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IN MY WORDS:
Research on
cost-effective
BNR | 36

Changing on the Fly

**EXCELLENT TECHNOLOGY AND DESIGN MEAN
UPGRADE SUCCESS AT PEIRCE ISLAND | 20**

SUSTAINABLE OPERATIONS:
A fishy solution | 26

Terry Desmarais
City Engineer
Portsmouth, N.H.



TECHNOLOGY DEEP DIVE:
Nanobubble treatment
technology | 18

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advertiser index

June 2022

Analytical Technology, Inc.	17	KELLER	Keller America Inc.	55
Anue Water Technologies	11	Komline-Sanderson	Komline-Sanderson	53
Atlantic Ultraviolet Corporation	9	LAKESIDE	Lakeside Equipment Corporation	3
Badger Meter	7	Lovibond	Lovibond	43
BDP Industries, Inc.	9	MYRON L COMPANY	Myron L Company	39
BioSafe Systems	47	Neptune Chemical Pump Company	51	
Blue-White Industries	back cover	Paxxo	8	
BOHN BIOFILTER	37	s::can Measuring Systems LLC ..	25	
Bright Technologies, Division of Sebright Products, Inc.	27	SAF-T-FLO	Saf-T-Flo Chemical Injection	4
Byo-Gon, Inc.	53	Seaman Corporation / XR Geomembranes	35	
Carbon Enterprises Inc.	53	SEEPEX.	SEEPEX Inc.	45
Carollo Engineers, Inc.	33	Vaughan	Vaughan Company, Inc.	15
Flomatic Valves	43	Veolia Water Technologies	49	
HF scientific, a Watts Brand	23	Xylem	2	
Howden	29	YSI, a Xylem brand	19	
In-Situ Inc. (ChemScan, Partech) ..	47	CLASSIFIEDS	52	
Industrial Flow Solutions	5			
JDV Equipment Corporation	37			
JWC Environmental Inc.	27			

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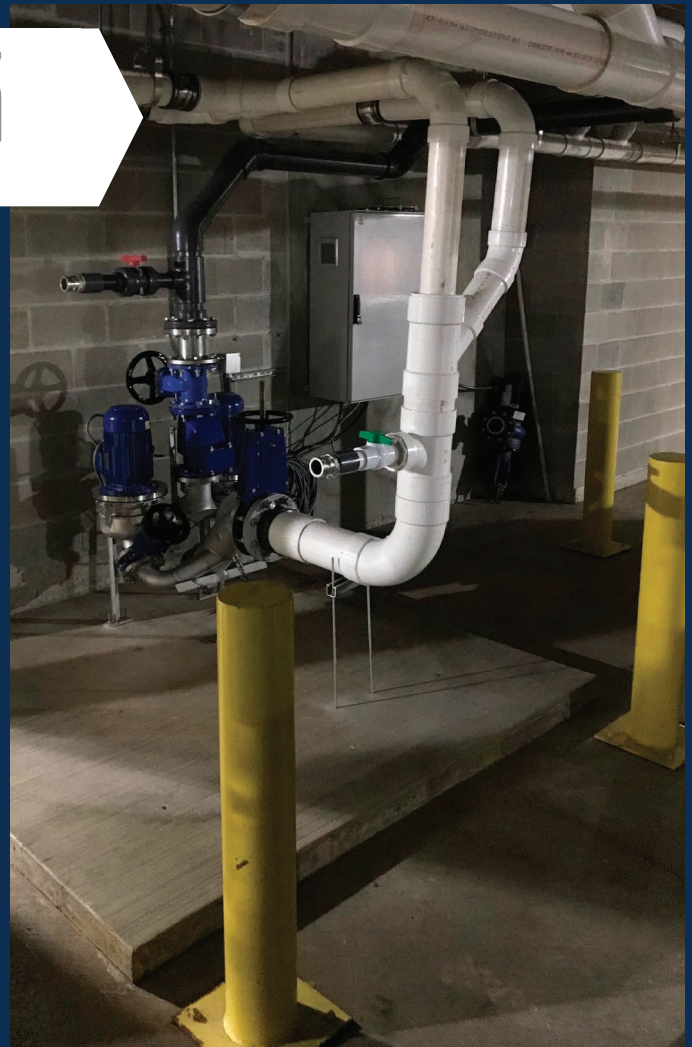
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Read the full story and more online



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contents June 2022

- 8 **LET'S BE CLEAR: NEED A CAREER BOOST?**
The Water Environment Federation offers scholarships to help aspiring and established operators improve their skills and ascend the licensing ladder.
By Ted J. Rulseh, Editor
- 10 **@TPOMAG.COM**
Visit daily for exclusive news, features and blogs.
- 18 **TECHNOLOGY DEEP DIVE: COARSE. FINE. NOW NANO.**
Nanobubble technology can deliver diverse benefits in treatment systems, like enhancing efficiency, controlling odors, improving effluent and saving money.
By Ted J. Rulseh
- 26 **SUSTAINABLE OPERATIONS: A PERFECTLY FISHY SOLUTION**
An operations team sends a swarm of bluegills to gobble up a nuisance overpopulation of *Daphnia* at a Washington clean-water plant.
By Steve Lund
- 28 **HOW WE DO IT: SEPTAGE OBJECTIONABLE? NOT FOR THIS FACILITY.**
A Connecticut clean-water plant turns septage into a revenue-generating asset with a lineup of robust equipment and an automated management technology.
By Chris French
- 36 **IN MY WORDS: REMOVING NUTRIENTS AT LOWER COST**
The Water Research Foundation and utility partners are collaborating to fund a study of effective, energy-efficient biological nutrient removal methods.
By Ted J. Rulseh
- 38 **INDUSTRY NEWS**
- 40 **PRODUCT FOCUS: ODOR CONTROL AND DISINFECTION**
By Craig Mandli
- 44 **CASE STUDIES: ODOR CONTROL AND DISINFECTION**
By Craig Mandli
- 46 **PRODUCT NEWS**
Product Spotlights:
Water: Flowmeter designed to provide complete look at water distribution systems
Wastewater: Backup pump designed for dependability when called upon
By Craig Mandli

top performers



- 12 **WASTEWATER OPERATOR: A LIFETIME IN WATER**
When Wade Lagle finds a career he likes, he sticks with it. That's why he's been in the wastewater industry since high school.
By James Careless
- 20 **WASTEWATER PLANT: CHANGING ON THE FLY**
Excellent technology and design meant success for a major upgrade at Peirce Island. So did close communication involving operators, engineers and construction contractors.
By Jim Force
cover story
ON THE COVER: To call the Peirce Island Wastewater Treatment Facility a success story is an understatement. The plant, recently upgraded to advanced secondary treatment and nitrogen removal, is actually several success stories. The \$92 million, four-year upgrade was completed on a very small footprint, without upsetting the existing primary treatment facility. The Water Environment Federation presented its home city of Portsmouth, New Hampshire, with a 2021 Project Excellence Award. (Photography by Adam Perri)
- 30 **WASTEWATER PLANT: FLIP-FLOP FLOW**
An innovative biological nutrient removal process helps an Illinois village complete a successful plant expansion, improve treatment quality and end a consent decree.
By Suzan Chin-Taylor
- 50 **HEARTS AND MINDS: FARMERS' HELPING HANDS**
Wisconsin farmers, Oneida Nation and other partners join a Green Bay utility in a project to improve water quality.
By Sandra Buettner
- 53 **EXAM STUDY GUIDE**
By Rick Lallish and Drew Hoelscher
- 54 **WORTH NOTING**
People/Awards; Events

coming next month: July 2022 FOCUS: **Conveyance and Distribution Systems**

» Let's Be Clear: How to turn your public against you » Wastewater Operator: Amanda Bird, Santa Cruz, California | Laboratory: Joga Cizer, Fairfield Suisun District, California | Wastewater Plant: North Fort (Florida) Wastewater Treatment Facility » How We Do It: Energy efficient sludge mixers in Fairfield, Connecticut » In My Words: Perspectives on leadership » Sustainable Operations: Biosolids to hydrochar in Phoenixville, Pennsylvania » Hearts and Minds: Award-winning video at Colorado's South Platte Renew » Technology Deep Dive: Efficient ultrasonic algae control

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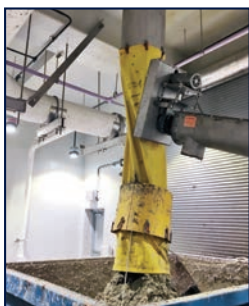
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BEFORE



AFTER

let's be clear

Need a Career Boost?

THE WATER ENVIRONMENT FEDERATION
OFFERS SCHOLARSHIPS TO HELP ASPIRING AND
ESTABLISHED OPERATORS IMPROVE THEIR SKILLS
AND ASCEND THE LICENSING LADDER

By Ted J. Rulseh, Editor



Continuing education and training are important. We all know it. But they also cost money, and not every community or utility picks up that expense for the operator workforce.

So, what can an operator do who aspires to more knowledge and a higher level of licensing or certification? One possibility is to apply for an operator scholarship from the Water Environment Federation.

I must apologize for letting the 2022 application window (January 15 to April 1) slip by this year without my notice. But there's always next year, and it's not too soon to think about giving it a shot.

A FINANCIAL BOOST

The aim of the program is to provide financial support for people who want water sector operator education, training or certification, whether to get a start in the industry or to advance their skills and credentials.

Scholarships of up to \$5,000 support professional development in municipal and industrial water and wastewater treatment, water reuse, wastewater collection, drinking water distribution and stormwater. WEF awarded 15 scholarships in 2021.

As you might imagine, some requirements and restrictions apply. For example, you can't apply for funds to cover types of training and education that your employer typically pays for. You can't receive a scholarship for training already started or completed.

You can apply the money toward the cost of a bachelor's or master's degree, provided the schooling is directly related to your advancement in water and water resource recovery operations. For example, a degree in water technology to enter or advance in the profession would be eligible, and so would a degree in business administration to support promotion into a management role.

Scholarships are not restricted to college or technical courses; they can be used to support attendance at a training school or industry conference, so long as you can justify how it will help advance your career. Expenses such as airfare and lodging can be included.

MAKING YOUR CASE

In your application, you should clearly describe how the training or certification will help advance your career. It's helpful to mention affiliations



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with industry groups and related activities such as the WEF Operations Challenge and water-related community volunteer service.

A committee of WEF volunteers and staff will review the applications and award the scholarships based on applicability and need. Points are awarded for criteria including:

- Clear and concise application
- Clarity and relevance of the relevance and purpose of the request
- Two 500-word essays
- Supporting data such as a resume and lists of memberships affiliations and certifications

To be eligible for a scholarship, you must be a member of WEF and your state or regional water environment association. Depending on your qualifications, you can choose a professional operator or student membership.

If you receive a scholarship, you should plan to use the funds within 12 months of receiving it. WEF maintains diversity, equity and inclusion as core principles of its mission, which board of trustees members, volunteer leaders and staff share responsibility to uphold.

Whether or not you pursue a scholarship, WEF offers a variety of resources to help you develop your career. They include the Wastewater Treatment Fundamentals series and Get Started resources for your state and surrounding region on website www.workforwater.org.

Your local member association likely provides training and tools and annual meetings or conferences. Then there's the annual WEFTEC national water conference, offering more than 100 technical sessions and nearly 1000 exhibitors — a great venue for education, networking and gaining continuing education credits.

As for the scholarships, what do you have to lose by applying? To find out more, visit www.wef.org or contact WEF staff member Tori Cox at tcx@wef.org or 703-684-2400, ext. 7070. **tpo**

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VIDEO TOUR

Meeting Strict Regulations

The city of Detroit Lakes, Minnesota, was faced with one of the state's most stringent nutrient limits for its planned new wastewater facility: a 94% reduction from the previous plant. An engineering firm worked with the utility to identify the best approach for replacing the city's 60-year-old plant. Tour the new facility in this online video.

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CYBERSECURITY UPDATE

Risk Summary Released

The Cybersecurity & Infrastructure Security Agency recently released a summary that identifies cybersecurity issues in the water/wastewater sector based on information collected from 44 service entities in fiscal year 2021.

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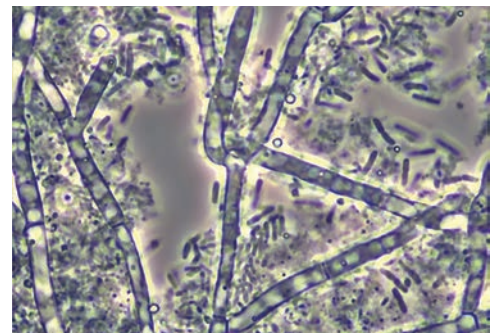


OVERHEARD ONLINE

“Toxic lead pipes carrying our drinking water, installed a century or more ago, have no place in the modern world.”

Water Prize Winners Tap Into Innovation to Replace Lead Pipes Faster

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BUG OF THE MONTH

What to Do About Fungi

In this wastewater microbiology spotlight, microbiologist Ryan Hennessy writes about how fungi enter wastewater treatment processes and what they mean for operations. Although they're common and often incidental visitors to treatment plants, fungi may rarely contribute to bulking events.

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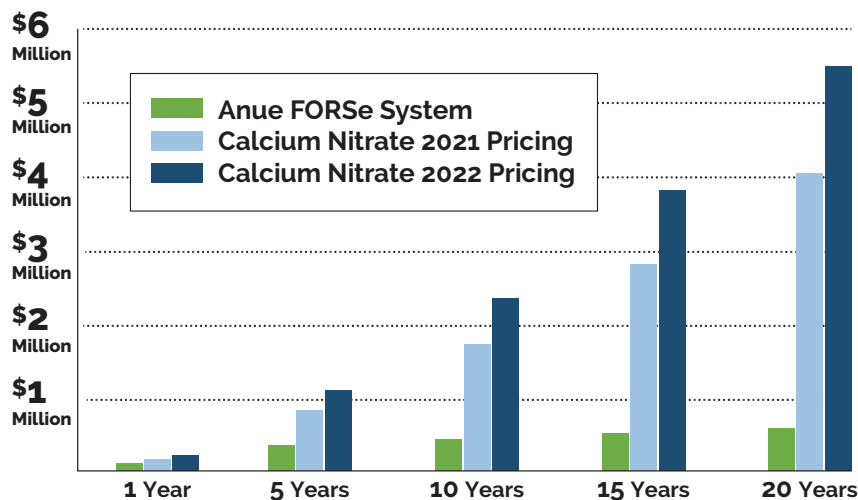
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WHEN WADE LAGLE FINDS A CAREER HE LIKES, HE STICKS WITH IT. THAT'S WHY HE'S BEEN IN THE WASTEWATER INDUSTRY SINCE HIGH SCHOOL.

STORY: **James Careless** | PHOTOGRAPHY: **Bradley Leeb**

Many high school students find their first jobs at McDonald's or Burger King. Not Wade Lagle.

"I didn't really want to work at a fast food restaurant, even though there's not a lot of options for kids when they turn 16," says Lagle. "So when my city had a summer job opening at their wastewater plant in 1984, I decided to go down there to see what it entailed and if I liked it."

He did like it, and so he spent his summer working at the Flora (Illinois) wastewater treatment plant. "I started out doing all the summer help, things like painting and cleaning buildings," he says. "But then it transitioned into training at the wastewater plant."

"I actually helped the guys operate and do maintenance, collect samples and run process control testing. I learned these things and then worked at the plant two hours a week, Monday through Friday, through my high school job co-op program."

The next summer, Lagle was back at the Flora plant: "One of the operators had back surgery and was off work for the entire summer. So I was able to work as essentially a full-time operator. That was when I actually decided that this could be a career path for me." In June 1986 he became a full-time operator.

Today Lagle is director of operations at the Urbana and Champaign (Illinois) Sanitary District. In 2020 he received the Operator of the Year award from the Illinois Association of Water Pollution Control Operators. His many recognitions include 33 consecutive years as a Safe Worker award recipient at the district. For the last 35 years, wastewater treatment has been his life's focus and his professional passion.

