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ON THE COVER: How far will Brianna Huber go to elevate the status of women in water professions? How about 8,300 miles to Tanzania, and then up 19,341 feet to the summit of Mount Kilimanjaro? How about launching a nonprofit organization, H₂O, with the vision of women "equitably involved in water management in every corner of the globe"? Huber is interim director of water filtration for the city of East Moline, Illinois. (Photography by Gregory Boll)

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let's be clear

Breaking Down Barriers

INTENSE POLITICAL DIFFERENCES TEND TO KEEP PEOPLE APART — AT WORK, AT HOME, AND IN COMMUNITIES. WHAT'S THE KEY TO EASING TENSION AND OPENING DIALOGUE?

By Ted J. Rulseh, Editor



Are there people in your life — at home, at work, in your social circle — with whom you don't dare discuss certain public figures or political issues?

In these polarized times, the answer likely is yes. Opposing political views, and the fear of raising them, can create barriers and simmering, under-the-surface resentments. That's not conducive to harmonious families or smoothly functioning workplaces. So, what's to be done? The ideal answer is not to clam up and avoid

political topics but to engage in some manner so that parties on both sides of the question at least understand and respect each other.

BEYOND STEREOTYPES

Maybe I'm naïve, but I believe people on different sides mostly want the same things and simply disagree on the best way to get them. For example, most of us would like to see an end to poverty. The cliché conservative would accuse liberals of thinking the only remedy is massive government welfare. The cliché liberal would accuse conservatives of being cruel and wanting to let poor families starve unless they pull themselves up by their bootstraps.

Of course, these clichés are wrong. Almost everyone and every issue is more nuanced than that; the true beliefs lie somewhere in the middle. Reasonable people can see this. Those on the right and the left have more in common than they want to admit. That common ground is a place to start.

Those on the right
and the left have more
in common than they
want to admit.

As an example, consider a friend and business associate of mine, who passed away a couple of years ago. We identified with different parties, often vigorously. Still, we could discuss politics over lunch and at times not only agree to disagree but come away with our positions softened and moved a bit toward the middle. It wasn't just because neither of us held extreme positions. It was because we respected each other.

BUILDING BRIDGES

My friend liked to say that in discussions over drinks at his favorite watering hole, he could get a group of friends to come to a consensus on almost any issue, including something as contentious as abortion, in as little as half an hour. It was just a matter of getting the participants to shed their political identity masks and talk openly.

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I guess it helped that besides being an intelligent and thoughtful person, my friend was a trained facilitator. Maybe a little chemical lubrication also helped move those discussions toward the center. Still, my friend fundamentally believed that few differences of opinion were too wide to be bridged.

The lesson I learned was that we shouldn't miss opportunities to open up dialogue and see where things lead. In my experience, it is surprising how quickly the defenses fall aside when, in a conversation with someone of opposite persuasion, I stop and say, "Oh, really? Tell me why." And then, maybe, "I see, but have you stopped to consider ..."

Once the masks are off, good conversation can follow. That doesn't mean one person comes around to the other's viewpoint. The two opinions might not budge at all. But the undertone of hostility goes away, or at least is mitigated. There is a certain power in being able to agree to disagree.

IN THE WORKPLACE

At work isn't the best place to resolve political differences, and it's not even the best place to bring them up. But regardless, when we come to work we bring our political views and preferences with us; it can't be otherwise.

Isn't it better, when working out in the plant or sitting in the break room, if we don't harbor silent grudges about our co-workers' politics? The gears of cooperation turn more smoothly when people more deeply understand and respect each other's differences. That's as true on the job as in the home and the community. **tpo**

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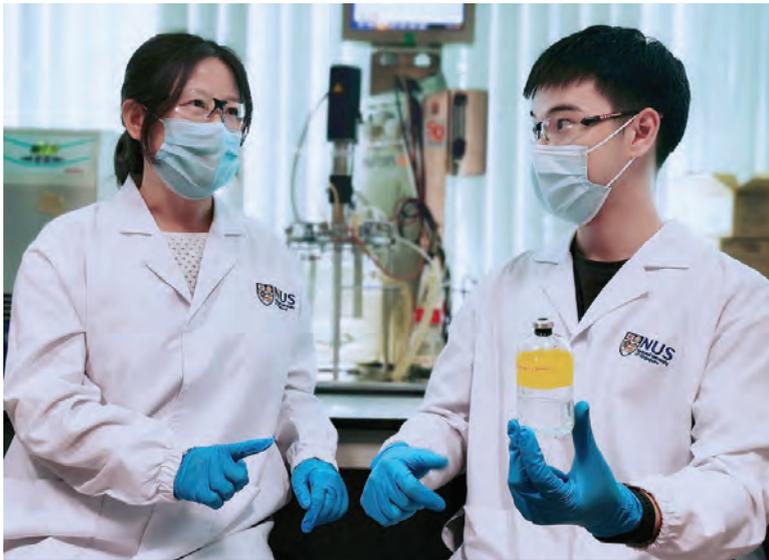
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ACE YOUR EXAMS

5 Math Tips

The words “wastewater math” can create an undercurrent of fear for operators about to take a state exam. Many students encounter a mental block when it comes to process control math. If you're among those who go weak in the knees when encountering math questions, rid yourself of those mental blocks with these five tips for mastering wastewater math exam questions.

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From Vacation to Vocation

JEFF PEARSON HELPS KEEP THE HAWAIIAN ISLAND OF MAUI SUPPLIED WITH WATER FROM A MIXTURE OF SURFACE AND UNDERGROUND SOURCES

STORY: **Pete Litterski** | PHOTOGRAPHY: **Aubrey Hord**



Jeff Pearson, director of the County of Maui Department of Water Supply, looks across the 50-million-gallon raw water reservoir at the Piholo Water Treatment Facility on the island of Maui, Hawaii.

After spending a few weeks in paradise, many people dream of staying put — making the vacation spot their full-time home.

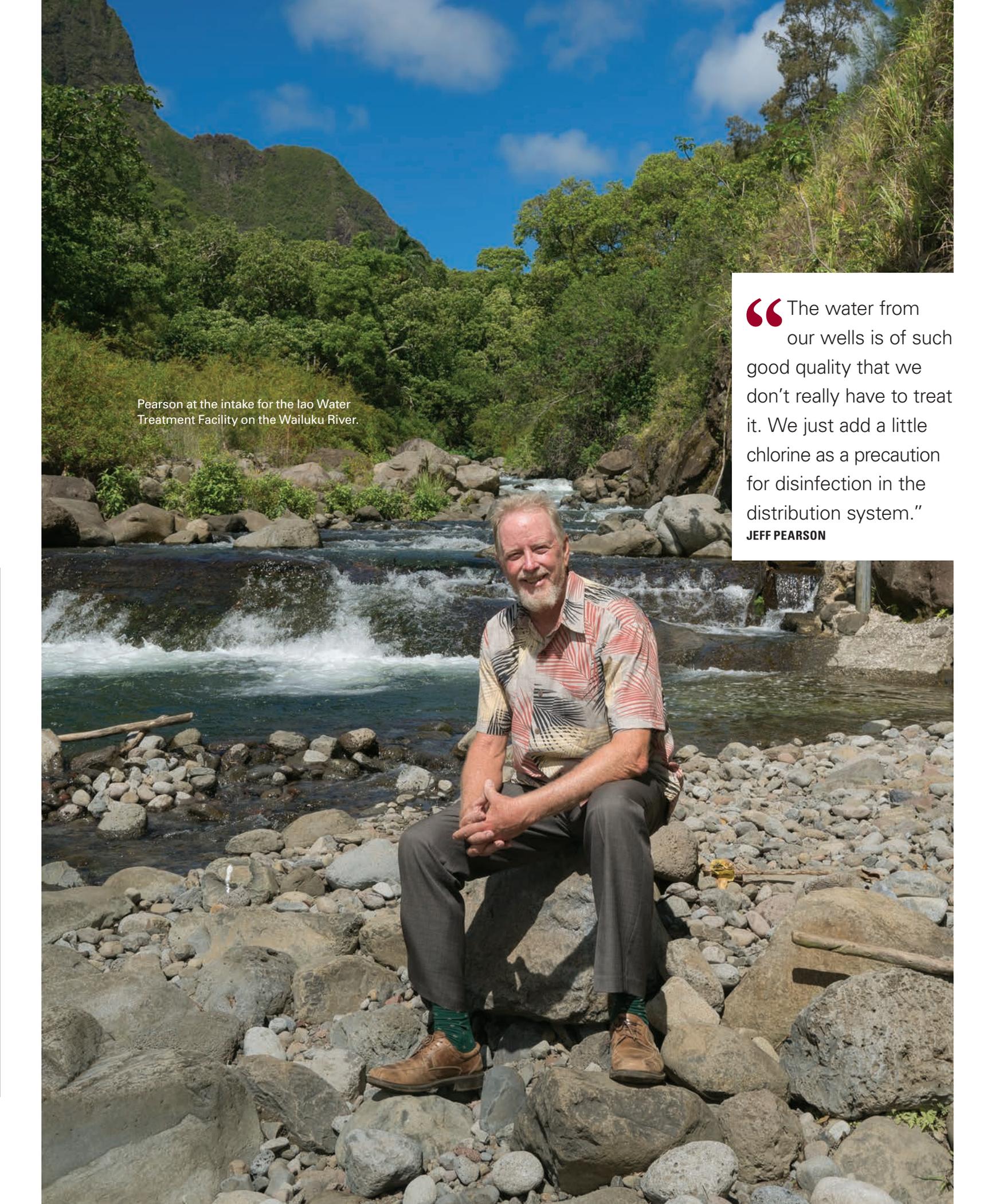
For a young engineer fresh out of school 35 years ago, the dream came true. As soon as Jeffrey Pearson, P.E., graduated from the University of Minnesota in 1981 with a degree in engineering, he jumped on a plane and flew to Hawaii, where his older sister was on vacation and had space for him to bunk down.

When his sister went home a few weeks later, he stayed behind. Today, Pearson is director of the County of Maui Department of Water Supply. He holds the reins on a collection of separate water systems serving diverse needs and drawing on diverse resources for a county unlike almost any other that people on the mainland might imagine.

Last year, Pearson's contributions to the water industry were recognized when he received the George Warren Fuller Award from the Hawaii Section, AWWA. The award cited his work on key water supply issues in Hawaii and his volunteer efforts in AWWA leadership and educational programming.

TWISTS AND TURNS

When Pearson decided to stay in Hawaii, he had no plan for the move and no leads for a job in engineering. So he worked where he could, often on construction and

A man with a beard and a patterned shirt is sitting on a large rock in the foreground. Behind him is a river with a small waterfall, surrounded by lush green trees and a mountain in the background under a blue sky with some clouds.

Pearson at the intake for the Lao Water Treatment Facility on the Wailuku River.

“The water from our wells is of such good quality that we don't really have to treat it. We just add a little chlorine as a precaution for disinfection in the distribution system.”

JEFF PEARSON



Jeff Pearson (left) and operator Phillip Noetzel in the Piiholo Water Treatment Facility lab (jar testing equipment from Hach).

in other fields related to his education. In the meantime, he searched for a job in his area, finally landing one with a small engineering firm. That enabled him to earn the hours he needed under the supervision of a licensed engineer to earn his Professional Engineer credential.

Pearson worked as an engineer-in-training from 1989-91 at Norman Saito Engineering in Wailuku, Maui. Along the way he supported engineers on drainage and waterline designs and conducted field inspection during construction of 36-inch waterline for the Maui department he now leads. He also studied for and passed the two eight-hour tests required by the University of Hawaii to earn his degree in public engineering in 1994.



Jeffrey Pearson, P.E.
Maui County, Hawaii

POSITION:
Director, Department of Water Supply

EXPERIENCE:
31 years in water industry

EDUCATION:
Bachelor's degree, civil engineering

CERTIFICATIONS:
Professional Engineer

AWARDS:
George Warren Fuller Award, Hawaii Section AWWA



The team at the IAO Water Treatment Facility includes, from left, Marvin Ignacio, plant operations/maintenance supervisor; Tony Linder, water treatment division chief; Troy Evans, plant worker; Kelly Wright, assistant plant operations and maintenance supervisor; Andrew Landgraf, facility operator; Francis "Koa" Martin, plant maintenance mechanic; Federico "Poncho" Quitevis, maintenance mechanic; and Jeff Pearson, director of the Department of Water Supply.

During the 1990s and through the turn of the century, Pearson worked with two engineering firms, mostly working on water and wastewater projects. In 2003, he joined the Maui Department of Water Supply as deputy director. There he managed three of six divisions, overseeing about 90 team members, involved in operations, water quality and water treatment. He also worked on the utility's budgets and was a liaison with state water quality officials.

Pearson left the county's payroll in 2005 but stayed in the county as water manager for the privately owned Kapalua Water Co. There he managed island-wide private nonpotable and potable systems while continuing to work closely with county and state agencies on water issues, compliance and rates.

Pearson stayed with the private company through 2011, when he was named head engineer for the Maui water department's Capital Improvement Section. In the position, he oversaw \$20 million to \$30 million per year in construction projects while working with the department leaders and the county council on the utility's budget. He also coordinated land management, easements and property acquisition.

In 2015, Pearson became deputy director of the Hawaii Department of Land and Natural Resources, overseeing all surface and groundwater sources in the state. It was an interesting position, but the county water department held an even stronger attraction, and he returned as director in 2018.

MULTIPLE SYSTEMS

Although Maui County bears the name of Hawaii's third largest island, the county borders cross several ocean channels to encompass the neighboring islands of Moloka'i, Lana'i, Kaho'olawe and Molokini, the last two uninhabited.

The Department of Water Supply operates water production and distribution systems on the two most populous islands, serving 37,000 metered customers on Maui and 7,000 on Moloka'i. Lana'i has a single landowner, and its water system is privately operated.

“ [The new Iao plant] replaces a temporary plant that operated with no protection from the elements for more than 10 years.”

JEFF PEARSON

Within that territory, the department operates six distinct water systems, serving the business and tourism hubs in the central area including the county seat of Wailuku, as well as a number of smaller communities.

Besides supplying water to nearly 170,000 residents, the department sees to the needs of substantial numbers of tourists. In 2019, before the COVID-19 pandemic, the average daily count of tourists in Maui County was more than 66,000, adding up to 2.9 million annual day visitors. The resorts also place a heavy demand on the system to maintain their lush landscaping, a need that has continued through pandemic.

In addition to the county's largest towns, Pearson's department operates water systems for small villages and farming communities on Maui, several on the east side of the island away from the business

hub and several more well above the beaches in the “up country” mountainous core of the island.

To meet the needs of the county, there are four water treatment plants operated by the DWS system: Kamole Weir, Piihoho, Olindo, Lahaina, Mahinahina and Iao.

FROM THE GROUND

The county's most predictable freshwater reserves sit under its mountains in aquifers, often at elevations higher than the coastal communities and resorts. The majority of the groundwater is considered basal aquifer; when tapping the aquifers, the department relies on nature to do the groundwater treatment and storage. The water in Maui's basal aquifers is well filtered as it drains through the island's volcanic soil and collects in a stable stratum of pure water, essentially floating atop the denser salt water that reaches the water table from the Pacific Ocean.

(continued)



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At the left are four continuous microfiltration units (Evoqua Water Technologies) in the Iao plant. Each can produce up to 1.50 mgd. The cabinets house the SCADA system servers and controls, developed and installed by Trimax.

Well depths can range from 300 to 1,500 feet deep. Due to the salt water, the wells actually draw freshwater from depths that are above sea level. “The water from our wells is of such good quality that we don’t really have to treat it,” Pearson says. “We just add a little chlorine as a precaution for disinfection in the distribution system.” The chlorination is done at the 50 well sites before the water is transported to the distribution network.

The department saves significant money because it doesn’t need to treat the well water, but it cannot rely on that source alone. A recent statewide study of water resources calculated the volume of water that can be taken from aquifers without damaging the natural balance between the volcanic surface and the saltwater base.

DUAL SOURCE

The Maui Water Use and Development Plan required by the state Commission on Water Resource Management studied the county’s aquifers and the water rights for domestic use, traditional and customary practices, keeping the water in its natural state, and fulfilling the needs of the Department of Hawaiian Home Lands, before setting out a proposal focused on meeting customer demands while maintaining the health of the resources.

Although protection of the aquifers is a key factor in the decision to use both well water and surface sources, Pearson says another reason for the dual systems is that the surface water can be stored and transported at low cost through ditch and pipeline systems originally built to serve the pineapple and sugar cane growing that once covered much of Maui.

