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Land of Opportunity

Joga Chizer
Senior Laboratory Technician
Fairfield, Calif.

JOGA CHIZER CAME FROM INDIA AND BUILT HIMSELF AN AWARD-WINNING LAB CAREER | 10

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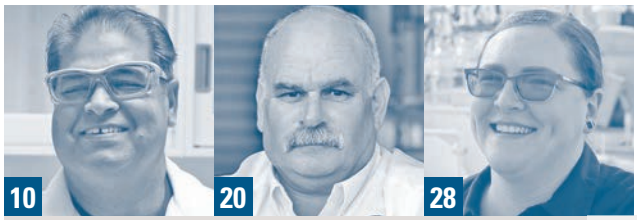

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let's be clear

How to Turn Your Public Against You

ARE YOU FACING A SENSITIVE ISSUE LIKE PFAS IN DRINKING WATER OR BIOSOLIDS? HERE ARE SOME FOOLPROOF WAYS TO LOSE YOUR COMMUNITY'S TRUST AND SUPPORT.

By Ted J. Rulseh, Editor

So, testing has revealed trace amounts of PFAS in your drinking water wells or the biosolids from your clean-water plant.

When members of your community find out, they will be concerned and look to you for answers to their questions. Here are some proven ways to make sure they lose confidence in your organization and turn against you.

1. Keep the issue quiet. What people don't know will not hurt them. You and your team know what to do about the problem. Getting the community involved will only create confusion. Just keep things under wraps while you work on a solution. If information leaks out and people become concerned, that's the time to start communicating.

2. Don't waste time planning. There's no need for fancy communication plans. Just get the message out as quickly and simply as possible. A news release, a press conference and maybe a public meeting will surely suffice.

3. Make the risk look small. So what if there are tiny amounts of a chemical in the water? It's only a few parts per trillion. Tell people: "A part per trillion is one droplet of water in an Olympic-size swimming pool. What harm can that possibly do?" That is sure to put their fears to rest and keep them quiet.

4. Be logical. This is about scientific information; people's feelings should not enter into it. When presenting information, stick to numbers, charts, diagrams, statistics. Once people understand the facts, they will come around. If people get emotional about risk to their own or their families' health, just tell them to calm down and look at the data.

5. Emphasize your knowledge and credentials. Make sure people understand that you and your colleagues are the ultimate authorities. You have certifications, college degrees in some cases, and decades of experience. The uninformed opinions of school teachers, garage mechanics, hairdressers and store clerks are not to be respected.

6. Ridicule the activists. You might be confronted by people from established environmental groups or a grassroots organization that springs up locally. Emphasize that these people are alarmists and are not to be listened to. Dismiss them as cranks, worrywarts and "tree-huggers."

7. In public meetings, stay in control. People in attendance should be there to listen, not to talk. Give a long presentation with all the necessary technical detail. Ignore the hands that get raised as you make your case. Questions and answers can wait until the end. There probably won't be many questions if you have covered the subject properly.

8. Make it clear who is in charge. Issues like this are best resolved by experts. Your staff and engineering consultants know what is best. Decide on a solution, announce your plan and be ready to defend it. Suggestions from ill-informed members of the public are not to be taken seriously; following them will only make things complicated and increase costs.

9. Treat the media like your enemy. If they pick up your releases, fine. If they start to dig deeper, shut them out. Reporters have their own agendas and are not to be trusted. If they call, don't engage with them. Just read a prepared statement, or simply say, "No comment." And be sure to let the public know how unfairly the media are treating you.

10. Don't bother looking for outside help. Fancy communication consultants cost big money. They are more interested in their hourly fees than in helping you. And what do they know about your community? You can handle things on your own; you have done it for years.

Follow these rules and you can count on a future of dealing with a mistrusting public and a deeply damaged reputation. tpo

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PLANNING AHEAD

WWTP Expansion Prep

Industrial growth in the past decade has put the Macon Water Authority in Georgia on the precipice of a major expansion of its wastewater treatment plants. MWA recently opted to rehabilitate its current facilities to get a baseline and increase its options for the larger expansion.

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OVERHEARD ONLINE

"Everyone who relies on the Colorado River must continue to work together to reduce use and think of additional proactive measures we can take in the months and years ahead to rebuild our reservoirs."

Bureau of Reclamation Takes Action to Boost Drought-Stricken Lake Powell

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WATER RECLAMATION PROCESS

Reducing Carbon Emissions

First year Ph.D. student Kevin Clack is conducting research on reclaiming potable water from wastewater while also recovering pipeline-grade methane and other biofuels that can make the reclamation process carbon negative, energy positive and economically favorable. The research aims to reduce the carbon emissions and economic burden of water reclamation.

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CAMPUS RAINWORKS CHALLENGE

EPA Announces Winners

The U.S. Environmental Protection Agency recently announced the winners of its 10th annual Campus RainWorks Challenge, a national competition that engages college students in the design of on-campus green infrastructure solutions to address stormwater pollution. This year's winning projects showcase the environmental, health, economic and social benefits of green infrastructure.

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Joga Chizer, senior laboratory technician with the Fairfield-Suisun Sewer District, started his career with a private lab company in California.

Land of Opportunity

JOGA CHIZER CAME FROM INDIA AND BUILT HIMSELF A CAREER AS AN AWARD-WINNING LAB TECHNICIAN AND A MENTOR TO HIS COLLEAGUES

STORY: **David Steinkraus** | PHOTOGRAPHY: **Fred Greaves**

> [The analytical lab] said, 'Can you do this? Can you do this?' I said, 'You tell me what to do, I'll do everything.'"
>
> **JAMIE REVELS**

Chizer believes in in-house lab work so that tests results are promptly available to plant operators.

Joga Chizer had no kind of background for the clean-water industry. As an immigrant, he wanted a job. He found an opportunity in an interesting field, and he made a career of it.

He's now the senior lab technician for the Fairfield-Suisun Sewer District in Fairfield, California, and the 2020-21 Laboratory Person of the Year, designated by the California Water Environment Association.

CLEARING HURDLES

It wasn't easy getting his start in the profession. Chizer came to the United States from India in 1990 at age 25 with a master's degree in political science. His only science courses were in high school; he immigrated because he married an American woman. He landed in San Francisco and needed a job because his degree wasn't useful there.

"I applied to 10 or 12 places for a job, and at that time people were picky," he recalls. "They were, 'Oh, you're new. You don't have experience.'" A call came early one morning offering an interview as a dishwasher. He thought it was at a restaurant and asked for the address.

"I got there, and it was an analytical lab called Pace," he says. That was in Novato, California. "They said, 'We need a dishwasher who can follow the procedures and make sure all the glassware is clean.'" The lead technician, a Russian immigrant, offered to train him when not busy with his primary job, he says.

So Chizer started learning how to measure pH, conductivity and TSS, and do other basic tests. As his ability and eagerness became clear, he learned how to analyze for cyanide, phosphate and other substances. After two years, a chemist who had left the company told him about an opportunity with his organization, Caltest Analytical Lab in Napa, a startup lab with only seven team members where everyone was doing multiple jobs.

Joga Chizer, Fairfield-Suisun Sewer District, California

POSITION:
Senior Laboratory Technician

EXPERIENCE:
32 years

DUTIES:
Run all analytical lab tests

EDUCATION:
Master's degree in political science from India

CERTIFICATIONS:
Grade IV Laboratory Technician, Grade 1 Environmental Compliance Inspector, Biosolids Management Application Certificate (CWEA)

GOAL:
"Be here and do better for the agency."

"They said, 'Can you do this? Can you do this?' I said, 'You tell me what to do, I'll do everything.'" And he did: dishwashing, sample pickup, lab work and cleaning and sample preparation for the organic department, such as gas chromatography mass spectrometry analysis. "I said, 'Train me, I will do it.' So I was there for 11 years."

One Caltest client he tested samples for was the Fairfield-Suisun District. At the time, the district's treatment plant was run by a contractor. Chizer went to work for the contractor in 2003. In 2007, the district took over operation of the lab and hired Chizer. In 2008, the district took over operation of the entire plant.

RECYCLING WATER

Inside the plant, after mechanical bar screens and primary clarifiers, the wastewater is sprayed over plastic media in oxidation towers. Intermediate clarifiers settle solids after the oxidation towers while the wastewater flows

The front entrance of the Fairfield-Suisun Sewer District headquarters.

Chizer's lab is in the process of meeting the standards formulated by The NELAC Institute and adopted by the state of California.

on to an activated sludge process. Secondary clarifiers are followed by a set of aeration basins for denitrification, and then sand and anthracite filters and UV disinfection (WEDECO).

Some of the effluent is sent into a slough that eventually enters the chain of bays and channels leading to San Francisco Bay. The rest is reused. A sod farm immediately west of the plant receives some of the recycled water, and the city of Fairfield uses it for irrigation.

About five years ago the district outsourced its biosolids handling to Lystek, which takes cake from the gravity belt thickeners and a screw press (FKC Co.) and produces fertilizer for area farms. The average daily flow is 14 to 15 mgd, Chizer says, but in the event of heavy rains and flows, the plant has the capacity to store and process up to 50 mgd. Several large ponds hold influent during heavy rains or when the plant might be temporarily shut down.

SAMPLING ON WHEELS

Chizer's job isn't as complicated as at Caltest because the Fairfield-Suisun lab isn't set up for complex testing. For example, samples from nearby Travis Air Force Base are sent to Caltest because the samples require expensive, specialized equipment.

The plant itself covers 600 acres. "Every operator has a golf cart," Chizer says. "Maintenance has golf carts, and the lab has golf carts. We use big jugs — 10-liter, 15-liter, 20-liter jugs. To bring them to the lab you need a cart. And there's a time limit. You have to be in the lab within 15 minutes of sampling."

Technicians arrange their routes to meet that limit. It typically takes three trips to collect all the samples. The lab is in the process of meeting the standards formulated by The NELAC Institute (TNI) and adopted by the state of California. "It's like attention to detail. It's very interesting," Chizer says. "The bar is high." The team has been working on compliance for more than two years, and it will be two more years until they must conform to the standard.

Chizer's days don't vary much: "The only thing is, it's a standing job. You cannot sit. So I compare my lab with the kitchen at home. Even for data entry, I always do it standing up."

QUESTIONING THE STATUS QUO

The nomination for his CWEA award was a stabilizing influence during a time of transition. During the pandemic he had a new supervisor, and the question was how to make the lab function under social distancing and other health regulations needed to contain the virus.

Managers considered outsourcing some lab work; Chizer told them that would affect operations. No commercial lab can turn samples around as fast as in-house technicians, so operators couldn't react as quickly to changes in the plant.

They discussed how to have Chizer and Raymona Shirmard, the other technician, in the same space. "I said, 'I will have the lab four days all by myself, and she will have the lab three days all by herself, and we will communicate through email and all the other ways.' And that schedule was pretty much permanently set. We worked one day a week together, Wednesday. We had a one-hour meeting and stayed apart, six, seven, eight feet with masks."

As he dug into TNI standards, Chizer began questioning the rationale for some of the lab's work. "I said, 'When did we have any violation for TSS, ammonia, BOD?' They figured 900 data points, no violation. I said, 'Then why are we doing this all the time?'" At district managers' request, the state agreed to a reduced frequency of once a week for those tests.

> "Every operator has a golf cart. Maintenance has golf carts, and the lab has golf carts."
> **JOGA CHIZER**

HELPING OTHERS ADVANCE

Another reason for his CWEA award was his mentoring of colleagues. "When I studied for the Lab IV exam, I put all the material together from whatever source," he says. "That could be going to conferences, going to lab meetings or dinner meetings. And whoever I find who's an expert, I always talk to.

"It took me a year plus to pass this exam. Then I knew everything about the exam: what they're asking for, how they ask, how they make trick questions." He saved all the information he had collected and then he began helping others with the exam. He taught five people at the plant, people who had nothing to do with the lab, and they all passed the Grade IV lab exam.

A previous supervisor who had moved to another county needed a Grade IV license to keep her job. Chizer had two three-hour training sessions with her; she also passed. He also guides people who express interest in a wastewater career and is regularly involved in plant tours.

"I tell them do this, take this class. Are you in high school? Are you good at math? Do you want to be an operator? Take this class and look for a job as an operator in training. If someone gets into this industry, no matter what you do, there's a lot of opportunity to grow."

(continued)

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KEEPING FISH HEALTHY

Clean-water plants monitor effluent for BOD, TSS, and other parameters that produce numbers on a report. At the Fairfield-Suisun Sewer District, there's another level of testing.