"Wastewater treatment is never boring," says Lagle. "It's a new challenge every day."



Wade Lagle, director of operations at the Urbana and Champaign (Illinois) Sanitary District



Layne DelValley (left) and Lagle check on the screenings compactor (Vulcan Industries).

“Wastewater treatment is never boring. It’s a new challenge every day.”

WADE LAGLE

LIFELONG LOVE OF WATER

Lagle was born and raised in Flora. His dad was a maintenance foreman, and his mother did various jobs as she took care of Wade, his two brothers and one sister.

From the earliest age, Lagle was entranced by water. Even today, “I love to go swimming and fishing. Working in the water industry was just kind of a natural thing for me to do.”

After finishing high school in Flora and his second summer at the treatment plant, Lagle enrolled at Southern Illinois University at Edwardsville’s Environmental Resources Training Center: “It was a one-year program that taught how to basically operate and maintain water and wastewater treatment plants. I then did my internship at the Urbana & Champaign Sanitary District, and they offered me a position. So that’s how I got started.”

Starting as an operator in August 1987, Lagle became a laboratory analyst in January 1989. “I worked in the lab until August 2012, when I became operations supervisor,” he says. “I was then promoted to director of operations in May 2021, when the former director, Jackie Christiansen, retired.”

A FRUITFUL CAREER

As director of operations, Lagle oversees two wastewater treatment facilities. The larger Northeast Wastewater Treatment Plant in Urbana, with near-perfect effluent compliance for the last five years, has a five-year average daily flow of 13.8 mgd. The smaller Southwest Wastewater Treatment Plant in Champaign, with perfect effluent compliance for the last five years, has a five-year average daily flow of 7.0 mgd.

“As director of operations, you have to basically oversee everything,” says Lagle. “I’m responsible for the operations department, the laboratory department, our pretreatment program and hauled waste that’s brought to our facility by our industrial clients.” He also handles project management, budget planning and a long list of other duties.

In executing his responsibilities, Lagle is backed by two supervisors, 12 full-time operators (all Illinois EPA certified), two full-time lab analysts and the district’s mechanical/electrical staff. “Justin Profancik is my operations supervisor,” says Lagle. “He went to the same technical program as I did and is very passionate about wastewater.”

Wade Lagle,
Urbana & Champaign
(Illinois) Sanitary District



POSITION:
Director of Operations

EXPERIENCE:
In the industry since 1984

DUTIES:
Operator, leader, mentor, compliance officer, teaching, engineering, finance

EDUCATION:
**Southern Illinois University at Edwardsville,
Environmental Resources Training Center,
Parkland College Mastery Leadership Series**

CERTIFICATIONS:
Class 1 Wastewater Operator, Class 3 Wastewater Analyst

GOALS:
Provide top-quality wastewater management; reduce phosphorus pollution downstream in the Gulf of Mexico



Accomplishments led by Wade Lagle include reducing electricity usage at the Northeast plant by 1,500 MWh (20%) and implementing a modified bio-P process at that location.

Bruce Rabe, laboratory supervisor, has been with the district for 10 years and has 32 years' experience in the industry. Layne DelValley has been lead operator for 15 years. He holds a Class 1 license. UCSD's other operators are Mark Muller, Tom Vlahovich, Jim Langheim, Mary DeRuntz, Tyler Huson, Trent Lyons, Matt Fraley, Charly Ilunga, Brad Izatt, Doug Bushue and Jason McDaniel.

In concert with his team, Lagle has a number of key accomplishments. They include reducing energy usage at the Northeast plant by 1,500 MWh (20%) in 2014 and implementing a modified bio-P process at that location — cutting effluent nutrient loading to the Saline Branch Drainage Ditch, which ultimately feeds the Ohio River, by nearly half over the past six years.

This last point is of particular importance to Lagle, since it is related reducing hypoxia (low oxygen) in the Gulf of Mexico, to which the district's effluent eventually flows. "We've done our part," says Lagle. "We've removed an additional 60,000 pounds a year of phosphorus in our receiving stream at our Urbana facility alone."

Lagle has also helped the district generate nearly 3,000 MWh per year with a combined Caterpillar heat and power system at the Northeast plant. In addition, he and his team have reduced that plant's chemical usage (including a 35% reduction in polymers). And they have maintained a biosolids land application program since 2013, saving more than \$100,000 annually.

CONTINUOUS IMPROVEMENTS

The district has a long and storied history, but had humble beginnings. "The first wastewater treatment process constructed in the city of Urbana was a septic tank," Lagle says. "The process was constructed in 1897 at the site of the present Northeast plant."

RELAXATION TIME

Given that he's spent almost half a century in wastewater treatment, Wade Lagle does find it hard to stop thinking about the job during off hours.

"My wife always accuses me of not leaving work at work," he says. "When I log into the UCSD computer remotely at home, she calls it my SCADA TV."

Nevertheless, Lagle does relax from time to time. "For fun, my wife and I love to travel," he says. "We love to go to wineries and breweries and travel all over the United States.

"I think we've been to 42 states. Our goal is to get to all 50. And we love St Louis Cardinals baseball. That's probably our number one passion: Baseball. We share that and try to watch as many Cardinal games as possible."

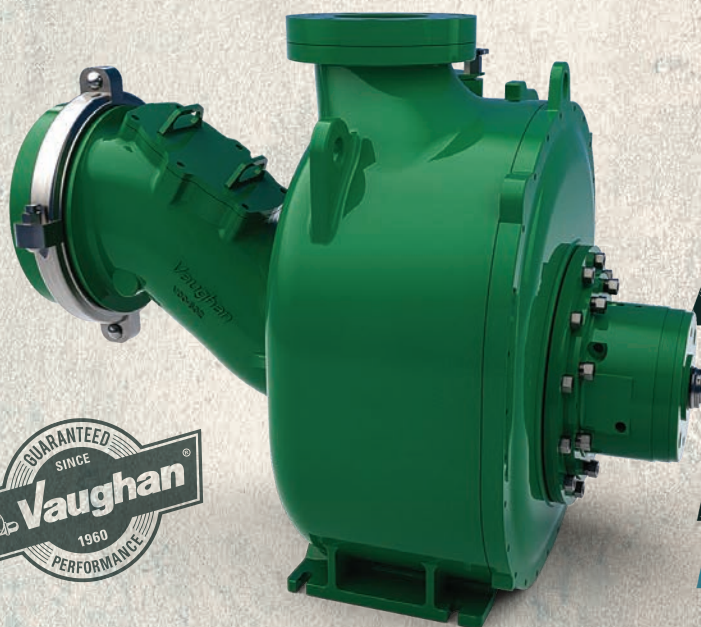
In 1922, the Urbana and Champaign Sanitary District was organized. "The first wastewater treatment plant was dedicated in 1924 and is presently known as the Northeast Wastewater Treatment Plant," he says. "The original facility consisted of coarse screening, Imhoff tanks, fixed nozzle trickling filters and sludge drying beds."

The Northeast WWTP has undergone several major plant expansions since 1924. "Today's plant consists of fine screens, grit removal, primary clarification, secondary treatment consisting of activated sludge and the same fixed nozzle trickling filter from 1924," says Lagle. The process also

(continued)



From left, Layne DelValley, Lagle and Justin Profancik survey the cloth media tertiary filters (Aqua-Aerobic Systems).



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includes secondary clarification, tertiary ammonia nitrification towers and cloth disk filtration (Aqua-Aerobic Systems), disinfection and dechlorination.

Excess flows receive primary clarification with coagulation, chlorination and dechlorination with a separate discharge to the Saline Branch Drainage Ditch.

The biosolids process consists of anaerobic digestion, dewatering with centrifuges (Alfa Laval), and methane gas utilization from combined heat and power generation (Caterpillar engines). The biosolids are land-applied.

In 1968, due to increasing population, the Southeast plant was constructed. Its original plant design used coarse screening, grit removal, activated sludge treatment, clarifiers, aerobic digesters and biosolids lagoons.

Since then, the Southwest plant has also seen several expansion projects. "Today's plant consists of fine screens, grit removal, secondary treatment with anaerobic/oxic activated sludge biological nutrient removal, clarifiers, tertiary ammonia nitrification towers and cloth disk filtration (Aqua Aerobics Systems), and UV disinfection (TrojanUV)," Lagle says.

All waste activated sludge is thickened and trucked to the Northeast plant for further treatment. Excess flows receive primary clarification with chlorination and dichlorination and are then blending with the main plant discharge to the Copper Slough, part of the Mississippi River watershed.

NOTEWORTHY CHALLENGES

During his many years with the district, Lagle has faced some noteworthy challenges.

For instance, "We did have a five-inch rainfall that took place over three or four hours," he says. "Even though we don't have a combined collection system, we still saw water flows go five times higher than what we usually see. Fortunately, we had done our best to be ready for such peak events beforehand."

In another situation, a tornado hit the area and caused a power outage. Normally that would not have been a problem because both treatment plants are fed by two separate power grids. However, it so happened that one of the grids was already offline for servicing, leaving the Southwest plant on the remaining grid when the tornado knocked it out.

"We ended up experiencing a complete power failure for six hours," Lagle says. "Getting everything up and running once the electricity came on was a real challenge."

In a similar power-related circumstance, a blown transformer forced the district to shut down the Northeast plant for eight hours. At least that event was planned, enabling Lagle and his team to plan for the downtime.

Before it occurred, they freed up storage space by pumping out the largest primary clarifier tank and using both excess-flow clarifiers, while shutting off half of the lift stations feeding the plants. "That allowed us to reduce the flow into the plant and store up to eight hours of flow without having to discharge anything," Lagle notes.



The team at the Urbana and Champaign Sanitary District includes, from left, Layne DelValley, lead operator; Bruce Rabe, laboratory supervisor; Justin Profancik, operations supervisor; and Wade Lagle, director of operations.

Beyond those events, Lagle loves to take challenges of his own making. Being a seriously competitive person, he takes part in events such as the Water Environment Federation's Operations Challenge (with the Central States Water Environment Association), and wins industry awards based on his dedication, high standards and unrelenting hard work.

"In 2017, our team won the Process Control and Laboratory events at WEFTEC, so that was pretty exciting," says Lagle. "That was the first year I had participated in the Operations Challenge, so it was a very cool experience. Given that our team members only get to meet a couple of times a year, it was awesome that we could be that successful."

"Then in 2018, I was fortunate to be selected as Operator of the Year by the Illinois Water Environment Association. Our Northeast plant was nominated for the 2021 Illinois Association of Water Pollution Control Operators Group 1 Plant of the Year."

NO PLANS TO RETIRE

With almost 40 years in the wastewater industry, Lagle has dedicated his life to this profession. So is he ready to retire? Hardly. "I never dreamed I would have the opportunity to be in the position that I'm in now," he says. "And I look forward to working in this position for another five to 10 years."

"After all, we're doing long range planning at both of our facilities right now. I don't know that I'll see that planning all the way through, but I would like to get it in motion and prepare for the next 20 to 25 years for our sanitary district. So no, I won't be quitting any time soon." **tpo**

“I look forward to working in this position for another five to 10 years.”

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1. A nanobubble generator package at a food processing facility for wastewater treatment operates at 4,000 gpm for supplemental aeration with a focus on reducing an accumulated sludge layer.
2. A service technician checks on four Moleaer 4,400 gpm nanobubble generators operating for odor control on the Dominguez Channel in Los Angeles County, California.

2



Coarse. Fine. Now Nano.

NANOBUBBLE TECHNOLOGY CAN DELIVER DIVERSE BENEFITS IN TREATMENT SYSTEMS, LIKE ENHANCING EFFICIENCY, CONTROLLING ODORS, IMPROVING EFFLUENT AND SAVING MONEY

By Ted J. Rulseh

You've heard of coarse and fine bubbles for aeration in secondary wastewater treatment. Now there are nanobubbles, promising new capabilities.

Unlike fine and coarse bubbles, which emerge from diffusers in a basin bottom and ultimately float to and escape at the surface, nanobubbles largely stay entrained in the wastewater stream and do a variety of good work.

Nanobubbles typically measure about 100 nanometers in diameter, invisible to the eye and 2,500 times smaller than a grain of table salt. For perspective, fine bubbles measure about 2 mm. Nanobubble technology can enhance the performance and productivity of wastewater treatment and industrial processes. Cost-effective and chemical-free, it has been shown to improve resource recovery while helping to improve the health of water resources.

Among providers of nanobubble technology is Moleaer, a company with some 1,500 installations in more than 30 countries. Andrea White, applications engineer leader, talked about the technology and its applications in an interview with *Treatment Plant Operator*.

tpo: What is different about nanobubbles for water and wastewater treatment?

White: When you think about nanobubbles, you can throw out everything you know about large air bubbles. Nanobubbles are in a class of their own in how they can be applied to improve things such as process performance, aeration efficiency and removal of surfactants and colloids such as FOG. They are also useful for enabling phase separation, and they have oxidative and electrochemical properties.

tpo: How do nanobubbles improve aeration efficiency?

White: Surfactants coat bubbles of all sizes. If you have bubbles trying to deliver oxygen to a biological process, and you have a high concentration of

surfactants as is typical in municipal and industrial wastewater streams, those surfactants will coat the larger bubbles and impede the transfer of oxygen to the wastewater. Nanobubbles also become coated with surfactants, but their job is not to transfer oxygen. Their job is to remove the surfactants and in doing so enable an aeration system to transfer oxygen to the process more efficiently.

tpo: How much more efficient can the oxygen transfer become?

White: We see 30% to 60% improvement in oxygen transfer when nanobubble technology is applied to processes such as membrane bioreactors or conventional activated sludge treatment. This results in payback periods on the order of two to five years. In an MBR, nanobubbles can enable operation at a much higher mixed liquor suspended solids concentrations, which means more wastewater can be treated in a smaller footprint.

tpo: So nanobubbles are used in concert with conventional fine bubble aeration?

White: Yes, and they can be used in many other settings. For example, an industrial discharger could inject nanobubbles into a dissolved air flotation system to improve separation of solids and removal of COD before discharge. Some of the bubbles then remain in the liquid discharged to the collection system, and because they have an oxidative property, they can do things such as oxidize hydrogen sulfide for odor and corrosion control.

tpo: Could the technology be applied specifically for odor control?

White: Yes. For example, in Los Angeles County, we deployed nanobubble generators to address an odor issue in the Dominguez Channel caused by hydrogen sulfide. Because nanobubbles have oxidative properties and the ability to transfer gas efficiently, we were able to devise a side stream treat-



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ment. We pulled a side stream off of the channel and returned it after injecting nanobubbles. The nanobubbles oxidized the hydrogen sulfide and other compounds that were consuming oxygen, and also transferred oxygen from the compressed air supply into the channel. The result was to raise DO and ORP to levels high enough to prohibit hydrogen sulfide formation.

tpo: Where can nanobubble technology be deployed in a typical wastewater treatment process?

White: It can be applied anywhere in the process, from the headworks down to the disinfection system. At each process step along the way, we're identifying distinct value that is created.

“When you think about nanobubbles, you can throw out everything you know about large air bubbles. Nanobubbles are in a class of their own.”

ANDREA WHITE

tpo: What are some other potential benefits of nanobubble technology?

White: A system where operators want to inhibit *E. coli* growth or enhance *E. coli* removal could use the nanobubble generator to provide that effect. It's a chemical-free means of providing additional disinfection or improving the efficacy of a disinfection system. In another instance, surfactants affect biomass kinetics. So by removing them, you not only improve the transfer of oxygen but also grow more aerobic biomass, enabling more efficient removal of BOD and ammonia.

tpo: From a mechanical perspective, how does the technology work?

