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William Leonard  
Production Lead Operator  
Elsinore Valley, Calif.

William





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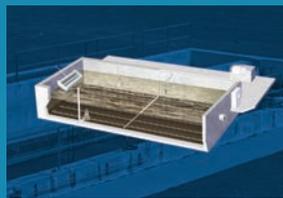
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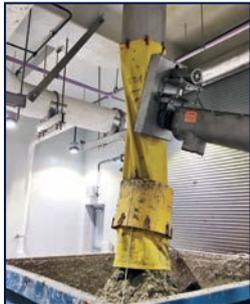
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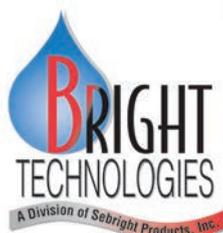
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let's be clear

## Passing the Sniff Test

FIRST IMPRESSIONS ARE EVERYTHING. WHAT IF THE MAIN IMPRESSION YOUR PLANT CREATES IN YOUR COMMUNITY IS AN ANNOYING OR OFFENSIVE ODOR?

By Ted J. Rulseh, Editor



**W**hy are there multibillion-dollar industries in products like underarm deodorants, mouthwashes and bathroom air fresheners?

In his *The Lord of the Rings* trilogy, why did J.R.R. Tolkien give the evil land of Mordor an overpowering stench?

The answers to these questions are obvious. So then, why do some communities and utilities allow their clean-water plants to send out odors that annoy or offend their neighbors? One could argue that a bad smell is a

worse assault on the senses than ugly appearance or a bothersome noise.

These days there are many ways — biological, chemical, mechanical and combinations — to make odors essentially disappear outside the facility fence line and to a large extent within the facility boundaries. So why aren't these technologies deployed more universally?

### A RISING PROFILE

I know, one major reason is cost, or more to the point, cost versus benefit. But a case can be made that controlling odor is the most important thing a facility can do for community relations, and for the advancement of the clean-water professions.

If you doubt the importance of odor control, consider that two months ago the Water Environment Federation (in cooperation with the Ohio Water Environment Association) held a three-day conference devoted solely to odors and air pollutants.

It covered the full range of odor-related topics: regulations in the United States and around the world, odor-control technologies of many kinds in treatment plans and collection systems, odor modeling, profiling of odors, odor system optimization and, yes, "the cost of being a good neighbor."

Maybe that last one is the most important of all. An odor emanating from a clean-water plant is more than just an annoyance to certain residents "when the wind is right." It makes a powerful and not at all favorable statement about the industry and the water professions.

### MESSAGE IN THE AIR

Let's face it: Many people already have negative perceptions about clean-water plants — perhaps the largest being that they smell. And what does that say about the people who work there? Surely not that they are highly trained and educated professionals who perform an absolutely essential community and environmental service. No, they're people who work in an unpleasant place and do dirty jobs.

The plant? Odors don't signify that it's a finely tuned, technologically advanced facility that produces recycled water, renewable energy and rich nutrients that can enhance farm soils, community gardens and parks, and residential landscapes. No, odors say it's just a place that handles sewage.



DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

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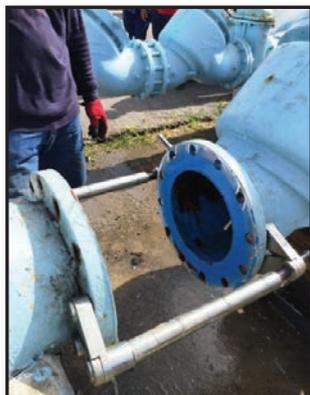


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A case can be made that controlling odor is the most important thing a facility can do for community relations, and for the advancement of the clean-water professions.

The industry and the people in it can't afford to contribute to those wrong perceptions. The folks on the receiving end of odors are the very people who will one day be relied upon to approve funding for large projects that upgrade collection systems, expand treatment capacity, and improve treatment technologies to meet ever-stricter effluent permit limits.

Would they rather support what they see as a bad-smelling place staffed by people in dirty jeans? Or a clean, effective facility that is indispensable to public health and the protection of water resources?

### WHERE TO TURN

So it seems the benefit of eliminating odors goes beyond heading off complaints and being a good neighbor. It helps create the kind of perception, the kind of prestige, that a clean-water plant and its operators deserve in their community.

So there's little question that odor control is worth the investment. Sometimes the needed control systems are simple and inexpensive. Other times they're more complex and require larger investments. Either way, the importance of odor control is not something to ignore.

Today there are many resources to help plants sweeten the air over their communities. Consultants, equipment suppliers and resources in WEF and state and regional associations are all there to help out. If your plant has an odor issue, isn't it time to look at ways to solve it? **tpo**



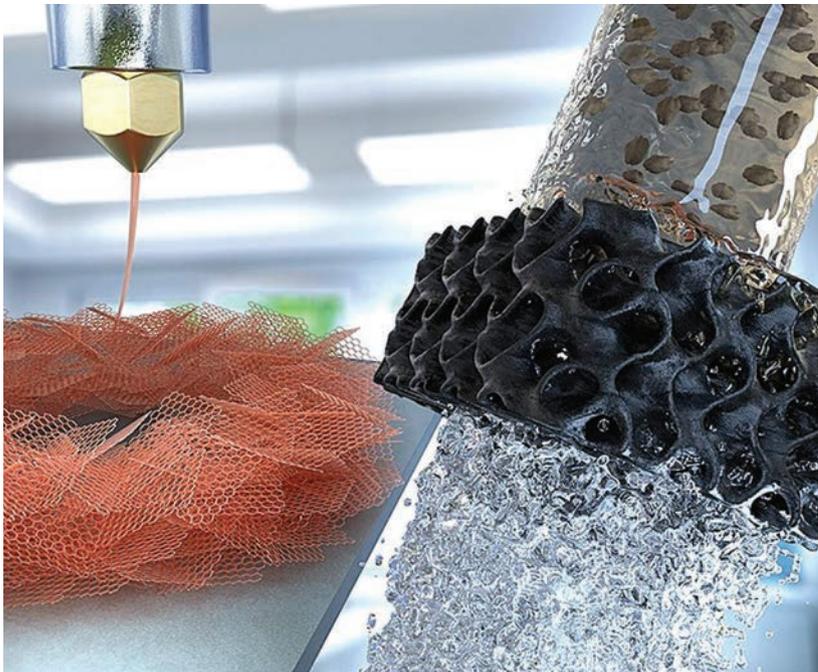
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### 3D PRINTING STUDY

## Using Graphene Aerogels for Treatment

Graphene excels at removing contaminants from water, but it's not yet a commercially viable use of the wonder material. That could be changing, as engineers at the State University of New York at Buffalo have reported a new process of 3D printing graphene aerogels that they say overcomes two key hurdles for water treatment.

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### OVERHEARD ONLINE

"A global public health pandemic, economic turmoil and a cybersecurity breach at a municipal system in Florida were just some of the challenges water providers faced in the past year."

**NAWC Releases 2021 Safety Benchmarking Report**  
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### SUSTAINABLE POWER

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The City of Rialto, California, is working on the next phase of an ambitious plan to design and install a microgrid powered through a unique combination of biogas cogeneration, solar power and backup battery storage to supply electricity for the city's wastewater treatment plant. Read more about it in this online exclusive article.

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### MANAGING EMPLOYEES

## Licensing and Credentials

For those who work in the water/wastewater treatment industry, success depends not only on developing core skills, but also keeping those skills sharp. In a field that requires licensure and ongoing education, it may be wise for employers to put structures into place to ensure employees stay on top of their requirements.

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# Knowing What's Important

IN LEARNING HIS TRADE, OPERATING WATER FACILITIES AND TEACHING OTHERS, WILLIAM LEONARD NEVER LOSES SIGHT OF HIS OWN AND HIS TEAM'S ESSENTIAL PURPOSE

STORY: **David Steinkraus** | PHOTOGRAPHY: **Matt Dayka**

From a young age William Leonard understood the importance of water.

That's not because he grew up in Lake Elsinore, about 60 miles southeast of Los Angeles and near the edge of Southern California's desert interior. His understanding came from his father, who grew up in North Carolina where the family didn't have running water; only a well.

"I knew from a very early age how important water was because a lot of my family back there didn't have it,"

he says. Today, as lead production operator for the Elsinore Valley Municipal Water District, he's informed by his family's history as he and his team provide water to 42,000 service connections.

His work has brought him satisfaction along with recognition through the 2020 Operator's Meritorious Service Award from the California-Nevada AWWA Section. Leonard didn't choose a water career at first. It was a chance remark from a supervisor that started him thinking.

FACING PAGE: William Leonard leads by treating all team members as being at his level — he never talks down to them.

### CHANGE OF COURSE

After high school in the late 1980s and early 1990s, he was an iron worker. He became a pipeline welder for the Rainbow Municipal Water District in Fallbrook, about 20 miles south of Lake Elsinore, working on pipelines and fixing leaks in pipes running beneath the streets.

“We’d work hours around the clock,” he recalls. One day supervisor Clint Baze came to a job site and told Leonard that if he took more schooling, he could better himself. “I was in a hole, actually, a 5-foot hole,” Leonard says. “And I thought, I’d like to be up there some day instead of down here in the hole.”

He worked as a welder for about four years, was a construction worker and backhoe operator for a year, and then saw a job opening with the Lake Elsinore district. He started as a lead construction worker, but when a job opened in water production, he moved. “That’s when I really started going to school and getting the grades I needed,” he says. Since 2016 he has been lead operator.

### TEAM BUILDING

“The biggest benefit of my job is trying to train young operators to have the same passion that I have,” Leonard says. “I don’t think there’s any downside to the position because it’s allowing me to continue to learn and to continue to lead other people into a supervisory role someday.”

Leonard’s water treatment team members are Shawn Gray, superintendent; Damien Gutierrez, production lead operator; and production operator Jim Scroggins,

Greg Lopez, Steve Garcia, Rafael Arriaga, Andrew Saucedo and Jason Dominguez. “All of us are water treatment operators, so that’s what makes us a little different than most,” Leonard says. “Our operators don’t just do water production; they do both water production and water treatment.”

Lake Elsinore uses a variety of water sources to balance demands. The district imports water from two other districts, has 14 wells, and draws surface water from the

“I knew from a very early age how important water was because a lot of my family back there didn’t have it.”

WILLIAM LEONARD



William Leonard, production lead operator, Elsinore Valley Municipal Water District



## William Leonard, Elsinore Valley (California) Municipal Water District

POSITION:  
**Production lead operator**

EXPERIENCE:  
**30 years**

DUTIES:  
**Oversees nine people running day-to-day water treatment and distribution system; takes care of water-quality issues and imported water**

EDUCATION:  
**Bachelor’s degree, applied**

management, **Grand Canyon University; associate degree, water technology, Mount San Jacinto College**

CERTIFICATIONS:  
**Grade 5 Water Distribution, Grade 4 Water Treatment**

GOALS:  
**Continue learning, training and keeping the community safe**

Canyon Lake reservoir. The water is treated at three plants: the Canyon Lake surface water plant, a 5 mgd groundwater plant that removes arsenic from two wells, and a small plant that treats water from two agricultural wells now being used for domestic supply.

Imported water isn't treated except for boosting chlorine concentration. "One of our sources comes from 10 miles away, and by the time it hits our pipeline, the residual has dissipated," Leonard explains. Most wells tap an aquifer in the Elsinore Valley. Depending on the time of year and the surface water conditions, all the sources can be used to deliver good water to customers.

## CONTROLLING QUALITY

Water from all sources uses chloramine as the residual disinfectant. The Canyon Lake treatment plant uses an upflow clarifier; it's tricky because everything happens in one unit. "What's tricky is keeping control of the sludge blanket," Leonard says. "We have to control the level so it doesn't come over the top of the clarifier." Control is achieved through chemical adjustments based on jar tests, which reveal the nature of source water and what kind of floc is building inside the clarifier.

"This type of plant, it's not just science," Leonard says. "You can't come up with a math equation to run this plant. It's a little bit of trial and error, a little bit of feel of what that blanket is doing."

The 720-square-mile San Jacinto watershed drains into the lake, Leonard says. Southern California's heavy seasonal rains generate substantial runoff into the lake, and there are periodic algae blooms.

"That's where the challenge is, because conditions are always changing on the lake." Algae, pH and runoff all affect the sludge blanket. As lead operator, Leonard has been deeply involved with compliance. Over the years, many limits have become stricter. When the arsenic limit was lowered from 50 parts per billion to 10, the district had to build a special treatment plant to remove that element from a couple of wells.

---

The staff at the Elsinore Valley Municipal Water District includes, from left, Jim Scroggins, Greg Lopez and Jason Dominguez, production operators; Shawn Gray, superintendent; William Leonard, production lead operator; and Rafael Arriaga, Steve Garcia, and Andrew Saucedo, production operators.

## LEARNING QUICKLY

"After we built the plant, I had to learn how to run it," says Leonard. "I worked with engineers for about a year to see whether the plant was removing arsenic and what conditions would affect that."

At the Canyon Lake plant, tighter limits for TOC removal and trihalomethanes meant switching from polyaluminum chloride to ferric chloride as a main coagulant. This change produced a thicker blanket and controlled inefficiencies of blanket rise at night. The change meant operators had to do a series of jar tests and work with engineers to discover how to fine-tune the process. The plant at first used free chlorine for disinfection and then switched to chloramine around 2007 because it lasts longer in distribution pipes and suppresses formation of trihalomethanes.

It took many days, and some nights, and plenty of internet research and conversations with engineers to learn how the upflow clarifiers worked and how they should work. "Because I wasn't shown how to run it, I developed my own way," Leonard says.

For a couple of years, he would make a change and then watch how the plant responded.

Then, before he became a lead operator, he trained others, trying to pass on the knowledge he had gained. He continues to learn and still runs experiments, often coupled with questions from the district's engineering group, to tweak the process.

## LITTLE SYSTEMS

The AWWA award cited Leonard in part for teaching others to handle the district's SCADA system. "We have so many different boosters and wells and different pressure zones; we have a lot of little systems in a big system," he says.