Once every quarter, the laboratory team conducts a bioassay, says Joga Chizer, senior lab technician. They start with 20 rainbow trout. Ten are placed in a tank fed by the effluent stream. The rest are placed in a separate tank as a control group.

The trout are about an inch and a half long and 15 to 30 days old. Before they go into the tanks for testing, they are monitored for an hour or two to make sure they are healthy, and they receive some food to make sure they're willing to eat.

Once the assay begins, the fish cannot be fed. For five days, the technicians monitor water temperature, dissolved oxygen, pH and salinity. They make sure fish won't die for any reason other than the quality of plant effluent.

"We need to let the operators know, this week we have a bioassay going, please, no cleaning, no bleaching, no nothing," Chizer says. "If any kind of ammonia leaks through and all the fish die, then we have to explain to the state exactly what happened to make sure the fish are not dying in our treated water."

Some recycled water from the plant is used for irrigation, but effluent also flows into a slough that leads to Grizzly Bay, part of the chain of channels and bays that eventually end in San Francisco Bay. In 2024, when the plant's discharge permit is renewed, the bioassay is expected to disappear, having revealed no problems.

Effective mentoring was among the reasons Chizer was chosen as CWEA Lab Person of the Year.

PERSONAL TIME

In his spare time, Chizer watches sports: "You ask me anything about sports, and I'll have the answer right in front of me." He doesn't watch sports popular in India, like cricket or soccer.

"I belonged to a very poor family," he says. "No matter how cold or hot it was, I never had shoes. I had flip-flops. When they broke, we repaired them. Over here it's a different story." In his new country, baseball and football are his favorites, along with basketball.

Chizer agreed that America is a land of opportunity: "When life takes a turn, you have no idea what is going to happen. So you wait for those moments. It's all in your control. You can say no to anybody. You can say yes to anybody. That's how much power you have."

Flexibility includes not letting yourself be controlled. Suppose you are cut off in traffic, he says. "They make you mad, right? You don't even know the person. You've already given control to the person you don't even know, and you're upset. Go on with your life." tpo

The Traits of Leaders

IF YOU ASPIRE TO A LEADERSHIP ROLE AT SOME POINT IN YOUR CAREER, YOU CAN LEARN FROM EXPERIENCES DESCRIBED IN A NEW PAPER ON LEADING THROUGH CHANGE

By Ted J. Rulseh

Many treatment plant operators plan on rising through the ranks to become plant supervisors, plant managers or even utility administrators.

But what does it take to be an effective leader? Eileen O'Neill, Ph.D., former executive director of the Water Environment Federation, explored that question in her new role as a co-founder of the nonprofit Partnering for Impact (PFI).

She reported the findings in a paper, *Staying Above Water: Lessons Learned from Water Sector Change Leaders.* The report is based on in-depth interviews with 11 leaders from water organizations in the United States. It explores transformational leadership practices, career pathways and leadership resilience.

PFI co-founder Rick Warner observes, "We believe strongly that there are skills, equally if not more important than our engineering and scientific capabilities, that will enable us to bring the most innovative and sustainable solutions to bear on interconnected and thorny problems. This project shines a light on some of those attributes."

The paper presents each leader's career story, explores their experiences in leading through change, and reveals what has kept them fresh and motivated going through the inevitable challenges of working in the water sector. O'Neill talked about her project in an interview with *Treatment Plant Operator.*

tpo: How would you describe the group of people you interviewed?

O'Neill: I contacted some people I knew and some I didn't know. Everyone said yes to an interview. I interviewed a diverse group in terms of geography and the kinds of organizations: public works departments, standalone entities, water, wastewater and stormwater agencies. I spoke to about half men and half women, and about half people of color. As soon as I started talking to them, I found there were important insights to be shared.

tpo: What were the interviewees' educational and career backgrounds?

O'Neill: Everyone I interviewed was an engineer. What surprised was that while we always think of engineers as problem solvers who deal with technical challenges, the one lesson that came to the top was that it's all about people: being able to listen to them and help them work together and be their best. They all probably got where they are by having a technical background, but they all stressed the ability to relate to people. That means all kinds of people: the public, the people in the organization, a wide range of people. Being a people person is really important to leading through change.

tpo: Did any other characteristics stand out as important?

O'Neill: Another important quality was courage — not being reckless but being able to take bold steps and deal with the ups and downs and the challenges that come, particularly with being in the public sector.

tpo: What are the special challenges of the public sector?

O'Neill: You're under the public eye a great deal. Depending on the nature of your agency, there can be extra political challenges around having to tell hard truths about investments that are needed, rates that may have to be increased, where you're dealing with politicians who think in terms of elections. And then there's the bureaucracy. Getting things accomplished quickly can definitely be a challenge in the public sector.

Eileen O'Neill

tpo: What did you learn about the importance of resiliency?

O'Neill: One key observation about the group is that they were optimistic — not irrationally so, but able to keep going and look for opportunities even within challenges. Another common trait is that they don't take highs or the lows in professional life too personally. This is business. Things can change. Perhaps not getting a job you wanted or having some other setback can be a learning experience. Don't take a setback as something permanent.

Meet the Interviewees

Eleven leaders in the water sector were interviewed for the paper, *Staying Above Water: Lessons Learned from Water Sector Change Leaders.*

- **Angela Charles,** director, Charlotte Water
- **Rudy Chow,** general manager, Washington (D.C.) Aqueduct
- **Yvonne Forrest,** director, Houston Water
- **Ghassan Korban,** executive director, Sewerage and Water Board of New Orleans
- **Mike Markus,** general manager, Orange County (California) Water Department
- **Raynetta Marshall,** general manager (GM), underground infrastructure and public assets, city of Tallahassee (now chief operating officer, JEA, Florida)
- **Oluwole McFoy,** general manager, Buffalo Sewer Authority
- **Jeff Mosher,** executive director, Santa Ana (California) Watershed Project Authority
- **Carla Reid,** general manager and CEO, WSSC Water, Maryland
- **Kevin Shafer,** general manager, Milwaukee Metropolitan Sewerage District
- **Diane Taniguchi-Dennis,** CEO, Clean Water Services, Oregon

The paper can be viewed or downloaded at: **www.partnering4impact.net.**

tpo: Where did these leaders say they looked for inspiration?

O'Neill: Much of their inspiration came from the big picture of doing important work. They all have stayed in the public sector because they recognize the value to their communities in terms of public health, economic development and the environment — the importance of being in water in a practical, service-oriented way. A number of them mentioned how they are inspired by the dedication, skills and sense of service among their frontline workers.

tpo: How do those workers provide inspiration to their leaders?

O'Neill: They see that their workforces have done heroic things during natural disasters, and have shown that they will do almost anything to keep their plants running. Some of those interviewed said that on a day-to-day basis, when feeling like they needed a lift, they would go out and spend time among their frontline workers to give themselves a pick-me-up. It's an emotional point with them, the importance of their operators and how underappreciated they feel these professionals are, from a skills perspective and the contributions they make.

tpo: Did these leaders' lives outside of work help make them more resilient?

O'Neill: It was interesting to see that they all took time for hobbies. Some were doing arts and crafts, not something I would have put together with engineers. Perhaps being very driven earlier in their careers, being in situations of high pressure, they now see it as important to take time to rest and recuperate.

tpo: How do you translate lessons from these leaders to plant managers or to young, up-and-coming operators who aspire to leadership?

O'Neill: The operative phrase is that leadership is not a title, it's a way to behave. Many frontline people likely are leaders already, serving as an example to others without even realizing it. The idea is that as you go up the chain, you will spend more time getting work done through others and helping others work together.

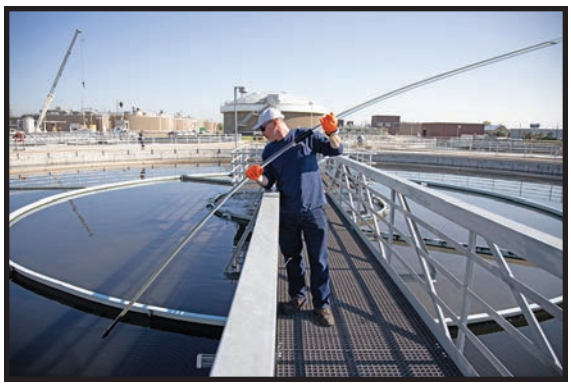
tpo: How did those you interviewed rate the importance of mentorship?

O'Neill: If you don't have a formal mentor, that doesn't mean you can't learn and get advice from others. None of the leaders I interviewed went through a former mentorship program. But when I asked who influenced them, they all named people. In almost all cases these were people who were humble, were optimistic and made time for them. So don't be afraid to reach out to people to get feedback. And in a similar way, you may be able to help someone without thinking of yourself as a formal mentor.

tpo: Were there other insights that stood out from your research?

O'Neill: One leader talked about how we all come to work as our whole selves. Leaders are not just their titles or their technical skills. We need to think about telling our story so that we can show up in the workplace as the whole person. As we move to be a more diverse and inclusive water workforce, we might make time to tell our story, what our values are, what brought us to where we are — and be ready to listen to the stories of others. There are some amazing stories in the paper. A number of the people have experienced being the first or being the only. For example, they were the first woman or the first African American to hold their role. There were very interesting things about each person's story. tpo

> "The operative phrase is that leadership is not a title, it's a way to behave. Many frontline people likely are leaders already, serving as an example to others without even realizing it."
> **EILEEN O'NEILL**



The South Platte Renew highlighted the daily tasks of operators such as Steve Molnar, shown collecting a sample from a clarifier.

The biogas facility is among treatment areas highlighted in the 10-minute video.

The treatment plant discharges to the South Platte River.

The South Platte Renew facility receives wastewater from some 300,000 residents.

Lights, Camera, Action!

AN AWARD-WINNING VIDEO FROM A COLORADO UTILITY KEPT THE PUBLIC INFORMED ON WASTEWATER PROCESS DURING THE PANDEMIC

By Sandra Buettner

For over 40 years the South Platte Renew wastewater treatment plant sent clean effluent to the South Platte River.

When the COVID virus hit, the utility wanted to keep its education efforts going for residents and stakeholders. The answer was a 10-minute video on the workings of the plant and how it helps its communities and the ecosystem.

South Platte Renew is the third-largest water treatment plant in Colorado. Located in Englewood, the utility serves that city, Littleton and 19 surrounding communities, home to a total of some 300,000 residents. Owned and operated by Littleton and Englewood, it treats about 20 mgd.

CREATING THE VIDEO

"We have always had a three-pronged approach to our outreach, and it was something we took very seriously," says Kacie Allard, deputy director of business solutions. "The approach included public tours of our facility, joining in community sponsored events to showcase what we do at the plant, and classroom visits. The video fit in nicely with all of these."

The South Platte Renew staff stepped up to the plate and put the script together. Except for the narrator, all people in the video were staff members: operators, mechanics, engineers, lab chemists, pretreatment team members, beneficial use operators and members of the administration. The video highlights on the importance of all these roles.

> "Water conservation seems to be what most people see promoted, but now they can see the importance of the other side of the water cycle."
> **KACIE ALLARD**

The outreach and education team wanted the video to contain a virtual tour so as to keep tours in front of residents, students learning from home and classrooms that still had in-person learning. An outside production company took video and still images and put the video together. The whole process took three months.

VIRTUAL TOUR

The video opens with utility statistics and metrics. It then explains what wastewater is, where it comes from, how it is cleaned and where it ends up: the cleaned water into the South Platte River, the biosolids to fertilize corn and wheat crops, and biogas converted to natural gas to help heat residents' homes. The video details all the major areas of the plant:

- Headworks
- Primary clarification
- Trickling filters

- Solids contact tank
- Secondary clarification
- Nitrifying trickling filters
- Denitrification
- Finals building

"It was also helpful in explaining what we do at the facility to our council members from Littleton and Englewood, who might not be familiar," says Allard. "It will be a tremendous help to create a deeper understanding of our organization when seeking funding to upgrade aging infrastructure and to meet more stringent regulatory requirements."

A surprising benefit of the video was for job applicants. Since the video is on the websites of the utility and several partners, applicants can view it and come prepared to their interviews.

MISSION ACCOMPLISHED

As of late 2021, the video had been viewed by more than 500 students, teachers, parents, residents, partners and council members.

"We're really hitting a wide audience, and because it is on multiple social media sites including both Littleton's and Englewood's, we're getting a lot of views," says Allard. "Water conservation seems to be what most people see promoted, but now they can see the importance of the other side of the water cycle."

The video won a 2021 National Association of Clean Water Agencies' award under the Public Information and Education E-media category.