White: The core technology is the nanobubble generator, which has no moving components. It can be installed with existing pumping systems. A

gas supply is also connected; essentially any gas that can be safely compressed. The generator creates the hydraulic conditions required to form the nanobubbles. Package systems are available for customers who may not have their own gas supply or pumping systems.

tpo: Can this technology be retrofitted to existing treatment systems?

White: Yes. We certainly can design around greenfield facilities, but most of our projects are retrofits, such as looking to identify the best location to install a nanobubble generator in an MBR or to improve solids separation. The further upstream the technology is installed, the more processes receive the value of nanobubble injection. We do research to identify both the impact of the nanobubbles on water quality and water chemistry, and the impact of the water quality and water chemistry on the nanobubbles. There's an optimization step in the design where we can manipulate the nanobubble generator operation to get the desired effect.

tpo: Where do the savings come from that give this technology attractive payback?

White: Most of the time the savings are associated with a reduction in aeration energy. But there are also savings available from wastewater intensification. So for example, if you're able to treat more wastewater in fewer aeration basins and therefore can take basins offline, you can decrease the usage of chemicals, such as ferric chloride. In industrial wastewater, more efficient BOD and TSS removal can reduce the sewer user fees they paid to the municipality. But typically the bulk of the savings come from reduction in energy usage. **tpo**

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Changing on the Fly

EXCELLENT TECHNOLOGY AND DESIGN MEANT SUCCESS FOR A MAJOR UPGRADE AT PEIRCE ISLAND. SO DID CLOSE COMMUNICATION INVOLVING OPERATORS, ENGINEERS AND CONSTRUCTION CONTRACTORS.

STORY: **Jim Force** | PHOTOGRAPHY: **Adam Perri**



The management team at the Peirce Island Wastewater Treatment Facility includes, from left, Peter Conroy, chief plant operator; Terry Desmarais, city engineer; and Glen Wilson, operations manager.

To call the Peirce Island Wastewater Treatment Facility a success story is an understatement. The plant, recently upgraded to advanced secondary treatment and nitrogen removal, is actually several success stories.

The \$92 million, four-year upgrade was completed on a very small footprint without upsetting the existing primary treatment facility. Public acceptance was achieved through a comprehensive education and information campaign.

Adjoining parkland, including trails, a public swimming pool and natural areas along the Piscataqua River were not compromised nor disturbed. Effluent quality has been greatly improved, helping protect the river and the sensitive Great Bay Estuary. Construction traffic was managed to limit congestion.

As a result, the Water Environment Federation presented home city Portsmouth, New Hampshire, with a 2021 Project Excellence Award.

SIGNIFICANT UPGRADE

“Peirce Island is considered the jewel of the city of Portsmouth,” says Terry Desmarais, P.E., city engineer. The city evaluated sending all wastewater to its smaller Pease Wastewater Treatment Facility site, but that would have meant rerouting the entire collection system; it wasn’t feasible for technical and regulatory reasons.

Instead, Portsmouth built the new facility on the 3.7-acre site of the old plant, installing a space-saving BIOSTYR biological aerated filter (BAF) process from Veolia. The project also included new headworks,



“Peirce Island is considered the jewel of the city of Portsmouth.”

TERRY DESMARAIS, P.E.

Operator Eric Gulbicki visually checks quality of biosolids in the dewatering screw press (HUBER Technology).

solids and electrical buildings, a gravity thickener and a standby electrical generator. Odor-control facilities were added, and the old biosolids processing building was converted to a laboratory and operations center.

The new facility has a design flow of 6.13 mgd and a peak of 22 mgd. It removes TSS and BOD by more than 80% over the old facility. Total nitrogen is reduced by more than 84%.

Desmarais, along with Glen Wilson, operations manager, and Peter Conroy, chief plant operator, agree that communication among all parties, especially the operations team, was the key to success.

STEPPING UP TO SECONDARY

While construction of the new plant took more than four years, the project’s origins go back to 2009, when the city entered a consent decree with the U.S. EPA to improve treatment. “We were one of the last plants in the country with a waiver of secondary treatment,” says Desmarais. Peirce Island had operated for more than two decades as a 4.8 mgd chemically enhanced primary treatment plant.

After comprehensive planning and public discussion, Portsmouth embarked on three technology pilots and selected the BAF system because it could achieve nitrification-denitrification in a small space. A second test of the BAF in 2014 confirmed its viability.

The system consists of upflow filters with biomass affixed to small polystyrene beads about the size of a BB. When the inlet valves are closed, the filters backwash using effluent water and the excess biomass is flushed into mudwells stacked below the filtration tanks.

Unlike the conventional three-stage nitrogen treatment common to other plants, Portsmouth uses a space-saving two-stage system. Carbon removal

Peirce Island Wastewater Treatment Facility, Portsmouth, New Hampshire

www.cityofportsmouth.com/publicworks/wastewater

BUILT:
1962; upgraded 1985, 2002,
2016-20

SERVICE AREA:
City of Portsmouth

FLOWS:
6.13 mgd design, 4.0 mgd average

TREATMENT LEVEL:
Secondary

TREATMENT PROCESS:
Biological aerated filters

RECEIVING WATER:
Piscataqua River

BIOSOLIDS:
Cake to landfill

AWARDS:
2021 WEF Project Excellence
Award, 2021 Associated
Builders and Contractors of
New Hampshire and Vermont
Project Excellence Award and
Chairman’s Award

ANNUAL BUDGET:
\$9.5 million (operations)

and nitrification take place in the first stage, while denitrification occurs in the second.

Ahead of the BAF system, wastewater is pumped to the headworks, which includes influent screens (HUBER Technology) and aerated grit chambers. The flow then passes through primary clarifiers and into a primary effluent distribution box. From there the wastewater passes through the first- and second-stage BAF tanks. Backwash water is returned to the primary clarifiers, which co-settle the excess biomass with the incoming wastewater.

Sodium hypochlorite is added ahead of the chlorine contact chambers for disinfection, followed by sodium bisulfite for dechlorination before discharge to the Piscataqua River.

To control odors, which had caused summer complaints in the past, the primary clarifier launders and aerated grit chamber are covered; exhaust air is directed to a carbon adsorption system (Calgon Carbon). A second Calgon Carbon adsorption system controls odors from solids processing.

An iFix Wonderware system monitors and controls plant operations. Maintenance is managed through JobCal (Hach) and Fiix (Rockwell Automation) work order development systems.

Co-settled filter backwash solids and influent solids are pumped from the primary clarifiers to a gravity thickener and then to storage tanks. Polymer is added before dewatering in screw presses (HUBER Technology). Trucks haul cake to landfill. Water started flowing through the new plant in January 2020, and the plant began meeting its effluent permit limits by April.



An iFIX SCADA system (GE Digital), being operated here by operator Kevin Daley, helps the plant team keep tabs on equipment and the process.

Peirce Island Wastewater Treatment Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	140 mg/L	9.1 mg/L	30 mg/L
TSS	175 mg/L	9.6 mg/L	30 mg/L
Total N*	N/A	4.0 mg/L	8 mg/L

* May-October

ENERGY AND ENVIRONMENT

In keeping with its efficient and space-saving design, the upgraded Peirce Island facility incorporates sustainability features that save energy and protect the environment. Over 18,000 cubic yards of rock had to be excavated for construction, but the waste rock was ground and used for backfill on site. That saved on disposal costs and reduced truck traffic.

High-efficiency blowers power the BAF system. Because there wasn't room for separate blowers at each cell, four blowers feed a single header that distributes air to all the cells.

Stormwater drainage from the site flows to a rain garden. Excess storm flow passes through catch basins to trap debris and floatables so they won't be discharged to the river. Solar panels provide water heating and warm up external air for building heating. In-plant heating and lighting systems are all high-efficiency.

Effluent is recycled for in-plant uses. Natural stone was used for revetments around the plant property; concrete would have been unsightly and less effective. The stone matches the outcroppings on the island and provides stability for the sloped shorelines around the plant.

ON THE FLY

Building a new plant on the site of an operating system is nothing new in wastewater treatment, but each overlay presents unique challenges and requires ingenuity and flexibility. According to Conroy, the keyword at Peirce Island was "temporary."

For example, the new gravity sludge thickener structure was used as the primary sludge pumping station — temporarily. A temporary electrical system was rigged overhead to keep the old treatment system linked together as the old underground electrical duct banks were demolished.

All of this occurred while maintaining treatment to meet the interim effluent permit limits stipulated in the consent decree. This required significant planning for construction phasing because the facility receives significant wet-weather flows.

Perhaps the most significant adjustment was temporary relocation of all the operators, laboratory, engineering and management staff to a cluster of trailers near the construction site. "It was not easy," says Desmarais, "Because the displacement of personnel from their normal workplaces lasted for more than three years. I am extremely proud of the staff and their patience with the inconvenience, especially during the COVID pandemic."

LET'S TALK

With so many teams working in a small space at the same time, it was critical for communications to remain clear and open to everybody. "Maintaining communications, especially during wet weather events, presented challenges," says Desmarais. "Our operators were up to the challenge and did an amazing job. It was what made this project successful."

Conroy adds, "Staff morale was an obvious concern. We had to make the extra effort to keep our team together as best we could. Besides Conroy and Wilson, the Peirce Island staff includes Jake Rogers, assistant chief plant operator; and operators Kevin Daley, Kathy Sanborn and Eric Gulbicki. One operator position was open as of December 2021.

The staff is onsite for one daily eight-hour shift a day, Monday through Friday; one person is on-call for the remaining hours. Conroy says it was critical for the engineering team of AECOM and the contracting crew of Methuen Construction to work with the operations team so that operators knew what to expect: "It was important that we not wear out our staff with unanticipated changes or interruptions."

Face-to-face meetings were the most effective means of communication, Desmarais believes: "We met every morning. We talked about what was going on that day. It was always a challenge to make sure there wasn't a loss of communication."

There were hundreds of meetings, and they involved all parties involved in the project, even down to the contract haulers. "The group worked as a solid team with the engineers on site, working closely with the contractor and all communicating with the city's operators," Desmarais says. "We were lucky to have the team we did for this project."

Training on the new processes was just as important. "We did a lot of training; it was a whole new process for us," says Conroy. "We did it one building at a time, starting with headworks." COVID had an impact because of travel restrictions, and manufacturers often had to offer training remotely via Facetime, Zoom calls or email checklists.

That puts more burden on the staff because it's easier to do troubleshooting when manufacturers' representatives are onsite, says Conroy. "A lot of the time they'd have to ask us what we were seeing. But they did readjust and support us well." The plant had only minor deviations from its permit, usually related to construction, or when a process unit was taken out of service and replaced with a new system.

(continued)

“We did a lot of training; it was a whole new process for us. We did it one building at a time, starting with headworks.”
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During the plant upgrade, an old biosolids processing building was converted to an operations center and a laboratory, where operator Kathy Sanborn is shown pipetting samples for nitrite, nitrate and ammonia using TNT vials (Hach).

A HAPPY ENDING

The Peirce Island upgrade was the biggest capital project the city of has even undertaken. Did it deliver a bang for their buck? A look at the effluent numbers and the quality of the water in the Great Bay Estuary clearly says the answer is yes.

BOD and TSS average less than 10 mg/L, and total nitrogen, restricted to no more than 8 mg/L in the consent decree, averages 3-4 mg/L. Desmarais observes, “We went with a conservative design because, even though we had no specific nitrogen limit for the new plant at the time of design, we knew what may be coming.”

The water quality on the New Hampshire coast and throughout New England is critical for several reasons, Desmarais notes. The estuary is listed as “significant” by the EPA and is part of the National Estuary Program.

“Fishing, lobstering, boating, diving, all are dependent on clean water in the estuary. Just off the point where our plant is located are reefs containing rare red-gilled nudibranchs (sea slugs), and divers go down to get a look at them when they open up and change color in the winter months.”

Operations manager Wilson may best summarize the success: “When you compare what was going out to the river before, when the facility was a chemically enhanced primary plant, and what’s going out now, the difference is dramatic. It’s a great benefit to the environment.” **tpo**



Kevin Daley uses a Sludge Judge (Nasco) to measure sludge depth in a primary clarifier.

A PUBLIC ASSET

Portsmouth made sure members of the public knew about the need for the Peirce Island Wastewater Treatment Facility upgrade and knew their concerns were being addressed.

Peirce Island contains several public features: a state fishing pier, a playground for children, a public swimming pool, a boat launch, a volleyball court, several wooded trails and an off-leash dog exercise area.

None of these features were destroyed or changed during plant construction, although some of the area had to be temporarily closed for contractor staging. Project planners addressed one of the biggest public concerns when they made special arrangements for truck traffic through the city onto the island.

A specific route was mandated in both the downtown area and the surrounding historical residential areas near the treatment plant. Violators paid fines. Travel was overseen by the contractor, and oversized tractor-trailer deliveries were scheduled during early morning hours to avoid traffic interference.

An extensive public education plan was implemented. Terry Desmarais, city engineer, says more than 40 public meetings were held before construction; public construction update meetings were held monthly and videotaped for the local public TV station. Drone flyovers of the construction progress were available for public viewing.

But one of the most significant efforts was protection public safety. Instead of using flammable methanol as the carbon source for the biological air filtration process, Portsmouth planners chose Micro-C 2000, a glycerin-based carbon source from EOSi. The decision obviated the need for a separate storage building at the plant site and avoided the hauling of methanol through the city.

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AN OPERATIONS TEAM SENDS A SWARM OF BLUEGILLS TO GOBBLE UP A NUISANCE OVERPOPULATION OF *DAPHNIA* AT A WASHINGTON CLEAN-WATER PLANT

By Steve Lund

For weeks the staff at the Clarkston Wastewater Treatment Plant battled an aggravating overpopulation of *Daphnia* in the secondary clarifiers.

The tiny crustaceans, often called water fleas, were reproducing in such numbers that they were clogging the screens. A team member suggested putting fish into the clarifiers to eat the *Daphnia* — and it worked. The *Daphnia* disappeared. Then, surprisingly, so did the fish.

Daphnia are an indicator of good water quality, so their presence in the clarifiers wasn't a sign of a treatment issue. But in large numbers, they can cause problems, and that's what was happening in 2018 in Clarkston, in the southeast corner of Washington, when the water in the clarifiers took on a reddish color.

WHAT'S THAT SHEEN?

"One operator came in all panicked," recalls Kevin Poole, Clarkston's public works director. "He thought somebody dumped some kind of fluid in there. Another operator told him, 'Fluid doesn't move out of the way when you put your hand next to the water. You've got *Daphnia*.'"

The *Daphnia* were so thick in the water it looked as if automatic transmission fluid had been dumped into the clarifiers. "When the sunlight shines through the *Daphnia*, you kind of get a red sheen," Poole says.

"We probably would have tried to put up with it and see if the bloom would eventually take care of itself, but we were eating up so much manpower cleaning the screens to our utility water that we decided we needed to take some form of action."

Clarkston (populations 8,000) is on the border of Washington and Idaho at the confluence of the Snake and Clearwater rivers. The treatment plant has a design capacity of 1.2 mgd and an average flow of about 1 mgd. The two clarifiers affected by the *Daphnia* were each 60 feet in diameter and 16 feet deep.

ENTER THE BLUEGILLS

Adding fish to the clarifiers turned out to be relatively simple from a regulatory standpoint, compared to chemically treating the clarifier with chlorine or some other chemical.

"When we talked to Department of Ecology, they said we'd have to note any chemical we added to the clarifier," says Poole. "We'd have to note an exception in our operating procedure. When we asked them about fish, they said we just need to note it in the operating log. We were already testing for suspended solids, and that was the only thing they would be curious about, if the TSS went up or down." The fish had no impact on TSS.

The state Department of Natural Resources required any fish added to the clarifiers to be native to the Snake River, the plant's receiving stream.



The bluegills, each about the size of a quarter, were transported in a plastic bag of water inside a cooler.

“I think at the time we just had the right conditions for an over-aggressive bloom. And it persisted until we put in the bluegills.”