The district provides water not only to the developed area around Lake Elsinore but also to homes in the nearby hills and to customers who live more than 2,400 feet up in the Santa Rosa Mountains. The district has nearly 75 pressure zones. SCADA allows remote access to the facility. "I can literally be as far as Disneyland from here and control a booster," Leonard says.

After all the training and schooling, Leonard has been happy to stay at Lake Elsinore with the supervisors he respects, and with a path open to

*(continued)*

“This type of plant, it’s not just science. You can’t come up with a math equation to run this plant.”

**WILLIAM LEONARD**



## Automatic Sensor Cleaning

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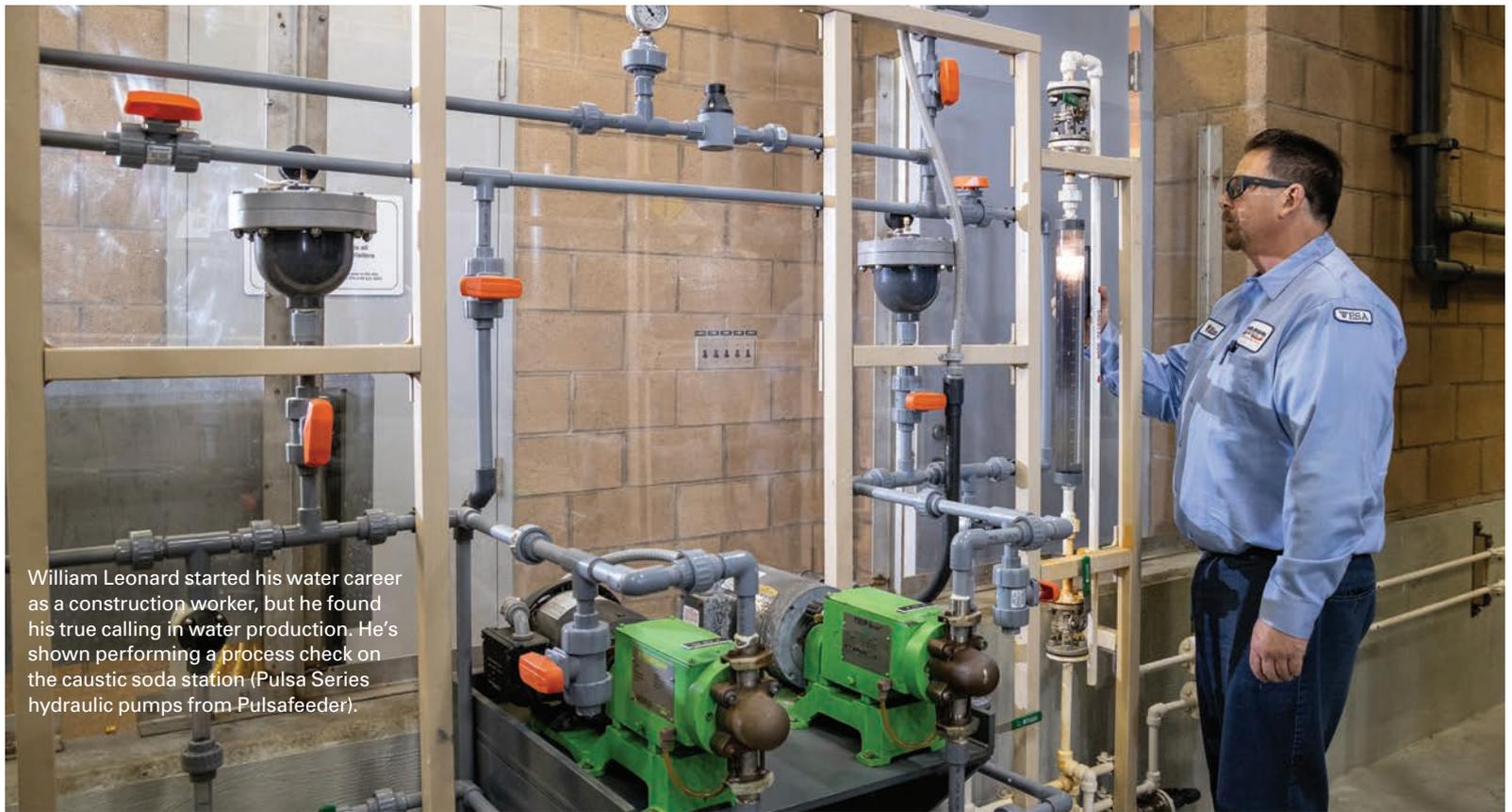


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- Automatic Sensor "bump test"



William Leonard started his water career as a construction worker, but he found his true calling in water production. He's shown performing a process check on the caustic soda station (Pulsa Series hydraulic pumps from Pulsafeeder).

“I put everybody working for me at my level, and I talk to them at my level. I don't try to separate myself as someone different or higher.”

**WILLIAM LEONARD**

future supervisory work for himself. “I feel like I'm making a difference here,” he says.

In college Leonard picked up an idea that has guided his life as a lead operator: servant leadership. “I put everybody working with me at my level, and I talk to them at my level,” he says. “I don't try to separate myself as someone different or higher. That allows me to have the trust of the operators to call and tell me when something is not correct. It's OK to make mistakes as long as we can correct them swiftly so no one gets sick.”

He notes that the Lake Elsinore district as a whole is moving toward a formal servant-leadership model: “When you work for an organization like that, it allows you to grow. It allows you to make mistakes. It allows you to try different things. If you don't have support from your management, you can get lost in the shuffle.”

### WHAT REALLY MATTERS

In his spare time, Leonard likes to work on classic cars, including a 1971 Monte Carlo, a 1967 Ranchero and a 1966 Mustang. “My dad was an excellent mechanic, so he taught me a lot from a very early age,” Leonard says. “The ability he gave me is what got me started.”

He learned more from his father than mechanics: he learned the importance of water. On his office wall is a picture of a child drinking from a water fountain. He has tried to implant that picture into his co-workers' memories. If a child goes to a public water fountain, takes a drink and the water is cool, sweet and healthy — that's all Leonard wants. Then he has done his job. **tpo**

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## FIGHTING FIRE

In the dry lands of Southern California, wildfire is as common as sunshine. And it presents another challenge for operators at the Elsinore Valley Municipal Water District.

The biggest wildfire happened in 1959, when seven firefighters were killed and 27 injured fighting flames on Ortega Mountain on the western edge of the community. Local news reports say that every few years a fire on the mountain closes the east-west highway for a day or two.

“As operators, in the back of our mind we're constantly thinking about fire flow for these remote areas,” says William Leonard, lead production operator for the district. “When something major happens, we have to be on the ball to make sure we have the water to fight something like that.”

When something does happen, an emergency operations center opens. Local officials meet there, gather information, and decide how to handle the crisis. “We'll have operators sitting there with officials and controlling SCADA and thinking about what we have to do,” Leonard says.

Operators work in the center and in the field for 24 hours a day until the emergency is over. What they must do is push water into areas threatened by the fire. That may mean increasing imports from other water districts, reducing flows to some parts of the Lake Elsinore system, or some combination of actions that ensure adequate flow and pressure up on the mountain.

It takes time and training to understand all the little parts of the system and to know what can be done, says Leonard: “You have to visualize the district as a whole.”



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Rotary presses are available with one to four channels and in hydraulic flow ratings from 5 to 260 gpm. They can process dry solids at 225 to 3,900 pounds per hour.



# Slow Rotation

A NEWLY INTRODUCED ROTARY PRESS OFFERS EFFICIENCY AND FLEXIBILITY IN DEWATERING A WIDE RANGE OF WASTEWATER TREATMENT SOLIDS STREAMS

By Ted J. Rulseh

There are various ways to dewater wastewater solids: Belt presses, filter presses, centrifuges and rotary presses all have their applications.

A new entry to the field is a rotary press from Evoqua Water Technologies. The unit uses pressure and friction to cost-effectively dewater wastewater sludges and a variety of industrial solids streams in agriculture, petrochemicals, food processing, and pulp and paper.

The press operates continuously at low speed. With few moving parts and a simple design, it runs with minimal maintenance and low energy demand. The press comes in a wide range of capacities. It is designed to be deployed in new facilities and to integrate efficiently with existing solids processing systems.

Systems are packaged at the factory and optimized to accommodate each facility's sludges. The skid-mounted units include PLC controls, polymer feed and mixing system, feed pump, discharge valves and piping. Mike Jager, senior product manager for dewatering, talked about the offering in an interview with *Treatment Plant Operator*.

**tpo: What was the reason for bringing this product to market?**

**Jager:** We wanted to deliver a product that is cheaper to operate and runs automatically to minimize operational costs and produce a drier cake.

**tpo: What would you say are the most significant advantages this rotary press has?**

**Jager:** There are few moving parts and few parts in general per unit. The machine is backed by Evoqua's long-standing ability to test sludge and help customers optimize dewatering devices for their applications. We have test-run more than 12,000 applications in our lab.

**tpo: Please briefly describe how the process works.**

**Jager:** Sludge conditioned with polymer is fed continuously into the

space between two filter screens. The solids are held by the filter screens while additional moisture is continuously pressed out as friction and pressure build. The material advances to the discharge end of the press, where pneumatically controlled restrictor gate arms slow the material, allowing a cake plug to form. The slow rotation of the press continues until enough cake has built up to push the plug past the restrictor gate and exit the press.

**tpo: What is the capacity range of these machines?**

**Jager:** We have models with one to four channels. The hydraulic flow ranges from 5 to 260 gpm. The dry solids per hour ranges from 225 to 3,900 pounds, comparable to a 2.5-meter belt press. With a four-channel unit a facility can run one channel or all of them, depending on solids volume that day. Often we sell a two-channel unit, and the facility will run one channel and keep the other for the heaviest days, or for redundancy.

**tpo: What levels of dryness can this press achieve?**

**Jager:** That depends on the material. With waste activated sludge, we would be in the range of 12%-16% solids; with lime sludge we can get to 45%;

“The machine is backed by Evoqua's long-standing ability to test sludge and help customers optimize dewatering devices for their applications.”

MICHAEL JAGER

with a mix of primary and secondary sludge, the range is 20%-32%. We test each individual sludge, but we've found that our cake is about 25% drier than with a belt filter press for each type of material. The nice thing is that the dryness is extremely adjustable.

**tpo: How can the solids content be adjusted?**

**Jager:** We can adjust the dryness by adjusting the back pressure on the restrictor gates. That is controlled by a PLC. Each channel is pressure-controlled separately.

## Anue Water Technologies

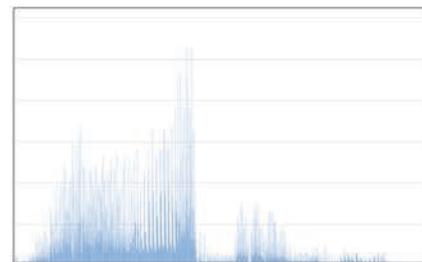
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### **tpo:** What does the unit include on delivery?

**Jager:** It is delivered complete on a compact skid. It includes a positive-displacement rotary-lobe feed pump, all piping, the polymer injection system and an inline mechanical mixer, the washing system, and controls.

### **tpo:** What design features help make this press reliable?

**Jager:** We use a small drive motor with a large reducer gear. Our two-channel 48-inch unit, for example, has a 5 hp motor and runs at 1 to 2 rpm. The components that come in contact with the solids slurry are stainless steel. The seals are internal and also do not contact the sludge. The housings are powder-coated. Spare parts costs are almost nonexistent — about 0.5% of total costs over 10 years.

### **tpo:** How does the press washing system operate?

**Jager:** There are internal and external channels to continuously wash the screens. The wash runs only as needed; usually washing for about five minutes at the end of the day will suffice, so the amount of wash water is very limited. We can also set a timer to wash every couple of hours, but normally that is not necessary.

### **tpo:** How would you describe this equipment's ease of operation?

**Jager:** We offer less maintenance and allow operators to spend less time standing around the machine, so they can work on other important tasks. The press can run intermittently. If they run out of sludge, it will turn off and go into a clean-in-place mode. Then after about five minutes it will turn off and be ready to start back up. We are capable of sending fault messages to a plant control system or to smartphones or laptops.

### **tpo:** What is involved in programming the press at initial startup?

**Jager:** It's completely set up at the factory based on our testing of the customer's material. We provide operator training, usually an eight-hour

session involving the operators and the polymer supplier. We connect the material feed, water, electricity and the source of polymer, and then it's basically plug and play.

### **tpo:** Can an installation include ancillary handling equipment?

**Jager:** Yes. We can supply belt or screw conveyors that pick up the cake and move it hundreds of yards if need be to an appropriate container, or to discharge into the back of a dump truck. It depends on the facility, how high-tech they need to be, and where they need the material to go.

### **tpo:** What odor controls are available with this equipment?

**Jager:** The system is completely contained. The feed material comes in on a pipe from the bottom of the digester, so there is no odor until after the unit. By that time it's pretty dry, and so the odor is reduced. We can also pull odorous air off at that point and join it to the plant's odor-control system.

### **tpo:** What other innovations are included with the technology?

**Jager:** We have see-through inspection piping so users can ensure that the floc is developing properly. There are inspection windows that open, so they don't have to turn the machine off and open housings to make sure it's running well. We also have an element in the top that stirs the drying sludge and releases any interstitial water. That way we don't form a hard plug toward the top that's hiding water inside it.

### **tpo:** What is the primary market opportunity for this product line?

**Jager:** It is available for new construction and for plant expansions, but the primary target is for replacement of aging infrastructure. **tpo**

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Fort Wayne captures biogas from six 1.7-million-gallon digesters at its wastewater treatment plant.

# Pushing Power Costs Down

FORT WAYNE ADOPTS MULTIPLE APPROACHES, FROM COMBINED HEAT AND POWER, TO PROCESS UPGRADES, TO RENEWABLES IN A LONG-TERM QUEST FOR NET-ZERO ENERGY

By Steve Lund

**W**ith five years of experience operating a combined heat and power system fueled with biogas, Fort Wayne City Utilities is ready to make more progress toward net-zero energy by 2030.

