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Derek Gormon
Laboratory Manager
Brownsburg, Ind.

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top performers

cover story

ON THE COVER: Derek Gormon never planned for a career in the clean-water industry. Still, he's not surprised to find himself as the manager of the laboratory at the Brownsburg (Indiana) Wastewater Treatment Plant. In 2022 he was named Laboratory Manager of the Year by the Indiana Water Environment Association. (Photography by Marc Lebryk)

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Where Are All the POs?

THE PROFESSIONAL OPERATOR CREDENTIAL IS A MARK OF COMPETENCY AND DEDICATION TO THE TRADE. SO, WHY DON'T MORE WATER AND WASTEWATER OPERATORS PURSUE IT?

By Ted J. Rulseh, Editor

The initials stand for Professional Operator, a credential offered by Water Professionals International, formerly the Association of Boards of Certification. The organization implements water-related certification programs, and that includes licensing exams.

When I first wrote about the PO credential about three years ago, 174 operators had acquired it. As of late May of this year, more than 300 operators held the credential, a nice increase but still only a sliver of the workforce, which numbers well into the tens of thousands in the United States alone. Most likely it's also a small fraction of the operators skilled enough to earn PO status.

And I wonder: Why do I so rarely see those two initials with the names of all the excellent operators who each year step up to higher levels of licensing and receive awards from national, regional or state associations? Is it because they don't have the credential? Or do some have it but fail to display it?

WHAT INITIALS MEAN

A credential after a person's name has a certain power, even if that credential is not as well recognized as, say, P.E., M.D., or CPA. My previous profession has a credential — APR, for Accredited in Public Relations. You don't have to go to college for four years to earn it. You do have to study for and pass a rigorous exam, and you're not likely to pass without also having significant experience and training in the field.

So, APR signifies someone who is serious about the profession, has demonstrated competency, upholds certain standards of performance and subscribes to a set of values and ethics. It sets the credential holder apart in the eyes of a prospective employer or client.

It's similar with the PO credential. The PO website (www.professionaloperator.org) states, "Becoming a PO means you are proud to be a water professional and that you've mastered the elements of your trade."

IS THE LICENSE ENOUGH?

So, why aren't more operators lining up to become POs? There could be a number of reasons. For one thing, operators have a lot of responsibility; maybe they can't find the time to apply and to prepare for and take the exam.

Perhaps their municipality or utility doesn't see value in the credential and isn't willing to pay the exam and application fees ($214 in total) or provide time off and reimbursement for travel to an exam site. Or is it that operators and their organization leaders feel state certifications already do enough to recognize expertise and professionalism?

Haley Vanness, certification and events manager with Water Professionals International, offers some thoughts on what generates interest in PO, and what might hold it back. One compelling argument for the credential is that it could help solve what operators known as the reciprocity problem in licensing.

States run their own licensing and certification programs; in many cases a given state won't recognize a license issued by another state. That makes it

difficult for operators to move freely around the country to pursue professional advancement or for other reasons.

"I would say a primary driver is operators interested in being more mobile with their certifications," Vanness says. "A lot of people want to relocate or move up in their careers. Another factor is that often utilities will pay operators a little extra if they have an additional credential."

> "I would say a primary driver is operators interested in being more mobile with their certifications. A lot of people want to relocate or move up in their careers."
> **HALEY VANNESS**

The flip side is that some states remain hesitant to accept the PO for reciprocity, but Vanness sees progress on that front: "I can't officially say which states will accept it, but we have had good experiences with Washington, New Jersey, Maryland and others."

Better marketing for the credential also may help spur interest. "We are doing a new branding campaign for it," Vanness says. "We changed our association name to WPI to be more aligned with the people we serve and what we do. With that came a new visual identity for our organization and for the credential itself."

WHAT DO YOU THINK?

So what is your opinion of the PO credential? Are you interested in it? Have you already earned it? If so, how has it helped you? Do you use the "PO" after your name in correspondence or other public forums? Do you feel it adds prestige to you and to the operations professions generally?

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BIOSOLIDS CHALLENGES

Options Dwindle in Northeast

The North East Biosolids & Residuals Association's latest newsletter reports that options for managing biosolids in that region are shrinking, and not necessarily because of concerns about PFAS contamination. An article cites challenges in Gardner, Massachusetts, as indicative of the situation across the northeastern states.

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OVERHEARD ONLINE

"It's extremely gratifying to see the students' talent and passion for water issues, and I hope to see them in the water workforce in the future."

Naomi Park Wins US Stockholm Junior Water Prize

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PFAS SETTLEMENTS

Considerations for Utilities

Two landmark settlement proposals have been announced over PFAS, in which two of the chemical companies that manufactured them have agreed to make payments to public water systems. Ken Sansone of SL Environmental Law Group offers some considerations for utilities regarding PFAS class-action settlements.

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SUPERVISOR-EMPLOYEE RELATIONSHIPS

Promoting Holistic Growth

Today's leadership strategies are stepping away from self-serving approaches and shifting focus towards the holistic growth and well-being of individuals. Brian Hess, president and CEO of The Pavement Group, argues that this evolution has positioned people-centric leadership not merely as a business advantage, but also as a moral and ethical imperative.

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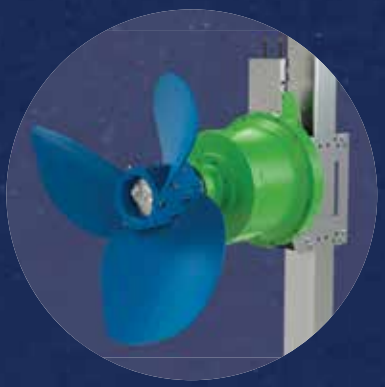

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Science Driven

LAB MANAGER DEREK GORMON FINDS SATISFACTION IN THE ANALYTICAL SIDE OF THE CLEAN-WATER BUSINESS, AND IN PLAYING A ROLE IN KEEPING THE ENVIRONMENT CLEAN

STORY: **Steve Lund** | PHOTOGRAPHY: **Marc Lebryk**

Derek Gormon never planned for a career in the clean-water industry. Still, he's not surprised to find himself as the manager of the laboratory at a wastewater treatment plant.

"I always gravitated toward the science fields," Gormon says. "I've always been a big outdoorsy person, fairly conscious of the environment, even as a kid growing up. A lot of those things steered me toward that throughout college, and then the wastewater treatment plant job just kind of happened.

"I was working for a laboratory that did industrial fluids testing, and the wastewater job came open at a really good time. It was a different step in my career, and I wanted to focus more specifically on the environmental field."

Gormon is the laboratory manager for the Brownsburg (Indiana) Wastewater Treatment Plant, and in 2022 he was named Laboratory Manager of the Year by the Indiana Water Environment Association.

WINDING ROAD

His career path wasn't exactly a straight line. After graduating from high school in Mooresville, Indiana, he worked for a year in an auto parts factory before enrolling at the University of Indianapolis.

He studied for part of a year in Spain under a program from St. Louis University before returning to Indiana and enrolling at Indiana University-Purdue University, Indianapolis and studying environmental science. He

Derek Gormon, laboratory manager at the Brownsburg Wastewater Treatment Plant, enjoys the way lab test results connect with treatment process quality.

Gormon aspires to return to school and complete his bachelor's degree in environmental science.

found a job in his field before graduating, so he left school a few classes short of a bachelor's degree.

With the industrial testing company, he ran lab tests on fluids from a variety of machines.

"Testing those fluids is kind of like testing human blood," he says. "You can tell a lot about what's going on with machinery just by testing a lot of the fluids." After eight years, in 2018, he took his current job in Brownsburg, a city of 30,000 just west of Indianapolis.

Gormon had a couple of mentors, Charles Akers and Carrie Arnold, when he was working in the industrial fluids field, and he credits Kathy Dillon, the Brownsburg director of water utilities, as a mentor who taught him the ins and outs of operating a wastewater lab: "She has taught me a lot. I talk to her pretty much on a daily basis."

The Brownsburg treatment plant (12 mgd design, 5.25 mgd average) uses an activated sludge process. Its customers include a large industrial bakery. Gormon's lab regularly tests samples from the bakery's waste stream, but the bakery has its own pretreatment system and also contracts with a third party for independent testing.

A ONE-PERSON LAB

Gormon works solo in the lab. "There is just enough testing and administrative work that it works pretty well with one person," he says. "Some days, a lab assistant would be nice, but it's not really warranted yet for the amount of testing we do."

That means Gormon typically goes out into the treatment plant to collect samples. That's fine with him: He thinks it's good for data consistency if the same person collects the samples. He samples and tests numerous places in the plant once a day for regulatory compliance and process control. In the lab he uses a variety on instruments including a pH meter (Hach), a dissolved oxygen meter (Hach), incubators (Thermo Fisher Scientific) and a spectrometer (Hach).

Operators use the test results to adjust aeration and wasting rates. The dried biosolids the plant produces are sampled and tested quarterly for metals, PCBs and coliform bacteria to make sure that the material is suitable for land application. All test results are kept in a database.

"We record a lot of weather information as well to go into our monthly reports," Gormon says. "Keeping track of that along with test data gives a good explanation of what might be happening. For example, when we get rain or big heavy snow, we'll definitely see a change in our results; same with a rise or lowering of temperatures.

"From a data perspective, it's always important to see any kind of a change. It's the same thing with the operators. It goes hand in hand for both of us to investigate what's going on. After a number of years of data, you can really get into your control charts and you can find the optimal ways of running your plant."

ANOMALOUS DAYS

On most days all the test results are within expected ranges, but Gormon remembers one day when some outcomes were off the normal charts: "I was doing some ammonia testing and was coming up with some really odd results. It was just on our actual samples at first, and then our quality control samples and spike samples were showing issues as well."

When the control samples also produced odd results, Gormon suspected a problem in the tests, not in the treatment process. "We went back and investigated and found out that we had a lot of bad vials in the testing kits that we had ordered," he recalls. "Every once in a while, you'll get that. They're mass-produced, so you can get a bad batch or a bad box. That was not a fun day trying to chase that down."

Gormon suspects the problem likely was improper storage somewhere along the supply chain:

"We use testing kits that already have freeze-dried reagents in them. If those aren't stored correctly, say by the manufacturer or during shipping, you can definitely risk having issues."

He documented that the test kits were the problem by running tests on standard samples.

PROBLEM ON WINGS

Although Gormon spends most of his work days inside the laboratory, he gets out around the treatment plant to take samples. That can be hazardous in an unusual way: The plant has a seasonal problem with geese, which can be aggressive especially when they are nesting.

> "I definitely get satisfaction out of doing something good for a bigger cause."
>
> DEREK GORMON

Derek Gormon, Brownsburg (Indiana) Wastewater Treatment Plant

POSITION:
Laboratory Manager

EDUCATION:
Bachelor's degree studies, environmental science, Indiana University-Purdue University, Indianapolis

AFFILIATIONS:
Indiana Water Environment Federation

AWARDS:
2022 Laboratory Manager of the Year from the IWEA

GOALS:
Finish bachelor's degree, gain wastewater laboratory analyst certification

LIFE OUTSIDE

When Derek Gormon says he is an outdoorsy guy at heart, it extends to his recreation. After work he likes to split wood, even though he doesn't heat his house with wood and he doesn't have a wood fireplace.

His property includes some woodlands, and he has been removing dead wood ever since he moved there with his wife, Jessica. "We've been clearing out some of the woods over the last couple of years," says Gormon. "That's what I like to do when I get home from work, if it's nice out."

Usually that means dragging fallen timber out of the woods, but sometimes he takes trees down himself, with some help: "I've had a couple of them that I've taken down, with the help of my cousin, but mostly it's just stuff that falls down." He uses a log splitter and has stacks of wood outside his house. He uses some for bonfires and gives a lot to a neighbor who heats with wood.

Gormon also likes to camp, and for him that means backpacking. He grew up camping with his grandparents, who had recreational vehicles, but now he likes to park the vehicle and hike in to remote campsites. He usually goes with a friend from college, since his wife doesn't enjoy camping and their son is too young.

"The longest trip I've taken was four and a half days," Gormon says. "I think we did 42 miles on the Knobstone Trail, which is the longest in Indiana. It was quite an experience. But if you plan right and you have the right equipment, you can do it."

The right equipment now includes a hammock for sleeping: "The first year or so I started with a backpacking tent. Then my hiking friend started using a hammock, and he sold me on that pretty quickly, after I got tired of sleeping on the ground."

One of his favorite destinations is Monroe Lake near Bloomington. They sometimes use a kayak to get to more remote campsites: "That's really fun. If you're trying to camp anywhere on the water, it's one of the easiest ways to do it. You can access different campsites a little easier that way, some that are off the beaten path."

Gormon, shown with a Hach SD900 automated sampler, believes it's good for consistency to have the same person always collecting the samples.

Derek Gormon was named 2022 Laboratory Manager of the Year by the Indiana Water Environment Association.

> "There is just enough testing and administrative work that it works pretty well with one person."
> **DEREK GORMON**

"They love to set up shop in different places of the plant," Gormon says. "We've had to chase quite a few of them out of our clarifiers. Sometimes they like to lay their eggs everywhere, and then you get attacked by geese when you're trying to do checks or take samples. That's one of the more comical things around here. They've even been known to attack the vehicles."

The geese also make a mess in the parking lots. "Mostly they're just around and being a nuisance, but some have actually died and we've found them in pumps. It doesn't happen very often, but it has happened on occasion since I've been here."

LOOKING AHEAD

Now that he has a few years of experience in the clean-water industry, Gormon finds that it suits him. He likes the work more than he liked testing industrial fluids: "It's very different. I do enjoy it a little bit more from a science standpoint. You get into a lot of the life sciences and biological activity of water. It's very interesting how it all ties together."

His near-term plans include going back to school for the few classes he needs to complete a bachelor's degree in environmental science. He also plans to get a wastewater laboratory analyst certification. Longer-term, he has thought about operating his own laboratory business or being a laboratory auditor.

"I definitely like the overall operations side of the laboratory and the quality-control side," he says. "So I'd like to further my career in that direction."

Gormon has met many people who greatly enjoy working in wastewater; some like the industry so much that they would never leave it. Still, he doesn't think any of them grew up hoping for a job at a wastewater treatment plant. Now, he has become one of those people.

"I consider myself an environmental type person," he says. "I definitely get satisfaction out of doing something good for a bigger cause. And then I have always been a lab rat." tpo

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WITH ADVANCING TECHNOLOGY, GOVERNMENT INCENTIVES AND INNOVATIVE PROJECT DEVELOPMENT, BIOGAS GAINS FAVOR AS A CARBON-NEGATIVE RENEWABLE ENERGY SOURCE

By Ted J. Rulseh

Yaniv Scherson

Biogas is a high-value clean and renewable fuel potentially available at thousands of clean-water plants that have anaerobic digesters.

Many facilities already put biogas to good use, such as to feed boilers that supply heat for the digesters, other processes and buildings; and to fuel combined heat and power systems. Today the value of biogas is growing with government financial incentives for gas-to-energy projects and for conversion to renewable natural gas for pipeline delivery.

One area gaining attention is the addition of food waste and other high-strength organic material to biosolids digesters to boost gas output significantly. Still, many facilities still simply flare their digester gas. One business aiming to lead in drawing more value from biogas is Anaergia. The company specializes in projects that turn wastewater into RNG, fertilizer and clean water using innovative technologies.

With experience on four continents, Anaergia helps clean-water agencies implement high-efficiency anaerobic digestion and optimize biogas production and usage. The company serves the municipal solid waste, wastewater, agriculture and food processing sectors.

Last May Anaergia was named Net Zero Carbon Champion in the prestigious Global Water Awards, presented by Global Water Intelligence. Yaniv Scherson, chief operating officer, talked about trends and potentials in biogas in an interview with *Treatment Plant Operator.*

tpo: Taking a high-level view, how would you rate the value of biogas?

Scherson: The biogas market is a booming space and can play an essential role in decarbonization, for two reasons. First, it can be converted to RNG, which is the only fuel that has carbon-negative intensity. It sequesters carbon when produced, unlike solar and wind, which are carbon-neutral. Second, it is immediately dispatchable. No change in infrastructure or distribution is necessary.

tpo: In biogas development, where do you see the greatest potential at present?

Scherson: We're focused on biogas-to-RNG projects, which constitute a huge opportunity. At present only a couple dozen of the roughly 1,300 treatment plants in the U.S. that have digesters are producing RNG. Most others are either running CHP or flaring. There are about 13,000 wastewater plants that don't have digesters, but could.

tpo: Why does digester performance need to be improved?

Scherson: Digesters are using mixing technology that is decades old and is inefficient. Basically, we require the tanks to be very large because digesters typically run at 2% solids. If we thicken it any further, the viscosity gets too high for most conventional mixers to be able to operate efficiently. If we thicken the solids — for example, if we triple the solids concentration — we can make the digester one-third the size, or achieve three times the throughput from the same tank.

tpo: How can that improvement be accomplished?

Scherson: It's very simple to do. The mixers are basically boat propellers installed on the inside circumference of the tank. They're placed at various heights to create a swirl in the horizontal plane and a swirl in the vertical plane. They work at low speed and high torque; imagine a spoon mixing honey. This configuration can achieve a mixing performance standard that to our knowledge no other technology can meet, which is 90% of the mixing volume above the critical velocity all the time.

tpo: How significant a contribution can biogas make in reducing greenhouse gases and combating climate change?

Scherson: One statistic that adds perspective relates to California, which has a waste diversion law designed to get organic waste out of the landfills. Wastewater treatment plants are the best places to go with that waste. In California, 156 wastewater plants have digesters. If that state's food waste were sent to those digesters to produce biogas, the reduction in greenhouse emissions would be equivalent to taking 3 million cars off the road.