"There are a lot of acronyms and industry terms in wastewater," Allard says. "The video gave us the opportunity to spell them out and keep them on the screen long enough so that the viewers could learn what they all are and how important they are to the wastewater process." tpo

Plant operator Mark Garwood collects water samples at the wastewater treatment plant in North Port, Florida.

All About Efficiency

AN AWARD-WINNING 7 MGD CLEAN-WATER PLANT IN NORTH PORT, FLORIDA, EPITOMIZES RESOURCE RECOVERY BY TURNING EFFLUENT AND BIOSOLIDS TO BENEFICIAL USES

STORY: **Jim Force** | PHOTOGRAPHY: **Lisa Tanner**

Look up the word "efficient" and you'll find it defined as "producing desired results without wasting materials, time or energy."

That certainly describes the main wastewater treatment plant in North Port, Florida. This 7.0 mgd (design) plant recycles all of its biosolids and effluent as it serves this community of 75,000 in southern Sarasota County, just inland from Venice.

Biosolids are turned into Class AA compost for use in landscaping and gardening, some of it in the community's Employee Garden. Effluent passes to a reclaim storage tank and then is recycled as irrigation water for area lawns, parks and golf courses, or is pumped into injection wells.

"A small portion, about 10,000 gpd, goes to a Tommy's Car Wash in town," says Marc Beauregard, wastewater superintendent. "That application recently won a David W. York Award for water recycling from the Florida Water Reuse Association."

NUTRIENT REMOVAL

The North Port facility is the larger of two plants serving the community. The Southwest Water Reclamation Facility (2 mgd) is just a few miles away.

At North Port, wastewater enters through a headworks equipped with automatic bar screens (Parkson Corp.) Then it moves to a modified Ludzack-Ettinger process with eight basins containing two anoxic and six aeration zones, each 225,000 gallons capacity.

The process is designed to use the nitrate produced by the aeration zone as an oxygen source for bacteria breaking down the raw wastewater in the anoxic zones. The oxygen-depleted return flow then enables microorganisms to consume phosphorus. The basins are equipped with Turblex blowers and fine-bubble diffusers (EDI). Hoffman blowers serve as backups.

After biological nitrogen and phosphorus removal, the water settles in four circular clarifiers, then passes through four deep-bed sand filters (Severn Trent). Disinfection occurs in four contact basins using liquid sodium hypochlorite injected by peristaltic pumps (ProMinent).

> "We came in with a new vision and put in a lot of blood, sweat, and tears to make the plant what it is today."
>
> **MARC BEAUREGARD**

The purified effluent flows to a 2.5 million-gallon recycled water storage tank, before being pumped to end users. BOD removal averages 99% and TSS removal 98%. Nitrogen is reduced to 6 mg/L and phosphorus to 2 mg/L.

SOLIDS TO COMPOST

Biosolids are aerobically digested in four digesters with a combined 600,000-gallon capacity. The material is dewatered to 20% in a centrifuge (Hiller); Synagro trucks it to the company's windrow composting operation. Monthly solids production is 45 to 50 dry tons — one or two truckloads per week.

Four circular clarifiers precede four deep-bed sand filters.

North Port (Florida) Wastewater Treatment Plant

www.cityofnorthport.com

BUILT:
1960, expanded 2009, upgraded 2016-present

FLOWS:
7 mgd design, 2.5 mgd average

TREATMENT PROCESS:
Modified Ludzack-Ettinger, sand filtration

TREATMENT LEVEL:
Tertiary

EFFLUENT:
Recycled for irrigation, deep well injection

BIOSOLIDS:
Centrifuged cake to comporting

ANNUAL BUDGET:
$5.4 million (operations)

Superintendent Marc Beauregard (right) has high praise for operators like Mark Garwood and the plant's instrumentation and control team.

> "When we have public tours of the facility, I'll offer to take a drink of our effluent. It is exceptional."
> **MARC BEAUREGARD**

The plant also accepts about 50,000 gallons a day of landfill leachate. It doesn't harm plant operation and in fact improves it, says Beauregard: "It has a pH of 7 to 8. We add it to the digesters; it improves pH and helps with decanting the solids."

A Wonderware SCADA system (AVEVA) provides the information and control operators need. Lucity provided the preventive maintenance package. Odors are well managed by a biological scrubber and carbon filter outside the headworks.

TASTY GARDEN

It's the bananas! They're the most sought-after produce from the Employee Garden near the City Hall in North Port, Florida.

"We have a banana tree in the garden," says Colleen "Coco" Hibbitts, community outreach coordinator for utilities. "Of all the fruits and vegetables we produce, our bananas are the most popular with our employees."

The garden provides healthful food and a relaxing atmosphere for the team, and it demonstrates a productive use of biosolids. The centrifuged biosolids cake from the treatment plant is trucked to a nearby Synagro facility, where it is composted at 130-170 degrees F and turned into a Class AA fertilizer for unrestricted use.

The garden was the 2019 brainchild of the city's Wellness Committee, working with the Utilities and Parks and Recreation departments. Creative as well as useful, the project won the 2020-2021 Biosolids/Residuals Excellence Award from the Florida Water Environment Association.

Besides bananas, the raised-bed garden produces mint, rosemary, chives, broccoli, tomatoes, green peppers, jalapeno peppers, eggplant and aloe vera, all distributed to city employees and their families. The garden also features an assortment of flowers.

Relaxation is another plus. "2020 brought even more focus to our garden, as it served as a retreat for employees who were remotely working due to COVID-19," says Hibbitts. The garden provided fresh produce and opportunities to learn how to grow, maintain and cook the herbs and vegetables."

Hibbitts notes that the reuse project has public understanding and acceptance of biosolids. Mixed with potting soil, the composted material provides long-term nutrients and reduces the need for fertilizer and other amendments. It also retains moisture, cutting watering needs.

"The garden shines a favorable light on the city," she says.

Synagro is a manufacturer of compost and fertilizer; its products are a staple in Florida's citrus and produce industries. Plant team members enjoy the nutritious food and are starting to share recipes that use the produce. You wonder if anyone has submitted Bananas Foster.

CHANGE FOR THE BETTER

The treatment plant dates back to 1960 and was modernized with a number of improvements in 2009. Still, when Beauregard arrived a few years later, there was more to do. He and Chad Nosbisch, water and wastewater operations manager, led a hardworking staff that made changes to bring the plant to the performance levels it is achieving today. The team includes James Bedford, chief operator, and operators Mark Garwood, Michael Stack, Ward Wright, Dakota Koontz and Nicholas Topolnycky.

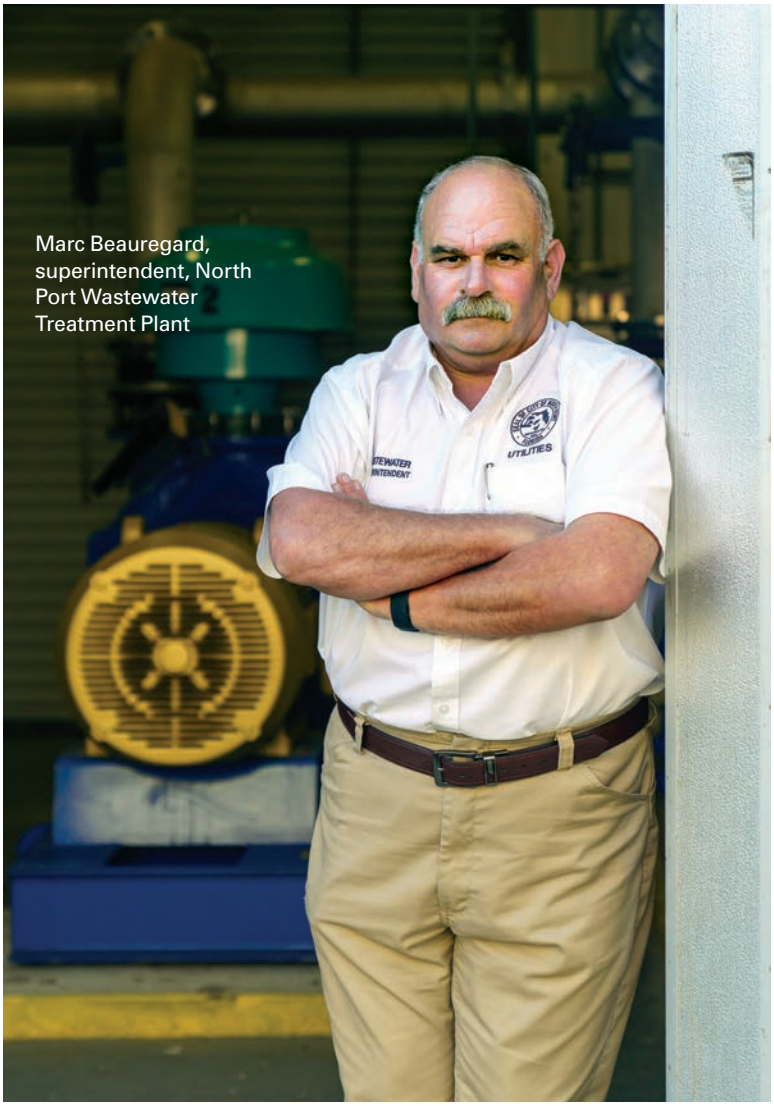
"We came in with a new vision and put in a lot of blood, sweat and tears to make the plant what it is today," Beauregard recalls. "Things basically needed sprucing up. There was equipment that hadn't been replaced. In some areas, we needed to start all over again."

The Turblex blowers made a big difference in how the plant's aeration basins and aerobic digesters operate. In other areas, it was a matter of new paint and coatings. The SCADA system servers were upgraded, and new PLCs are scheduled to be added this year. The automated bar screens were new last year.

The biggest improvement came in the biosolids area. "We had two digesters and three mixing tanks," Beauregard says. "We removed walls and converted the mixing tanks into one large storage tank. That gave us more daily solids capacity and a place to rotate our waste activated sludge, and it improved our ability to decant." The upgrade also included two new digesters, and the addition of Hoffman blowers.

PRAISE FOR THE TEAM

Beauregard takes his hat off to the operators, who are supported by an excellent instrumentation and control and field operations staff. They don't rely solely on the city's maintenance staff: "They do it themselves, be it picking up a paintbrush, shovel or wrench.



Marc Beauregard, superintendent, North Port Wastewater Treatment Plant

> "After nearly 35 years in the business I don't feel I'm here to supervise operators but to train future superintendents."
> **MARC BEAUREGARD**

Bedford and Wright hold Class A licenses; the operators all hold Class C. "I have an exceptional staff," Beauregard says. "After nearly 35 years in the business I don't feel I'm here to supervise operators but to train future superintendents."

Finding new operators, along with adopting new technology and serving a growing community, remains the utility's biggest challenges. The COVID pandemic, during which many people worked from home, made recruiting and hiring all the more challenging.

Those same factors have made the application and certification processes slower than normal. "Operators are in demand everywhere," Beauregard says. The slower hiring process can result in candidates taking jobs elsewhere, as open positions are abundant.

GETTING RECOGNIZED

Still, Beauregard remains optimistic. "Nothing's insurmountable," he says. That attitude is no doubt one reason North Port has achieved first or second place four years running (first place for 2021) in the Florida WEA's Earle B. Phelps Award competition. The honor recognizes plants for exceptional operations, maintenance, recordkeeping and effluent quality.

Mark Garwood checks the chlorine analyzer (Hach).

North Port Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	128 mg/L	0.9 mg/L	20 mg/L
TSS	150 mg/L	0.7 mg/L	5 mg/L
Nitrogen	60 mg/L	6 mg/L	N/A
Phosphorus	4 mg/L	2 mg/L	N/A

The judges were right on target about the effluent: It's so clean the utility is seriously considering direct potable reuse, in which the effluent would go directly into the region's potable water supply, after further treatment at the city's water treatment facility.

An engineering firm is studying the science and the economic feasibility of the idea, but Beauregard is convinced it will work: "When we have public tours of the facility, I'll offer to take a drink of our effluent. It is exceptional. There's nothing in it I wouldn't drink."

Direct reuse would literally make the North Port treatment process a closed loop — extra efficient, you might say. tpo

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Causing a Stir

LIGHTER AND MORE ENERGY-EFFICIENT MIXERS FOR RETURN ACTIVATED SLUDGE BRING SUBSTANTIAL SAVINGS ON ELECTRICITY AND MAINTENANCE AT A CONNECTICUT CLEAN-WATER PLANT

By Chris French

Replacing anoxic zone mixers with much more energy-efficient units is saving more than $22,000 per year for a water pollution control facility in Connecticut.