That was the goal set in 2017, and the success of the CHP system has given the wastewater treatment plant staff confidence that they can reach the goal.

“The CHP has worked remarkably well, better than expected,” says Doug Fasick, engineering manager for energy for the Indiana utility. “The plant staff has championed this. They’ve taken ownership of it and they make sure that it is maintained properly to keep it up and running. Now we’re looking at enhancing our biogas production by taking in additional organic waste.”

The first source of outside organic material was a Nestle processing plant in nearby Anderson that makes CoffeeMate creamer. Since 2018 the wastewater plant has received up to four 6,000-gallon truckloads of food waste every day from that facility.

“It’s basically fats, oil and grease (FOG), and we feed it to the bugs in our digesters,” Fasick says. “We’re a 100 mgd plant (peak), so 24,000 gallons is a very small percentage. We have significant capacity to do more.” In 2020, the utility acquired more digester feed by signing a contract with quasar, an organic waste broker.

## ORGANIZING A CO-OP

The COVID-19 pandemic, which has crippled the restaurant business, has slowed some of the utility’s other plans to put more organic material in the six anaerobic digesters. An example is a co-op program designed to boost the supply FOG.

“Right now, it is the responsibility of the restaurant owners to dispose of their FOG,” Fasick says. “The co-op is a voluntary program that gives them another way to manage their FOG. They pay us a membership fee; we hire a third party to clean out their grease interceptor on a scheduled basis.

It helps the waste haulers because they get what we would call a milk run.”

Septic haulers that handle grease have other options for handling FOG, but Fasick hopes that by making grease management easier for both the restaurants and the haulers, the co-op will make the treatment plant more competitive in the market.

“There are other facilities that can handle FOG; waste haulers do have a choice,” Fasick says. “We’re hoping to get 100 restaurants signed up as part of the pilot program, and then we’ll be able to offer reduced prices. We want all that waste to come to us.”

## FEEDING THE BUGS

Fort Wayne is also looking to get more solid food waste from restaurants and grocery stores, which would then be macerated to feed the digesters. It’s lower in energy than FOG, but the microbes in the digesters need variety in their diet.

“We’re hoping to get 100 restaurants signed up as part of the pilot program, and then we’ll be able to offer reduced prices. We want all that waste to come to us.”

**DOUG FASICK**

“You have to take into account the bugs,” Fasick says. “You don’t want to feed them the same thing all the time. You want to give them variety. It’s like giving a kid candy. If that’s all you give them, that’s all they’ll eat. You’ve got to balance it to maintain good health. And it fills a need for the community. We’re diverting the organic waste from a landfill.”

The methane production at the wastewater treatment plant was one factor in Fort Wayne winning a 2019 Sustainable Water Utility Management Award



The Fort Wayne plant has two 400 kW generators driven by Guascor engines and housed inside these enclosures.



Biogas fuels these engine-generators in a combined heat and power system.

from the Association of Municipal Water Agencies. But the wastewater plant has potential for many other energy projects.

“We’re looking at our property for opportunities to install solar components to help us generate energy,” Fasick says. “There’s going to be a request for proposals for energy companies to help us determine what makes the most economic sense from biogas, from solar, and from wind possibly. We’re also looking to optimize our operations in the plant, so we’re using our assets the best we can, always with the premise that we’re trying to keep our rates low and making sure we’re competitive for economic development.”

### LONG HISTORY, AMBITIOUS GOAL

Fort Wayne would probably get high marks for sustainable operations on any scale. Since 2001, the wastewater plant has been producing Class A biosolids that get mixed with composted leaves collected by the city. The soil supplement is given away to residents and sold to landscapers and farmers.

Dewatered lime from the water plant is also sold to farmers. Since 2017 the plant has reduced its electricity usage by about 5% by replacing low-efficiency motors and lightbulbs, adding variable-frequency drives to motors, and upgrading some processes. The energy produced by the CHP system has replaced about 30% of the plant’s consumption.

Still, the staff is in a constant battle with energy costs. “Since 1992, the utility has seen electricity costs go up almost 100%,” Fasick says. “At one point several years ago, it was just the nature of doing business. You couldn’t control it; you just had to cost it into your rate base.

“That’s no longer the case. There are opportunities from a renewable standpoint and looking at operations. We started putting some of these things in little by little, learning from them, and seeing the benefits they bring.” In five years the team has reduced utility energy consumption by \$2.2 million and has produced more than 32 million kWh of electricity.

Fasick believes the goal of becoming a net-zero utility by 2030 is achievable: “It’s an ambitious goal, but so far we’ve been fairly successful.” **tpo**



PRESENT THE WEBINAR:

# How a Dryer Filter Cake Leads to Reduced Operating & Maintenance Costs

— June 9 at 10 am CST —

### DESCRIPTION:

The sludge from municipal wastewater treatment has a high impact on disposal costs. Dewatering your slurry is a critical process in achieving a dryer sludge. Ultimately, the dryer the cake, the more efficient your dewatering process is, enabling you to reuse more water while reducing your plants maintenance and operating costs.

Balancing consumer pressures for a smaller environmental footprint and sustainable operations, as well as managing rising utility costs and evolving regulatory requirements, are ongoing concerns for plant managers. *Learn how your filter cake holds the key to permanently reducing your WWTPs total operating costs.*

### LEARNING OBJECTIVES:

- A review of dewatering solutions and common challenges
- How to go about calculating your total cost of dewatering and disposal with various technologies
- How a dryer filter cake yields reduced total operating costs, while improving operating efficiency
- Selecting and sizing a solution that best meets your needs
- How temporary solutions can address spikes in sludge disposal needs

### SPEAKERS:



#### Ed Norfleet

leon.norfleet@evoqua.com

#### Dewatering Sales Manager

With over 25 years of experience working with customers across various markets, Ed has helped WWTPs meet their goals in reducing OPEX, by improving their dewatering process. Ed offers his expertise in managing filter press, belt press, centrifuge and rotary press systems.



#### Will Greene

william.greene@evoqua.com

#### Dewatering Sales Rep

After recently graduating from Saint Vincent College, Will is actively engaged in Evoqua’s Leadership Development program, growing his skills as a Sales Representative. Will has been spending much of his time engaged in Evoqua’s dewatering solutions, in an effort to promote Evoqua’s mission to transform water, and enrich life.



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# Serving With Humility

IN A THREE-DECADE CAREER, JOSÉ MORENO HAS ACHIEVED PROFESSIONAL EXCELLENCE WHILE MAKING SUBSTANTIAL CONTRIBUTIONS TO HIS SOUTH TEXAS COMMUNITY

STORY: **Suzan Chin-Taylor**

PHOTOGRAPHY: **Verónica G. Cárdenas**

**J**osé Moreno has achieved levels of knowledge and licensure that many with advanced degrees would find daunting.

He didn't have the opportunity to attend college, but that didn't stop this eager learner from creating a good life and a stellar career, earning the respect of his peers and the community. As North Wastewater Treatment Plant Manager for the McAllen (Texas) Public Utility, he was instrumental in producing Type I reclaimed water for residential use.

Moreno began his wastewater career in 1987, joining the McAllen utility as a Wastewater Class D operator trainee. Taking every opportunity to learn and grow, he quickly worked his way up to a Class B in 1998. His advancement didn't stop there, as a new requirement enabled him to gain even higher levels of knowledge and technical expertise.

His achievements were recognized in 2020 with the Outstanding Wastewater Operator Award from the Water Environment Association of Texas.

## DRIVING FORCE

In 2000, McAllen had begun generating Type II reclaimed water, for controlled use or areas where human contact is unlikely. The main customers were local energy provider, Calpine Energy, and a community golf course.

Then a local developer, Tres Lagos, asked the utility for Type I reclaimed water to irrigate a new residential development planned for 5,000 homes. The utility board,



The entrance of the North Wastewater Treatment Plant in McAllen, Texas.

which had a longtime vision to produce Type I water, decided the time was right and moved to create a private-public partnership.

It was possible to make the needed treatment plant modifications without raising rates for residential customers. The utility raised the necessary \$8.3 million through collaboration with Tres Lagos, which had received Tax Increment Reinvest Zone (TIRZ) funding for its development from Hidalgo County.

The McAllen utility also received a low-interest loan from the Texas Water Development Board with a loan

Jose Moreno, manager of McAllen Public Utility's North Wastewater Treatment Plant, in front of facility's odor-control system (Enduro Composites).



## GOING ON TOUR

José Moreno, manager of McAllen Public Utility's North Wastewater Treatment Plant, has a passion for teaching. One of his favorite duties is conducting plant tours for students from elementary to post-graduate level. He enjoys helping the community understand what happens "after the flush" and the vital role his plant plays in residents' lives.

By involving the community, Moreno helps to establish awareness about water and conservation and why McAllen has expanded its capabilities to produce Type I and Type II reclaimed water. Moreno's plant is the first in the Rio Grande Valley to produce Type I reclaimed water for residential irrigation.

Although at present water shortages may not be a major issue for the region, water use will be increasingly top of mind as the local population grows. Many more people will need access to clean water, and at current rates of use, there may not be sufficient supply.

"What we are seeing here in South Texas, and what is facing our industry as a whole, is increasing water demand and decreasing supply," Moreno says. "Utilities need to find ways to use wastewater discharges for residential and public irrigation. When we educate the community about it, its purpose and its importance, they become part of the solution."

“When José says he only has his high school diploma, no, he's done so much more... His passion and drive are to be commended.”

DAVID GARZA



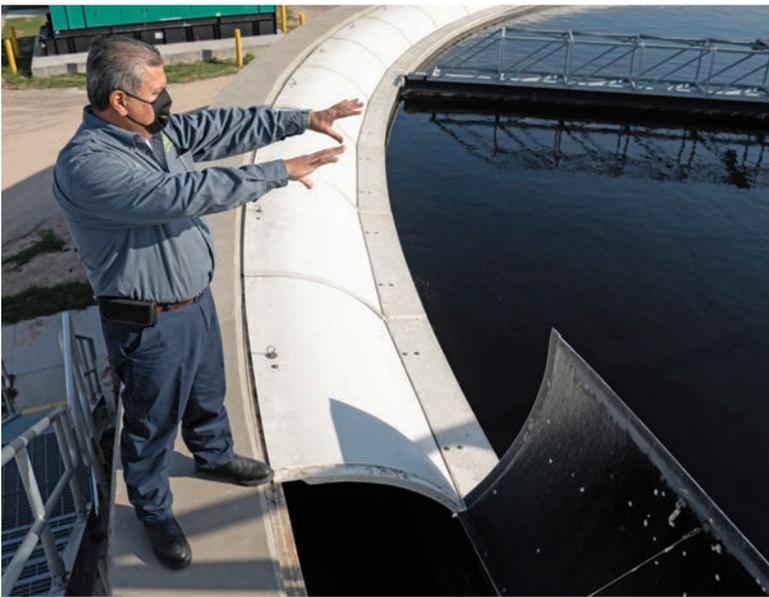
José Moreno,  
McAllen (Texas) Public Utility

POSITION:  
**Manager, North Wastewater Treatment Plant**

EXPERIENCE:  
**33 years in wastewater treatment plant operations**

LICENSES:  
**Wastewater Class A**

GOALS:  
**Innovate, educate the community, create a work environment for growth and solution-oriented thinking**



Jose Moreno likes helping residents understand wastewater treatment and become integral to improving the wastewater system (circular clarifier from Envirodyne).



The team at the North Wastewater Treatment Plant includes, from left, Ramon Treviño, working supervisor; Luis Muñoz and Roberto Martinez, operators; Guadalupe Montez, mechanic; Jose Moreno, plant manager; Jose Saldaña and Emilio Castro, operators; Juan Sanchez, lab technician; Eligio Alfaro, lab technician; and David Garza, wastewater system director.

forgiveness of \$1.25 million, because the funds were to be used for a green project. The utility will also receive \$4.5 million from the TIRZ for its investment in infrastructure. Between that and the loan forgiveness, the project is close to 75% funded. As a result, the utility will have two major customers for reclaimed water and an increase in revenue, without placing a financial burden on ratepayers.

## UPPING THE ANTE

To meet the new demand, treatment plant capacity had to increase from 10 mgd to 15 mgd, and turbidity had to be reduced. To that end, the utility added an AquaDisk cloth media tertiary filter (Aqua-Aerobic Systems); it cut turbidity from an average of 3.0 NTU to 0.03 NTU.

Installing new technology was the easy part; operations required Moreno to up his game and acquire his Wastewater Class A license. “The Texas Commission on Environmental Quality has regulations and rules we have to follow to operate,” says David Garza, director of wastewater systems. “When

the decision was made to produce Type I reclaimed water, the jump from 10 mgd to 15 mgd placed required that the North Plant have an operator with a Class A license.”

The step up to Class A meant a substantial commitment of time and energy; Moreno took on the challenge. To begin qualifying coursework he needed six years’ experience; to win the license he needed eight years’ experience and successful completion of 120 hours of core coursework.

“When José says he only has his high school diploma, no, he’s done so much more,” Garza says. “That license process and requirement, when you think about it and compare the hours dedicated, it is like getting a college degree. He has done that, and it isn’t something everyone can do. His passion and drive are to be commended.”

## OPERATING CHALLENGES

Moreno and a 15-member team keep the North Plant running smoothly. The team includes:

- Operators Emilio Castro, Daniel Lara, Rodrigo Martinez, Roberto Martinez, José Munoz, Gerardo Velasquez, Miguel Ramos, José Saldana Jr., Frank Villa and Oswaldo Oropeza
- Ramon Trevino, working supervisor
- Sergio Salinas and Lupe Montez, journeyman mechanics
- Juan Sanchez and Fernando Valente, lab technicians

Reclaimed water production averages 8 mgd; the facility serves 146,000 residents. The treatment process consists of headworks with Hydro-Dyne fine screens and a Hydro International grit collector; four Envirodyne aeration basins fed by five APG-Neuros turbo blowers, four Envirodyne clarifiers, the cloth media filters, and an Ozonia UV disinfection system (SUEZ).

