the plants we work with, we like to develop champions. Then we work with those champions, document their experiences and their savings, and use those successes to pull more people into the program.

tpo: Do you help streamline the audit process for the operators?

Nall: Yes. I have done all the paperwork for the communities, so all they have to do is call and say, "We are interested," and I put them on the list.

tpo: How does your department interact with the utilities and NHSaves?

Nall: Plants could contact their electric utility, which would pay for an audit. But if they come to us for alternative funding, that saves the utilities money that they can use to pay incentives. That means they can possibly do more aggregating of projects and include some longer-payback items they otherwise wouldn't be able to include and incentivize. The utilities are our partners. With every audit we hold a wrap-up meeting with the utility, community leaders and finance people, and the operators. We go through the audit and discuss how to move the projects out of the report and into reality.

tpo: Is there recognition for top-performing plants in energy efficiency?

Nall: We did our first energy efficiency awards last year. An intern developed an amazing benchmarking tool that we use. I was able to pair energy data with millions of gallons treated and pounds of BOD removed. So we had a most efficient plant based on flow, a most efficient plant based on BOD removal, and four most improved plants — two lagoon and two nonlagoon plants.

tpo: Can you describe the accomplishments of one of these award winners as an example of what is possible?

Nall: Somersworth was our most efficient based on BOD removal. Jamie Wood is the superintendent, and he and his staff have done it through energy awareness. It's a 30-plus-year-old plant and a really good example of what you can do if you just pay attention to energy. Wood put signs up on every door that ask, "Did you shut the lights off?" He monitors dissolved oxygen very closely. A lot of plants have a low DO alarm; he has a high DO alarm, so if DO gets up to a certain level, they get an alarm and can turn the blowers down. It's really just a matter of stepping back and saying, "We've been doing it this way for 20 years, but do we need to?"

> "On the 35 audits completed, we have averaged about 29% potential energy savings and a three-year payback."
> **SHARON NALL**

tpo: What are some of the most common opportunities the energy audits turn up?

Nall: Right-sizing of equipment is one: Blowers and pumps are frequently oversized. At communities that converted from lagoons to entirely new plants, there's a need to optimize the operation. Energy-efficient equipment may have been put in, but are the setpoints optimal? Until you open the cabinets and take measurements, you can't really tell where the energy is going, unless they have accurate kilowatt meters.

DO control is a big item; blowers are typically the largest energy user. Pump systems are probably No. 2. One you might not think of is generator block heaters. They range from 1,000 to 4,000 watts. If the block heater has a thermostat, frequently it has failed. If that device is running 24/7/365, that's a lot of energy use.

tpo: Do you see a great deal of diversity in the sources of energy efficiency?

Nall: We audited three small, very simple lagoon systems. One was over-aerating, not monitoring the DO levels. The next one did not have variable-frequency drives on their pumps, and they were using a valve to throttle the pumps back. The third one had an uninsulated chemical storage building, and they were using an electric heater to keep the chlorine from freezing. So even though they were very similar plants, the solutions for energy savings were very different.

tpo: Is lighting a significant source of savings?

Nall: That largely depends on hours of usage. One cultural shift we see is with security lighting. It has been found that having a facility dark at night unless there is movement is more secure than having everything lit up. That way a police officer driving by who sees the lights on says, "That place is supposed to be dark. What's going on over there?" That's a total change in thought process. Those big outdoor lights do eat up a lot of energy.

tpo: Beyond the audits, what is your department doing to help plants become more energy efficient?

Nall: Through the DOE grant, we have done continuing education workshops. Operators like to hear from other operators. Peer-to-peer learning is critical. We've done two series of workshops in different regions of the state. We've held them at a few plants that have good training rooms. In other communities, we've held them at a restaurant. As part of every workshop, we've had a plant tour. One-on-one education is also really helpful. It's time consuming, but it works well as a follow-up to group training.

tpo: Do you see any ancillary benefits as plants become more energy efficient?

Nall: One operator told us, "My effluent is better. I'm saving energy by being more efficient, and my effluent quality improved." We see that more and more because they get better control over their process when they tighten things down to control energy use. The bugs react to better control.

tpo: How would you summarize the results of your energy initiatives to date?

EXCELLENCE IN EFFICIENCY

The New Hampshire Department of Environmental Services in cooperation with NHSaves last year issued its first Wastewater Treatment Plant Energy Efficiency awards. Winners are:

- **Overall most energy efficient based on flow:** Winnipesaukee River Basin Program, Franklin, with energy use of 853 kWh per million gallons treated, versus national benchmarks of 1,200 to 2,400 kWh per million gallons.
- **Overall most energy efficient based on pollutant loading:** Somersworth, with energy use of 0.62 kWh per pound of BOD removed, versus national benchmarks of 0.7 to 2.2 kWh per pound of BOD.
- **Most improved based on flow:** Pittsfield, 63% reduction in kWh per million gallons (2012-18); and North Conway Water Precinct, 44% reduction (2012-18).
- **Most improved based on pollutant loading:** Troy, 56% reduction in kWh per pound of BOD removed (2015-18); and Epping, 48% reduction (2012-18).

Nall: On the 35 audits completed, we have averaged about 29% potential energy savings and a three-year payback. On top of that, we have the utility incentives. In addition, through our revolving loan program, for energy projects identified in an audit, we have 50% principal forgiveness up to $200,000. So that makes the payback even shorter.

tpo: Is there a role for renewable energy in your program?

Nall: As energy projects are implemented, we encourage communities to apply the savings to renewable energy projects. In that way, they cement the savings. The most cost-effective way to save on energy is through energy efficiency. It's the cheapest, and the payback is the quickest. So we're trying to go with efficiency first and then go with renewables.

tpo: What kind of mindset does it take to maximize savings?

Nall: The auditor we use is really good at working with operators, finding their comfort zone and pushing them out of it just a little bit. It's about being willing to tweak the process and get out of the box of how you've been operating for the last 20 or 30 years. tpo

Like something? Hate something? Agree? Disagree?

Share your opinions about *TPO* articles through our Letters to the Editor.
Send a note to editor@tpomag.com

Tom Myers, wastewater superintendent, Siloam Springs, Arkansas

It's All About Relationships

HATFIELD AWARD WINNER TOM MYERS ENJOYS A LONG CAREER BUILT ON LISTENING AND SHARING WITH INDUSTRY CONTACTS ACROSS THE BOARD

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Luke Davis**

> "You get a kinship with others, and the sharing of knowledge with fellow association members has been really, really helpful."
>
> **TOM MYERS**

Tom Myers has worked on the drinking water side but likes the challenges that go with the complexity of biological treatment processes.

Tom Myers has reaped many rewards from a 43-year career in the clean-water profession. He'll be the first to tell you he didn't do it on his own.

Myers has gained a great deal — and has helped many others — through deep involvement with industry associations, from the time he got his start in Iowa until today, as wastewater superintendent in Siloam Springs, Arkansas.

Throughout the years he has thrived on relationships with counterparts in other communities, members of his own team, engineering firms, state lawmakers and regulators, and representatives of industries that send pretreated wastewater to his treatment plant.

"We don't always have all the answers," says Myers, winner of a 2019 William D. Hatfield Award from the Arkansas Water Environment Association. "It's great to be able to ask someone from another plant, 'What are you doing about this problem?' They may have an awesome idea that we didn't think about. And it works the other way around too. Hopefully we can give them some insight on issues they are facing."

Relationships certainly helped during construction of a new treatment plant and process in 2009-10 to meet stricter limits on phosphorus discharge to the Illinois River, which is designated as a scenic river after it crosses into Oklahoma.

APPEALING CAREER

Growing up in Fort Dodge, Iowa, Myers took an interest in the environment. The Clean Water Act took effect in 1972, and career opportunities in wastewater treatment abounded as new plants were built and existing plants upgraded their processes.

Myers earned an environmental science degree from Iowa State University in 1976 and was drawn to the water sector. "It was either water or wastewater treatment I was thinking about," he recalls. "I just really liked the wastewater side. There's a lot to treating drinking water, of course, but in wastewater there are so many complexities. There's the microbial activity and the biological science, as well as the hydraulics and mechanics. And then you've got the maintenance on all that equipment."