In pursuing its goal to achieve net zero carbon, the town of Fairfield (population 60,000), wanted to reduce the operating costs of mixers that ran around the clock. The change was part of a capital improvement plan to replace aging assets with modern and more energy-efficient equipment.

"Like all treatment plants, we have been a very big electricity user," says John Bodie, superintendent of the Fairfield Water Pollution Control Facility. "But when we reviewed our energy usage and developed a full plan, it presented us with an excellent opportunity to adopt green design standards."

HELP AVAILABLE

Numerous treatment facilities are discovering, to their considerable benefit, that help for capital improvements is at hand with grants and incentives from energy providers. In Fairfield, the help came from United Illuminating, a subsidiary of Avangrid, which owns and operates a portfolio of renewable energy generation facilities.

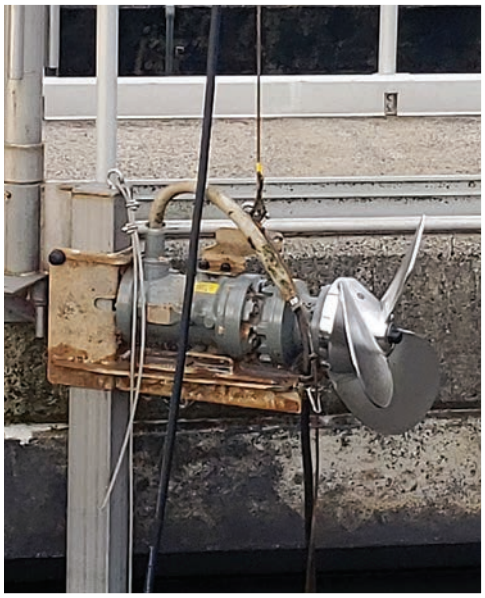
Bodie, who has worked at the Fairfield plant for 30 years, observes: "When we plugged in the numbers, it all added up: smart energy improvements that would give us the greatest return at the lowest cost, as well as big savings for many years to come.

"The help we had toward capital costs from United Illuminating gave us every incentive to go ahead. Our 12 existing mixers were never the most efficient, and we also found them very difficult to work on, mainly because of how heavy they were."

The mixers at the 8.5 mgd Fairfield facility continuously suspend solids and mix the return activated sludge into the influent stream. The energy input from the old mixers met industry standard recommendations, but the single-point submersible propeller mixers left some dead zones in the denitrification process. They also contributed to scum and foam formation and required high maintenance and frequent rebuilds.

SHEDDING WEIGHT

"After looking at several options, we invested in six mixers made by Landia that came highly recommended as the best solution," notes Bodie. "At 2.4 hp each, compared to the previous 6.5 hp units, we expected a reduction in energy usage. The bonus is that despite being smaller, the new mixers do a better job than the old ones.



The new mixers at the Fairfield plant are designed for high energy efficiency. They continuously suspend solids and mix the return activated sludge into the influent stream. Team members at the plant include, from left, Sam Charest, John Bodie, Steve Salvio and Mike "Spider" Repko.

"The first six mixers have been installed for just over three years with no issues at all. Previously, when servicing a 6.5 hp mixer weighing in at around 800 pounds, we needed three or sometimes four men to lift it out. Even then, it was very easy for someone to suffer a back strain. Now, with the Landia mixers weighing 200 pounds, it's easy for just one person. That has also made a big saving on maintenance."

The new mixers are of a type used for applications such as mixing in aeration basins and moving solids from membrane bioreactors. With their slow revolutions and low floc shear, the mixers are designed for the gentle treatment of activated sludge in continuous applications where sedimentation in anoxic (or anaerobic) tanks must be prevented.

> "When we plugged in the numbers, it all added up: smart energy improvements that would give us the greatest return at the lowest cost, as well as big savings for many years to come."
> **JOHN BODIE**

The design of the propeller allows low-speed flow creation with the lowest possible power consumption. Adjustable propeller blades enable energy consumption to be fine-tuned by simply changing the blade angles blades to achieve the desired velocity.

Based on the success of the first six new mixers, six more were installed in 2020, replacing units that also used too much energy and were time-consuming to maintain.

MORE SAVINGS IN STORE

The mixers' annual electricity cost reduction of more than $22,000 equates to a reduction in energy usage of 182,383 kWh. "The WPCF was constructed in 1950, with upgrades made in 1968, 1972 and 2001," Bodie says.

"It has always been very well run, but now the capital improvement plan from four years ago can show other treatment facilities what substantial savings can be made in energy. We are pleased with the new mixers, which provide many cost and operational benefits."

Long-term energy efficiency improvements at the plant also include a 2 MW solar energy system at a former landfill nearby, and a 400 kW fuel cell. A new 1.3 MW natural gas generator was also installed, with interconnecting switchgear. That allows the plant and surrounding town facilities to operate independently in the event of power outages. tpo

Pulsar family ultrasonic algae-control units are suitable for applications from ponds and clarifiers up to reservoirs and wastewater lagoons. They are configurable with various AC/DC power supplies, power cable lengths and plug-ins for different geographies.

Zapping Algae With Efficiency

AN ULTRASONIC CONTROL TECHNOLOGY USES A WIDE SPECTRUM OF SOME 2,000 FREQUENCIES TO KILL MULTIPLE SPECIES OF ALGAE AND LIMIT BIOFILM FORMATION

By Ted J. Rulseh

Algae is a growing problem in all sorts of water and wastewater facilities — reservoirs, lagoons, ponds, water storage tanks and more.

The problem grows more acute as the climate warms, making conditions more hospitable for green and blue-green algae to proliferate. Water utilities are looking for ways to control algae that are cost-effective and sustainable.

WaterIQ Technologies offers what it calls next-generation ultrasonic algae defense systems. They function without chemicals and in many cases with battery-backed solar energy. The company offers Pulsar family ultrasonic units suitable for a range of applications, from smaller facilities like ponds and wastewater treatment plant clarifiers, on up to large reservoirs and wastewater lagoons.

They are highly configurable with various AC/DC power supplies, power cable lengths and plug-ins for different geographies. The basic devices can be upgraded to integrate internet of things (IoT) and telemetry technologies to enable remote monitoring. George Hutchinson, chief technology officer, and Lawrence Field, founder and president, talked about the systems in an interview with *Treatment Plant Operator.*

> "Pulsar units have been engineered to produce the right frequencies at the right decibel levels. The idea behind the large number of frequencies is to kill more species more precisely."
> **LAWRENCE FIELD**

tpo: In the most basic sense, how do the Pulsar units work?

Hutchinson: The different versions all basically do the same thing. They put out sounds at a certain intensity level over a span of frequency bandwidths. The user places them in a body of water where there is a need to control algae or biofilm. There are different effective ranges for different types of algae. For blue-green algae, the range is about 400 meters — that's about 120 acres of coverage. For green algae and diatoms the range is smaller.

tpo: How does the sound actually control the algae?

Hutchinson: For green algae and diatoms, it causes the inner cell wall to vibrate. At the correct frequency, you achieve what we call critical structural resonance. When this occurs, it creates enough stress to cause that inner cell wall to tear, so that the cell loses pressure control and the ability to transfer fluid within the cell. It also opens an avenue for bacteria to enter. The bacteria then start eating the algae cell from the inside.

tpo: Is the mechanism the same with blue-green algae?

Hutchinson: Blue-green algae are totally different organisms. They use gas vesicles as a means to go up and down in the water column. The sound breaks those vesicles; the gas then migrates to the outer cell wall and slowly diffuses out, like a balloon leaking air over time. Once enough of that gas escapes, the cells can't get back up to the surface to get sunlight for photosynthesis, and they eventually die.

tpo: How can ultrasonic technology help control biofilm?

Hutchinson: Biofilm consists of bacteria that create colonies on equipment surfaces. Our technology covers frequencies in two bandwidths. By alternating those frequencies we create a sensation similar to water turbulence. Anaerobic bacteria can't create colonies in turbulent water, and so they go into stasis. We have one frequency set centered around 42 kHz and one around 200 kHz. Inside water process plants, the impact of eliminating biofilm is huge. Not only do you eliminate THM and HAAs, you keep the equipment clean and trouble-free. It saves money just in the people it takes to manage and maintain the equipment.

tpo: How does Pulsar differ from other ultrasonic systems for algae control?

Field: Pulsar units have been engineered to produce the right frequencies at the right decibel levels. We have 2,000 frequencies that are substantially different in killing power, and our frequency sets run 24/7. It takes

about 34 minutes to run through the 2,000 frequencies. They pulse 0.4 seconds on and 0.6 seconds off. The idea behind the large number of frequencies is to kill more species more precisely.

tpo: Are there also differences in the physical construction of the devices?

Field: Yes. Typically, when you place a device in water that contains algae, it becomes covered in algae after two or three weeks, and you have to clean it. We apply a material called Sharklet to our units. It mimics shark skin, which does not attract bacteria; it's used in hospitals and in medical implants. Because our units are covered with the Sharklet material, they don't accumulate biofilm or algae. They last without having to be cleaned.

tpo: What has been done with the product to provide durability?

Field: Earlier transducers were put together with a conductive glue. We do not use glue at all. We use one mold and a specific type of screw to hold the piezos and the units together. So we experience no field failures.

tpo: How are units powered when deployed in larger bodies of water?

Field: For drinking water reservoirs, for example, we power them with a solar unit that is highly efficient. At installations near the equator, it is often cloudy, so we have a solar panel that is about 50% more efficient. We think it's the most efficient solar panel on the market.

tpo: What kind of battery backup do these solar-powered units have?

Hutchinson: It's a 24-volt, deep-cycle type marine-type battery. It will run the unit for almost a week even with no sun at all.

tpo: How can these units be controlled and monitored?

Field: For our larger units, we offer the latest in remote monitoring technology and interface that takes the information into the cloud, so that engineers can look at the data real time. We measure seven parameters for water quality, and we also have also two types of algae sensors. So users are able to look at their water quality every single day, measure algae on a daily basis and see the decrease.

> "Inside water process plants, the impact of eliminating biofilm is huge. It saves money just in the people it takes to manage and maintain the equipment."
> **GEORGE HUTCHINSON**

tpo: What is driving the demand for ultrasonic control technologies?

Field: Issuers of requests for proposals are saying they want algae remediation systems that are chemical-free. So we are seeing a really strong demand for nonchemical solutions where they don't have to pour copper sulfate into their water to get rid of the algae. This is the biggest trend I have seen in the last year among governments and municipalities. tpo

Chasing Net Zero

AMANDA BIRD WANTS HER CLEAN-WATER FACILITY TO BE COMPLETELY SELF-SUFFICIENT IN ITS ENERGY USAGE AND IS WORKING TOWARD THAT GOAL

STORY: **James Careless** | PHOTOGRAPHY: **Shmuel Thaler**

Amanda Bird, interim operations supervisor at the Santa Cruz Wastewater Treatment Facility

Amanda Bird is on a mission to achieve net zero energy at the Santa Cruz (California) Wastewater Treatment Facility.

To Bird, senior wastewater treatment operator and interim operations supervisor, that means obtaining all the power needed to run the facility from renewable energy sources.