*(continued)*

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Keeping things running during the facility modifications was sometimes challenging. “Stopping incoming flow and powering down during periods of construction affects the treatment process,” Moreno says. “During this, we had to be vigilant, always making sure the water kept up and nothing got upset. Sometimes we were re-routing connections to ensure maintenance of our permit and to maintain delivery of the reclaimed water we committed to.”

Those experiences confirmed the importance of what Moreno has consistently practiced as a manager: cross-training of teams. Although McAllen has very low staff turnover, Moreno has seen the benefit of training all the operators, regardless of level, how to troubleshoot all plant equipment. As a result, team members are equipped to handle most situations without Moreno’s involvement.

Moreno also holds daily briefings with his team to keep them up on in-plant requirements and what is happening outside of the facility. “Everyone gets a turn,” he says. “Everybody can be learning and aware of where things stand, even when I’m not here, so things keep moving forward as needed.” He is deeply involved with the plant’s lab work in reviewing, analyzing and acting on the results.

### IT TAKES A VILLAGE

While taking a community approach within the plant, Moreno does the same with the utility’s outreach program, a favorite aspect of his position. He derives fulfillment from helping residents understand wastewater treatment and become an integral part of making the wastewater system better.

“The more the community knows about what’s going on in their environment and in their household, the more they can help us,” Moreno says. “Most people don’t think about the impact of what they flush down the drain, but once we educate them, they become partners in keeping the system healthy.”

To make the learning more fun and engaging, Moreno and his team decided to offer something more than static picture displays and balloons and candy for children at the annual McAllen Public Utility Night Out, an open-house event for citizens.

The team built a scale model display of the treatment plant with realistic details, like colored water that changes shades and eventually becomes clear as it goes through the treatment stages. Over the years, the crew has enhanced it with an actual working fine screen and UV light. They incorporated aquarium rock to simulate grit, pumped

“The more the community knows about what’s going on in their environment and in their household, the more they can help us.”

JOSÉ MORENO

diffused air into the aeration basins and added extra touches like tractors, model trees and cars.

The display attracts many people each year and is a highlight of visits to the Night Out event. Moreno and his team explain the process with the aid of the model, along with samples of water at process stages from influent to effluent or reclamation. The creation and use of the model has been great for building teamwork and camaraderie.

### CREDIT WHERE DUE

When told he was to receive the Outstanding Wastewater Operator Award, Moreno thought it was a practical joke: He asked the caller, “Who is this?”

His peers felt that his quiet humility and dedication to his work deserved to be acknowledged. Moreno’s experience illustrates why a degree is not the only

Here are the characteristics of the reclaimed water produced by McAllen Public Utility:

#### TYPE 1: Suitable for Residential Use

	Permit	Effluent
<i>E. coli</i> /100 mL daily avg.	20.0	1.26
<i>E. coli</i> /100 mL daily max.	75.0	3.0
CBOD	5.0 mg/L	0.926 mg/L
Turbidity	3.0 NTU	0.338 NTU

#### TYPE 2: For Irrigation, Industrial and Other Uses Where Human Contact Is Unlikely

	Permit	Effluent
<i>E. coli</i> /100 mL daily avg.	200	9.244
<i>E. coli</i> /100 mL daily max.	800	18.0
CBOD	15.0 mg/L	4.250 mg/L
Turbidity	N/A	N/A



Moreno (left, with operator Luis Muñoz) has a passion for teaching, whether leading plant tours or mentoring his team members. (Fine screens by Hydro-Dyne).

option for a having a great job — dedication, attention to detail, a strong work ethic and a positive attitude can take a person far in a wastewater career path.

He encourages young people in his community to give wastewater treatment and operations a serious look. “You learn a lot,” he says. “It’s a long journey, but if you dedicate yourself and stay humble, you’ll succeed. If you love what you do, all the puzzle pieces will fall into place.” **tpo**

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Volunteers from the 2019 cleanup show off their collection of trash.

# Coastal Cleanup in the Age of COVID

DESPITE PANDEMIC-RELATED CHALLENGES, RESIDENTS OF A CALIFORNIA SEWER DISTRICT REMOVE AN IMPRESSIVE AMOUNT OF TRASH FROM SHORELINES AND WATERWAYS

By Sandra Buettner

It's no doubt that COVID-19 has disrupted lives and brought new challenges to getting things done. That didn't keep California's Fairfield-Suisun Sewer District from continuing its long history of taking part in a Coastal Cleanup Day, albeit with some modifications.

The cleanup day is part of a statewide California Coastal Commissions (CCC) initiative that started 36 years ago when residents along the Pacific Ocean became concerned about a large amount of litter and plastic debris appearing on the shoreline. At the first event, more than 5,000 people showed up to collect the trash. Since then, more volunteers have come forward, including participants from cities and areas affected by the trash.

The Fairfield-Suisun district has been involved for 22 years and usually attracts 400 to 700 residents. The district serves some 135,000 residential, commercial and industrial customers in central Solano County, 40 miles northeast of San Francisco. Its 48-square-mile service area includes 70 miles of sewer; average wastewater flow is 10 to 15 mgd.

## HALF-DAY ACTIVITY

"Even though our service area does not border the coast, our creeks and streams ultimately empty into the San Francisco Bay, which empties into the ocean," says Lexi Valenti, junior engineer and lead organizer for the event.

The district has 25 cleanup sites in its area, each with a team captain responsible for the day's activities. Volunteers from scouts, youth and church groups, schools and the community college take part. This year the

“Despite the challenge we had with the pandemic, we still managed to collect 4,000 pounds of trash through our volunteers.”

LEXI VALENTI

youngest participant was 4 years old; the oldest was 77. Some volunteers in kayaks clean up the marshes and waterways.

Every year, one month before the cleanup, a large billboard appears along a major highway and advertises the event. The day is also promoted through social media, on the district website, and through news media. Much of the promotion is through word-of-mouth by way of residents who return every year.

The event takes place on the third Saturday in September, typically from 8 a.m. to noon. Volunteers receive supplies such as buckets, grabbers, gloves, trash bags and hand sanitizer. Water and snacks are available to them. Each captain gives a presentation warning volunteers about items such as needles that are unsafe to pick up.

"We supply a sharps container that is dedicated to needles and other sharp objects," Valenti says. "Only adults are allowed to handle sharps. We dispose of the sharps containers properly accordingly after the event."

After all the trash is picked up and bagged, a hauling company collects and weighs the bags.



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Young volunteers clean the area surrounding one of the creeks that flow through the city of Fairfield.

The district announces who collected the most trash through social media and on its website. Each year includes a competition for who can collect the strangest trash item. Last year's winner was a stolen parcel box found along the shore.

### COVID CHALLENGES

The district made several adjustments last year to continue the cleanup through COVID. The CCC changed the event to include the entire month of September and asked participants to clean up their backyards, neighbor-

hoods, local parks and storm drains, while keeping with established CDC guidelines for social distancing and wearing masks.

The cleanup day theme was "Protect Your Happy Place," emphasizing the value to neighborhoods. District residents were tasked to clean up their locales instead of going to the usual 25 sites. They received the usual tools and supplies and were encouraged to use their own household items like tongs as a picker, their own trash bags and other materials. Videos on the district website gave the safety information, and a checklist was available for download.

In addition, the CCC provided a smartphone app where volunteers could record the items and the amounts they retrieved. The app also recorded other information, such as how many miles participants walked. Later, the CCC recorded and analyzed the data to see how much trash was collected and what kinds.

### IMPRESSIVE METRICS

More than 6,300 disposable masks and plastic gloves were retrieved and recorded; plastic grocery bags were still among the most common trash items. "This year the app was used more because of the virtual nature of the event," Valenti says. "Despite the challenge we had with the pandemic, we still managed to collect 4,000 pounds of trash through our volunteers."

Statewide, the CCC reported that 70,000 pounds of refuse were collected during September, and more than 10,000 people took part.

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# People. Technology. Systems. Success.

THE SAN JACINTO WATER AUTHORITY TREATMENT PLANTS ARE SET UP FOR EXCELLENCE. IT'S NO WONDER THEY DELIVER CONSISTENT QUALITY EFFLUENT — AND HAVE THE AWARDS TO PROVE IT.

STORY: **Jim Force** | PHOTOGRAPHY: **Jon Shapley**



The team at the San Jacinto River Authority includes, from left, Jason Williams, utility enterprise operations manager; Rick Moore, utility operations superintendent; Tracy McGrew, senior operator; Cory Brown, lead operator; and Joshua Hatch, Kevin Burnett and Jeremy Elder, operators.

If you joined the San Jacinto River Authority as a new clean-water plant operator, the first thing they'd talk to you about would be leadership.

That's the culture, according to Jason Williams, utility operations manager, and Rick Moore, utility operations superintendent. "It's what management communicates to staff," Williams says. "It's a team effort. We care about the quality of the effluent. We're concerned about the environment. We share knowledge and information, and we're proud of what we do."

What they do is operate three regional wastewater treatment plants serving several municipal utility districts in the San Jacinto River watershed. While all the facilities have won awards, the most recent honors went to plants 2 and 3, named 2019 Plant of the Year in their size categories by the Water Environment Association of Texas.

### PLANT PROCESSES

Plant 2 is the larger, with a design capacity of 6 mgd and average daily flow of 3.8 mgd. It came online in April 1999.

The plant uses Flygt and Gorman Rupp pumps for influent and return and waste activated sludge. Two automatic mechanical bar screens (Headworks) and one manual screen remove rags and debris, followed by grit removal.

Eight aeration basins with fine-bubble rubber membrane diffusers (Sanitaire) are designed for single-stage nitrification. These are followed by three secondary clarifiers, one cloth media filter and two low-head sand filters (all Aqua-Aerobic Systems). After chlorination and then dechlorination with sulfur dioxide, the effluent is discharged to Panther Branch, which feeds into Lake Woodlands.

Waste activated sludge is thickened on gravity belt thickeners (Alfa Laval), and aerobic digesters condition the biosolids before dewatering on Alfa Laval belt filter presses. Cake is trucked to a landfill or composting site.

Plant 3 (0.9 mgd design/0.5 mgd average) began operating in July 2003. It is a complete mix facility. Debris is removed via a perforated bar screen (Parkson Corporation). Two aeration basins with fine-bubble diffusers (Sanitaire) provide biological treatment, followed by two secondary clarifiers and chlorination before discharge to an unnamed creek.

Digested liquid solids are hauled to another facility for final treatment. At Plant 2, odors at the headworks are controlled with an earthen media bio-filter. Odors are not an issue at Plant 3. "We pay vigilant attention to odors at all our plants," Williams says.

### STATE-OF-THE-ART CONTROLS

A central SCADA system enables operators to remotely monitor process operations and equipment status, and control process equipment 24/7.

San Jacinto River Authority,  
Plants 2 and 3, Conroe, Texas

www.sjra.net



YEAR BUILT/UPGRADED:  
**Plant 2 1999, Plant 3 2003**

FLOWS:  
**Plant 2, 6 mgd design/3.8 mgd average; Plant 3, 0.9 mgd design/0.5 mgd average**

TREATMENT PROCESS:  
**Activated sludge**

TREATMENT LEVEL:  
**Plant 2 tertiary, Plant 3 secondary**

BIOSOLIDS:  
**Plant 2, landfill/composting; Plant 3, liquid sent to another plant**

RECEIVING STREAM:  
**Adjacent creeks**

ANNUAL BUDGET:  
**\$2.5 million (total operations, both plants)**

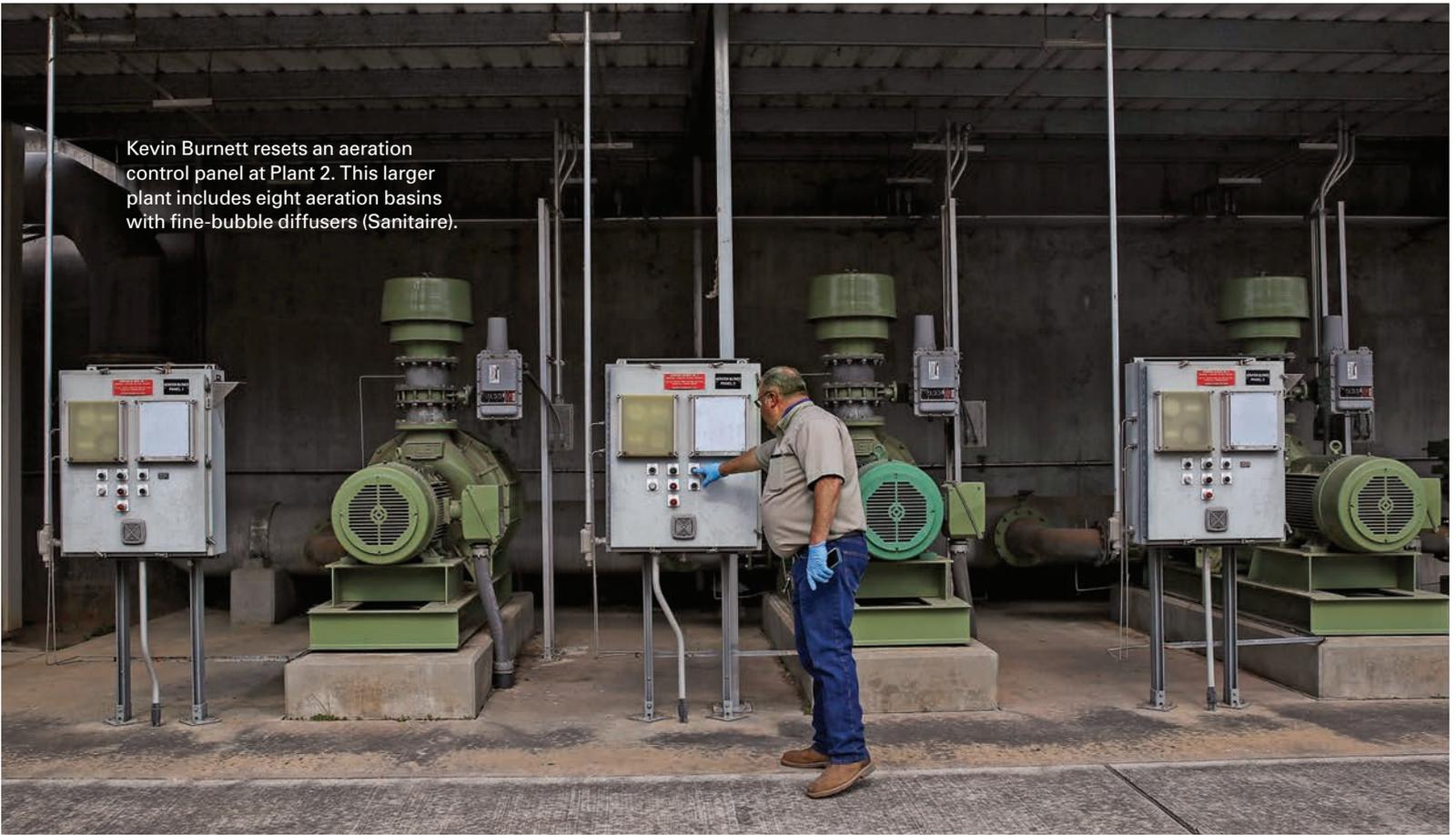


Cory Brown and colleagues benefit from a comprehensive enterprise asset-management plan and a rolling 10-year project plan as they keep the facilities up to date and in compliance.