He started his career with an internship in Sioux City, Iowa, and then became plant manager in Carroll for seven years. He moved to Creston as

Tom Myers, Siloam Springs, Arkansas

POSITION:
Wastewater superintendent

EXPERIENCE:
43 years in the industry

RESPONSIBILITIES:
Manage wastewater treatment plant and 20 lift stations

EDUCATION:
Bachelor's degree, environmental science, Iowa State University

CERTIFICATIONS:
Grade 4 wastewater operator, Iowa, Kansas, and Class IV Arkansas; Grade 2 water operator, Iowa; Grade 4 industrial treatment, Arkansas

AWARDS:
2019 William D. Hatfield Award, Arkansas Water Environment Association

GOALS:
"Make sure that after I leave, the staff will have the same opportunities and growth potential I had."

plant manager and was promoted to Public Works director. After 20 years there, he left Iowa for Siloam Springs, where he has been for 18 years.

Situated on the Oklahoma border, Siloam Springs has grown from about 8,000 population when Myers arrived to nearly 20,000 today. It's the home of John Brown University (just 600 feet from the treatment plant), has a historic downtown area and has a thriving arts community anchored by the Sager Creek Arts Center and the John Brown University art gallery.

The team at the Siloam Springs treatment plant includes, from left, Hector Aranda, operator; Steve Gorszczyk, Public Works director; Tom Myers, superintendent; John McKain, operator; and Tony Brown, foreman.

DEALING WITH INDUSTRY

Siloam Springs, Arkansas, has a robust industrial base that includes poultry and meat processing, canning, rubber vulcanizing and pet food production.

Many of those facilities deal with high-strength wastewater; Tom Myers and the municipal treatment plant team keep the influent loading stable with a thorough pretreatment program. "We allocate BOD based on our headworks loading rates," says Myers, wastewater superintendent. "Then we make sure they are in compliance by requiring monthly reports and by going out and checking the industries, doing random testing to verify their analysis."

Here again, communication and relationships come into play. "We need to have them as our allies," Myers says. "They make mistakes. When they do, we want them to let us know." For example, if notified of a plug load that could shock the plant, Myers and his team can adjust the process or divert the flow to an equalization basin used for high flows from storm events.

"By having those relationships, we can alleviate potential problems," Myers says. "Like any facility, they can have a pump break down or an operator error. If they hurry up and notify us, we can minimize the effect."

TREATMENT FLEXIBILITY

When Myers came on board, the treatment plant used contact stabilization and trickling filters. A new effluent phosphorus limit of 1.0 mg/L drove the need for the new plant, designed by Garver engineering with the University of Cape Town process, combining anaerobic, anoxic and aerobic sections for biological nutrient removal. The plant has a design flow of 5.3 mgd and an average flow of 3.1 mgd.

The headworks includes a 6 mm bar screen (Parkson Corp.) and a fixed bar screen followed by basic grit channel where WEMCO pumps (Trillium Flow Technologies) provide grit removal. "We have two primary clarifiers, but because our process needs 30 mg/L of BOD typically removed there, we bypass them and go directly to a BNR splitter," Myers says.

The biological process consists of three trains, each with three anaerobic, four anoxic and three aerobic cells with a mean cell retention time of about 19 days. The process lends flexibility to introduce return activated sludge at different points as required to optimize nutrient removal. After the BNR process, the flow moves on to a pair of 1.2 million-gallon final clarifiers, sodium hypochlorite disinfection and dechlorination with sodium bisulfite before discharge.

Waste activated sludge is sent to a storage tank, thickened from 0.5% to 1% to 2% solids, and delivered to five aerobic digesters for an extended aeration time of 100 days or longer. The digested material is dewatered to 23%-25% solids on a 2.5-meter belt press. The dewatered material is trucked to a landfill for use as night cover.

MAKING A TRANSITION

The switch to a new process was challenging, but made easier by communication between the Garver consultants and Myers' team, which now includes:

- Tony Brown, foreman with six years of service and a Class III operator license
- Hector Aranda, with 17 years and a Class III license
- Jon McKain, with 13 years and a Class II license.

"We let them tell us what they were thinking and what technologies we should use to achieve our goals," Myers says. "Garver wanted city personnel to be involved in the design process. It's very important to have buy-in from the city staff on any improvements. That way they become involved. They take pride in it, and they know firsthand how it's supposed to work."

The Siloam Springs plant team helped select the University of Cape Town process; its flexibility held considerable appeal. Before making the selection, team members visited other treatment plants in the area to evaluate their performance and costs.

The city received a State Revolving Fund loan of $20 million for the $24 million project and paid for the facility with a temporary local sales tax of 0.625%. During the Obama administration, the city qualified for $4 million stimulus funds. "I was involved in establishing the sales tax," Myers says. "Rather than have our residential and industrial customers see a significant rate increase to pay for the improvements, we went with the sales tax.

"We paid the 20-year note off 12 years early, in part because of all the growth in our community. After that, the sales tax went off. We could have extended it, but we didn't need it anymore. Now we're looking at $31 million in improvements to the water plant, and the taxpayers said, 'Rather than raise our rates, let's go ahead with the sales tax.'"

BUILDING CONNECTIONS

Myers attributes ideas like that, and much of his career success, to connections he has forged over the years. His time in Creston helped him appre-

ciate communication. As Public Works director, he had to work closely with the City Council and administrator: "Good communication means addressing issues upfront, instead of letting things fester until you have a major upset."

Early on in his career, he got involved in the Iowa WEA and its committees. That included chairing safety and government affairs committees; he now chairs the safety committee of the Arkansas WEA.

> "It's important to have strong relationships with the regulators so you can confide in and trust them, and they can do the same with you."
> **TOM MYERS**

Tom Myers (right), shown in the lab with Hector Aranda, is a big believer in cross training as a way to help team members expand their skills and take ownership in plant operations.

"By affiliating with the Water Environment Federation and state associations, you have outreach to other municipal agencies," he says. "You get a kinship with others, and the sharing of knowledge with fellow association members has been really, really helpful. Sharing experiences and working with surrounding cities is always important. They have a lot to offer."

There's a vibrant wastewater community in the Northwest District of the Arkansas WEA. It includes an annual all-day meeting in Siloam Springs every August, as well as rotating monthly meetings at 11 cities where attendees earn continuing education units. That's in addition to the statewide annual joint meeting of the Arkansas Water Works and Water Environment Association.

TEAM CHEMISTRY

Myers encourages his team members to follow his lead and get involved in association work. That includes Brown, who is expected to take over as wastewater superintendent when Myers retires in the next year or two and who was scheduled to take his Class IV operator license exam in September 2019.

Meanwhile, communication looms large in the way Myers leads his staff. "I hate to micromanage," he says. "As a leader, you need to be able to sit down and talk to them. They have to be on board."

His approach includes significant cross-training: "Because of the size of our plant, we have the opportunity to let our employees do the laboratory analysis, as well as run the belt press and handle plant operations. There's value in getting them actively involved, taking ownership, giving input, being part of the big picture."

Myers' outreach extends to the state level, where he strives for open communication with regulators. "It's not a perfect world. We all make mistakes. It's important to have strong relationships with the regulators so you can confide in and trust them, and they can do the same with you." The state Department of Environmental Quality and Department of Health are deeply involved in WEA meetings, offering classes on safety, emerging regulations and more.

Through WEA Government Affairs committees, Myers has worked with state legislators to influence regulations. As committee vice chairman in Arkansas, he was part of a group led by chairman Heath Ward, utility director in Springdale, that pushed through legislation to enable state-level nutrient trading. More recent, he has worked on a proposal to win tax exemptions on equipment for water treatment plants; that remains a work in progress.

As he looks toward retirement, Myers offers simple, yet powerful advice to people working their way up in the water professions. "Get involved," he says. "Read trade magazines. They contain a lot of good articles about what other cities have achieved. Stay on top of new technology. Always open your horizons. Set goals for where you want to be, and where you want your facility to be, 10 or 20 years down the road.

"Be active in your associations. It's so rewarding, not so much to get recognition as to build relationships with others in the industry, state agencies and cities in your area. You'll find there is always a need. Either you can help somebody or they can help you." tpo

Comparing VOC Removal Technologies

AIR STRIPPING METHODS EXCEL FOR LIFE-CYCLE COST, EFFICIENCY AND REMOVAL EFFECTIVENESS WITH A VARIETY OF WATER AND WASTE STREAMS

By Dave Fischer

Various treatment technologies are available for removing volatile organic compounds from water before it is used or discharged. Each one has its own pros and cons.