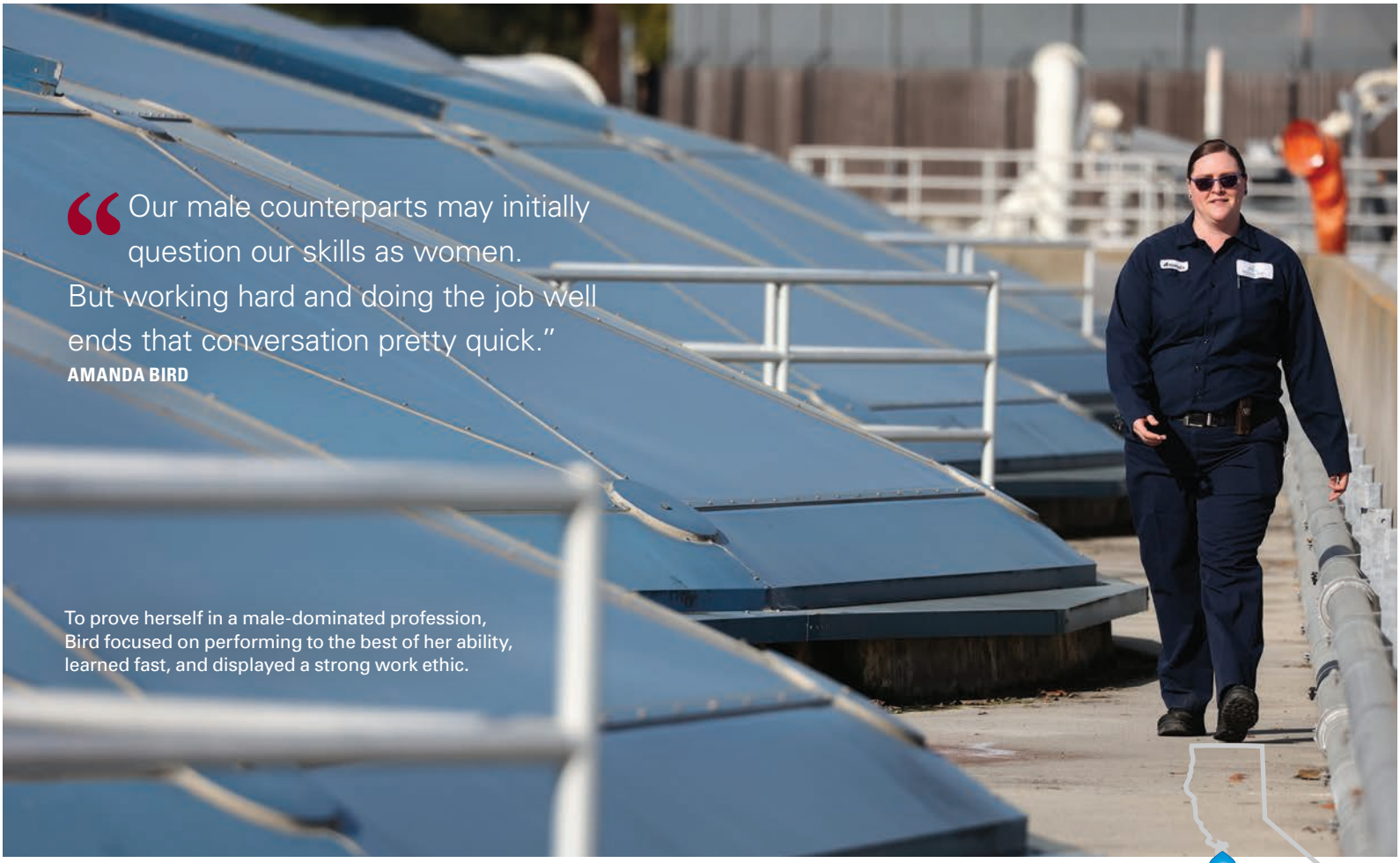
"We're trying to do this through a range of renewable options," she says. "Here at the facility, we burn methane gas created by our treatment process to generate electricity. We have solar panels as well that help provide power during the daytime." At night, the facility sources power from external green energy producers.

"We're not at net zero yet, but 90% of our power is generated from renewable green resources," says Bird. "It may take us another 30 years to get there, but we're on the right track. For instance, we can always install small wind turbines on site and put paddlewheel generators in line between our tanks and use falling water to drive them.

"We simply strive to reduce our purchased energy in order to reduce our overall facility operation costs, a cost savings we pass on to our customers."

"We're trying to do this through a range of renewable options," she says. "Here at the facility, we burn methane gas created by our treatment process to generate electricity through cogeneration. We have solar panels as well that help provide power

> "We're not at net zero yet, but 90% of our power is generated from renewable green resources."
> **AMANDA BIRD**



"Our male counterparts may initially question our skills as women. But working hard and doing the job well ends that conversation pretty quick."
AMANDA BIRD

To prove herself in a male-dominated profession, Bird focused on performing to the best of her ability, learned fast, and displayed a strong work ethic.

during the daytime." To be precise, the facility has 14 solar panels, with the system size being 4.4480 kW DC each. Together, the solar panels produce 20-28 kW of power each day on average, depending on whether skies are sunny or cloudy. At night, power is brought from Monterey Bay Community Power, an external green energy producer.

Cogeneration accounts for 76% of Santa Cruz's daily power needs, followed by 1% from solar and 30% from Monterey Bay Community Power. The excess heat from the cogeneration engines is used to heat the two primary and two secondary anaerobic digesters, maintaining a sludge temperature between 96 and 98 degrees F. It also heats the facility's administration building and a large underground equipment gallery.

AN UNEXPECTED PATH

Bird's passion is genuine and strong. Her devotion to the wastewater industry and her skills explain why she received the 2020-21 Operator of the Year award from the California Water Environment Association.

Bird never planned to work in the water industry. Growing up in San Jose during the 1990s where her dad worked in telecommunications and her mother at the local school district, "I wasn't at all interested in water," she says. "As a kid, I was really into playing soccer, with an eye to using it to get into college on a scholarship."

Unfortunately, while in high school Bird suffered a traumatic knee injury that ended her soccer career. "That left me scrambling to figure out my next way to get into college," she says. "So then I just dove into academics, trying to get the highest GPA I could in order to get scholarships."

It proved to be a wise strategy. She used her scholarships to earn a bachelor's degree in environmental studies from Portland State University and a master's in environmental management from the University of San Francisco.

As for joining the wastewater industry: "I wanted a career that was recession-proof after the 2008 stock market crash," says Bird. "I also wanted my husband to be able to stop working on ships and being away from home for long periods at a time." She started work as an operator-in-training at the South County Regional Wastewater Authority in Gilroy in 2012, while working on her master's degree on weekends.

She gained more experience, and a growing passion for the industry, at the South County Regional Wastewater Authority before joining the Santa Cruz facility in 2015 as a Grade 3 operator. Today, she holds California licenses as a Grade 5 wastewater treatment operator, Grade T2 water treatment operator and Grade D2 water distribution operator.

KEEPING IT RUNNING

As interim operations supervisor (while Mike Sanders, operations manager, is away from work), Bird leads a crew of three operators: Sang Douangpannha, Austin Johns and Armando Deloera. "The four of us provide the marching orders for the plant, ensuring that our wastewater is getting the treatment it needs and running the system as efficiently as we can," Bird says.

Amanda Bird, Santa Cruz (California) Wastewater Treatment Facility

POSITION:
Interim Operations Supervisor

EXPERIENCE:
In the field since 2012

DUTIES:
Operator, supervisor, mentor, promoter

EDUCATION:
Bachelor's degree, environmental studies, Portland State University; master's degree, environmental management, University of San Francisco

CERTIFICATIONS:
Grade 5 Wastewater Operator, Grade D2 Water Distribution, Grade T2 Water Treatment

GOAL:
Achieve net zero energy usage at the Santa Cruz facility

The team at the Santa Cruz facility includes, from left, Dave Meyers, operations supervisor/interim facilities manager; Dustin Bird, wastewater operator 2; and Sang Douangpannha, senior wastewater operator. In front is Amanda Bird, interim operations supervisor.

She and her team oversee day-to-day operations, project management, worker safety and ongoing inspections. She is tasked with managing our biological treatment system and making sure the plant effluent meets permit requirements.

The Santa Cruz process begins with septage receiving and advanced primary treatment assisted by pre-aeration grit tanks. Secondary treatment consists of trickling filters and solids contact tanks, followed by clarifiers.

The trickling filter/solids contact tank process is "a little bit different than what most people have to deal with in the industry," Bird says. "Our microorganism population lives on fixed media. We're literally sprinkling/trickling the wastewater over this fixed media where the organisms live. And that's where we get our organic content removal."

The Santa Cruz facility (17 mgd design, 6.5 mgd average) has three Vulcan bar rakes, two dedicated to flows from the city of Santa Cruz, the third to flow from the county of Santa Cruz. Ceramic coarse-bubble diffusers provide aeration for the contact tanks.

Carbon anthracite filters provide tertiary treatment to recycle water for use on site; there are being replaced with cloth disc filters (likely AquaDisk from Aqua-Aerobic Systems). Effluent is UV disinfected (WEDECO) before discharge.

Two Pentair Fairbanks Nijhuis 6360 vertical mixed-flow pumps, driven by natural-gas-fueled Caterpillar engines send effluent to the Pacific Ocean. Each pumping unit has a capacity of 50 mgd. "The outfall is gravity-fed, but there are moments during very high tides where we have to pump the outfall against the pressure of the ocean," says Bird.

THE ENERGY FRONT

A key to the quest for net zero energy is cogeneration system, Anaerobically digested biosolids are dewatered on three 320 gpm centrifuges (Andritz), yielding about 20 million pounds of Class B biosolids per year. The cogen system has two Waukesha Engine generators (ClarkeEnergy), a 480 kW unit burning natural gas or biogas, and an 820 kW biogas-only unit.

Cogeneration supplies 76% of the plant's daily power needs. Heat from the engine generators feeds the two primary and two secondary digesters, maintaining a temperature of 96 to 98 degrees F. It also heats the administration building and a large underground equipment gallery.

Solar panels help power the plant during the daytime. The facility has 14 solar panels that produce 20-28 kW of capacity, depending on whether the skies are sunny or cloudy. At night, power is brought from Central Coast Community Energy (formerly known as Monterey Bay Community Power) an external supplier of green and renewable energy.

Energy conservation is an essential component of net zero. "We are conscious of our power usage and have taken some steps to reduce imported power," Bird says. This effort includes switching to LED lighting, automating control of exterior lighting control, and upgrading the tertiary treatment process.

"We are also beginning a capital improvement program that includes upgrading our UV disinfection system, our power cables throughout the facility, our standby generators, and the internal mechanisms of our gravity thickener," Bird says.

A WOMAN IN WASTEWATER

Bird's management position and award-winning status prove that she is being accepted in the wastewater world, but that wasn't always the case.

"In the beginning, I was treated differently because I was a woman in the field," she says. "Some male counterparts didn't want to train me or thought that I couldn't physically do the job. So they wouldn't give me as much responsibility as somebody else, or I got relegated to the 'Oh, you're really good at typing and paperwork' administrative duties."

To get past all that, Bird focused on performing to the best of her ability, learned as fast as she could, and displayed a work ethic that shut down any concerns people had about her gender. Her efforts have paid off.

"After I left one facility, the manager there said, 'You know, I was really hesitant to hire you because you're a woman. Thank you for changing my mind.'" Bird recalls. "More important, the places I have moved on from have all hired women since I left.

"Here at Santa Cruz, I'm not the first woman they've had as an operator, but I am the first they've ever promoted. And since I've been here, they've hired two more women behind me. So yes, our male counterparts may initially question our skills as women. But working hard and doing the job well ends that conversation pretty quick."

This TECO-Westinghouse three-phase induction motor powers 300 hp, 490 rpm interstage pumps with adjustable-speed magnetic drive clutch that send water from the primary sedimentation structure effluent channel into the trickling filters.

An aerial view of the secondary clarifiers at the Santa Cruz plant (clarifier drives by WesTech Engineering).

> "Anything I can do to promote our industry and motivate good people to join it, I do."
> **AMANDA BIRD**

An example of Amanda Bird's painting.

BRUSH IN HAND

When Amanda Bird isn't helping to clean Santa Cruz's wastewater, she spends her time as an oil painting artist.

"I got into oil painting a few years ago and it now absorbs all of my free time," she says. Her work is good enough that people are taking notice: "I've probably done 40 or 50 paintings in the past couple of years and sold them. I've done commissions: I just completed a family portrait for a former boss."

Bird initially found oil painting difficult: "I took classes at my local art store, but I could never do the various styles the teacher kept telling me to do, like impressionism or surrealism. It all looked the same when I did it.

"That frustrated me a lot, until my mother looked at my work and said, 'Well, you're just doing your own style: That is how you paint.' And so I stopped fighting it, and now people are buying my work."

AN EYE TO THE FUTURE

Although she has only been in the wastewater industry for a decade, Bird has definitely found her calling. That's why she is concerned about the industry's future and the problem of finding enough skilled workers to keep America's treatment plants running.

"This industry used to be populated with former military people who knew all about working on large engines, industrial pumps and treatment processes," she says. "But my generation and later ones were encouraged to go to college and become computer engineers. Add the fact that high schools have dropped shop and other practical skills training, and it is becoming hard to find new people."

To raise awareness about careers in wastewater management and the good its people do for the environment, Bird hosts tours for local high school and college students. She also does media interviews whenever she can to promote the profession and has produced a polished 17-minute plant tour video that can be seen on YouTube.

"Anything I can do to promote our industry and motivate good people to join it, I do," says Bird. "Most members of the younger generations are not even aware that this field exists and that it can provide a very comfortable living without people having to become hotshot lawyers or the next social media stars. That's the message I try to get out as much as I can."

As for her own future in wastewater management: "I'm here for the long haul. Filling in as operations supervisor has given me some really good insight into what this position is all about. It has opened doors to meetings that I normally wouldn't be on topics like long-term planning and big capital improvement projects. Even scheduling timecard management is just really interesting. I am really enjoying seeing the big picture of plant management.