> "At present only a couple dozen of the roughly 1,300 treatment plants in the U.S. that have digesters are producing RNG."
>
> **YANIV SCHERSON**

tpo: Does the biogas-to-energy market benefit from any recent federal legislation?

Scherson: Yes. The Inflation Reduction Act includes an incentive under the investment tax credit that provides direct reimbursement against the capital cost that wastewater treatment plants and utilities incur for projects that generate RNG. It can cover up to 40% of the capital cost.

tpo: What incentives exist for RNG after it has been produced?

Scherson: There are two broad categories. First are renewable fuel credits from federal and state governments. Second, there is the voluntary market in which companies buy RNG for decarbonization purposes. They

> “Everybody has barriers, but they all can be overcome with new tools in the toolbox.”
> **YANIV SCHERSON**

are basically buying RNG at a premium price, and that provides an economic incentive for utilities to pay for the needed infrastructure upgrades.

tpo: What do you see as deterring clean-water agencies that have anaerobic digesters from investing in some form of biogas-to-energy?

Scherson: I prefer to think in terms of opportunity. Everybody has barriers, but they all can be overcome with new tools in the toolbox. One tool is the economic incentive by way of the Inflation Reduction Act. Another tool is an alternative project delivery model called P3, which stands for public-private partnerships. In that model, a private company invests in all the infrastructure while the utility pays no money upfront. In return, the utility receives an ongoing revenue stream to help fund capital improvement programs and rate stabilization.

tpo: How does the P3 model differ from traditional project development?

Scherson: The traditional design-bid-build model is very time-consuming. There is an RFP process to select an engineer. The engineers do the design, which goes to bid. The bids are too high, so the project goes back for value engineering. Each step takes a long time, during which prices go up. In the P3 model, the technology, construction and engineering team is together from day one, sitting with the client to design the system and deliver it faster and more economically. Technical and economic risks are shifted away from the utility onto private companies that have expertise in delivering and operating biogas projects.

tpo: How would you assess the potential for co-digestion as a way to increase biogas production?

Scherson: Food waste is so good because it has a very high energy yield, double that of wastewater sludges. That’s simply because the food waste has not been already digested by humans. All the energy that our bodies would otherwise consume when we eat the food is available to the digester. Every wastewater treatment plant that has digesters can co-digest. There is no limitation. The question is what technologies and what design configurations are needed to retrofit the plant to make it work.

tpo: What forms of food waste are the most viable?

Scherson: The keys to success are homogeneity and scale. The preference is for high energy density, so high COD. Brewery waste, dairy waste, expired packaged goods, all qualify. Then we look at what is available in large quantities, such as material from grocery chains and other businesses. The kind of machinery used to slurry it up doesn’t matter.

tpo: How would you rate the potential for capturing post-consumer food waste, such as from green bin programs, for co-digestion?

Scherson: That has wide applicability. California is unique in having a statewide mandate, and that is a huge opportunity for the 156 treatment plants in the state that have digesters. Some states in the Northeast also have source-separated food waste streams, or requirements for large generators to have source-separated collection. Another driver is the high cost of disposal in many places, including the Northeast. So there is a pure economic incentive for food waste generators to find lower cost outlets. Wastewater plants are ideally positioned to serve that function. **tpo**

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More Than Wastewater

FOR BRUCE ROYCE AND HIS TEAM IN THE MICHIGAN CITY OF MIDLAND, SOME OF THE BIGGEST CHALLENGES COME FROM OUTSIDE THE PIPES THAT DELIVER INFLUENT

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Katy Kildee**

Bruce Royce, plant manager, Midland (Michigan) Water Reclamation Department

It's not just the water coming through the sewer system that concerns Bruce Royce and his team at the Midland Water Reclamation Department.

Located in Central Michigan, Midland lies at the confluence of the Tittabawassee and Chippewa rivers, whose watersheds encompass a large share of the Lower Peninsula. The two meet downtown at a three-legged footbridge known as the Tridge.

"We are at a natural choke point of a very large drainage basin," Royce observes. As a result, the city is more than usually susceptible to flooding during major rain events. Those floods have affected the Midland Water Reclamation Facility several times in relatively recent years.

It's no accident that Royce, in addition to his Class A (highest) wastewater operator license, also holds Industrial Stormwater certification. In his 18 years with the city, Royce and his team have worked through significant floods, one involving an upstream dam failure in 2020.

Good preparation and an all-hands-on-deck team spirit have been essential in meeting those challenges. For this and other successes, Royce was named 2022 Operations Professional of the Year by the Michigan Water Environment Association.

EDUCATOR BY TRAINING

Royce, a native of western Michigan, earned a bachelor's degree in physical sciences, environmental science and education from Central Michigan University. After teaching in an adult and alternative educa-

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Bruce Royce, shown inspecting an effluent water pump, has an online alter ego in Bruce the Water Guy.

> "My leadership philosophy is to develop buy-in or ownership. I want them to take responsibility and pride."
> **BRUCE ROYCE**

tion program for two years, he came upon an ad for a wastewater operator job in Midland.

"One of the preferred qualifications was a science degree," he recalls. "The pay and benefits looked good, so I thought, let's apply." He placed in the top five on a city exam, received an interview, and upon being hired in 2005 saw a career path: "Within the first year I set my goal to obtain my Class A operator license as soon as possible." He became general supervisor at the treatment facility in 2014, served as interim director of wastewater for seven months starting in December 2020, and in 2022 was promoted to plant manager.

The Midland plant (9 mgd design) runs two parallel treatment trains. Influent passes through a headworks building with center-flow 6 mm perforated plate screens (Hydro-Dyne Engineering) and grit settling chambers with reciprocating rakes (Ovivo). The flow then splits between the parallel trains with a two-stage trickling filter system engineered by McNamee, Porter and Seeley (Tetra Tech) with primary treatment followed by an oxidation ditch (same engineering firm).

Ferric chloride and polymer are added to aid in phosphorus removal. Final effluent is disinfected with gaseous chlorine and dechlorinated using sodium bisulfite before discharge to the Tittabawassee River.

Sludges are sent to two 500,000-gallon primary digesters and a 1-million-gallon secondary digester with a floating lid for biogas collection. The gas is compressed and sent to an on-site gas-to-energy facility, where it is blended with biogas from the city landfill. The mixture is burned in two 1.6 MW generator sets (Caterpillar) to produce electricity sold to the grid and to supply heat for the entire wastewater treatment process, including the digesters.

Class B biosolids are land-applied by a contractor. A belt filter press (Phoenix Process Equipment) is held in reserve to produce cake for landfilling in case land application is interrupted.

Bruce Royce, Midland, Michigan

POSITION:
Plant Manager

EXPERIENCE:
18 years in the industry

CERTIFICATIONS:
Class A Wastewater Operator, Industrial Stormwater Operator

EDUCATION:
Bachelor's degree, physical sciences, environmental science and education, Central Michigan University; general associate degree, Muskegon Community College

AFFILIATIONS:
Michigan WEA, Delta College Water Environment Technology Advisory Committee, Operations Challenge 2008-2014 (Michigan Brown Trout team)

GOALS:
Continue promoting the industry, plan effectively for succession to new leadership

DEALING WITH FLOODS

For decades, Midland has dealt with flooding that affects the collection system and the water reclamation facility. The city has 43 remote pump stations and about 200 miles of separated sanitary sewers.

In 2020, Royce spearheaded the city's response to a 2018 Storm and Sanitary Sewer Report, leading to a $49.5 million flood mitigation program now in progress with the Moore and Bruggink consulting firm. That effort includes a campaign to disconnect household footing drains from the sewer system in two targeted neighborhoods covering roughly 375 homes. About 10,000 homes in older sections of the city remain connected.

The first major flood in Midland in 1986 affected the entire middle of the state, from Lake Michigan to Lake Huron. Another relatively widespread flood occurred in 1996. During a 2013 rain event a substantial rise in river levels was predicted. It didn't actually happen, but city teams were prepared for it based on experience from the 1986 flood.

(continued)

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The staff at the City of Midland Water Reclamation Facility includes, from left, Ryan Ives, maintenance supervisor; Scott Clark, electrician; Kurt Bruske, operator mechanic; Craig Baumer, electrician; Tony Dancer, operator; Carl Minton, plant mechanic; Bruce Royce, operations manager; Jordan Rulapaugh, service person; Jon Gehringer, electrician; Kyle Shann, electrician; Tom Wiles, operator; Rick Wall, operator mechanic; Hunter Schneider, utilities maintenance; and Brandon Willman, utilities maintenance.

Two much more recent events tested Royce and his team. In June 2017 about 5 inches of rain over one week was followed by an overnight rain that brought 4.25 inches at the treatment plant and up to seven inches reported in some areas of town. That triggered flash flooding that struck from about midnight to 6 a.m. "A significant amount of rain hit our collection system very fast," Royce recalls. "Everything was at capacity. Every pump station was running full tilt."

At the plant, the inrush of water and the first flush of solids and trash plugged and disabled the headworks equipment. "There was a fountain from and underground rising well coming up out of the ground," Royce recalls. "The flow was splitting and we had a river running down each side of the plant. The water was coming faster than we could possibly push it through."

Royce instructed operator Tony Dancer to call in all available personnel, while he worked at opening all the bypasses in an effort to eliminate the overland flooding at the plant. He managed to divert the flow from the screenings building and into a 3 million-gallon underground storage tank, from which pumps lifted it to a 43.5 million-gallon aboveground basin.

"That way I could chlorinate it, knowing full well that we were going to have an SSO," says Royce. "I tried to minimize impact to the environment and provide some relief so that when our electricians and mechanics arrived in the next hour or two they could start repairing equipment and getting it online." By 4 a.m. the repairs were in progress; by 6 a.m. the overland flooding had stopped, and gradually the plant was brought back to normal high-flow operation.

DANGER FROM A DAM

The team's cumulative experience with flooding came into play in 2020 when a private dam upstream on the Tittabawassee River failed during a

Royce's daily tasks include inspections of plant equipment and infrastructure.

AN ALTERNATE IDENTITY

During the workday Bruce Royce is manager of the wastewater treatment plant in Midland, Michigan.

In his spare time he's Bruce the Water Guy, active on YouTube, Facebook and other social media platforms. His simple videos, generally about two or three minutes long, highlight areas of the treatment process and give credit to the people who help keep waterways clean.

Bruce appears front and center and narrates the videos using clear, nontechnical language that almost anyone can understand. The topics he covers include biosolids application, chemical treatment, confined space entry, cold-weather plant operation, screening systems and hidden infrastructure.

Royce recalls, "It was Earth Day 2020 and we were in the middle of COVID. I was sitting in my office in the afternoon thinking of how I always wanted to do Earth Day education." Public outreach was nothing new for the Midland plant team, which has promoted school plant tours and career days and has partnered with a school-based Lego robotics program.

Among his first thoughts was to make a video, but he saw the need for a hook. And so Bruce the Water Guy was born. "I love to promote our industry and the importance of what we do for the environment," says Royce.

"I like to call us environmental warriors. We're environmentalists on an industrial scale. Instead of doing little things like saving a bit of water at home, we're treating billions of gallons of water. Bruce the Water Guy gives me another platform to put out our message and educate the general population about the water environment and the impact they have on it."

The messages have potential for more than local appeal because the videos don't mention Midland — he covers the various topics in a generic way. To view the videos, just search YouTube on "Bruce the Water Guy."

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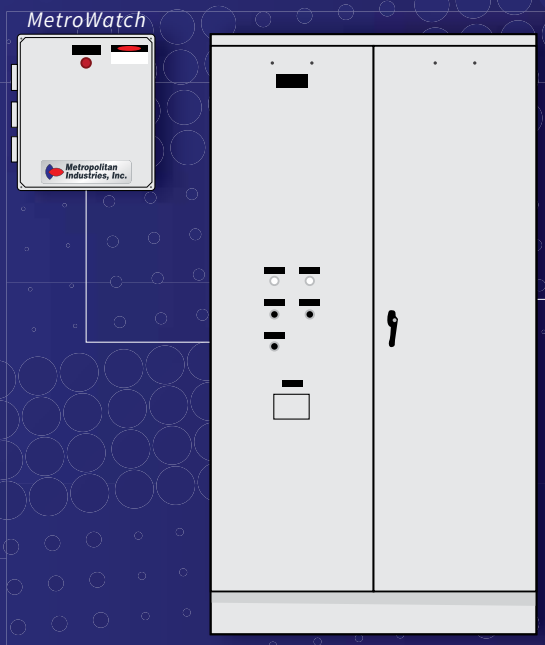

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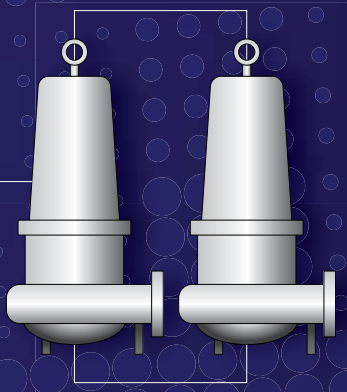

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25-year rainfall. Six months earlier, the Midland County emergency coordinator had conducted a tabletop exercise for a catastrophic dam failure, and Midland had developed an action plan.

On May 18 the city received a report of an impending dam failure. It turned out to be a false alarm, but it gave Royce and his staff time to prepare to protect critical lift stations and make plans to power stations down as needed to keep them from short-circuiting when flooded and destroying the equipment inside.

"We knew about how many hours we had from the time a dam failed until the water hit the city," Royce recalls. "We also knew the river level that would occur. The dam failure exercise showed that it would breach a 500-year flood level."

The next morning an alert came of an actual dam failure. As the flood waters rose, about one-third of the city was evacuated. Royce's team put the emergency plan into action and minimized damage to the lift stations. After the water peaked and subsided the next day, the plant team and contractors pumped down the system, made repairs to motors and other electrical equipment, and had essentially the entire system back in operation within 48 hours.

> "The flow was splitting and we had a river running down each side of the plant. The water was coming faster than we could possibly push it through."
>
> **BRUCE ROYCE**

CREDIT TO THE TEAM

Royce praises the facility staff members for their performance during the floods and for their generally excellent work in keeping the plant running efficiently. His team includes:

- Jared Driscoll, wastewater director
- Tom Wiles, Tammy Birchmeier, Mike Castillo, Austen Tyrer, Tony Dancer and Tim Reinke, operators
- Steve Smith, collections maintenance manager, and Ryan Ives, collections maintenance supervisor
- Craig Baumer, Jon Gehringer and Kyle Shann, electrical mechanical maintenance
- Chris Flemming and Carl Minton, plant mechanics, and Rick Wall, Kurt Bruske and Scott Clark, operator mechanics
- Justus Stalter, Shaun Lachcik, Hunter Schneider and Brandon Willman, utilities maintenance
- Jordan Rulapaugh and Megan Brawt, service personnel.

"My leadership philosophy is to develop buy-in, or ownership," Royce says. "I want our team members to take responsibility and pride. I give them parameters and encourage them to think critically, make decisions for themselves, and try to answer their own questions.

"The plant operators are the ones who run the place. They work 75% of their time without supervision. I need them to be quality employees who have a high level of responsibility. I want them to think, 'This is my plant.'

"I do not micromanage. I have told them all: If you have an idea or there is something you want to try, great. Don't just come to me and say, 'Hey, we should try this.' Flesh it out. Give me the program and the data. Make an argument. Then if it's reasonable, and if it's within budget, we'll try and implement it."

STAFFING CHALLENGES

Keeping a skilled and cohesive team on board is increasingly difficult: "It's getting harder to find quality team members, even if it's just having a Class B CDL and running a flusher truck. We need quality employees, and we're struggling to find them. Each job posting sees fewer applications."

Royce places high priority on training his team and passing along the knowledge he has acquired from nearly two decades with the city. In the bigger picture of training, he has assisted with regional training classes for the Michigan WEA.

Royce, front, speaks with, from left, Scott Clark, operator mechanic; Justus Stalter, utility maintenance technician; and Kurt Bruske, operator mechanic, beside a center flow screener (Hydro-Dyne).

He also serves on the Water Environment Technology Program Advisory Committee at Delta College in nearby University Center. That program delivers operator training, and the advisory committee works with employers to ensure that the program includes the right content and meets professionals' expectations. It also helps operators arrange for the hands-on experience their certifications require.

Royce's goal is to develop operators' skills and help them to be successful: "If that unfortunately means I train somebody well and they move on to be a manager elsewhere, so be it. They're advancing in their careers, and I see that as a success on my part."

"I wouldn't have been nominated as Operations Professional of the Year if not for the great crew of people who work with me. I believe in helping them to feel an essential part of the team by recognizing and making use of their achievements, skills and abilities. They are essential to my success." **tpo**

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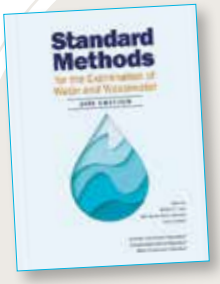

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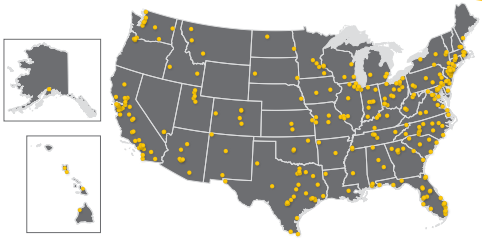

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STORY: **James Careless** | PHOTOGRAPHY: **Stephen Brashear**

When Johnny Cash sang "I walk the line," he wasn't referring to monitoring a line of 240 rural septic tanks.

But that is exactly what Larry Peterson does as Chelan County (Washington) Public Utility District treatment plant operator. The tanks contain 1,000 to 6,000 gallons and send graywater by pipeline to the Lake Wenatchee Wastewater Treatment Plant, west of Leavenworth.