“We care about the quality of the effluent. We’re concerned about the environment. We share knowledge and information, and we’re proud of what we do.”

JASON WILLIAMS

Kevin Burnett resets an aeration control panel at Plant 2. This larger plant includes eight aeration basins with fine-bubble diffusers (Sanitaire).



San Jacinto River Authority Plant 2 PERMIT AND PERFORMANCE			
	INFLUENT	EFFLUENT*	PERMIT
<b>BOD</b>	160 mg/L	2.9 mg/L	10 mg/L
<b>TSS</b>	200 mg/L	2.4 mg/L	15 mg/L
<b>Ammonia</b>	36.5 mg/L	0.6 mg/L	2.6 mg/L

\* Annual averages

San Jacinto River Authority Plant 3 PERMIT AND PERFORMANCE			
	INFLUENT	EFFLUENT*	PERMIT
<b>BOD</b>	155 mg/L	4.4 mg/L	10 mg/L
<b>TSS</b>	105 mg/L	5.3 mg/L	15 mg/L
<b>Ammonia</b>	38 mg/L	0.3 mg/L	3 mg/L

\* Annual averages

Features of the SCADA system include aeration control, flow proportional return-activated sludge control, and disinfection system control. Instruments include Hach Solitax and LDO (luminescent dissolved oxygen) probes that provide real-time aeration basin TSS and DO readings.

Operators can access the SCADA system via their iPhones or iPads, or laptop and desktop computers. They can also consult dedicated on-site SCADA workstations at each facility. SCADA system design, improvements and maintenance are a collaborative effort between operations and the SCADA team, led by Matt Volna, SCADA/instrumentation and control manager; Chris

“We operate the plants so they don’t operate us.”  
**RICK MOORE**

Clements, instrumentation and control superintendent; Danny Burns, programming superintendent; and their teams.

All process and regulatory data is stored in the Hach Water Information Management System (WIMS). Operators collect and input data via an iPhone app, and from field observations and laboratory tests for such parameters as temperature, SV30, BOD, NH3-N, MLSS, turbidity, chlorination and pH.

The staff has the support it needs to get the job done. “We have a comprehensive enterprise asset-management plan, as well as a rolling 10-year project plan,” Moore says. “Our project plan is robust and updated annually.

We also include all lift stations and underground assets in these programs, as all utilities should.”

Through diligent rehabilitation and replacement of infrastructure, the utility is working to minimize I&I and has replaced or improved process equipment from pumps, bar screens and blowers, to diffusers, clarifiers and filters. “We’re getting better and better at it every year,” Williams says.

### SUPER STAFFING

The modern processes and automation go a long way to maintain staff morale and motivate excellence. Cory Brown, lead operator, heads the crew responsible for plants 2 and 3. On his team are senior operator Tracy McGrew, and operators Josh Hatch, Jeremy Elder and Kevin Burnett.

They are supported by the operations team at Plant 1, including lead operator Will Parks, and operators John Connell, Scott Schwinn, Tia Ramey and Mike Coyne. Chris Meeks serves as operations and maintenance manager. The authority makes it a practice to rotate staff among the plants to increase the knowledge and skills of all team members.

“We also have a top-flight maintenance and electrical crew, which we rely on a lot,” Moore says. David Guyer is maintenance manager; Jacob Everett is chief maintenance technician; Jeff Meyer and David Lindquist are lead maintenance technicians; James Turner, Curtis Nord, Jeff Harris, Andrew Ridpath, Jacob Sherrod and Bill Gibson are maintenance technicians; and Wayne Jackson is chlorine technician.



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## WEATHER CHECK

When severe weather threatens, it's all hands on deck at the San Jacinto authority. Located near the Gulf of Mexico, the plants are often in the bullseye for hurricanes and significant rainfalls.

Moore ticks off the more memorable storms: "The Tax Day Flood of 2016, Hurricane Harvey in 2017, Tropical Storm Barry in 2019, and Hurricane Laura in 2020. With storms in the Gulf, you never know where they're going to go. We get high winds, heavy rains and increased storm flows."

The well-trained crew is a blessing when that happens, and the facilities are ready. All plants have backup generators. "We test run them every week, and load test them quarterly," Moore says. "We make sure we have access to fuel. With Hurricane Ike in 2008, power was out for three days but it wasn't an issue here."

To handle the bad weather, shifts are re-aligned to provide 24-hour coverage. Sometimes, as with Harvey, the operators' homes are also flooded and team members end up staying in the treatment facilities for several days. "In that case we provide bedding, food, dry socks and clothes," Williams says. "We give them time to rest and wind down."

Moore summarizes the wet-weather strategy: "We operate the plants so they don't operate us."

## BOOSTING ALKALINITY

The San Jacinto authority had to take control of another situation in 2015 when the utility switched its raw water supply from groundwater to surface water, complying with the county's groundwater reduction policy.

"Surface water is naturally alkaline deficient," Moore explains. "To achieve nitrification, we had to add alkalinity to our influent." After experimenting, the staff chose to add magnesium hydroxide ahead of the biological treatment basins at all three plants, giving the organisms the opportunity to nitrify. They found that to be safer and less hazardous than other chemicals.

(continued)



Operators use a Hach HQ40D portable meter to check dissolved oxygen levels.



“With storms in the Gulf, you never know where they’re going to go. We get high winds, heavy rains and increased storm flows.”

**RICK MOORE**

Cory Brown views the SCADA screen at the plant. Operators can also access the system remotely at any time.

“We get fantastic support from our tech services group. We collaborate to solve issues,” Williams adds.

Other challenges to the team include increasing population in the fast-growing community, maintaining assets, and keeping up with technological advances. Moore says team members are always looking for upgrades and implement them when and where needed.

And then there’s the pandemic. The staff experienced cases of COVID-19 during 2020. A few operators were quarantined; all recovered. The authority provided personal protective equipment and took an approach which it calls “very careful.”

He explains, “We set up shifts for four 10-hour days. One crew operates Sunday through Wednesday, and the second crew Wednesday through Saturday. That gave us the opportunity to meet together on Wednesday, talk shop and pass along information. Most of the meetings are outdoors, and everyone stays socially distanced.”

The WIMS and SCADA control were instrumental in operators sharing data and information across shifts without having to meet face-to-face.

## OPERATOR FOCUSED

Having overcome these challenges in the past, the authority’s skilled operations team is well prepared to handle whatever issues the future may bring. That’s because the utility values its operators and creates the opportunity for them to succeed.

“We work as a team,” Moore says. “Our pay rates and benefits are very good, and the utility provides good working conditions. The utility pays for training and licensing.”

Training is a point of emphasis. Williams, Moore, operations and maintenance manager Meeks, and lead operator Brown are all certified water professionals through the Texas A&M Extension course of study.

The team has seen some veteran operators retire recently, and more will follow five or 10 years from now. “The state of Texas is short of operators, so we have to plan and hire a new generation,” Williams says. “We teach them our culture of pride, responsibility and constant improvement from day one. From the top down, it’s all about leadership.”

Or as Moore puts it: “We train up.” **tpo**

## A HISTORY OF AWARDS

All three wastewater treatment plants operated by the San Jacinto River Authority have been honored for consistent excellence.

The awards are “a testament to our operations staff,” says Jason Williams, utility operations manager. In 2020, the Water Environment Association of Texas presented its Plant of the Year award to plants 2 and 3. Plant 1 received the same award in 2011 and 2012, and Plant 3 also won it in 2016.

All three facilities have earned peak performance awards from the National Association of Clean Water Agencies. Plant 3 achieved Platinum status for 2011 through 2019 and Gold status for 2010. Plant 2 received Gold in 2012, 2018-19 and Silver in 2010-11 and 2013-17. Plant 1 received Gold in 2010-11 and 2013-15, and Silver in 2012 and 2016-19.

Rick Moore is another honoree: He received the Water Environment Federation’s William D. Hatfield Award in 2011.

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James Gaunt, lead plant operator, on the oxidation ditch at the Great Bend treatment facility.

# A Nutrient Reduction Bargain

A KANSAS OPERATIONS TEAM REDUCED EFFLUENT NITROGEN AND PHOSPHORUS WITH SIMPLE PROCESS ADJUSTMENTS AND AVOIDED A \$6 MILLION INVESTMENT IN A NEW CLEAN-WATER PLANT

By Ted J. Rulseh

Facing a need to reduce effluent nitrogen and phosphorus, the Kansas city of Great Bend had a choice: Try to get it done with oxidation ditch process adjustments, or invest millions of dollars in a new clean-water plant.

The operations and laboratory team members chose process changes. With the advice of an operations specialist, the addition of a \$25,000 variable-frequency drive, some diligent work and a little trial and error, they succeeded.

Effluent total nitrogen has come down from 8 to 12 mg/L to 3 to 6 mg/L on average, and total phosphorus has dropped from about 2 mg/L to 0.5 mg/L or less, against state-prescribed goals of 10 mg/L nitrogen and 1.0 mg/L phosphorus.

While the initiative is a work in progress and effluent nutrient levels are subject to seasonal variation, the work to date has met the approval of the Kansas Department of Health and Environment (KDHE).

If at some point the state sets actual permit limits on the two nutrients, “We won’t treat it as a not-to-exceed,” says Tom Stiles, director of the department’s Bureau of Water. “It would be a rolling average over 12 months and would take the ebb and flow of the seasons into account, so they would not be penalized for that. Their performance has been great.”

## DOWNWARD PRESSURE

Great Bend, just about smack in the center of Kansas, is a mostly residential community of 15,000. It is home to the Fuller Brush Co. and lies just southwest of the Cheyenne Bottoms Wildlife Area, a major stopping point for migrating waterfowl.

Built in 1952 and upgraded in 1998, the wastewater treatment plant has a design flow of 3.6 mgd and an average flow of 1.28 mgd. The plant upgrade was completed at a time when the city was expected to grow, but then the local oil industry mostly faded away. Only one of the plant’s two racetrack-style oxidation ditches (Ovivo) was ever placed in operation.

Influent wastewater passes through an automatic bar screen (Parkson Corporation) and newly installed grit removal system (Smith & Loveless). After the oxidation ditches, the water flows to a pair of secondary clarifiers, followed by UV disinfection (TrojanUV). Thickened biosolids are anaerobically digested and land-applied as a Class B liquid product.

In April 2020, the city received a letter from KDHE stating the goals of 10 mg/L total nitrogen and 1 mg/L total phosphorus. The city had tried five years earlier, unsuccessfully, to meet those goals.

Stiles notes that Kansas had made nutrient reduction a priority since the early 2000s, focusing on mechanical treatment plants and emphasizing biological nutrient removal. “Subsequent to that we had total maximum daily loadings come through on a variety of streams that were deemed to be impacted by phosphorus,” says Stiles. “So the regulatory push has been nutrient reduction in the face of TMDLs that would result in permit limits.”

## TWO STEPS

To make the needed process adjustments, the city team worked with consultant Grant Weaver — a licensed wastewater operator, professional engineer and president of CleanWaterOps — who was under a contract with the state to provide technical advice on nutrient reduction strategies using equipment and resources on hand.

They devised a two-step plan. First, operate the main body of the oxidation ditch to continue the removal of ammonia, while also removing nitrate. This would enable the pre-anoxic zone designed for nitrate removal to be employed for phosphorus reduction. Second, make adjustments so that the pre-anoxic zone becomes anaerobic — and as it does, get it to work as a fermenter to support and drive biological phosphorus removal.

A key to the process changes was the addition of a variable-frequency drive to the vertical-shaft aeration rotor at the front end of the aeration ditch to enhance control of dissolved oxygen, notes James Gaunt, lead plant operator.

“Before we had a high and a low switch, and typically just always ran on high,” Gaunt says. “Now we have automated control of that rotor speed through a DO probe (YSI, a Xylem brand) in the aeration basin. That enables us to create different zones with different levels of DO for better removal of nutrients, while still maintaining our ammonia level.”

Weaver observes, “The operators began adjusting the DO setting downward in an effort to provide enough oxygen to continue converting ammonia-nitrogen to nitrate-nitrogen, while at the same time limiting the amount of oxygen added to the ditch. This allows a portion of the ditch to become sufficiently oxygen deficient (anoxic) to support nitrate-nitrogen conversion to nitrogen gas. It took a few months until they got it dialed in.”

Next, they then closed the gate that lets flow recycle from the ditch into the pre-anoxic zone. In addition, says Gaunt, “The anoxic zone on the back side of the aeration basin had a mixer on it. We turned that off; now we run it for 15 minutes a day just to keep the water from going completely septic.”

## SEEING RESULTS

So far, the changes are having the desired effect. “For the last quarter of 2020, we saw 0.5 mg/L phosphorus and about 7 mg/L total nitrogen, of which about 5 mg/L was nitrate,” Stiles says. “Those are good numbers from our perspective.”