It actually costs more to transport the well water from the mountainsides to the distribution systems than it does to treat the surface water in treatment plants, but the well water becomes an important resource during the drier spring months when surface water is not enough to meet the demands.

With either source, Pearson says his system has a key advantage. In most of the system the source elevation is high enough above the population centers that the water flows by gravity. Even though the system’s newest facility, the Iao Water Treatment Plant, requires a 30 psi head pressure, the natural surface water pressure actually has to be reduced before it reaches the microfiltration facility.

READY FOR THE FUTURE

With the opening of the Iao plant in 2019, Pearson’s department increased its peak water capacity to 28 mgd. “It replaces a temporary plant that operated with no protection from the elements for more than 10 years,” Pearson says. “The new plant is state of the art with a capacity of 5 mgd.”

The Iao plant treats water from the Wailuku River; it is diverted to the facility by a private water delivery company. The system’s Kamole and Lahaina plants also use microfiltration. The Piholo system is a sand filter plant, recently refurbished to provide up to 6 mgd. The county moved to the microfiltration plants because they are more efficient and easier to maintain.

The Iao plant gives the county capacity to meet serve the growing number of residents and visitors in the Central Maui area for the next five to seven years. Before reaching the limits of the existing system, the department will turn to the Maui Water Use and Development Plan to help determine the source and the location of future water reserves. **tpo**

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The submersible mixers were installed in a full tank while the treatment process continued to operate.



Energy Savings and More

MIXERS ENABLE OPERATORS AT A NORTHERN MONTANA CLEAN-WATER PLANT TO ACHIEVE NUTRIENT REMOVAL IN A FACILITY NOT DESIGNED FOR THAT PURPOSE

By Chris French

When the small team at the Chinook (Montana) Wastewater Treatment Plant selected new mixers for a plant upgrade in 2004, they could not have known that the same mixers would still be dutifully working 16 years later — and contributing to nutrient removal.

The mixers were purchased so that a 50 hp surface rotor aerator could be switched off during night hours of low BOD loading. The two 5 hp submersible mixers have saved \$18,000 per year on electricity, achieving pay-back on the entire installation in slightly less than 4.5 years.

In addition, by trying the mixers on different on-off cycles, plant team members of Eric Miller, Cory Fox and Matthew Finley have significantly reduced effluent nitrogen and phosphorus in a plant never designed mainly for nutrient removal. The introductions of a SCADA system and automated control of ORP (oxidation-reduction potential) have further enhanced treatment performance and efficiency.

“The savings speak for themselves, but the benefits have been manifold,” says Miller, plant superintendent.

TARGETING NUTRIENTS

Chinook, the largest city in Blaine County with 1,500 residents, lies in the far north of Montana and in the heart of the Milk River Valley. Farming and ranching still prevail there, but the valley is known as the home of the Sugarbeetters, from the days of the Utah-Idaho Sugarbeet Co., which operated in the city for 26 years.

Chinook’s treatment plant went online in 1984 as a single oxidation ditch equipped with dual aeration

“Today, with much tougher regulations, we have our ammonia at almost zero, nitrogen at the 2 mg/L required for permit reissuance since 2012, and phosphorus at just 1 mg/L ...”

ERIC MILLER

rotors; it was constructed to provide TSS and BOD removal. The original installation was designed for ammonia removal, but not for reduction of total nitrogen or total phosphorus.

Miller, who has served the plant for more than 20 years, observes, “Before the mixers were installed, we were over 4 mg/L for phosphorus and close to 30 mg/L for nitrogen. Now, along with the energy savings, we achieve effective, consistent nitrogen removal from the same 1984-vintage oxidation ditch plant that was modified in 2004 for energy efficiency.

“Today, with much tougher regulations, we have our ammonia at almost zero, nitrogen at the 2 mg/L required for permit reissuance since 2012, and phosphorus at just 1 mg/L, all from the same mixers installed 16 years ago.”

SEAMLESS INSTALLATION

In the original plant, both oxidation ditch rotors ran continuously, introducing a surplus of dissolved oxygen. To allow for the cycling of the fixed-speed aeration equipment, the mixers were installed to produce liquid velocity and mixing so that solids would remain suspended and continue to circle the ditch with the rotors turned off.

The low-speed mixers (Landia) are essentially gentle flowmakers that enable operators to adjust the angle of the stainless steel propeller blades so that energy consumption can be fine-tuned. Typically, at speeds up to 47 rpm for aeration applications, the mixers ensure that no process-damaging floc shear is caused.

With no other tank to go to, shutting the plant down for installation was not an option. Instead, the submersible mixers were installed in a full tank



The low-speed mixers (Landia) enable operators to adjust the angle of the stainless steel propeller blades and fine-tune energy consumption.



Chinook plant superintendent Eric Miller (center) with colleagues Cory Fox (left) and Matthew Finley.

using Landia’s guide rail system, enabling the plant to operate nonstop. Landia also provided a set of custom-built service platforms. “Landia made it very simple for us,” says Miller. “On the very rare occasions when we’ve needed a spare part in 16 years, they have ever since. The mixers just keep on going.”

KNOWLEDGE AT WORK

In 2012, the Chinook staff attended a two-day training class sponsored by the Montana Department of Environmental Quality. Using the knowledge they gained, they experimented with extended air-off cycle times.

By allowing dissolved oxygen in the ditch to cycle between anoxic andoxic conditions, the plant achieved an immediate 50% improvement in nitrogen removal. No equipment was purchased; no funds were expended. In fact, because of reduced rotor operating time, electricity costs were further reduced.

As a result of the lower tank dissolved oxygen, there also was some improvement in total phosphorus removal. Now, the ORP system, allowing control of the on-off cycles of the rotors and mixers, has been a welcome addition.

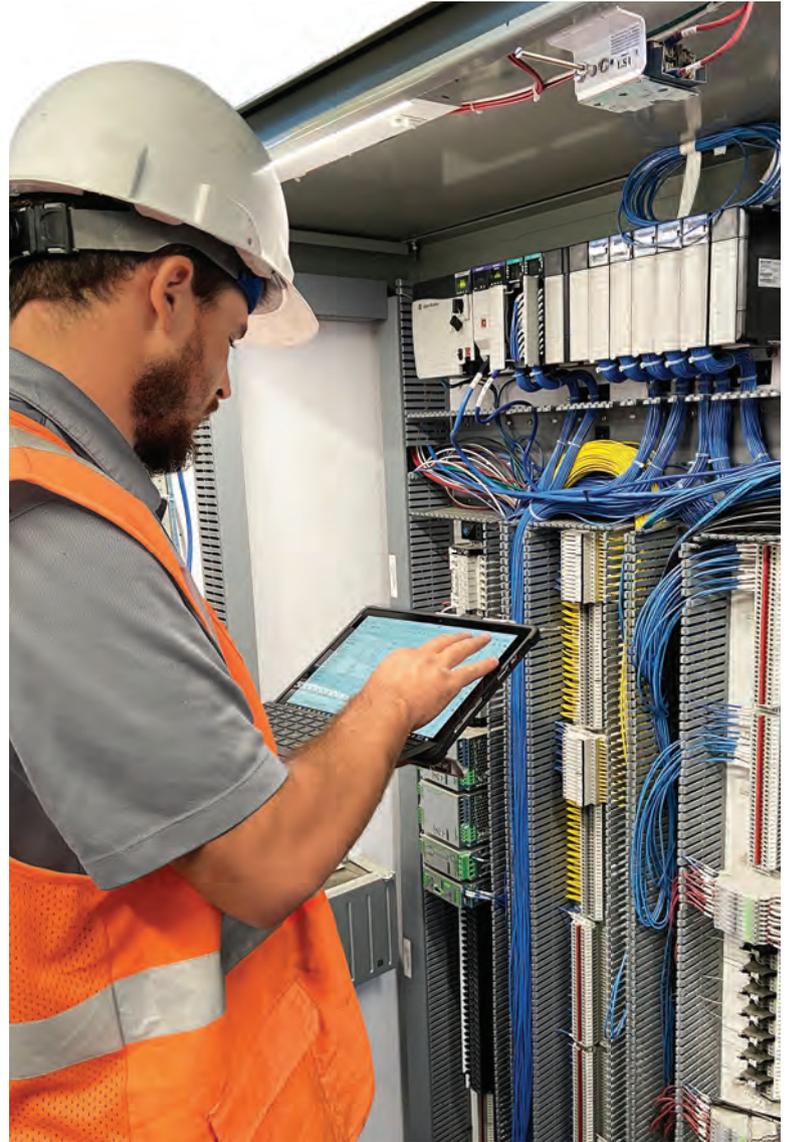
Even this very remote small city receives all the usual non-flushables that treatment plants have to contend with, though Miller admits that the wastewater it receives from its one industrial user — a local slaughterhouse — is a helper rather than a hinderer for BOD levels.

ECONOMICAL OPERATION

“The introduction of SCADA has made life a bit easier, but then the mixers have never given us any trouble,” says Miller. “Back in 2004 they were our biggest capital expense, but now they enable us to achieve full nutrient removal and process optimization.

“The old 50 hp rotors produced lots of air that we simply didn’t need all the time. We needed to save money and had looked at soft starts to reduce spikes, but running the mixers for about 13.5 hours per day has proved much more economical than what we had before.

“Where electricity costs are higher, the return on investment would be even better than the savings we’ve enjoyed here in Chinook. Over the years we’ve understandably had to see to the odd seal, but with their standard bearings, maintaining the mixers is a piece of cake — just a bit of grease and oil.” **tpo**



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Songs, skits, and stories help inspire lower elementary learners.

Rockin' the Environment

WATER ROCKS! AT IOWA STATE UNIVERSITY TEACHES EDUCATORS AND K-12 STUDENTS ABOUT WATER AS AN INTEGRAL PART OF OUR ECOSYSTEM

By Sandra Buettner

Music, videos, puppet shows and school assemblies from an Iowa university teach students about our natural resources. Water Rocks!, an educational program for K-12 students created in 2012 by Iowa State University, continues to make a big impact.

“The program is a success with the kids because it’s high-energy, hands-on and very participatory,” says Jacqueline Comito, executive director of the program and one of its creators. “Because it’s fun, the kids don’t realize they’re learning. This approach helps the children learn about and appreciate the natural resources around them.” Water Rocks! was an offshoot of the Iowa Learning Farms, also a collaboration of university extension and sev-

eral state and federal agencies. Seed money came from the Iowa Department of Natural Resources, which is still a funder. Other sponsors include ISU Extension and Outreach, the Leopold Center for Sustainable Agriculture, the Des Moines Water Works, Polk County Conservation, Soil and Water Conservation Districts across the state, and several private donors.

Des Moines Water Works was moving away from youth education and toward adult instruction, so the Water Rocks! team partnered with the utility to fill that need. The program covers all the counties in Iowa and surrounding states including Kansas, Minnesota, North Dakota, Missouri and Nebraska. It’s promoted through social media, word-of-mouth, and an e-newsletter that goes out weekly to more than 9,000 teachers and water quality stakeholders.

PROGRAMS AND PRESENTATIONS

Ann Staudt, director of Water Rocks! and the other creator, says its mission is to foster education on water and other natural resources: “Our natural resources are interconnected, so you can’t separate water from all the other elements. Our program combines STEM, music and the arts to educate and inspire everyone.”

Much of the training takes the form of game shows, so the children can join in and have fun at the same time. Other offerings include:

- A Conservation Station trailer fleet that hits the road to present children and educators with hands-on lessons and education modules, including a rainfall simulator, a watershed game and dogs as conservation mascots.
- A variety of videos for the students to watch online, including a show that uses animal puppets to teach about wildlife in a watershed.



Interactive skits help students learn how a variety of pollutants affect water resources.

“The program is a big success with the kids because it’s high-energy, hands on, and very participatory.”

JACQUELINE COMITO

- Original music videos in all genres that kids can sing and dance to, with environmental messaging such as a “Let it Rain” song.
- School assemblies led by the Water Rocks! team that engage the students in singing and in various activities and environmental presentations.

TRAINING THE TEACHERS

Through a summer teachers’ summit, the Water Rocks! team trains educators so that they can adapt offerings for their classrooms. “The teachers integrate what we offer with what they are already doing in their science, music, and art programs,” Staudt says. Teachers also receive a kit of materials to take back to their classrooms; before the onset of COVID-19, the Water Rocks! team made many in-person visits each year.

Other than the school assemblies, all programs continued last fall but were held outside; participants were socially distanced and wore masks. When the weather turned cold, the programs went online. In-person presentations are 40 minutes, and online presentations take about 30 minutes. A comprehensive website, www.waterrocks.org, is self-paced and contains all the information, photos, videos and music for the children and educators.

MEASURING SUCCESS

The program has been successful and the metrics show that it is making waves in Iowa and surrounding states. Pre-COVID, the team was visiting



Water Rocks! school assemblies are designed to reach hundreds of students.

nearly 200 schools per year and performing at 13 outdoor classrooms and water festivals, reaching nearly 33,000 students.

The program touches all 99 counties in Iowa by reaching out to educators and principals and taking the show on the road. After the presentations and training, 97% of the children were able to

define a watershed; before the program and training, it was 42%.

Thank-you notes flood into the organization after the events. “One creative student’s note included a comic strip on everything he learned at his presentation,” Comito says. “We were very impressed with his ingenuity.” **tpo**

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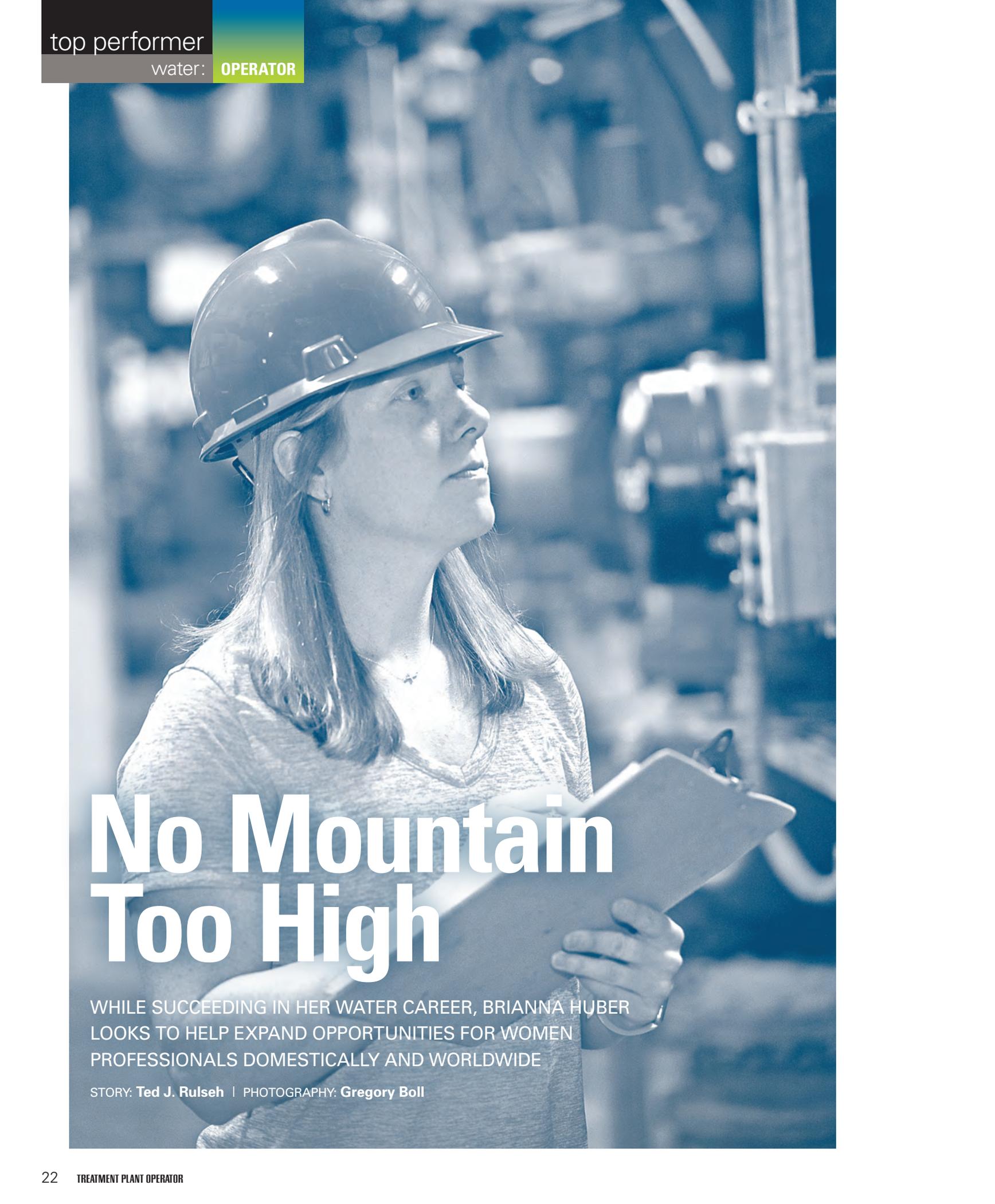
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No Mountain Too High

WHILE SUCCEEDING IN HER WATER CAREER, BRIANNA HUBER LOOKS TO HELP EXPAND OPPORTUNITIES FOR WOMEN PROFESSIONALS DOMESTICALLY AND WORLDWIDE

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Gregory Boll**

OPPOSITE: Brianna Huber, interim director of water filtration, at East Moline (Illinois) Water Treatment Plant.