It's part of his crusade to ensure the best-quality wastewater treatment in his jurisdiction. "There's just over 10 miles of collection systems to be monitored," says Peterson. "So it's about 20 miles by the time I walk to the end and then back to my truck. There's no easy way to do it. I'd like to use my bike, but it wouldn't work. And unless I had a horse that would follow me on the road or something, it just is what it is."

It's a solitary job of marathon proportions, but Peterson does it with dedication and consistency. "Before Larry came on, we'd be lucky to service a couple of dozen of these tanks each year," says Ron Slabaugh, Chelan County district water and wastewater manager.

"Larry has serviced 120 tanks in the last two years alone. That's half of our system. In addition, he walks that entire collection system once a year to put eyes on each of the tanks, see if any trees have fallen onto control panels, and fix any other damage that's been done.

"Back at the treatment plant, Larry keeps our 0.05 mgd lagoon/spray field and recirculating sand filter treatment system and grounds in really good order. He has also built relationships with the locals and the contractors. He's just doing a great job because he wants to."

That is why Slabaugh nominated Peterson as the 2022 Washington Public Utility Districts Association Water/Wastewater Outstanding Employee of the Year. And he won.

Larry Peterson puts a zip tie on knife switch in a lockout safety procedure on a pump control panel from Orenco Systems.

"It's a big honor to get this," says Peterson. "It's not something I'd really had ever thought about. So when Ron gave me a call and said I would have to take a couple days off to accept it, I was kind of surprised. And yeah, it was really cool."

EARLY DAYS

Peterson grew up in north-central Washington in the small town of Oroville, about three miles from the Canadian border. "My dad had an apple orchard and my mom was a hairstylist," he says. "At middle school I loved the scientific process, and science fair season was always my favorite. In the eighth grade I made gasohol, but I never saw a connection between my love of science and wastewater." *(continued)*

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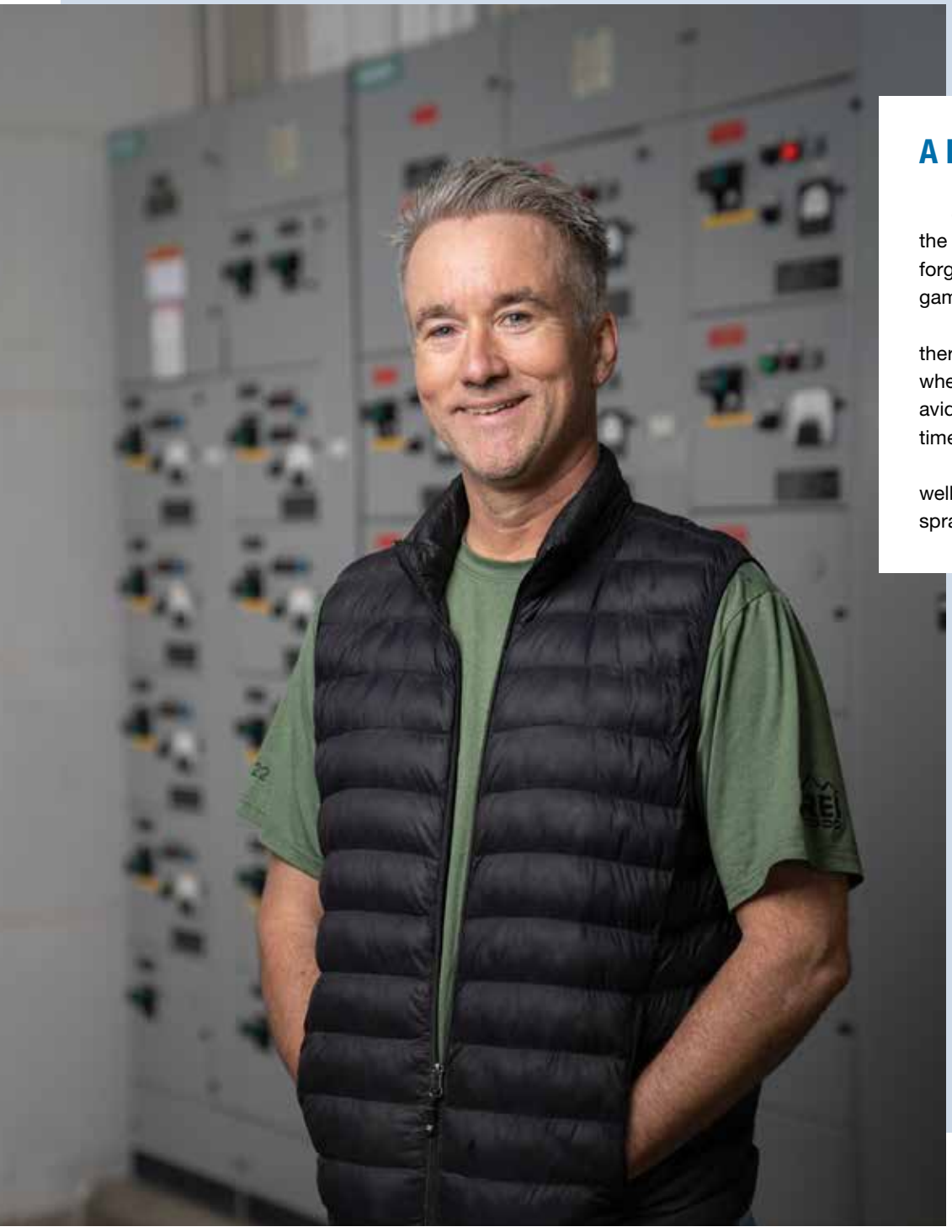


A LIFE OUTDOORS

Since his wastewater job entails lots of time in the Great Outdoors, Larry Peterson could be forgiven for spending his days off playing video games on the couch. But he doesn't.

"What with working 300 hours of overtime a year, there's not a whole lot of downtime," he says. "But when I do have time off, I enjoy riding my bike. I'm an avid mountain biker and road biker who likes to do time trials.

"In the winter, I like to snowshoe. That works out well up here at the lake because I've got 20 acres of spray field that I can go out and snowshoe in."

> "I'd like to use my bike on the line, but it wouldn't work. And unless I had a horse that would follow me on the road or something, it just is what it is."
> **LARRY PETERSON**

Larry Peterson, operator at Lake Wenatchee Wastewater Treatment Plant.

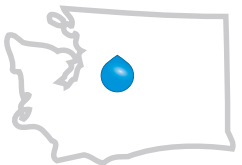
That love continued at Oroville high School, which he graduated in 1994. He then attended the University of Puget Sound, graduating in 1998 with a bachelor's degree in economics: "I enjoyed economics because of the patterns and trends of numbers, and it just makes a lot of rational sense," he observes.

During the summer before his last year, he worked as a pipefitter in Seattle. "After I graduated, I went back to work on the pipe crew because I really enjoyed seeing how things got done," he says. "After four years of school I was tired of paperwork, and we got to work on some really cool jobs. But after several years, our son was getting old enough to start school, and we didn't want him growing up in the city. So we moved back to eastern Washington in 2005."

(continued)

Larry Peterson, Lake Wenatchee Wastewater Treatment Plant

Leavenworth, Washington



POSITION:
Wastewater Treatment Plant Operator, Water Treatment Plant Operator in Training

EXPERIENCE:
18 years in water treatment

EDUCATION:
Bachelor's degree, economics, University of Puget Sound

CERTIFICATIONS:
Water Distribution Manager 3, Wastewater Operator Group 3, Cross-Connection Control Specialist

GOAL:
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He took a job with the City of Chewelah as a water and sewer maintenance technician. In June 2013 he joined the Chelan County district as a journeyman water technician and operator. He became a journeyman water technician and treatment plant operator in 2020.

At present he is certified as a wastewater distribution manager Level 3, wastewater operator Level 3, and cross-connection specialist and an International Fire Service Accreditation Congress-certified fire instructor. That's because he was in two volunteer fire departments in Northeast Washington as assistant chief.

A UNIQUE JOB

"This is kind of a unique little system, but not totally unique." That's how Peterson describes the 240 tanks he monitors and mends along Lake Wenatchee. Each tank acts like a traditional septic tank in capturing the household's wastewater and solids.

However, "instead of going out to a traditional drainfield, the wastewater is pumped using half-horsepower submersible pumps to the mainline running along the road," Peterson says. "At the road, a force main transfers all wastewater back to the treatment plant. There are no lift stations." Orenco Systems supplies all equipment in the collection infrastructure.

Larry Peterson (left), shown with Dale Pipkin, contractor, keeps the plant's lagoon/spray field and recirculating sand filter in tip-top shape.

The Lake Wenatchee Wastewater Treatment Plant received effluent pumped in from some 240 individual septic tanks.

> "Larry has serviced 120 tanks in the last two years alone. That's half of our system."
> **RON SLABAUGH**

When the wastewater gets to the treatment, it flows into a lagoon comprising slightly more than an acre, roughly the size of a football field. "In the summer, the water goes into the lagoon, and biology happens," Peterson says.

Then the water leaves the lagoon, gets chlorine disinfection, and goes out to a 14-acre spray field with 151 NaanDanJain 5022 SD sprinklers. During winter, the water goes to a 17,000-square-foot Seaman Corp XR-5 geomembrane sand filter with an inground liner with gravel media, and a Spencer Turbine Vortex sand filter blower.

It then undergoes UV disinfection using an Aquionics Proline low-pressure four-bulb unit (Nuvonic) before going to the river. "I spend a good portion of time either getting something ready for a season or taking something out of a season," Peterson says.

WATCHING FOR TROUBLE

Working with a lagoon does pose challenges. "Algae has been the biggest problem," Peterson says. "When I got here, there was a nagging high-pH issue that peaked in August of my first summer. All of a sudden the algae bloomed and my pH went up to 9.55, which was in violation of standards."

To fix that, Peterson did research that led him to install two 5 hp AIRE-O2 horizontal aerator units (Newterra) in the lagoon. That was on a Thursday: "By Sunday, the pH had dropped to 8.58, and the water quality had dramatically improved. It just needed more air. So I took this long-standing pH issue and was able to fix it in three days."

Keeping up with equipment problems on the septic tank effluent pump tanks is another issue. Being isolated units operating outdoors, they can fail without anyone noticing, unless someone like Peterson regularly walks the line, determined to keep the lake water clean.

It's not an easy job. "Last year, we received about 13 feet of snow cumulatively over the winter," he says. "Plus we got windstorms and people moving snow out of their driveway and such. In spring, I find all kinds of problems with the tanks, which we don't hear about because they are not connected to a telemetry system."

That's why Peterson opens the panels, checks the floats, and clears any downed trees that have come down on the tanks and their pipes. "We rely on buzzers and lights to draw someone's attention to call in

PHOTO COURTESY OF THE LAKE WENATCHEE WASTEWATER TREATMENT PLANT

Peterson was named the 2022 Washington Public Utility Districts Association Water/Wastewater Outstanding Employee of the Year.

Peterson pipettes a sample to a BOD test bottle.

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> "I really enjoy just working alone. I also know that if there's something that's been done, it's because I did it."
> **LARRY PETERSON**

if they're seeing a problem, so it's imperative that this stuff works," he says.

SOLVING RIDDLES

Sometimes the causes of problems aren't easy to find. In one case, the power cut out on a number of the STEP tank panels and pumps after a big snowstorm. It was a head-scratcher. The knife switches controlling the electricity had been pulled down, hence the power losses, but there were no footprints and nothing mysterious at the affected sites.

Eventually, it occurred to Peterson that the heavy snowfalls had forced the knife switches down, melting afterward and leaving no trace of their handiwork. "So immediately I got hold of our superintendent and let him know that I needed to walk the entire system right now. He approved it, no problem.

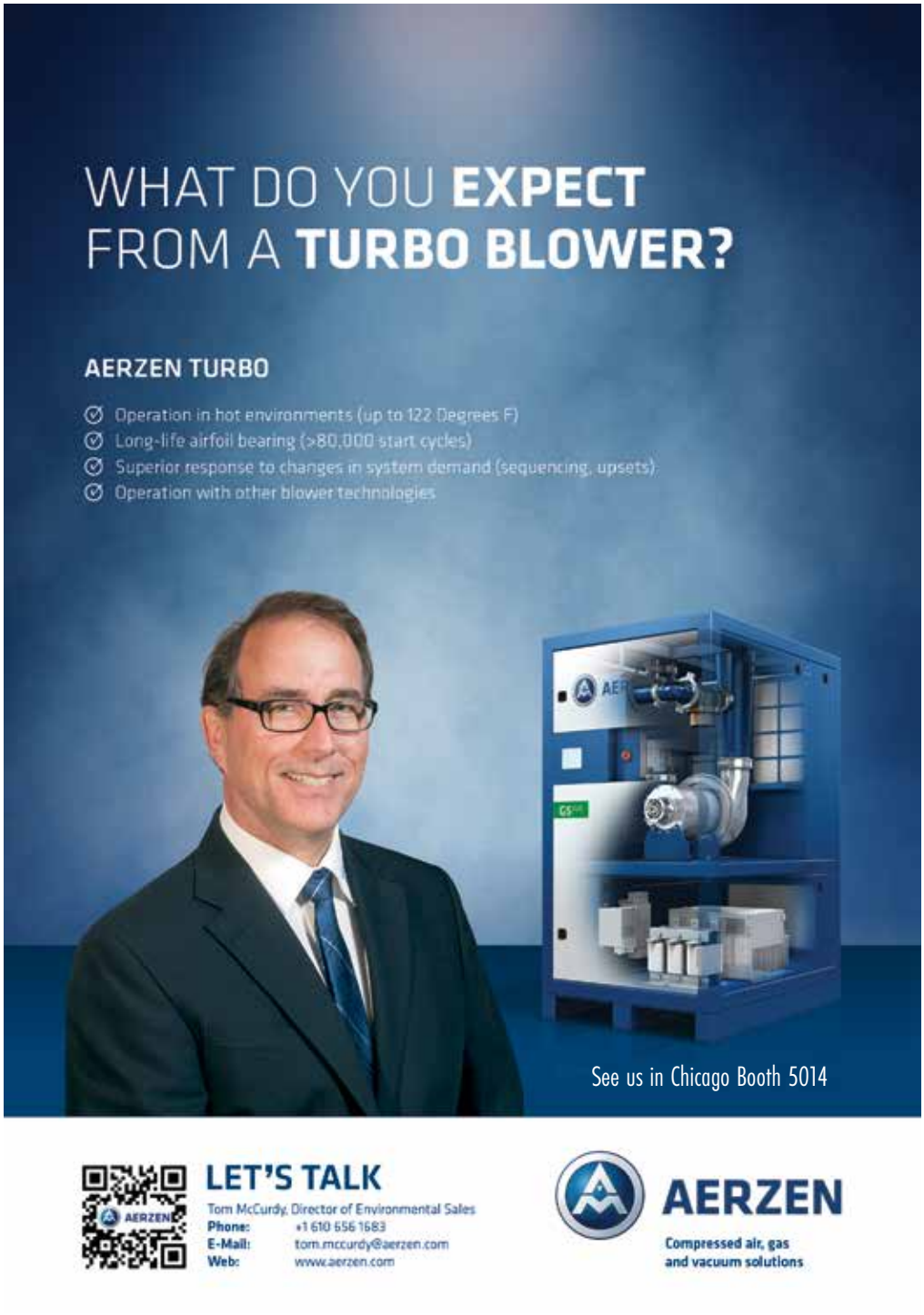
"So I started working like 12-hour days to walk the whole system, just to make sure that the power was on. I ended up finding 10% of the tanks had their power shut off. Thankfully, there were no overflows at the 24 powerless tanks, but it was a close call."

Slabaugh observes, "When Larry turned those knife switches back on to restore power to those tanks, he also installed heavy-duty zip ties to hold them in place. That way, heavy snow or ice won't be able to force them open next time."

No plans to quit

Despite the physical challenges of his work, Peterson loves his job. That's why he plans to stick with it for the foreseeable future.

"I really enjoy just working alone," he says. "I also know that if there's something that's been done, it's because I did it. If there's something not done, it's because I didn't do it. I feel full ownership of this system up here. I love that. I mean, it's mine to do whatever happens to me. So I actually enjoy that. I have a lot of pride and ownership here." **tpo**



> "We want students to get top-notch information and be exposed to professionals from a wide range of fields."
> **LARA HOOPER**

Water poetry contest winners display their certificates and ribbons.

Keeping Kids Engaged

A POPULAR NEW HAMPSHIRE WATER FESTIVAL AND SCIENCE FAIR PRESENTS STUDENTS WITH A FULL DAY OF THOUGHT-PROVOKING ACTIVITIES

By Sandra Buettner

The New Hampshire Department of Environmental Services started its water festival 31 years ago to engage fourth graders in learning about the role of water in their lives and how our actions affect water resources.

"The festival has evolved over the years, but our mission has not," says Lara Hooper, drinking water and groundwater education coordinator for the department. "In fact, we added another goal, and that is to empower students to help protect our waters."

FORMING THE FESTIVAL

New Hampshire is home to almost 1,000 lakes and ponds. Protecting watersheds from wastewater discharges and nonpoint pollution is critical.

Soon after creating the festival, the department partnered with Manchester Water Works to start the New Hampshire Water Science Fair state finals at the festival. At the same time, NHDES built a coalition with federal, state, regional and municipal organizations to ensure robust and nuanced water education. Today, the festival events are organized by coalition partners Keene Public Works, Manchester Water Works, the New Hampshire Water Works Association, Plymouth Village Sewer and Water District, Concord General Services, RCAP Solutions and NHDES.

Then, in 2018, NHDES added a water poetry contest to engage the students more inclined to the arts. This enables third through fifth graders with varied interests to take part. "We want to engage all kids at those formative ages and impress upon them that the water cycle knows no borders," Hooper says.