KEVIN POOLE

The fish also had to come from a supplier certified to stock fish in the state's waters. The DNR provided a list of suppliers.

The Clarkston staff chose bluegills, which are native to the Snake River. They purchased about 1,400, each about the size of a quarter.

The fish had an immediate impact on the *Daphnia* population. "Within a couple days the problem went away," Poole says. The staff expected the fish continue thriving in the clarifiers after they took care of the *Daphnia*, but that's not what happened.

"There are probably still *Daphnia* in there and probably residual things along the edges of the clarifiers," Poole says. "We thought there would be plenty of food for the fish." But when the clarifiers were drained for routine maintenance several months later, staff members were surprised to find no fish. They knew some had escaped over the weir, but expected to have to dip net bluegills out of the tank.

MASS ESCAPE

"We drained those clarifiers down to where we could get a person in there, and we looked around just because we wanted to see if we could find any

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Operator Lonnie Cannon dumps bluegills into one of the final clarifiers at the Clarkston treatment plant.

bluegills," Poole says. "We didn't see any. We did see a couple of them in the trench after the UV light, and that was a couple months after we put them in."

Apparently, all the fish had gone over the weir and washed out to the river. Poole thinks it's unlikely any of them survived going through the UV channel. "The people we picked the bluegill up from told us that they naturally swim toward the sound of flowing water," Poole says. "They said they were pretty good at finding escape routes."

Clarkston hasn't had a problem with *Daphnia* since the bluegills cleared them out: "We still have a few, but not as aggressive a bloom. I think at the time we just had the right conditions for an over-aggressive bloom. And it persisted until we put in the bluegills."

If the plant were to have another *Daphnia* bloom, Poole wouldn't hesitate to use the same technique again. And why not? The fish worked quickly, they didn't cause any regulatory issues, and they managed to clean up after themselves. From a sustainability point of view, it was practically perfect. **tpo**



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Septage Objectionable? Not for This Facility.

A CONNECTICUT CLEAN-WATER PLANT TURNS SEPTAGE INTO A REVENUE-GENERATING ASSET WITH A LINEUP OF ROBUST EQUIPMENT AND AN AUTOMATED MANAGEMENT TECHNOLOGY

By Chris French

Two things are certain about septage. It is highly variable. And by its very nature — containing assorted debris, releasing odors and carrying pathogens — it is objectionable.

Or is it? According to the U.S. EPA, more than 20% of homes in the United States use septic systems. Some 6,500 businesses install and maintain those systems, employing more than 30,000 people in an industry worth \$5 billion. Is that objectionable?

The word “debris” generally means small pieces of trash or loose natural material. But for one treatment plant in Connecticut, debris included a large fencepost doing its best to wreck and block the screen and components of its septage acceptance station.

Raising more than an eyebrow at the fencepost were members of the team at the Montville (Connecticut) Water Pollution Control Wastewater Treatment Facility, whose key responsibility is to protect the Thames River.

“I can’t say that we had seen a fencepost here before,” says Scott Farrington, plant operator. “But in the large volume of septage we receive, about 150,000 gallons per week, we see plenty of interesting objects, and on top of everything else we take in, our treatment equipment is constantly put to the test.”

The Montville team has turned septage into an asset with a combination of durable septage receiving equipment, a fine screen and an automated data management and accounting system.

FOR THE LONG TERM

In addition to the typical challenges facing clean-water facilities, including supposedly flushable wet wipes, Montville’s 2 mgd capacity includes industrial-strength wastewater from a major packaging factory by way of a dedicated 2.4-mile pipeline.

Fred Croy of Maher, a wastewater equipment supplier based in Rockland, Massachusetts, is quite familiar with the challenges presented by septage. “To be frank, much as we’ll always be there for our customers, we don’t want to be called back to problems every week. So selling, reliable long-lasting equipment for such a tough application as septage is a must.

“We are very conscious that the septage going into the Montville facility has contained no shortage of crushed granite. That shouldn’t get sucked up by the hoses when haulers make their collections, but inevitably it happens — all the more reason for us to recommend equipment that is seriously rugged.”

About 18 years ago, Montville (population 20,000) purchased a Septage Acceptance Plant from Maher. The device, manufactured by Lakeside, is designed to remove debris and inorganic solids from septage as well as from grease trap waste, sludge, landfill leachate and industrial waste.



Operator Scott Farrington with the Septage Acceptance Plant at the Montville clean-water facility.



The fine screen’s angled installation and screen bars of varied heights maximize removal efficiency and minimize headloss. It also effectively removes debris such as rags and plastics.

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Revolving Around You™

In a skilled, delicate balancing act, Montville generates revenue from highly variable septage. The plant team, led by Derek Albertson, superintendent, has mastered the art of keeping the treatment process stable, consistently meeting permit requirements for TSS and BOD₅ while effectively removing phosphorus.

Up to 75% of the effluent is recycled for use in a nearby paperboard manufacturer. The rest is discharged to Horton Cove on the Thames River.

To meet the additional challenge of record-keeping and billing of septage haulers, Montville 10 years ago added a Raptor Acceptance Control System, also from Lakeside. Integrated with the SAP, this security access station includes a data management and accounting system that provides administrative capabilities to track and invoice customers.

SIMPLE OPERATION

Albertson observes, “We offer very reasonable rates for septage haulers, so we have taken many more on board in recent years. That is fine, so long as we manage the process professionally.

“We have a constant flow of trucks, but some haulers think they can bring almost anything in. That is where the RACS is so effective. It requires a learning curve and skill set for the operators, but it is incredibly robust; it doesn’t need very much maintenance at all. The drivers sign in with a code that provides traceability and frees us up. It gives haulers the flexibility to call when they need to, without any unnecessary waiting.”

The upgrade a decade ago also included a Raptor fine screen (Lakeside) in the influent channel with a cylindrical screenings basket similar to the SAP. It has angled installation and screen bars of varied heights to optimize removal efficiency and minimize headloss.

The screen’s rotating rake teeth fully penetrate the cylindrical screen bars to prevent plugging and blinding from grease and small debris, allow-

“We offer very reasonable rates for septage haulers, so we have taken many more on board in recent years. That is fine, so long as we manage the process professionally.”

DEREK ALBERTSON

ing fast unloading times to help generate more revenue. Captured screenings are dewatered, washed free of most organic materials and compacted to about 40% solids. Volume is reduced by 50% and weight by 67%, reducing the cost of disposal.

LINE OF DEFENSE

“The Lakeside screen with quarter-inch apertures has been extremely effective in removing rags and plastics from our process,” notes Albertson.

“We never know quite what we’re going to get with septage. Over the years, the Lakeside equipment has really taken some hits. People have tried their best to kill it, including with that recent fencepost.

“But despite being our first line of defense at the intake, the SAP and the Raptor screen have been very dependable, with just routine maintenance. To say the unit is robust is a big understatement. The equipment also doesn’t take up too much space and is very easy to get at and work on. The SAP and screen certainly shields our secondary equipment.

“The consistency in configuration effectively has given us one technology for two applications. What we have now is so much better for the facility, with an automatic screen compared to the old bar rack that had to be cleaned manually.”

So clearly, septage at the Montville facility is nothing like objectionable.

tpo

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Flip-Flop Flow

AN INNOVATIVE BIOLOGICAL NUTRIENT REMOVAL PROCESS HELPS AN ILLINOIS VILLAGE COMPLETE A SUCCESSFUL PLANT EXPANSION, IMPROVE TREATMENT QUALITY AND END A CONSENT DECREE

STORY: **Suzan Chin-Taylor** | PHOTOGRAPHY: **Rob Hart**

Operator Todd Tatum (left) and contract operator Dale Youngers at the Hinckley Wastewater Treatment Plant.



The Village of Hinckley needed to upgrade its rotating biological contactor plant to activated sludge to meet a consent decree.

Looking to minimize impact on ratepayers, the village's engineers and its operations and maintenance contractor found a solution through a small-footprint aeration technology that would save the expense of a large capital upgrade, while being easy to operate and maintain.

They chose the Aero-Mod SEQUOX activated sludge process, which provides biological nutrient removal in a configuration that can be easily expanded to accommodate growth. The system's successful performance has been partly responsible for the facility's recognition as 2020 Class C 2020 Plant of the Year by the Illinois Association of Water Pollution Control Operators.

NEED FOR GROWTH

Hinckley, a community of about 2,100, was the site of the very first road game for the Harlem Globetrotters basketball team in the 1930s. The wastewater treatment plant was built in 1974. At the time the village determined

that outsourcing operations and maintenance for the plant and sewage lift stations made economic sense. The plant is operated by Total Environmental Service Technologies.

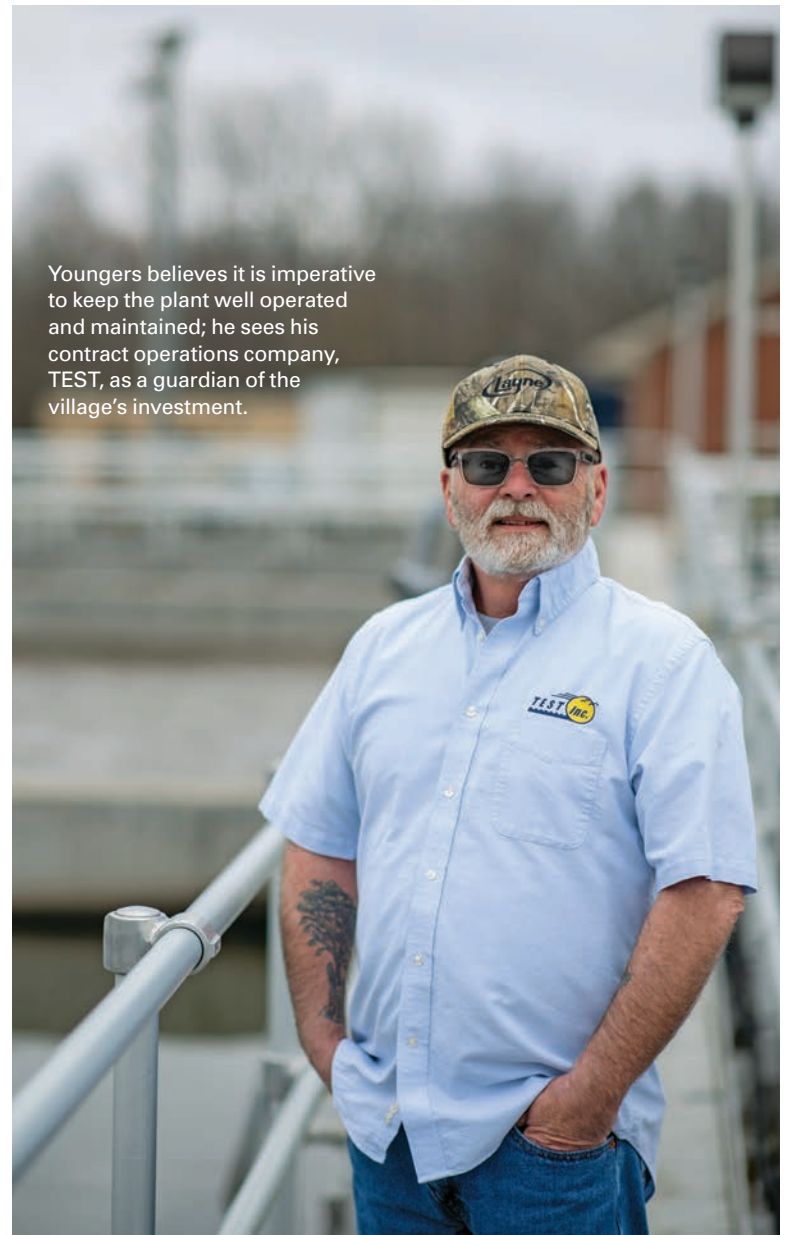
As the years went by, the plant became hydraulically and organically overloaded, and TEST recommended modifying it to an activated sludge process to meet concerns about capacity and compliance. The consent decree sped up the timeline for change, and in 2014 an expansion was completed.

Instead of building a new plant, TEST and the village's engineers looked to source components that could be integrated with existing structures, and to reuse or repurpose still-serviceable buildings. The engineering team investigated solutions, considering BOD loading and future regulatory requirements, including phosphate and nitrogen removal.

In visiting other treatment plants and interviewing operators, they encountered the Aero-Mod process in a neighboring community. "We learned from operators that the Aero-Mod system is very easy to operate, takes a relatively small footprint, and is easily expandable," says Dale Youngers, contract operator with TEST and operations manager for water and wastewater systems in Hinckley.

"If the town were to grow, it is designed to accept additional treatment modules. The number of moving parts underwater is very limited, including only submersible mixers in a selector zone."

Youngers believes it is imperative to keep the plant well operated and maintained; he sees his contract operations company, TEST, as a guardian of the village's investment.



“If the town were to grow, it is designed to accept additional treatment modules.”

DALE YOUNGERS

TREATMENT IN ACTION

With the integration of the Aero-Mod process and a Hach dissolved oxygen control system, the plant capacity increased from 0.2 mgd to 0.5 mgd (average flow is 0.25 mgd).

Inflow comes through an automatic bar screen (Hydro-Dyne) and enters a wet well where pumps (Smith & Loveless) transfer it to the biological nutrient removal system. In that process, the water first goes through a bio-P fermentation zone in a tank that provides anoxic conditions to promote the growth bacteria that take up phosphate. From there it flows to a bio-P selector with submersible mixers (Wilco USA).

The flow then splits into two treatment trains where it undergoes two sequential stages of aeration. "If you were to look at this standing on top of



Hinckley (Illinois) Wastewater Treatment Plant

www.hinckleyil.com

BUILT:
1974, upgraded 2014

POPULATION SERVED:
2,100

FLOWS:
0.5 mgd design, 0.250 mgd average

TREATMENT LEVEL:
Secondary

TREATMENT PROCESS:
Activated sludge (Aero-Mod SEQUOX Process)

RECEIVING WATER:
Little Rock Creek

BIOSOLIDS:
Land-applied



the tankage, you have one first stage and one second stage aerating at the same time in a diagonal configuration. Then the process splits every two hours so what was aerating is no longer.

“The purpose of this is the destruction of nitrogen. Under aeration you’re converting the ammonia to nitrate. When it goes into the unaerated tank, the nitrate is converted to nitrogen gas and simply off gases into the atmosphere. It’s so simple it’s brilliant.”



Dale Youngers, shown with the Smith & Loveless pump that transfers inflow to the biological nutrient removal system, believes in close communication with village trustees.



Youngers is shown at the electrical control panel for the plant’s two submersible mixers (Wilo USA).

Hinckley Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	158 mg/L	2 mg/L	10 mg/L
TSS	251 mg/L	6 mg/L	12 mg/L
Ammonia	Not tested	0.9 mg/L	1.1 mg/L spring/summer 1.6 mg/L fall/winter
Total N		<3.0 mg/L	
Total P		<0.50 mg/L	

The flow then enters a small tank to be commingled for third-stage aeration. From there it splits again into separate trains and into the final clarifiers. The clarified effluent flows by gravity through UV disinfection (Glasco) before discharge to Little Rock Creek.

REGIONAL CHALLENGES

Hinckley, about 60 miles west of Chicago, has harsh winters; operators are challenged when plant water temperatures drop to 50 degrees F, slowing biological activity. Youngers compensates by raising mixed liquor suspended solids concentrations and adjusting the wasting schedule.

During summer the wasting rate is relatively high; it decreases starting in fall. In extreme cold winter, Youngers may even skip a day of wasting at times. Wasting is performed out of first-stage aeration, into the Aero-Mod digesters, and the amount is controlled depending on the time of year.

Since the existing plant had two usable digesters, part of the upgrade included retrofitting these with aeration diffusers Aero-Mod supplies.

When the solids start to fill up the Aero-Mod digesters, operators run the Aero-Mod belt filter press to dewater the solids from the old, retrofitted

(continued)



Team members like full-time operator Todd Tatum support sound operations by thinking outside the box and solving problems in-house.