How far will Brianna Huber go to elevate the status of women in the water management professions? How about 8,300 miles to Tanzania, and then up 19,341 feet to the summit of Mount Kilimanjaro? How about launching a nonprofit organization, H₂O, with the vision of women “equitably involved in water management in every corner of the globe”?

She has done all this while working up the ranks from the water plant laboratory in East Moline, Illinois, to her current role as interim director of water filtration. Right now, she’s working on an MBA from Western Illinois University to add to her master’s in health science from the same school and her bachelor’s degree in biology from Augustana College.

She entered the water business seven years ago and found it appealing. “First of all, it’s science, and I’ve always been interested in science,” Huber says. “But most intriguing are the infinite possibilities. It’s so large and so broad. There are always opportunities to learn more and to gain additional skills.

“At the end of the day, it’s an industry where you know that what you’re doing is good, not only for your local community but your country and really the entire world.” Now a key part of her mission is to help women see and take advantage of the industry’s possibilities. For her efforts she received the 2020 Women in Water Outstanding Woman Award from the AWWA Illinois Section.

CHANGE OF DIRECTION

Huber grew up in Rock Island, Illinois, part of the Quad Cities metropolitan area at the Iowa-Illinois border on the Mississippi River. She worked in a hospital medical laboratory while doing her undergraduate studies and then became a child health consultant at a public health department in the Quad Cities.

“After I had been there for a while, I needed a change, and so I decided to switch over to the environmental side of public health,” she says. On a whim, she applied for and won a lab chemist/lab supervisor/assistant department head position in East Moline. “It didn’t take me long to fall in love with the industry, and I know this is where I’m supposed to be. I would definitely say water chose me.”

The East Moline Water Filtration Plant (10 mgd capacity, 3-4 mgd average production) treats Mississippi River water in a largely conventional process, using powdered activated carbon for taste and odor removal, traditional sedimentation basins (aluminum sulfate as coagulant), gravity filtration (sand,

Huber, with maintenance crew leader Bob McGeehon (left) and lead operator Chris Fronk, observes, “We do work miracles here.”



Brianna Huber, East Moline, Illinois

POSITION:
Interim Director of Water Filtration

EXPERIENCE:
7 years in the industry

EDUCATION:
Bachelor’s degree, biology, Augustana College; master’s in health science, Western Illinois University

CERTIFICATIONS:
Class A Drinking Water Operator

MEMBERSHIPS:
AWWA, International Water Association

GOAL:
Always be learning

gravel and anthracite coal media), UV inactivation, fluoridation and pH adjustment with caustic soda.

The plant team includes Bob McGeehon, maintenance crew leader; Chris Fronk, lead operator; David Thompson, electrician technician specialist; Jim Rosenthal, Alec Thompson and Fred Snead, operators; Perry Barber, Jared Barber and Josh Bowen, maintenance technicians; and Regina Walters, administrative assistant.

KEEPING TABS ON QUALITY

Source water quality is variable. “It’s definitely not clean water coming in,” Huber says. “We do work miracles here. But once you understand our treatment process and get a feel for it, it’s fairly consistent. It’s definitely harder to treat in spring, summer and fall than in the winter, but each season has its own challenges.”

Lab work is crucial to making the adjustments needed to ensure a high-quality product: “We do a lot of lab monitoring of our raw, process and



Brianna Huber's accomplishments in East Moline include creating a comprehensive lab procedure manual and a lab training and competency program for water plant team members.



Huber, shown performing tests on the SENTINEL UV disinfection system (Calgon Carbon), has become a global advocate for advancing the role of women in the water professions.

finished water throughout the day, and a lot of visual monitoring goes on in addition to the laboratory testing. We have a good feel for what our basins and filters should look like. That helps us understand what we need to do in terms of our carbon dosage and what kind of organics we have coming in.”

The lab performs coliform and heterotrophic plate count testing, titrations for alkalinity and hardness, and continuous monitoring for chlorine and turbidity. Lab equipment includes Hach pocket colorimeters, a Hach benchtop turbidity meter, and a Hach AT1000 titrator for free and total chlorine testing. Advanced tests are sent out to a reference lab.

Points of pride for Huber include the creation of a comprehensive lab procedure manual, a laboratory training and competency program to help new analysts acquire certifications and maintain their skills, and an emergency response plan.

COMMUNITY SERVICE

Huber has also developed a variety of initiatives extending into the community. A school outreach program includes third- and fourth-grade classroom presentations and drinking water plant tours.

Plant staff members take part in a middle school career fair with a table where students can look at bacterial growth under a microscope and run a chlorine test on a pocket colorimeter. For high school, Huber does two-day presentations in chemistry and earth and space classes, dealing with water treatment, water careers, and lab investigation of water quality.

She worked with Black Hawk College and neighboring utilities to create a drinking water operations and maintenance specialist certificate program that includes a set of five courses followed by an internship. “When the students complete the program, they are fully qualified to sit for an exam and become fully licensed as Class D water operators,” Huber says. East Moline was the first utility to hire one of the interns (Alec Thompson) as a full-time employee.

LIFTING WOMEN UP

Amid all that, Huber's passion has been to help other women enter and succeed in water professions historically dominated by men. She recalls, “As I began feeling comfortable in my job, I also recognized how differently men and women can function in the workplace.

“It kept occurring to me, why don't they communicate in meetings? Why is it so hard to get somebody to respond to a question? I started noticing differences between my approach to problem-solving and solutions, compared to the men's approaches. As I started serving on water-based committees and coalitions in the community, I noticed the differences there, too. I thought, ‘Is this just me? What is going on here?’”

Curious to understand if other women saw the same differences, she reached out to Kyla Jacobsen, then utility director in Elgin, Illinois, and if her experiences were the same. “She said, ‘I've been experiencing them for the last 30 years.’” Out of that conversation, in 2016, she proposed forming a Women in Water Committee in the AWWA Illinois Section. The board approved.

“At the end of the day, it's an industry where you know that what you're doing is good, not only for your local community but your country and really the entire world.”

BRIANNA HUBER

Women quickly embraced the committee, and as it grew, Huber looked to a broader horizon, reaching out to women in other states and offering her help in creating similar committees; some accepted. “Then my interest was even more piqued, and I thought, I'm going to do some research on women in water.” She made it part of graduate research for her MBA.

GOING GLOBAL

At the same time, Huber contacted U.N. Water to inquire about a group she had learned about in Tanzania doing work with women in water. That led to a connection with a woman who was a U.N. Water delegate based in the Netherlands: “She invited me to the U.N. Commission on the Status of Women at U.N. headquarters in New York. I attended that, and I learned so much.”

In the meantime, she connected with a women's group, the Tanzanian Gender Networking Program, which was working on water and sanitation projects led by women. She was so inspired that she decided to summit Mount Kilimanjaro to fundraise for the group. By promoting the hike through the Illinois Section AWWA and on social media, she raised \$3,000. In September 2019 she summited Uhuru Peak, despite a bout of altitude sickness.

A year before the adventure in Tanzania, Huber had started sketching out the framework for a nonprofit group for women in water. A few months

(continued)

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“We want to get to a place where gender is not an issue in the water industry, where all we see are skills and how those skills work together.”

BRIANNA HUBER

after returning from Africa, she received an invitation to speak in the Women Leaders track at a water and waste management conference in India. At that point, she thought, “That’s it. This is my life’s purpose. I’m going to bite the bullet and form this nonprofit.” In January 2020, with Huber as founder and executive director, H_{er}2O (www.her2o.org) became a legal entity. Its board members as of last October were:

- Kyla Jacobsen, secretary, an AWWA training specialist
- Martha Wells, treasurer, owner of an accounting business
- Julie Gelaude, director of Business Training Center at Black Hawk College
- Susan Llewellyn, retired training coordinator at Black Hawk College
- Miranda Robinson, municipal engineer with the Village of Skaneateles, New York
- Margaret Maina, managing director at Limuru Water and Sewerage Company, Kenya

Three precepts underlie the group’s approach to women in global water management:

- **Stimulate.** Encourage women’s interest and development and fuel women’s opportunities.
- **Elevate.** Raise awareness of the critical role women play in water sustainability and create a culture of enthusiasm and vitality.
- **Embolden.** Build women’s courage and confidence to be their authentic selves.

“We intend to have programming in several areas, including outreach and education, training and mentoring, advocacy, scholarship and sponsorship, research and support,” Huber says. “We’re working toward an ecotourism program where women-led groups of water professionals from more developed countries would help less-developed countries evaluate their water and sanitation needs and implement water and sanitation projects, involving or led by women in those countries. This may include training, advocacy, education and outreach as well.”

Other projects include partnering with Girl Scouts of the United States of America to develop water and sanitation-based programming, working to create H_{er}2O programs at colleges, and doing national research on recruiting, integrating, supporting and retaining water professionals — for both men and women but with a gender focus.

“We want to understand what water professionals’ experiences have been and what exactly they want and need from the workplace,” says Huber. “This research touches on recruitment practices, workplace cultures, employee preferences and benefits.”

H_{er}2O has an interesting long-term aim: “Our overarching goal is to put ourselves out of business,” says Huber. “We want to get to a place where gender is not an issue in the water management industry, where all we see are skills and how those skills work together. Men and women might sometimes bring different skills to the table, but all of those skills are necessary for a well-rounded team.”

One gets the sense that Brianna Huber won’t be “out of business” for a very long time. **tpo**

READY FOR ACTION

As the new director of water filtration in East Moline, Brianna Huber has ambitious plans.

“What’s most exciting about being the director is the opportunity to make improvements that will bring us up to date and into the future,” Huber says. “Right now we don’t use a whole lot of technology aside from the SCADA system.

“I am really interested in data analytics and how we can use data to predict future failures of equipment and to look at patterns of treatment during different seasons and even different months. We know that at a given time of year we see an increase in organics coming in, or we see algae. And so, looking at historical data, we can identify what has previously been the most effective chemical dosages.”

Data analytics will entail new instrumentation and sensors along with software programs that can process large amounts of information and identify patterns: “We’re really just looking to buckle down on our treatment processes to find out how we can most efficiently optimize our plant.”

Then there’s the prospect in some future year of being part of the design of a new treatment plant — the existing facility dates back to 1952: “The idea of building a plant in the 21st century, when we have all this newer technology, is pretty exciting.”



Brianna Huber with her staff. From left, Jared Barber and Josh Bowen, maintenance technicians; Bob McGeehon, maintenance crew leader; Alec Thompson, operator; Chris Fronk, lead operator; Dave Thompson, electrician technician specialist; and Perry Barber, maintenance technician. Not pictured are Jim Rosenthal and Fred Snead, operators; and Regina Walters, administrative assistant.

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A Guide to Filaments

A CONTRACT OPERATIONS COMPANY OFFERS A SIMPLIFIED HANDBOOK TO HELP CLEAN-WATER PLANT TEAMS USE MICROSCOPY TO DIAGNOSE TREATMENT ISSUES

By Ted J. Rulseh

Filamentous bacteria can cause operational problems for clean-water plants and are typically a symptom of a process upset that needs correction.

Different filamentous morphotypes point to different conditions, and operators can benefit greatly from being able to identify the various strains using phase contrast microscopy and make appropriate process adjustments based on their findings. Midwest Contract Operations, a company based in Neenah, Wisconsin, that provides hands-on technical support to municipalities, utilities and industries, has published an updated handbook of wastewater microscopy emphasizing methods of filamentous identification.

The company provides microscopy interpretation services to clean-water organizations throughout the United States and Canada.

The new 50-page handbook combines images of the most common filamentous organisms with easy-to-use tables and charts to help operators identify the different filament types and the issues they can cause. Ryan Hennessy, microbiology and operations specialist with MCO, talked about the handbook in an interview with *Treatment Plant Operator*.

tpo: What is your background in plant operations and microscopy?

Hennessy: I worked for seven years at an industrial facility, and for another three years with MCO doing a split between operations and microbiology. I am still involved in operations on a fill-in basis. I took a number of wastewater classes from Moraine Park Technical College and Milwaukee Area Technical College. I have an Advanced Wastewater Operator license in Wisconsin.

tpo: How did you acquire your knowledge of microbiology and filamentous bacteria?

Hennessy: For about 10 years I learned under Dr. Michael Richard, who is a world authority on wastewater treatment microbiology. In the 1980s and 1990s, he and Dr. David Jenkins did a great deal of work on the correlations between the different types of filament and their causes. I reached out to Dr. Richard through some wastewater forums and eventually took the class he was teaching in Oregon. Over the years, I would go to any wastewater plant I could find and take a sample of the mixed liquor. I would take and analyze a picture, send it to Dr. Richard, and he would tell me if my analysis was right or wrong.

tpo: What is the history behind the handbook you have created?

Hennessy: In 2004, Dr. Richard, Dr. Jenkins and Glenn Daigger wrote the third edition of their handbook, which has been a popular tool for identifying and learning the different filaments. Between 2004 and 2020, we have learned a lot through DNA studies and more advanced technologies. Over

the past 40 years, there is a really good track record in correlating what we see under the microscope with the actions we take as operators. We've also learned that there is a lot more diversity among filaments than we originally thought.

tpo: Who has access to this handbook?

Hennessy: Anybody who wants a copy can have it. Dr. Jenkins as well as many highly esteemed colleagues have seen it; Dr. Richard was deeply involved in writing it.



Ryan Hennessy

tpo: What is the value of this handbook for a clean-water plant operator?

Hennessy: If they can identify the filament types and the associated causes, then they can make appropriate corrective changes to the treatment process.

tpo: Why does the handbook include images of glycogen accumulating organisms, phosphorus accumulating organisms, and nitrifying bacteria in addition to filaments?

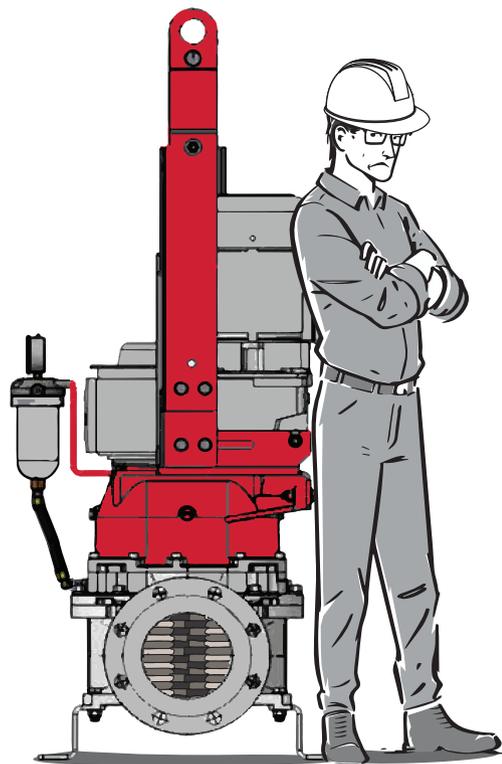
“If they can identify the filament types and the associated causes, then they can make appropriate corrective changes to the treatment process.”

RYAN HENNESSY

Hennessy: Under the microscope we're looking at filaments and also looking at indicator organisms. Everything you look at basically supports the big-picture diagnosis of what you're seeing. You're taking pieces of a puzzle and putting them together. The higher life forms, the floc structure, whether you have PAOs, the different filaments, you get a big picture of the sludge characteristics. Then the next step is to decide: Is there a problem or not? The biggest thing is to determine at what point you should act. That's going to be different for every plant.

tpo: Why did you decide not to include a dichotomous key for identifying filaments?

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Hennessy: It is very easy to get on the wrong path with the dichotomous key, because it is highly dependent on staining reactions, which can often be affected by the chemistry of the wastewater. Often in industrial processes the staining reactions can be highly variable. The stains are still important, but when you start with them on the key, there is a lot of room for going down an incorrect route. Also, based on what we have learned from genetic research, the diversity among the different filament types may be a factor in abnormal staining reactions.

tpo: Without the key, what helps users of this handbook make the right determination?