NHDES works directly with teachers and elementary school principals to promote the festival. The department also posts the information on its website (https://nhwaterfestival.org) and promotes the event through social media. The festival rotates around the state to four regions. The supporting utilities encourage educators to participate.

VARIED ACTIVITIES

The festival is held during the first full week of May as part of National Drinking Water Week. The children arrive at 8:30 a.m. and the festivities start at 9 a.m. About 400 students typically attend.

Students participating in the state Water Science Fair finals spend the morning presenting before panels of judges for the state title. Meanwhile, students at the festival are divided into groups and attend multiple 20-minute lessons. An exhibitor tent includes variety of activities from which students can choose.

Volunteer science fair judges and festival presenters come from various fields in the water industry, including water and wastewater operators, engineers, lab technicians, foresters, research scientists, geologists, land conservationists, wildlife specialists, university professors, environmental education center professionals, and staff from NHDES and the state Department of Transportation.

"We want students to get top-notch information and be exposed to professionals from a wide range of fields, so they know that there are many, many

(Continued on page 34)

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(Continued from page 32)

ways to take care of water and our planet," Hooper says. "Our volunteers are amazing." The topics and current issues the various experts bring to the festival include:

- Water taste testing competition from utilities
- Glacier ice core samples
- Camera tours of septic system pipes
- Plant tours
- Pipe tapping
- Taxidermy of animals in a watershed
- Stormwater runoff
- Watersheds, pollution and erosion
- Water science
- Impacts of climate change on water

About halfway through the day the kids take a lunch break and enjoy a concert. In the afternoon the science fair and poetry contest winners are announced and poetry winners share their entries. Cash prizes and gift cards are awarded for first, second and third place and honorable mention. The students' choice for the Best Tasting Water is also announced.

Organizers work with presenters so that lessons create little to no waste. Instead of bottled water, a water fountain and refill stations are set up for attendees.

FESTIVAL FEEDBACK

Thank you cards and feedback from the students and teachers are always incredibly positive and uplifting to the organizers. One student wrote that she wanted to repeat fourth grade so that she could come to the event again.

"Our presenters and volunteers also leave the event changed," says Hooper. "They leave knowing they have made a difference. That makes them feel good and excited about coming back for next year's event." **tpo**

ABOVE LEFT: A water festival activity teaches students about capturing stormwater runoff. ABOVE RIGHT: A student at the water festival prepares for a lab activity.

What's Your Story?

***TPO* welcomes news about your public education and community outreach efforts for future articles in the Hearts and Minds column. Send ideas to: editor@tpomag.com or call 877-953-3301**

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A 1.8 mW solar array takes up about four acres of the 17-acre recycled water storage pond at the Town of Windsor Water Reclamation Facility in Northern California.

Small Town Thinks Big

A NORTHERN CALIFORNIA COMMUNITY AIMS FOR NET-ZERO TRIFECTA COVERING ENERGY USAGE, WASTEWATER RECYCLING AND BIOSOLIDS REUSE

By Steve Lund

Significant progress toward net-zero power consumption with solar energy only made the staff at the Town of Windsor Water Reclamation Facility in California think even bigger.

Why not go for an environmental impact trifecta: net-zero power, net-zero effluent discharge and net-zero biosolids waste?

"We started to really look at the way things are run," says David Ernst, wastewater superintendent. "We said if we can recycle everything we have with 100% renewable energy, then let's do it. It sounds like a lofty goal, but I think it's within reach for our town."

LOOKING DEEPER

The California utility completed a modernization study in 2019 that suggested some improvements to the plant, notes Veronica Siwy, deputy director of water and environmental management.

"When we looked at some of the improvements, we realized that if we just tweaked them a little bit, some things we had to do anyway, we were really close to achieving the net-zero concept," Siwy says. "And then we figured if we could pursue that goal while achieving some of the necessary improvements, then Windsor could achieve something really cool."

The Town of Windsor, population 26,000, is in Northern California about 45 miles from San Francisco. The water reclamation facility (2.25 mgd design, 1.2 mgd average) uses an activated sludge process with tertiary filter (Parkson DynaSand) and UV disinfection (a Trojan Signa system is scheduled for installation in 2024).

A large portion of the effluent is stored in a pond and used for irrigation. Effluent that can't be recycled or stored flows into the Russian River via Mark West Creek. Biosolids are stored in ponds that have aerated water caps (Fluence Tornado aerators) to control odors. The solids are collected once a year by a contractor, centrifuged and applied to farm fields as Class B material.

SOLAR PANELS FLOAT

The town has a goal of net-zero carbon emissions by 2030. Solar power for the reclamation facility was the first step, since the plant was the source of 45% total greenhouse gas emissions. However, the town didn't have enough land for a large solar array.

The solution was to use the surface of the 17-acre recycled water pond. The town entered a power purchase agreement with Ciel et Terre USA for a 1.8 mW floating solar array. Nearly 5,000 solar panels occupy about four acres of the pond, anchored to the berms around the pond so that they rise and fall as the water level fluctuates. Typically, the water is low in the summer, when demand for recycled water is highest.

The solar array went online in October 2020 and has done what utility staff intended: produce a large portion (72%) of the power for the treatment plant, the public works yard and administration building, and a pump station. The project won a 2021 California League of Cities Helen Putnam Award of Excellence in public works, infrastructure and transportation.

> "I think the drought made us all a little more creative. It's been unfortunate, but the positive side of it is giving people the drive to find better solutions for water management."
> **VERONICA SIWY**

"We're all very proud of it, and it has given us the energy to pursue even more sustainable projects," Siwy says.

FIVE-PART PLAN

The successful solar project led to a five-part plan to get all the way to net zero on power consumption, biosolids and recycled water. The plan, some parts in early development, involves updating parts of the reclamation plant, increasing recycled water infrastructure and collaborating with other utilities to develop regional water and wastewater solutions.

"We're trying to implement these five parts together, so that all of these benefits come into play at the same time," says Ernst. "That makes it exciting. We need all of these parts to work together so everyone has the best chance of success." Here's a closer look at the plan:

Aeration basin improvements

The utility plans to redesign or replace the secondary clarifiers; redesign or replace pumps, blowers and aerators; and to build a new aeration basin. The project is in early design but is expected to reduce energy use and operating costs, provide higher-quality recycled water, and offer some infrastructure redundancy.

Biosolids handling improvements

Ernst thinks this will provide the biggest sustainability gains. It includes converting open-air biosolids ponds to contained structures (BioDryer units) from Bioforcetech to produce 90% dry Class A EQ biosolids and recoverable heat.

The biosolids can be further refined through a separate pyrolysis process (high temperature without oxygen) to create biochar, a carbon-rich product that has numerous applications. Resulting syngas can be captured and burned to provide heat to continue the process. *(Continued on page 38)*

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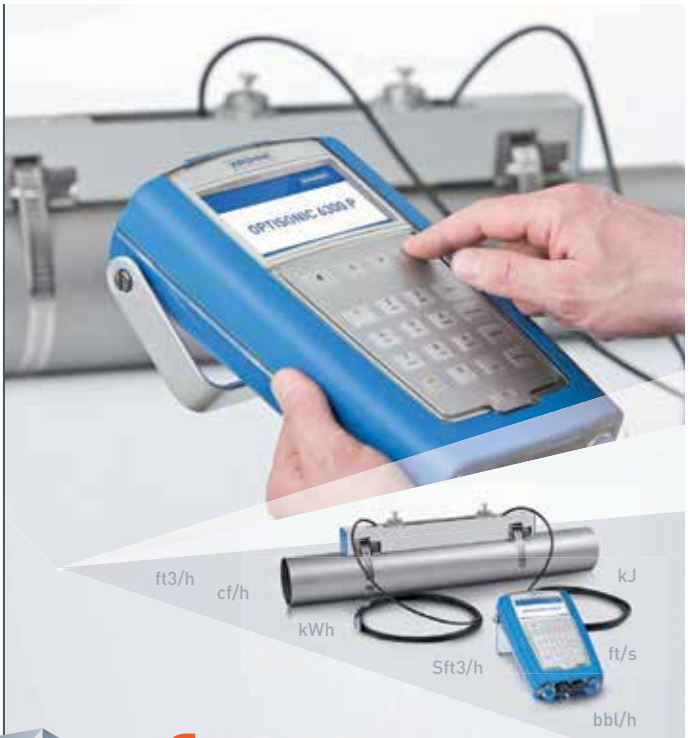

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(Continued from page 36)

"You end up using the greenhouse gas that is released through pyrolysis, similar to biogas capture in conventional anaerobic digestion," Ernst says. "It does take some outside energy to kick the process off, but through drying and pyrolysis, you release methane, which then can be burned to fuel the process." Some research indicates that pyrolysis may be effective at destroying PFAS.

Extending the recycled water system

The town plans to run a recycled water pipeline to a business district near the airport for irrigation. New residential developments are already required to have purple pipe systems, but so far not all are supplied with recycled water. Residents are usually eager to connect because recycled water costs less than potable water and is available even during drought when potable water use is restricted.

As the recycled system grows, potable water demand declines, conserving that resource. Also, the more wastewater is recycled, the less effluent goes to the river. In 2022, Windsor recycled 92% of its effluent. Surplus recycled water from the low-demand winter season can be stored to boost the supply for summer.

The Windsor Water Reclamation Facility staff includes, from left, Jason Sachs, operator; Jourdan Illingworth, utility maintenance mechanic; Fred Oster and Todd Darlington, operators; David Ernst, wastewater superintendent; and Richard Bevan and Mathew Underwood, operators.

Combining with a nearby wastewater treatment plant

The town proposes to combine with a Sonoma Water treatment plant that needs an upgrading. Windsor's plant can handle the added flow and could use some infrastructure at the other plant to increase recycled water storage capacity.

Regional collaboration

A group known as the Russian River Reuse Collaborative began meeting in fall 2022. Members besides Windsor include the cities of Cloverdale, Rohnert Park, Healdsburg and Santa Rosa and Sonoma Water. The group meets bimonthly to discuss regional opportunities for beneficial reuse and to promote regional planning to maximize resources.

"We realized that when we fit these components together, we could get to net zero," Siwy says. "It was like a puzzle. Windsor is proud of the work we've done on sustainability. We feel like this could be another step in that direction."

Northern California had a wet winter in 2022-23, so drought-related restrictions were lifted. Siwy thinks the drought made a lasting impression, helping create interest in regional cooperation: "I think the drought made us all a little more creative. It's been unfortunate, but the positive side of it is giving people the drive to find better solutions for water management."

Although most of the five-part plan is still in design, Ernst is encouraged by the progress toward the three net-zero targets: "We have a ways to go, but at the same time, I think we're very close. When all these projects come online, net zero is within reach." tpo

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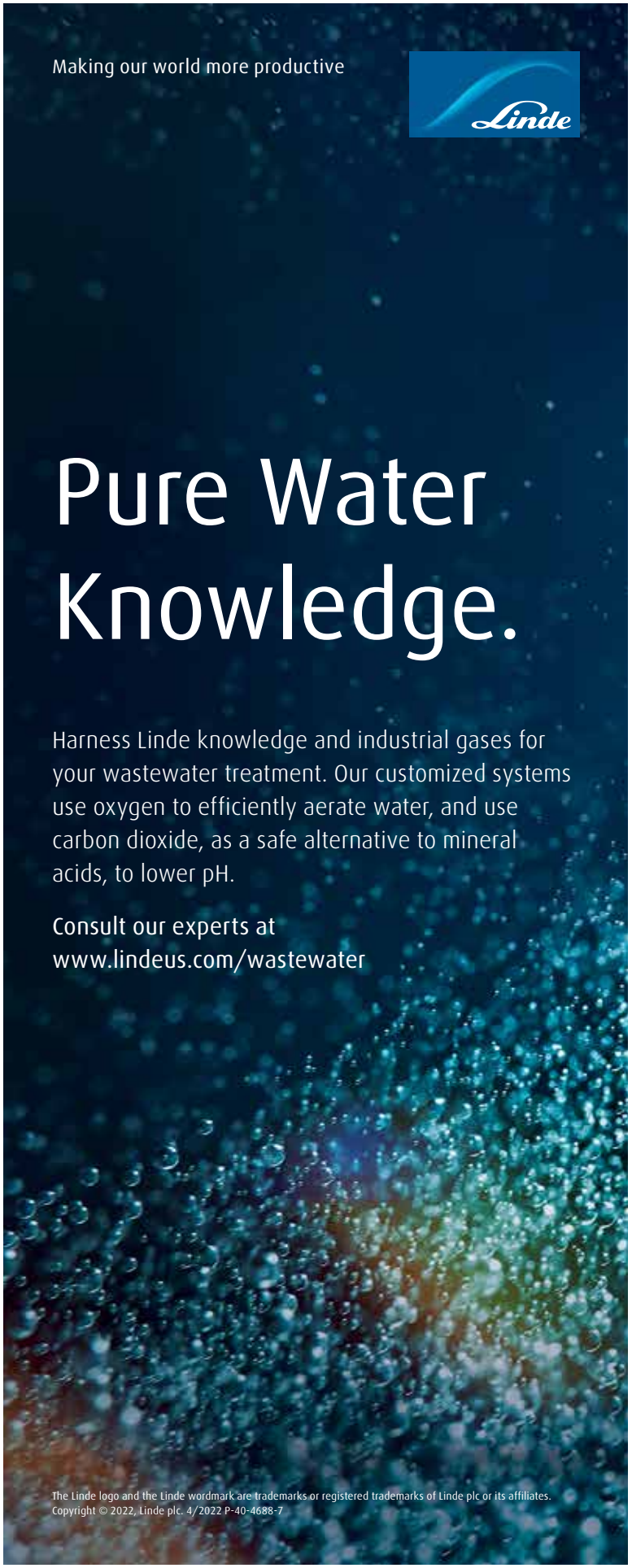

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A HYBRID ACTIVATED SLUDGE TECHNOLOGY OUTPERFORMS LAGOON TREATMENT AND ENABLES YEAR-ROUND PERMIT COMPLIANCE FOR A SMALL COLORADO DISTRICT

By Daniel Dair

The BIOCOS process is a hybrid activated sludge system in which all mixing and recycling are driven by blower air, significantly reducing energy usage.

In today's economic and social climate, federal and state agencies are tightening wastewater discharge permits and pushing clean-water facilities to adopt more sustainable practices.

In line with that, many treatment plants are upgrading their systems to match or outperform the new regulatory limits. One example is the Edgemont Ranch Metropolitan District, 6 miles northeast of Durango, Colorado.

The district's treatment facility (175,000 gpd design, 138,000 gpd average) is using an innovative treatment solution as part of an upgrade that has improved operations and enabled compliance with more stringent limits. Besides improving effluent quality, the technology, BIOCOS from World Water Works has enhanced energy efficiency.

SEASONAL STABILITY

The Edgemont Ranch facility services a 710-unit housing development consisting of 35-year-old single-family homes that previously were hunting cabins. When originally built, the cabins all had septic systems.

Edgemont Ranch lies in the watershed of the Florida River, a tributary of the Animas River. Downstream of the treatment facility are agricultural irrigation reservoirs that experienced algae blooms, possibly attributed to the district's nutrient-rich effluent.

The Florida River is considered the largest contributor of *E. coli* to the Animas River, largely because of many septic systems in the area. As a point source of pollution Edgemont Ranch saw its discharge limits for ammonia, total inorganic nitrogen and other contaminants tightened by the state Department of Public Health and Environment.

The treatment facility previously used a connected series of aerated and non-aerated lagoons to treat wastewater. Lagoon operation was simple but lacked flexibility, and energy usage was high because of older equipment, including two blowers that had to run continuously to keep the aerated lagoon well mixed.

A BETTER DESIGN

Because lagoon-based systems are vulnerable to cold temperatures, Edgemont Ranch was unable to nitrify for several months of the year in its high-mountain climate, where water temperatures could drop close to freezing. Small upgrades such as covering over the lagoons could not meet stricter effluent standards.

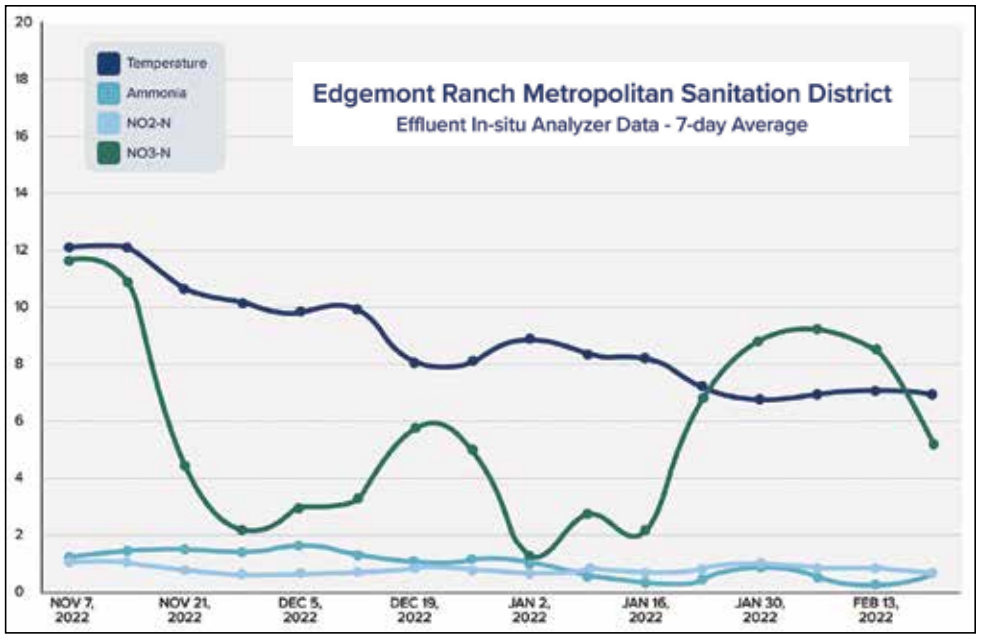
As a remedy, the district looked to the BIOCOS technology, a hybrid activated sludge system designed to deliver more thorough treatment than conventional systems. The system was designed by Element Engineering based in Lakewood and installed by Integrated Water Solutions of Longmont.