For many VOCs, air stripping, including newly introduced sliding-tray technology, has proven to provide the optimum balance of capital and operation costs and therefore the lowest cost per volume treated.

BASIC VOC REMOVAL OPTIONS

Four common technologies are used to remove VOCs from drinking water, contaminated groundwater and waste streams.

Granular activated carbon. Used to adsorb natural organic compounds, taste and odor compounds, and synthetic organic chemicals in drinking water, GAC uses a form of carbon processed to create a large surface area in pores available for adsorption. GAC is made from high-carbon organic materials such as wood, coconut shells, lignite and coal. The contaminants adhere to the carbon, which must be disposed of or regenerated.

Advanced oxidation processes. These chemical treatment processes remove organic (and sometimes inorganic) materials by oxidation through reactions with hydroxyl radicals. Most wastewater treatment AOPs use combinations of ozone, hydrogen peroxide and UV light.

Air stripping. This process strips VOCs by way of contact with clean air across a high surface area, causing the volatiles to transfer from the water to the air.

Reverse osmosis/ultrafiltration. These technologies remove particulate matter by a force differential across a porous membrane. Reverse osmosis filters have a pore size of about 0.0001 micron. In addition to removing all organic molecules and viruses, it removes most minerals. Ultrafiltration uses a pore size of about 0.01 micron. Both types of filtration can remove VOCs to very low levels.

Table 1 compares these processes, some of which can be used in combination. Air stripping often has the lowest cost per volume. For example, GAC has low capital costs but higher ongoing costs for refreshing carbon. AOP has higher capital costs for sophisticated controls and specialized materials, chemical feed equipment, and chemical feed and energy costs.

While air stripping capital costs are higher than for GAC, operating costs are almost always lower. Air stripping can also work with GAC to extend carbon bed life.

Table 1 – Comparison of VOC Removal Processes

	Capital cost	Operating cost	Advantage/ disadvantage	Complexity	Stability	Cost per thousand gallons (Kgal)*
Activated carbon	Low	High	Inefficient loading for low-concentration contaminants	Low	Medium	95 cents to $1.57
Air stripping	Medium	Medium Main operating cost is blower energy	Capable of high removal efficiency Can extend GAC life	Low	High	Tray type: 10 cents to 35 cents Tower type: 48 cents
Advanced oxidation process	High	High Energy and chemicals	Complete destruction of contaminants	High	Low	88 cents to $2.42
Reverse osmosis/ ultrafiltration	High	High Energy use	Not always capable of >99% removal Some organics can damage membranes	Medium	Medium	40 cents to 70 cents

*Web sources; flat 10-year applied capital equipment cost assumed

AIR STRIPPING METHODS

In air stripping processes, countercurrent flow causes the cleanest air to contact the cleanest water. This ensures efficient mass transfer throughout the flow path. The air-to-water (A/W) ratio is the primary physical driving parameter; increasing A/W increases removal efficiency. Requirements for successful air stripping include:

- Dissolved VOCs in a water matrix
- Pretreatment to remove any free-phase organics
- Clean air
- High surface-area contact between air and water
- Sufficient contact time
- No surfactants or dissolved polar organics present.

Common air stripping methods include tower, stacking tray and sliding tray designs. Table 2 compares these methods.

In air stripping processes, countercurrent flow causes the cleanest air to contact the cleanest water. This ensures efficient mass transfer throughout the flow path.

cium scales can deposit on mass transfer packing or trays and restrict air passage, leading to lower A/W and less VOC removal.

SLIDING TRAY TECHNOLOGY

One sliding tray air stripper technology, which uses the froth and turbulent mixing approach, can enable long operation before cleaning is needed. The design uses a sealed stripper box with a removable end door. With no external tray seals and no need to disconnect piping for cleaning, leaks are virtually eliminated.

Table 2 – Comparison of Common Air Stripping Designs

Stripper type	How it works	Modeling	Footprint	Monitoring	Cleaning
Tower	Thin film of water flows over packing with high surface area	Engineering design required	Small footprint but tall	Packing difficult to inspect	Packing access and removal is difficult
Stacking tray	Air bubbles/froth and turbulent mixing create mass transfer surface area	Some are online	Extra space on sides plus piping disconnects	Limited porthole observation	Extra disassembly; multiperson crew often needed
Sliding tray	Air bubbles/froth and turbulent mixing create mass transfer surface area	Online Easy to use	Reduced footprint	Clear door for observation	Single-person cleaning

Tower-style air strippers use a tall column filled with high-surface-area media for mass transfer. Plastic or ceramic media feature open area for airflow. Inspection and cleaning can be an issue.

With tray designs, a high volume of air is mixed with the water, resulting in bubbles and froth that create surface area for contaminants to move from the water into the air. A countercurrent flow uses the air volume for maximum effectiveness. Sliding-tray designs have a front door that opens like a pizza oven and stripper trays that slide out on rails, like oven racks. The door can be easily removed and sprayed down for cleaning.

All stripper types are prone to fouling from inorganic compounds, especially scale-forming compounds. For example, insoluble iron oxides and calcium scales can deposit on mass transfer packing or trays and restrict air passage, leading to lower A/W and less VOC removal.

The design provides easy access for process monitoring and inspection, even while in operation. It is resistant to fouling and can be cleaned by one person with a simple pressure washer. It is also easy to accommodate on sites and offers a wide turndown range.

Air strippers are effective at removing dissolved VOCs and gases from water. Well-maintained air stripping equipment will provide many years of efficient service.

ABOUT THE AUTHOR

Dave Fischer is vice president of technology with QED Environmental Systems, a manufacturer of innovative environmental products based in Dexter, Michigan. tpo

industry news

Xylem offers decision intelligence paper

Xylem offers a white paper on decision intelligence, presenting six strategies to transform the economics of utility water management. Titled Harness the Power of Decision Intelligence, the paper spotlights the strategies of reducing nonrevenue water, proactive asset management, ensuring water quality from source to tap, advancing water equity, managing urban watersheds and mastering the data deluge.

Holland Pump announces acquisition of Alpha Pump & Equipment

Holland Pump announced it acquired Alpha Pump & Equipment, based in Baton Rouge, Louisiana. The acquisition provides Holland Pump with enhanced product and engineering capabilities to service industrial facilities and expands the company's footprint in the greater Gulf Coast region. With over 16 years of experience, Alpha Pump has developed a reputation for a high level of customer service and industrial pumping expertise, especially when dealing with highly technical applications such as pumping hydrochloric acid, phosphoric acid, sulphuric acid, sodium hydroxide or benzyne.

BASF sells its ultrafiltration membrane business to DuPont

BASF and DuPont announced that the companies signed an agreement where BASF will sell its ultrafiltration membrane business to DuPont. The divestiture includes the shares of inge GmbH, the business' international sales force, its headquarters and production site in Greifenberg, Germany, and certain intellectual property currently owned by BASF SE. Financial details of the transaction are not being disclosed.