The accomplishments in Great Bend and similar Kansas cities are helping to pave the way for what Stiles calls an inverse trading program for nutrients, notably phosphorus, as a way to help reduce loadings to streams. “We’re looking to invite cities to participate in water-quality trading, potentially spending money not in the city but in the rural areas to help farmers with nonpoint source loads,” Stiles says.

“Instead of waiting for the farmers to generate credits, we’ve got the cities generating credits that allow them to expend resources out into the watershed to bring the agricultural sector more into line with reducing nutrient contributions.”

Weaver sees the Kansas program as a way for communities to “take free advice” on innovative and affordable ways to reduce effluent phosphorus. “Great Bend is a good example, but it’s not the only one,” he says. “Other communities in the state, some working with me, some working with Kansas Rural Water circuit riders, some on their own without any outside support, have done great jobs. The state has given municipalities the chance to take some technical advice and run with it.”

“Operators can make this approach work or not. It’s totally up to the operations team. The Great Bend team took the challenge to prove it workable.”

GRANT WEAVER



The Great Bend team includes, from left, Trenton Brown, operator; James Gaunt, lead operator; April Batt, lab technician; Reuben Martin, utilities superintendent; Jenna Pitchford, utilities supervisor; and Ben Frayer and Doug Prosser, operators.

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## TEAM EFFORT

“Great Bend took advantage of that and ended up saving a lot of money and getting it done quicker, and also more sustainably, because they’re not using chemicals and they didn’t have to build anything. They put their brains and energies to work. Operators can make this approach work or not. It’s totally up to the operations team. This team took the challenge to prove it workable.”

Jason Cauley, public works director, praises the plant team members for their effort: “We have to give James credit for a lot of this work. He has followed Grant’s advice to a tee and has done a really great job in helping us meet the standards. April Batt, our lab technician, has supported the effort by performing the necessary tests along the way. Between those two we have done really well. They have worked really, really hard to get us to this point.”

tpo

# Taking Ownership

WEF'S NEW DIRECTOR OF SUSTAINABLE BIOSOLIDS PROGRAMS BELIEVES A KEY TO COMMUNICATION IS HELPING PEOPLE UNDERSTAND THE ROLE THEY PLAY IN THE NUTRIENT CYCLE

By Ted J. Rulseh

For many years biosolids have been a key point of focus for the Water Environment Federation. Now the federation is looking to help its members and the water sector advance beneficial use initiatives by creating the position of director of sustainable biosolids programs.

For that role WEF selected Maile Lono-Batura, who previously served 22 years as executive director of Northwest Biosolids, based in the state of Washington. There she dedicated herself to fostering sustainable solutions for biosolids, and to helping generate funding for research.

Lono-Batura's interest in biosolids goes all the way back to high school, where she heard a presentation on the subject in a biology class; it included a segment on using biosolids in a sustainable forestry program.

Aspiring to a career involving biosolids, she earned a bachelor's degree in community and environmental planning with an environmental studies minor from the University of Washington. She later received a master of non-profit leadership from Seattle University.

## A toolkit for communicators

The Water Environment Federation has released a new toolkit as a resource to utilities for communicating about biosolids in ways that are factual, science-based and easy to understand.

The kit includes guidance on challenging communication tasks, including responses to or planning for media coverage, handling concerns raised about biosolids safety, creating presentations for public events or meetings, and developing content to post online or on social media. It highlights umbrella messages that utilities can adapt for FAQs, talking points, fact sheets, brochures, websites and more.

"We've done this in response to our members saying, 'We don't have enough information to provide to our communities about biosolids,'" says Maile Lono-Batura, director of sustainable biosolids programs. "Not every utility has the budget to have a social media coordinator, a branding company or a communications specialist.

"The kit is full of information and templates that any utility can use. It's all built around a unified message: Here's what biosolids are, here's what biosolids can do for your community. It's designed to make it easy for utilities to take the materials and customize them for their own use." **Information about the toolkit is available at [www.wef.org/biosolids](http://www.wef.org/biosolids).**



Maile Lono-Batura

In her new position, Lono-Batura serves as the WEF lead for all biosolids activities. That includes acting as a central coordinator on national issues for the organization's members and the larger water sector, in concert with WEF Member Associations and regional biosolids organizations.

She also communicates with entities including agricultural, environmental and climate change groups, along with the news media. She helps utilities and regional groups that are facing challenges to their biosolids programs and promotes research on biosolids safety and efficacy.

Lono-Batura talked about her role in an interview with *Treatment Plant Operator*.

**tpo:** Isn't it unusual for a young person to pursue biosolids as a career aspiration?

**Lono-Batura:** People thought I was a little nuts. They asked, "Is there any work in that field?" And I said, "Are you kidding? This is job security. It's not ever going away." It has been inspiring. You deal with a great cross-section of people, and it's magic. It's fun to be a part of.

**tpo:** What were some of your proudest accomplishments at Northwest Biosolids?

**Lono-Batura:** Northwest Biosolids is a pretty small nonprofit with a budget under \$250,000, with 200 members at our highest, and typically 120 to 150 depending on the year. But with that group of agencies and people, we were able to leverage upwards of \$3 million in research funding over time to answer questions our utility members got from their communities. In addition, where needed, we were there to provide a unified voice on biosolids for utilities across the Northwest and in the national conversation.

**tpo:** What was WEF's rationale for creating the position you now hold?

**Lono-Batura:** WEF has a Residuals and Biosolids Committee that has done excellent work. They have done a lot of heavy lifting that includes setting up the Resource Recovery and Recycling Library ([www.biosolidsresources.org](http://www.biosolidsresources.org)). They created this new position to help provide a unified voice and to help utilities figure out, budget-wise and sustainability-wise, how to manage their biosolids in ways that return nutrients to the earth.

**tpo:** Why is it important in this time and place to advocate for sustainable biosolids programs and beneficial use?

**Lono-Batura:** We're having important conversations around topics like climate change and sustaining soil for food security. Those conversations are much more heightened now. There are opportunities for utilities to bring biosolids into the picture, along with clean water and renewable energy.

**tpo:** What do you see as some of the most promising approaches to and technologies for beneficial use?

**Lono-Batura:** There is never one perfect fit for all utilities. They all have to adjust based on what they have available to them. The one thing that binds them all together is that there are nutrients and energy in biosolids. How do utilities take what is being sent to them, make resources from that, and return them to the environment? Anything that helps do that at the highest level is the most hopeful technology. The lens to put on biosolids for the future is how to make the highest use of all those resources.

**tpo:** After a long track record of successful biosolids programs, why do we still see public skepticism about beneficial use?

**Lono-Batura:** What is making people skeptical boils down to ownership. It's ownership of what we put in our bodies, what we ingest and what we buy. We need to see the personal role we all play in the biosolids story. Sometimes it's hard for people to recognize that when we flush, we're part of that system. It's taking ownership of the products we consume, and it's companies taking ownership of the life cycles of the products they make. If you think about it in that way, you can understand better that wastewater treatment is not an us-and-them problem. It's a you-and-me-and-society problem. We all need to think about how we play a role.

**tpo:** Beyond the concept of ownership, what are some specific obstacles to beneficial use initiatives?

**Lono-Batura:** PFAS, microplastics, the "ick factor" — all those are rooted in the concept of owning it. If there is one tip I would give to utilities having a difficult time communicating the important work they do, it's to bring people to the plant. Show them that magnificent system of taking nature's way of treating wastewater, putting it on a factory level, and making resources from it. Take people out to the fields to see what biosolids look like and what the application process looks like. We're using what we put into the system. It's the whole farm-to-table-to-farm concept. Utilities play an important role in that circular economy.

“Whether talking to utilities or to their community members, we need to deliver research-vetted information in such a way that everybody can understand it.”

**MAILE LONO-BATURA**

there is one thing I learned from Northwest Biosolids, it's how important it is to have a network. So while I'm in the position of director, I rely heavily on the utilities because they are the front-line workers. I rely on the researchers because they are the ones who come up with answers to the questions we receive. I talk with regulators to understand more about the challenges they see. It's about how we can all come together as a unified voice around biosolids reuse.

**tpo:** What would you say was your most effective communication strategy while with Northwest Biosolids?

**Lono-Batura:** It was building on a foundation of research. If we don't have research, we can't provide outreach materials. We can't comment on reg-

**tpo:** How do you see WEF advancing beneficial use now that your position has been created?

**Lono-Batura:** It's about proactive communication — opening conversations and fostering ones that have been opened but need to be advanced further. The position is focused on having that voice as a central point of contact for WEF. If

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ulations. If Northwest Biosolids didn't have funding for research, it would have been much harder to have an effective communication strategy. Every bit of information that goes out of Northwest Biosolids is rooted in research. Whether talking to utilities or to their community members, we need to deliver research-vetted information in such a way that everybody can understand it.

**tpo:** What words of inspiration would you offer to those on the front lines of sustainable biosolids programs?

**Lono-Batura:** What utilities are doing as front-line workers is such an important job. I want my kids, when they flush, to realize that someone is there waiting for it, to make it into resources again. It's amazing as a utility team member to be able to say, "That's me bringing clean water to you. That's me taking the nutrients you ate and making them into biosolids to put back to the farms that will feed you again." It's pretty incredible. **tpo**

# Odor Control and Disinfection

By Craig Mandli

## Biofiltration

### ANUA AIRASYMBIO

AiraSymBIO from Anua is an on-site, closed-loop odor treatment system that harvests raw wastewater, filters and then treats it for use as the irrigation water in the multistage biological odor treatment system. The system utilizes a water resource already present, thus reducing operating costs, uses no freshwater, and allows the biological odor control system to function as intended, as many areas around the country do not have potable water available at the lift or pump station site or have water conservation initiatives in place, which prohibits the use of biological treatment technologies. **346-225-8033; www.anuainternational.com**



AiraSymBIO treatment system from Anua

### EVOQUA WATER TECHNOLOGIES BTF-BIOSCRUBBER

The BTF-Bioscrubber biological odor control system from Evoqua Water Technologies is an advanced, nonhazardous biological air treatment system that integrates equipment, media and the NUCIRC process for optimal performance and flexibility. Utilizing a dual-stage bio-trickling filter system, which can be operated in both single- or dual-stage modes, applications have achieved 99.9% hydrogen sulfide removal and up to 97.5% of total odor removal during performance testing. The process skid allows operation in recirculation or once through modes, delivering accelerated acclimation without separate startup equipment. Systems are available in both single- and dual-stage options with single-stage recirculated systems suited for treating raw biosolids odors found in pump stations, headworks and primary sedimentation, while dual-stage systems are better suited to handle entire plant odors. **800-466-7873; www.evoqua.com**



BTF-Bioscrubber biological odor control system from Evoqua Water Technologies

operation in recirculation or once through modes, delivering accelerated acclimation without separate startup equipment. Systems are available in both single- and dual-stage options with single-stage recirculated systems suited for treating raw biosolids odors found in pump stations, headworks and primary sedimentation, while dual-stage systems are better suited to handle entire plant odors. **800-466-7873; www.evoqua.com**

### INDUSTRIAL ODOR CONTROL HI-FLOW RADIAL FILTER

Industrial Odor Control's Hi-Flow Radial Filter is an activated carbon radial molecular air scrubber that captures VOCs and particulate matter in a broad range of environments. It has a small footprint but can handle a large volume of air. It can be ducted into existing HVAC systems or be stand-alone with a power blower. It comes in three sizes, the HRF-1.5 holds 1.5



Industrial Odor Control's Hi-Flow Radial Filter

cubic feet of activated carbon, the HRF-5 holds 5 cubic feet, and the HRF-7 holds 7 cubic feet. The units come with Norit Darco's H<sub>2</sub>S activated carbon. It is specifically developed for removing hydrogen sulfide from air streams and eliminating sewage odors. It is produced by steam activation of a raw material to provide increased pore volume for adsorption of hydrogen sulfide and mercaptan odors. These filters are offered with an optional power blower that has a standard voltage in one-phase, but units are also available in three-phase. **866-667-8465; www.industrialodorcontrol.com**

## Chemicals

### BIOSAFE SYSTEMS OXYFUSION

The OxyFusion system from BioSafe Systems generates peroxyacetic acid on site to meet the disinfection needs of municipal wastewater treatment facilities. This technology is praised for precisely dosing powerful oxidizing chemistry that eliminates pathogens on contact and leaves no harmful residues. The use of concentrated precursor chemistry significantly reduces shipments, providing an economic answer to sustainable disinfection. It comes pre-assembled and includes a PLC system to make measuring, monitoring and datalogging easy, with reports available via mobile app or offsite browser. **860-290-8890; www.biosafesystems.com**



OxyFusion system from BioSafe Systems

### VEOLIA WATER TECHNOLOGIES HYDREX

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



Hydrex odor control process from Veolia Water Technologies

provides a rapid reaction, using a biodegradable, nonhazardous, cost-effective solution. A capital equipment option customized for the catalyst and designed to treat up to 100 ppm hydrogen sulfide is also available where a new scrubber is required. **919-677-8310; www.veoliawatertech.com**

## Chlorination/Dechlorination

### FORCE FLOW CHLOR-SCALE TON CONTAINER SCALE AND CHLOR-SCALE 150

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much chlorine remains in the tank. The steel, rectangular tube platform is robotically welded and then epoxy powder-coated to ensure maximum strength for safety and durability. The Chlor-Scale 150 provides a simple and reliable way to monitor the amount of chlorine or ammonia used and the amount remaining in the cylinder. The solid PVC scale platform provides a strong defense against the corrosive environments associated with gas-feed applications. **800-893-6723; www.forceflow.com**



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**SWAN ANALYTICAL USA AMI TRIDES ANALYZERS**

SWAN Analytical USA AMI Trides Analyzers provide reagentless chlorine measurements in clean water. Self-cleaning reference and flow validation functions ensure reliable results. A complete panel-mounted system makes installation easy. Software, hardware and sensor self-checks, and electronic drift stabilization ensure high confidence in the measurement accuracy. Digital and analog communication options are available. **847-229-1290; www.swan-analytical-usa.com**