It consists of two aeration tanks (AIR tanks) hydraulically connected to an alternating pair of sludge recycling and settling tanks (ALT tanks). The design is built with redundancy in mind, enables continuous wastewater processing, and promotes removal of BOD, TSS, TIN and total phosphorus.

All mixing and recycling are driven by blower air, significantly reducing energy usage and maintenance while simplifying treatment. Multiple SCADA-driven aeration control loops based on dissolved oxygen, ammonia and ammonia versus NOx allow operators to set concentration thresholds and provide flexibility to meet the new discharge limits.

HYBRID PROCESS

The BIOCOS system was started up in July 2022. Raw wastewater passes through a standard headworks including a 6 mm screen and a grit removal system. The preliminary-treated water is pumped to a BIOCOS SEL tank, an unaerated portion of the AIR tank.



The BIOCOS process meets newly strict effluent permit limits year-round, something the previous lagoon system could not do.

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From there, the blower delivers process air to the AIR tanks, supporting the growth and cultivation of beneficial bacteria. The blower air is also used to create an airlift that moves the thickened sludge layer from the bottom of the ALT tanks and back into the SEL tank, where it mixes again with the influent wastewater.

The BIOCOS process has reduced energy costs by nearly 50% while providing a high level of treatment. It enables the facility to meet effluent limits year-round.

The system includes the inDENSE selective sludge wasting process, which uses hydrocyclones. This form of wasting retains the heavier, easier-to-separate bacteria while the lighter, less desirable populations are discharged as waste activated sludge.

After settling, the cleaned water exits the ALT tanks and runs through a UV disinfection system. The final effluent, meeting all permit limits, is discharged to the Florida River.

The process has reduced energy costs by nearly 50% while providing a high level of treatment. It enables the facility to meet effluent limits year-round.

The discharge permit requires 20 mg/L TIN; the BIOCOS process achieves 1.5 to 2.0 mg/L. It also removes more than 95% of BOD and TSS. The advanced activated sludge process has given the Edgemont Ranch facility greater operational flexibility and environmental resilience.

ABOUT THE AUTHOR

Daniel Dair (dair@worldwaterworks.com) is vice president of innovation with World Water Works. tpo


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Different Chemicals. Different Pumps.

CLEAN-WATER PLANT OPERATORS CAN OPTIMIZE OPERATIONS BY SELECTING THE BEST-FIT METERING PUMP TECHNOLOGY. HERE'S SOME PRACTICAL ADVICE TO FOLLOW.

By Eulis Ester

1. Hydraulic pumps in this skid are designed to inject a single chemical to four locations (Keen Solutions). Pressure gauges have block valves so that they can be replaced without stopping the system.
2. Solenoid-actuated diaphragm metering pumps offer highly reliable dosing accuracy even when working with extremely low flow rates and operating pressures.
3. Peristaltic pumps (shown in a skid assembly) have no valves that can clog. When the pump is shut down, viscous liquids that might solidify or become gelatinous when resting will hinder pump operation.

At first glance municipal wastewater treatment seems straightforward. Wastewater flows into the plant, gets purified to permit requirement and is released to the environment or reused.

In reality, treating wastewater is a complex that depends on dosing with chemicals that regulate a variety of parameters and processes. A few of the common chemicals and their characteristics are:

Sodium hypochlorite. Most often used for disinfection, this chemical is among the most difficult to handle as it will corrode most metals and it cannot be mixed or stored with ammonia, acids, organics and reducing agents. It is also challenging for metering pumps because it tends to off-gas and can cause the pumps to become gas-bound. (This does not happen with peristaltic pumps; in diaphragm pumps it can be prevented with special vent valves.)

Sulfuric acid. This acid is used for pH adjustment, mostly in a concentrated form. Concentrated solutions can often be handled with vessels of Alloy 20 or PVDF, while more corrosive dilute solutions require plastics such as PVC or PVDF.

Sodium hydroxide. Also used for pH adjustment, this chemical is supplied 25% to 50% solutions. It is incompatible with metering pump elastomers, such as FKM in O-ring seals. In higher-strength solutions, it tends to gel in pumps left idle for a time. Flush valves or special pump heads can address the issue.

Sodium bisulfite. This common dechlorinating agent requires a mixer to keep it in solution in the metering pump supply tank. Plastics such as PVC and PVDF and metals such as 316 stainless steel are suitable for handling this chemical.

Emulsion polymer. Fed as a coagulant to assist in biosolids dewatering, these chemicals are often extremely viscous and are shear-sensitive once hydrated. Diaphragm pumps with high-viscosity head designs or peristaltic pumps are often required.

VARIETIES OF METERING PUMPS

Faced with this array of chemicals, and sometimes others, each with unique handling and usage characteristics that must be followed to the letter, plant operators must select the most appropriate metering pump technology for each dosing application.

There is no one-size-fits-all solution to metering pump selection. In fact, creating the most efficient, effective and safest chemical-handling most often requires using different pump technologies for different chemicals. Here's a look at four pump technologies that when deployed properly can play a key role in optimizing treatment operations.

Mechanical diaphragm

Mechanically actuated diaphragm metering pumps offer an ease of operation and startup, making them attractive for many applications. They normally offer lower initial cost than other motor-driven pump designs, especially at higher flow rates, but they can have higher operating costs.

These pumps offer excellent suction lift and can handle liquids such as sodium hypochlorite that off-gas, and more viscous chemicals. This is because the diaphragm is attached to the piston for a positive return, usually aided by a spring. These pumps are somewhat limited in discharge pressure capability, many being around 100 to 235 psi. Repeatable accuracy is about +/-2%. An external relief valve usually needs to be added to prevent damage in over-pressurized situations.

Hydraulic diaphragm

Hydraulically actuated diaphragm metering pumps are well suited for the harshest chemical-handling conditions; they are low-maintenance pumps designed for 20 years of service. This is because most of their moving parts are submerged in a bath of hydraulic fluid.

In addition, the diaphragm is hydraulically balanced meaning that the hydraulic fluid is on the oil side of the diaphragm while the chemical being pumped is on the wetted (or process) side. The piston, internal to the pump, pushes oil against the diaphragm but never directly contacts it. These units can pump against extremely high pressures if need be, so long discharge lines are not a problem.

Hydraulic diaphragm pumps are also equipped with an adjustable internal relief valve that prevent over-pressure and resulting pump damage. They offer a repeatable dosing accuracy of +/-1%.

Solenoid diaphragm

Solenoid actuated (or electronic) metering pumps are a viable economical option for low-flow, low-pressure chemical-dosing. They are generally available to a maximum of 20 gph, and at those capacities maximum pressures are normally about 30 psi. The lower and medium capacities are compatible with pressures of 100 to 150 psi with low flows (less than 1 gph) to over 200 psi. They offer a repeatable dosing accuracy of +/-3%. They normally include an onboard relief valve to prevent pump damage from over-pressurization.

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Peristaltic

This pump technology is simple in design and well suited for handling viscous and abrasive chemicals. Because the design includes a rotor with shoes or rollers that squeeze the hose or tube and force the liquid to the discharge port, peristaltic pumps can run dry.

Peristaltic pumps do not have valves that can become clogged. This is important when a pump needs to be shut down during a product run. The lack of valves eliminates clogging especially when handling viscous liquids or those that will solidify or become gelatinous when resting.

GETTING ASSISTANCE

While all these pump technologies can provide significant benefits, the key challenge is knowing which pump is best for each chemical metering application. This is where the pump manufacturer can lend a hand. Many manufacturers also offer most of the components included in a complete chemical-feed system: relief and back-pressure valves, calibration columns, tanks, mixers, injection quills and control panels. While the task of properly outfitting a treatment facility may seem overwhelming, manufacturers of the various components or complete system can be a valuable source of assistance.

The variety of chemicals required for various treatment processes can pose risks for plant operators. With multiple variables to consider, such as flow rates, viscosities, compatibility issues, pH levels and handling characteristics, an array of pump types must be deployed to ensure optimized operations.

Mechanical, hydraulic and solenoid metering pumps, along with peristaltic pumps, have been proven to offer excellent capabilities. When properly applied, these technologies can help overcome operators' concerns — and the pump manufacturers stand ready to lend a hand, ensuring that treatment systems will reliably operate at the highest level.

ABOUT THE AUTHOR: *Eulis Ester (eulis.ester@psgdover.com) is product manager with PSG, a Dover company, for Neptune and Abaque products.* tpo

Chlorine analyzers like this APFCL unit from Blue-White Industries operate without reagents, saving money and maintenance.

Measuring Chlorine

ANALYZERS FROM BLUE-WHITE INDUSTRIES HELP WATER PLANT OPERATORS ENSURE ADEQUATE DISINFECTION THROUGH THE DISTRIBUTION SYSTEM

By Ted J. Rulseh

Chlorine is a reliable and widely used disinfection agent for drinking water. When dosed correctly, it kills a broad range of pathogens and is safe for people and animals to consume.

Accurate dosing is essential, since inadequate chlorine might not kill the most harmful pathogens, and too much will give the water an unpleasant taste or smell. For that reason, water plant operators monitor chlorine levels before the water enters the distribution system.

Measuring chlorine isn't as simple as finding that the water contains X parts per million. The most critical value is free chlorine — the amount available to actually destroy pathogens. The higher the free chlorine level, the greater the disinfecting power.

A proven way to measure chlorine in real time is with analyzers, such as those supplied by Blue-White Industries. Since late 2022 the company has offered two such analyzers: the APFCL for measuring free chlorine, pH and temperature; and the APH2O Multi-Parameter, which measures the same three parameters plus ultra-low turbidity.

Both help operator consistently maintain the desired level of free chlorine in the water going out to customers' taps. Patrick Murphy, vice president of operations with Blue-White, talked about the instruments in an interview with *Treatment Plant Operator.*

tpo: Are these your company's first analyzers?

Murphy: Yes. Previously we focused mostly on metering pumps and flowmeters.

tpo: What was your motivation for introducing these chlorine analyzers?

Murphy: We discovered that our customers always had some kind of analyzer to measure the quality of finished water, whether turbidity or chlorine levels. Many customers asked us to offer analyzers, and so we decided to create those products for them.

tpo: What makes these products different?

Murphy: For chlorine analysis we use Bare-Gold electrodes, which require no reagents. No chemical needs to be put into the water to cause a reaction. The electrode itself collects the information needed to give the proper free chlorine reading. In addition, the devices have no membranes, which can become fouled and lead to false readings.

> "For chlorine analysis we use bare gold electrodes, which require no reagents. No chemical needs to be put into the water to cause a reaction."
>
> **PATRICK MURPHY**

tpo: Why is it beneficial for the analyzers to operate without reagents?

Murphy: Reagents are expensive and can be hazardous and time-consuming to use. They are something that has to be constantly used and cleaned out. With our devices the gold electrode can simply be cleaned and put right back into the sample. Gold also resists electrical interference.

tpo: Do the instruments also measure total chlorine?

Murphy: Yes. The free chlorine measurement is important because users need to know they have effective disinfection as the water runs through the piping system. Total chlorine is important because they also need to make sure the combined chlorine in the water is not at an excessive level.

tpo: What is the exact mechanism by which the electrode converts the chlorine level into a readout on the analyzer?

Murphy: A voltage is applied across the electrode. The voltage causes an electrochemical reaction, which then generates an electric current. The amount of current generated is directly proportional to the amount of chlorine in the water.

tpo: How does the multi-parameter unit measure turbidity?

Murphy: Turbidity is measured by a second sensor, which uses a light-scattering method. A warm white light from an LED is sent into the sample of water, and the amount of light scattered by particles in the water is measured. More light is scattered as turbidity increases.

tpo: How and where are these analyzers deployed?

Murphy: The devices are housed in a building or a lab. They are not completely inline; they are on the side. Typically a valve opens to let a sample flow into a reservoir. The electrode then does what is necessary to collect the information needed for a proper chlorine reading.

tpo: What must be done to install and calibrate the instruments?

Murphy: You put the electrode into a reference sample that we provide and calibrate against that. Once you do that, the sensor is calibrated and will give you the proper reading on actual samples. Our sensors have a compensation algorithm for temperature and pH.

tpo: What maintenance is required for these devices?

Murphy: The only required maintenance is periodic cleaning of the electrode. If properly cleaned, the electrode will deliver accurate results for a very long time. Also, our flat bubble pH electrode design reduces potential for fouling. It provides a scrubbing action on the electrode to maintain cleanliness.

> "A customer should be able to turn it on and instinctively know what to do with it – almost like when you get a smartphone these days."
> **PATRICK MURPHY**

tpo: How do users interact with the instruments?

Murphy: Depending on the model, we have a touchscreen display or a 2.8-inch screen with a touchpad. They are simple to operate. Users just need to decide what they want to display on the screen, whether chlorine levels, pH, temperature or multiple parameters.

tpo: How easy is it to learn how to use the touchscreen?

Murphy: It's very intuitive. We try to make all our products simple, almost to where they don't require a manual. A customer should be able to turn it on and instinctively know what to do with it — almost like when you get a smartphone. tpo

New Technology Slated for Chicago 2023

By Craig Mandli

The 96th annual Technical Exhibition and Conference offers international water and wastewater professionals exposure to the newest products, along with water-quality education and training. This year's event, from Oct. 2 to 4 in Chicago, promises to show off some of the finest new products on the market for municipal water, industrial water and wastewater professionals. Below is a preview of some of the newest products that will be highlighted at this year's show.

AERZEN Rental Temporary Oil-Free Blowers

AERZEN Rental provides temporary **oil-free blower packages** engineered for aggressive rental environments with onboard variable-frequency drives, remote monitoring and outdoor builds with sound-attenuating enclosures. The rental units are available for immediate deployment in the event of a production failure or shortfall to longer-term operational leasing and rent-to-own.

844-400-2379; www.aerzenrentalusa.com; Booth 5014

AllMax Software Operator10 Wastewater

Operator10 Wastewater from **AllMax Software** is a leading software solution for wastewater management, catering to both industrial and municipal facilities. The user-friendly interface simplifies data collection, analysis and real-time monitoring of treatment processes, ensuring compliance with regulatory standards. Its automated data logging, customizable reporting tools and trend analysis empower operators to make informed decisions and promptly identify potential issues. The software's robust capabilities allow users to minimize downtime, reduce operational costs and maintain environmental compliance effectively, optimizing overall wastewater treatment system performance. Trusted by operators worldwide, it is a reliable and efficient solution to streamline wastewater operations.

800-670-1867; www.allmaxsoftware.com; Booth 819

Anaergia OmniMix

The high-thrust **Anaergia OmniMix** submersible mixer delivers 30,000 gpm of flow. Its gearless direct-drive motor averages less than 6 kW power draw. Ideal for varying solids content and feedstocks, it automatically adjusts torque and speed to avoid cavitation, abrasion and power loss. The mixer effectively mixes material from approximately 1% TS to 15% TS, and its anti-ragging sickle-shaped propeller sweeps backwards to prevent fibers from snagging. Operators can adjust mixer height and direction to break up floating layers and resuspend grit. Roof-mounted service box enables mixer access and servicing without taking digesters offline.

866-978-9785; www.anaergia.com; Booth 3643

Aqua-Aerobic Systems AquaPrime

The **AquaPrime** cloth media filtration system from **Aqua-Aerobic Systems** utilizes a disk configuration and OptiFiber PF-14 pile cloth filtration media to effectively filter high solids waste streams without the use of chemicals. Ideal for primary wastewater treatment and wet-weather applications, it has proven removal efficiencies and provides high-quality effluent, even under varying influent conditions. The system is designed to handle a wide range of flows in a fraction of space compared to conventional primary clarifiers. The filter's high solids removal in comparison to conventional treatment puts the technology in the advanced primary treatment category.

815-654-2501; www.aquaprimefiltration.com; Booth 4448

Aries Voyager

Technicians can navigate pipes and capture mainline details with the **Voyager** from **Aries.** The high-definition mainline inspection system is equipped with CANbus technology and a 1080p WiperCam camera for inspecting mainlines relined 6 to 48 inches and up.

800-234-7205; www.ariesindustries.com; Booth 1262

Asahi/America Series 19 MAV MultiPack

Asahi/America has expanded its Series 19 electric actuation line to include a multiturn unit capable of operating on diaphragm and gate valves. The **Series 19 MAV MultiPack** actuator, like all Series 19 actuators, comes standard with multivoltage capability, a visual position indicator, an LED light to indicate valve position or fault, and auxiliary contacts. Controlled by firmware, it is available in two sizes to meet valve torque requirements and comes as an on/off or modulating unit. It mounts on Asahi/America Type-14 1/2- to 4-inch diaphragm valves and 1 1/2- to 4-inch gate valves.

800-343-3618; www.asahi-america.com; Booth 2255

BDP Industries 3DP Belt Press

The **3DP Belt Press** from **BDP Industries** is the proven, reliable machine for all types of dewatering applications. Recent improvements to this modern belt press have led to increased odor control and solids containment. New features include odor hoods, mist-reducing showers, piped away filtrate, and increased automation. According to the maker, the increased containment of material has led to an even more efficient machine, while also becoming more operator-friendly. Contact BDP for more information or come see our machines and speak with us in person in Chicago!