"So yes, I really like the next level of what it is to be an operator, and that's what I want to do going forward — along with working toward my net zero goal here in Santa Cruz." **tpo**

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A PENNSYLVANIA COMMUNITY TESTS A NEW HYDROTHERMAL CARBONIZATION CONVERSION TECHNOLOGY TO BYPASS DIGESTION AND TURN BIOSOLIDS INTO AN ENERGY-DENSE HYDROCHAR FUEL

By Steve Lund

The Borough of Phoenixville is a small municipality in southeastern Pennsylvania that rises to the challenges of being first.

It was first in the state to pledge a transition to 100% renewable energy for electricity by 2035 for all municipal operations. Now it is first to install a new technology that could be a giant step toward that goal.

Phoenixville's hydrothermal carbonization system, the first large-scale system of its kind in the United States, transforms biosolids into hydrochar, a coal-like substance. When at capacity and integrated with a cogeneration system, it is expected to produce enough hydrochar to generate a surplus of electricity to operate the wastewater treatment plant.

Since early this year, the HTC process has been running alongside the anaerobic digesters. If the technology proves itself, all the biosolids will eventually go through the system, which occupies a much smaller footprint than a digester, yields a drier end product, and breaks downs PFAS and pharmaceuticals in just a few hours.

"We're excited about it," says E. Jean Krack, borough manager. "We're at the embryonic stage right now. The good thing is we've got leadership that sees the borough as an innovator and a leader in getting to net zero. This will help us get there very quickly."

The Bucher filter press, shown being moved into the wastewater treatment plant, will dry biosolids processed by hydrothermal carbonization to 50-60% solids.

Shipping containers holding the reactor and the heat exchanger for hydrothermal carbonization were moved into a building at the Phoenixville treatment plant.

FIRST IN THE NATION

Phoenixville's partner is SoMax BioEnergy, which has tested the HTC technology over the last eight years on waste streams including wastewater biosolids, food waste and industrial waste through a pilot project in Switzerland.

The company has sponsored master's level laboratory research at Villanova University. The installation at the Phoenixville Wastewater Treatment Plant (4 mgd design, 1.5 mgd average) will be the first commercial-scale and first municipally owned HTC system in the nation.

The process can be "bolted on" to a treatment plant ahead of an anaerobic digester, after a digester or, as at Phoenixville, in place of a digester. The reactor and heat exchanger for the HTC process fit in two shipping containers, which become part of the installation.

Sludge at about 15% solids flows into the reactor, where they are broken down by heat (375-420 degrees F) and pressure (150-290 psi). "The water acts as a catalyst, and it causes chemical reactions to occur," says Dan Spracklin, SoMax CEO. "In layman's terms, it takes compounds in the waste, whether undigested food in the fecal matter or food waste or pharmaceuticals, and breaks those long-chain compounds into smaller compounds."

SUPER DRY

After the reactor and heat exchanger, the biosolids go through a filter press (Bucher). "The material comes out 50-60% dry matter through those presses," Spracklin says. "Most presses for biosolids have a limit of 25-30% dry matter."

> "The good thing is we've got leadership that sees the borough as an innovator and a leader in getting to net zero. This will help us get there very quickly."
> **E. JEAN KRACK**

The press can squeeze more water out because the HTC process weakens the cell walls of microorganisms and because the hydrochar is hydrophobic. "It actually repels water, which allows us to achieve that high level of dewatering," Spracklin says. "If we include an acid treatment in the filter press, we can achieve up to 70%."

The water pressed out of the hydrochar gets pumped back to treatment plant headworks, just as the water removed from anaerobically digested solids would be.

MIMICKING NATURE

Spracklin describes the HTC process as similar to the way fossil fuels are produced: biomass is compressed and subjected to heat over a long time. The difference is that HTC acts much faster: "Essentially we mimic the way that Mother Nature creates coal. We take that same approach by applying mechanical and chemical engineering to create a modern-day biofuel."

While a typical anaerobic digester processes solids for 14-30 days, the solids usually stay in the HTC reactor for just three hours. "Anaerobic digestion is a biological process," Spracklin says. "Biology is slow. Chemistry is quick. The minimum time to complete the reaction is 30 minutes. The reason we do it for three hours is that it makes a much better carbon product with more energy density."

The hydrochar can be used in a variety of ways. It has an energy profile similar to anthracite and so it can fuel a cogeneration system. It can also be used to create activated carbon for filtering water or gas, or to sequester carbon in building products like roof shingles or concrete. "We believe we've solved the fundamental issue that faces all municipal wastewater treatment plants: What do we do with our biosolids?" Spracklin says.

SURPLUS ENERGY

Phoenixville hopes to use its hydrochar for cogeneration. The treatment plant has used biogas for heating only. The hydrochar can be heated and gasified, and the gas then can fuel a generator. Phoenixville expects to produce enough hydrochar to generate 153% of the treatment plant's energy demand, which would mean selling a lot of power back to the utility grid.

That won't happen right away. "We're years away from that," Krack says. "If we're the first ones doing this, there's nobody making that type of boiler. We've got to show everybody that this is all working."

The project will cost about $5 million, but the borough received more than $1 million in state and county grants. The project also won a $250,000 U.S. Department of Energy Water Resource Recovery Prize for SoMax, one of two winners in 2021.

The project has the aura of a startup company. The process is so new that Phoenixville has to run it in parallel with its anaerobic digestion process to generate data and demonstrate to regulators that it is effective.

"We had to figure out financially how this could work, but equally, if not more important, how do you get a permit to do it?" Krack says. "Nobody has done it in the United States. The way the rules are, we couldn't use the empirical data that was being provided in Europe. We had to do it here. We had to scale it down to do it at Villanova in a laboratory environment. Once they showed that it could be done, then the next step was to scale it back up."

BIOSOLIDS SAVINGS

Phoenixville's biosolids traditionally have been distributed to farms, but that has become more difficult as regulators recognize risks from PFAS and pharmaceuticals.

"With this HTC process, we'll virtually eliminate most of those things that are still getting through in anaerobic digestion," Krack says. "We've got to show that we're removing PFAS and biopharmaceuticals and thereby putting cleaner water back into the river."

Phoenixville plans to keep its anaerobic digesters operational to enable storage of solids if the HTC process is down for maintenance. Until the plant has the equipment and permits for cogeneration using hydrochar, the borough will continue with land application, although Krack expects considerable hauling cost savings since the product is so much drier.

He also envisions eventually processing food waste from restaurants and grocery stores through the HTC system. Initially, operating costs will be higher while running both HTC anaerobic digestion, but the long-term prospects are for enormous energy cost savings.

Krack says, "First, we have to show that it works." tpo

Conveyance and Distribution Systems

By Craig Mandli

Blowers

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ZZ Series blowers from Eurus Blower

ZZ Series blowers from Eurus Blower are drop-in replacements for competitor blowers. They have heavy-duty cast housings, machined impellers, alloy steel shafts with oversized bearings, hardened/precision machined steel forged gears, oil-lubricated gear and/or grease- or oil-lubricated drive sides, plus keyless locking assemblies for easier timing gear maintenance. The blowers provide up to 15 psig pressure and 2,350 cfm flow. **630-221-8282; www.eurusblower.com**

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Motor and Pump Controls

ORENCO CONTROLS OLS CONTROL PANELS

OLS Control Panels from Orenco Controls

OLS Control Panels from Orenco Controls come with the choice of either integrated starters or variable frequency drives that optimize system operation. These panels are suitable for a variety of pumping applications such as lift stations, stormwater pump stations, water boosting, dewatering or sludge pumping. They can also be used as a SCADA patch, connecting peripheral equipment to future or existing SCADA systems. Parameters can be configured via a human-machine interface and include a user-friendly startup wizard. Engineers can preprogram user interfaces to the site-specific needs of an installation, making the panel virtually plug-and-play. Maintenance staff can easily adjust settings and monitor the system remotely. These weatherproof control panels are UL 508A listed and include service-rated circuit protection, phase and voltage protection, and level controls. **877-257-8712; www.orenco.com**

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The Eco Smart Station control system from PRIMEX provides a safe, energy-efficient solution for optimum pump control in municipal lift station applications. It uses the latest technology in VFD, microprocessor-based controller, data storage and communication capabilities available. It achieves up to 30% energy savings using an efficiency auto-tune algorithm that searches for the pump speed that will consume the least amount of energy per gallons of liquid pumped. It is housed in a multiple-compartment Arc Armor Enclosure, reducing the risk of injury resulting from electric shock and exposure to arc flash. It features the Energy View controller powered by kW Logix software, an energy-efficient solution. The color touchscreen HMI provides level control, pump alternation, flow monitoring, data logging, alarm logging, historical trending and comes equipped with a SD memory card for data storage and download. It is available in 29 models, from 10 to 100 hp. **844-477-4639; www.primexcontrols.com**

Eco Smart Station control system from PRIMEX

PULSAFEEDER XAE STROKE LENGTH CONTROLLER

XAE Stroke Length Controller from Pulsafeeder

Pulsafeeder's XAE Stroke Length Controller provides fast and accurate response when there are changes to chemical dosing demands of diaphragm metering pumps. With microprocessor-based digital logical and a brushless stepper motor, pump chemical delivery response is nearly instantaneous. Onboard push-button self-calibration means that startup and commissioning is finished in a matter of minutes. It is fault-tolerant and self-correcting after power loss or system fault, with settings automatically maintained and monitored even without power. A full array of dry contacts and 4-20mA inputs/outputs allows it to communicate and integrate seamlessly with system controls to monitor pump ready-to-run or fault conditions status and shut down in the event of system alarm or diaphragm failure. Fast operation and service means operators can spend less time troubleshooting pumps and more time monitoring system efficiency and know the status of key aspects of pump performance and health easily and remotely. **585-292-8000; www.pulsafeeder.com**

Pipe/Parts/Components

GORMAN-RUPP ECHOSTORM

EchoStorm aeration device from Gorman-Rupp

The EchoStorm static venturi aeration device from Gorman-Rupp is designed to add dissolved oxygen into liquids as they are being pumped. It adds oxygen to wastewater, reduces the size of organic solids and degases organic solids. It is available in 2-, 3-, 4- and 6-inch sizes. Depending on the pump it is paired with, it can provide flows from 50 to 1,300 gpm with up to 857 pounds of dissolved oxygen per day. It is suitable for aeration in a variety of municipal, industrial and agricultural applications, including wet well influent, aerobic sludge digestion, lagoons, oxidation ditches, fat, oil and grease digestion, landfill leachate and mine water treatment, according to the maker. The device can be combined with Super T Series, Ultra V Series, Super U Series, 80 Series, 10 Series and 6500 Series pumps. **419-755-1011; www.grpumps.com**

PATTERSON DAVIT CRANE

Davit Cranes from Patterson

Patterson davit cranes are manufactured with a low maintenance, easy-to-assemble design. They are available in 1/2- and 1-ton capacities with key features such as a reliable brake with long life and readily available parts, a hot-dipped galvanized finish and no plastic sheaves or pulleys. **800-322-2018; www.pattersonmfg.com**

Pumps

ASHLAND PUMP EFFLUENT PUMPS

Heavy-duty effluent pumps from Ashland Pump

Heavy-duty effluent pumps from Ashland Pump are available in multiple horsepower sizes for various performance requirements and have efficient permanent split-capacitor motors. The oil-filled pumps have an upper and lower ball bearing design and handle solids up to 3/4 inch. They are made of cast iron, with cast iron impellers and equipped with a piggyback switch (20-foot standard cord) or in manual configurations. They are offered in 3/10, 4/10, 1/2, 3/4, 1 and 1 1/2 hp models. **855-281-6830; www.ashlandpump.com**

BLUE-WHITE INDUSTRIES FLEXFLO M4

M4 peristaltic dosing pump from Blue-White Industries

The low shearing pumping action of M4 peristaltic dosing pump from Blue-White Industries allows it to gently and precisely pump chemicals that off gas, including peracetic acid and sodium hypochlorite, with no vapor lock and no lost prime. Advanced features include a highly responsive and intuitive 5-inch display, firmware that can be field updated, and easy-to-attach M12 watertight connectors. **714-893-8529; www.blue-white.com**

(continued)

BOERGER BLUELINE ROTARY LOBE PUMPS

BLUEline Rotary Lobe Pumps from Boerger

Boerger BLUEline Rotary Lobe Pumps are engineered for low maintenance and high performance. The pumps feature pulsation-free operation and dry-run capabilities, which is key to avoiding downtime. They were designed with maintenance in place, which means they can be serviced without having to take them offline. It is heavy-duty, self-priming, valveless, positive-displacement pump that can be used for loading and unloading by reversing the flow direction. **612-435-7300; www.boerger.com**