**USA AMI Trides Analyzers from SWAN Analytical**

**Covers/Domes**

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ClearSpan Fabric Structures are a solution for odor mitigation, making them a suitable addition to any treatment plant or wastewater facility. Their durable, 12.5-ounce polyethylene fabric covering lets light and air permeate throughout the structure, allowing for practical energy efficiency and proper odor control. They are available in several temporary and permanent foundation options, includ-



**ClearSpan Fabric Structures**

ing blocks, shipping containers and a helical anchoring system, allowing customers to build their structure nearly anywhere, even on existing foundations. Every building can be individually customized to the needs of any business or operation. **866-643-1010; www.clearspan.com**

### JDV EQUIPMENT LEVEL LODOR

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



Level Lodor from JDV Equipment



Longopac Fill continuous bag system from Paxxo

### PAXXO LONGOPAC FILL

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

## Distillation/Fluoridation Equipment and Microbiological Control

### BLUE-WHITE INDUSTRIES PROSERIES-M M-4

The ProSeries-M M-4 from Blue-White Industries is suitable for metering the harsh chemicals associated with the water and wastewater treatment applications. It delivers accurate, smooth and quiet dosing of treatment chemicals. With output rates ranging from 0.002 to 158.5 gph, the peristaltic chemical metering pump is well-suited to dosing chemical into large municipal water and wastewater treatment applications. The peristaltic pumping action ensures the unit will not vapor lock or lose prime, even when using off-gassing chemicals such as sodium hypo-

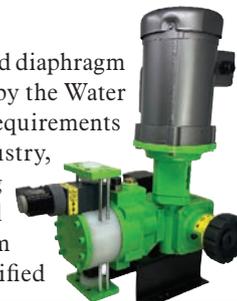


Proseries-M M-4 from Blue-White Industries

chlorite and hydrogen peroxide. Units have CNC-machined squeeze rollers and two alignment rollers for optimum squeeze and tube life. The single-piece, heavy-duty rotor means no flexing as well as increased accuracy, and there are no metal springs or hinges to corrode. **714-893-8529; www.blwhite.com**

### PULSAFEEDER PULSAPRO

The PulsaPro family of hydraulically actuated diaphragm metering pumps from Pulsafeeder is certified by the Water Quality Association to meet health and safety requirements in the North American municipal water industry, including NSF/ANSI/CAN 61 - 2018: Drinking Water System Components - Health Effects; and NSF/ANSI 372 - 2016: Drinking Water System Components - Lead Content. The pumps certified to NSF 61 are part of the next generation of products that can be counted on for a safe and healthy environment. **800-333-6677; www.pulsa.com**



PulsaPro diaphragm metering pumps from Pulsafeeder



TOPAX MC controller from Lutz-JESCO America

### LUTZ-JESCO AMERICA TOPAX MC

The TOPAX MC multichannel controller from Lutz-JESCO America has a modular design that makes it an adaptable and effective solution for all measurement and control technology requirements. It offers automated efficiency — freedom from repetitive control tasks while providing accuracy and reliability. Users can actuate the dosing pumps using an optocoupler or relay and servomotors by using a relay or a 20mA output. The high-resolution, 5-inch color display offers a user-friendly operating interface, with a simple touch-control and intuitive navigation menu that can be set to multiple languages. Use four analog outputs (0/4-20mA) or the network capability to transfer measured values to a web browser or a telemaintenance point. A programmable interval timer can be used to set automatic alerts for wear-related sensor change. **800-554-2762; www.lutzjescoamerica.com**

## UV Disinfection Equipment

### SALCOR 3G UV WASTEWATER DISINFECTION UNIT

The 3G UV Wastewater Disinfection Unit from SALCOR is used for residential, commercial and municipal applications, and it is UL-certified NEMA 6P flood-proof and NSF/Washington State Protocol six-month tested (with 21 upstream treatment systems). It inactivates bacteria/virus pathogens, including superbugs. Rated at 9,000 gpd gravity flow, it is meant as a reliable building block for large water recovery/reuse systems. When installed in 12-unit parallel/series arrays with ABS pipefittings, systems can disinfect more than 100,000 gpd. Gravity flow equalizes without distribution boxes. Each unit has a foul-resistant Teflon lamp covering, two-year long-life lamp with efficient installation, minimal annual maintenance and energy use of less than 40 watts. **760-731-0745; www.salcor.world tpo**



3G UV Wastewater Disinfection Unit from SALCOR

By Craig Mandli

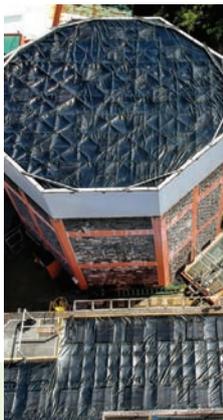
## Geomembrane covers solve odor issue in wastewater plants

### Problem

Laguna Madre Water District in Port Isabel, Texas, sought to eliminate odor complaints after a high-end housing development was built next to the primary treatment plant. “We had all this new construction getting closer and closer to the plant, and we were concerned about keeping the nuisance odors within our buffer zone,” says Charles Ortiz, district engineer. Offsite odors at the worst point averaged above 88 ppm just above the channel surface; peak spikes registered above 860 ppm.

### Solution

Anue Water Technologies provided a breathable **geomembrane solution**, enabling effective treatment without changing the plant footprints or operations. The flexible geomembrane system has a breathable design where pockets in the material contain replaceable carbon-infused filters that allow water and air to pass through, but trap the odorous compounds. No special equipment was needed to install the customized solution.



#### RESULT:

The membranes lowered odor levels to an average of 1.2 ppm; all offsite odors were eliminated. “We still have a little tweaking to do here and there — nothing is perfect, but as odor controls go, I would say that the system has done its job,” says Ortiz. 760-727-2683; [www.anuewater.com](http://www.anuewater.com)

## Covers eliminate odor from screw pumps

### Problem

The St. George (Utah) Water Reclamation Facility houses 82-foot Archimedes screw pumps that are the longest in the world. The potential for hydrogen sulfide buildup in pumps stations required an odor containment and mitigation system.

### Solution

Flight Dek Covers modular and lightweight covers from **Epic International** were custom manufactured for the screw pumps. The covers are made of pultruded fiberglass and weigh 75% less than steel and 30% less than aluminum. OSHA required 30 psf load-bearing capacity. Non-slip grit factory molded into the cover’s surfaces satisfied another OSHA requirement. The covers are UV stable and reduce screw pump thermal expansion. Interlocking joints between sections contain the odor and mist. An air-handling system safely vents the gases.

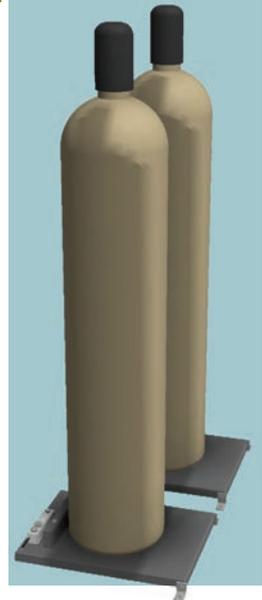


#### RESULT:

The covers contained the odor by easily integrating with an air venting system. 804-798-3939; [www.epicintl.com](http://www.epicintl.com)

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## Plant uses analyzers to simplify chloramination monitoring

### Problem

When the Milwaukee Water Works invested more than \$250 million in water infrastructure and advanced water treatment, the process included converting from chlorine to ozone disinfection with chloramine as a secondary disinfectant. Operators quickly discovered the difficulty of maintaining precise ratios of chlorine and ammonia, which requires feed rate monitoring or grab-sample analysis. The chloramination monitoring system proved unreliable and required frequent maintenance.

### Solution

The utility ultimately installed a **ChemScan UV-2150/S Analyzer** at two of its plants, making it possible to monitor and control chloramination without needing multiple instruments.



#### RESULT:

The system has provided online chloramination analysis at the two plants for a number of years, while requiring only routine maintenance. “It’s probably the best thing we ever purchased since I’ve been here,” says Scott Pavlik, water quality operations manager. “We’re happy to have something so reliable.” 800-665-7133; [www.in-situ.com](http://www.in-situ.com) tpo



### DeZURIK's APCO Brand Valves

DeZURIK's APCO Swing Check Valves prevent the backflow of stormwater by closing before flow reversal, preventing slam and water hammer. The designs meet or exceed the current revision of AWWA standard C508. The APCO ASV air vacuum valves allow large volumes of air to be exhausted from or admitted into a pipeline as it is being filled or drained. Four of the 60-inch APCO brand CVS-6000 swing check valves and ASV air vacuum valves are installed at the Louis Armstrong New Orleans Airport Pump Station. This pump station directs stormwater away from the airport to protect against flooding damage during tropical storms. The valves are part of the extensive post-Katrina infrastructure modifications that are critical to the protection of the City of New Orleans and its transportation system. DeZURIK has extensive experience manufacturing large valves for water distribution, water treatment, wastewater collection and wastewater treatment.

320-259-2000; [www.dezurik.com](http://www.dezurik.com)



### Franklin Miller bulk water fill station

The Franklin Miller bulk water fill station provides water districts a complete engineered solution for automatic dispensing of bulk water. The system consists of enclosed plumbed hardware, the control and proprietary HaulerLogic software.

## product spotlight wastewater

### Pump head addition increases metering pump's accuracy

By Craig Mandli

Polymers are often used in the precipitation of suspended solids in wastewater treatment. However, due to the dynamic character of many wastewater treatment works, it is difficult to measure and control the actual optimal dosing of the expensive chemicals. Fortunately, **ReNu pump head technology** from **Watson-Marlow Fluid Technology Group** offers accurate and repeatable flow for polymer dosing.

The ReNu PU pump head, available on Qdos metering pumps, offers accurate and repeatable flow for chemicals with a wide-ranging viscosity. Not only does it offer process chemical containment, it reduces operator risks during maintenance.

"The Qdos 20 with the ReNu PU pump head offers repeatable flow of 7.3 gph at a pressure rating of up to 60 psi for fluids of wide-ranging viscosity whilst metering accuracy is assured to  $\pm 1\%$ ," says Rob Martindale, industrial product manager for Watson-Marlow. "It is primarily designed for accurate polymer metering applications in the water and wastewater treatment sector."

The Qdos 20 ReNu PU responds to a growing worldwide demand for polymer dosing systems in wastewater treatment, according to Martindale. The majority of these systems use polymers to dewater sludge to minimize its bulk, thus reducing the cost associated with the disposal and storage of the cake by up to 75%. Martindale says that users of the pump



ReNu PU pump head from Watson-Marlow Fluid Technology Group

head have already seen significant process improvements for dosing polymers, when compared to diaphragm metering pumps.

"Several customers came to us looking for a pump solution that could accurately meter oil-based polymers with various levels of viscosity, and a pump that contains the polymer upon tube failure, as polymer spills are difficult and time-consuming to clean up," Martindale says. "In addition, this pump is extremely quick and easy to maintain."

As Martindale pointed out, the ReNu PU pump head is designed to deliver maximum process uptime. This is facilitated by rapid, safe and easy pump head removal and replacement. There is no need for special tools and no requirement for specially trained on-site maintenance technicians.

Moreover, the ReNu PU pump head offers integral leak detection and chemical containment; an important point as not only can cleaning up polymer spillages be hazardous and time-consuming for operators, the chemicals are also quite expensive, making waste control all that much more important.

800-282-8823; [www.wmftg.com](http://www.wmftg.com)

An easy-to-use touch-screen user interface allows haulers to operate the system without operator assistance. The control system authenticates users and monitors and records all transactions. With the water fill station and HaulerLogic software, users can monitor the station activity, administer accounts and collect payments for dispensed water from a computer or with a mobile device. The station comes complete with all piping and equipment housed in an attractive, insulated equipment enclosure. The system's Hauler Station control communicates with the proprietary HaulerLogic software for maintenance of accounts, balances and payments. It is available in a variety of pipe sizes and capacities, and

a wide range of options can be added. 973-535-9200; [www.franklinmiller.com](http://www.franklinmiller.com)



### Watson-Marlow Bredel heavy-duty hose pumps

Watson-Marlow Fluid Technology Group's Bredel heavy-duty hose pumps are a reliable and easy-to-maintain solution for handling the viscous slurries and grit-filled sludge in wastewater treatment plants.

Unlike diaphragm, rotary lobe and PC pumps, the peristaltic design of Bredel hose pumps contains no moving parts that come into contact with the product, and no seals, ball-checks, diaphragms, glands, immersed rotors, stators or pistons to leak, clog, corrode or replace. Bredel hose pumps also remove the need for ancillary equipment such as dry-run protection, seal water flush systems and in-line check valves. A simple hose change takes only minutes and can be performed in-situ without special tools or skilled personnel. The hose pumps are dry-running and self-priming, and allow no slippage, for true positive displacement to provide accurate and repeatable metering.

800-282-8823; [www.wmftg.com](http://www.wmftg.com)



## Atlas Copco AIRCUBE compressor room

Atlas Copco's AIRCUBE is a containerized range of plug-and-play compressor rooms to meet the needs of customers who have space limitations or restrictions within their current facilities. An AIRCUBE can be equipped with fixed-speed or energy-efficient variable-speed drive compressors with sizes ranging from 15 to 110 hp, depending on the models chosen. It comes with a number of standard features, such as ventilation, internal power distribution, certification and lighting. A wide array of options is available, including environmental add-ons, smart connectivity and control features, ISO 8573 filtration class options and safety add-ons. The container is built to withstand temperatures from 32 to 110 degrees F, and containers that can operate in low temperatures down to negative 40 degrees F are available as an option.

803-718-7434; [www.atlascopco.us](http://www.atlascopco.us)



## Hawk Measurement laser level products

Hawk Measurement's OptioLaser L100 and L200 laser level transmitters are ideal for level, distance and position measurement of solid and liquid surfaces. The laser has a very narrow beam that can measure long and short distances at virtually any angle. The OptioLaser L100/L200 is completely stainless steel and extremely rugged, built for the harshest of environments. The transmitters are fully programmable and include a simple to use software, and can be configured for either distance or level measurement.