518-695-6851; www.bdpindustries.com; Booth 3612

Blue-White FLEXFLO M5 Peristaltic Metering Pump

The **FLEXFLO M5 Peristaltic Metering Pump** from **Blue-White** is an advancement in high-volume, precision chemical feed. It is fully enclosed, easily configurable and does not require external control devices to operate. The pump features a large 5-inch display for easy viewing of

simple, intuitive touchscreen controls. Its remote control signal options include Pulse, 4-20mA, Modbus TCP, EtherNet/IP, and PROFIBUS for enhanced supervision and automation for critical metering and transfer applications. The energy-efficient unit delivers outputs of 0.0302 to 534 gph at just 75 rpm motor speed, maximizing energy efficiency. Because it's a peristaltic pump, it will not vapor lock or lose prime.

714-893-8529; www.blue-white.com; Booth 1248

Bright Technologies, Division of Sebright Products, Belt Filter Press

The compact 0.6-meter skid-mounted **belt filter press** from **Bright Technologies, Division of Sebright Products** has stainless steel frame and roller construction as well as radius wedge zone and wing roller for sludge dewatering. Components include a sludge pump, polymer system and washwater booster pump. Options include a sludge flowmeter, air compressor and discharge conveyors. The compact walk-around skid design can be utilized in as little as a 10-by-20-foot floor area. Rates of 25 to 50 gpm make it ideal for small applications or when a processor has outgrown dewatering containers.

800-253-0532; www.brightbeltpress.com; Booth 2801

CLA-VAL 63 SERIES

The **CLA-VAL 63 SERIES** is an electronic pump control valve designed for installation on the discharge of booster pumps to eliminate pipeline surges caused by starting and stopping the pump. The valve is controlled using the CLA-VAL PC-22D Pump Control Panel installed with programmable control curves for optimum opening and closing rates customized to the specific application. It also has the option to interface with SCADA systems for retransmission of pressure, flow rate, valve position and valve alarms.

800-942-6326; www.cla-val.com; Booth 3302

Crane Pumps & Systems Barnes SITHE Chopper Pump

The **Barnes SITHE Chopper Pump,** distributed by **Crane Pumps & Systems,** is a versatile and efficient solution that will solve clogging problems in any application — saving time, money and resources. The chopper features the option to select either an oil- or air-filled motor to suit the application. Both options solve clogging with a patented chopping technology that slices even the most troublesome solids in the waste stream. This premium efficient IE3 motor delivers significant energy savings and is easy to service. The dry-run submersible motor combined with proven chopping hydraulic performance can handle anything thrown it's way.

937-214-9008; www.cranepumps.com; Booth 2908

Eagle Microsystems PS-2000 Multifunction Controller

The **Eagle Microsystems PS-2000** is a multifunction controller capable of being configured as a process controller, sensor monitor and data logger. It can fulfill a large number of tasks that would normally require multiple separate instruments. This is accomplished by its ability to accept a wide variety of input signals and the availability of up to 10 user-configurable relays. The multifunction controller uses a color touchscreen interface allowing for intuitive operation and configuration.

610-323-2250; www.eaglemicrosystems.com; Booth 4045

EBARA Pumps Ameracas DKEU/DKEXU

EBARA Pumps Americas recently released the **DKEU/DKEXU** submersible wastewater product line. These pumps are designed with improved hydraulics to match anti-clog performance and operating efficiency conditions. Technical features such as semi-open backswept impellers, grooved suction covers, internal cooling system and IE3 efficiency motors make up a competitive class offering. The pumps will offer discharge sizes 2 through 10 inches and horsepower ranges from 2 to 60, with dry pit and six-pole versions available.

803-327-5005; www.pumpsebara.com; Booth 1635

ELODE USA Electro-Osmosis Dehydrator

The compact **Electro-Osmosis Dehydrator** from **ELODE USA** can easily retrofit in line with many existing presses. It is specified to reduce sludge disposal cost by 60% by producing much drier sludge cake. It uses the electrical potential difference in the sludge cake to separate water in the process and it works on 95% of municipal cakes tested without any chemical, polymer, heat nor mechanical press. It can be used to turn 15 to 20% DS cake to 40 to 45% DS quickly.

201-568-7778; www.elodeusa.com; Booth 7739L

Emerald Coast Manufacturing WAVE

The **WAVE** from **Emerald Coast Manufacturing** is an all-climate, heavy-duty vacuum wastewater sampler. The ABS/acrylic case provides superior weather protection, according to the maker. Its 7-inch color touchscreen grants ease of programing and status viewing. This refrigerated sampler provides composite sampling with high accuracy, and the powerful vacuum system will lift nearly 30 feet. It is completely user-friendly. Sample size can be programmed, and the system will automatically adjust to ensure an accurate repeatable sample.

850-469-1142; www.emeraldcoastmfg.com; Booth 5153

Flomatic Valves Model 408S6 Ball Check Valve

With today's increasing use of nondegradable sanitary products, **Flomatic Valves** offers a solution to meet the harsh complexities of congested wastewater systems — the AIS-compliant **Model 408S6 Ball Check Valve.** It is AIS compliant and designed according to AWWA C508 standard lay lengths. The self-cleaning model has no sharp edges or snag points, helping to prevent clogging from nondegradable sanitary products. There are no moving parts except for the Buna-N vulcanized metal ball.

800-833-2040; www.flomatic.com; Booth 4821

Fournier Rotary Press

The **Fournier Rotary Press** is an innovative dewatering solution that simplifies the process of separating water from solids. It achieves this using slow-rotating filter screens and a restricted cake solids outlet. This technological advancement can produce a drier cake and cleaner filtrate compared to traditional belt presses, centrifuges or screw presses. One of the main advantages of the press is its ability to deliver cost savings in terms of operations and maintenance. Fournier offers

free laboratory testing on sludge samples from treatment plants and provides full-scale onsite piloting. Rental units are available.
800-463-6328;
www.fournierdewatering.com;
Booth 848

Franklin Electric FPS FVT Series Vertical Lineshaft Turbines

From deep-set vertical lineshaft turbines delivering 2,500 feet of head — to axial-flow turbines moving 35,000 gpm — **Franklin Electric's** array of pumping solutions is engineered to handle the toughest applications. **FPS FVT Series Vertical Lineshaft Turbines** are ideal for commercial, municipal or industrial applications where water supply is readily available. Plus, they come in a variety of configurations, including mixed or axial flow. Outfitted with ASTM A48 high tensile cast iron bowls, investment-cast 304 stainless impellers, and bronze bearings standard, operators get superior materials for proven durability, aligned with a highly efficient broad operating range.
866-271-2859; www.franklinwater.com;
Booth 4012

Hach RTC Software

Optimize your processes like never before with **RTC Software** from **Hach.** RTC software is now hosted on the SC4500 controller, allowing the user to take advantage of potential energy, chemical and labor savings, from a simple and environmentally friendly solution.
800-227-4224; www.hach.com;
Booth 1014

Halliday Products Series F Flushmount Floodtight Covers

Series F Flushmount Floodtight Covers from **Halliday Products** are made from highly durable aluminum and stainless steel, featuring EDPM compression gaskets, spring assists and stainless steel cam locks. They are structurally designed to support a 25-foot column of water.
800-298-1027; www.hallidayproducts.com;
Booth 448

Hayward Gordon HydroMix

The **HydroMix** hydraulic mixing system utilizes a **Hayward Gordon** solids-handling or chemical processing pump to recirculate and discharge the contents of a tank through strategically installed nozzles within the same tank. Systems develop a mixing regime in the fluid volume consisting of circular and top-to-bottom fluid motion. The mixing regime promotes the uniform blending of the contents and solids suspension. These systems develop fluid velocities of greater than 90% of the tank. They can obtain complete mixing in less than 120 minutes, and reduce maintenance with no moving parts located inside the tank. All projects are validated using computational fluid dynamics. Common mixing applications include anaerobic digesters, sludge storage tanks, equalization tanks and basins, crude oil storage tanks and chemical blending tanks.

855-693-8595; haywardgordon.com;
Booth 1635

InfoSense SL-RAT

Are staffing shortages adding extra stress to your job? **InfoSense's** new, turnkey service offering — using **SL-RAT** — can provide actionable information to focus cleaning resources and manhole maintenance requirements. Service teams can inspect over 10,000 feet of gravity sewer lines per day, providing all the data needed in a user-friendly, cloud-based GIS dashboard. Let us become the force multiplier that helps your team work smarter, not harder.
877-747-3245; www.infosense.com;
Booth 720

Inovair Blowers IM-Series

Inovair's highly efficient and durable **IM-Series** geared centrifugal blowers deliver a low total ownership cost. Thanks to the use of industry standard components, its proven design offers simplicity and affordability. It offers documented energy savings as high as 45% relative to PD and multistage blowers, and without the electrical complexity and durability issues seen in high speed turbo blowers. Customers are supported by the advantages of a vertically integrated manufacturer, with the maker controlling design, production, and service.
913-469-7244; www.inovairblowers.com;
Booth 5263

JDV Equipment Nozzle Mix System

The dual-zone **Nozzle Mix System** from **JDV Equipment** provides uniform mixing patterns that produce even distribution and a stable environment. It optimizes solids suspension and contact to promote efficiency in a wide range of applications. The system is designed with pumps installed outside the tanks and are typically chopper pumps or pumps incorporating in-line grinders. The high-velocity nozzles mounted inside the tank completely mix the tank contents. Applications include anaerobic digestion, biosolids storage, blending tanks, excess flow tanks, septage or leachate, anoxic zones, CSO handling, aerobic digestion, secondary treatment and biosolids holding ponds.
973-366-6556; www.jdvequipment.com;
Booth 3840

Keller America LevelRat

The **Keller America LevelRat** is built to provide reliable, low-maintenance service in wastewater level measurement applications. It offers 0.5% FS TEB accuracy, dual outputs (one analog and one RS485 digital), and models equipped with a 4-20mA analog output include Keller's guaranteed lightning protection at no additional cost. The LevelRat is available with or without a protective spacer and is built to order in the U.S. with a lead time of only three business days.
877-253-5537; www.kelleramerica.com;
Booth 2655

Komline-Wyssmont Turbo-Dryer

The **Komline-Wyssmont Turbo-Dryer** is a tried and tested dryer design for even, thorough, and rapid drying using a system of rotating trays which material is transferred onto one after the other. This high thermal efficiency, low-maintenance dryer produces Class A Biosolids. It offers a small footprint and low operating cost.
800-225-5457; www.komline.com;
Booth 2231

Lakeside Equipment Raptor Multi-Rake Bar Screen

The **Raptor Multi-Rake Bar Screen** from **Lakeside Equipment** is an efficient, proven screen technology for removal of inorganic solids

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that can be harmful to downstream equipment in municipal and industrial applications. The heavy-duty design provides durability and long life in the most severe conditions. High removal efficiency and low headloss is achieved with multiple rakes cleaning the screen and rake teeth penetrating the bar openings to positively remove captured material. The benefit is rapid debris removal for applications with a high screenings load at treatment plant headworks, pump stations or combined sewer systems. It is designed for rapid debris removal and deep channels, and offers coarse or fine screening, with spacing 3/16 inch and larger. Minimum headroom is required. It has a stainless steel design, with low maintenance and high performance.

630-837-5640; www.lakeside-equipment.com; Booth 1631

OZ Lifting Products Aluma-Lite 1000 Davit Crane

OZ Lifting Products' full range of innovative davit cranes and lifting solutions will be showcased in Chicago. These patented davit cranes are constructed of carbon fiber, composite, aluminum and steel, providing users with safe, lightweight and portable options for demanding applications. They allow wastewater and water professionals to lift more weight further out, which presents many benefits for various lifting and material handling operations. Visit the OZ Lifting Products booth to view our wide range of material handling solutions that can improve safety, efficiency and productivity in the wastewater industry.

800-749-1064; www.ozliftingproducts.com; Booth 8505

Saf-T-Flo Chemical Injection Saf-T-Seal

The **Saf-T-Seal** elastomeric duckbill tip from **Saf-T-Flo Chemical Injection** can be a timesaver when added to injection quills dosing sodium hypochlorite or ammonia. These chemicals are prone to forming deposits, which eventually lead to a clogged injection quill. The tip can be added to any 3/8- or 1/2-inch injection quill to help reduce tip clogging, extending maintenance intervals.

800-957-2383; www.saftflo.com; Booth 1357

SAVECO North America FOG BEAST

The **FOG BEAST** from **SAVECO North America** has been developed to process a more viscous type of waste. A sloped inlet guides the heavy materials into the screen and reduces sedimentation. A U-shaped flushing header cleans the tank between loads. This is a dual drive screening system that allows for the independent operation of the screen and transport tube. Drum speed can be slowed or increased to promote faster unloading and capture. Along with the dual drive flexibility, the drum sits at a 25-degree angle, which further aids in capture efficiency. The drum is supported from the top with an oversized slewing ring bearing. The top support feature eliminates the need for support arms at the inlet which collect debris.

815-636-8306; www.savecowaterna.com; Booth 1621

SEEPEX Smart Air Injection

Smart Air Injection is a **SEEPEX** customized system solution for pumping over long distances. The system uses compressed air and polymer injections to convey sewage or other media with a dry matter content of 20 to 40%, over distances of up to 1,000 meters. This combination ensures a low-pressure level in the delivery line, as well as low friction, which translates into a long life cycle and low operating costs. The system is easy to integrate into existing automation and control systems; reduces the pressure rating of the pipework and valves; and is an enclosed pipework system, eliminating unpleasant odors or rainfall dilution. Open hopper systems with Smart Conveying Technology reduce maintenance time by up to 85% with the maintain-in-place design, requiring no disassembly of discharge pipework.

937-864-7150; www.seepex.com; Booth 737

Sulzer Pumps Solutions HST Turbocompressor

The **HST Turbocompressor** from **Sulzer Pumps Solutions** offers an advanced design with digitally controlled magnetic bearing technology and a premium efficient high-speed motor driven through a built-in frequency converter. It has no mechanical wearing parts or lubricants requiring minimal maintenance. This is made possible by electronically controlled magnetic bearing technology, which levitates the integrated rotor/shaft/impeller single-piece assembly along the self-diagnostic features of the active magnetic bearing controller. The result is a compressor with no performance deterioration over time and no need for scheduled maintenance. They are widely used in wastewater treatment plants and in low-pressure industrial processes.

203-238-2700; www.sulzer.com; Booth 3625

Vactor 2100i

The **2100i** from **Vactor** provides the cleaning power needed to handle the toughest sewer challenges. This system employs advanced technology that not only enhances the performance of the equipment but the individuals who operate it — meaning less fatigue, more comfort, push-button operation, greater precision and superior power and performance. An international dealer network maintains a vast inventory of spare parts and offers fast shipment to any region of the world. Altogether, the rugged, reliable unit is easy to operate and maintain, and is an easy choice when you are looking for quality equipment that is built to last.

815-672-3171; www.vactor.com; Booth 3862

Vaughan Conditioning Pump

Don't miss the **Vaughan Conditioning Pump** on full display during this year's Operations Challenge. As a proud sponsor of the Vaughan Maintenance Event, we invite you to come support over 50 teams from around the globe working specific scenarios that include one of our most popular pumps. American-made and built to last, the pump is designed to be used in several different applications to save you from costly clean out cycles and maintenance.

360-249-4042; www.chopperpumps.com; Booths 1412 & 6831

VEGA Americas VEGAPLUS

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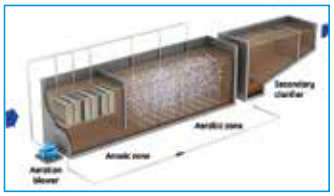
800-367-5383; www.vega.com;
Booth 4444

Veolia Zeelung

Upgrading wastewater treatment plants for capacity expansion or nutrient removal can be complex and expensive. The **Zeelung** membrane-aerated biofilm reactor from **Veolia** is a technology used to improve the conventional activated sludge process without having to construct new bioreactor tanks. It expands plant capacity and improves nutrient removal in a simple, fast and modular way while also reducing energy and mitigating GHG emissions. It is a platform for a suite of wastewater treatment applications, amongst them is zeeDENSE, a state-of-the-art product to obtain super-intensification of activated sludge, resulting in increased treatment capacity for biological reactors and secondary clarifiers.