Hennessy: There is a series of pictures showing different morphology traits, like cell diameters, septa (crosswalls), presence of a sheath, branching, and different cell shapes, like sausage, rectangle, ovals, squares and elongated rods. There are also pictures of some of the more common filaments. There are descriptions of all the different filament types, and then there's an identification table. It's all built together.

tpo: Why do the identification tools de-emphasize traits such as filament length, location, and shape?

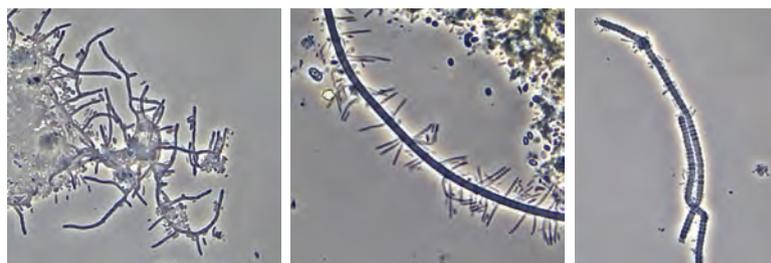
Hennessy: Those traits in filaments are not entirely consistent. For example, a filament that's typically located in floc may grow dispersed if it is growing fast enough. It's the same with shape. You can have the same filament type and sometimes it's curved, sometimes it's straight, sometimes it can be in the floc.

tpo: Do you offer any other tools that can accompany this handbook?

Hennessy: We provide hands-on training upon request and have a fleet of traveling microscopes. Also, due to the sample volume we work with, we are typically able to bring the majority of the common filament types and good samples for training purposes. From an operational standpoint we have

“The biggest thing is to determine at what point you should act. That's going to be different for every plant.”

RYAN HENNESSY



From left, *actinomycetes*; *Thiothrix* with attached growth; and *Nostocoida limicola* III.

an app to accompany our microbiology reports. The app contains all the different filaments and all the indicator organisms that operators are looking at. Users can pull up that app and follow trends to see which way things are going and determine where the plant runs the best. **tpo**



Plant operator J.C. Davis grabs a sample of effluent at the Tullahoma plant, which treats an average of 3.5 mgd.



Sleeping Easy

THE CLEAN-WATER PLANT IN TULLAHOMA RUNS LIKE CLOCKWORK, QUIETLY AND EFFICIENTLY MEETING ITS PERMIT, EVEN WHEN OPERATORS ARE NOT ON DUTY

STORY: Jim Force | PHOTOGRAPHY: Martin Cherry

“No worries.” That’s how supervisor Jeff Totherow feels about his wastewater treatment plant when he’s not there.

It’s because of a competent and talented staff of Matt Smith, laboratory director; Bryan Gordon, maintenance director; Loarn Hinkle, lead operator; J.C. Davis, operator; and Jeff Turner and Martin Dixon, operator trainees.

Together they run the 5.0 mgd (design) Tullahoma (Tennessee) Wastewater Treatment Plant, which uses an intermittent cycle extended aeration system (ICEAS) to treat wastewater from a community of 19,000 about 75 miles southeast of Nashville. “They’ve got it together,” Totherow says. “They understand their responsibilities. I can sleep like a baby at night.”

UNIQUE PROCESS

Constructed in the mid-1980s, the Tullahoma plant receives wastewater from a collection system with 160 miles of pipe, 42 lift stations, and more than 900 grinder pumps. The flow passes through center flow band screens (Hydro-Dyne) and is lifted by KWS screw pumps (Lake-side Equipment) to a pair of pre-air basins where grease balls are removed and the wastewater is freshened.

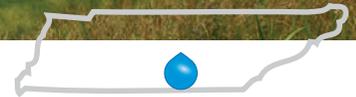
The ICEAS process provides complete treatment. It was the largest of its kind in the world and first in the United States when installed in 1985 by Austgen Biojet (now Xylem). It includes a pair of basins, each rated at 2.4 mgd.

Conventional sequencing batch reactors fill, aerate, settle, and draw. They require two or more basins or

“It’s not about me. It’s about my team. Without them, it’s not possible.”
JEFF TOTHEROW



When commissioned in 1985, the Tullahoma Wastewater Treatment Plant had the first large-scale, continuous-influent, intermittent-discharge variant of a sequencing batch reactor.



an equalization tank to receive flow during the settling or decant phase. The ICEAS, however, needs no diversion. It operates on a timed-based control system, allowing continuous flow during all phases of the cycle. The basins fill, aerate, decant and discharge once every two hours. Pre-react and main react zones are separated by a baffle; the pre-react zone can operate as a selector zone.

Totherow says the design has drawn visitors from all over the world who come to see how it works.

The system was upgraded in 1995 when 5,700 Series E fine bubble aerators (Sanitaire, a Xylem brand) replaced the original aeration system. At the same time, a 48 mgd retention pond was constructed to provide flow equalization during wet weather.

POWER SAVINGS

In 2016, new Sulzer turbo blowers were installed to save on power costs. A new 250 kW natural gas backup generator (Kohler) was also added that year, and in 2017 the decanter drives were replaced. The plant changed its disinfection system as well, switching from gaseous chlorine to peracetic acid (PAA), supplied by PeroxyChem.

“PAA costs more,” Totherow says. “But we were able to use our existing chlorine contact basin and get rid of two very dangerous gases — chlorine and sulfur dioxide. Consequently, we no longer are subject to the Risk Management Plan regulations.”

PAA is a stronger oxidant than sodium hypochlorite and chlorine dioxide. Most of the disinfection occurs in the first minute of contact, and the acid decomposes quickly into acetic acid, oxygen and water. There is no need to neutralize it before discharge into the effluent channel and to Rock Creek.

The plant’s SCADA system was built in-house and uses the Survalent Technology platform.

Tullahoma (Tennessee) Wastewater Treatment Plant

www.tub.net

BUILT:
1985; upgrade in 1995

POPULATION SERVED:
19,000

FLOWS:
5.0 mgd design, 3.5 mgd average

TREATMENT LEVEL:
Secondary

TREATMENT PROCESS:
Intermittent cycle extended aeration system (ICEAS)

RECEIVING WATER:
Rock Creek

BIOSOLIDS:
Aerobic digestion, land application

ANNUAL BUDGET:
\$1.1 million (operations)

Tullahoma practices cost-effective biosolids handling. Aerobic digestion stabilizes the material, which is then applied as a liquid on farm fields approved by the Tennessee Department of Environment and Conservation. The plant generates 2 million to 4 million gallons of biosolids a year, at 1% solids.

TOP-TIER PERFORMANCE

The plant is not only cost-effective; it’s compliant. For meeting discharge requirements regularly, Tullahoma received Operations Excellence Awards from the Kentucky-Tennessee Water Environment Association in 2014, 2017 and 2019. The plant received the association’s biosolids award in 2014.

The plant is essentially violation free. The key parameters of CBOD, TSS and ammonia are barely detectable in the effluent. Performance is a key to

winning awards, but so is innovation, and Tullahoma has taken several steps to become more green.

“The turbo blowers use magnetic bearings, which don’t wear out and are very energy efficient,” Totherow says. “It’s new technology, and it has helped us cut energy costs by about \$30,000 per year.”

The plant team has also installed LED lighting throughout the property. The elimination of chlorine and sulfur dioxide has removed disinfection byproducts and improved the safety of staff and neighbors. “With chlorine, we had a kill-zone of almost 2,000 people,” says Totherow.

SHARING THE CREDIT

Totherow was named Operator of the Year by the Tennessee Association of Utility Districts in 2017, but he declines to take credit: “It’s not about me. It’s about my team. Without them, it’s not possible.”

He calls lab director Smith one of the smartest clean water professionals in the field: “Matt is very bright, has a master’s degree in environmental science and natural resource conservation from the University of Tennessee at Chattanooga and joined us in 2010. I watched him the other day giving a tour to students. He taught them all about standard methods and CBOD.”

Totherow refers to maintenance director Gordon, on the staff since 2011, as the plant’s MacGyver. “He has lots of confidence. Piece by piece, he’s revamped the whole plant since 1995. He’s made changes to our bar screens and turbo blowers, getting ready for biological nutrient removal down the road.”



The team at the Tullahoma Wastewater Treatment Plant includes, from left, J.C. Davis, Grade 4 operator; Jeff Totherow, plant supervisor; and Bryan Gordon, maintenance director.

Operators Hinkle (24 years) and Davis (19 years) are loaded with experience. In Totherow’s view, there is no situation they haven’t encountered and can’t deal with. And he’s enthusiastic about the two trainees: “Jeff Turner also helps with our lift stations and has about two years on the job. This is Martin Dixon’s first year in the wastewater profession.”

THE TULLAHOMA UTILITIES AUTHORITY

Wastewater treatment is just one of a number of services the Tullahoma Utilities Authority provides. The utility also delivers drinking water and electricity, and a relatively new division supplies fiber optics for home services including cable television, internet and telephone.

And though the utility has operated separately from Tullahoma city government only since 2016, its history stretches back for well over 100 years. Electricity and water came to the city in 1901 with the formation of the Electric Light and Waterworks commission. An electrical generating station was built then, and a year later a well was drilled to provide safe drinking water.

The city formed a Board of Public Utilities in 1947, when the Tennessee Valley Authority took over distribution of electricity to the area. In 1959, the city turned over water and sewer systems to the board.

While TUA operates its own wastewater treatment plant, it imports drinking water from the Duck River Utilities Commission and manages distribution. More than 10,000 customers are served by 220 miles of water mains and eight elevated storage tanks.

In 2008, the board created a new division, called LightTube, to help businesses grow and to attract new ventures. LightTube provides fiber connections to commercial, industrial and residential accounts. In 2016, when the organization became independent of the city, it took on its new name: the Tullahoma Utilities Authority.



Plant supervisor Jeff Totherow refers to Bryan Gordon (shown checking the peracetic acid drip disinfection system from PeroxyChem), as the facility’s MacGyver for his inventiveness and problem-solving.

**Tullahoma Wastewater Treatment Plant
PERMIT AND PERFORMANCE**

	INFLUENT	EFFLUENT	PERMIT
CBOD	110 mg/L	2 mg/L	20 mg/L
TSS	330 mg/L	4 mg/L	45 mg/L
Ammonia	23 mg/L	0.5 mg/L	3 mg/L summer 6.5 mg/L winter

Totherow is a good judge of talent because he has been there, and understands what it takes to be successful. Plant staff members often work by themselves. Operators need to be comfortable doing that, he says; he mastered that skill when he helped out on a dairy farm while in high school: “I milked cows by myself.”

After high school in 1970 he learned pipe fitting at the U.S. Department of Energy’s Y-12 National Security Complex in Oak Ridge, Tennessee. He then got an associate degree in data processing. He moved to Tullahoma in 1986 and two year later took a position at the wastewater treatment plant.

MORE CHANGE AHEAD

The Tullahoma plant isn’t finished making changes and improvements. The next challenge, Totherow says, is to take on new biological nutrient requirements. The improvements the staff has already made to the ICEAS system, changing the aerators and adding turbo blowers, will be a big help.

“BNR will be mandated by the state, and our town will keep growing,” he says. Based on its record, the Tullahoma plant will be up to the task. Totherow is proudest that the plant is better than when he started. It’s more compliant, cost-effective, safe and environmentally friendly. And, he could add, it’s worry-free. **tpo**



Gordon with the center flow band screens (Hydro-Dyne).

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Fast-Track Digitization

TRANSFORMATIVE TECHNOLOGY FOR WATER TREATMENT PLANTS CAN OFTEN BE DEPLOYED QUICKLY, AFFORDABLY AND WITHOUT MAJOR PROCESS DISRUPTION

By Tony Wachinski

Water treatment plant operators face daily challenges meeting drinking water demand, managing scheduled and unscheduled maintenance, ensuring regulatory compliance, monitoring and troubleshooting to optimize performance, reporting to management and stakeholders, and more.

Digital technology can transform the role of operators and the operations management team, and the ways in which they manage smarter plants. Digitization doesn't have to be a complex and costly venture — it can be deployed on a plant's existing automation framework.

DIVERSE DUTIES

Water plant operators are charged with making sure that critical processes like coagulation, sand filter backwashing, fail-safe filter ripening and disinfection are operating at or near their optimum.

Historically, operators have monitored and managed plant operations mainly by interacting with the process control system through the human-machine interface component of the SCADA system. In recent years, digital transformation technologies have been introduced to facilitate plant operations.

A paradigm shift is occurring with this technology infusion. Plants are transitioning from reactive to proactive (or predictive) maintenance — in other words, toward a “smart water plant” paradigm.

In an April 2020 white paper, *COVID-19 Water Industry Impact: Navigating toward Resiliency*, Bluefield Research contends that digitization of water treatment is needed, but that “It is too late for most utilities to rapidly transition to significant remote operational control of their assets in the next three months.”

The paper continues, “Only those utilities that have already invested heavily in remote monitoring and digital asset management will likely see more immediate benefits from a resiliency perspective. Those that have not will be more challenged in the foreseeable future. Seventy-nine percent of U.S. community water systems have SCADA systems fully implemented, while just 21% have network optimization solutions in place that facilitate remote management.”

This presents a partially correct picture, based on the notion that digitization is a massive undertaking, requiring significant investment in infrastructure. However, retrofit digitization of a water treatment plant can be surprisingly straightforward if the plant already has a SCADA system and parts of its operations are already automated.

BROAD BENEFITS

Digitization disconnects water plant performance information from the SCADA historian and HMIs and delivers it encrypted over the internet outside the plant to any computer or mobile device anywhere in the world.

This enables operators to track what is happening at the plant with near-real-time fidelity. Moreover, the information can be delivered to multiple experts at the same time, allowing a team of experts to troubleshoot an event. This can help prevent the recurring anxiety that a lonely operator in the graveyard shift may feel when an excursion happens.

Any intervention decision can be collective and collaborative, capturing the knowledge and experience of the operations team, based on objective data and evidence collected directly from the plant.

It is entirely feasible to add digitization components that provide decision support and even elements of remote decision automation to water treatment plants, using existing technologies that are primarily software- and cloud-based.

The technology requires no additions to plant hardware and causes no disruption to operations. It can be deployed on any water plant automation platform distributed control system/SCADA to monitor, control and optimize critical water processes.



The reporting tool is customized for every facility by the design engineer and the plant operations team to report the plant's response to changing influent quality.

If the unit operation has already been modelled — for example, coagulation, multimedia filtration, and low- and high-pressure membrane filtration — optimization of these processes can be completed in about two weeks, after all necessary information is provided.

From a process control perspective, digital transformation allows operators to monitor the plant remotely, reducing time required on site — important during the COVID-19 pandemic — without losing any control or insight to the plant’s performance

PUTTING IT TO WORK

The digitization technology, once deployed, has a wide range of practical applications.

Operational monitoring

Dashboards and reports give process engineers a thorough overview and detailed understanding of the plant. The overview screen provides the operational details, while various drill-down menus deliver details about the individual process component behaviors.

The reporting tool allows the plant engineers to track plant behavior in response to fluctuations of influent quality or operating conditions. It is customized for every plant and is developed in consultation with the plant designer, operator and process engineering team. The reporting tool also provides a dynamic view of how the plant is optimized. It can provide estimates of savings, waste and energy reduction, and increases in production, with resolution to the level of individual processes.

Coagulant dosing

Coagulation dosing can be optimized essentially with an “inline jar tester” to reduce chemical consumption and subsequent residuals handling. It also helps ensure the best floc for the filter and ties in with filter operation.