ClearSpan Fabric Structures announces new manufacturing facility

ClearSpan Fabric Structures completed construction on a new, state-of-the-art manufacturing facility. The 94,000-square-foot facility sits on ClearSpan's 60-acre campus in Dyersville, Iowa. The new building and technology are expected to bring an additional 75 to 100 jobs to the local economy and allow the company to completely customize customer-specific solutions. tpo

Reuse, Recovery and Energy Management

By Craig Mandli

Asset Management

FLOTTWEG SEPARATION TECHNOLOGY XELLETOR

Xelletor series separators from Flottweg Separation Technology

Xelletor series separators from Flottweg Separation Technology include a rotor and scroll designed to reduce the consumption of polymer while also reducing energy consumption. Depending on biosolids quality, the centrifuge can save about 20% on energy while providing significantly better performance. It can increase throughput by up to 15%, reduce the volume of biosolids by as much as 10% and save up to 20% in energy and polymer consumption. **859-448-2331; www.flottweg.com**

Automation/Optimization

ADEDGE WATER TECHNOLOGIES INGENIUS

InGenius control panels from AdEdge Water Technologies

InGenius control panels from AdEdge Water Technologies are custom-engineered programmable logic control panels designed to meet site specifications for monitoring and integrating treatment systems with auxiliary equipment and controls for water systems. The panels integrate the process in one place for safety, monitoring, ease of service and installation. They are NEMA 1-4, 4X, 12 and 13 certified and constructed from thermoplastic, stainless steel, painted steel and fiberglass. They have a hand on/off selector, backwash indicator, LED lamps, a security key latch and probe-mounted displays for flow, pH, chlorine, TDS and turbidity. They include level and relay controls, auxiliary power supplies, power converter (110- to 24-volt or 12-volt and AC to DC), surge protection, Ethernet networking, audible/visual alarm indicators and a SCADA interface. **866-823-3343; www.adedgetech.com**

ALLMAX SOFTWARE OPERATOR10

Operator10 operations data management software from AllMax Software

Operator10 operations data management software from AllMax Software is designed to centralize operational data into one database. Whether from plant rounds, SCADA and Historians, LIMS or other sources, the database can store operational data for easy review later. Calculations, reports, trending and review of data from any time period make it quick and easy to make sense of plant operation and efficiency. Technical support, program setup and training all combine to make it a trusted and reliable software solution in the water and wastewater industry. **800-670-1867; www.allmaxsoftware.com**

ANUA QUANICS AEROCELL

Quanics AeroCell from Anua

Quanics AeroCell for wastewater treatment from Anua utilizes synthetic media housed in an engineered pod. The open-cell foam cubes have high surface area and porosity, which balance water movement and oxygen availability. The media will not degrade over time. Pretreated effluent is sprayed over the media using specially designed helical spray nozzles, which provide uniform distribution over the entire surface area within the pod. The treated effluent is recirculated through the media multiple times, ensuring optimum treatment. The media properties and timed dosing allow for large loading rates, ensuring a small footprint. It provides BOD, TSS, ammonia and total nitrogen reduction. **877-782-6427; www.anuainternational.com**

GORMAN-RUPP INTEGRINEX ADVANCED

Integrinex Advanced lift station controls from Gorman-Rupp

Integrinex Advanced lift station controls from Gorman-Rupp are custom-engineered to meet unique system requirements. When equipped with FloSmart technology, the control system can detect a pump obstruction and run a cleaning cycle until the debris clears. Upon detection, the device initiates a cleaning operation without interfering with the operation of the pump station. When the cycle is complete, the pump is ready to return to normal operation. If the clog remains, the cleaning sequence repeats until the blockage is cleared. FloSmart helps maximize uptime while reducing maintenance costs. **419-755-1011; www.grpumps.com**

MARKLAND SPECIALTY ENGINEERING SUSPENDED SOLIDS DENSITY METER

Suspended Solids Density Meter from Markland Specialty Engineering

The Suspended Solids Density Meter from Markland Specialty Engineering provides real-time knowledge of primary, secondary and return activated sludge concentrations in pipes, clarifiers and tanks, and automates biosolids removal. It allows users to program underflow pumps to shut off before biosolids density becomes too thin and to optimize polymer dosing and equipment variables for enhanced dewatering. This ultrasonic meter provides continuous suspended solids percentage readings, unaffected by the color of particulates or fluid, and enables calculation of mass flow rate. It is available in two versions: a nonintrusive sensor within an in-line pipe spool-piece and a throw-in-style probe. Each style is simple to install, calibrate and clean. **855-873-7791; www.sludgecontrols.com**

VEOLIA WATER TECHNOLOGIES AQUAVISTA PLANT

AQUAVISTA Plant from Veolia Water Technologies

AQUAVISTA Plant from Veolia Water Technologies provides a holistic digital solution for optimization of the consumption of energy and chemicals, biological and hydraulic capacity enhancement, stable operation and increased compliance of wastewater treatment plants and sewer networks. With advanced analysis of online sensor measurements in real time, it con-

tinuously determines optimum setpoints and updates those settings in the plant control system automatically through a dedicated portal. Significant gains in performance, capacity and efficiency have been verified in wastewater systems using its advanced controls. The system is suitable for small and large municipal and industrial wastewater systems and is applicable to a wide variety of systems including complete collections systems, CAS/biological nutrient removal systems, biofilters, moving bed biofilm reactor/integrated fixed film activated sludge, oxidation ditches, UASB systems and deammonification. **919-677-8310; www.veoliawatertech.com**

Biogas

JDV EQUIPMENT DOUBLE MEMBRANE BIOGAS HOLDER

Double Membrane Biogas Holder from JDV Equipment

The Double Membrane Biogas Holder from JDV Equipment is easy to install, has low upfront capital costs and requires low operating capital. Its design allows for variable biogas storage within the inner membrane at constant pressure during gas production and utilization, while the air-inflated outer membrane provides gas pressure and protection. The outer membrane is constructed of a high-tech, cross-woven fabric that's coated with PVC- and UV-ray protection, proven to endure the weather elements. Sensors monitor the volume of gas present, giving operators full control of optimizing the utilization of biogas to feed generators and/or heating systems. Storing digester biogas can eliminate flaming from the digester, and it can help reduce or completely eliminate the need for electric grid power when generators and/or hot-water boilers are incorporated into the facility design. **973-366-6556; www.jdvequipment.com**

Drive

SCHNEIDER ELECTRIC ALTIVAR PROCESS ATV6000

The Altivar Process ATV6000 from Schneider Electric is a smart, connected product that can help optimize businesses by enabling process optimization, improving energy management, enhancing asset management and providing a tailored engineering solution. Equipped with EcoStruxure Asset Advisor, it provides a solution to optimize the operation and maintenance of installations. It allows businesses to plug into the Industrial Internet of Things to manage maintenance tasks on assets with preventive and predictive management based on real-time assessments and predictive analytics. This service-oriented drive delivers greater energy management through smart data collection, real-time performance information and lifetime energy monitoring to reduce consumption. It provides a high level of customization to meet specific purposes, offering flexibility for modifications and extensions. This means that no matter the challenge, electrical or mechanical, Schneider Electric's application specialists and design engineers will provide optimized solutions resulting in Capex and Opex savings. **888-708-2733; www.schneider-electric.us**

Altivar Process ATV6000 from Schneider Electric

Turbo G5Plus from Aerzen

High-Efficiency Motors/ Pumps/Blowers

AERZEN TURBO G5PLUS

The Aerzen Turbo G5Plus is the most compact and efficient turbo in its class. It offers Aerzen airfoil bearings with double coating and multilevel frequency converter technology, which reduces the heat loss in the motor to a minimum and, consequently, improves the total efficiency significantly. **610-380-0244; www.aerzen.com/en-us**

ALL-STAR PRODUCTS REGENERATIVE BLOWER MOTORS

Regenerative blower motors from All-Star Products

All-Star Products regenerative blower motors exceed the efficiency standards established by the U.S. Department of Energy EISA (Energy Independence and Security Act) standard and European IEC (International Electrotechnical Commission) standards IE1, IE2 and IE3. The high-efficiency standards became mandatory for all electric motors manufactured and installed worldwide and within the U.S. after Jan. 1, 2017. These standards also include a requirement to meet a minimum power factor as well. In addition to the usual motor nameplate, to assure that the motors on the regenerative blowers meet the new high-efficiency standards, the company applies two labels to the motor stating "High Efficiency Design" and the motor power factor. **901-755-9613; www.all-star-usa.com**

BLUEline Rotary Lobe Pump from Boerger

BOERGER BLUELINE ROTARY LOBE PUMP

The BLUEline Rotary Lobe Pump from Boerger is a self-priming, valveless, positive displacement pump used to convey viscous and abrasive materials. There are 21 pump models in six series with pulsation-free operation, fully reversible rotation, dry-run capabilities and flow rates up to 7,500 gpm. The pumps are stable and wear-resistant with a maintenance-in-place design that allows for all wetted parts to be easily replaced through the front cover without the removal of pipe or drive systems. **612-435-7300; www.boerger.com**