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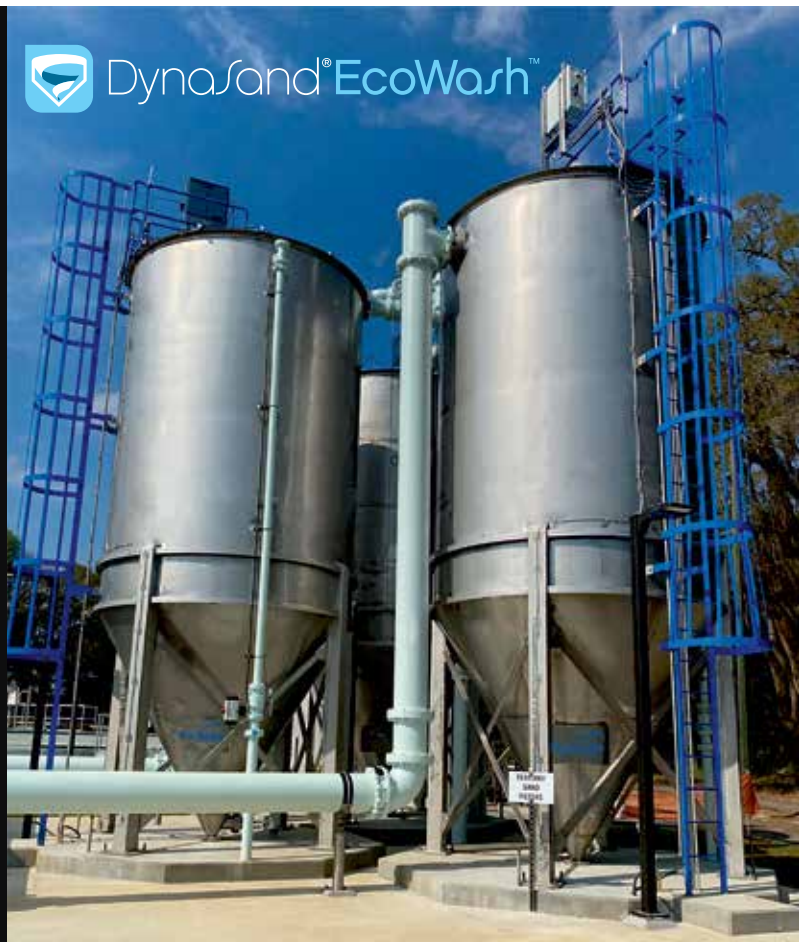

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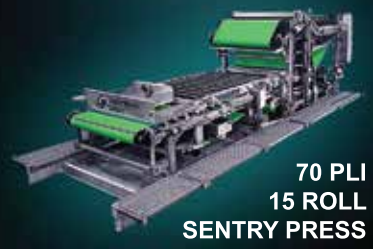

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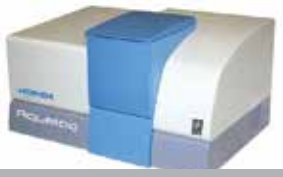
The HORIBA Scientific Aqualog is an optical spectrometer that is the gold standard in environmental water research worldwide to study color dissolved organic matter (CDOM). It meets the needs of environmental water researchers studying CDOM using fluorescence spectroscopy. Previously, researchers were using scanning spectrofluorometers to slowly acquire a 3D matrix of the fluorescence excitation and fluorescence emission spectra, called an Excitation Emission Matrix (EEM). The EEM provides a fingerprint for studying dissolved organic matter, however it took up to an hour to collect a single EEM profile, tying the researcher to the lab bench for the entire day. The Aqualog vastly improves the speed with which fluorescence EEMs are collected, increases the dynamic range across which EEM fingerprints are quantitative, and simultaneously acquires absorbance spectra for absorbance and color analysis of nonfluorescent molecules present in water. This technique is called: A-TEEM, an Absorbance-Transmission Excitation Emission Matrix. **866-562-4698; www.horiba.com/scientific**



Scientific Aqualog spectrometer from HORIBA

YSI, A XYLEM BRAND ALYZA IQ

The Alyza IQ from YSI, a Xylem brand is an online wet chemistry analyzer platform developed to help ensure regulatory compliance, improve operational efficiency, and reduce costs. It is designed to minimize analyzer maintenance while maximizing accuracy and reliability. It features automatic cleanings and calibrations, no-spill reagent containers, and uses only 5 to 15 microliters of reagent per measurement, resulting in fewer reagent changes over time. The analyzer platform has a fully automated temperature control system with a double-insulated cabinet to maximize performance regardless of where it's deployed. The Alyza NH4 continuously measures ammonium and can be used to help control ammonia-based aeration and ensure regulatory compliance. The Alyza PO4 continuously measures orthophosphate to monitor and control chemical-P removal, verify bio-P removal and help ensure regulatory compliance. **937-767-7241; www.ysi.com**

Alyza IQ chemistry analyzer platform from YSI, a Xylem brand

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OLS Control Panels from Orenco Controls

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SJE RHOMBUS EZ SERIES IN-SITE CL

EZ Series In-Site CL data logging control panel from SJE Rhombus

The EZ Series In-Site CL data logging control panel from SJE Rhombus offers wireless Bluetooth connection for smart devices. There is no need to open the panel for configuration, viewing status or downloading data using the EZ Connect Mobile App. The Bluetooth smart module eliminates the need for a PC to enable safe and secure access in all weather conditions. The panel utilizes the C-Level sensor for continuous level monitoring and records up to 4,000 system events, including pump run times, pump cycles, alarm conditions, HOA settings, power outages and service calls. The In-Site software formulates system data for you, creating reports quickly and easily so system conditions can be identified and corrected. Single-phase simplex or duplex models are available. This panel can be easily converted to demand or timed dose in the field. **888-342-5753; www.sjerhombus.com**

SMITH & LOVELESS SHADE AIDE

SHADE AIDE screen protector from Smith & Loveless

The SHADE AIDE from Smith & Loveless is a human-machine interface screen protector that easily installs onto a variety of control panels so that operators can see their HMI no matter how sunny of a day. It collapses when not in use and is fully lock-

able. It also protects the display from the harmful effects of constant UV ray exposure, saving the maintenance budget from replacement HMI costs due to excessive sun exposure. The product is compatible and customizable to fit every HMI screen sold today, with custom sizes available. **800-922-9048; www.smithandloveless.com**

Data Logger

AUTOMATION24 NOVUS FIELDLOGGER 8812191900

NOVUS FieldLogger 8812191900 from Automation24

The NOVUS FieldLogger 8812191900 from Automation24 is a versatile data logger designed for industrial and laboratory applications. This compact device can monitor and record a wide range of physical and electrical parameters, including temperature, humidity, pressure, voltage, current and resistance. With eight universal analog inputs, two relay outputs and up to eight digital inputs and outputs, it can be customized to suit different measurement needs. It has a large color display that provides an intuitive interface for configuration, data visualization and alarm management. The device can store up to 512k of data on its internal memory, which can be expanded with an SD card. The data can be transferred to a computer or a cloud service through Ethernet, USB or RS485 connections. It also features advanced functions such as math and logic operations. **800-250-6772; www.automation24.com**

Drive

Cerus X-Drive from Franklin Electric

FRANKLIN ELECTRIC CERUS X-DRIVE

Designed for variable torque applications up to 600 hp, the Cerus X-Drive is Franklin Electric's all-inclusive drive solution for a variety of markets. Available as a standalone drive and in multiple enclosed configurations, these panels are built to last, according to the maker, with every detail and component centered around the application's specific requirements. It can be paired with a choice of motors and pumps to maximize the performance of the application. **866-271-2859; www.franklinengineered.com**

Gas/Odor/Leak Detection Equipment

EAGLE MICROSYSTEMS GD-4000

GD-4000 gas detector from Eagle Microsystems

The Eagle Microsystems GD-4000 multiple channel gas detector is designed to monitor hazardous gases commonly found in water and wastewater treatment environments. It is capable of supporting up to four pre-calibrated gas sensors with an isolated 4-20 mA signal for each sensor. A multicolor touchscreen allows for simple re-calibration of sensors, as well as operation of the instrument. Up to 10 programmable relays are available for a fully configurable operation. Available with options and accessories like battery backups and Ethernet connectivity, it is designed for versatility. It is built to withstand harsh conditions with rugged construction and excellent durability. **610-323-2250; www.eaglemicrosystems.com**

RKI INSTRUMENTS GX-3R PRO CONNECTED WORKER SOLUTION

GX-3R Pro Connected Worker Solution from RKI Instruments

RKI Instruments offers the Connected Worker Solution for the GX-3R Pro powered by Guardhat. It is a subscription service that provides a single view into a gas detector fleet and worker condition via the Safety Control Center, accessible from any computer or tablet. The subscription provides features like live monitoring with gas readings and GPS location, visual, haptic and audible notifications including to notify near-by users, geofencing for hot or safe zones, heatmapping, push-to-talk communication, audio and video capture and management, as well as predictive gas detection analytics and instrument history. The GX-3R Pro connects via Bluetooth to the SCC through the Guardhat app for Android or iOS or the Scout wearable device. **800-754-5165; www.rkiinstruments.com**

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XIO WATER SYSTEMS ACUITY HUB

Acuity Hub from XiO Water Systems

XiO Water Systems' data services and analytics solution enables water utilities to gain valuable insights from their data and optimize operations. Real-time data can be extracted from existing SCADA systems, stored in the cloud, and made available through the Acuity Hub cloud-based portal. It provides a suite of solutions designed to provide system-wide visibility, automate regulatory reporting and track equipment performance. Acuity Analytics will help limit leaks and equipment failures by detecting abnormalities in behavior and immediately notifying operators. Additionally, the portal provides a way to monitor and control multiple systems from a single dashboard and establish digital twins to improve efficiency through asset management and predictive modeling. **415-462-1300; www.xiowatersystems.com**

(continued)

Process Control Systems

FORCE FLOW CHLOR-SCALE AND HALOGEN ECLIPSE

Halogen Eclipse and Chlor-Scale from Force Flow

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 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**

PULSAFEEDER PULSATRON MP SERIES

Pulsatron MP Series from Pulsafeeder

Pulsafeeder's Pulsatron MP Series now features an optional 4-20mA output signal that provides a remote indication of pump speed to remotely confirm the pump's speed is adjusting to process parameters, and more accurately estimate chemical usage over time. The pump transmits a 4-20mA signal proportional to the actual speed of the unit and is factory calibrated for easy installation in the field. It is a true microprocessor-controlled instrument delivering precise and accurate metering control. Packed with standard features, it includes automatic control via 4-20mA or 20-4 mA inputs, an external pace function with a stop feature, and a graphical LCD display with support for English, French, German and Spanish languages. Models are capable of flows ranging between 3 and 504 gpd and pressure ranges from 20 to 300 PSIG with a turndown ratio of 1000-1. **800-333-6677; www.pulsafeeder.com**

Sensors

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TurbiTech Suspended Solids and Turbidity Sensors from In-Situ

TurbiTech Suspended Solids and Turbidity Sensors from In-Situ use a solid-state infrared light source to deliver stable measurements of mixed liquor suspended solids, total suspended solids and turbidity. Their radial cleaning system eliminates the need for expensive compressors required for air-blast cleaning. Within each six-hour cleaning cycle, scrapers take only 90 seconds to completely remove any ragging or smearing on the optics, leaving the sensor available 99.5% of the time. A large optical surface and sample volume prevent deposits from covering the sensing area, leaving it clear to take representative measurements and ensuring the sensor remains fouling-resistant between cleanings. **800-446-7488; www.in-situ.com**

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Econoline pressure transmitter from Keller America

The redesigned Econoline pressure transmitter from Keller America is built for consistent performance. The Lean Production cell provides maximum versatility for customer-specific applications with short lead times, thus negating the need for the user to maintain extra inventory on-site. It combines a media-isolated piezoresistive silicon sensor with signal conditioning electronics to provide a compact pressure transmitter with < ±1% total error band accuracy over 0-50 degrees C. The industry standard 4-20mA analog output is compatible with most existing monitoring infrastructure and SCADA systems and provides meaningful output in ranges from 30 to 10,000 psi. The design makes it suitable for use under harsh environmental conditions, including those with high levels of electromagnetic radiation, both conducted and radiated. As a result, it provides trouble-free service and sufficient accuracy for almost any application, including those involving aggressive media and/or high levels of electromagnetic interference and where small size, low weight and reasonable cost are required. **877-253-5537; www.kelleramerica.com**

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Automatic Sludge Blanket Level Detector from Markland Specialty Engineering

The Automatic Sludge Blanket Level Detector from Markland Specialty Engineering uses high-intensity infrared light that, along with its slim profile, enables it to measure the sludge bed depth even in water and wastewater clarifiers and tanks that have obstructed or constricted areas, such as the inclined plates of lamellae. Beam intensity of the LED-phototransistor sensors automatically adjusts for thick or thin biosolids concentration or even light flocs. This detector allows operators to program desludge pumps to run only when necessary for maintaining the preferred liquid-solids interface level, saving wear and tear on pumps. It helps maximize water removal and optimize sludge feed density. In DAF units, it can adjust surface skimmer speeds to match variations in the thickness of the floating sludge layer. In SBRs, it can control the decant valve to minimize cycle times. Calibration is not required. **855-873-7791; www.sludgecontrols.com**

SENSOREX S8000 SERIES

S8000 Series sensor platform from Sensorex

The Sensorex S8000 Series modular pH/ORP sensor platform delivers accurate pH and ORP measurement in water and wastewater treatment. The modular platform is a custom configured system that can grow and change with process needs, saving users time and money. Users first choose the pH or ORP (Redox) electrode suited to their process. Mounting interface choices enable retrofit, submersion and inline installations. Optional electronic modules include unity gain pre-amplifiers for longer installation distances, 4-20mA outputs or Modbus for direct interface to plant control systems. If monitoring needs change, users simply update the applicable module without the need to replace the entire system. **714-895-4344; www.sensorex.com** tpo

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OZ Lifting XR Series davit cranes

OZ Lifting Products has launched its XR Series of davit cranes for wastewater and water operators. The Winona, Minnesota-based manufacturer has released the model in 500- and 1,000-pound capacities, but the long reach of the range is a standout benefit for operators. Where other davit cranes typically have reduced capacity when it is in the longest reaching position, this series maintains its maximum capacity rating in all configurations. This means wastewater and water professionals can lift more weight, further out, which presents many benefits for numerous lifting and material handling applications. The smaller crane weighs only 57 pounds and the larger crane weighs 95 pounds. Both have a maximum 62-inch reach and maximum hook height of 87 inches.

800-749-1064; www.ozliftingproducts.com

Patterson portable davit cranes for mobile lifting

Patterson davit cranes allow for servicing multiple locations with a single piece of equipment, minimizing upfront investment. The low maintenance, easy-to-assemble crane can be used at the plant or on a truck for lifting pumps and other equipment in and out of pits and manholes. The cranes are now available with an optional magnet attachment that is perfect for lifting road eyes and other metal pieces weighing up to 2,000 pounds. Built with Patterson's hallmark safety and durability, the crane and magnet attachment were developed with the highest quality materials. The crane features a brake that keeps loads in position without creeping and comes standard with a hot-dipped galvanized finish, steel sheaves and stainless steel hardware to prevent rust and corrosion. Available in 1/2- and 1-ton capacities, the cranes are built for safety, minimal maintenance, extended life — reducing cost and increased efficiency. Learn more and watch the assembly video online.

800-322-2018; www.pattersonmfg.com/crane-details

product spotlight

water

Sensors a fit for remote applications

By Craig Mandli

In your treatment plant, sensor readings are often right at your fingertips. But what if you need readings from remote lift stations, water towers or pump stations? The **dBi Modbus series** from **Pulsar Measurement** are low-power, ultrasonic level sensors that benefit from Modbus communication.

Modbus makes it possible to connect a plant's supervisory computer with a remote terminal unit in SCADA systems. The Modbus protocol uses character serial communication lines, ethernet, or the internet protocol suite as a transport layer. The protocol supports communication from multiple devices connected to the same cable or ethernet network.

"The dBi Modbus series is a good fit for the industry because of its flexibility," says Ken Elander, senior product manager for Pulsar Measurement. "Modbus communications makes it possible to connect up to 120 sensors to a single controller, greatly reducing the setup costs for new installations."

The IP68 design enables the unit to be fully submerged, making it ideal for applications where flooding or surcharging can occur. The ultra-low power consumption provides a long deployment time, providing data insights for extended periods while reducing the need to maintain a data collection system. Thanks to the built-in DATEM software, the dBi Modbus provides accuracy and reliability by continuously adapting to conditions in the well.

"Due to the intelligence of DATEM built into our software, call outs because of a well running dry or overflowing is a thing of the past as the dBi-M is able to actively discriminate against false-echo targets like pump heads, chains, ladder rungs and grease rings so that the sensor never reports back a false level," Elander says. "The advantage DATEM provides can be extended to other applications like sewer collections system monitoring thanks to the ultra-low power consumption and its ability to be connected to remote loggers."

dBi Modbus series from Pulsar Measurement

The Modbus Series of Transducers are available in a range of different formats, including with flanged or front-thread connections for mounting flexibility, PTFE coating for corrosive applications, fitted with a foam face for solids applications, and submergence shields to prevent the face of the transducer from becoming dirty in applications where submergence is common.

"The short measuring cycle allows customers to maintain a system battery life, ahead of what they have seen with previous products," says Stephen Bell, global product and marketing director for Pulsar Measurement. "They also use DATEM to map obstructions, and have found this to be extremely powerful."

888-473-9546; www.pulsarmeasurement.com

In-Situ Aqua TROLL 700 and 800 sondes

In-Situ's Aqua TROLL 700 and 800 multiparameter sondes hold six Aqua TROLL sensors and an automatic antifouling wiper. The seven-port water monitoring instruments expand the company's Aqua TROLL portfolio, which now includes both five-port and seven-port water quality sondes for a variety of surface water, coastal, groundwater and aquaculture applications. Both instruments are ideal for long-term continuous monitoring and spot checking in freshwater, brackish water and saltwater environments. And both are part of In-Situ's shared ecosystem of products designed to work together from handheld to cable to communication. Available in vented and nonvented options, both the 700 and 800 connect to VuLink telemetry for remote monitoring or the Wireless TROLL Com for communication with a Bluetooth-enabled mobile device using the free VuSitu mobile app. The Aqua TROLL 800 has internal battery power, internal logging and a micro SD card for backup data storage.

800-446-7488; www.in-situ.com

KROHNE TIDALFLUX 2300 F flowmeter

KROHNE's TIDALFLUX 2300 F electromagnetic flowmeter is a flow measurement solution ideal for partially filled pipes. It provides reliable flow measurement in pipes between 10 and 100% full. It features a non-contact sensor that is unaffected by oils and fats floating on the surface. Its smooth surface prevents buildup, minimizing the need for regular cleaning. Available in diameters to fit pipes up to 72 inches, TIDALFLUX 2300 F has high chemical and an abrasion resistant polyurethane liner to provide durability. The electromagnetic flowmeter features an integrated, non-contact capacitive level measurement and a Class 1 Division 2 rating for use in hazardous environments. The flowmeter is an great choice for municipal or industrial wastewater transport application, and can also be used for measurement of effluent brine from dredging, mining or sea/well water injection applications.