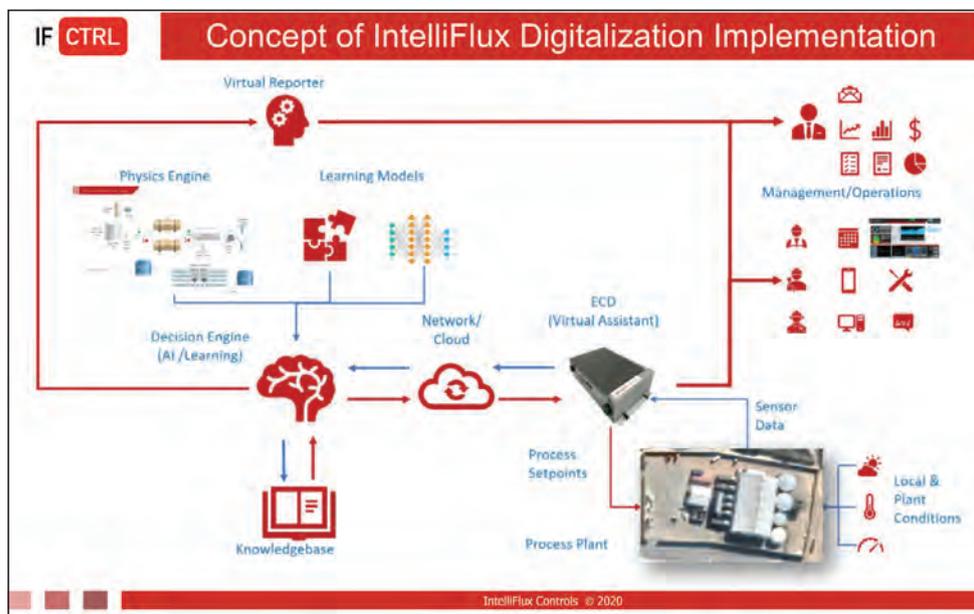
Filtration

Surface water multimedia filtration. Media filters including rapid sand, dual-media and multimedia beds treating for microbial removal can be optimized by controlling filtration rate changes, reducing backwash and optimizing filter ripening to reduce the volume of backwash water. Other benefits include reducing or eliminating manganese release by minimizing offline time and minimizing the volume of backwash wastewater requiring further treatment.

Low-pressure hollow-fiber and ceramic membrane filtration. Self-adaptive flux optimization can be used to optimize low-pressure membrane

filtration processes where the fast (seconds to minutes) kinetics of fouling outpace human operators’ and engineers’ ability to make adjustments. It automatically and directly adapts and adjusts flux optimization cleaning actions in real time to mitigate irreversible fouling, maintain optimum water production, and extend filter life.

GAC/BAC filters. Self-adaptive flux optimization can be used to adapt artificial-intelligence-controlled air-water scour and water filter backwash to suit feedwater conditions.



Schematic diagram illustrates how a digital transformation framework functions.

TIME TO GET ONBOARD?

By embracing digitization technologies, water treatment plant operators can gain additional capabilities. They can dynamically optimize the plant, prepare for and respond to sudden excursions in raw-water quality or operating conditions, and schedule maintenance of critical components.

They can also remotely modify or change plant operating conditions, automate routine tasks such as report preparation, and automatically manage consumables inventory and delivery. It all can happen on the existing plant automation platform, and without disruptive and major capital investments.

ABOUT THE AUTHOR

Tony Wachinski (tony@wisewaterglobal.com) is a civil engineer and the CEO of Wisewater Global, a consultancy specializing in process water treatment technology for municipal and industrial markets. **tpo**



Columbus Water Works team members regularly wade upstream in creeks looking for problems such as cracked sewer pipes or erosion that has left pipes unsupported.

Up the Creeks

UTILITY TEAM MEMBERS IN A GEORGIA COMMUNITY EXPLORE STREAMS TO ASSESS WATER QUALITY AND TO LOOK FOR PIPE DEFECTS THAT COULD CREATE PROBLEMS

By Steve Lund

Columbus Water Works uses electronic monitoring and other technology to manage its watershed and its water and wastewater treatment, but it also uses more pedestrian methods.

“We find it very beneficial to routinely walk the creeks,” says Vic Burchfield, senior vice president for the Division of Information, Security, Environmental and Meter Services in Columbus, a Georgia city of nearly 200,000. “You have to have a trained eye. It’s like any inspection: You have to know where to look.

“We’re not only inspecting piping. We’re looking for water-quality issues. We also observe the wildlife, such as frogs, turtles and minnows. When you’re walking, you can see how the stream is flowing, and if it looks healthy. That’s also a good indicator.”

The creek walking program was one reason Columbus Water Works won a 2019 Sustainable Utility Award for utility management from the Association of Metropolitan Water Agencies.

LOOKING FOR DEFECTS

Once a year, the water utility joins with the stormwater utility for a creek-walking event, but the water utility also has a three-person watershed crew that routinely walks creeks known to have issues with sewer pipes that cross them, or other potential problems. They generally walk the creeks during low-flow periods; they work two or three at a time for safety.

Knee-deep in the water, the creek walkers look for pipes that are cracked, for pipes that have been bumped by trees washing downstream during high water, or for erosion that might leave pipes unsupported and vulnerable to cracking. “We generate work orders based on each walk, and our field services team follows up,” says Burchfield.

Walking the creeks is just one way Columbus Water keeps a close watch on the creeks that drain its service area and supply its reservoir. It also has electronic monitors on creeks throughout the region.

The utility pumps an average of 35 mgd from a treatment plant with a capacity of 90 mgd. It serves Muscogee County and sells water to Harris and Talbot counties and the Fort Benning military base.

It also operates one central wastewater treatment plant and two small plants that handle combined sewer overflows in the older part of the city. The source water is the Chattahoochee River on the border between Georgia and Alabama. Georgia Power owns the reservoir.

CONSTANT MONITORING

The water works and its regional partners have had a Source Water Assessment Plan in place since 2001 and upgraded in 2018. The SWAP identifies all the sources of waste in the tributaries that feed the river, such as fueling plants or bridges where there is potential for a tanker spill.

“All those vulnerability points are identified upstream in the watershed,” Burchfield says. “We have partnerships with other utilities pulling water from the same reservoir. It’s a common goal to keep that watershed as clean as possible. Ongoing sampling is part of that. We have real-time monitoring probes that measure pH, oxygen and turbidity. We can look at the devices



A Columbus Water Works truck collects grease that is added to the digesters to boost methane production.

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Residents can drop off kitchen grease at recycling locations around the community.

“We’re not only inspecting piping. We’re looking for water-quality issues. We also observe the wildlife, such as frogs, turtles and minnows.”

VIC BURCHFIELD

and tell the condition of the water before it gets to the water plant.

“Even as you get down into the city, where we’re below the water plant, that’s where our watershed protection plan kicks in for all tributaries in Columbus that feed into the river that would affect people downstream. That watershed protection plan is really a whole plan that looks at everything that would be affected south of us.”

FINANCIAL SUSTAINABILITY

Columbus Water Works has numerous sustainability programs, including on the financial management side. “We really focus hard on financial sustainability,” Burchfield says. “One program is our rate model that predicts out 15 years ahead and establishes a five-year financial plan. It looks at our water usage over the past five years and predicts usage going forward. It also looks at our capital needs. We heavily rely on that rate model to set our rates each year.”

Programs like that help the utility keep a good bond rating so it can borrow at reasonable rates. The utility also has a five-year master plan for its facilities and operations and additional plans that cover IT, facilities, energy and asset management.

“We take the outputs from those plans and we input them into a facilities overall master plan to develop the projects we need to sustain the water works,” Burchfield says.

GREASE COLLECTION

In another sustainability initiative, the utility captures methane at its wastewater treatment plant and uses it to heat the digesters and to run turbines that generate electricity. Fats, oils and grease added to the digesters boosts methane production and takes care of a pesky waste product.

Area residents help. The utility places grease containers at 49 apartment complexes and 89 commercial facilities. A specially painted truck does the collections. “We set out containers where people can dump their grease every day,” Burchfield says. There are also 13 locations where residents can drop off containers of grease. They are at park entrances and other easily accessible places.

“This is where homeowners can bring their leftover kitchen grease, so they can have a place to put it instead of down the drain,” Burchfield says.

Columbus Water Works has been recycling grease this way since 2011, so it’s not surprising that the sustainability award it won in 2019 was not its first. The utility also won an AMWA sustainability award in 2014. **tpo**

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1. OxyStar units mix and oxygenate the water by rotating a submerged propeller that pumps water downward and forward as air is aspirated through a hollow shaft.
2. OxyStar aerators are well suited for oxidation ditches and for treatment lagoons.

Air for Oxidation Ditches

ASPIRATING AERATORS ARE DESIGNED TO PROVIDE AN EASY-TO-INSTALL AND EFFICIENT SOLUTION FOR SECONDARY WASTEWATER TREATMENT

By Ted J. Rulseh

There are various ways to deliver air to a secondary wastewater treatment process. Some involve blowers feeding diffusers on the bottom of a basin. Others are mechanical, introducing air through a stirring action.

Now Aqua-Aerobic Systems offers OxyStar aspirating aerators for municipal and industrial wastewater applications. Rated at 3 to 30 hp, they can be used to deliver oxygen and mixing to oxidation ditches and also to lagoons, aerobic digesters and equalization basins.

The units provide efficient fine-bubble aeration by circulating and mixing basin or tank contents. They are well suited for retrofit in process upgrades or to supplement or replace aeration systems that no longer perform adequately. Alan Rice, product manager with Aqua-Aerobic Systems, talked about the technology in an interview with *Treatment Plant Operator*.

tpo: What was the rationale for bringing this technology to the market?

Rice: Aqua-Aerobic Systems has a long history in manufacturing surface aerators, and there is a market need for directional aerators. A number of processes, including oxidation ditches, require directional aeration and mixing, for which our typical aerators would not be a good fit.

tpo: How do you define a directional aerator?

Rice: Our traditional aerators spray water in a radial pattern. OxyStar units pump water downward and forward at a 45-degree angle. Oxidation ditches have long, narrow channels that need this directional mixing to maintain a certain velocity throughout the channel and to hold the solids in suspension.

tpo: In basic terms, how do these devices work?

Rice: They mix and oxygenate the water by rotating a submerged propeller. As the propeller spins, it creates a low-pressure zone below the surface. That pressure gradient aspirates air through a hollow shaft and discharges it into the water. There the turbulence created by the propeller shears it into fine-bubble aeration.

tpo: Would this technology also be suitable for traditional secondary aeration basins?

Rice: That is a different treatment process used mostly in larger communities. Oxidation ditches are designed for smaller communities, and that is the No. 1 application for these aspirating aerators.

tpo: Where does this product fit in with the other applications mentioned?

Rice: It fits well in cold-weather areas where other surface aerator technologies could cause ice buildup. The aspirator is completely subsurface, which means we're not splashing water or creating aerosols or mists. In a northern state during winter, that moisture can potentially freeze and coat plant equipment with ice. In addition, for plants in residential areas, those aerosols and mists can be picked up in the wind and bother local residents.

tpo: Do these devices produce air bubbles as fine as those from traditional bottom-mounted membrane-type aerators?

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Rice: It creates fine bubbles by a different mechanism. Rather than create bubbles at the bottom of the basin, we draw air into the basin and shear it with a propeller. That creates fine bubbles according to the U.S. EPA definition.

tpo: Why is this technology more suitable in certain applications than bottom-mounted membrane aerators?

Rice: These units are especially designed for shallow operation. The efficiency of membranes on the floor is highly dependent on how deep the basin is. They are very efficient at 20 feet deep, but they're not efficient at all at 5 feet deep. The efficiency of our units is independent of depth, and so it makes a lot of sense in shallow operations.

tpo: What other major advantages does this technology have?

Rice: It is very mechanically simple. There are only three moving parts — a motor shaft, a coupler and a propeller — and they are all above the surface. In addition, the motor bearings are sealed for life, so there is no regular maintenance to perform.

tpo: What is involved in installation of these units?

Rice: They are very simple to install. The units float on the surface, so all that's needed is a crane, a hammer drill and a set of bolts. You drill the bolts into the side of the basin, set the units in, and the work is essentially complete. They can be installed within hours. The primary use for these aerators is in retrofits.

tpo: Can they be installed without taking an oxidation ditch out of service?

Rice: Yes. Installations can be completed while the basin is full and operating.

tpo: How would you characterize the energy efficiency of these aerators?

Rice: They have energy efficiency similar to brush rotor aerators.

tpo: What features make the aerators durable?

Rice: They are long-lasting because there is so little maintenance to do. There are no submerged seals or bearings that can be damaged by grit or solids in the wastewater. The pontoons are molded polyethylene and built for buoyancy, and they are connected with a stainless steel framework.

tpo: Is there a sweet spot in the size of facilities for these units?

Rice: They make the most sense for facilities smaller than 3 to 4 mgd. On the lower end, we can fit almost any size facility, but the sweet spot would be 0.1 to 1 mgd.

tpo: How many of these units does it take to serve a 1 mgd facility?

Rice: For mixing we would typically use two 30 hp units. For oxygen transfer, we would require four units.

tpo: So far, how have customers responded to this technology?

Rice: They have spoken highly of it. Most have used it to replace old equipment. A small town in Alabama replaced an old brush aerator with the OxyStar and reported a doubling of mixing capacity. They have basically no maintenance issues. Customers have been happy with the performance and the low maintenance of our unit. **tpo**

“Installations can be completed while the basin is full and operating.”

ALAN RICE

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CRANE PUMPS & SYSTEMS 420 Third St., Piqua, OH 45356 937-778-8947 937-773-2157 crane pumps@cranepumps.com www.cranepumps.com See ad on page 11				YES				YES	YES
EBARA Pumps Americas Corporation 1651 Cedar Line Dr., Rock Hill, SC 29730 803-327-5005 info@pumpsebara.com www.pumpsebara.com		YES				YES		YES	YES
EPIC INTERNATIONAL, Inc. 10993 Richardson Rd., Ashland, VA 23005 804-798-3939 Fax: 804-798-9175 try@epicintl.com www.epicintl.com Environmental Products for Innovative Conservation	YES								
FPZ, Inc 150 N Progress Dr., Saukville, WI 53080 262-268-0180 Fax: 262-268-0415 usa@fpz.com www.fpzusa.com See ad on page 37		YES							
Franklin Electric 9255 Coverdale Rd., Fort Wayne, IN 46809 260-824-2900 franklinwater@fele.com www.franklinengineered.com See ad on page 33		YES			YES	YES		YES	YES
Gardner Denver 1800 Gardner Denver Expy., Quincy, IL 62305 866-428-4890 www.gardnerdenver.com/gdproducts		YES				YES			
Global Pump 10162 E Coldwater Rd., Davison, MI 48423 866-360-7867 810-653-4828 Fax: 810-658-0632 sales@globalpump.com www.globalpump.com		YES			YES	YES			
Gorman-Rupp Company 600 S Airport Rd., Mansfield, OH 44903 419-755-1011 Fax: 419-755-1251 grsales@gormanrupp.com www.GRpumps.com See ad on page 17		YES				YES		YES	
Hawkins Water Treatment Group 2381 Rosegate, Roseville, MN 55113 800-328-5460 612-331-6910 john.andren@hawkinsinc.com www.hawkinsinc.com/groups/equipment		YES	YES				YES		
Hydra-Tech Pumps 167 Stock St., Nesquehoning, PA 18240 570-645-3779 Fax: 570-645-4061 htpump@hydra-tech.com www.hydra-tech.com See ad on page 51				YES		YES			

	High Pressure	Metering	Peristaltic	Piston/Plunger	Progressive Cavity	Pump Alignment/ Vibration	Pump Controls	Pump Parts/ Components	Pump Repair/ Service	Rotary Lobe	Solids/Sludge	Submersible	Vertical/ Lift Station	Other
							YES				YES	YES		
		YES	YES											
											YES			
							YES	YES	YES		YES	YES	YES	
		YES												
	YES				YES		YES	YES				YES	YES	
			YES					YES	YES					
				YES				YES	YES	YES	YES	YES	YES	
	YES						YES	YES	YES		YES	YES	YES	
		YES	YES					YES						
								YES			YES	YES		

(continued)

Pumps Directory 2021



Archimedes/
Screw

Centrifugal

Chemical Feed

Chopper

Deep Well

Dewatering/
Bypass

Diaphragm

Effluent

Grinder/
Sump



IWAKI America
5 Boynton Rd., Holliston, MA 01746
508-429-1440
info@iwakiamerica.com www.iwakiamerica.com

YES

YES

YES



See ad on page 55

JAECO Fluid Systems
100 Quaker Ln., Malvern, PA 19355
877-778-3456 610-407-7207
info@jaecofs.com www.jaecofs.com

YES

YES



See ad on page 8

JDV Equipment Corporation
1 Princeton Ave., Dover, NJ 07801
973-366-6556
sales@jdvequipment.com www.jdvequipment.com

YES

YES



See ad on page 58

Komline-Sanderson
12 Holland Ave., Peapack, NJ 07977
800-225-5457 908-234-1000 Fax: 908-234-9487
info@komline.com www.komline.com

YES



See ad on page 3

Lakeside Equipment Corporation
1022 E Devon Ave., Bartlett, IL 60103
630-837-5640 Fax: 630-837-5647
sales@lakeside-equipment.com
www.lakeside-equipment.com

YES



Lutz-JESCO America Corp.
55 Bermar Park, Rochester, NY 14624
800-554-2762 585-426-0990 Fax: 585-426-4025
mail@jescoamerica.com www.lutzjescoamerica.com