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we see opportunity. It's all in how you look at it.

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Dale Youngers (left) and Todd Tatum with the 2020 Class C Plant of the Year award trophy.

digesters. These dewatered solids are then land-applied two times each year. Solids from the Aero-Mod digesters are then transferred to the older retrofitted digesters to fill them back up. This cycle takes about one week; the belt press runs one day each week.

“That’s a little unique for us, as most plants only have one set of digesters being added to every day,” says Youngers. “So, you may not get digestion as complete as if you could just let the digester sit and let the microbes do the work uninterrupted with no more food introduced for a week at a time.

We have found this transfer to be very advantageous.”

The Aero-Mod system offers flexibility with automated controls that allow operators to adjust for variable conditions. For example, inflow and infiltration during heavy rains can double plant flows within hours, creating a potential for washout of the mixed liquor.

To protect the mixed liquor in that scenario, all of the return activated sludge is pumped out of the final clarifiers into the aeration tanks to preserve the solids. Operators can then manually manipulate which of

the aeration tanks are online and dial blower output down.

All of these adjustments are initiated and managed through the system’s computerized control system and software with just a few mouse clicks. “This is just one example of the flexibility of the system,” Youngers says. “Operators have the ability to adjust the system to manage multiple situations.”

COMMUNITY IMPACT

The plant expansion did not come without cost, and it followed a water treatment plant upgrade to deal with radium in the groundwater source. To limit the impact on ratepayers, the city increased the rates in four stages.

The upside to the expansion is that increased flows and sewer backups are no longer an issue. In addition, the end of the consent decree enabled the village to end a moratorium on new sewer connections and remove what had been a lid on development. As a result, new subdivisions are being built and businesses are looking at Hinckley as a place to set up shop.

WHEN OUTSOURCING MAKES SENSE

When Village of Hinckley leaders decided to contract for water and wastewater operations, they chose Total Environmental Service Technologies (TEST) for the company’s client-centered philosophy.

TEST, based in Peru, Illinois, offered experienced operators, a positive culture that retains quality talent, a specialty in serving smaller communities and a state-certified laboratory. The choice has garnered awards and recognition for the wastewater treatment plant.

“I believe there are more incentives for contract operators to go above and beyond the call,” says Dale Youngers, TEST contract operator and operations manager for Hinckley’s water and wastewater systems. “The reality is that if you’re not doing the job, you’re not going to get a contract renewed.”

Youngers is surrounded by like-minded people, such as full-time operator Todd Tatum, part-time operator John Veliz, and the Hinckley board of trustees. All are willing to think outside the box and solve problems in-house, saving money for the village.

The TEST philosophy is to take the word “no” out of the vocabulary; if the client needs something done that is not in the contract, the answer will be “yes.”

TEST is treated as a trusted advisor and partner and not just a vendor. As a result, the company and village staffs have created an environment of collaboration to meet the community’s toughest challenges.

Youngers notes that communications with village trustees and sound plant operation decisions were factors in winning the Plant of the Year award. “We’re also concerned about how things look,” he says. “When you work 40-plus hours a week at a plant, you spend many more waking hours there than at home. So, we keep a really nice-looking plant.”

Before the COVID pandemic, Hinckley often conducted plant tours for visiting operators, who often asked if the team actually ran the biosolids filter press because the room was so clean. “We are the guardians of the village’s investment, and it’s our job to keep it clean, well-operated and well-maintained,” says Youngers. “We’ve been recognized with awards for these efforts, and it’s nice to get that recognition.”

Youngers also credits some the successes to TEST’s relationship with the village: “They respect our advice. Sometimes there are things they can’t agree to because of cost, but overall, they have open arms to take our suggestions and help improve operations. We owe a debt of gratitude to the part they play in our peer recognition.” tpo

“When you work 40-plus hours a week at a plant, you spend many more waking hours there than at home. So, we keep a really nice-looking plant.”

DALE YOUNGERS

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Removing Nutrients at Lower Cost

THE WATER RESEARCH FOUNDATION AND UTILITY PARTNERS ARE COLLABORATING TO FUND A STUDY OF EFFECTIVE, ENERGY-EFFICIENT BIOLOGICAL NUTRIENT REMOVAL METHODS

By Ted J. Rulseh

Removal of nutrients is a growing challenge for clean-water plants, especially where effluent phosphorus limits are strict.

Plants today are looking toward biological nutrient removal as a cost-effective and sustainable alternative to chemical addition and filtration.

Now The Water Research Foundation has launched a \$1 million research project to develop guidelines for designing, implementing and operating low-energy BNR processes at water resource recovery facilities. The aim is to help utilities reduce the environmental footprint and costs of treatment. The work is funded by WRF with \$800,000 in-kind contributions from several utility partners.

For clean-water facilities, nutrient management is key to addressing water quality issues in watersheds challenged with rapid urbanization and growing populations. While conventional BNR technologies are effective, they are costly and energy-intensive.

Led by a principal research team of Dr. Jose Jimenez of Brown and Caldwell, Dr. Belinda Sturm of University of Kansas, and Dr. Leon Downing of Black & Veatch, the project aims to advance low-dissolved-oxygen BNR to intensify treatment processes and significantly reduce energy demands and use of chemicals.

The research will use bench-scale, pilot-scale and full-scale testing at several plants throughout the U.S. to cover multiple influent and operational conditions, with the goal to develop a basic understanding of low-DO BNR. Stephanie Fevig, WRF research manager, talked about the project in an interview with *Treatment Plant Operator*.

tpo: How would you describe the trend in effluent permit limits for nutrients?

Fevig: It differs all around the country. Some utilities still don't have nutrient limits. Some are just starting to see them on the horizon. In Colorado where I live, we're looking at limits of 15 mg/L total inorganic nitrogen and 1 mg/L for total phosphorus. But around the corner are even stricter limits, down to less than 2 mg/L total nitrogen and 0.1 mg/L total phosphorus.

tpo: Is there any support available to help utilities meet those very low limits?

Fevig: In Colorado, for example, the Colorado Department of Public Health and Environment is incentivizing utilities to start making operational changes now to reduce their effluent nutrient discharges. In return they will gain more time to comply with those more stringent limits in the future. While that is unique to Colorado, I believe other state regulators also see that as an opportunity to nudge facilities to try some new operations to prepare for what is to come.

tpo: What is driving the trend toward BNR, and low-DO BNR in particular?

Fevig: When we say BNR we're talking about removal of both nitrogen and phosphorus. We know those nutrients have a role in the formation of harmful algal blooms and cyanotoxins. Depending on the specific waterway or watershed, there might be a discharge permit limit that water resource recovery facilities have to meet. Those facilities are considered point sources, and so they are regulated, while nonpoint sources might not be. This research is important because a lot of the cost burden is on the utilities to meet those low nutrient limits.



Stephanie Fevig

tpo: What makes conventional BNR costly?

Fevig: The microorganisms using air to break down organic matter and remove nitrogen need big tanks to allow them to grow and thrive. That's a significant capital investment. And then the electrical energy to run the blowers that provide oxygen for the microorganisms is a significant line item for operations. Utilities have infrastructure in place to meet certain permit limits, and now they're asked to do more. So they're looking to get more out of what they have. They're interested in learning more about low-DO technologies and how to implement them, so they can save on energy and potentially reduce the amount of carbon or chemicals they need.

tpo: Where has low-DO BNR been done successfully so far?

Fevig: A great example is St. Petersburg, Florida, which has been testing and operating a low-DO BNR process at full scale for a few years. Two

“When we say BNR we're talking about both nitrogen and phosphorus. We know those nutrients have a role in the formation of harmful algal blooms and cyanotoxins.”

STEPHANIE FEVIG

others are Pueblo, Colorado, and the Trinity River Authority in Texas. As part of our research project, we'll be gathering data from these facilities to help understand the operational adjustments that are making those processes successful.

tpo: In essence, how does low-DO BNR operate?

Fevig: Low DO typically refers to levels less than 1 mg/L, although some folks are saying 0.5 mg/L, and success has been demonstrated even as low as 0.2 mg/L. Lowering DO is potentially an easy change for utilities that have the capability to turn down their blowers. The second piece is understanding carbon management. Carbon is important because the organisms

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“The research team will provide a Blueprint Guidance Document that synthesizes all the findings.”

STEPHANIE FEVIG

that do denitrification want carbon, as so do those that do phosphorus removal. So there's a need to make sure enough carbon, and the right kind of carbon, is provided to supply both categories of microorganisms.

tpo: Are there any pitfalls to attempting low-DO BNR?

Fevig: One concern is the formation of filamentous organisms that cause bulking and result in poor sludge settling. Some utilities that have tried this have found that their clarifiers blow out and effluent TSS goes up. One way our project is addressing that is to understand the role of carbon. We know that carbon can be used up by organisms that do phosphorus removal in an anaerobic zone, but if too much carbon comes out of that zone into a low-DO zone, that can cause the filaments to thrive. So can we select for organisms that can better take up and utilize that carbon for BNR? What are those mechanisms?

tpo: What is the role of the pilot scale component of this research?

Fevig: Three utilities are operating pilot plants: the city of Lawrence, Kansas, the Madison (Wisconsin) Metropolitan Sewerage District and the Hampton Roads (Virginia) Sanitation District. Pilot scale testing offers more flexibility with operational changes; obviously you don't want to make major changes in a full-scale plant. Pilot operations will allow more detailed analysis. There are also demonstration facilities in Rochester, Minnesota; King County, Washington; and Boise, Idaho.

tpo: What is the function of the demonstration sites?

Fevig: What we learn from the full-scale plants will be tested at the demonstration sites. They will test new operating parameters to inform facility designs of low-DO systems.

tpo: What is the role of the bench scale side of the research?

Fevig: That work is being done at the University of Kansas and Brown and Caldwell's lab. That will mainly include bioassay testing and evaluating the kinetic parameters of the process and the carbon utilization, mechanisms, conditions that impact BNR. They will also analyze the samples from the various utilities involved.

tpo: How will the result of this research be put to practical use at treatment facilities?

Fevig: The research team will provide a Blueprint Guidance Document that synthesizes all the findings. There are four pieces to that. First, it will

explain the fundamental mechanisms of low-DO BNR. Second, there will be a decision tree to help utilities compare low-DO BNR to other low-energy BNR technologies, such as membrane aerated biofilm reactors. A third piece will delve into the design, operation and process modeling of low-DO BNR systems. And finally, we will reach out to utilities and others to share all that information. We expect to publish the final work toward the end of 2023.

tpo: How would you describe the Water Research Foundation's role in the project?

Fevig: We have a Project Advisory Committees of volunteers who are experts in the field and can provide external review. They receive quarterly updates from the research team and will provide peer review of the guidance document. When the report is published, we'll have a webcast to share the findings, and conduct outreach so that utilities can take the knowledge we've gained and run with it. **tpo**



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HDR acquires water engineering firm SPF

HDR acquired Boise, Idaho-based SPF Water Engineering, an employee-owned water, wastewater and hydrogeologic consulting firm. Going forward, they will do business as HDR | SPF. As part of the asset acquisition, SPF includes MDS Drafting, which will be doing business as HDR | MDS.

Anue names new sales director

Anue Water Technologies announced that Joe Kratochvil has joined the company as sales director. Kratochvil joins Anue with 35 years' wastewater industry experience. Most recently, he owned his own wastewater treatment company, Botany Bay Chemical. Before that, he served in sales management positions for HOH Water Technologies, Ashland Chemical and Betz Laboratories.



Joe Kratochvil

Sacramento District selects Stantec to provide pipeline design

The Sacramento Regional County Sanitation District selected Stantec to provide design for 16 miles of transmission pipelines as part of the Harvest Water program. The program will provide tertiary-treated recycled water for growers to use to irrigate crops instead of pumped groundwater on 16,000 acres of agricultural lands in southern Sacramento County.

HF scientific's Mike Goodman retires

After 42 years with the company, Mike Goodman has retired from HF scientific. Goodman is credited with developing the company's two major product lines used in the production of clean drinking water: turbidimeters and CLX chloring analyzers.



Mike Goodman

Nampa, Idaho wastewater division to upgrade system

Centrisys/CNP announced a partnership with Nampa, Idaho's Wastewater Division to implement two MagPrex biological nutrient removal systems with sequestration as part of its phase II upgrades. These improvements will allow Nampa to meet new regulations that mandate Idaho cities to lower phosphorus in wastewater discharge.

JMS announces succession plan, celebrates anniversary

Jim Myers & Sons kicked off its 60th anniversary with the announcement of a major succession plan, encompassing seven promotions and transitions across various levels of management. Since founded by Jim Myers Jr. in his North Carolina home in 1962, JMS has operated under the leadership of family members. The tradition will continue with Sam Myers named as chief operating officer. With his father Dave Myers, the father/son duo will be responsible for company-wide leadership and performance evaluation. Kerry Dissinger will continue his leadership role as vice president and director of MEGATREATMENT, the business arm dedicated to surface water treatment.

Additional staff changes include Director of Bio-HANDLING Anthony Sherrill, responsible for the management and performance of the sales, marketing and product management of the Bio-HANDLING product portfolio globally; Director of Engineering Justin Craig, responsible for project performance from purchase order through warranty and engineering standards development and compliance; Director of Manufacturing Derrick Cox, responsible for the management and performance of the JMS supply chain; Director of Quality Derek Fleetwood, responsible for the culture of quality

for all JMS products and projects; Director of Finance Mark Noggle, responsible for the management of all JMS accounting, finance and IT related requirements; and Marketing Manager Laura Lando, responsible for management of internal and external JMS marketing initiatives.

An employee appreciation day is scheduled March 3 at the company headquarters in Charlotte, North Carolina, marking the official launch of a year-long 60th anniversary celebration. It will be preceded by monthly culture events for employees, as well as special programming at the annual cigar party held for the last 30 years at WEFTEC.

MFG Chemical hires Zukis as business development manager

MFG Chemical has hired Katy Zukis as business development manager. In addition to driving top line sales growth, she will be shaping MFG Chemical's oil and gas strategy, optimizing the product portfolio and developing a robust pipeline. Zukis will be based out of the company's sales office in Houston.



Katy Zukis

Winners of The Water Council's 2021 Tech Challenge announced

The Water Council announced the three winners for its 2021 Tech Challenge. Sponsored by A.O. Smith, Badger Meter, Watts Water Technologies and Xylem, the three winners were: CAVinTace, from Istanbul, Turkey, for reducing operating expenditures in aerobic wastewater treatment; Anthony Dichiara, from Seattle, for his IoT-enabled water quality sensing topic; and Vienna Water Monitoring Services, from Vienna, Austria, for its microbial-control ColiMinder technology. Applications were submitted from 17 countries for the 2021 challenge.

Xylem moving headquarters to Washington, D.C.

Xylem announced that it is moving its headquarters to Washington, D.C. The company's new facility will be co-located with the Reservoir Center for Water Solutions, a hub for multiparty, water-focused stakeholder collaboration, in the Navy Yard district along the Anacostia River. The center is anticipated to open in June.