EURUS BLOWER ZG BLOWER PACKAGE

ZG blower package from Eurus Blower

The ZG blower package from Eurus Blower includes an internal sound-dampening feature lowering both sound and pulsations in blower packages with or without a sound enclosure. The package includes an integrated silencer, base frame, inlet filter/silencer with automatic belt tensioning and vibration isolators. Other components include a motor, drive, valves, flex connections and controls that are provided site specific and interchangeable. The complete blower skid package does not need to be sent to a blower repair facility in the event one item fails or needs rework. All critical components may be quickly replaced, substituted or repaired directly by the original supplier. **630-221-8282; www.eurusblower.com**

(continued)

HOWDEN 827 DVJ

827 DVJ dry-vacuum blower from Howden

The 827 DVJ dry-vacuum blower from Howden is a heavy-duty unit with integral ductile iron impellers. The casing headplates, gear cover and drive-end are gray iron. Carburized and ground spur timing gears are taper-mounted on the shaft and secured with a locknut, cylindrical roller bearings, splash lubrication on both ends, and easy-to-read sight glasses for maintenance. The blower is capable of handling high inlet temperatures for rough applications. An efficient discharge jet plenum design allows cool atmospheric air to flow into the cylinder, so the blower continues to run under blank-off conditions. It comes in a compact, lightweight package and delivers more than 5,700 cfm in an 8-inch gear diameter frame, as well as 28 inches Hg. **800-557-6687; www.howdenroots.com**

INOVAIR IM-20

Centrifugal blower package from Inovair IM-20

The Inovair IM-20 geared centrifugal blower package is designed for applications ranging from 20 to 75 hp and flow ranges of 300 to 1,800 scfm. The compact footprint of the unit allows it to pass through a conventional man-door and offers customers up to 50% in space savings compared with competing technologies. Additionally, the high-efficiency geared centrifugal design provides energy savings of up to 40%. This reliable and robust design is ideal for demanding applications with fluctuating discharge pressures and/or frequent starts and stops. It has low maintenance requirements and standard components such as off-the-shelf variable-frequency drives and standard motors, as well as the proven, reliable Inovair 2200 series gear head. **855-466-8247; www.inovair.com**

KAESER COMPRESSORS PILLAERATOR

PillAerator turbo blowers from Kaeser Compressors

PillAerator turbo blowers with magnetic bearing technology from Kaeser Compressors have direct-drive, active magnetic bearing motors and intelligent control systems that help boost energy savings. They have single-unit flows up to 10,000 cfm and are available in two model ranges with three designs within each. For flow rates up to 4,700 cfm, there is the 200 hp series; and for flow rates up to 10,000 cfm, there is the 400 hp series. Each impeller design delivers different pressures and flow rates. Pressures are available from 4.4 to 20.3 psig. **866-516-6888; www.us.kaeser.com**

NAMWON TURBO ONE BLOWERS

Blowers from NamWon Turbo One

Blowers from NamWon Turbo One are equipped with high-speed permanent magnet synchronous motors, boosting their maximum efficiency of around 98%. They include the latest innovations in air bearing, precision, machining impeller, high-speed high-efficiency permanent magnet motor, high-speed control inverter, automatic control logic and system design. They use an airfoil bearing that employs air as a lubricant, meaning they do not need separate lubricant and have a long service life. Maintenance costs are low because only the suction filter is replaced. There is no vibration and no need for separate sound proofing with a noise of 70 to 80 dB. **821-544-2280; www.nwturbo.com**

ROBUSCHI ROBOX SCREW BLOWER PACKAGE

Robox Screw blower package from Robuschi

The Robuschi Robox Screw blower package offers pressures up to 36 psi and flows up to 5,625 cfm. The efficient rotary screw blower offers energy savings of up to 30% when compared to previous blower technologies. The package offers the widest efficient turndown capability in flow to save energy. All enclosed packages come standard with the AirSmart G2 controller. This offers 24-hour monitoring and provides flexible data output via Ethernet or RS-232 port. **866-428-4890; www.gardnerdenver.com**

VAUGHAN CONDITIONING PUMP

Vaughan conditioning pump

The Vaughan conditioning pump is a Vaughan submersible chopper pump mounted on a portable stand that's fitted with a high-velocity mixing nozzle. The unit recirculates the contents of the wet well, chopping and mixing to produce a homogeneous mixture that is more easily pumped out. Floating mats are removed, and solids accumulated on the floor are resuspended. The pump is mounted on a portable stand, easily used in multiple applications at a single job site, facility or municipality. **888-249-2467; www.chopperpumps.com** tpo

It's your magazine. Tell your story.

Send your ideas for future articles to editor@tpomag.com

WORLD CLASS EDUCATION

Come to the WWETT Show to step up your game with unmatched education for the best value in our industry.

- Over 100 Sessions across 21 topic tracks
- CEU credits from 45 states, provinces and organizations
- Certification classes, Technical Tours and a new workshop series

- ☑ Surround yourself with other wastewater and environmental services professionals & world-class professionals who understand your daily challenges
- ☑ Uncover the most effective treatment processes through educational insights, innovative techniques and groundbreaking tools
- ☑ Learn best practices for sustaining and growing your business so it can continue to serve your customers for generations to come

wwett 20

CONFERENCE: **FEBRUARY 17-20**
MARKETPLACE: **FEBRUARY 18-20**
INDIANA CONVENTION CENTER

LEARN MORE at www.wwettshow.com
@wwettshow

JOIN THE COMMUNITY
REGISTER NOW

Proud Member of:

APWA · NASSCO · NASTT · NAWT · NOWRA

By Craig Mandli

Ceramic membrane system solves disinfection byproduct challenge

Problem

In 2010, a pine beetle infestation killed most of the trees surrounding the Basin Creek Reservoir in Butte, Montana. Many fell into the chlorinated water, increasing organic matter and disinfection byproducts. To keep using the reservoir, the utility planned the Basin Creek Water Treatment Plant.

Solution

Initial efforts focused on site selection, pilot testing, hydraulic analysis, distribution system modeling and process selection. The Butte-Silver Bow Water Utility procured an **Aqua MultiBore C-Series ceramic membrane system** from **Aqua-Aerobic Systems.** The system could accept water directly from the reservoir, at much higher elevation than the plant. The reservoir pushes water through the membranes and directly into town, so when users turn on their faucets, more water flows through the plant.

RESULT:

"It saved a lot of infrastructure and pumping costs," says Jim Keenan, chief operator. In addition, the plant wastes less than 0.2% of the water it treats. "We've been really pleased with how well the system works and how efficient it is," Keenan says. **815-654-2501; www.aqua-aerobic.com**

University reduces water consumption through blowdown reuse

Problem

During a drought in 2015, a Southern California university decided to treat cooling tower blowdown for reuse in its cogeneration plant. The university hired an engineering firm to assist with design and integrate the treatment system into the facility.

Solution

In addition to high hardness and dissolved solids in the water supply, environmental factors such as Santa Ana winds, wildfires and nearby freeways increased suspended solids in the cooling tower water. **U.S. Water Services** designed a system that combined **ultrafiltration and reverse osmosis,** allowing strained water from the cooling tower to advance to the ultrafiltration membranes as pretreatment to the RO membranes. The permeate water flows back into the cooling tower with 99% of the impurities removed.

RESULT:

Started up in 2016, the system has cut the university's potable water use by about 18 million gallons. With other sustainability initiatives, the university is on the way to reducing consumption by 30 million gallons per year. **866-663-7632; www.uswaterservices.com**

Gasification project results in efficiency for large municipality

Problem

The New York metropolitan area includes the five largest cities in New Jersey, generating more than 1 million tons of biosolids annually.

Solution

Linden Roselle Sewerage Authority found that **Aries Clean Energy** had an environmentally friendly solution. The plan called for anaerobic digestion followed by hauling the remaining biosolids offsite. Biosolids are dried to 90% solids and then fed into a gasifier, which converts the material to a syngas in a thermochemical process. The syngas then provides fuel for the dryers. The only byproduct is biochar for beneficial use. The system achieves 90% mass reduction. The gasification process consumes little oxygen and produces lower emissions, making it an attractive alternative to landfilling or land application.

RESULT:

The process diverts 130,000 tons of biosolids from landfills annually and is carbon negative. It also reduces greenhouse gases by reducing truck haulage. **615-471-9299; www.ariescleanenergy.com**

Ultrafiltration provides private development with space savings, high-quality effluent

Problem

A planned development in Indian Beach, North Carolina, included more than 200 condominium units near oceanside property. State regulators advised the developers to discuss combining the wastewater system with that of a next-door housing development, whose treatment system was aging. The combined scheme required a 101,000-gpd treatment system with screening. Land costs were high and dictated a system with a compact footprint. The existing subsurface discharge field necessitated a treatment system able to produce high-quality effluent that could be reused/reclaimed.