YES

YES

YES



See ad on page 4

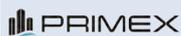
Penn Valley Pump Co., Inc.
998 Easton Rd., Warrington, PA 18976
800-311-3311 215-343-8750 Fax: 215-343-8753
info@pennvalleypump.com www.pennvalleypump.com

YES

YES



Philadelphia Gear, Power Systems by Timken
935 First Ave. 2nd Fl., Ste. 200, King of Prussia, PA 19406
800-766-5120 610-265-3000 Fax: 610-337-5637
info@philagear.com www.philagear.com



PRIMEX
22650 Cty. Hwy. 6, Detroit Lakes, MN 56501
218-847-1317 Fax: 218-847-4617
info@primexcontrols.com www.primexcontrols.com



Proco Products, Inc.
2431 N Wigman Dr., Stockton, CA 95205
800-344-3246 209-943-6088 Fax: 209-943-0242
miquelm@procoproducts.com www.procoproducts.com



Pulsafeeder, Inc.
27101 Airport Rd., Punta Gorda, FL 33982
800-333-6677 941-575-3800
kreid@idexcorp.com www.pulsatron.com

YES

YES



See ad on page 9

SEEPEX Inc.
511 Speedway Dr., Enon, OH 45323
937-864-7150
sales.us@seepex.com www.seepex.com

YES

YES

	High Pressure	Metering	Peristaltic	Piston/Plunger	Progressive Cavity	Pump Alignment/ Vibration	Pump Controls	Pump Parts/ Components	Pump Repair/ Service	Rotary Lobe	Solids/Sludge	Submersible	Vertical/ Lift Station	Other
	YES	YES				YES					YES			
	YES	YES	YES				YES	YES						
											YES	YES		
	YES		YES			YES	YES	YES			YES			
	YES	YES	YES		YES	YES	YES	YES						
			YES								YES			
						YES	YES	YES	YES					
						YES								
					YES									
		YES	YES				YES	YES	YES					
	YES	YES		YES		YES	YES	YES			YES			

(continued)

Pumps Directory 2021



Smith & Loveless, Inc.
14040 Santa Fe Trail Dr., Lenexa, KS 66215
800-898-9122 913-888-5201
answers@smithandloveless.com
www.smithandloveless.com



Sulzer Pumps Solutions, Inc.
140 Pond View Dr., Meriden, CT 06450
800-525-7790 203-238-2700 Fax: 203-238-0738
info.abs.usa@sulzer.com www.sulzer.com



Vaughan Company, Inc.
364 Monte-Elma Rd., Montesano, WA 98563
888-249-2467 360-249-4042 Fax: 360-249-6155
info@chopperpumps.com www.chopperpumps.com

Vertiflo Pump Company
7807 Redsky Dr., Cincinnati, OH 45249
513-530-0888 Fax: 513-530-0893
sales@vertiflopump.com www.vertiflopump.com



Wastecorp Pumps
PO Box 70, Grand Island, NY 14072
888-829-2783 201-445-2882 Fax: 888-888-3320
info@wastecorp.com www.wastecorp.com

Archimedes/ Screw	Centrifugal	Chemical Feed	Chopper	Deep Well	Dewatering/ Bypass	Diaphragm	Effluent	Grinder/ Sump
	YES						YES	
	YES		YES	YES	YES		YES	YES
YES	YES		YES		YES		YES	YES
	YES				YES		YES	YES
	YES	YES	YES		YES	YES	YES	YES

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Factory: 518-695-6851

Email: info@bdpindustries.com



www.bdpindustries.com

High Pressure	Metering	Peristaltic	Piston/Plunger	Progressive Cavity	Pump Alignment/ Vibration	Pump Controls	Pump Parts/ Components	Pump Repair/ Service	Rotary Lobe	Solids/Sludge	Submersible	Vertical/ Lift Station	Other
					YES	YES	YES			YES		YES	Dry-Pit Immersable
YES					YES	YES	YES			YES	YES	YES	
						YES				YES	YES	YES	Hydraulic Mixing
										YES	YES	YES	Stormwater
			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	

(Blowers Directory follows on page 47)

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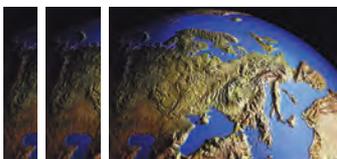
   @wwettshow

Blowers

Directory 2021



	CENTRIFUGAL			POSITIVE DISPLACEMENT		
	Multistage	Single Stage	High-Speed Turbo	Rotary Lobe	Hybrid	Rotary Screw
AERZEN 108 Independence Way, Coatesville, PA 19320 610-380-0244 aerzen@aerzenusa.com www.aerzen.com/en-us See ad on page 21	YES	YES	YES	YES	YES	YES
Atlas Copco Compressors 300 Technology Center Dr., Ste. 550, Rock Hill, SC 29730 866-546-3588 info@atlascopcousa.com www.atlascopco.us See ad on page 25	YES	YES	YES	YES	YES	YES
Eurus Blower, Inc. PO Box 4588, Wheaton, IL 60189 630-221-8282 Fax: 630-221-1002 tomh@eurusbLOWER.com www.eurusbLOWER.com See ad on page 55	YES	YES		YES		
FPZ Inc. 150 N. Progress Dr., Saukville, WI 53080 262-268-0180 Fax: 262-268-0415 usa@fpz.com www.fpzusa.com See ad on page 37	YES	YES				
Franklin Electric 9255 Coverdale Rd., Fort Wayne, IN 46809 260-824-2900 franklinwater@fele.com www.franklinengineered.com See ad on page 33	YES	YES				
Howden 900 W. Mount St., Connerville, IN 47331 800-557-6687 765-827-9200 Fax: 765-827-9317 inquiries.usa@howden.com www.howden.com See ad on page 45	YES	YES	YES	YES		
Kaeser Compressors, Inc. 511 Sigma Dr., Fredericksburg, VA 22408 866-516-6888 540-898-5500 info.usa@kaeser.com http://us.kaeser.com/tpo See ad on page 15			YES	YES		YES
Spencer Turbine Company 600 Day Hill Rd., Windsor, CT 06095 860-688-8361 sales@spencer-air.com www.spencerturbine.com	YES	YES	YES			
Sulzer Pumps Solutions, Inc. 140 Pond View Dr., Meriden, CT 06450 800-525-7790 203-238-2700 Fax: 203-238-0738 info.abs.usa@sulzer.com www.sulzer.com See ad on page 27			YES			



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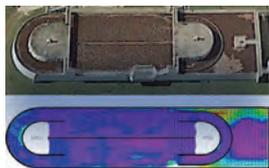
Read why and learn about the operators, tools and techniques behind it.
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Duperon Dual Auger System

The Duperon Dual Auger System is a solution to pump clogging caused by flushable wipes and other pump-fouling debris. The patent-pending DAS uses three proven Duperon technologies to remove flushable wipes at or near where they enter the collections system, before downstream equipment can be impacted. The DAS, which offers a mechanical solution that reduces hands-on labor, can be installed easily in manholes as small as 17 inches. The system captures, dewater, compacts and conveys solids in a single system. It features completely contained screenings for odor control and aesthetics. Above- or below-grade discharge options offers flexibility for each application and a built-in bypass eliminates sewer backup during power outages.

800-383-8479; www.duperon.com



U.S. Submergent Technologies SediVision imaging system

U.S. Submergent Technologies' SediVision is a sonar imaging system designed especially for wastewater conditions. SediVision allows for greater visibility under dark water due to excessive turbidity in tanks. This information can be used to guide the allocation of limited resources and direct cleaning efforts toward structures with the highest accumulation, resulting in a more efficient cleaning process. The system provides comprehensive pre- and post-cleaning inspection images and reports, and offers recommendations for the best course of action for removal of material.

844-765-7866;
www.ussubmergent.com

product spotlight wastewater

System makes in-plant process monitoring easy

By Craig Mandli

As more processes in the wastewater treatment plant become automated, the ability to monitor those processes to maintain safe and effective treatment is of the utmost importance. **Hawk Measurement Systems** recently introduced an in-plant and cloud-based measurement and monitoring system, **HawkEye365**, designed to make that monitoring easy.

The HawkEye365 online inventory asset and monitoring portal is a complete remote and in-plant measurement and monitoring system. The unique system offers communications capabilities and compatibility with Power over Ethernet level sensors. The advantages to Power over Ethernet connectivity are secure in-plant and remote monitoring as well as remote sensor setup, diagnostics and troubleshooting abilities. The portal not only monitors PoE transmitters, but is sensor agnostic and can monitor any type of field device such as level, flow, pressure, temperature and pH. The multiple communication methods include RS485, HART, Modbus, Ethernet TCP/IP, cellular, Bluetooth and PoE.

"HAWK has been providing innovative sensor technologies for over 30 years in some of the harshest environments," says Jack Evans, president of HAWK. "We have provided remote service capabilities for many years now, and have developed remote monitoring of assets with the ability to provide remote service."

HawkEye365 can monitor multiple tanks and applications worldwide in real time. The portal provides accessibility to critical data such as the ability



HawkEye365 from Hawk Measurement Systems

to view volume, space, material height, historical trending, alarms and alerts, sensor setup and diagnostics. Plant level operator screens are customized to the company's specifications to include control room level and operations level interface screens. The graphical user interface will be common throughout and permissions can be set for different tiers such as plant-level, finance or executive level. If any troubleshooting is required, the HawkEye365 will communicate to remote service technicians for off-site diagnostics, sensor health and reconfiguration, without the need to climb a tank or enter the facility.

Inventory asset management is becoming more critical throughout many process industries besides just water and wastewater, including in oil and gas, chemical and petrochemical, energy, mining and agriculture. Evans explained that the decision to design and develop the HawkEye365 monitoring technology was necessary based on their customer feedback and foreseeable direction of the market.

"The HawkEye365 is designed for expansion to uplink data to unlimited facilities and unlimited remote sites," he says. "HAWK is committed to providing innovative technology and services to customers globally." 888-429-5538; www.hawkmeasurement.com



Shimadzu FTIR plastic analysis system

Shimadzu Scientific Instruments' new Fourier Transform Infrared spectrophotometer plastic analysis system includes proprietary UV- and thermal-damaged plastics libraries to facilitate highly accurate qualification and determines the state of deterioration when analyzing foreign substances, contaminants and microplastics. The system features

Shimadzu's IRSpirit FTIR spectrophotometer, QATR-S single-reflection ATR attachment and the plastic analyzer method package. The plastic analyzer method package includes FTIR spectral libraries for plastics degraded by UV rays and heat. The UV-damaged plastics library includes more than 200 spectra from the UV degradation of 14 types of plastics, unirradiated and UV irradiated for one to 550 hours. The thermal-damaged plastics library includes more than 100 spectra from the degradation of 13 types of plastic heated to between 392 and 752 degrees F.

800-477-1227;
www.ssi.shimadzu.com



Alfa Laval CM wireless condition monitor

Alfa Laval's CM is a condition monitoring system for rotating equipment such as pumps, mixers and agitators, used in hygienic process environments. Compact, easy to use and easy to install, it tracks equipment vibration, temperature and total runtime: three of the most widely used parameters for detecting and diagnosing equipment faults. Powering the system are equipment sensors that transmit data to a con-

nected compatible mobile device for predictive maintenance analysis, supporting decision-making with advanced diagnostics such as trend monitoring. Equipment vibration and temperature can be checked by visible notification on an LED indicator on the monitor or through a mobile app on a connected iOS or Android device within a 20-meter range during a periodic walkaround. **866-253-2528; www.alfalaval.us**



Watson-Marlow Qdos chemical metering pumps

Qdos chemical metering pumps from Watson-Marlow Fluid Technology Group now feature four configurable outputs to help cut down on the need for additional PLCs and provide extra flexibility when communicating with SCADA or other external monitoring systems. This provides for access to increased options for connectivity, enabling improved communication regarding pump performance and function status. The configurable outputs will sit alongside the current 4-20mA for a total of five outputs.

800-282-8823; www.wmftg.com



KROHNE OPTISONIC 6300 V2 ultrasonic flowmeter

The OPTISONIC 6300 V2 ultrasonic flowmeter from KROHNE has a stationary, clamp-on design ideal for a wide range of systems. New to the OPTISONIC 6300 V2 is a viscosity range of up to 200 cSt, so no need for re-greasing due to solid coupling material, a next generation signal converter for enhanced application range, Namur NE107 diagnostics, and integrated thermal energy calculation. The flowmeter is suitable for diameters ranging from 1/2 to 160 inches. It has a process temperature range of negative 40 to 392 degrees F. The flowmeter is constructed as a submersible stainless steel sensor rail (IP 68/NEMA 6P).

For the complete diameter range, the OPTISONIC offers flexible configurations: single and dual ultrasonic sensors; wall and field signal converter housing; and V-, W-, Z-, and X-mode measurement modes.

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



FTI Flow Technology OCT_PA2 Series flowmeters

The QCT_PA12 Series of in-line liquid ultrasonic flowmeters from FTI Flow Technology are compact, lightweight and designed for use in low-viscosity liquid applications requiring excellent accuracy and reliability at an economical price point. The meters' construction and Nylon-12 (PA12) material make them the meters of choice for many high purity and corrosive liquids. The flowmeters have non-wetted sensors and no moving parts. They are available in sizes 1/8- to 2-inch, accurate to positive/negative 0.5% of reading positive zero stability, and repeatability is positive/negative 0.2% over 10-to-1 calibration range. It has a 0.035 to 250 gpm flow range, 14 to 176 degree F temperature range, and analog, scaled frequency and Modbus RTU outputs.

480-240-3400; www.ftimeters.com



Hydro-Thermal's Hydrive Linear Actuator

Hydro-Thermal's Hydrive Linear Actuator was designed from the ground up to optimize the performance of Hydro-Thermal's direct steam injection fluid heating and cooking systems, to deliver accurate and precise temperature control. It features ultrasmooth and precise movement in a compact yet robust package, and advanced sensors and smart digital connectivity to achieve the perfect temperature. The Hydrive is designed to meet 3-A standards, has a clean and compact design weighing just 30 pounds, and features an adjustable stroke length for up to 1.5-inch of travel enabling its use on a broad array of heater sizes.

800-952-0121; www.hydro-thermal.com



Patterson Manufacturing davit cranes

New davit cranes are available from corrosive environment and safety experts, Patterson Manufacturing. Give your operations a lift with models in 1/2- and 1-ton capacities. The cranes exhibit the company's hallmark safety, simplicity and durability, 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. They put safety and simplicity within your reach with a low maintenance, easy-to-assemble design that is made in the U.S.A. For over 160 years, Patterson has been a trusted supplier of winches, rigging, fittings and custom products for lifting applications in the marine, construction and mining markets. These davit cranes continue to deliver the company's promise of helping businesses run safer, easier and faster. Find out how our team and products can improve employee safety and positively impact your bottom line.

800-322-2018; www.pattersonmfg.com/davit-cranes



Flomatic wafer-style check valves

Flomatic's Model 888VFD wafer-style check valves can be close coupled with a butterfly valve, allowing for operation of the butterfly valve in an open or closed position with no interference. Its unique poppet design operates quietly and efficiently across a wide range of flow velocities, which makes it ideal for varying flow rates in VFD-controlled pumping systems. The design helps minimize flow losses and hydraulic shocks in the pump system. The spring-loaded poppet system is guided in an oversized sleeve for stability, resulting in quiet and efficient operation regardless of flow rate. The valve begins to close as flow is reduced and fully closes at zero velocity stopping reverse flow, helping to reduce water hammer shock. It is suitable for direct mounting of butterfly valves, eliminating the need for a 2- to 6-inch spool piece. The valves save energy and maintenance costs, and are rated NSF/ANSI 61 and NSF/ANSI 372, and they meet MSS-SP 125.

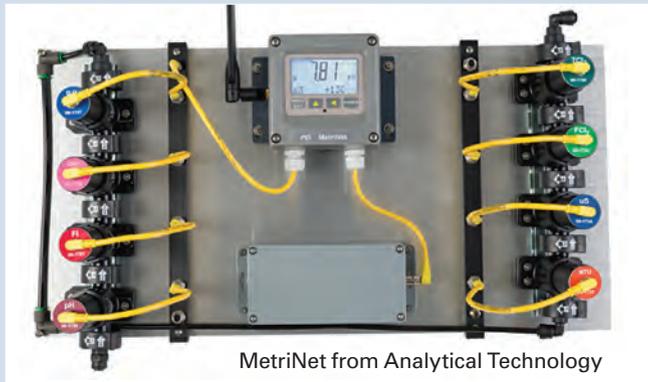
800-833-2040; www.flomatic.com tpo

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MetriNet from Analytical Technology

Monitoring system helps operators keep tabs on remote locations

By Craig Mandli

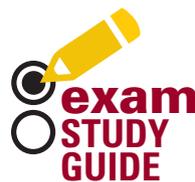
Remote locations can make water quality monitoring an expensive and complicated task. Traditionally, engineers would visit a site and manually monitor the water quality instrumentation. However, the traditional approach isn't capable of alerting you to water quality issues as they happen. That's where **MetriNet** from **Analytical Technology** can provide an answer.