Asahi/America welcomes Josh Goldberg to team

Asahi/America added Josh Goldberg as its business development manager for industrial and environmental piping systems in the western U.S. He has over 20 years of polymer formulation and product development experience and 10 years in market analysis and technical product sales. **tpo**



Josh Goldberg

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Activated Carbon Systems

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FILTRASORB SENTRY activated carbon from Calgon Carbon can be used in a variety of liquid phase applications for the removal of dissolved organic compounds. Its 8x30 mesh size provides improved pressure drop performance while delivering adsorption capacity for PFAS, making it a suitable granular activated carbon for surface water treatment. It also removes other contaminants of emerging concern, such as 1,2,3- TCP, as well as legacy contaminants like taste and odor compounds, organic color, total organic carbon and DBPs. It is made from select grades of bituminous coal through a process known as re-agglomeration to produce a high activity, durable, granular product capable of withstanding the abrasion associated with repeated backwashing, hydraulic transport and reactivation for reuse. The raw coal is mined and subsequently manufactured into GAC in the United States to ensure the highest quality and consistency in the finished product. **800-422-7266; www.calgoncarbon.com**



FILTRASORB SENTRY activated carbon from Calgon Carbon

Chemicals



OxyFusion system from BioSafe Systems

BIOSAFE SYSTEMS OXYFUSION

The OxyFusion system from BioSafe Systems generates peroxyacetic acid on site to meet the disinfection needs of municipal wastewater treatment facilities. This technology is praised for precisely dosing powerful oxidizing chemistry that eliminates pathogens on contact and leaves no harmful and or regulated residuals. The use of concentrated precursor chemistry significantly reduces shipments, providing an economic answer to sustainable disinfection. It comes preassembled and includes a PLC system to make measuring, monitoring

and datalogging easy, with reports available via mobile app or offsite browser. **860-290-8890; www.biosafesystems.com**

OPERATORS UNLIMITED CUSTOM CHEMICAL FEED SYSTEMS

From wasted chemicals to permit violations, operational efficiency can be controlled and maximized through proper chemical dosing. Operators Unlimited designs custom chemical feed systems for all areas of the facility. Cooling towers, boiler water, process and solids all benefit from proper dosing. If a chemical feed system is improperly designed, the facility could face several issues including



Custom chemical feed systems from Operators Unlimited

permit violations, increased operational costs, increased maintenance costs and additional labor costs. The plant could potentially overuse chemicals, thus contributing to safety issues, waste and create a system performance issue. An issue in performance can lead to more repairs and the need for replacement parts. As a result, the plant could suffer downtime with consequences for the entire manufacturing facility. Therefore, the design and implementation of a quality chemical feed system that releases the correct amount of chemicals for your exact wastewater treatment needs can be an essential component of a treatment facility. **864-228-1131; www.operatorsunlimited.net**

PULSAFEEDER PULSATRON SERIES HV

The Pulsatron Series HV from Pulsafeeder is designed for high-viscosity applications for precise and accurate metering control. It offers manual control over stroke length and stroke rate, with the option to choose between 4-20mA and external pace inputs for automatic control. Models are available with pressure capabilities to 150 psi at 12 gpd, and flow capacities to 240 gpd at 80 psi, with a turndown ratio of 100-1. It comes with a reliable timing circuit, circuit protection against voltage and current upsets, panel-mounted fuse, solenoid protection by thermal overload with auto-reset, water resistance for outdoor and indoor applications, and guided ball check valve systems to reduce back flow and enhance priming characteristics. **800-333-6677; www.pulsatron.com**



Pulsatron Series HV from Pulsafeeder



Hydrex odor control process from Veolia Water Technologies

VEOLIA WATER TECHNOLOGIES HYDREX

The Hydrex odor control process from Veolia Water Technologies is a redox chemical reaction that combines the Hydrex catalyst with hydrogen peroxide to produce hydroxyl free radicals that quickly and efficiently oxidize sulfide and other malodorous compounds. The process is pH neutral and the only byproduct is dissolved oxygen. The process can be used in headworks, lift stations in the collection system and biosolids dewatering. The catalyst can also be used in the vapor phase in chemical scrubbers, replacing the current use of caustic and bleach for hydrogen sulfide reduction with minimal media fouling and pH adjustment required. The process provides a rapid reaction, using a biodegradable, nonhazardous, cost-effective solution. A capital equipment option customized for the catalyst is designed to treat up to 100 ppm hydrogen sulfide is also available where a new scrubber is required. **919-677-8310; www.veoliawatertech.com**

Chlorination/Dechlorination

FORCE FLOW CHLOR-SCALE AND HALOGEN ECLIPSE

To protect chlorination systems from dangerous leaks, the Halogen Eclipse emergency valve shut-off system instantly closes the container valve when a signal is received from a leak detector, panic button or SCADA. The actuator quickly installs on the tank without the use of any tools and allows manual operation of the valve while in place. During an emergency shutdown event, the system measures the actual torque applied to the valve to ensure that the valve is closed to



Chlor-Scale from Force Flow

Chlorine Institute recommended standards and provides remote confirmation that the emergency close operation successfully closed the valve. The Chlor-Scale from Force Flow safely cradles a chlorine ton container while providing critical feed and chemical inventory information. Know in real time exactly how much chlorine has been fed and how much remains in the tank. It can warn of excessive or insufficient feed rates and can be remotely monitored from a PLC or SCADA system. **925-893-6723; www.forceflow.com**

HF SCIENTIFIC, A WATTS BRAND CLX ONLINE CHLORINE ANALYZER

Save on time, labor, and total cost of ownership with the CLX Online Chlorine Analyzer from HF scientific, a Watts Brand. It uses a flow-through cuvette design to flush out debris during each cycle, and a double-checked reagent injection design for maximum precision. The unit flushes the cuvette and takes a zero reading before injecting reagent for accurate readings, even as the glass becomes dirty. Its use means no more erratic trend graph readings, messy sample chambers that backflow into the reagent bottles, or constantly cleaning the sample chamber. **888-203-7248; www.watts.com/our-story/brands/hf-scientific**



CLX Online Chlorine Analyzer from HF scientific, a Watts Brand

Covers/Domes



Longopac Fill continuous bag system from Paxxo

PAXXO LONGOPAC FILL

The Longopac Fill continuous bag system from Paxxo can connect to the discharge point of machines used to move, dewater or compact screenings, grit and biosolids. Material is then deposited in a 90-meter-long continuous bag for odor containment and spillage control. The cassette bag can be sealed with ease, and the material and odors are trapped inside, cutting down development of bacteria and fungus spores. **770-502-0055; www.paxxo.com**

Detection Equipment

CAS DATALOGGERS ODALOG G20

The OdaLog G20 from CAS DataLoggers employs a digital smart sensor designed to enable longer in-field deployment of up to 90 days to reduce labor costs. It offers built-in diagnostics with health indication enabling predictive maintenance in the field for improved uptime. Built-in Bluetooth and USB communication makes it easy to configure and access data. Integrated MODBUS support allows the G20 to send data to existing SCADA systems. For remote logging applications, the OdaLog G20-RTX model provides 4G cellular access with the ability to automatically push data to a server eliminating manual retrieval. Both models are IP68 rated and ATEX/IECEX certified, making them ideal for use in harsh wastewater applications and in hazardous environments to monitor gas levels in treatment plants, sewers, collection lines, and pumping stations, for odor control, corrosion and remediation studies. **800-956-4437; www.dataloggerinc.com**



OdaLog G20 from CAS DataLoggers

Distillation/Fluoridation Equipment and Microbiological Control

BYO-GON PX-109

Byo-Gon PX-109 is a nontoxic, non-corrosive and 100% organic and biodegradable alkaloid compound used for eliminating grease, sewage odor and hydrogen sulfide from restaurant grease traps, lagoons and municipal sewage systems. As a stimulant to enzymatic activity at the cellular level, it promotes more rapid cell growth and consumption of organic material, overcoming limiting environmental factors to stabilize wastewater systems. Its use promotes healthy biological systems, preventing the need for large capital expenditures, as well as reducing costs. It is organically certified by OMRI. **888-296-4661; www.byogon.com**



Byo-Gon PX-109 organic compound

ENVIRONMENTAL CHEMICAL NATURAL D

Natural D from Environmental Chemical is a bio-based liquid bacterial concentrate that combines eco-benign chemistry and application-specific bacteria to offer a long-term approach to odor control. It contains protein, starch, cellulose, fat, oil and grease-digesting bacteria, eliminating the source of the odor instead of masking it. It converts the organics to carbon dioxide and water and combines chemistry with microbes. It also prevents accumulation of scum, grease and other organics. It is designed for use in sewage disposal traps, plants, sludge beds, manholes, catch basins, storm sewers, drainage ditches, grease traps, creek traps, creek and canals, city garage dumps, refuse cars and trucks, public market areas, landfill deodorization, leachate ditches and lift stations. **800-262-0458; www.environmentalchemical.com**



Natural D bacterial concentrate from Environmental Chemical

PRODEX BAE

BAE (Biological Activity Enhancer) from Prodex is an organic liquid formula for use in aerobic and anaerobic environments to improve operational efficiency and maximize renewable energy production. As the green component to the engineered infrastructure, it provides plants with a low-cost biostimulant for existing microbes, increasing activity and populations to give the plant the best biology possible. Wastewater treatment plants can use it to boost biogas production, convert food waste to energy, help remove nitrogen, in maintenance dosage/emergency use, to reduce operational costs such as hauling, chemicals and energy, enhance plant operational efficiency and stability, improve solids handling and sludge settling, and accelerate recovery after plant upsets. By maximizing the microbial workforce, it helps the industry work towards cleaner water resources and a greener energy supply. **856-234-4540; www.prodexproducts.com**



BAE (Biological Activity Enhancer) from Prodex

(continued)

Mechanical Odor Elimination

JDV EQUIPMENT LEVEL LODOR

The Level Lodor from JDV Equipment provides water quality professionals a means to dispose of processed waste, control odors and limit waste exposure to operators. It uses auto-leveling technology to level the waste material. This increases the fill percentage of a dumpster without operator intervention, slide gates or extensive control strategies, while limiting exposure to potentially hazardous material and working conditions. Made for indoor or outdoor use, it can save valuable indoor square footage or eliminate the need for additional building space by installing the system outdoors. The covers are custom made to cover standard 20-, 30- and 40-yard dumpsters, with an overall footprint barely larger than a standard dumpster. The shaftless option uses replaceable ultra-high molecular weight liners that will reduce screw wear. The shafted option can be used for increased efficiency and has easily accessible grease points. **973-366-6556; www.jdvequipment.com**



Level Lodor from JDV Equipment

INDUSTRIAL FLOW SOLUTIONS OVERWATCH DIRECT IN-LINE PUMP SYSTEM



OverWatch Direct In-Line Pump System from Industrial Flow Solutions

The OverWatch Direct In-Line Pump System from Industrial Flow Solutions is designed to lift influent at the point of entry, eliminating the wet well. Effluent is contained and never becomes atmospheric. Not only are smelly, dangerous odors and gases eliminated, but also the need for odor suppression systems is eliminated. Clogs are a thing of the past, as this smart sensing system adjusts in real time to manage flow and avoid blockages. The result is a safer working environment for maintenance crews, less environmental impact, lower equipment costs and reduced maintenance. **860-631-3618; www.flowsolutions.com**

Scrubbers

SIMPLE SOLUTIONS DISTRIBUTING HRF HI-FLOW RADIAL FILTER

The HRF Hi-Flow Radial Filter line from Simple Solutions Distributing are deep-bed radial molecular air scrubbers that capture VOCs in a broad range of environments. They have an extremely low pressure drop and a small footprint. They can handle airflows up to 2,800 cfm. The units are available in mild steel or stainless steel, and are suitable for air relief valves and lift stations. They can be used as a passive filter or as a complete system with pressure blower and control panel. For indoor odor control a blower can be mounted on its inlet for a recirculating air purifier. The units hold between 1.5 and 7 cubic feet of activated carbon. They come with Norit Darco's H₂S activated carbon, specifically developed for removing hydrogen sulfide from air streams. Other media are available to match specific applications, including Microbesorb antiviral permanganate. **973-846-7817; www.industrialodorcontrol.com**



HRF Hi-Flow Radial Filter line from Simple Solutions Distributing

UV Disinfection Equipment

ATLANTIC ULTRAVIOLET MEGATRON ULTRAVIOLET WATER DISINFECTION SYSTEMS

Megatron Ultraviolet Water Disinfection Systems from Atlantic Ultraviolet are available in several models available in both 120 V 50/60Hz or 220 V 50/60Hz to handle a wide range of large flow applications, 90 to 450 gpm. Multiple chambers can be interconnected to achieve desired flow and/or dosage requirements. The line is economical and safe offering rapid water disinfection without the use of heat or dangerous chemicals and provides continuous disinfection and best of all water is ready for use as soon as it leaves the purifier chamber. It is operator-friendly and includes a chamber constructed of high-quality Type 316 stainless steel. A choice of a manual or automatic wiper system facilitates routine cleaning of the quartz sleeves without disassembly or shutdown of the system. **631-273-0500; www.ultraviolet.com**



Megatron Ultraviolet Water Disinfection Systems from Atlantic Ultraviolet

DE NORA WATER TECHNOLOGIES CAPITAL CONTROLS ULTRAVIOLET ADVANCED OXIDATION PROCESS



Capital Controls Ultraviolet Advanced Oxidation Process from De Nora Water Technologies

According to the U.S. EPA, 1,4-dioxane is a synthetic chemical increasingly found in potable water sources deemed hazardous to humans. It moves rapidly from soil to groundwater, and has been detected in groundwater sources across the U.S. De Nora

Water Technologies is pioneering 1,4-dioxane treatment with Capital Controls Ultraviolet Advanced Oxidation Process (UV AOP) systems. When combined with other technologies, including Capital Controls Ozone Generators, De Nora's multibarrier technology solutions effectively treat a full range of contaminants. The system doesn't require the use of chemicals, doesn't create disinfection byproducts, and is proven effective at inactivating 1,4-dioxane, as well other harmful contaminants frequently discovered in water sources, such as PFAS and lead. A full range of models is suited to application, including Sentinel, Rayox and C3 Series system reactors. **215-997-4000; www.denora.com tpo**



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Continuous ion exchange technology utilized to combat rising nitrate levels

Problem

The city of Bayard, Nebraska was experiencing rising nitrate levels in their water and made the decision to pre-purchase a water treatment system to address the nitrate concerns. In addition to the nitrate levels, they also had constraints on their discharge and were unable to discharge to the sewer. This was going to require the acquisition of additional land to dig waste lagoons.

Solution

Tonka Water, a Kurita America Brand's Pur-IX system was selected due to its minimal waste and reduced salt usage. The reduced waste output also allowed for the city to keep the land requirement to a minimum, further reducing costs. The system applies conventional ion exchange treatment through an



innovative process, allowing for a smaller footprint while ensuring the lowest waste volume. It incorporates 20 continuously operating ion exchange vessels, 14 of which are treating water in unison, while the remaining six vessels are regenerating. The system continuously cycles out-of-service vessels through an efficient multi-step regeneration process, automatically returning regenerated vessels back into service. Operating this way ensures the ion exchange resin is being utilized to its maximum capacity, providing the highest level of efficiency. It generates a single continuous low flow waste stream, eliminating the need for enhancements such as waste equalization, gradual "bleeding" to final discharge, large evaporative pond waste handling systems, or shock loading to wastewater plants.

RESULT:

The Bayard plant is performing well and has been meeting expectations since commissioning in 2018. **866-663-7633; www.kuritaamerica.com**

System clears the air at municipal pumping station

Problem

Odors around two municipal pumping stations in L'Assomption, Quebec, compromised quality of life for residents. Hydrogen sulfide and mercaptan odors were concentrated at times throughout the day. Oils and grease in the foul air stream also had to be.

Solution

Newterra supplied two deep-bed scrubber systems with properly sized fans and prefiltration units for mist and grease removal. Each vessel was filled with high-yield carbon to target the odors.



RESULT:

Odor removal was greater than 99.95%, leaving an undetectable odor level at the outlet side of the units. The air phase scrubber systems were installed within a few hours and have required minimal maintenance. **800-420-4056; www.newterra.com**

Oxygen injection system answers odor concerns

Problem

A 9,000-foot-long force main at the Granby RV Park in Granby, Colorado, was going septic, causing a huge odor problem in a pristine area 30 miles south of Rocky Mountain National Park. In the mountain location, frigid weather sometimes made it difficult for field technicians to work on issues. There were plans for a 300-unit residential development nearby, making odor reduction all the more important.