888-429-5538;

[www.hawkmeasurement.com](http://www.hawkmeasurement.com)



## KROHNE OPTIMASS 1000 Coriolis mass meter

The OPTIMASS 1000 straight-tube Coriolis mass meter from KROHNE is designed with a close-coupled twin-tube configuration with an optimized flow splitter, manufactured to be highly durable and capable of handling flow rates, even in the face of pressure fluctuations. It comes with a standard measuring tube that is 100% accurate, ensuring the highest level of safety. The meter has been designed without installation restrictions and remains unaffected by external influences, such as vibration and hydraulic noise interferences. The OPTIMASS 1000 utilizes KROHNE's modular electronic converters, which can be fitted across a range of flowmeters, allowing instruments to address unique applications, providing either basic functionality or high-end diagnostic capabilities. The OPTIMASS 1000 can be fitted with most industry standard hygienic connectors and DIN, ANSI and JIS standard flanges.

800-356-9464;

[www.us.krohne.com](http://www.us.krohne.com)



## Val-Matic American-BFV butterfly valves

Val-Matic's American-BFV butterfly valves feature a standard epoxy interior, continuous uninterrupted seating and Tri-Loc seat retention system, which allows for field adjustment/replacement without the need for special tools or epoxies. The valve's disc is constructed of ductile iron for added strength and improved headloss characteristics. The valves have a pressure rating up to 300 psi and ductile iron construction, a 17-4 stainless steel shaft and double offset design.

630-941-7600; [www.valmatic.com](http://www.valmatic.com)

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## Endress+Hauser iTEMP TMT142B temperature transmitter

The iTEMP TMT142B from Endress+Hauser is a new generation smart temperature transmitter with Bluetooth. The transmitter delivers highly accurate and reliable measurements, wireless communication via Bluetooth and user-friendly operation all packaged in a single-chamber field housing. The secure, integrated Bluetooth interface enables users to wirelessly visualize measured values, NAMUR NE 017 diagnostic information, and perform configuration tasks. It is easy and fast to operate using a phone or tablet and the Endress+Hauser SmartBlue app. No special tools are required and access to the device is password-protected. The backlit display provides excellent readability under all environmental conditions,

and diagnostic messages are highlighted when the normally white background turns red.

888-363-7377;

[www.us.endress.com](http://www.us.endress.com) tpo

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## product spotlight water

### Organic carbon analyzer designed for ultrapure water measurement

By Craig Mandli

More industrial applications are requiring the use of high-purity water. The **TOC-1000e online total organic carbon analyzer** from **Shimadzu Scientific Instruments** provides high sensitivity and low-detection limits, reaching 0.1 µg/L using a mercury-free excimer lamp in the smallest and lightest casing available to provide the high-purity water needed in the manufacturing process.

“Key markets include semiconductors and pharmaceutical manufacturing,” says Kevin McLaughlin, marketing communications for Shimadzu Scientific Instruments. “Customers loosely aligned to the pharmaceutical market or use or make USP-grade water are also applicable. These could be customers in such areas as nutraceuticals, cosmetics, personal care, food/beverage, pet food, cleaning products, insecticides, automotive products and fragrances.”

The excimer lamps emit high-energy 172 nm wavelength light by inducing a dielectric

barrier discharge within a xenon gas. The instrument also features active-path technology that McLaughlin says efficiently irradiates the sample inside the lamp with ultraviolet light to reliably oxidize organic matter.

The easy-to-use analyzer improves efficiency with a simple configuration designed to be maintenance-free under standard use for a year. The only parts that need to be replaced during regular maintenance are the excimer lamp and pump head. Operators can access both parts through the front door of the analyzer and easily remove or install them without any tools. Additional features include a smart user interface and large touch-panel screen that provide exceptional visibility and operability. The analyzer can be installed on a tabletop or mounted to a wall or pole using an optional bracket kit. A sampler can be attached to the side to calibrate the analyzer on site, offering the flexibility to choose the most convenient location for installation.



TOC-1000e from Shimadzu Scientific Instruments

Using an optional vial sampler, users can calibrate or validate the analyzer at the operating site. The sampler can hold four standard solutions for creating up to four-point calibration curves. Certified standard solutions, which are suitable for calibration, validation or system suitability testing, are also available.

The TOC-1000e can output data to a USB flash drive in text or PDF format. By connecting it to a network, users can check results remotely from a web browser without the need for special software. According to McLaughlin, routine checking can be conducted from one place, even with multiple analyzers in different locations.

800-477-1227; [www.ssi.shimadzu.com](http://www.ssi.shimadzu.com)

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**Xylem and Planet Water Foundation provide clean water**

Xylem announced that its longtime partnership with Planet Water Foundation has provided more than 1 million people with access to safe, reliable drinking water and hygiene education. The milestone was achieved through 10 years of partnership centered on a shared mission to create stability and equity for communities that lack access to clean water. Over the last decade, more than 1,600 Xylem employees have served as Planet Water project volunteers to install AquaTower systems and engage local residents in WASH education programs. Most recently, Xylem supported natural disaster responses in the Philippines after super Typhoon Goni, and in Honduras following hurricanes Eta and Iota.

**Asahi/America welcomes new operations vice president**

Asahi/America announced the addition of Andrew Meschisen to its executive management team. Meschisen joined Asahi/America as vice president of operations and materials where he will oversee the company’s operations and manufacturing, materials and supply chain, quality assurance, warehousing, and facility maintenance.



Andrew Meschisen

**Rajan Ray takes digital leadership role at CDM Smith**

CDM Smith announced that Rajan Ray joined the firm as a global strategy lead for digital solutions. Ray has more than two decades of experience in the development, commercialization and implementation of advanced digital solutions in the water industry. Prior to CDM Smith, Ray was the global director of product marketing at Innovyze, where he and his team developed and supported the go-to-market strategy for the company’s entire software portfolio, including the company’s first foray into artificial intelligence and machine learning.

**Justin Schram joins ResinTech in technical sales**

ResinTech hired Justin Schram to lead business development efforts for the company’s Western U.S. and Canada regions. Schram began his career in solar energy before joining the water industry where he worked for Pentair helping distributors and dealers throughout Southern California solve their water treatment needs.



Justin Schram

**Resilient Infrastructure acquired by Partners Group**

Resilient Infrastructure Group announced its acquisition by Partners Group, a global private markets firm. The acquisition will allow Resilient to continue building a diversified, multi-industry water platform operating in the distributed water and wastewater sectors, including wastewater treatment and reuse infrastructure, wastewater-to-renewable natural gas facilities and potable water infrastructure.

**Goulds Water Technology introduces virtual training tool**

Goulds Water Technology, a Xylem brand, has launched the V.A.R.I. Challenge, an online tool for industry professionals to properly and safely use a digital multimeter to troubleshoot pump systems. Set up in a gamified format, users of the V.A.R.I. Challenge use a digital multimeter to test the voltage, amperage, resistance and insulation of the brand’s Aquavar SOLO2 variable-frequency drive performance, enabling users to advance from level to level. Users are timed throughout the challenge and receive points for accuracy of responses. Upon completion of the challenge, users can see where they stack up on the V.A.R.I. Challenge leaderboard. Additional features and resources are integrated throughout the interactive tool, which include links to Goulds Water Technology service manuals and video tips for each level.



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**Nidec Motor Corp. introduces virtual program for motor testing**

Nidec Motor Corp. launched a virtual test service that enables customers to remotely witness and monitor motor testing that is being done at NMC’s Mena, Arkansas, manufacturing facility. The service, which can eliminate the need for an on-site inspection, provides original equipment manufacturers and end users with a safe, convenient and economical way to validate that a product is being manufactured to specifications, view performance results and receive additional technical support.

**Anue Water names new channel partner**

Anue Water Technologies named Faco Waterworks as its exclusive new channel partner for the sales and distribution of Anue’s eco-friendly product line throughout Indiana. In a company release, Greg Bock, Anue Water vice president general manager, says, “We are happy and proud to have Faco Waterworks as our exclusive channel partner throughout the state of Indiana. Faco has a 56-year history of leadership in the wastewater treatment industry, an outstanding team of process technology experts and a high level of energy and enthusiasm for solving customer problems.” tpo

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## people/awards

The 2020-21 New England Water Environment Association/WEF Award Recipients include:

- Stockholm Junior Water Prize: **Colin Speaker, Amara Ifeji, Shreya Nagri**
- Scholarship recipients: **Kennedy Brown** and **Anna LeClair**, undergraduates, **Cassidy Yates**, graduate student
- Alfred E. Peloquin Award: **Gary Zrelak, Mac Richardson, Keith Bourassa, Ray Gordon, Stephen Buckley, Margaret Dwyer**
- Asset Management Award: **John Vogl**, Salem, New Hampshire
- Biosolids Management Award: **Hawk Ridge Compost**
- Clair N. Sawyer Award: **Nora Lough**, Providence, Rhode Island
- Committee Service Award: **Kate Biedron**, Manchester, New Hampshire
- E. Sherman Chase Award, **John Esler**, Enfield, New Hampshire
- Elizabeth A. Cutone Executive Leadership Award: **John Sullivan**, Roxbury, Massachusetts
- Energy Management Achievement Award: **Greater Lawrence Sanitation District**, North Andover, Massachusetts
- Founders Award: **Jeanette Brown**, Darien, Connecticut
- James J. Courchaine Collection Systems Award: **Don Kennedy**, Lowell, Massachusetts
- Operator Award: **Mark Bukowski**, Windsor Locks, Connecticut; **Scott Lausier**, Sanford, Maine; **Carl Thurston**, Chicopee, Massachusetts; **Ray McNeil**, Rollinsford, New Hampshire; **Jose Da Silva**, Bristol, Rhode Island; **Marty Frizzell**, Brighton, Vermont
- Operator Safety Award: **Shannon Eyler**, Portland, Maine
- Past President's Plaque and Pin: **Ray Vermette**, Dover, New Hampshire
- Paul Keough Award: **Bonnie Combs**, Whitinsville, Massachusetts
- Wastewater Utility Award: **Montville WPCA**, Uncasville, Connecticut
- Young Professional Award: **Kate Roosa**, Boston
- Youth Educator Award: **Kerry Reed**, Framingham, Massachusetts

NEWEA Committee awards:

- Crystal Crucible: **Walter Palm**, Providence, Rhode Island
- Golden Manhole: **Tom Loto**, Amston, Connecticut
- Golden Raindrop: **Amy Schofield**, Roxbury, Massachusetts
- Green Steps: **RMI**

WEF-Massachusetts awards:

- Arthur Sidney Bedell Award: **Dennis Palumbo**, Stamford, Connecticut
- Laboratory Analyst Excellence Award: **Andy Wendell**, Newport, Maine

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- William D. Hatfield Award: **Jeff Gamelli**, Westfield, Massachusetts
- WEF Student Design Competition: **Samantha Kinnaly, Kate Engler, Annie Lamonte** and **Emma Totsubo**, Northeastern University; and **Ian Kosnik, Jake Senecal, Olivia Nachbauer** and **Sam Mikell**, University of Vermont
- WEF Fellow: **Charles Tyler**, Sherborn, Massachusetts

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

## events

### June 1-2

British Columbia AWWA Section Virtual Conference. Visit [www.bcwwa.org](http://www.bcwwa.org).

### June 2

New AWWA Water Audit Software v6: Advancing State-of-the-Art KPIs to Propel Water Loss Performance Webinar. Visit [www.awwa.org](http://www.awwa.org).

### June 7-9

California WEA 2021 Annual Conference, online. Visit [www.cwea.org](http://www.cwea.org).

### June 9

AWWA Incorporating Diversity, Equity and Inclusion into Your Workforce Development Strategy Webinar. Visit [www.awwa.org](http://www.awwa.org).

### June 9-10 and 15-16

WEF Innovations in Process Engineering 2021: A Virtual Event. Visit [www.wef.org](http://www.wef.org).

### June 13-16

ACE21, San Diego (California) Convention Center, California. Visit [www.awwa.org](http://www.awwa.org).

### June 20-23

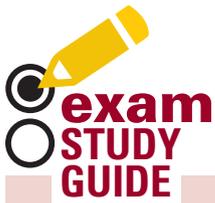
PennTec Annual Conference and Exhibition (Pennsylvania WEA), Kalahari Resorts Poconos, Pocono Manor. Visit [www.mms.pwea.org](http://www.mms.pwea.org).

### June 22-23

Stormwater Summit 2021: A Virtual Event. Visit [www.wef.org](http://www.wef.org).

### June 27-30

Michigan WEA Annual Conference, Boyne Mountain Resort, Boyne Falls. Visit [www.mi-wea.org](http://www.mi-wea.org).



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**WASTEWATER**

By Rick Lallish

Even though there are many ways to determine wasting amounts, what is the main purpose of wasting?

- A. Maintain acceptable sludge blanket depth
- B. Maintain proper facultative levels in the lagoon
- C. Maintain effluent total suspended solids requirements
- D. Maintain a sludge age that produces the best effluent

**ANSWER:** D. One of the best ways to have successful process control is to have proper wasting procedures and calculations. By wasting, you maintain control of your food/microorganism levels and median cell retention time, or sludge ages. There are many ways to waste; each when correctly performed will achieve a sludge age that produces the best effluent possible for your treatment system. One rule of thumb is generally accepted: You should never vary your wasting amount by more than 10%-15% on a daily basis. This will allow you to make changes without shocking your system. More information may be found in the Office of Water Programs, California State University, Sacramento textbook: *Operation of Wastewater Treatment Plants Vol. 2* (Seventh ed.), Chapter 11.

**DRINKING WATER**

By Drew Hoelscher

The U.S. EPA Lead and Copper Rule revision requires which liter of water to be collected when the sample location has a known lead service line?

- A. First
- B. Fifth
- C. 10th
- D. 15th

**ANSWER:** B. The recent revisions to the Lead and Copper Rule are the first major changes since the original rule issued in 1991. The updated rule provides an opportunity to further reduce lead and copper contamination in public water supplies. One of the many updates is the required fifth-liter collection of water from a sample location with a known lead service line. The fifth liter of water collected is more likely to be the water that was sitting stagnant in the service line, where the first-liter sample would represent the stagnant water within the premise plumbing.

ABOUT THE AUTHORS

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

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