MetriNet is a low-power, modular system for monitoring water quality parameters and collecting data at remote locations. This system is suitable for monitoring drinking water distribution systems, greenhouse water delivery systems, produce section misting systems, and other clean water applications. It provides a monitoring package of up to eight different parameters, with reliable collection and transmission of the acquired data.

"We provide end-users with greater flexibility in water quality monitoring and data transfer," says William Popp, national sales manager for Analytical Technology. "Smart water systems require water quality data that is generated in multiple locations throughout the distribution system. Each of these locations can present unique demands for monitoring, data collection and data transfer. MetriNet is designed to provide a solution to these monitoring challenges."

At the heart of the MetriNet system is a series of smart digital sensors. M-Nodes are a complete sensor and transmitter housed in a miniaturized body. They operate as independent modules that can be linked via a communication bus. Sensor and bus connectors are IP-67 rated for maximum signal protection. The controller allows setup and calibration of M-Nodes, as well as storing data and transmitting data to either local or remote locations. All nodes plug directly into MetriNet systems and are powered directly from the communications bus. Nodes may be added or removed as needed, and removal of a node will not affect system measurements. Data sampling rates are user selectable to minimize power consumption. Data is stored locally in standard .csv file format for easy manipulation with spreadsheet programs.

"This project was truly customer driven as several years of market research, by way of customer interaction and feedback, went into MetriNet design and development," Popp says. "Reliable, real-time water quality data that helps end-users improve their treatment process benefits the entire community. As more municipalities move toward a smart water distribution system, we feel that water quality is a critical component, and MetriNet is ideally suited to meet their water quality monitoring needs." **800-959-0299; www.analyticaltechnology.com**



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WASTEWATER

By Rick Lallish

When defining confined spaces in your facility, who makes the determination whether the space is nonpermit confined space or permit-required confined space?

- A. OSHA
- B. Local health department
- C. Operator
- D. Employer

ANSWER: D. Confined spaces are very common in the water/wastewater industry. OSHA standard 29 CFR 1910.146 states the employer evaluates the workplaces and makes the determination of what type of confined space each one is. The definition of confined spaces can be found in the standard. If the space is defined as a permit-required confined space, then the employer must inform the employees of its existence, its location and hazards it poses. These procedures are important for the operator to understand, especially when performing duties in confined spaces. Remember, safety first. More information may be found in the OSHA standard, 29 CFR 1910.146 or the OWP CSU-Sacramento textbook: *Operation and Maintenance of Wastewater Collection Systems Vol. 1* (Eighth Ed.), Chapter 3.

DRINKING WATER

By Drew Hoelscher

Using the table below, what finished water quality parameter(s) should the operator try to improve?

Analyte	Concentration
Fluoride	0.7 mg/L
Iron	0.6 mg/L
Manganese	0.04 mg/L
Calcium as CaCO ₃	85 mg/L
Magnesium as CaCO ₃	35 mg/L
Nitrate - N	4 mg/L
Chloride	200 mg/L

- A. Fluoride is too low and nitrate is too high
- B. Manganese, calcium and magnesium are above the SMCL
- C. Iron is above the SMCL
- D. Chloride is extremely high

ANSWER: C. Iron is listed on the National Secondary Maximum Contaminant Level (SMCL) list at 0.3 mg/L. At or above this level, iron may cause discolored water complaints at the point of use and/or staining on plumbing fixtures. The SMCLs are unenforceable and are only set as guidelines for public water supplies. More information about National Primary Maximum Contaminant Levels and National SMCLs can be obtained at https://www.epa.gov/sites/production/files/2016-06/documents/npwdr_complete_table.pdf.

ABOUT THE AUTHORS

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



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Pumps and Blowers

By Craig Mandli

Pump - Centrifugal

PENTAIR V2 SERIES

The V2 Series grinder from Pentair is designed with computational fluid dynamics software and has a volute and impeller design that allows shut-off heads up to 185 feet with a single-stage centrifugal pump. This design gives operators the flexibility to change between the standard, high-head and high-flow design by swapping the impeller and cutter plate, simplifying maintenance and reducing service parts inventory for low-pressure sewage system projects. It is available with an optional quick-disconnect cord for easier servicing in the field, double-row bearings to absorb axial and radial loads and an oil-filled motor for cooler operating temperatures and longer life. **855-274-8948; www.pentair.com**



V2 Series grinder from Pentair



BA150E Trailer Pump Package from BBA Pumps

Pumps - Dewatering/Bypass

BBA PUMPS BA150E TRAILER PUMP PACKAGE

The 6-inch BA150E Trailer Pump Package from BBA Pumps is a dewatering pump that provides a capacity up to 2,090 gpm. Due to the large solid passage of 3.15 inches, combined with a grinding wear plate, the

pump is also suitable for sewer bypass projects. The completely galvanized trailer is equipped with a large composite fuel tank. The lifting device also serves as a protective cover for pump and engine. The height of the pintle hitch can be adjusted, and the trailer is fitted with all the necessary safety provisions. **843-849-3676; www.bbapumpsusa.com**

PUCK ENTERPRISES BOOM TRUCK LEAD PUMP

Puck Enterprises's Boom Truck lead pump is manufactured for supreme flexibility and reach, allowing better, easier access to tanks and lagoons. It's equipped with a CAT 13B engine that can achieve maximum power at 577 hp. This translates to a 4,000 gpm pump capacity. The Boom Truck comes equipped with Puck's LightSpeed control system software. The truck's boom utilizes Puck's suite of hydraulic and electric control systems to ensure that the boom can be placed exactly where it needs to go. The wirelessly controlled boom has a 70-foot reach, which is supported by four large outriggers. **712-653-3045; www.puck.com**



Boom Truck lead pump from Puck Enterprises

WANER ENGINEERING HYDRA-CELL Q330

Hydra-Cell Q330 Series pumps from Wanner Engineering have a seal-less design to avoid the maintenance problems of mechanical or



Hydra-Cell Q330 Series pumps from Wanner Engineering

dynamic seals and packing that can leak and wear. They are designed for a variety of high-capacity applications, including saltwater disposal, saltwater injection, bulk transfer and hydraulic lift in oil fields, as well as steam generation, reverse osmosis in water and wastewater treatment, mine dewatering, boiler feed, and high-pressure cleaning.

Models are available to meet API 674 performance standards. The medium-pressure models offer flow rates up to 153 gpm and a maximum pressure rating of 3,500 psi. High-pressure models offer flow rates up to 118 gpm and a maximum pressure rating of 4,500 psi. The seal-less design means they don't have a leak path and therefore eliminate hazardous VOC emissions and the cleanup and disposal costs of packed-pump leakage. **612-332-5681; www.hydra-cell.com**

Pump - Effluent

ASHLAND PUMP EFFLUENT PUMPS

Heavy-duty effluent pumps from Ashland Pump are available in multiple horsepower sizes for various performance requirements, with efficient permanent split-capacitor motors. The oil-filled pumps have an upper and lower ball bearing design and handle up to 3/4-inch solids. 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, 2/5, 1/2, 3/4, 1 and 1 1/2 hp models. **855-281-6830; www.ashlandpump.com**



Effluent pumps from Ashland Pump



Chem-Tech Series XP peristaltic pumps from Pulsafeeder

Pump - Peristaltic

PULSAFEEDER CHEM-TECH SERIES XP

Chem-Tech Series XP peristaltic pumps from Pulsafeeder deliver worry-free dosing in disinfection applications. They are self-priming and inherently degassing, making them suitable for gaseous chemicals such as chlorine. They are available in both fixed "F" Models being the most economical and simplest to use and the adjustable "A" models. The electronic timing circuit in the adjustable "A" Models provides reliable pump control, without relying on mechanical adjustment components that wear over time. The intuitive interface and controls provide easy operation, and the peristaltic design is virtually maintenance-free. A rugged gear train ensures long-lasting performance. They are available in Fixed Rate, Adjustable, Pulse Input, Flow Switch Activated, Dry Contact Input and Timer models. **800-333-6677; www.pulsatron.com**

Pumps - Solids/Sludge

BOERGER BLUELINE

The BLUEline rotary lobe pump from Boerger is a self-priming, valveless, positive-displacement pump used to convey viscous and abrasive materials. There are 21 pump models in six series with pulsation-free operation, fully



BLUEline rotary lobe pump from Boerger

reversible rotation, dry-run capabilities and flow rates up to 7,500 gpm. The pumps are stable and wear resistant with a maintenance-in-place design that allows for all wetted parts to be easily replaced through the front cover without removing the pipe or drive systems. **612-435-7300; www.boerger.com**

VERTIFLO PUMP 1600 SERIES



1600 Series pump from Vertiflo Pump

The 1600 Series horizontal close-coupled, vortex end suction pump from Vertiflo Pump is suitable in a wide range of applications in areas like food processing solids, wastewater treatment, pollution control, slurries and solids. It offers capacities to 1,600 gpm and heads to 170 feet TDH, and it withstands temperature to 250 degrees F. Pumps are designed with back pullout construction that permits easy inspection and access for service or

maintenance if needed without disturbing the piping to the pump. Standard construction is cast iron, 316 stainless steel fitted, all 316 stainless steel, alloy 20 or CD4MCu. The impeller has a fully recessed design, which accommodates the passage of solids. All impellers have wiping vanes, which reduce axial loading and prevent dirt from entering the sealing area. The impeller is keyed to the shaft, and an impeller locking screw ensures positive attachment. **513-530-0888; www.vertiflopump.com**

Pumps - Submersible

HYDRA-TECH PUMPS S3CSL

The S3CSL submersible 3-inch hydraulic-driven sand slurry pump from Hydra-Tech Pumps includes a built-in agitator used for stirring up solids. It has hardened alloy wear parts and is designed to be used in applications where settled solids must be put into suspension and pumped away with the discharge water. Primary applications include desilting ponds, lakes and streams; other uses include filling sandbags to prevent beach erosion, cleaning tanks and digesters, or pumping sediment from caissons. It requires hydraulic inputs of up to 10 gpm at 3,000 psi, and when combined with HT11 to HT20 open and sound-attenuated power units, it is capable of output flows to 450 gpm. **570-645-3779; www.hydra-tech.com**



S3CSL pump from Hydra-Tech Pumps

POLYLOK PL-CPE4A

The Polylok PL-CPE4A is a submersible, 4/10 hp, 115-volt, single-phase effluent pump with a 2-inch NPT vertical discharge. It has a maximum head of 38 feet and a maximum flow of 56 gpm. The pump is designed with a 3,450 rpm oil-filled permanent split-capacitor motor and has an amp rating of 6.6 for 115 volts, a rugged cast iron housing and volute equipped with a cast iron vortex impeller capable of passing 3/4-inch-diameter solids. The



Polylok PL-CPE4A effluent pump

stainless steel shaft is supported by two single-row, oil-lubricated ball bearings. The shaft seal is an inboard design with a secondary Exclusion

V seal. It has a 20-foot UL/CSA-listed power cable suitable for submersible service and fitted with a three-prong plug. The unit is supplied with an integrated clip for the included piggyback mechanical float switch and used for automatic operation. **888-765-9565; www.polylok.com**

Pump - Vertical/Lift Station

SCREENCO SYSTEMS PATZ SHAFT DRIVE PUMPS

Patz Shaft Drive Pumps, distributed by ScreencO Systems, are vertical pit pumps that can be used in aboveground or underground storage tanks and include choices of single- or three-phase electric motors. They have high solids and grit capacities with large centrifugal pumps and hardened steel impellers. High capacities include the 3333 series up to 500 gpm and the 4444 series up to 1,580 gpm. They can be deployed in depths from 3 feet to 12 feet, 8 inches. The 6000 and 8000 series have a three-point hitch with PTO drive and can offer up to 3,500 gpm at depths from 6 to 12 feet. They can be used with an agitator nozzle to mix and pump fast. The 616 vertical prop agitator is capable of mixing at 9,000 gpm, keeping grit and solids mixed at pit depths of 6 to 16 feet. **208-790-8770; www.screencosystems.com**



Patz Shaft Drive Pumps, distributed by ScreencO Systems

Blower

TMC FLUID SYSTEMS TURBO ONE

The TURBO ONE blower from TMC Fluid Systems comes with a high-speed permanent magnet motor boosting the motor's maximum efficiency to around 98%. The package comes standard with a pre-programmed inverter that improves energy savings, and a controlling logic system allowing for optimum operation. Benefits include a reduced energy usage; low maintenance costs, as only the inlet/suction filter needs replacing; quiet operation at 75 to 80 dB(a); and a compact size at about a third the size of a PD blower. **949-269-1472; www.tmcfluidsystems.com**



TURBO ONE blower from TMC Fluid Systems

Pump Controls

GORMAN-RUPP INTEGRINEX ADVANCED

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



Integrinex Advanced lift station controls from Gorman-Rupp

INDUSTRIAL FLOW SOLUTIONS STANCOR OIL MINDER CONTROL AND PUMP SYSTEM

The Stancor Oil Minder control and pump system from Industrial Flow Solutions allows water to be automatically pumped with-

out the danger of ejecting potentially harmful, oily substances into sewers, rivers and waterways. There is no need for a separate oil-water separator. The product is engineered for efficient and trouble-free pumping, even under the most severe conditions. It is a plug-and-play system that is easy to install and is designed with



Stancor Oil Minder system from Industrial Flow Solutions

conductive sensing technology to ensure the most reliable signal. It offers push-to-test to monitor installation. Complementary components, which are UL certified, are then designed to offer a high level of reliability from installation to operation.

It does so in a modular package configured to balance performance for the best value over the lifetime of equipment. **860-391-5719; www.flowsolutions.com**

LUTZ-JESCO AMERICA TOPAX MC

The TOPAX MC multichannel controller from Lutz-JESCO America has a modular design that makes it an adaptable and effective solution for all measurement and control technology requirements. It offers automated efficiency — freedom from repetitive control tasks while providing accuracy and reliability. Users can actuate the dosing pumps using an optocoupler or relay and servomotors



TOPAX MC controller from Lutz-JESCO America

by using a relay or a 20mA output. The high-resolution, 5-inch color display offers a user-friendly operating interface, with a simple touch-control and intuitive navigation menu that can be set to multiple languages. Use four analog outputs (0/4-20 mA) or the network capability to transfer measured values to a web browser or a telemaintenance point. A programmable interval timer can be used to set automatic alerts for wear-related sensor change. **800-554-2762; www.lutzjescoamerica.com**



OLS Control Panels from Orenco Controls

ORENCO CONTROLS OLS CONTROL PANELS

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**

SMITH & LOVELESS FORCE MAIN SYNC

Force main pressures vary; and without accounting for the variable conditions, reduced service life and a multitude of other issues arise. These phenomena result in impeller and volute



Force Main Sync from Smith & Loveless

erosion, reduced bearing and seal life, excessive pump noise, and vibration. Force Main Sync from Smith & Loveless monitors hydraulics in the common force main to keep pumping at the required flow rate. Using a PLC touch-screen human-machine interface, a VFD and a force main sensor, it constantly senses force main pressure and automatically adjusts the VFD to maintain a constant flow rate, no matter how many stations are online. **800-898-9122; www.smithandloveless.com**

Pump Parts/Supplies/Service

GRUNDFOS DOSING SKID SYSTEM CONFIGURATOR

The Grundfos Dosing Skid System Configurator lets users design a custom dosing skid system package online by answering a few simple questions. The interactive tool offers 16,000 possible configuration variants that serve an array of markets with complete chemical dosing solutions. It generates an interactive 3D model of a pre-engineered dosing skid system, a materials list, dimension drawings, a downloadable submittal package, and a contact form to learn more about ordering and availability. Users can design their custom skid systems by selecting the flow capacity and discharge pressure per pump, and pumped liquid for applications that include 12.5% sodium hypochlorite, 93% sulfuric acid, 10% hydrochloric acid, 50% sodium hydroxide, sodium bisulfate or peracetic acid. Additionally, selections are available to factor in controls and functionality, from remote start/stop to graphical display, field bus protocol, number of pumps (simplex or duplex), floor or wall mounting, and pipe material or choice between standard/vented ball valves. **913-227-3400; www.us.grundfos.com**