Solution

The **FORSe oxygen injection system** with remote digital telemetry (**Anue Water Technologies**) was tested for six months and ultimately chosen. It replaces chemical treatment and related operating requirements. The system has capability to inject ozone or a combination of oxygen and ozone. The remote digital telemetry makes it safe and easy for operators to monitor and control dissolved oxygen levels. Technicians at Anue Water can also log in and monitor.

RESULT:

The system eliminated the odors, bringing hydrogen sulfide levels nearly to zero. The system is paying for itself in chemical and operating cost savings. Operators can monitor and control remotely, important during winter and under the COVID-19 pandemic. **760-727-2683 www.anuewater.com**

Plant achieves 99.9% hydrogen sulfide removal

Problem

The 75 mgd Blue River Wastewater Treatment Plant in Kansas City, Missouri, needed to meet high odor removal efficiency requirements.

Solution

The city deployed a dual-stage **BTF-Bioscrubber biological odor control system** from **Evoqua Water Technologies**. The advanced, non-hazardous air treatment system includes structured and randomly packed biological media and integrates equipment, media and a NUCIRC process for optimal performance and flexibility. The process skid can operate in recirculation or once-through modes.



RESULT:

During testing, the system consistently achieved 99.9% reduction in hydrogen sulfide while removing of organic sulfur compounds such as a methyl mercaptan, dimethyl sulfide, carbon disulfide and dimethyl trisulfide. The single vessel treated a foul airflow of 14,000 cfm with no increase in pressure differential. **844-409-9492; www.evoqua.com**

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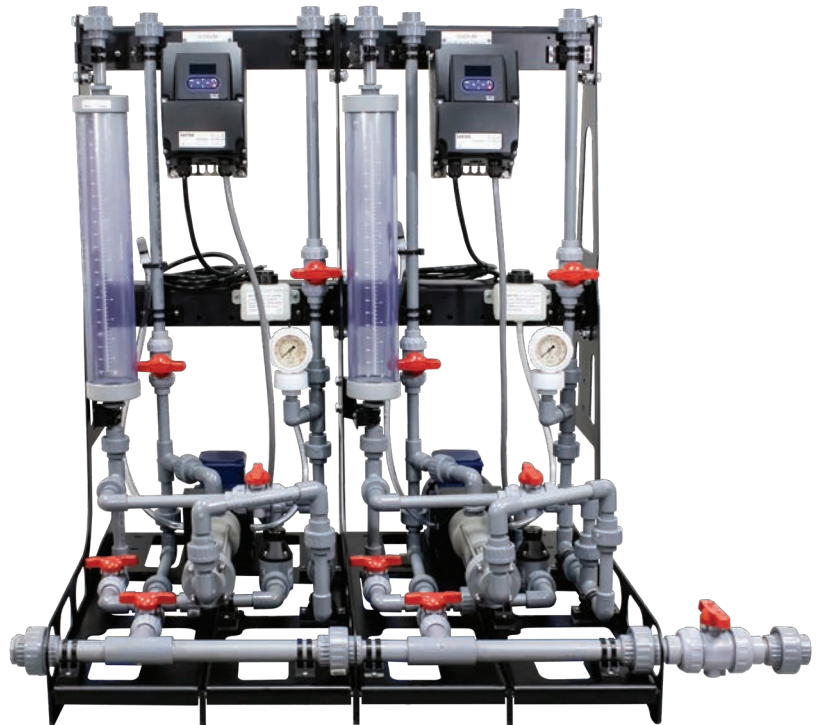
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BRAVO H

CHEMICAL METERING SYSTEMS

SEPEX BRAVO Chemical Metering Systems are modular and scalable systems that incorporate progressive cavity Intelligent Metering Pumps (IMP) into a plug-and-play solution for disinfection, pH control, flocculation, and other chemical processes. The new BRAVO H offers the ability to install the pumps horizontally, providing a low center-of-gravity, to accommodate chemical tanks of all shapes and sizes.

SEPEX Inc.
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sales.us@seepex.com
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www.seepex.com



City uses software to mitigate odor and improve community relations

Problem

The Kalamazoo (Michigan) Water Reclamation Plant faced odor complaints from the community. The solution needed to consider potential hydrogen sulfide sources on- and off-site.

Solution

The city implemented **EVS Omnis** from **EnviroSuite**. The program enables real-time monitoring and visualization of hydrogen sulfide data and provides alerts for exceedances. Reverse trajectory modeling helps identify the sources of odor complaints. Predictive odor modeling helps assess potential emissions during high-risk periods.



RESULT:

The staff gained better situational awareness and was better positioned to investigate and resolve odor complaints. They have identified potential emission sources and can analyze their contributions to air quality. 424-335-1331; www.envirosuite.com

Plant upgrades ozone contacting system

Problem

The Orlando (Florida) Utilities Commission's 45.6 mgd Southwest Water Treatment Plant's needed to upgrade an ozone system used ozone for disinfection and to convert hydrogen sulfide in well water into sulfate, solving a taste and odor challenge.

Solution

Three fine-bubble diffuser contact basins were replaced with a sidestream injection system using five venturi injectors with a **Pipeline Flash Reactor** from **Mazzei Injector Company**. The change streamlined operations and enabled turndown without sacrificing efficiency or control of precise ozone dosing.



RESULT:

The system improved operational control, resulting in a more precise ozone dose. Maintenance no longer requires time spent in the confined space of a basin. The sidestream system is maintained with a simple walk around of the equipment. The system has no moving parts and has large orifices to prevent fouling or clogging. The commission plans to convert its remaining plants to the ozone injection system. 661-363-6500; www.mazzei.net tpo



OZ Lifting Products CompOZite davit crane

OZ Lifting Products' patented CompOZite davit crane is made of advanced composite materials making it 40% lighter than equivalent capacity steel davits. With a total weight of only 83 pounds for the boom, mast and winch combined, a single crane is commonly moved to multiple base locations throughout a treatment plant. A ratchet screw jack allows the user to adjust the boom from horizontal to 45 degrees while under load and the 360-degree rotation of the crane allows a full range of motion. Smart-latch technology at the boom/mast means no tools are required for assembly. A zinc-plated finish on all noncomposite parts provides added corrosion protection. AC and DC electric winches are optional or a manual winch comes standard with a drill drive adapter. The cranes are made in the U.S. and each one is individually tested and certified at 125%. **800-749-1064;**
www.ozliftingproducts.com



Patterson Manufacturing Davit Crane

Give your operations a lift with Patterson Davit Cranes, available in ½-ton and 1-ton capacities. The low maintenance, easy-to-assemble design offers adequate reach to accommodate lifting large loads within tight spaces, and a boom that can be adjusted to nearly 45 degrees to allow for clearance over obstructions such

product spotlight water

Flowmeter designed to provide complete look at water distribution systems

By Craig Mandli

Water distribution networks supply users with water on demand, with adequate pressure under various loading conditions. Municipal water supply systems in particular are subjected to different loading conditions such as peak daily demands that vary throughout a day, such as critical loads when pipes burst or fires need extinguishing. Utility companies can increase their operational efficiency by knowing, with accuracy, the load on the network.

ABB's AquaMaster4 Mobile Comms provides that accuracy. The flowmeter is a wireless solution for continuous flow measurement, the logging of accurate data and communication of information that is critical for today's water management. Employing connectivity on 4G-LTE and NB-IoT networks, the flowmeter enables lower power consumption, and is designed to identify leaks 10 times faster than the market standard.

"AquaMaster 4 Mobile Comms allows you to stay connected to the flowmeter instead of just relying on data being communicated," says Krishna Prashanth, global product line manager, Electromagnetic Flowmeters with ABB Measurement & Analytics. "That provides dynamic insights into supply and demand and allows better control and hence intelligent water management."

Employing bidirectional connectivity, AquaMaster4 Mobile Comms provides the near-real time data

AquaMaster4
Mobile Comms
from ABB



needed for today's intelligent water management. Operators can be hundreds of miles away and read values from the device remotely, giving them access to manage the device and their operations wherever they are located and at any time. Historical logged values of pressure, flow rate, alarms, battery life and activity record can also be retrieved remotely. The flowmeter can also be used to identify low-flow nighttime leaks that would otherwise be undetected.

By using high speed, low-cost mobile data accessible via an internal SIM card connected to a mobile network, the flowmeter provides an adaptable and agile solution for deployment from virtually any location, according to Prashanth. The flowmeter's high battery life further reduces costs, removing the need for electrical connections. The flowmeter detects battery life and can be reconfigured to a suitable power mode. The device recovers itself by rebooting in case of faults and allows for task automations. It can also be renewable-powered, further extending its cost-cutting capabilities.

"This is a significant step forward in the digital journey in water networks, helping to save resources in an industry that is focusing so much on conservation and sustainability," says Prashanth. **800-435-7365;**
www.abb.com

as handrails. Built for durability, it comes standard with a hot-dipped galvanized finish and stainless steel hardware to prevent rust and corrosion in wet work environments. Following Patterson's tradition of safety-focused innovation, the davit features a reliable brake to keep loads in position without creeping. For over 160 years Patterson has been a trusted supplier of winches, rigging, fittings and custom products for lifting applications. Patterson Davit Cranes are made in the U.S.A. and deliver on the company's promise of helping businesses run safer, easier and faster. Find out how Patterson can improve employee safety and positively impact your bottom line. **800-322-2018;**
www.pattersonmfg.com/davit-cranes



Evoqua Next Generation Collector Chain from the OEM

The new Envirex HS730-NX Collector Chain is designed to be as strong as steel, but one-third of the weight of stainless steel conveyor chain, reducing installation time and maintenance. The design has virtually no elongation in comparison to molded chain and is wear resistant to abrasive materials such as sand and grit, which can be carried through pretreatment systems. This translates to less frequent tensioning of

the collector chain, which requires basins to be drained. Contact Evoqua about the next generation collector chain and learn how it can help extend the life of your chain and scraper system. **800-524-6324;**
www.evoqua.com



FCI FLT93 Series flow switch

The FLT93 Series flow switch from Fluid Components International provides a reliable early warning alert to the potential of dry running conditions, cavitation and other pump issues that can lead to emergency shutdowns, service inter-

ruptions and unplanned costly maintenance. With a no-moving-parts design, the SIL2-rated switch offers robust pump protection with its dual alarm capability. With Alarm 1, the switch will detect a low flow situation anywhere between 0.01 and 3 feet per second. If Alarm 2 occurs because the feed line to the pump is running dry, it would be an emergency signal to shut down the pump immediately because the bearings see gas instead of a liquid as a heat transfer media. Dual 6A-relay outputs are standard and are assignable to flow, level or temperature. The FLT93 switch can be specified in either insertion or inline styles for pipe or tube installation.

800-854-1993;

www.fluidcomponents.com



KROHNE OPTIBAR pressure switches

KROHNE's OPTIBAR PSM 1010 and OPTIBAR PSM 2010 ultra-compact pressure switches are designed for absolute and gauge pressure measurement in gases and liquids. The switches feature a double-axis (multitrotatable) display and adjustment module, a robust IP67 construction and fully configurable communication outputs for all possible configurations: IO-Link and PNP/NPN as standard I/O, and 4-20 mA, 0-10 V or NPN/PNP as secondary output. Both devices offer excellent temperature stability due to advanced digital compensation.

978-535-6060; us.krohne.com



LineWise Swing Gate Wire Holders

LineWise's two new swing gate wire holders can be used on both vertical and horizontal construction and are the only wire holders available with a load-rated gate. For maximum safety, the wire holders have

two side-swinging redundant gates that can be opened and closed individually or together by hand or with a hot stick. Aluminum rollers are included on all four sides of the units for conductor protection. Unlike traditional wire holders, this unique design allows contractors to safely roll captured lines from horizontal to vertical construction or vice versa. Model SGWH 500 is rated for a 500-pound downward load, 500-pound side load and 200-pound gate load. The SGWH 2500 has 2,500-pound downward and side load ratings, plus a 500-pound gate load rating.

254-757-1177; www.line-wise.com



HEMCO Drench shower

HEMCO's Drench shower is equipped with a pull-rod activated shower and push handle eye/face wash for immediate drenching of personnel that have been exposed to hazardous chemicals. After activation, the shower provides a continuous stream of non-injurious water for 15 minutes or longer. Combination shower and eye/face wash deliver 30 gpm of flowing pressure from the shower head and 8 gpm of flowing pressure from the eye/face wash. The shower comes ready to install to a water supply and waste system. Compliant with ANSI and OSHA requirements.

800-779-4362;

www.emergencyshowerbooths.com



Franklin Electric's FPS MH Series horizontal booster pumps

Franklin Electric announced several additions to its line of FPS MH Series horizontal booster pumps. The expanded offering includes

BioSafe Systems
OXYFUSION®
On-Site & On Point

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1-888-273-3088 | BioSafeSystems.com

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In-Situ

pumps with nominal flow ratings of 70 and 90 gpm. By delivering this increased flow, the MH Series will now cover flow rates of up to 145 gpm and discharge heads to 280 feet. The pumps feature impellers and diffusers made of 300 Series stainless steel for maximum durability. The new models powered with 4, 5.5 or 7.5 hp, three-phase motors rated IE3 for premium efficiency, IP55 enclosure and Class F insulation. All MH Series pumps are also compatible with select models of the SubDrive family of variable frequency drives.

866-271-2859;

www.franklinengineered.com



Spencer Strainer GS-144-F self-cleaning filter

Spencer Strainer's GS-144-F sanitary self-cleaning filter is for process flow of up to 400 gpm. Constructed of 316L stainless steel, there are no bags or elements to replace, so there is no waste and no downtime for filter changes. Wedgewire or perforated screens of various openings are available and interchangeable, allowing one strainer to be used for multiple applications. The product to be filtered enters the strainer through the inlet, and filtration occurs from the outside in. Screened particulate accumulates within the canister and is purged through the bottom drain as needed. Purged particles are piped away for disposal, recycling or reuse. The GS-144-F operates continuously as a sealed device, so product stays within the piping and out of the atmosphere.

800-801-4977;

www.spencerstrainer.com



Endress+Hauser Netilion Water Networks Insights

Netilion Water Network Insights from Endress+Hauser enables full transparency for water networks around the clock by providing reliable monitoring of flow, pressure, temperature, level, water quality and other measurements. The technology connects multiple sources in a single interface, including field devices, industrial controllers, data transfer components, data recording and archiving devices, analysis and forecasting tools, and others. The web-based interface provides users with complete system monitoring, and when limit values are exceeded, or in the event of failure, it delivers alarms to users via email, SMS or push notifications. All communication is encrypted and secure, even in remote regions with a self-sufficient power supply, providing data reliability and integrity.

888-363-7377; www.endress.com tpo

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Model 6JSCE from Thompson Pump

Backup pump designed for dependability when called upon

By Craig Mandli

Severe storms and hurricanes often lead to thousands of homes and businesses losing vital power, communication and water and wastewater services. Losing these services for long periods as utilities are restored can lead to safety issues, not to mention environmental concerns. That has forced consumers to pay attention to the importance of public utility systems and the emergency backup systems that keep them operating after a disaster.

Thompson Pump recently introduced the **Model 6JSCE**, a 6-inch **solids handling pump** equipped with the company's Enviroprime System. The diesel-powered compressor-assisted solids handling pump is ideally used in sewer bypass, emergency response or any high-head/high-volume applications. With its heavy-duty cast iron construction and fast priming capabilities, the 6JSCE is designed for flows up to 2,680 gpm, and heads up to 190 feet, with maximum solids handling up to 3 inches. This end-suction centrifugal pump can dry-prime and re-prime automatically, and is equipped with the Enviroprime System that does not allow product blow-by of pumped materials.

"Our JSC series pumps are powerful, dependable, built for longevity and offer exceptional return on investment, and this pump leads the industry in municipal, construction and industrial applications," says Chris Thompson, president of Thompson Pump.