FRANKLIN ELECTRIC FPS NCX SERIES

NCX Series of pumps from FPS, a brand of Franklin Electric

The NCX Series of explosion-proof submersible non-clog pumps from FPS, a brand of Franklin Electric, are certified for use in Class 1, Division 1 and Group C and D hazardous location requirements for municipal markets as well as any commercial or industrial application that requires an explosion-proof rating. The pumps are available in single- and three-phase power options to accommodate flows up to 625 gpm. Each unit is designed for serviceability and reliability with features including a field-adjustable wear plate, factory-standard dual-silicon carbide mechanical seals and chemical-resistant components. **866-271-2859; www.franklinengineered.com**

HYDRA-TECH PUMPS S4THL

S4THL trash pump from Hydra-Tech Pumps

The S4THL 4-inch hydraulic drive vortex impeller trash pump from Hydra-Tech Pumps offers 3-inch solids handling and head capabilities up to 210 feet. The durable biosolids pump is primarily used for oil refinery waste, sewage digester clean-out, wastewater and biosolids pumping and desilting applications using divers. It can be bolted directly into a pipeline or fitted with a suction hose for underwater dredging. Combined with HT50 to HT75 power units, the S4THL is capable of flows up to 1,000 gpm. The safe and variable-speed hydraulic drive submersible pump can be used where electric power is hazardous or impractical. **570-645-3779; www.hydra-tech.com**

INDUSTRIAL FLOW SOLUTIONS OVERWATCH

OverWatch pump system from Industrial Flow Solutions

Industrial Flow Solutions' OverWatch pump system lifts influent at the point of entry, eliminating the wet well. Effluent is contained, eliminating odors and reducing maintenance. The stainless steel body is designed to withstand the effects of corrosion from harsh materials and solutions, making OverWatch an ideal solution for the municipal, industrial and commercial industries. In addition, the system has HMI touchscreen controls to further simplify operations. **860-631-3618; www.flowsolutions.com**

JAECO FLUID SYSTEMS FRAM

FRAM diaphragm metering pumps from Jaeco Fluid Systems

FRAM diaphragm metering pumps from Jaeco Fluid Systems are hydraulically actuated and designed for accurate, completely leak-proof metering of difficult-to-handle liquids. The durable cast iron pumps are available in simplex or duplex, with capacities ranging from 0.86 to 56 gph at operating pressures up to 1,200 psi. Liquid end options include 316 stainless steel, PVC or Alloy 20, and include single- or double-ball or poppet spring-loaded check valves. **877-778-3456; www.jaecofs.com**

LUTZ-JESCO AMERICA MEMDOS SMART SERIES

MEMDOS Smart Series metering pumps from Lutz-JESCO America

The MEMDOS Smart Series mechanically actuated metering pump from Lutz-JESCO America is designed and built for precise liquid dosing, and includes an additional size that delivers 0.5 gph at pressures up to 300 psig in 316 stainless steel PVDF or polypropylene materials. It has a high-quality, compact design and sturdy tappet drive that make handling acid, lye, coagulants and flocculants easy. It includes remote start and stop control, level and diaphragm rupture monitoring, and batch dosing with interval and timer functionality. Double-ball check valves are standard, and it comes with an integrated dosing head venting device (plastic version). The entire series is available in PVC, PVDF, polypropylene and stainless steel. **800-554-2762; www.lutzjescoamerica.com**

SMITH & LOVELESS CAPSULAR UNDERGROUND PUMP STATION

CAPSULAR Underground Pump Station from Smith & Loveless

The CAPSULAR Underground Pump Station from Smith & Loveless provides an operator-friendly and economical solution for large-flow pumping up to 20,000 gpm. With a Safe-Stair entryway module and integrated HVAC, the pump station design meets the OSHA definition of "designed for continuous human occupancy" and therefore does not require classification as confined space entry. It comes with simplified, yet powerful QUICKSMART Touchscreen Controls and a spacious interior offering a variety of user options including shelving, work desks, sinks and storage. The station is pre-engineered and fabricated, allowing for simple installation and future flow capacity increases via adaptation of additional pumps or larger rotating assemblies. **800-898-9122; www.smithandloveless.com**

Self-priming chopper pumps from Vaughan

VAUGHAN SELF-PRIMING CHOPPER PUMP

Self-priming Chopper Pumps from Vaughan are designed to be easily accessed outside of the wet well while pumping waste solids at heavy consistencies, without plugging or dewatering of the solids. They eliminate the loss in production and mess, along with making it easy to service the pump to get it back in operation. **888-249-2467; www.chopperpumps.com** tpo

By Craig Mandli

Aeration system promotes treatment with minimum energy usage

Problem

The Manteca (California) Wastewater Quality Control Facility (9.87 mgd design, 7.6 mgd average) seasonally accepts industrial food processing effluent. Water use reductions combined with population growth drastically increased influent BOD and total nitrogen.

Solution

The facility was designed by HERWIT Engineering with **turbo blowers** and complete **aeration systems** provided by **APG-Neuros.** The system includes dissolved oxygen control in multiple aeration zones. The aeration improvements produced electricity savings of 963,000 kWh/year, and the facility received energy rebates of $93,000. HERWIT and APG-Neuros further optimized aeration control to improve nitrogen removal in response to the increased nitrogen loadings. The ammonia limit is less than 1.5 mg/L, and the total nitrogen limit is less than 10 mg/L.

RESULT:

To improve nitrogen removal, the staff first added online nitrate and ammonia sensors in Zones B and E of one process train at each plant. Cycling of DO in Zone B between low and high values brought immediate improvement. In response to higher nitrogen loadings, the process was again improved using ORP probes in Zone B. The staff then worked with HERWIT and APG-Neuros to implement Zone B ORP cycling control throughout the process. Zone B no longer runs on DO control. **866-592-9482; www.apg-neuros.com**

Biogas digester mixing system increases production at waste-to-energy operation

Problem

At a waste-to-energy operation in the United Kingdom, an anaerobic digester with a compressor mixing system had issues with foam, crusting at the tank top, and blocked pumps, all suppressing biogas production.

Solution

Engineering component specialists Hayley Group recommended a **digester mixing system** from **Landia** with a chopper pump Landia invented in 1950. With venturi nozzles, the pump has an external knife system that continuously reduces particle sizes and keep solids in suspension. Everything is accessible from outside the tank, reducing maintenance and improving site health and safety.

RESULT:

Gas production per cubic meter increased by more than 40%. "Our customer has not seen the Landia Digester Mixing System ever struggle to cope," says Hayley Group engineer Rob Bentley. "Over time in the digester, plastics would float to the top, forming a blanket and then a crust, which eventually had to be dug out. The chopper pumps do not allow that buildup. **919-466-0603; www.landiainc.com**

Sensors revolutionize city's response to SSOs

Problem

The city of Winter Haven, Florida is prone to heavy rains that contribute to sewer overflows.

Solution

To mitigate overflows, the city deployed a network of 24 **SmartCover sensors** and **rain monitors** to provide real-time sewer level and trend analysis at potential overflow sites. The technology transmits data from a sensor on the underside of a manhole cover to an Iridium satellite network to relay reliable, uninterrupted sewer to a centralized online dashboard and mobile app. The sensor withstands harsh sewer system conditions and can be installed and serviced without confined space entry. SmartCover also provided an integrated event management platform with localized weather data from the National Oceanic and Atmospheric Administration to rapidly respond to issues before they become emergencies.

RESULT:

Within the first few hours, the city received an alarm that helped avoid a sewer overflow. A few months later, a lift station failed due to an electrical issue, and the city was able to pinpoint the location using the SmartCover technology and mobile app and respond within minutes to prevent an overflow. The event-driven monitoring system has revolutionized the city's response by helping staff proactively respond to blockages and other potential overflow conditions, and schedule only needed maintenance and cleanings. **760-291-1980; www.smartcoversystems.com**

Ion exchange technology used to treat uranium

Problem

Bridgeport, located in western Nebraska, had previously been able to pump water directly out of the ground and into the distribution system without treatment. It was later discovered that the water contained elevated levels of uranium. Classified as a human carcinogen known to cause kidney toxicity, contaminant levels are regulated by the EPA, and accordingly, Bridgeport needed to take action.

Solution

Following the successful pilot study, the system design included **Tonka Water, a Kurita America Brand's RidION system.** The treatment process begins as water flows through three 8-foot-diameter ion exchange vessels. During this process, uranium adheres to the anion exchange resin, removing it from the water. The resin is regenerated on a monthly basis with a diluted brine solution that includes softened water. This process forces uranium off the resin bed, with the byproduct sent to waste. Softened water is used in the brine solution during the regeneration process to prevent precipitation of calcium solids due to elevated levels of sulfate.

RESULT:

The Bridgeport plant has been meeting treatment goals since its commissioning in early 2010. **866-663-7633; www.kuritaamerica.com** tpo

OZ Lifting Dyno-Hoist lever hoist

OZ Lifting Products introduces the first lever hoist with an integrated dynamometer to the North American market, the Dyno-Hoist. It gives users a real-time reading of the load — in kilograms or pounds — they are applying to the hoist, whether during a lifting or pulling application. An overload alert is triggered at 126%. The hoist is available in 0.75-, 1.5-, 3-, 6- and 9-ton capacity, matching the ranges of the company's industrial and premium (overload protected) lever hoist offerings. Dyno-Hoist's dynamometer fitting can also retrofit to either of the industrial or premium lever hoists. Other features include all-steel construction; steel handle with rubber grip; zinc-plated load chain; forged alloy steel hooks; and fully enclosed gearing. Dyno-Hoist meets or exceeds CE, ASME B30.21, and AS 1418.2 standards. Standard AA batteries offer a runtime of 150 hours, but the product can be plugged into a 115/1/60 outlet. Each hoist is load-tested and arrives with a test certificate, one-year warranty and a free set of latches. **888-617-3579; www.ozliftingproducts.com**

ATC Diversified Electronics SENSERT remote monitoring system

An affordable remote process monitoring technology makes it easy for water departments and wastewater treatment plants to monitor and measure operations without committing to a costly condition monitoring system that's only compatible with proprietary sensors. SENSERT, from ATC Diversified Electronics, is a remote monitoring and alert system in which a variety of sensors can be hardwired directly to the SENSERT base unit or wirelessly connected via the SENSERT remote I/O. SENSERT monitors use the sensors that are already in place, giving operators total control over the kinds of sensors they use in the future. SENSERT can monitor many conditions including level, temperature, pressure, flow and current, as well as vibration, presence of voltage and others. It works throughout water and wastewater treatment plants. SENSERT's unique capabilities, ease of use and low price make it a ready solution for water and wastewater treatment plants. **304-387-1200; www.sensertio.com**

KROHNE 24 and 80 GHz OPTIWAVE radar transmitters

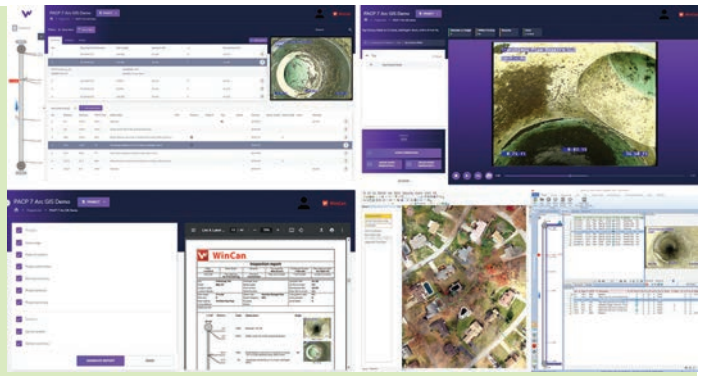
KROHNE added three 24 GHz and three 80 GHz OPTIWAVE radar level transmitters to its product line, which complement the existing 10 GHz devices. With the 10 GHz OPTIWAVE 5200 and the series of 24 and 80 GHz radars, KROHNE offers the appropriate frequency for multiple applications. The new radars are each designed for specific industry needs, delivering reliable and accurate level measurement of liquids and solids, even in most difficult applications. The transmitters offer a measuring range from the antenna edge up to 328 feet, with accuracy from plus/minus 0.08 inches, and can measure products with dielectric constants as low as 1.4. They feature a quick setup assistant for easy commissioning as well as an empty tank spectrum function for eliminating false reflections. **800-356-9464; www.us.krohne.com**

product spotlight

wastewater

Wastewater inspection data offered on digital platform

By Craig Mandli



Web Flex from WinCan Web

WinCan Web continues to be a valuable platform to help municipalities to streamline tasks. But that doesn't mean WinCan has stopped attempting to improve the product. The company now touts **Web Flex,** a powerful new **cloud-based platform for** managing, sharing, editing and analyzing **wastewater inspection data.**

While the original launch of WinCan Web focused on project management and communication tasks, Web Flex adds functionality with creation and editing features. It allows users to create projects, drop media directly into the web, and instantly log observations from any internet-enabled device. Projects can be scored and reports generated from directly within the platform.