Solution

The parties selecting the packaged **TITAN MBR wastewater treatment system** from **Smith & Loveless.** It has a compact design and produces effluent that exceeds the strictest regulatory standards, including California Title 22, for direct discharge and secondary reuse. The treatment plant arrived in a complete factory-built system with minimal field assembly. Installation and startup took a few days. Automatic fine screening, prewired instrumentation and PLC control equipment were included. High-performance flat-sheet membrane modules provide effluent suitable for the direct subsurface discharge. The system's standard modular design allows for high flows while using minimal beachfront property.

RESULT:

The unit has provided years of dependable service. **800-898-9122; www.smithandloveless.com** tpo

exam STUDY GUIDE

Licensing exams can be challenging. Our **Exam Study Guide** helps you prepare by presenting questions similar to those on an actual exam. You can find many more sample questions on the *TPO* website at www.tpomag.com/study.

WASTEWATER

By Rick Lallish

What condition occurs when the sludge age advances and there is less food available per bacteria?

A. Flocculation
B. *Nocardia* filaments
C. Excessive white foam
D. Endogenous respiration

ANSWER: D. A portion of the bacteria can be lost due to endogenous respiration at high sludge ages. This is due to the lack of food available or an unbalanced food-to-microorganism (F/M) ratio. The bacteria will consume their own cell mass and exopolymer to survive. This will provide food for the other bacteria as well. Understanding the natural cycle of life and conditions in an activated sludge treatment process gives operators useful knowledge for troubleshooting. More information may be found in the Water Environment Federation textbook: *Wastewater Treatment Fundamentals I – Liquid Treatment*, Chapter 8.

DRINKING WATER

By Drew Hoelscher

A well with an encrusted screen can cause which of these to occur?

A. Decrease in the specific capacity in gpm/ft of drawdown
B. Increase in the specific capacity in gpm/ft of drawdown
C. Decrease in drawdown
D. Increase in the static level

ANSWER: A. Over time, well screens become plugged due to dissolved minerals in the water coming out of solution and collecting on the screen openings. Calcium and magnesium carbonate will precipitate out of the water rather easily under high-velocity and low-pressure conditions. This is one reason well drillers and engineers design a well to limit the velocity of the water entering the well to 0.1 feet per second or less. As the screen plugs, water is restricted from entering the well, which increases the drawdown and ultimately decreases the gpm/ft of drawdown (specific capacity).

ABOUT THE AUTHORS

Rick Lallish is water pollution control program director and Drew Hoelscher is program director of drinking water operations at the Environmental Resources Training Center of Southern Illinois University Edwardsville. tpo

Flomatic AIS-Compliant Automatic Control Valves

Flomatic Automatic Control Valves are designed for use with various types of pressure and electric controls to provide the desired control of pressure or flow for a variety of water system applications. Flomatic pilot operated control valves are built in compliance with AWWA C530 standards. NSF/ANSI 61 approved, fusion-bonded, epoxy-coated ductile iron globe or angle-style bodies are available standard in full- or reduced-port configuration. Valves are fitted with various pilot control systems to control conditions in pressurized pipeline systems. Flomatic Automatic Control Valves are in full compliance with the American Iron & Steel provisions for affected Federal/State Revolving Fund projects, as all iron and steel products are 100% produced in the U.S. Available in sizes 1 1/4 through 36 inches and covered with a three-year warranty, Flomatic Automatic Control Valves are manufactured under a certified ISO 9001:2015 and ISO 14001:2015 quality and environmental system programs.

518-761-9797; www.flomatic.com

Xylem Godwin S Series smart pumps

The Godwin NC100S and CD100S Dri-Prime dewatering pumps from Xylem are equipped with interchangeable, application-specific impellers and a new generation of cloud-based Field Smart Technology. The 4-inch, surface-mounted centrifugal pumps can switch from a NC100S to a CD100S and vice versa, due to the interchangeable impellers. The CD100S pump's impeller can be exchanged with a Flygt N-Technology self-cleaning, nonclog impeller to deliver sustained hydraulic efficiency. The NC100S and CD100S models have a redesigned pump end and also come equipped with a Final Tier 4 engine, cutting diesel particulate emissions by 90%. Field Smart Technology allows for remote monitoring and control.

800-247-8674; www.xylem.com

product spotlight

wastewater

Wastewater sampling made easy

By Craig Mandli

Wastewater sampling can be an arduous process. Because treatment facilities are held to high uniform standards, the methods for both collecting and testing samples must be secure. **Emerald Coast** recently introduced the **WAVE electronically controlled vacuum wastewater sampler** to take secure sampling to the next level. The heavy-duty refrigerated sampler provides composite and sequential sampling options with high accuracy.

"The WAVE was built with human interaction in mind," says Ron Jones, president of Emerald Coast. "Features include a sleek enclosure design, easy-to-access sampling compartment and a full-color touch screen with that interaction in mind."

The unit comes with a high-impact and weather-resistant acrylic/ABS body for all-season use in indoor and harsh outdoor environments. An integrated touch screen enables users to specify the volumes of water and program times and flow intervals to collect samples. Controls also let users digitally regulate temperature within the sample compartment, from the unit directly or from an app-enabled device.

In the unit's fully customizable sampling program, the operator can stop, pause and resume the current program from a user-friendly home screen, along with manually drawing samples, while easily viewing all the selected program options. Aside from setting all the program parameters from cycle details to bottle type, the user has the ability to access previous cycle information from a selected date and time range. The user manual and help options are easily available from all screens.

WAVE by Emerald Coast

The vacuum system generates strong purges that remove contamination. It can draw samples from long distances and can pull samples with vertical lifts of nearly 30 feet, and it provides consistently accurate sampling with no need to replace internal tubes.

"Its advanced sampling system showcases the highly effective and accurate sampling process while being fully configurable to fit specific needs," Jones says. "It has an extremely efficient cooling unit paired with state-of-the-art internal components to minimize complexity and the quantity of internal parts."

Features include a heavy-duty piston vacuum pump; 1-liter, 2.5-gallon and 5.5-gallon sample container options; programmable sample size; and constant sampling intervals up to 9,999 minutes. The unit has a 7-inch color touch screen, data logging capability, an alarm output option, auto shut-off and passcode protection.

850-469-1142; www.emeraldcoastmfg.com

GE Digital iFIX 6.0 technology

The iFIX 6.0 from GE Digital provides integrated support for ISA 18.2 standards for consistent alarm shelving and interface presentation. The update also includes secure-by-design client connections with an OPC Unified Architecture server, enabling it to run across a variety of hardware platforms and operating systems. Also provided are rapid application development features for HMI/SCADA, such as long tag names and descriptions, which helps to speed up configuration and deployment.

800-433-2682; www.ge.com/digital

Franklin Miller Taskmaster TM6500 grinder

The Taskmaster TM6500 from Franklin Miller has twin shaft grinding performance in a compact design. It features high-strength Cutter Cartridge technology to protect pumps, valves, centrifuges

product spotlight
water

System allows operators to get a handle on membrane fouling

By Craig Mandli

Membrane Monitor (MeMo) from Noria Water Technologies

The ability to cut costs while maintaining high-quality treatment is on the forefront of every water treatment operator's mind, especially during budget time. Rather than install new treatment processes, though, sometimes the key to cost savings is simply ensuring existing processes run as peak efficiency. **Noria Water Technologies** offers the **Membrane Monitor (MeMo),** a technological advancement designed to detect and continuously monitor fouling and scale on nanofiltration and reverse osmosis membranes as it occurs.

The device helps enable effective fouling and scale mitigation strategies in water treatment and desalination plants, including optimal anti-scalant dosing. The company estimates that by eliminating fouling and scaling on the membrane surface, water production costs can be reduced by 10% to 30%.

"Plant operators are typically left with very little information when operating their systems, relying on industry standards, indirect monitoring and trial and error," says Sivan Sidney Cohen, CEO of Noria Water Technologies. "Our system enables plants to cut chemical use in half, double membrane life span, increase recovery rates by up to 30%, decrease energy usage by up to 20% and reduce plant downtime."