The pump includes a 12-inch impeller that is dynamically balanced, nonclogging and enclosed. It is constructed out of 65-45-12 ductile iron with rear-equalizing vanes to reduce axial loading and prolong seal and bearing life. Its mechanical seal can be dry-running, grease or oil lubricated, with tungsten carbide rotating and silicon carbide stationary seal faces. It is a single inside mounted, nonpusher type with self-adjusting elastomeric bellows. Other components are 304 stainless steel and Viton. Its heavy-duty bearings are grease lubricated to carry both axial and radial loads, while its head has a rugged, back pull-out design, and is constructed from heavy-duty class 30 cast iron with a tapered bore design. It can handle solids up to 3 inches and offers a maximum operating speed of 2,000 rpm and maximum operating pressure of 82.3 psi.

"As with all our pumps, the 6JSCE provides the quality, performance and reliability people have come to expect to get the job done, every time," says Thompson. 800-767-7310; www.thompsonpump.com



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Christen Wood
Operations Administrator
Upper Tuscarawas Wastewater Treatment Plant, Akron, Ohio



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▶ June 22, 2022, 11 am EDT ◀

DESCRIPTION:

Mobile pilot treatment units are set up on site and operated by experienced personnel under a range of conditions to ensure the best technological solution for specific water. This webinar will demonstrate the benefits of pilot testing and how to maximize their value. Examples will be shown of project successes enhanced by pilot testing and how they can be used to improve infrastructure funding ranking.

SPEAKERS:



Tom Perry

Director New Product and Market Development
Veolia Water Technologies

Tom Perry is the Director of New Product and Market Development for Veolia Water Technologies in the US and has been in the water and wastewater industry for 25 years. Early in Tom's career he spent multiple years pilot testing various technologies for both research and development and establishing full scale design requirements. In his current role, Tom also oversees all municipal and light industry pilot testing efforts conducted by Veolia in the US.

▶ Register here: <https://bit.ly/3MHpbDh> ◀

Farmers' Helping Hands

WISCONSIN FARMERS, ONEIDA NATION AND OTHER PARTNERS JOIN A GREEN BAY UTILITY IN A PROJECT TO IMPROVE WATER QUALITY

By Sandra Buettner



PHOTOS COURTESY OF NEW WATER

Ben Young, NEW Water watershed specialist, taking samples.

Farmers, the Oneida Nation and many other partners have joined NEW Water in a project to help NEW Water in Green Bay meet new phosphorus limits from the Wisconsin Department of Natural Resources.

Instead of investing millions in facility upgrades to meet effluent phosphorus limits, NEW Water reached out into the watershed to encourage farmers to reduce their phosphorus discharges by adopting innovative cropping practices.

ADAPTIVE MANAGEMENT

NEW Water, the brand of the Green Bay Metropolitan Sewerage District, treats wastewater for 15 municipal customers and serves 236,000 residents in a 285-square-mile area. The utility treats 33 mgd at its Green Bay facility and 8 mgd at a plant in neighboring De Pere.

In 2014 the DNR mandated different requirements that limited NEW Water's effluent total phosphorus and suspended solids. The utility had five years to determine its path forward before the limits went into effect. NEW Water now has four permit cycles (five years per cycle) to meet phosphorus limits of 0.075 mg/L in two impaired subwatersheds of the lower Fox River.

The NEW Water team evaluated several ideas to choose a phosphorus reduction plan that would be the most cost-effective for ratepayers and involve the community. To that end, NEW Water started a pilot project to evaluate adaptive management as an alternative compliance option offered by the DNR.

Based on the success of the pilot project, the utility launched the NEW Watershed Program to go full scale into watershed work. The plan requires

the district to work with rural and urban landowners to help them reduce releases of phosphorus and suspended solids to the impaired waterways. The district funds the program, along with grants and cost share through the Natural Resource Conservation Service.

FORGING PARTNERSHIPS

Because they had a good working relationship with Outagamie and Brown counties, two counties in their service area, the utility reached out to the landowners there, which included many farmers. It also included the Oneida Nation, which leases much of its land to farmers.

"The Oneida Nation has a strong environmental program focus, and so they were very motivated to work with us," says Erin Houghton, watershed programs manager for NEW Water, "The farmers were also willing to work with us; they too are very close to the land."

“The farmers are at the heart of what we do. We literally could not have done this program without them.”

ERIN HOUGHTON

NEW Water began working with the farmers and their agronomists, walking the fields with them to understand their resource concerns. "No one knows their fields better than the farmers do, but they may not be looking at their fields through the same conservation lens that we do," Houghton says.

NEW Water suggested several ideas, such as no-till farming, interseeding, and the use of cover crops. Through these measures to help the district,

farmers saw their soil health improve without affecting crop yield. The pilot program was completely voluntary, but the farmers soon discovered the mutual benefits. Thirty-two farmers now take part.

Meanwhile, ratepayers see a direct benefit to water bodies in their backyard. The utility is also sharing its best practices with several other Wisconsin cities.

AWARD-WINNING VIDEO

To announce the results of the pilot and to launch the next stage, the district held a 30-minute kickoff event in October 2021 to inform the community about the status of the program, its involvement with other organizations, and its plans for moving forward. Because of the pandemic, the meeting was held virtually.

Speakers scheduled included Congressman Mike Gallagher, State Sen. Robert Cowles, utility officials and partners. About 90 people were invited.

To show appreciation to the farmers for their cooperation, NEW Water created a video to thank them. It won the 2021 award for Public Information and Education in the video category from the National Association of Clean Water Agencies.

“The farmers are at the heart of what we do. We literally could not have done this program without them,” says Houghton. “We found that it is important to plan, execute, verify and follow up with the farmers to get the best results.” **tpo**



NEW Water serves Green Bay and surrounding communities, helping to protect water quality in the Fox River and the Bay of Green Bay.



Aerial view in the Silver Creek Pilot watershed representing different best management practices.



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Description

Water is one of the building blocks of life – organisms ranging from humans to plants to animals could not survive without it, and the operation of many of the world’s major industries would also come to a halt without water. So, with water playing such a critical role in our lives, it puts a great amount of pressure on the water & wastewater treatment facilities tasked with ensuring we have the cleanest water possible.

To help guarantee a water treatment operation reaches the pinnacle of proper performance, operators must select the best pump technology for each of the many critical chemical processes involved. While many different types of pumps can be used for these applications, learn how one type of pumping technology – hydraulic metering pumps – has risen to the challenges inherent in the injection of chemicals for a wide variety of municipal and industrial water treatment applications.

Speakers



Eulis Ester

Product Manager, Neptune, a brand of PSG

Eulis has been with PSG for nearly four years focused on product management and inside sales. She is currently responsible for supporting the Neptune and Abaque Americas portfolio throughout the product lifecycle from planning to execution in support of organizational strategy and objectives, including developing comprehensive product growth strategies, supporting the global sales effort, and developing new products. Before joining PSG, Eulis spent 14 years in management roles at Toshiba America Information Systems.



Tim Fagan

Applications Manager, Neptune, a brand of PSG

With more than 30 years of experience working with chemical pump technology, Tim is responsible for providing pump application, troubleshooting, technical and product support for Neptune. His experience in the pump industry ranges from engineering and external sales to new product development and technical specialist.



Dustin Wong

Product Specialist, Neptune, a brand of PSG

Previously a flight instructor and data analyst within the aviation and aerospace industry, Dustin is currently focusing on providing product and application support to Neptune customers worldwide.

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EDUCATION

Wastewater Microbiology Textbook updated for 2022. Author Ryan Hennessy. Wastewater troubleshooting strategies, microscopy techniques, and potential micro/DNA correlations are explained in the text. https://www.amazon.com/Wastewater-Microbiology-Filamentous-Identification-Troubleshooting/dp/0578357283/ref=sr_1_3?crid=2JYV40RPN6W04&keywords=Wastewater+Microbiology&qid=1649789736&s=books&prefix=wastewater+microbiology%2Cstripbooks%2C89&sr=1-3 (006)

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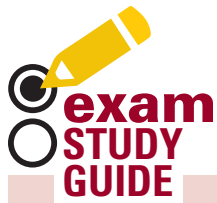
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Mark Fogle
Senior Wastewater Treatment Operator
Lakehaven Utility District, Federal Way, Wash.



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WASTEWATER

By Rick Lallish

Which type of blower may *not* be operated against a closed valve?

- A. Centrifugal
- B. Positive displacement
- C. High-speed driven (turbo)
- D. Open-impeller single-stage

ANSWER: B. Blowers and pumps have similar characteristics. Positive displacement blowers, like positive displacement pumps, may never be operated against a closed valve. If so, damage will occur to the piping, valves and possibly the blowers. This is an unsafe condition that may cause bodily harm to personnel nearby. Only centrifugal or like blowers may be operated in this manner. More information may be found in the WEF textbook *Wastewater Treatment Fundamentals II – Solids Handling and Support Systems*, Chapter 8.

DRINKING WATER

By Drew Hoelscher

How are hardness concentrations converted from mg/L as CaCO_3 to grains per gallon?

- A. Dividing mg/L as CaCO_3 concentration by 17.1
- B. Multiplying mg/L as CaCO_3 concentration by 17.1
- C. Dividing mg/L as CaCO_3 concentration by 2.5
- D. Multiplying mg/L as CaCO_3 concentration by 2.5

ANSWER: A. Typically, systems using ion exchange to soften water discuss hardness in terms of grains per gallon, and systems using precipitation techniques to soften water discuss hardness in mg/L as CaCO_3 . It may look misleading, but water containing 15 grains of hardness per gallon would be harder than water with 200 mg/L as CaCO_3 . One grain per gallon is equal to 17.1 milligrams per liter.

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**

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Richard “Doc” Lambert, operator for the Town of Woodstock, Virginia, retired after 31 years of service.

Brian Sullivan, superintendent of the Colebrook (New Hampshire) Wastewater Treatment Facility, received a 2021 Regional Wastewater Treatment Plant Operator of the Year award from the U.S. EPA New England Office.

The **Exeter (New Hampshire) Wastewater Treatment Plant** received a 2021 Regional Wastewater Treatment Plant Excellence Award from the U.S. EPA New England Office.

Ryan Peebles of Clean Waters Inc. received the 2021 Regional Wastewater Trainer of the Year award from the U.S. EPA New England Office.

The **Town of Milford, New Hampshire**, received the 2021 Industrial Pretreatment Program of the Year from the U.S. EPA New England Office.

Mark Kosakowski, director of operations for the Livingston County Water & Sewer Authority, won the 2022 New York Water Environment Association Collection System Operator of the Year award.

Bob Protivansky of the Rutland (Vermont) Sewage Plant received the 2021 Operator of the Year award from the New England Water Environment Association.

George Staley, a utility technician in the Marianna (Florida) Water and Sewer Division, retired after more than 42 years with the city.

Gordon Wood retired after 28 years with Madras (Oregon) Public Works in the utilities and wastewater management department.

Christy Everett was named chief executive officer of the Grand Strand (South Carolina) Water and Sewer Authority. She succeeds Fred Richardson, who retired after 37 years with the authority, including 28 years at the helm.

Maryland American Water was honored by the U.S. EPA AQUARIUS and PISCES awards programs for improvements to the Winters Run Drinking Water Treatment Facility in Harford County.

The Cadiz (Ohio) wastewater treatment building was renamed the **Thomas H. Carter Water Treatment Plant** in honor of a longtime water superintendent who gave several decades of service to Cadiz and surrounding villages.

Louise Grant retired after 37 years career with Paris Utility District Water Treatment Facility in Maine. She also received a 2021 Regional Wastewater Treatment Plant Operator of the Year award from the U.S. EPA New England office.

The village of **Montpelier, Ohio**, took first in the Municipal Category of the Berkeley Springs International Water Tasting Competition. The contest included spots in Japan, Italy, Australia and the United States.

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WEF Innovations in Process Engineering Conference 2022, Hyatt Regency Miami, Florida. Visit www.wef.org.

June 27-29

WEF Stormwater Summit 2022, Hyatt Regency Minneapolis. Visit www.wef.org.

June 29

AWWA Treatment, Distribution, and Wastewater Optimization Programs webinar. Visit www.awwa.org.



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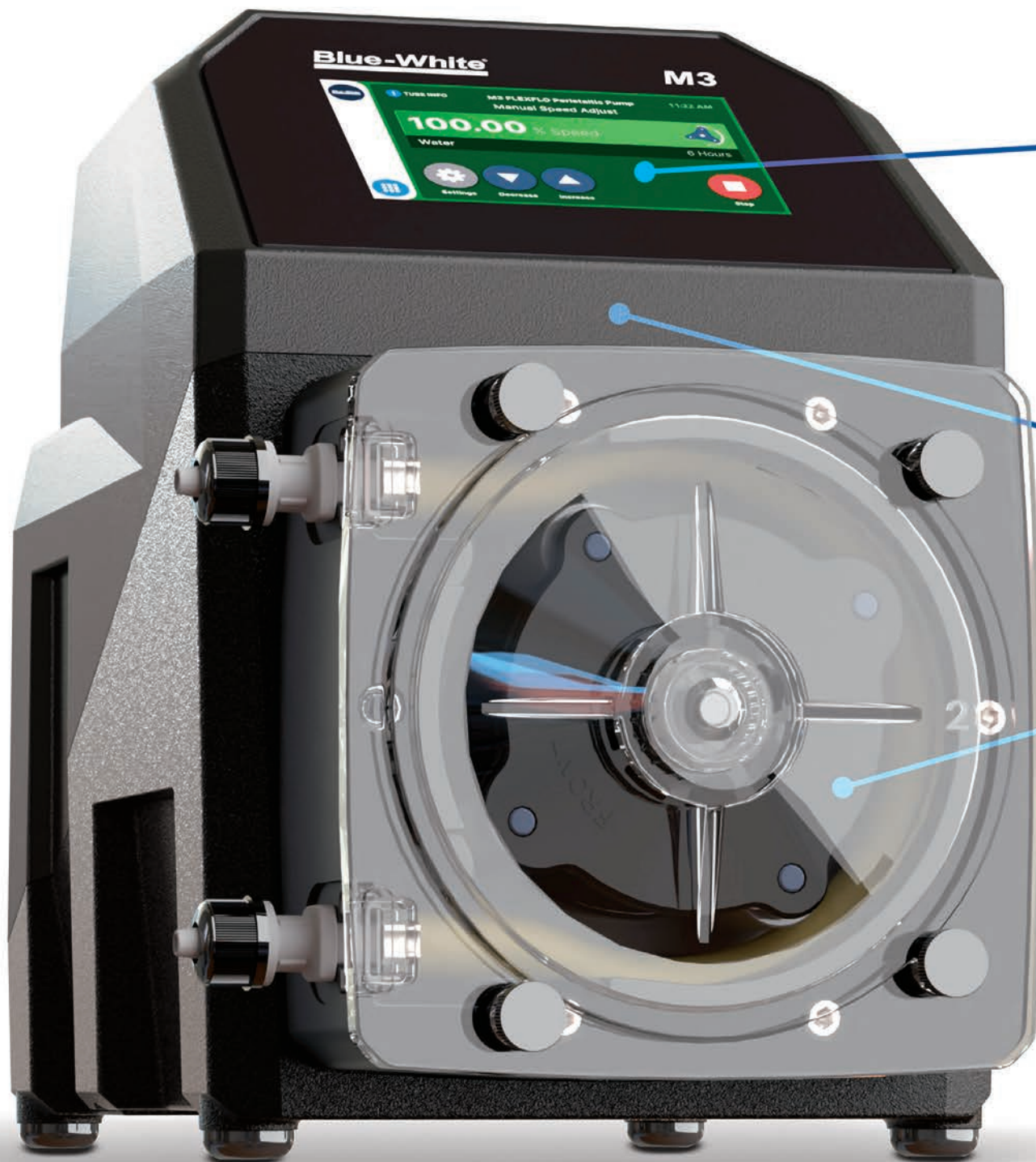


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