800-356-9464; www.us.krohne.com

Nuvonic UV Connect remote access device

Nuvonic UV Connect is a cost-effective solution that offers remote access to industrial computers, reducing downtime and site visits. It's a remote access device that allows the WEUVCARE team (Nuvonic's service team), to access the UV system programmable logic controllers for remote troubleshooting and monitoring of systems without physically going onsite. The device uses a cloud-based remote-connectivity solution so the UVCARE team can connect remotely using a VNC Viewer Software package. UV Connect offers 24/7 global remote access and can be used with any product with Allen Bradley PLCs. It comes in two variants; a device that allows connectivity through an active internet connection or a 4G mobile connection.

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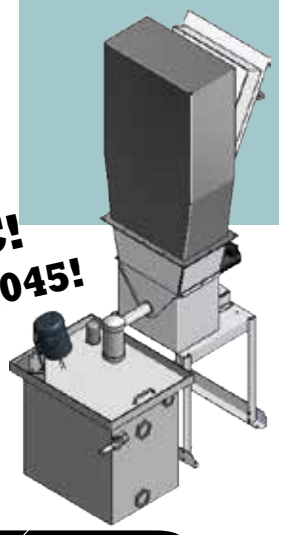

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product spotlight wastewater

Sewage grinder cuts through today's waste stream

By Craig Mandli

Sometimes in the wastewater treatment industry, there simply isn't a need to reinvent the wheel. That is certainly the case with **Muffin Monster sewage grinders** from **JWC Environmental,** which have been providing peace of mind to treatment plant operators and collections managers for nearly a half century. The sewage grinder is always ready for rags that can damage pumps, clog valves and foul treatment equipment — helping municipalities avoid costly damage and excessive repairs.

"The purpose of the Muffin Monster is to reduce the size of solids in waste streams down to a size that is harmless to downstream equipment," says Saretta Brown, vice president of sales and marketing for JWC Environmental. "Those solids can range from wipes, which can clog equipment such as pumps and valves, to rocks and wood that can damage equipment such as screens."

Muffin Monsters are installed in a wide range of locations — at pump stations to allow pumps to operate trouble-free, at headworks to prevent large solids from damaging equipment, and before or after digesters to prevent debris build-up in the digesters, themselves, and prevent solids from damaging the equipment that dries the sludge, such as centrifuges and heat exchangers. The original 30K Muffin Monster covers flows from 450 to 2,450 gpm and has the ability to not only cut through rags and other solids, but also precondition biosolids to a uniform consistency prior to digestion. The 30K units are also commonly installed within dry wells of pump stations to protect pumps from solids found in the collections systems.

Muffin Monster units have two rows of hardened steel cutters that rotate at slow speed and with high torque. They are also available with Wipes Ready Technologies specifically designed for shredding wipes and rags, preventing the materials from forming long strips and reweaving in the waste stream. Easy removable cartridge maintenance allows for overhaul without removing the unit from the pipeline. The 30K Units are designed for pipelines up to 12 inches and flows from 450 to 2,450 gpm

"There is a reason why the Muffin Monster has been the market leader over the last 50 years. With 40,000-plus installations worldwide, both customers have respected and appreciated our products and service," says Brown. "The Muffin Monster is a very well-recognized brand and logo in the wastewater industry, which is only possible due to the positive industry perspective of the product and company."

800-331-2277; www.jwce.com

Muffin Monster from JWC Environmental

By Craig Mandli

Controller solves facility's chromium contamination problem

Problem

An FAA Certified Part 145 Repair Station maintenance repair overhaul facility was unable to discharge to their treatment plant because the hexavalent chromium Cr(VI) concentration in their wastewater stream was over the regulated discharge limit. The manager of the facility called Electroplating Consultants International to solve the problem.

Solution

ECI identified sloppy dosing by existing controllers and excess polymer and bisulfite treatment. They selected **Myron L Company 900 Series controllers** for both pH and ORP control based on experience with their high degree of accuracy and reliability. The units were also manufactured to the standard 1/4 DIN size shared by the old controllers, making control panel replacement easy. Sodium hydroxide concentration was then regulated via pH control between 7.5 to 8, and bisulfite addition was regulated via ORP control between 130-140 mV.

RESULT:

Cr(VI) levels were immediately reduced to 0.96 ppm with haul-offs and recirculation no longer needed. ECI then incorporated chemistry changes that enabled the facility to reduce caustic and sulfuric usage while eliminating the need for standard bisulfite treatment. This made working conditions safer while stabilizing and lowering solid waste volume. The MRO continues to maintain compliance with their discharge limits, with recent chromium concentration tests indicating a negligible 0.013 ppm. **760-438-2021; www.myronl.com**

Going digital breaks down data silos and saves time in wastewater lab

Problem

The City of San Luis Obispo wastewater treatment laboratory conducts over a dozen daily tests and was using paper bench sheets to enter and analyze data. The results from the physical sheets were then entered into the water information management system, making two-step manual process that provided information to operators in the mid-afternoon.

Solution

The city replaced paper log books and bench sheets with a **water information management system (WIMS)** from **Aquatic Informatics.** Lab technicians now use laptops at sampling and analysis stations to enter data. Once a variable or sample result is entered, it automatically populates on other digital bench sheets that have that same variable. Calculations are automated, reducing the time to create reports. Edits to sheets are automatically time-stamped for tracing and tracking. The WIMS enables parameter limits to be set for any variable. A result outside a limit turns the cell a different color, indicating that action is required.

RESULT:

"Before WIMS we submitted our data to operations by 3 p.m.," says Tanner Duncan, water quality analyst. "Now they get the results by 9 a.m. That's a significant time savings." Having data stored and accessible in one place has significantly improved reaction times as operators receive immediate alerts and can adjust the treatment process sooner. **877-870-2782; www.aquaticinformatics.com** tpo

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WASTEWATER

By Rick Lallish

What piece of laboratory equipment is used to determine settleable solids?

A. Crucible
B. Settleometer
C. Imhoff cone
D. Filter

ANSWER: C. The settleable solids test is used to measure the volume of settleable solids in one liter of sample over a one-hour period. It is an indicator of how much solids will settle in a clarifier or pond. It is read as milliliters per liter. The Imhoff cone is made of plastic or glass and is the proper piece of equipment to perform this analysis. It should not be confused with a settleometer, which is used to measure settling of mixed liquors in an activated sludge process. More information may be found in the OWP, CSU-Sacramento textbook: *Operation of Wastewater Treatment Plants* Vol 2 (Seventh Edition), Chapter 16.

DRINKING WATER

By Drew Hoelscher

The NaOCl bulk tank concentration has weakened overtime, and the operator is tasked with increasing the concentration from 4% to 10%. How much 12% NaOCl should the operator add, if the bulk tank is currently holding 20 gallons of 4% NaOCl solution?

A. 6 gallons
B. 12 gallons
C. 24 gallons
D. 60 gallons

ANSWER: D. NaOCl is commonly used as a disinfectant in water treatment. The concertation of NaOCl should be monitored closely so that the correct dosage can be calculated. NaOCl loses disinfection power over time, especially if it is stored in a warm environment or exposed to sunlight. NaOCl will decompose into sodium chlorate and sodium chloride, which eventually results in salt water under certain conditions.

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

Online Exclusives at www.tpomag.com

Xylem completes acquisition of Evoqua

Xylem has completed its acquisition of Evoqua Water Technologies. Headquartered in Washington, D.C., the combined company includes more than 22,000 employees globally. Xylem's portfolio of innovative solutions across the water cycle, including advanced technologies, integrated services, and deep application expertise, will help customers in utilities, industrial and commercial end markets address their most pressing water needs. The combined company's executive leadership team will be led by Patrick Decker and include senior leaders from both Xylem and Evoqua. Xylem has also appointed Lisa Glatch and Lynn Swann, former Evoqua directors, to serve as members of its board of directors.

Duperon's Steve Aiken earns MWEA honor

Steve Aiken (center) accepts his award during the 2023 MWEA Annual Conference. From left, granddaughter Mackenzie Fris, wife Diane Aiken, Steve, daughter Cori Fris, and granddaughter Taylor Fris.

Duperon Regional Sales Manager Steve Aiken was named recipient of the Michigan Water Environment Association Dan Wolz Clean Water Award for Environmental Excellence. As the highest MWEA honor, the award is reserved for individuals of admirable character who have demonstrated exemplary service to the MWEA and made distinctive contributions to the water environment field. With Duperon since 2010, Aiken has helped customers in Michigan, Ohio, Kentucky, Indiana and Wisconsin identify the best solutions to meet screening and processing needs.

UGSI Solutions changes name to cleanwater1

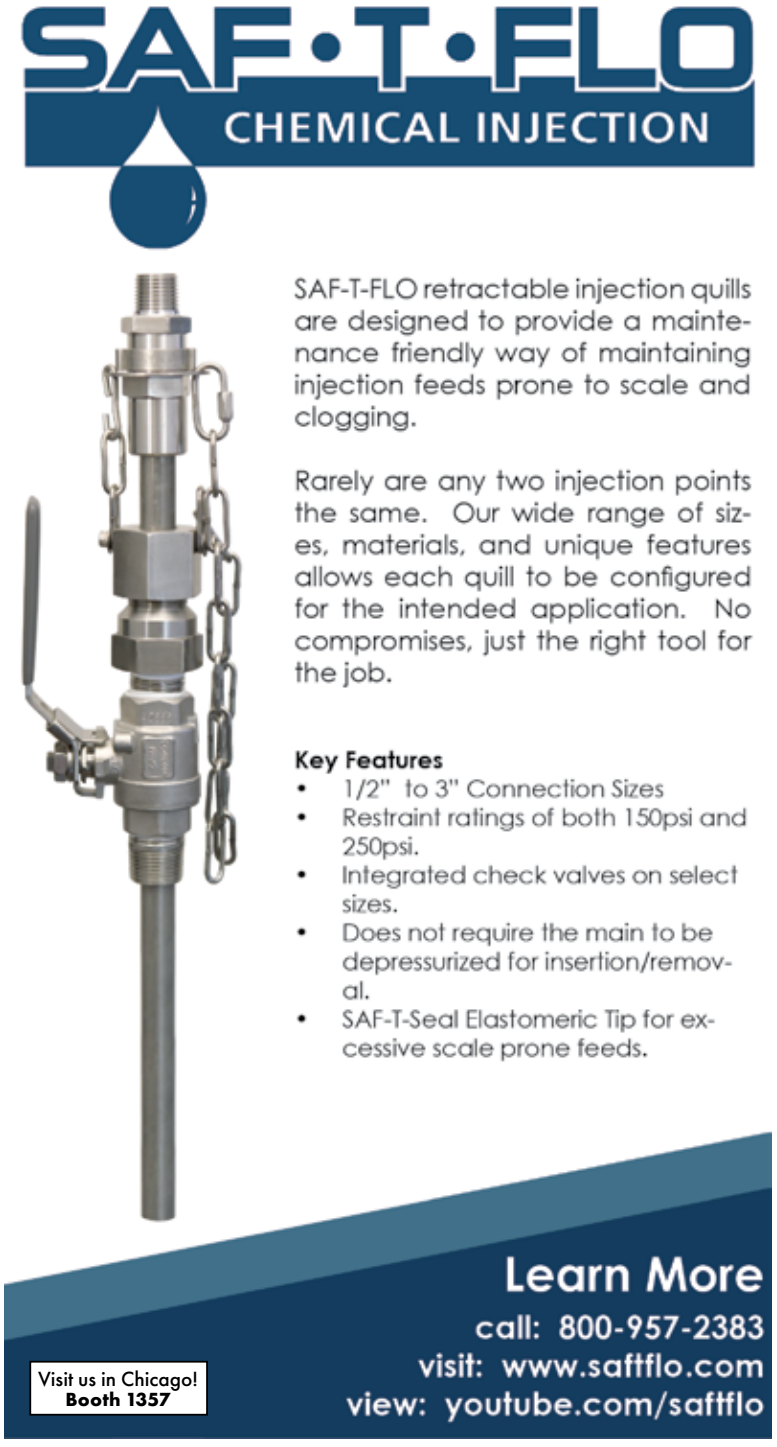
UGSI Solutions has changed its name to cleanwater1. Brands under the company's umbrella include Microclor On-Site Hypochlorite Generation Systems, Polyblend and Dynablend Polymer Feed Systems, Encore Chemical Metering Pumps and PAX Mixers.

Veolia Academy launches free online training program

Veolia North America has opened its in-house training program to the general public to support skills acquisition for individuals looking for jobs in the water and wastewater treatment industry. Veolia Academy offers free online courses for people to learn the technical skills and prepare for the state certifications necessary for a career in the industry, which needs tens of thousands of new workers across the country to handle today's environmental challenges. Veolia Academy was developed in 2021 and its training has been approved by 38 states, with more in the process, through each state's licensing and regulation authorities.

New AWWA president a tested leader

Having served 10 years as an active U.S. Army officer and an additional 10 years as a reservist, Patrick Kerr began his one-year term in June as the 142nd president of the American Water Works Association with decades of experience working with others to get results. One of Kerr's goals as AWWA president is to expand the association's reach and influence in the water sector by encouraging existing members to personally introduce their colleagues and water sector partners to the benefits of AWWA membership. "We owe it to the water community to expand our reach and increase the capacity of water utilities to provide safe drinking water for their customers," he says in a release. "There is no doubt that being an AWWA member makes you better at your job." **tpo**



people/awards

The **Sheboygan Regional Wastewater Treatment Plant** was recognized as the 2023 Lab of the Year from the Wisconsin Department of Natural Resources.

The Alderwood Water & Wastewater District's **Picnic Point Wastewater Treatment Plant** received a 2022 Outstanding Performance Award from the Washington State Department of Ecology.

The **Peel Region Public Works** staff in Brampton received two awards from the Ontario Public Works Association. The **Lakeview Village District** Energy project won the Climate Action award, and **Mario Menezes** won the George W. Burke Jr. Award, for safety programs in wastewater facilities.

The National Weather Service recognized the **Hartford (Wisconsin) Wastewater Treatment Plant** for 75 years of weather observations, highlighting the importance of local weather observation points for understanding and predicting the weather.

The **Easterly Wastewater Treatment Plant** in Vacaville was named the 2022 Section Medium-Sized Plant of the Year by the California Water Environment Association Redwood Empire Section. **Jason Maher,** public works field utilities lead, was named the section's Collection Person of the Year.

The **City of Guelph** received the Project of the Year award from the Ontario Public Works Association for the Howitt Creek emergency sewer repair in the category of Disaster or Emergency Construction/Repair under $2 million.

The **City of Kennedy Wastewater Treatment Facility** was recognized for operational excellence by the Minnesota Pollution Control Agency.

Boothbay Harbor (Maine) Sewer District named its water reclamation facility on Sea Street in honor of **John "Jolly" Arsenault.** Arsenault, a lifelong resident, served the district for over half a century and was one of its founding members. He died in 2022 at 92.

Thomas Tucci Jr. was re-elected as chair of the Passaic Valley (New Jersey) Sewerage Commission.

The Gwinnett County (Georgia) Board of Commissioners confirmed **Rebecca Shelton** as director of water resources and **Matt Dickison** as director of planning and development.

SCV Water received the Clair A. Hill Award from the Association of California Water Agencies for its Valley Center Well PFAS Treatment Facility.

Clearwater received the 2023 Wastewater Gold Award from the Georgia Association of Water Professionals.

Tap water from the **Macon Water Authority** was recognized by the Georgia Association of Water Professionals for the best tasting in the state.

Barbara Chappell, water services director in Goodyear, was named Engineer of the Year by the Arizona Water Association.

The Jonesville (Michigan) City Council recognized **Brian Boyle,** wastewater treatment plant superintendent, for more than 40 years of service. He retired last May.

events

Sept 10-13
AWWA Water Infrastructure Conference 2023, Sheraton Philadelphia Downtown. Visit www.awwa.org.

Sept. 10-13
Rocky Mountain Water Conference, Embassy Suites by Hilton Hotel Conference Center & Spa, Loveland, Colorado. Visit www.rmwea.org.

Sept. 11-14
WaterJam 2023: Power of Water, Virginia Beach Convention Center. Visit www.pheedloop.com.

Sept. 11-Oct. 13
AWWA Water Treatment Operator Level 2, online. Visit www.awwa.org.

Sept. 12-15
Michigan-AWWA Annual Conference and Exhibits, Blue Water Convention Center, Port Huron. Visit www.mi-water.org.

Sept. 13-14
AWWA 2023 WIFIA/SRF Workshop: Financing Solutions for Water Infrastructure, Sheraton Philadelphia Downtown. Visit www.awwa.org.

Sept. 13-15
South Dakota AWWA Annual Conference, Holiday Inn, Spearfish. Visit www.sdawwa.org.

Sept. 13-15
Wisconsin AWWA Section Annual Conference, Monona Terrace, Madison. Visit www.wiawwa.org.

Sept. 13-15
Illinois Potable Water Supply Operators Association Annual Conference, Crowne Plaza, Springfield. Visit www.ilrwa.org.

Sept. 17-20
New England AWWA Section Annual Conference, Hilton Burlington Lake Champlain, Vermont. Visit www.newwa.org.

Sept. 19-22
Minnesota AWWA Section Annual Conference, Duluth Entertainment and Convention Center. Visit www.mnawwa.org.

Sept. 19-21
Intermountain AWWA Section Annual Conference, Davis Conference Center, Layton, Utah. Visit www.ims-awwa.org.

Sept. 20-22
Washington Association of Sewer & Water Districts 2023 Fall Conference, Clearwater Casino, Suquamish. Visit www.waswd.org.

Sept. 25-27
Water Pro Conference 2023, Gaylord Rockies Resort & Convention Center, Aurora, Colorado. Visit www.waterproconference.org.

Sept. 25-28
Western Canada AWWA Section Annual Conference, TCU Place, Saskatoon, Saskatchewan. Visit www.wcwwa.ca.

Sept. 30-Oct. 4
WEFTEC 2023, McCormick Place, Chicago. Visit www.weftec.org.

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