"It's a unique link between the coding office and the field, allowing for more effective remote workflows and more productive inspections," says Mike Russin, general manager of WinCan in the Americas. "But more importantly, it is a gateway to WinCan artificial intelligence via Sewermatics. Field teams can focus on collection and limit time on roadways as the Sewermatics' AI-powered coding team processes the footage in the Web Flex media bucket. Paired with Sewermatics and WinCan VX, Web Flex ties the WinCan ecosystem together, creating a comprehensive inspection solution designed to get jobs done quickly and safely."

These changes open up new workflows for sewer inspection teams, allowing them to prioritize speed and efficiency. It creates flexible remote workflows for field and office teams to work simultaneously on the same project. If legacy inspections need to be re-evaluated for precision, re-scored using new standards, or offloaded to a third-party like Sewermatics, you can do it all online in Web Flex.

"With COVID-19-related operational shifts putting an emphasis on remote workflows, more people are going mobile than ever before," says Russin. "But even before the pandemic, the wastewater industry was trending toward digital sewer inspection workflows. WinCan Web Flex is a response to the growing demand for flexible, cloud-based inspection solutions that offer efficient collaboration between field and office teams."

According to Russin, technology that gives utility workers mobility is a prized acquisition. "Customers love that they can work remotely and bring work materials home with them," he says. "At the end of the day, not only does Web Flex allow them to employ more productive workflows in the field, it also brings convenience to the coding side of inspection work, which doesn't need to be completed out in the field." **877-626-8386; www.wincan.com**

product spotlight water

Correlating sensor system keeps water distribution networks leak-free

By Craig Mandli

AQSense-Edge series from Aquarius Spectrum

Leaks in your municipality's water distribution network can often be difficult to pinpoint. But as treatment costs continue to rise, those leaks are, literally, money down the drain. To combat those difficult-to-locate leaks, **Aquarius Spectrum** has announced the launch of the **AQSense-Edge series of Cat-M/NB-IoT correlating sensors.**

According to Naama Zeldis, CEO of Aquarius Spectrum, AQSense-Edge represents the next generation in the company's AQSense Fixed Sensors, a product range designed for continuous pipe monitoring.

"Aquarius is extremely proud to be at the forefront of technological innovation in the water industry for over 12 years, and we are excited to be cooperating with leading water utilities in all five continents, driving forward our vision of digital water transformation," she says. "We bring superior solutions that address all types of water infrastructure."

The AQSense-Edge sensor boasts compact dimensions, ultra-long 10-year battery life, and superior accuracy powered by an improved correlating algorithm. The series supports all water supply pipe materials and diameters, distribution and transmission, offering extensive coverage with fewer sensors, typically approximately four sensors per mile of piping.

The series includes three types of products suitable for different types of installations: AQSense-Edge (AG), an accelerometer designed for aboveground installation on fire hydrants and other access points on metal and AC pipes up to 24 inches; AQSense-Edge (BG), an accelerometer designed for belowground installation on fire hydrants or on valves inside a pit on metal or AC pipes up to 24 inches; and AQSense-Edge (Hyd), a hydrophone sensor designed for PVC, PE and transmission (trunk main) lines, and installation on air release valves.

Aquarius Spectrum's acoustic leak detection technology is distinguished by its combination of automatic correlation between each pair of sensors, and its sophisticated analysis engine that verifies the existence of the leak and pinpoints its exact location. Thanks to its latest AI and UI improvements, the system is now able to locate and present multiple leaks occurring between each pair of sensors and can provide operators with an estimation of their size and intensity.

"With a deployment of more than 10,000 acoustic sensors, we can declare with confidence that our solutions provide efficient and accurate results," says Zeldis. "We will continue to develop innovative solutions that provides customers with excellent ROI and customer experience."

www.aqs-systems.com

Mueller Water Products Singer in-line strainer

Mueller Water Products' Singer in-line strainer is designed to protect valves and regulators from pipeline debris, so utilities don't have to worry about costly maintenance, downtime and repairs. Manufactured in ductile iron with a corrosion-resistant stainless steel screen, the design provides a smooth laminar flow, which is ideal for locations ahead of automatic control valves. The strainer is now available in eight sizes: 2-, 2 1/2-, 3-, 4-, 6-, 8-, 10- and 12-inch. It is also supplied with flushing ports on both sides of the strainer, and an air-bleed connection and connections across the screen for the installation of a differential pressure gauge if required.

800-423-1323; www.muellerwaterproducts.com

IDEC 7-inch touchscreen HMI

IDEC Corp. expanded its HMI product family with the HG2J Series 7-inch touchscreen HMI. The HMI's projected capacitive touch panel technology saves space, improves performance, is wear-resistant and provides a long life. PCAP glass requires fewer layers than traditional analog resistive plastic films, and the self-capacitance technology can also prevent accidental input due to water droplets. Also, it is more resistant to scratches, won't turn yellow in the sun, and has a higher tolerance for dirt deposits and for contact with cleaning or washdown chemicals. Fewer layers and better light transmission ratings mean less backlight power is needed.

800-262-4332; www.idec.com

Asahi/America Type-57P CPVC butterfly valves

Asahi/America added to its Type-57P butterfly valve line to include 10- and 12-inch sizes in a CPVC body and disc model. The valve is available in ANSI wafer-style connection or with 316 stainless steel lug inserts in the 10- and 12-inch sizes. Both options are offered with a Plasgear operator only. Additionally, the Type-57P CPVC can be actuated both electrically and pneumatically, and various manual accessories can be installed. The larger butterfly valves are best suited for chemical processing applications.

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

Xylem Edge Control analytic system

Xylem's Edge Control is designed to help wastewater utilities achieve compliance targets while cutting energy consumption from aeration by up to 25%. Edge Control applies analytics to real-time data to provide rapid process recommendations to optimize chemical usage and aeration. The platform can operate with any programmable logic controller under various communications protocols and connect to existing hardware, including sensors and probes. It can be used as a standalone process or as a connected, subscription-based enterprise with fees based on efficiency and savings.

855-995-4261; www.xylem.com tpo

Tsurumi Pump names new Southwest sales manager


Slater Blanchard

Tsurumi Pump announced Slater Blanchard as its new regional sales manager for the Southwest. With over 20 years' experience, he has held general manager positions at several pump companies in the past. In addition to overseeing pump sales for the Southwest, he will source equipment and materials, and work with distributors to maximize customer support.

SJE acquires Massachusetts-based Horlick Co.

SJE announced it has purchased Randolph, Massachusetts-based Horlick Co., a manufacturer of custom control panels and motor-generator sets for commercial and industrial markets. Horlick will continue to operate out of its current facility in Randolph, marketing under the Horlick brand. Shawn Hennessey, who has managed the day-to-day business for the past 27 years, will continue as director of operations.

HOLLOSHAFT motor marks 100th anniversary

U.S. MOTORS is celebrating 100 years of vertical HOLLOSHAFT motor innovation. The vertical motor for deep well pumping was introduced in 1922 and has played a major role in supplying groundwater in California. Now a brand of Nidec Motor Corp., U.S. MOTORS developed the product in response to a critical need for farms and water districts in California. Nidec has two North American manufacturing plants dedicated to producing vertical HOLLOSHAFT motors for agricultural, industrial and municipal pumping applications.

Watson-Marlow changes name

Watson-Marlow Fluid Technology Group, part of Spirax-Sarco Engineering, has changed its name to Watson-Marlow Fluid Technology Solutions. The name change aligns with a strategic commitment to providing end-to-end fluid management solutions for customers.

Mazzei Injector and BL Anderson join forces

BL Anderson has teamed up with Mazzei Injector as its manufacturer's representative for Indiana, Ohio and Kentucky. Based in Lafayette, Indiana, BL Anderson has served the environmental processing industry since 1961.

Singapore utility contracts with EVS Water

Envirosuite announced its agreement with the Public Utility Board Singapore for its EVA Water Optimizer, the first application globally for EVS Water in the drinking water sector. Envirosuite won the utility's Global Innovation Challenge in June 2021 for coagulant dosage in water treatment processes from a field of 104 applicants. Since then Envirosuite has been working closely with PUB to map out the implementation for its current project. The Optimiser will be used to help PUB determine the required coagulant dosage in water treatment processes that will make the process faster, more connected and automated.

Liberty Pumps building new material handling center

Liberty Pumps announced its new material handling center is under construction and on track to be completed by the end of 2022. The 107,000-square-foot expansion will house both raw and finished component inventory and allow for more efficient tracking and flow of components to manufacturing. The expansion will also allow for additional manufacturing space in Liberty's current building when material storage is moved over to the new facility. tpo

people/awards

Austin Water's **South Austin Regional Wastewater Treatment Plant** was named Municipal Wastewater Treatment Plant of the Year, Category 3, by the Water Environment Association of Texas. The **Sulphur Springs Wastewater Treatment Facility** received that same award in Category 2.

The **city of Midland** received a 2022 Governor's Texas Environmental Excellence Award in the water conservation category for secondary upgrades to its water pollution control plant from the Texas Commission on Environmental Quality.

Paula Ely was named superintendent of the wastewater treatment operation in Great Barrington, Massachusetts. She succeeds **Bill Ingram,** who retired after 36 years of service to the town, the last five as superintendent.

Bonita Springs Utilities won the 2022 Region V Best Tasting Drinking Water Award from the Florida Section AWWA.

Solano County Sheriff's Deputy **Dale Matsuoka** was recognized by the Vallejo Flood and Wastewater District Board of Trustees for his role in contacting people living at homeless encampments ahead of last year's Coastal Cleanup Day.

Drew McIntyre, head of the North Marin (California) Water District, retired after nearly a quarter-century with the agency, including five years as general manager, two years as assistant general manager and 17 years as chief engineer.

The **Bemidji (Minnesota) Water Treatment Plant** received a 2022 Honor Award for Engineering Excellence from the American Council of Engineering Companies of Minnesota for design and construction to remove PFAS from city water.

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events

July 16-20
Georgia AWWA Section Annual Conference, Savannah. Visit www.gawwa.org.

July 17-20
Kentucky/Tennessee Water Professionals Conference, Central Bank Center, Lexington, Kentucky. Visit www.kytnawwa.org.

July 18
AWWA Building A DE&I Culture webinar. Visit www.awwa.org.

July 18-19
AWWA Water Treatment Operator Level 1 course, online. Visit www.awwa.org.

July 20
AWWA Mindful Water Management – Water & Land Use Planning webinar. Visit www.awwa.org.

July 25-28
ONE Water Technical Conference, Cleveland, Ohio. Visit www.onewaterohio.org.

July 27
Utility Perspectives on Digital Twins webinar. Visit www.awwa.org.

exam STUDY GUIDE

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

WASTEWATER

By Rick Lallish

What color is the waste gas burner on a properly operating anaerobic digester with an approximate mixture of methane 68% and carbon dioxide 32%?

A. Red
B. Orange
C. Blue
D. Green

ANSWER: C. Anaerobic digestion uses waste gas burners to burn excess gases from the system. It has a continuously burning pilot flame to perform this action safely. Methane-rich gases burn with a blue flame, and gases rich in carbon dioxide burn orange. This is a quick way to visually check your gas content in the anaerobic digester. It is also a safety device to help prevent explosive conditions that arise with volatile gases such as methane. More information may be found in the WEF textbook, *Wastewater Treatment Fundamentals II – Solids Handling and Support Systems*, Chapter 4.

DRINKING WATER

By Drew Hoelscher

What tool and setting would an operator use to identify a blown fuse?

A. Megger/voltage
B. Megger/amperage
C. Volt-ohm-meter/amperage
D. Volt-ohm-meter/continuity

ANSWER: D. A volt-ohm-meter (or multimeter) is a handheld device that can measure several functions within an electrical circuit. The multimeter is a common tool operators use to identify faults during field maintenance work. For example, the multimeter positioned in the continuity setting will give an audible alarm when a complete path for current is detected. This helps operators identify a blown fuse, bad switch or any other electrical connection/component problem.

ABOUT THE AUTHORS

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