To optimize performance, the system can be placed in a variety of positions throughout the membrane plant. Larger uses can choose multiple monitoring points within a facility, while smaller systems may require only one monitoring point. The technology yields savings by enabling membrane operation at near maximum or optimal product water recovery levels. It also reduces RO brine volume and related treatment and disposal costs.

In addition, the system prolongs membrane life and reduces chemical cleaning costs by catching fouling and scaling issues early through automated detection. This allows for more effective application of membrane fouling/scaling mitigation strategies. Finally, the system reduces personnel time and cost for membrane replacement and cleaning and for general membrane troubleshooting.

"Product and process innovations are being implemented across the water industry and are driving down the costs and challenges of desalination," Cohen says. "Real-time monitoring is an approach that is poised to make a significant impact on the way we use membrane-based water treatment to meet our rising water needs."

310-488-5238; www.noriawater.com

and more in sludge and raw sewage applications. Other features include a small footprint to fit into tight plant locations, a drop-in housing design for easy maintenance and a heavy, 2-inch hex shafting. The unit's proven seals, as well as the bearings, are located in bearing/seal cartridge assemblies. The unit is powered by a 2 hp gear motor and is supplied for open channel or in-line applications.

800-932-0599;
www.franklinmiller.com

ThingWorx Kepware Edge technology

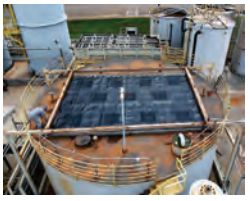
ThingWorx Kepware Edge allows for secure and reliable connection of remote assets to SCADA and other critical applications. The product features out-of-the-box connectivity to the most popular automation devices, including Allen-Bradley (Rockwell Automation) and Siemens, as well as devices using the popular Modbus TCP Ethernet protocol. It offers secure read/write access a wide variety of applications via OPC UA and MQTT, including SCADA and Historians as well as Industrial Internet of Things platforms. The product also features native connectivity to ThingWorx. With support for Linux-based environments and tag-based pricing, the product can scale to create a distributed connectivity architecture that reduces the cost of data transfer and improves reliability and security.

207-775-1660; www.kepware.com

Neptune Chemical Pump NXP Series stepper motor-driving metering pump

With its compact design and intelligent-drive concept, the Neptune NXP Series from Neptune Chemical Pump combines the advantages of a solenoid-driven pump with the precision of a motor-driven pump. It is designed to safely feed chemicals in accurate, reproducible applications. The NXP Series is fully adjustable to produce a constant supply stream during low-pulsation dosing, and the stepper motor with its wear-free tooth belt drive ensures a homogeneous and gentle dosing process. Available in six sizes, the NXP Series is plug-and-play and includes a universal power supply unit.

215-699-8700; www.neptune1.com



Anue Water Technologies odor control systems

Anue Water Technologies' geomembrane-based odor control system is designed to reduce odorous emissions for tanks and containers of nearly any shape or size. The membranes are supported by a cable grid and batter bars so it is unaffected by aeration, changing water levels, foaming, bacteria and other conditions. The filters consist of a spongelike

media filled with an odor control substance. Air flows through, allowing the system to breathe while odors are captured. Rainwater does not hinder odor-capturing ability. Gas-specific filters for hydrogen sulfide and ammonia can be combined in the system, even under grates and manhole covers.
760-727-2683; www.anuewater.com

Emerson Ovation OCC100 compact controller

The Ovation Model OCC100 compact controller from Emerson is nonredundant with a small footprint. A suite of communication protocol software and wide-area networking technology reside in the controller, providing small and midsized municipalities a cost-effective way to boost reliability and control geographically dispersed equipment. It is well-suited for applications including reservoir monitoring, gravity filtering, disinfection, tertiary treatment, and pump or booster station operation. The controller can be merged into a larger, Ovation distributed control system, enhancing visibility into plantwide operations.
800-972-2726; www.emerson.com

Blue-White Industries ProSeries-M Chem-Feed skids

The ProSeries-M Chem-Feed polyethylene engineered skid systems from Blue-White Industries are designed to be used with chemical dosing pumps. The systems can be equipped with a ProSeries-M pump, and both diaphragm types and peristaltic types are offered. Single- and two-pump units are available on skids constructed of chemical-resistant polyethylene with a drop-in-place design. Components include a visual flow indicator and an optional chemical feed flowmeter.
714-893-8529; www.blue-white.com

Flowrox FXM metering pump

The Flowrox FXM metering pump allows for 24/7 monitoring with the use of any computer or mobile device, creating awareness of minor mishaps before they reach critical levels that can cause serious downtime or costly damage. Every Flowrox FXM pump is IIoT ready. The optional Flowrox Malibu portal can remotely manage, measure and analyze processes from anywhere with a computer or any hand-held device with internet connection. The pump also includes a contactless, external leak sensor for tube failure detection. The pump has serviceable rotor construction, which can be disassembled for maintenance, and operation adjustment through a digital touchpad.
410-636-2250; www.flowrox.com

SEEPEX sanitary progressive cavity pump

The BCF sanitary progressive cavity pump from SEEPEX is 3-A Sanitary Standards certified. The hygienic design is based on a flexible titanium shaft, the Flexrod, instead of a coupling rod with universal joints. The design ensures residue-free cleaning by Clean in Place and Clean on Place processes. Clean in Place cycles are shorter, and Clean on Place is simplified by easier disassembly of the rotating parts without needing to disassemble the Flexrod connecting rods or joints. Existing BCS pumps can be upgraded to the BCF design by changing the wetted rotating parts. The external dimensions and pump casing are identical, requiring no further adaptation of the suction/discharge pipe or mounting footprint.
937-864-7150; www.seepex.com tpo

INDUSTRY MARKETPLACE

With over 600 exhibitors and 350,000 sf of exhibit space, the WWETT Show is THE marketplace for the wastewater and environmental services industry. See the new product launches, get hands-on with equipment and make your purchases. The WWETT Show Marketplace is WHERE DEALS GET DONE!

- Surround yourself with other wastewater and environmental services professionals who understand your daily challenges
- Uncover the most effective treatment processes through educational insights, innovative techniques and groundbreaking tools
- Learn best practices for sustaining and growing your business so it can continue to serve your customers for generations to come

wwett 20

CONFERENCE: **FEBRUARY 17-20**
MARKETPLACE: **FEBRUARY 18-20**
INDIANA CONVENTION CENTER

LEARN MORE at www.wwettshow.com
@wwettshow

JOIN THE COMMUNITY
REGISTER NOW

Proud Member of:

APWA · NASSCO · NASTT · NAWT · NOWRA

people/awards

The West County (California) Wastewater District hired four executives: **Andrew Clough,** deputy general manager; **Justin Lovell,** administrative services department manager; **Michael Savannah,** infrastructure and planning department manager; and **Aaron Winer,** water quality and resource recovery department manager.

William Barlow Jr., mayor of Oswego, New York, received a Public Officials Award from the Water Environment Federation for his commitment to improving the condition and operation of the city's two wastewater facilities and water plant.

The **North Shore Water Reclamation District** in Illinois received three Peak Performance Awards from the National Association of Clean Water Agencies: Gold Award to the Waukegan Water Reclamation Facility and Silver Awards to the Clavey Road Water Reclamation Facility in Highland Park and the Gurnee Water Reclamation Facility.

The **City of Lynden Wastewater Treatment Plant** and Pierce County's **Chambers Creek Regional Wastewater Treatment Plant** received Outstanding Performance awards from the Washington Department of Ecology.

Olathe facilities and staff earned 2019 awards from the Kansas Water Environment Association.

- **Harold Street Wastewater Treatment Facility,** top Class 5 plant (more than 3 mgd)
- **Compost Facility on Hedge Lane,** Biosolids Management Award
- **Heather Phillips,** wastewater treatment operations manager, William D. Hatfield Award
- **Steven McNolty,** environmental services maintenance manager, Select Society of Sanitary Sludge Shovelers.

Dale Vanderhoof, wastewater plant manager for the City of Larned, received the Jim Current Professional Excellence Award from the Kansas Department of Health and Environment.