Dosing Skid System Configurator from Grundfos

It generates an interactive 3D model of a pre-engineered dosing skid system, a materials list, dimension drawings, a downloadable submittal package, and a contact form to learn more about ordering and availability. Users can design their custom skid systems by selecting the flow capacity and discharge pressure per pump, and pumped liquid for applications that include 12.5% sodium hypochlorite, 93% sulfuric acid, 10% hydrochloric acid, 50% sodium hydroxide, sodium bisulfate or peracetic acid. Additionally, selections are available to factor in controls and functionality, from remote start/stop to graphical display, field bus protocol, number of pumps (simplex or duplex), floor or wall mounting, and pipe material or choice between standard/vented ball valves. **913-227-3400; www.us.grundfos.com**

KSB SES SYSTEM



SES System from KSB

The SES System from KSB can show an operator ways to increase the energy efficiency of pump systems and prolong their service. By recording extensive measurement data, it is possible to evaluate the system operation and identify potential savings and any causes of damage. The operating range can be assessed regardless of the installation type or manufacturer. It can record process variables and vibration levels through on-site measurements, including pressure, rotational frequency, fluid and bearing temperature, analog signals 0/4-20mA and vibration, performing frequency analyses to identify causes of damage. The report and presentation of findings include an action plan and profitability analysis. **804-222-1818; www.ksbusa.com**

It can record process variables and vibration levels through on-site measurements, including pressure, rotational frequency, fluid and bearing temperature, analog signals 0/4-20mA and vibration, performing frequency analyses to identify causes of damage. The report and presentation of findings include an action plan and profitability analysis. **804-222-1818; www.ksbusa.com**

PATTERSON DAVIT CRANE

Patterson Davit Cranes give operations a lift with a low maintenance, easy-to-assemble design. They are available in 1/2- and 1-ton capacities, with a reliable brake with long life and readily available parts, a hot-dipped galvanized finish, and no plastic sheaves or pulleys. Winches, rigging, fittings and custom products for lifting applications are also available. **800-322-2018; www.pattersonmfg.com**



Davit Cranes from Patterson

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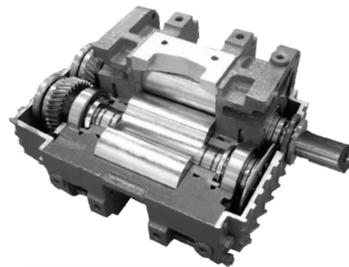
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Eliminate troublesome outside drops and clean up failed inside drops. RELINER/Duran Inside Drop Bowls and stainless steel pipe support brackets simply bolt to the manhole wall and can be cleaned and inspected from above. The compact, low-profile bowls are available in dozens of sizes to fit any application, including service laterals, mainline sewers and wet well drops. Stainless brackets are easily installed adjustable clamping pipe brackets available in noncorrosive 11-gauge 304 or 316 Stainless Steel and they are AIS Certifiable. They securely attach pipes to structure walls with no protruding hardware and are fully adjustable to fit irregular surfaces. Modular Manhole Invert Channels improve manhole hydraulics, reducing maintenance, turbulence and odor. 800-508-6001; www.reliner.com tpo



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Sealless pump a fit for bleach conveyance

Problem

The White House Utility District in Tennessee experienced leaks in some bleach pumps caused by seals deteriorating. “They had been using mechanically sealed pumps, which caused issues over time due to frequent repairs,” says Will Weathers, regional manager with Finish Thompson.

Solution

The district replaced one pump with a **Finish Thompson DB Series sealless pump**. After it worked well, they changed out all the pumps in that application and now have 12.



RESULT:

“The new pumps were pretty much plug and play,” says Chris MacPhee, plant supervisor. “We installed them six years ago and haven’t had one issue since.” 800-934-9384; www.finishthompson.com

Piston pumps help stabilize incinerator operations

Problem

Piston pumps fed dewatered cake solids to the incinerators at the Metropolitan Sewerage District of Buncombe County, North Carolina. The pumps were supplied in 1993 and sequentially replaced in 2005 and 2007. Pump capacity had to be nearly doubled as part of a plant expansion to accommodate community growth.

Solution

The package included upsized feed hoppers and a delivery piping and an actuated ball valve system that can feed the incinerator or be bypassed to truck loading. The **Schwing Bioset pipeline lubrication** was incorporated to reduce line pressure, extend wear part lives, and minimize the power draw of the hydraulic power pack. The original pumps had a single discharge line feeding the incinerators. The new pumps were delivered with a dual discharge system that splits the flow, enabling the incinerator to be fed from multiple locations to stabilize incinerator operations. To meet EPA regulations, Schwing Bioset provided its Sludge Flow Measuring System, which accurately measures the pump feed to the incinerator.



RESULT:

The package has performed without issue. Schwing Bioset provided the cake pumping equipment package and recently supplied new KSP 17 piston pumps to feed the dewatered cake solids to the incinerators. 715-247-3433; www.schwingbioset.com

Submersible chopper pump stands strong through tropical storm

Problem

The main lift station serving the wastewater treatment plant in Morgan’s Point, Texas, had problems with three standard nonclog pumps, which frequently clogged with shop rags and other debris after heavy rains. Over seven years, those issues cost \$100,000 for pump maintenance and service.



Solution

The city installed a **Vaughan SE-Series submersible chopper pump** and a complete guide-rail system.

RESULT:

The city received more than 100 inches of rain with no plugging or other issues. During Hurricane Harvey in 2017, the pumps ran continuously for 72 hours without incident, while pumping over 2.5 million gallons of sewage through the lift station. It never flooded and none of the 150 homes served experienced sewer backups. 888-249-2467; www.chopperpumps.com

Centrifugal blowers and master control panel lead to significant cost savings

Problem

An Ohio wastewater treatment plant’s aeration blowers were consuming about half the plant’s electricity. The multistage blowers operated at a constant speed and used an inlet throttling valve to regulate flow. The three 100 hp blowers were inefficient and had limited turndown capability. The plant needed to reduce energy costs and improve dissolved oxygen control.

Solution

The facility team chose three 75 hp **Inovair IM-30 integrally geared centrifugal blowers**, along with the company’s standard master control panel. The change immediately reduced blower power consumption by more than 25%. The blowers’ turndown range provided flexibility not previously possible. The control panel provided tight dissolved oxygen control with simple operation and easy interface with the plant SCADA system. This resulted in less airflow with minimal operator input, enhancing overall efficiency and significantly reducing costs.



RESULT:

Power consumption declined by almost 350,000 kWh, reducing annual energy bills by some \$26,000. Low capital cost and installation costs and the energy savings enabled fast payback, leading the utility to purchase additional Inovair blowers for its digestion process. 855-466-8247; www.inovair.com

people/awards

Paul D. Jones II, P.E., Eastern Municipal Water District general manager, received the John P. Fraser Emissary Award from the Association of California Water Agencies.

The **Orange County Water District** was the Region 10 winner of the 2020 Outreach Recognition Award from the Association of California Water Agencies for helping the association accomplish its legislative goals.

The Clayton County Water Authority's **W.B. Casey Water Reclamation Central Lab** earned its first Laboratory QA/QC Gold Award for Municipal Wastewater Systems greater than 20 mgd, from the Georgia Association of Water Professionals. The team had earned the Lab of the Year award twice before the award was changed to a silver, gold and platinum system. The Carrollton Water Treatment Plant received a Laboratory QA/QC Silver Award for facilities serving 10,000 to 100,000 residents.

New Jersey American Water received a Governor's Environmental Excellence Award from the New Jersey Department of Environmental Protection.

The **South Valley Sewer District** received a 2020 Sherwin-Williams Impact Award for restoration of eight deteriorated membrane bioreactor basins at the Jordan Basin Water Reclamation Facility in Bluffdale, Utah.

The **Gulf Coast Water Authority** in Texas City, Texas, dedicated a new \$19 million industrial pump station in honor of Joseph A. Willhelm, its first general manager.

For the second year in a row, the **City of Concord Water Department** was named Wastewater Collection System of the Year for medium-sized systems by the AWWA North Carolina Section.

The **Lincoln Wastewater System** received the 2020 Nebraska Water Environmental Association Scott Wilber Award for excellence in facility operation and maintenance. The system's Theresa Street Facility received the Special Innovation Award for biogas recovery and generating renewable natural gas for vehicle fuel.

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Progressive cavity pump simplifies maintenance

Problem

A wastewater treatment plant in Kentucky used piston pumps for bio-solids conveyance. The pumps tended to pulsate and, due to the high demands of the plant, they were operated at high speeds and pressures. Parts wear led to time-consuming maintenance and costly replacements. Maintenance issues along with conveyed product leaking from the pumps led the plant to explore alternatives.

Solution

The facility team selected four **BN 35-6LS pumps** with 20 to 100 gpm capacity. The pumps were equipped with the **SEEPEX** maintain-in-place Smart Conveying Technology and TSE temperature controllers, which shut the pumps off at unsafe temperatures. The integrated solution ensures optimal maintenance costs; the pumps are protected against various kinds of damage.



RESULT:

Smart Conveying Technology simplified maintenance and repair. Spare parts costs have been reduced substantially. The pumps can be serviced quickly without being dismantled. **937-864-7150; www.seepex.com**

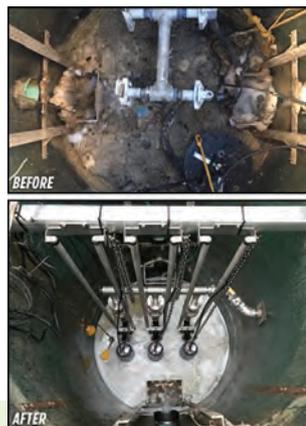
Grinder pumps solve community's clogging issue

Problem

At least once a month residents of a 48-unit townhome complex in New Jersey saw a vacuum truck unclogging their sewer pump system and cleaning out the well. The complex used a four-pump system engineered for single-family homes, and it was underperforming with a pumping capacity of 11 gpm. Rags and solids accumulated in the basin, and frequent vacuum truck visits were needed to keep the system operational.

Solution

The facility turned to **Franklin Electric FPS IGP Series Grinder Pumps**, designed as replacements for small-horsepower progressive-cavity and other centrifugal grinder systems. The 2 hp pumps have a maximum flow rate up to 33 gpm; the quadplex system was simplified to a triplex. These pumps allowed the owner to keep the existing basin and modify the controls. They were installed on a guiderail so that maintenance technicians can easily slide them out of the well, saving time and money.



RESULT:

Installed in 2018, the system has never clogged, eliminating the vacuum truck visits and the maintenance and emergency repair costs. **800-437-6897; www.franklin-electric.com tpo**

events

March 8

AWWA Women's Day Webinar, online. Visit www.awwa.org.

March 23-25

Water Environment Federation Collections Systems 2021: A Virtual Event. Visit www.wef.org.

March 31

Staying Ahead of PFAS Using AWWA's Drinking Water Treatment for PFAS Selection Guide Webinar. Visit www.awwa.org.

industry news

Ashland Pump announces name change, acquisition

Ashland Pump announced it acquired Water Source, a supplier of accessories and pumps for the sump, sewage and water systems markets. The Water Source team, currently located in Norwalk, Ohio, will be relocating to the Ashland, Ohio, facilities. Their key staff will remain with the company. In addition to the acquisition, Ashland Pump is also changing its corporate name to Ashland Water Group, effective Jan. 1, 2021.

Kaeser expands U.S. headquarters

Kaeser Compressors broke ground on a new 30,000-square-foot facility expansion at its headquarters, based in Fredericksburg, Virginia. The virtual ceremony was led by Frank Mueller, president of Kaeser Compressors, and included representatives of Lifecycle Construction Services, McKinney Architects and the Spotsylvania County Economic Development Department. The new space will accommodate an additional 100 people and also provide enhanced amenities for all employees.

Ken Gayer named CEO of USALCO

USALCO has appointed Ken Gayer CEO. Gayer is the first nonfamily CEO of the private equity-backed chemical company, sponsored by H.I.G. Capital. Gayer most recently served as CEO of Gelest. Prior to Gelest, he was business president of Honeywell Specialty Products and had a 15-year tenure at Honeywell in a variety of leadership positions.



Ken Gayer

Anue Water names J.H. Wright as exclusive channel partner

Anue Water Technologies announced that J.H. Wright and Associates is the exclusive new channel partner for the sales and distribution of Anue's eco-friendly product line throughout the Gulf States of Louisiana, Mississippi, Alabama, the Florida Panhandle and Georgia.

Flottweg opens new customer care center in Ontario

Flottweg announced it opened a new customer care center in Etobicoke, Ontario. The new 15,000-square-foot facility offers product sample analysis and field trial equipment, and also services to evaluate and tailor the right solution to a customer's application. On-site service and repair, along with equipment startup and training services, is supported by its spare parts inventory. The facility is also equipped to provide shop repair, rebuild and reconditioning services. Flottweg's service provider agreement with Centrifuges Unlimited provides local repair, rebuild and reconditioning support to customers in Western Canada.

Centrisys/CNP introduces new name for AirPrex

Midwest-based Centrisys/CNP has introduced a new name for one of the company's nutrient-recovery technologies, previously called AirPrex, which will now be called MagPrex in North American markets.

Brown and Caldwell hires new Pittsburgh leader

Brown and Caldwell welcomed Heather Dodson as its new Pittsburgh leader. With 17 years' experience in water, wastewater, and stormwater management design and permitting, land development and municipal engineering, Dodson will be responsible for operations management, providing client service, and expanding Brown and Caldwell's regional presence and talent pool to meet market and customer needs.

Aquatic Informatics receives ISO/IEC 27001 certification

Aquatic Informatics' cloud-based environmental data analytics platform, Aquarius, has received the ISO/IEC 27001 standard certification. This certification recognizes the highest level of security for the protection of customer information within the Aquarius Cloud platform.

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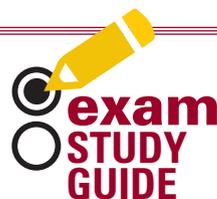
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120Water and PUR Community join forces on water programs

120Water, a digital water platform in use at more than 180,000 sample sites across the nation, has joined forces with PUR Community, a new municipality initiative created by PUR, a Helen of Troy brand, to simplify point of use drinking water programs for utilities, municipalities, and facilities, including lead remediation programs. With this partnership, 120Water can offer PUR pitcher and filter kits as part of its digital water platform to manage and modernize complex water programs and to help stay compliant with EPA regulations, including the upcoming revised Lead and Copper Rule.

Schneider Electric invests \$40M in U.S. supply chain

Schneider Electric announced an additional \$40 million investment toward modernizing its U.S. manufacturing plants in Iowa, Kentucky, Nebraska and Texas. The investment will go toward innovative technologies and new production lines that will help increase Schneider Electric's capacity of operations in the U.S. for its customers, and also to further develop its local workforce. **tpo**



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Self-Cleaning pH System

pH/ORP Monitor

The Q46P/R Monitors enhance the reliability of long-term pH or ORP measurement by providing automatic sensor cleaning. Effective on biological growth, oily coatings and other non-crystalline buildups, sensor maintenance is greatly reduced.

FEATURES

- "Q-Blast" Air-Blast Sensor Cleaning System
- Differential pH and ORP Sensors
- Sealed Reference Prevents Sensor Contamination



Total Chlorine Monitor



Reagent Free Measurement

The Q46/79PR is ideal for controlling chlorine addition in disinfection chamber.

FEATURES

- Submersible or Flowcell Type Sensor
- Optional pH Measurement
- Easy Installation and Low Operating Cost

Dissolved Oxygen Monitor



Automatic Sensor Cleaning

Optical Sensor with **Q-Blast**

FEATURES

- Self-contained, High Pressure Autocleaner
- Optical Luminescence or Membraned Sensors
- Factory Assembled for Easy Installation

Toxic/Combustible Gas XMTR



"Smart Sensor" Technology

D12 Gas Transmitter for H₂S, LEL, and oxygen depletion.

FEATURES

- Interchangeable "Smart Sensors"
- Internal Data-Logger
- Automatic Sensor "bump test"



WE STIR UP EVERYTHING BUT TROUBLE.



Rotamix

For hydraulic mixing without headaches, choose the reliable Vaughan Rotamix System. Blend lower operating and maintenance costs with a more efficient breakdown of solids. Your digesters, sludge storage tanks, and equalization basins won't know what hit them.

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GUARANTEED PERFORMANCE | NO MOVING PARTS IN THE TANK | FOCUSED MIXING