Benjamin Brockschmidt, major accounts manager for Illinois American Water, received the Friend of Infrastructure Award from the Underground Contractors Association.

Stephen Morton, superintendent of the Muskogee (Illinois) Water Treatment Plant, was presented with the 2019 Roy Tucker Award of Excellence by the city in recognition of his efforts to keep the water plant operational as it was assaulted by floodwaters in May.

State legislation co-sponsored by the **San Diego County Water Authority** and the **Otay Water Distric**t has been signed into law, making it possible for veterans to receive credit for their military education and experience when applying for civilian water and wastewater system operator certifications in California.

The **Linden Water Resource Recovery Facility** received the first-ever Premier Utility Management Performance (PUMP) Award from the Michigan Water Environment Association in partnership with the Michigan Department of Environment, Great Lakes and Energy.

events

Jan. 10-12
IAFOR International Conference on Sustainability, Energy & the Environment, Hawaii Convention Center, Honolulu. Visit www.iicseehawaii.iafor.org.

Jan. 23-24
Michigan Water Environment Association Annual Wastewater Administrators Conference, Bavarian Inn Lodge and Conference Center, Frankenmuth, Michigan. Visit www.mi-wea.org.

Jan. 23-24
Nebraska Water Environment Association Snowball Conference, Holiday Inn Conference Center, Kearney, Nebraska. Visit www.nebwea.org.

Jan. 26-29
New England Water Environment Association Annual Conference and Exhibit, Boston Marriott Copley Place. Visit www.newea.org.

Jan. 28
Water & Wastewater Treatment (WWT) Wastewater 2020 Conference & Exhibition, National Conference Centre, Birmingham, United Kingdom. Visit www.wwtonline.co.uk.

Jan. 28-30
DISTRIBUTECH International, Henry B. Gonzalez Convention Center, San Antonio. Visit www.distributech.com.

Peter Schwarz has been hired as the director of water services for the City of Midland, California. Schwarz returns after serving as the general manager of the Saginaw-Midland Municipal Water Supply Corp.

Ozark's Water Department was honored with the Best Operated Plant Award for the state of Alabama. The city's waste treatment plant also received an Award of Excellence.

Cleveland Utilities in Tennessee has been recognized with two excellence awards for water treatment operations at its water filter and wastewater treatment plants. The awards were granted by the Kentucky-Tennessee Section of the American Water Works Association and the Clean Water Professionals of Kentucky & Tennessee.

A team including the **City of Boulder, Colorado School of Mines and Carollo Engineering** placed first among 17 teams in the 2019 Intelligent Water Systems Challenge. The competition is hosted by the Leaders Innovation Forum for Technology, a joint effort of WEF and The Water Research Foundation. The team, comprised of multidisciplinary engineers, develops model predictive control systems with the goal of increasing energy efficiency and optimization at the Boulder Water Resource Recovery Facility.

The **Kitsap County Public Works Sewer Utility Division** has been recognized by the Washington State Department of Ecology for its outstanding performance in 2018 at wastewater treatment plants in Manchester and Kingston.

TPO *welcomes your contributions to Worth Noting. To recognize members of your team, please send notices of new hires, promotions, certifications, service milestones or achievements as well as event notices to editor@tpomag.com.* tpo

BIOGAS BOILERS

Sludge / Digester HEATING

"We added two 5,000 MMBtu/hr biogas boilers from Hurst to help heat the sludge before it enters the digesters," says Pippenger. "So we're using the gas produced in the digesters to heat the digesters."

-Jeff Pippenger, Utilities Administrator.
Eau Claire, Wisconsin Wastewater Treatment Plant

"The boilers burned 9 million cubic feet of biogas in the first 22 months, saving the plant about $40,000 over natural gas fuel"

CALL toll free **1.877.774.8778**

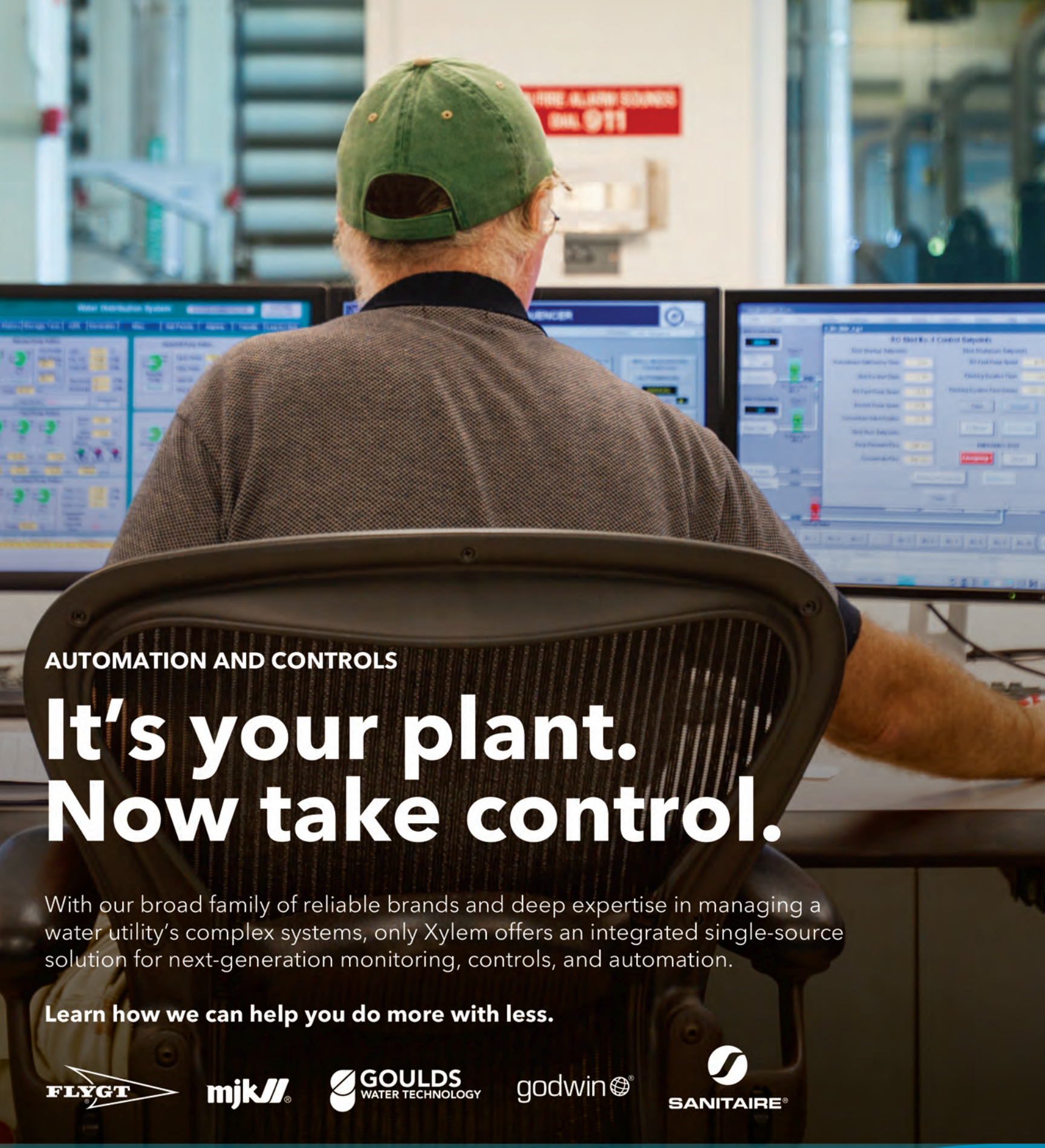
click hurstboiler.com

Digester
Methane Gas
Ready

Hurst BOILER

HURSTBOILER

100 Boilermaker Lane • Coolidge, GA 31738-USA
Tel: (229) 346-3545 • Fax: (229) 346-3874
email: info@hurstboiler.com


AUTOMATION AND CONTROLS
It's your plant.
Now take control.
With our broad family of reliable brands and deep expertise in managing a water utility's complex systems, only Xylem offers an integrated single-source solution for next-generation monitoring, controls, and automation.
Learn how we can help you do more with less.
FLYGT
mjk
GOULDS WATER TECHNOLOGY
godwin
SANITAIRE
xylem.com/utilitycontrols
xylem
Let's Solve Water